



**MPA CONTRACT NO.  
H296-C1**

**REHABILITATE TAXIWAY E FROM TAXIWAY M TO RUNWAY 5-23  
AND CONSTRUCT TAXIWAY E5  
HANSCOM FIELD**

**MARCH 2025  
BEDFORD, MASSACHUSETTS**

**MASSACHUSETTS PORT AUTHORITY  
CAPITAL PROGRAMS DEPARTMENT  
SUITE 209S - LOGAN OFFICE CENTER  
ONE HARBORSIDE DRIVE  
EAST BOSTON, MASSACHUSETTS 02128-2909**

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**CONTRACT DOCUMENTS  
AND SPECIFICATIONS**

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3-21-25

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**DIVISION I FOR CHAPTER 149 AND 30 CONTRACTS  
FOR FEDERALY FUNDED PROJECTS**

**MPA PROJECT NO. H296-C1**

**MARCH 2025**

**MASSACHUSETTS PORT AUTHORITY  
EAST BOSTON, MASSACHUSETTS**

**DIVISION I**

**GENERAL REQUIREMENTS  
AND  
COVENANTS**

## **Section 10 Definition of Terms**

When the following terms are used in these specifications, in the Contract Documents the intent and meaning shall be defined as follows:

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-01</b>	<b>AASHTO</b>	The American Association of State Highway and Transportation Officials.
<b>10-02</b>	<b>Access Road</b>	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
<b>10-03</b>	<b>Advertisement</b>	A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
<b>10-04</b>	<b>Airport</b>	Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; airport buildings and facilities located in any of these areas, and a heliport.
<b>10-05</b>	<b>Airport Improvement Program (AIP)</b>	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
<b>10-06</b>	<b>Air Operations Area (AOA)</b>	The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.
<b>10-07</b>	<b>Apron</b>	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.
<b>10-08</b>	<b>ASTM International (ASTM)</b>	Formerly known as the American Society for Testing and Materials (ASTM).
<b>10-09</b>	<b>Award</b>	The Owner's notice to the successful bidder of the acceptance of the submitted bid.
<b>10-10</b>	<b>Bidder</b>	Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.
<b>10-11</b>	<b>Building Area</b>	An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.
<b>10-12</b>	<b>Calendar Day</b>	Every day shown on the calendar.
<b>10-13</b>	<b>Certificate of Analysis (COA)</b>	The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.
<b>10-14</b>	<b>Certificate of Compliance (COC)</b>	The manufacturer's certification stating that materials or assemblies furnished fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer's authorized representative.

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
10-15	<b>Change Order</b>	A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for work within the scope of the contract and necessary to complete the project.
10-16	<b>Contract</b>	A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment. The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.
10-17	<b>Contract Item (Pay Item)</b>	A specific unit of work for which a price is provided in the contract.
10-18	<b>Contract Time</b>	The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date.
10-19	<b>Contractor</b>	The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.
10-20	<b>Contractors Quality Control (QC) Facilities</b>	The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).
10-21	<b>Contractor Quality Control Program (CQCP)</b>	Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.
10-22	<b>Control Strip</b>	A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.
10-23	<b>Construction Safety and Phasing Plan (CSPP)</b>	The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
10-24	<b>Drainage System</b>	The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.
10-25	<b>Engineer</b>	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering, inspection, and/or observation of the contract work and acting directly or through an authorized representative.

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-26</b>	<b>Equipment</b>	All machinery, together with the necessary supplies for upkeep and maintenance; and all tools and apparatus necessary for the proper construction and acceptable completion of the work.
<b>10-27</b>	<b>Extra Work</b>	An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.
<b>10-28</b>	<b>FAA</b>	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
<b>10-29</b>	<b>Federal Specifications</b>	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.
<b>10-30</b>	<b>Force Account</b>	<p><b>a.</b> Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis.</p> <p><b>b.</b> Owner Force Account - Work performed for the project by the Owner's employees.</p>
<b>10-31</b>	<b>Intention of Terms</b>	<p>Whenever, in these specifications or on the plans, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner.</p> <p>Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.</p>
<b>10-32</b>	<b>Lighting</b>	A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.
<b>10-33</b>	<b>Major and Minor Contract Items</b>	A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.
<b>10-34</b>	<b>Materials</b>	Any substance specified for use in the construction of the contract work.
<b>10-35</b>	<b>Modification of Standards (MOS)</b>	Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-36</b>	<b>Notice to Proceed (NTP)</b>	A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.
<b>10-37</b>	<b>Owner</b>	The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only. The Owner for this project is <u>the Massachusetts Port Authority</u> .
<b>10-38</b>	<b>Passenger Facility Charge (PFC)</b>	Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.
<b>10-39</b>	<b>Pavement Structure</b>	The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.
<b>10-40</b>	<b>Payment bond</b>	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.
<b>10-41</b>	<b>Performance bond</b>	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.
<b>10-42</b>	<b>Plans</b>	The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.'
<b>10-43</b>	<b>Project</b>	The agreed scope of work for accomplishing specific airport development with respect to a particular airport.
<b>10-44</b>	<b>Proposal</b>	The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.
<b>10-45</b>	<b>Proposal guaranty</b>	The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner.
<b>10-46</b>	<b>Quality Assurance (QA)</b>	Owner's responsibility to assure that construction work completed complies with specifications for payment.
<b>10-47</b>	<b>Quality Control (QC)</b>	Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.
<b>10-48</b>	<b>Quality Assurance (QA) Inspector</b>	An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.
<b>10-49</b>	<b>Quality Assurance (QA) Laboratory</b>	The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer or RPR. May also be referred to as Engineer's, Owner's, or QA Laboratory.

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
10-50	<b>Resident Project Representative (RPR)</b>	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor, and acting directly or through an authorized representative.
10-51	<b>Runway</b>	The area on the airport prepared for the landing and takeoff of aircraft.
10-52	<b>Runway Safety Area (RSA)</b>	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.
10-53	<b>Safety Plan Compliance Document (SPCD)</b>	Details how the Contractor will comply with the CSPP.
10-54	<b>Specifications</b>	A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.
10-55	<b>Sponsor</b>	A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.
10-56	<b>Structures</b>	Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.
10-57	<b>Subgrade</b>	The soil that forms the pavement foundation.
10-58	<b>Superintendent</b>	The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the RPR, and who shall supervise and direct the construction.
10-59		
10-60	<b>Surety</b>	The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.
10-61	<b>Taxilane</b>	A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.
10-62	<b>Taxiway</b>	The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.
10-63	<b>Taxiway/Taxilane Safety Area (TSA)</b>	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA.
10-64	<b>Work</b>	The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's

Paragraph Number	Term	Definition
		performance of all duties and obligations imposed by the contract, plans, and specifications.
10-65	<b>Working day</b>	A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.
10-66		

**END OF SECTION 10**

**Section 40 Scope of Work**

**40-01 Intent of contract.** The intent of the Contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the contract.

**40-02 Alteration of work and quantities.** The Owner reserves the right to make such changes in quantities and work as may be necessary or desirable to complete, in a satisfactory manner, the original intended work. Unless otherwise specified in the Contract, the Owner's Engineer or RPR shall be and is hereby authorized to make, in writing, such in-scope alterations in the work and variation of quantities as may be necessary to complete the work, provided such action does not represent a significant change in the character of the work.

For purpose of this section, a significant change in character of work means: any change that is outside the current contract scope of work; any change (increase or decrease) in the total contract cost by more than 25%; or any change in the total cost of a major contract item by more than 25%.

Work alterations and quantity variances that do not meet the definition of significant change in character of work shall not invalidate the contract nor release the surety. Contractor agrees to accept payment for such work alterations and quantity variances in accordance with Section 90, paragraph 90-03, *Compensation for Altered Quantities*.

Should the value of altered work or quantity variance meet the criteria for significant change in character of work, such altered work and quantity variance shall be covered by a supplemental agreement. Supplemental agreements shall also require consent of the Contractor's surety and



separate performance and payment bonds. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

**40-03 Omitted items.** The Owner, the Owner's Engineer or the RPR may provide written notice to the Contractor to omit from the work any contract item that does not meet the definition of major contract item. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be non-performed, the Contractor shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item. Payment for work performed shall be in accordance with Section 90, paragraph 90-04, *Payment for Omitted Items*.

**40-04 Extra work.** Should acceptable completion of the contract require the Contractor to perform an item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, Owner may issue a Change Order to cover the necessary extra work. Change orders for extra work shall contain agreed unit prices for performing the change order work in accordance with the requirements specified in the order, and shall contain any adjustment to the contract time that, in the RPR's opinion, is necessary for completion of the extra work.

When determined by the RPR to be in the Owner's best interest, the RPR may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, *Payment for Extra Work*. Extra work that is necessary for acceptable completion of the project, but is not within the general scope of the work covered by the original contract shall be covered by a supplemental agreement as defined in Section 10, paragraph 10-59, *Supplemental Agreement*.

If extra work is essential to maintaining the project critical path, RPR may order the Contractor to commence the extra work under a Time and Material contract method. Once sufficient detail is available to establish the level of effort necessary for the extra work, the Owner shall initiate a change order or supplemental agreement to cover the extra work.

Any claim for payment of extra work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the Owner.

**40-05 Maintenance of traffic.** It is the explicit intention of the contract that the safety of aircraft, as well as the Contractor's equipment and personnel, is the most important consideration. The Contractor shall maintain traffic in the manner detailed in the Construction Safety and Phasing Plan (CSPP).

**a.** It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to their own operations and the operations of all subcontractors as specified in Section 80, paragraph 80-04,

*Limitation of Operations.* It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in Section 70, paragraph 70-15, *Contractor's Responsibility for Utility Service and Facilities of Others.*

b. With respect to their own operations and the operations of all subcontractors, the Contractor shall provide marking, lighting, and other acceptable means of identifying personnel, equipment, vehicles, storage areas, and any work area or condition that may be hazardous to the operation of aircraft, fire-rescue equipment, or maintenance vehicles at the airport in accordance with the construction safety and phasing plan (CSPP) and the safety plan compliance document (SPCD).

c. When the contract requires the maintenance of an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep the road, street, or highway open to all traffic and shall provide maintenance as may be required to accommodate traffic. The Contractor, at their expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel. The Contractor shall furnish, erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices (MUTCD) (<http://mutcd.fhwa.dot.gov/>), unless otherwise specified. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways. Unless otherwise specified herein, the Contractor will not be required to furnish snow removal for such existing road, street, or highway.

**40-06 Removal of existing structures.** All existing structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.

Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Resident Project Representative (RPR) shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the RPR in accordance with the provisions of the contract.

Except as provided in Section 40, paragraph 40-07, *Rights in and Use of Materials Found in the Work*, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

**40-07 Rights in and use of materials found in the work.** Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the

established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be embankment, the Contractor may at their own option either:

- a. Use such material in another contract item, providing such use is approved by the RPR and is in conformance with the contract specifications applicable to such use; or,
- b. Remove such material from the site, upon written approval of the RPR; or
- c. Use such material for the Contractor's own temporary construction on site; or,
- d. Use such material as intended by the terms of the contract.

Should the Contractor wish to exercise option a., b., or c., the Contractor shall request the RPR's approval in advance of such use.

Should the RPR approve the Contractor's request to exercise option a., b., or c., the Contractor shall be paid for the excavation or removal of such material at the applicable contract price. The Contractor shall replace, at their expense, such removed or excavated material with an agreed equal volume of material that is acceptable for use in constructing embankment, backfills, or otherwise to the extent that such replacement material is needed to complete the contract work. The Contractor shall not be charged for use of such material used in the work or removed from the site.

Should the RPR approve the Contractor's exercise of option a., the Contractor shall be paid, at the applicable contract price, for furnishing and installing such material in accordance with requirements of the contract item in which the material is used.

It is understood and agreed that the Contractor shall make no claim for delays by reason of their own exercise of option a., b., or c.

The Contractor shall not excavate, remove, or otherwise disturb any material, structure, or part of a structure which is located outside the lines, grades, or grading sections established for the work, except where such excavation or removal is provided for in the contract, plans, or specifications.

**40-08 Final cleanup.** Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. The Contractor shall cut all brush and woods within the limits indicated and shall leave the site in a neat and presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the Contractor has obtained the written permission of the property Owner.

## END OF SECTION 40

## **Section 50 Control of Work**

**50-01 Authority of the Resident Project Representative (RPR).** The RPR has final authority regarding the interpretation of project specification requirements. The RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The RPR does not have the authority to accept work that does not conform to specification requirements.

**50-02 Conformity with plans and specifications.** All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross-sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans, or specifications.

If the RPR finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications, but that the portion of the work affected will, in their opinion, result in a finished product having a level of safety, economy,

durability, and workmanship acceptable to the Owner, the RPR will advise the Owner of their determination that the affected work be accepted and remain in place. The RPR will document the determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the work. Changes in the contract price must be covered by contract change order or supplemental agreement as applicable.

If the RPR finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the RPR's written orders.

The term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the contract, plans, and specifications. The term shall not be construed as waiving the RPR's responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's execution of the work, when, in the RPR's opinion, such compliance is essential to provide an acceptable finished portion of the work.

The term "reasonably close conformity" is also intended to provide the RPR with the authority, after consultation with the Sponsor and FAA, to use sound engineering judgment in their determinations to accept work that is not in strict conformity, but will provide a finished product equal to or better than that required by the requirements of the contract, plans and specifications.

The RPR will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

**50-03 Coordination of contract, plans, and specifications.** The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. If electronic files are provided and used on the project and there is a conflict between the electronic files and hard copy plans, the hard copy plans shall govern. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited advisory circulars (ACs); contract general provisions shall govern over plans, cited standards for materials or testing, and cited ACs; plans shall govern over cited standards for materials or testing and cited ACs. If any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

From time to time, discrepancies within cited testing standards occur due to the timing of the change, edits, and/or replacement of the standards. If the Contractor discovers any apparent discrepancy within standard test methods, the Contractor shall immediately ask the RPR for an interpretation and decision, and such decision shall be final.

The Contractor shall not take advantage of any apparent error or omission on the plans or specifications. In the event the Contractor discovers any apparent error or discrepancy, Contractor shall immediately notify the Owner or the designated representative in writing requesting their written interpretation and decision.

**50-04 List of Special Provisions.** See Division IIB of the Contract Documents for Special Provisions

**50-05 Cooperation of Contractor.** The Contractor shall be supplied with five hard copies or an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hardcopy each of the plans and specifications. Additional hard copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the work to facilitate the progress thereof, and shall cooperate with the RPR and their inspectors and with other Contractors in every way possible. The Contractor shall have a competent superintendent on the work at all times who is fully authorized as their agent on the work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the RPR or their authorized representative.

**50-06 Cooperation between Contractors.** The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

When separate contracts are let within the limits of any one project, each Contractor shall conduct the work not to interfere with or hinder the progress of completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with their own contract and shall protect and hold harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced because of the presence and operations of other Contractors working within the limits of the same project.

The Contractor shall arrange their work and shall place and dispose of the materials being used to not interfere with the operations of the other Contractors within the limits of the same project. The Contractor shall join their work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

**50-07 Construction layout and stakes.** The Engineer/RPR shall establish necessary horizontal and vertical control. The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor. Contractor is responsible for preserving integrity of horizontal and vertical controls established by Engineer/RPR. In case of negligence on the part of the Contractor or their employees, resulting in the destruction of any horizontal and vertical control, the resulting costs will be deducted as a liquidated damage against the Contractor.

Prior to the start of construction, the Contractor will check all control points for horizontal and vertical accuracy and certify in writing to the RPR that the Contractor concurs with survey control established for the project. All lines, grades and measurements from control points necessary for the proper execution and control of the work on this project will be provided to the RPR. The Contractor is responsible to establish all layout required for the construction of the project.

Copies of survey notes will be provided to the RPR for each area of construction and for each placement of material as specified to allow the RPR to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. Surveys will be provided to the RPR prior to commencing work items that cover or disturb the survey staking. Survey(s) and notes shall be provided in the following format(s): AutoCADD Civil 3D and XML .)

Laser, GPS, String line, or other automatic control shall be checked with temporary control as necessary. In the case of error, on the part of the Contractor, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on the plans, the Contractor is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

No direct payment will be made, unless otherwise specified in contract documents, for this labor, materials, or other expenses. The cost shall be included in the price of the bid for the various items of the Contract.

**50-08 Authority and duties of Quality Assurance (QA) inspectors.** QA inspectors shall be authorized to inspect all work done and all material furnished. Such QA inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. QA inspectors are not authorized to revoke, alter, or waive any provision of the contract. QA inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

QA Inspectors are authorized to notify the Contractor or their representatives of any failure of the work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the RPR for a decision.

**50-09 Inspection of the work.** All materials and each part or detail of the work shall be subject to inspection. The RPR shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the RPR requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing

of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

Provide advance written notice to the RPR of work the Contractor plans to perform each week and each day. Any work done or materials used without written notice and allowing opportunity for inspection by the RPR may be ordered removed and replaced at the Contractor's expense.

Should the contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (contract) Owner, authorized representatives of the Owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility owner a party to the contract, and shall in no way interfere with the rights of the parties to this contract.

**50-10 Removal of unacceptable and unauthorized work.** All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the RPR as provided in paragraph 50-02, *Conformity with Plans and Specifications*.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with the provisions of Section 70, paragraph 70-14, *Contractor's Responsibility for Work*.

No removal work made under provision of this paragraph shall be done without lines and grades having been established by the RPR. Work done contrary to the instructions of the RPR, work done beyond the lines shown on the plans or as established by the RPR, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the RPR made under the provisions of this subsection, the RPR will have authority to cause unacceptable work to be remedied or removed and replaced; and unauthorized work to be removed and recover the resulting costs as a liquidated damage against the Contractor.

**50-11 Load restrictions.** The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the Contractor of liability for damage that may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor,



at their own expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel.

**50-12 Maintenance during construction.** The Contractor shall maintain the work during construction and until the work is accepted. Maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

In the case of a contract for the placing of a course upon a course or subgrade previously constructed, the Contractor shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices bid on the various contract items, and the Contractor will not be paid an additional amount for such work.

**50-13 Failure to maintain the work.** Should the Contractor at any time fail to maintain the work as provided in paragraph 50-12, *Maintenance during Construction*, the RPR shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the RPR's notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be recovered as a liquidated damage against the Contractor.

**50-14 Partial acceptance.** If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the Contractor may request the RPR to make final inspection of that unit. If the RPR finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the RPR may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

**50-15 Substantial Completion and Final acceptance.** Substantial Completion: "Substantial Completion" is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Authority can occupy or utilize the Work for its intended use.

When the Contractor considers that the Work, or a portion thereof which the Authority agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Engineer a comprehensive list of items to be completed or corrected prior to final payment. Failure

to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Upon receipt of the Contractor's list, the Engineer will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Engineer's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Authority can occupy or utilize the Work or designated portion thereof for its intended use, the Engineer will issue a non-compliance report ("Noncompliance Report") to the Contractor which report shall list all such items. The Contractor shall before issuance of the Certificate of Substantial Completion, complete or correct all items contained in the Noncompliance Report. In such case, the Contractor shall then submit a request for another inspection by the Engineer to determine Substantial Completion.

When the Work or designated portion thereof is substantially complete, the Engineer will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Authority and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

The Certificate of Substantial Completion shall be submitted to the Authority and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Authority shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

Once the Contractor has fulfilled the responsibilities assigned to it in the Certificate, the Contractor shall so notify the Engineer in writing. Provided that the Engineer considers the Work to be sufficiently complete so as to warrant a Final Inspection, the Engineer shall perform a Final Inspection within ten (10) calendar days of receipt of the Contractor's written notice. The Contractor will be notified in writing of the time and date of said Final Inspection, in advance, or of the reasons for which the Final Inspection has not yet been scheduled.

If the Work or any part hereof is not acceptable to the Engineer at the Final Inspection, it shall notify the Contractor in writing of the particular or general defects or parts to be remedied before Final Acceptance of the Work.

Upon completion of the Work and before acceptance and final payment, the Contractor shall remove, at his/her own expense, from the site of the Work, from adjoining property, and from the Contractor's camp site on Authority property, all temporary structures and all surplus material and rubbish which may have accumulated during the prosecution of the Work, and shall leave the Work in a neat and orderly condition. The Contractor shall insure that neither soil nor ground water have

become contaminated from his/her activities. In the event of a "release to the environment", the Contractor shall insure that appropriate notifications to the Authority's Project Manager, Chief of Environmental Management, the Massachusetts Department of Environmental Protection and other agencies with jurisdiction are made immediately and that all appropriate and required remedial actions are undertaken by the Contractor at his/her expense.

No equipment shall be left at the site of the Work or in the vicinity of the Work without the written permission of the Engineer.

**50-16 Claims for adjustment and disputes.** If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the RPR in writing of their intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the RPR is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the RPR has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the RPR who will present it to the Owner for consideration in accordance with local laws or ordinances. Nothing in this subsection shall be construed as a waiver of the Contractor's right to dispute final payment based on differences in measurements or computations.

**50-17 Value Engineering Cost Proposal. (Not Included)**

**END OF SECTION 50**

## **Section 60 Control of Materials**

**60-01 Source of supply and quality requirements.** The materials used in the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the RPR as to the origin, composition, and manufacture of all materials to be used in the work. Documentation shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

At the RPR's option, materials may be approved at the source of supply before delivery. If it is found after trial that sources of supply for previously approved materials do not produce specified products, the Contractor shall furnish materials from other sources.

The Contractor shall furnish airport lighting equipment that meets the requirements of the specifications; and is listed in AC 150/5345-53, *Airport Lighting Equipment Certification Program* and *Addendum*, that is in effect on the date of advertisement.

**60-02 Samples, tests, and cited specifications.** All materials used in the work shall be inspected, tested, and approved by the RPR before incorporation in the work unless otherwise designated. Any work in which untested materials are used without approval or written permission of the RPR shall be performed at the Contractor's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the RPR, shall be removed at the Contractor's expense.

Unless otherwise designated, quality assurance tests will be made by and at the expense of the Owner in accordance with the cited standard methods of ASTM, American Association of State Highway and Transportation Officials (AASHTO), federal specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids.

The testing organizations performing on-site quality assurance field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel. Unless otherwise designated, samples for quality assurance will be taken by a qualified representative of the RPR. All materials being used are subject to inspection, test, or rejection at any time prior to or during incorporation into the work. Copies of all tests will be furnished to the Contractor's representative at their request after review and approval of the RPR.

A copy of all Contractor QC test data shall be provided to the RPR daily, along with printed reports, in an approved format, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the RPR showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

The Contractor shall employ a Quality Control (QC) testing organization to perform all Contractor required QC tests in accordance with Item C-100 Contractor Quality Control Program (CQCP).

**60-03 Certification of compliance/analysis (COC/COA).** The RPR may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's COC stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified. The COA is the manufacturer's COC and includes all applicable test results.

Materials or assemblies used on the basis of certificates of compliance may be sampled and tested at any time and if found not to be in conformity with contract requirements will be subject to rejection whether in place or not.

The form and distribution of certificates of compliance shall be as approved by the RPR.

When a material or assembly is specified by "brand name or equal" and the Contractor elects to furnish the specified "or equal," the Contractor shall be required to furnish the manufacturer's certificate of compliance for each lot of such material or assembly delivered to the work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

- a. Conformance to the specified performance, testing, quality or dimensional requirements; and,
- b. Suitability of the material or assembly for the use intended in the contract work.

The RPR shall be the sole judge as to whether the proposed "or equal" is suitable for use in the work.

The RPR reserves the right to refuse permission for use of materials or assemblies on the basis of certificates of compliance.

**60-04 Plant inspection.** The RPR or their authorized representative may inspect, at its source, any specified material or assembly to be used in the work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or materials to be used in the work and to obtain samples required for acceptance of the material or assembly.

Should the RPR conduct plant inspections, the following conditions shall exist:

- a. The RPR shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.
- b. The RPR shall have full entry at all reasonable times to such parts of the plant that concern the manufacture or production of the materials being furnished.
- c. If required by the RPR, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Place office or working space in a convenient location with respect to the plant.

It is understood and agreed that the Owner shall have the right to retest any material that has been tested and approved at the source of supply after it has been delivered to the site. The RPR shall have the right to reject only material which, when retested, does not meet the requirements of the contract, plans, or specifications.

**60-05 Engineer/ Resident Project Representative (RPR) field office.** If required by the Division IIB or Technical Specifications C-105, Mobilization, the Contractor shall provide dedicated space for the use of the engineer, RPR, and inspectors, as a field office for the duration of the project. This space shall be located conveniently near the construction and shall be separate from any space used by the Contractor. The Contractor shall furnish water, sanitary facilities, heat, air conditioning, and electricity.

**60-06 Storage of materials.** Materials shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the RPR. Materials to be stored on airport property shall not create an obstruction to air navigation nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the plans and/or CSPP, the storage of materials and the location of the Contractor's plant and parked equipment or vehicles shall be as directed by the RPR. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish the RPR a copy of the property Owner's permission.

All storage sites on private or airport property shall be restored to their original condition by the Contractor at their expense, except as otherwise agreed to (in writing) by the Owner or lessee of the property.

**60-07 Unacceptable materials.** Any material or assembly that does not conform to the requirements of the contract, plans, or specifications shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the RPR.

Rejected material or assembly, the defects of which have been corrected by the Contractor, shall not be returned to the site of the work until such time as the RPR has approved its use in the work.

**60-08 Owner furnished materials.** The Contractor shall furnish all materials required to complete the work, except those specified, if any, to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified.

All costs of handling, transportation from the specified location to the site of work, storage, and installing Owner-furnished materials shall be included in the unit price bid for the contract item in which such Owner-furnished material is used.

After any Owner-furnished material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor's handling, storage, or use of Owner-furnished materials.

## END OF SECTION 60

### **Section 70 Legal Regulations and Responsibility to Public**

**70-01 Laws to be observed.** The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner and all their officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's employees.

**70-02 Permits, licenses, and taxes.** The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful execution of the work.

**70-03 Patented devices, materials, and processes.** If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the Patentee or Owner. The Contractor and the surety shall indemnify and hold harmless the Owner, any third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay by reason of an infringement, at any time during the execution or after the completion of the work.

**70-04 Restoration of surfaces disturbed by others.** The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work. To the extent that such construction, reconstruction, or maintenance has been coordinated with the Owner, such authorized work (by others) must be shown on the plans and is indicated as follows: None known at this time.

Except as listed above, the Contractor shall not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or facilities located within the limits of the work without the written permission of the RPR.

Should the Owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the work, the Contractor shall cooperate with such Owners by arranging and performing the work in this contract to facilitate such construction, reconstruction or maintenance by others whether or not such work by others is listed above. When ordered as extra work by the RPR, the Contractor shall make all necessary repairs to the work which are due to such authorized work by others, unless otherwise provided for in the contract, plans, or specifications. It is understood and agreed that the Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the work resulting from such authorized work.

**70-05 Federal Participation.** The United States Government has agreed to reimburse the Owner for some portion of the contract costs. The contract work is subject to the inspection and approval of duly authorized representatives of the FAA Administrator. No requirement of this contract shall be construed as making the United States a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

**70-06 Sanitary, health, and safety provisions.** The Contractor's worksite and facilities shall comply with applicable federal, state, and local requirements for health, safety and sanitary provisions.

**70-07 Public convenience and safety.** The Contractor shall control their operations and those of their subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to their own operations and those of their own subcontractors and all suppliers in accordance with Section 40, paragraph 40-05, *Maintenance of Traffic*, and shall limit such operations for the convenience and safety of the traveling public as specified in Section 80, paragraph 80-04, *Limitation of Operations*.

The Contractor shall remove or control debris and rubbish resulting from its work operations at frequent intervals, and upon the order of the RPR. If the RPR determines the existence of Contractor debris in the work site represents a hazard to airport operations and the Contractor is unable to respond in a prompt and reasonable manner, the RPR reserves the right to assign the task of debris removal to a third party and recover the resulting costs as a liquidated damage against the Contractor.

**70-08 Construction Safety and Phasing Plan (CSPP).** The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction. of the project plans.



**70-09 Use of explosives.** The use of explosives will not be permitted unless expressly specified in the Special Provisions and even then only upon the written authorization of the Owner's Director of Capital Programs and Environmental Affairs. When the use of explosives is necessary for the execution of the work, the Contractor shall exercise the utmost care not to endanger life or property, including new work. The Contractor shall be responsible for all damage resulting from the use of explosives.

All explosives shall be stored in a secure manner in compliance with all laws and ordinances, and all such storage places shall be clearly marked. Where no local laws or ordinances apply, storage shall be provided satisfactory to the RPR and, in general, not closer than 1,000 feet (300 m) from the work or from any building, road, or other place of human occupancy.

The Contractor shall notify each property Owner and public utility company having structures or facilities in proximity to the site of the work of their intention to use explosives. Such notice shall be given sufficiently in advance to enable them to take such steps as they may deem necessary to protect their property from injury.

The use of electrical blasting caps shall not be permitted on or within 1,000 feet (300 m) of the airport property. The method of storage and handling of explosives and highly flammable materials shall be in strict compliance with all State laws and regulations, as well as local laws and regulations.

**70-10 Protection and restoration of property and landscape.** The Contractor shall at its own expense be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer/RPR has witnessed or otherwise referenced their location and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character, during the execution of the work, resulting from any act, omission, neglect, or misconduct in manner or method of executing the work, or at any time due to defective work or materials, and said responsibility shall not be released until the project has been completed and accepted. All equipment used by the Contractor which could create potential fire hazard such as steam generating or steam operated machinery, heaters, gas generators, and the like shall be equipped with spark arresters and/or other safety devices and utmost precaution will be exercised by the Contractor in the use of such equipment.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore, at their expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise restoring as may be directed, or the Contractor shall make

good such damage or injury in an acceptable manner. The Contractor shall receive no extra compensation for such Work unless said compensation is authorized in writing by the Engineer.

**70-11 Responsibility for damage claims.** The Contractor shall indemnify and hold harmless the Engineer/RPR and the Owner and their officers, agents, and employees from all suits, actions, or claims, of any character, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any failure in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the “Workmen’s Compensation Act,” or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of their own contract considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, their own surety may be held until such suits, actions, or claims for injuries or damages shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that he or she is adequately protected by public liability and property damage insurance.

**70-12 Third party beneficiary clause.** It is specifically agreed between the parties executing the contract that it is not intended by any of the provisions of any part of the contract to create for the public or any member thereof, a third-party beneficiary or to authorize anyone not a party to the contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the contract.

**70-13 Opening sections of the work to traffic.** If it is necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such “phasing” of the work must be specified below and indicated on the approved Construction Safety and Phasing Plan (CSPP) and the project plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified.

**See the Division IIB and the G series drawings for specific project phasing elements which are incorporated into the CSPP. .**

Upon completion of any portion of work listed above, such portion shall be accepted by the Owner in accordance with Section 50, paragraph 50-14, *Partial Acceptance*.

No portion of the work may be opened by the Contractor until directed by the Owner in writing. Should it become necessary to open a portion of the work to traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the RPR, such portion of the work is in an acceptable condition to support the intended traffic. Temporary or intermittent openings are considered to be inherent in the work and shall not constitute either acceptance of the portion of

the work so opened or a waiver of any provision of the contract. Any damage to the portion of the work so opened that is not attributable to traffic which is permitted by the Owner shall be repaired by the Contractor at their expense.

The Contractor shall make their own estimate of the inherent difficulties involved in completing the work under the conditions herein described and shall not claim any added compensation by reason of delay or increased cost due to opening a portion of the contract work.

The Contractor must conform to safety standards contained AC 150/5370-2 and the approved CSPP.

Contractor shall refer to the plans, specifications, and the approved CSPP to identify barricade requirements, temporary and/or permanent markings, airfield lighting, guidance signs and other safety requirements prior to opening up sections of work to traffic.

**70-14 Contractor's responsibility for work.** Until the RPR's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with Section 50, paragraph 50-14, *Partial Acceptance*, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause whatever, the Contractor shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The Contractor shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at their own expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

**70-15 Contractor's responsibility for utility service and facilities of others.** As provided in paragraph 70-04, *Restoration of Surfaces Disturbed by Others*, the Contractor shall cooperate with the Owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

To the extent that such public or private utility services, FAA, or NOAA facilities, or utility services of another governmental agency are known to exist within the limits of the contract work, the approximate locations have been indicated on the plans and/or in the contract documents.

Party

Contact Telephone

Digsafe

(888) DIG-SAFE (344-7233)

It is understood and agreed that the Owner does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities, or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the Contractor of the responsibility to protect such existing features from damage or unscheduled interruption of service.

It is further understood and agreed that the Contractor shall, upon execution of the contract, notify the Owners of all utility services or other facilities of their plan of operations. Such notification shall be in writing addressed to "The Person to Contact" as provided in this paragraph and paragraph 70-04, *Restoration of Surfaces Disturbed By Others*. A copy of each notification shall be given to the RPR.

In addition to the general written notification provided, it shall be the responsibility of the Contractor to keep such individual Owners advised of changes in their plan of operations that would affect such Owners.

Prior to beginning the work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such Owner of their plan of operation. If, in the Contractor's opinion, the Owner's assistance is needed to locate the utility service or facility or the presence of a representative of the Owner is desirable to observe the work, such advice should be included in the notification. Such notification shall be given by the most expeditious means to reach the utility owner's "Person to Contact" no later than two normal business days prior to the Contractor's commencement of operations in such general vicinity. The Contractor shall furnish a written summary of the notification to the RPR.

The Contractor's failure to give the two days' notice shall be cause for the Owner to suspend the Contractor's operations in the general vicinity of a utility service or facility.

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use hand excavation methods within 3 feet (1 m) of such outside limits at such points as may be required to ensure protection from damage due to the Contractor's operations.

Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, the Contractor shall immediately notify the proper authority and the RPR and shall

take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such events, shall cooperate with the utility service or facility owner and the RPR continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to their operations whether due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the Contractor, or their own surety.

**70-16 Furnishing rights-of-way.** The Owner will be responsible for furnishing all rights-of-way upon which the work is to be constructed in advance of the Contractor's operations.

**70-17 Personal liability of public officials.** In carrying out any of the provisions of the Contract Documents or in exercising any power or authority granted by this contract, there shall be no liability upon the Engineer, RPR, their authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

**70-18 No waiver of legal rights.** Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of final acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or stopped from recovering from the Contractor or their surety, or both, such overpayment as may be sustained, or by failure on the part of the Contractor to fulfill their obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the contract, shall be liable to the Owner for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Owner's rights under any warranty or guaranty.

**70-19 Environmental protection.** The Contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment. The Contractor shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, asphalts, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

See the project drawings, technical specifications, and specifications appendix for specific project requirements related to environmental protection and pollution control.

**70-20 Archaeological and historical findings.** Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does

not contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior.

Should the Contractor encounter, during their operations, any building, part of a building, structure, or object that is incongruous with its surroundings, the Contractor shall immediately cease operations in that location and notify the RPR. The RPR will immediately investigate the Contractor's finding and the Owner will direct the Contractor to either resume operations or to suspend operations as directed.

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, *Extra Work*, and Section 90, paragraph 90-05, *Payment for Extra Work*. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with Section 80, paragraph 80-07, *Determination and Extension of Contract Time*.

### **70-21 Insurance Requirements**

The Contractor shall take out and maintain the insurance coverages listed in this Section as modified by the insurance requirements set forth in Division IIB (Special Provisions). This insurance shall be provided at Contractor's expense and shall be in full force and effect for the full term of the Agreement except as otherwise specified herein. All deductibles and/or retentions are the responsibility of the Contractor. Contractor may offer insurance coverages that are structurally different than those outlined in this section but that are acceptable to Authority in its sole discretion.

All policies shall be issued by companies authorized to write that type of insurance under the laws of the Commonwealth of Massachusetts and have a minimum A.M. Best's rating of "A-" and a financial size of IX, or otherwise acceptable to the Authority.

The Contractor shall submit certificates of insurance for all coverages required in this Section, acceptable to Authority, simultaneously with the execution of this Agreement. Certificates shall show Authority as an additional insured as to Commercial General Liability, Business Auto Coverage, Umbrella Liability and Pollution Legal Liability and shall state that none of the coverages shall be cancelled, terminated, or materially modified unless and until 30 days prior notice is given in writing to Authority or 10 days' notice of cancellation due to non-payment of premium. Contractor shall submit updated certificates thirty (30) days prior to the expiration of any of the policies referenced in the certificates so that Authority shall at all times possess certificates indicating current coverage.

If Authority is damaged by Contractor's failure to maintain such insurance and to comply with the terms of this Agreement, then Contractor shall be responsible for all costs and damages to Authority attributable thereto.

A. Commercial General Liability Insurance:

1. Contractor shall procure and maintain Commercial General Liability Insurance as hereinafter specified, at Contractor's own expense, during the TERM of this Agreement, written on an "occurrence" basis.

2. This insurance must protect Contractor from all claims for bodily injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any operations under this Agreement, whether such operations are by Contractor or by any subcontractor or anyone directly or indirectly employed by Contractor or by a subcontractor. In the event any of the hazards or exposures, normally listed in a standard ISO Commercial General Liability policy as "Exclusions," are involved or required under this Agreement, then such hazards or exposures shall be covered and protection afforded under the amended policy.

3. Liability Insurance Limits and Coverages

a. Contractor shall provide the following minimum Commercial General Liability coverage with respect to the operations performed by Contractor and any employee, subcontractor, or supplier:

- i. Each Occurrence Limit  
\$1,000,000
- ii. General Aggregate Limit  
\$2,000,000
- iii. Products & Completed Operations Aggregate  
\$1,000,000
- iv. Personal & Advertising Injury  
\$1,000,000
- v. Medical Expenses  
\$10,000

b. Limits shall be provided on a per project basis.

c. This policy shall include coverage relating to explosion, collapse, and underground property damage.

d. This policy shall include contractual liability coverage.

e. If the Work includes Work to be performed within 50 feet of a railroad, any exclusion for liability assumed under contract for Work within 50 feet of a railroad shall be deleted.

f. This policy shall include endorsement CG2010 (07/04 edition) or its equivalent, naming Authority as Additional Insured.

- g. This policy shall provide a Waiver of Subrogation. If not included in the standard policy form, this may be accomplished by adding a Waiver of Subrogation endorsement CG2404 (05/09 edition) or its equivalent.

B. Business Auto Coverage:

1. Contractor shall provide a Business Auto policy with a minimum limit of \$10,000,000 Each Accident for owned, non-owned, and hired vehicles.
2. The policy shall include a Pollution Liability Endorsement form CA9948 (03/06 edition) or its equivalent.
3. The policy shall name Authority as an Additional Insured. If not included in the standard policy form, this may be accomplished by adding Designated Insured endorsement CA2048 (02/99 edition), or its equivalent.
4. This policy shall provide a Waiver of Subrogation.

C. Workers' Compensation & Employer's Liability Insurance:

1. Contractor shall provide Workers' Compensation and Employer's Liability Insurance covering all employees at the Worksite in accordance with M.G.L. c.152, as amended. Workers' Compensation shall provide statutory limits and Employer's Liability insurance with minimum limits of \$1,000,000 for bodily injury by accident and by disease.
2. If applicable, the policy must be endorsed to cover United States Longshoremen & Harbor Workers Act (USLHW), Maritime/Jones Act and/or Federal Employer's Liability Act.
3. Contractor shall require that all subcontractors also maintain such Insurance for their own employees. Contractor accepts full liability and responsibility for all subcontractor employees not so covered. In cases where any class of employees engaged in hazardous Work under this Agreement at the Worksite is not protected under Workers' Compensation statute, Contractor shall provide, and shall cause each subcontractor to provide adequate and suitable insurance for the protection of such employees not otherwise protected.

D. Pollution Legal Liability:

1. Contractor shall provide Pollution Legal Liability coverage with a minimum limit of \$1,000,000. Coverage must respond to bodily injury; property damage, including loss of use of damaged property or of property that has not been physically injured or destroyed; cleanup costs; and defense, including costs and



expenses incurred in the investigation, defense, or settlement of claims. Authority shall be named as an additional insured.

E. Builder's Risk/Stored Materials:

1. Contractor shall provide coverage against loss or damage on all Work included in this Agreement in an amount equal to the Total Project Cost. Such coverage shall be written on an all risks basis or equivalent form and shall include, without limitation, insurance against perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, pollution including mold and fungus, pollution cleanup, expediting expenses, testing, mechanical or electrical breakdown, electrical arcing, water damage, earthquake, flood (if the Project is not in an "A" or a "V" flood Zone), windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Contractor's services and expenses required as a result of such insured loss. This policy and/or installation floater shall indicate if Stored Materials coverage is provided as required below.
2. Then Work will be completed on existing buildings owned by Authority, Contractor shall provide an installation floater, in the full amount of the Total Project Cost. Such coverage shall be written on an all risks basis or equivalent form and shall include, without limitation, insurance against perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, pollution including mold and fungus, pollution cleanup, expediting expenses, testing, mechanical or electrical breakdown, electrical arcing, water damage, earthquake, flood (if the Project is not in an "A" or a "V" flood Zone), windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Contractor's services and expenses required as a result of such insured loss. This policy and/or installation floater shall indicate if Stored Materials coverage is provided as required below.
3. Contractor shall maintain insurance on delivered and/or stored material designated to be incorporated in the Work against fire, theft or other hazards as described above. Any loss or damage of whatever nature to such material while in transit or temporarily stored at an offsite location shall be forthwith replaced by Contractor at no expense to Authority.
4. The policy or policies shall specifically state that they are for the benefit of and payable to Authority, Contractor, and all persons furnishing labor, or labor and

materials for the Work, as their interests may appear. The policy or policies shall list the Authority, Contractor, and Subcontractors of any tier and any other parties with insurable interest requested by the Contractor as named insureds.

5. Coverage shall include any costs for Work performed by the Contractor or any consultant as the result of a loss experienced during the term of this Agreement.
6. Coverage shall include permission for temporary occupancy and waiver of subrogation in favor of all parties insured under the policy.

#### **70-22. Massachusetts Sales Tax Exemption**

The Contractor's attention is directed to Chapter 757, Section 6, Legislative Acts of 1967, effective January 1, 1968 which exempts certain sales and gross receipts therefrom, and amendments thereto, including Chapter 313, Section 1, Legislative Acts of 1998, effective August 28, 1998, which exempts sales of building materials and supplies to be used in the construction, reconstruction, Alteration, remodeling or repair of any building, structure, residence, school or other facility included under any written contract arising out of or related to the Authority residential and school soundproofing programs, notwithstanding whether such building, structure, residence, school or other facility is owned by or held in trust for the benefit of the Authority or is used exclusively for public purposes.

The exemption number assigned to the Massachusetts Port Authority as an exempt purchaser is E046 006 429.

#### **70-23 TRAFFIC OFFICERS, POLICE DETAILS AND FLAGMEN**

When, in the opinion of the Engineer, it is necessary that uniformed police be used to protect and control pedestrian traffic, to direct vehicular traffic during construction and to keep the traffic off any part of the Work, or to protect the public safety, s/he will obtain a police detail for this purpose.

All customary expenses for uniformed police required for the protection and control of pedestrian and vehicular traffic during construction, or to provide protection of the health and safety of persons or property from routine and anticipated construction activities, shall be assumed by the Authority.

All expenses for uniformed police required for the protection of persons and property arising out of activities not ordinarily encountered by the Authority during construction, including, but not limited to, labor difficulties, crowd control, etc., shall be at the sole cost of the Contractor.

For construction Work performed at Boston Logan International Airport, only Massachusetts State Police shall be used unless otherwise authorized by the Authority.

In contracts for Work to be performed in locations other than at Boston Logan International Airport, local police, or police as determined by the Authority, shall be employed.

When any Work is being done by the Contractor, which may obstruct the tracks of the railroad or in any way endanger the running of trains, a flagman or flagmen, designated by the Chief Engineer of the railroad, shall be on duty for the protection of the property and traffic of the railroad.

The expenses for all flagging service, which is required, shall be assumed by the Contractor and included in the prices bid for the various items for Work to be performed under this Contract.

The Engineer may require flagmen for the protection of aircraft when, in his/her discretion, such are reasonably required. The provisions of this paragraph in no way limits the application of the discretion of the Engineer.

### **70-24 Prevailing Wage Law Requirements**

The Massachusetts Prevailing Wage Law, codified at M.G.L, Chapter 149, Sections 26 and 27, requires that all workers on a public construction projects be paid the prevailing wage for work on the project as determined by the Department of Labor Standards through prevailing wage schedules issued by the department. Chapter 149, Sections 26 and 27 are fully incorporated as if set forth herein. The prevailing wage rate schedule for the Project is attached to the Contract Documents and is made a part thereto. The Contractor shall post a copy of the prevailing wage rate schedule at the Site in a location where the wage schedule can be easily seen by the workers. All workers performing work on the Site must be paid no less than the prevailing wage rates set forth on the prevailing wage schedule. Because the Contract is federally funded, the Davis Bacon prevailing wage law is also applicable to the contract and the Contractor and Subcontractors shall pay workers the higher of the two wage scales.

Weekly certified payroll reports (“CP Reports”) must be prepared and submitted separately to the Authority in electronic format by the Contractor and each Subcontractor and Trade Contractor performing work at the Site. The CP Reports are required to contain the following information: the names of the workers, the work classification, the hours worked for the week, and the amount paid per hour for the work performed. Failure by the Contractor to timely submit the CP Reports will be cause for a delay in the processing of invoices/requisitions for payment.

The Contractor and each Subcontractor and Trade Contractor shall maintain full and complete copies of each CP Report for no less than six years after Final Completion of the Work.

**END OF SECTION 70**

## **Section 80 Execution and Progress**

**80-03 Execution and progress.** Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the RPR's review and acceptance at least 14 days prior to the start of work. The Contractor's progress schedule, once accepted by the RPR, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the RPR's request, submit a revised schedule for completion of the work within the contract time and modify their operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the execution of the work be discontinued for any reason, the Contractor shall notify the RPR at least 48 hours in advance of resuming operations.

The Contractor shall not commence any actual construction prior to the date on which the NTP is issued by the Owner.

The project schedule shall be prepared as a network diagram in Critical Path Method (CPM), Evaluation and Review Technique (PERT), or other format, or as otherwise specified.

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a twice monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Contractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

**80-04 Limitation of operations.** The Contractor shall control their operations and the operations of their subcontractors and all suppliers to provide for the free and unobstructed movement of aircraft in the air operations areas (AOA) of the airport.

When the work requires the Contractor to conduct their operations within an AOA of the airport, the work shall be coordinated with airport operations (through the RPR) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the RPR and until the necessary temporary marking, signage and associated lighting is in place as provided in Section 70, paragraph 70-08, *Construction Safety and Phasing Plan (CSPP)*.

When the contract work requires the Contractor to work within an AOA of the airport on an intermittent basis (intermittent opening and closing of the AOA), the Contractor shall maintain constant communications as specified; immediately obey all instructions to vacate the AOA; and immediately obey all instructions to resume work in such AOA. Failure to maintain the specified communications or to obey instructions shall be cause for suspension of the Contractor's

operations in the AOA until satisfactory conditions are provided. The areas of the AOA identified in the Construction Safety Phasing Plan (CSPP) cannot be closed to operating aircraft to permit the Contractor's operations on a continuous basis and will therefore be closed to aircraft operations intermittently as specified in the CSPP.

The Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction and the approved CSPP.

**80-04.1 Operational safety on airport during construction.** All Contractors' operations shall be conducted in accordance with the approved project Construction Safety and Phasing Plan (CSPP) and the Safety Plan Compliance Document (SPCD) and the provisions set forth within the current version of AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP included within the contract documents conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit a SPCD that details how it proposes to comply with the requirements presented within the CSPP.

The Contractor shall implement all necessary safety plan measures prior to commencement of any work activity. The Contractor shall conduct routine checks to assure compliance with the safety plan measures.

The Contractor is responsible to the Owner for the conduct of all subcontractors it employs on the project. The Contractor shall assure that all subcontractors are made aware of the requirements of the CSPP and SPCD and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved CSPP and SPCD unless approved in writing by the Owner. The necessary coordination actions to review Contractor proposed modifications to an approved CSPP or approved SPCD can require a significant amount of time.

**80-05 Character of workers, methods, and equipment.** The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the Contractor or by any subcontractor who violates any operational regulations or operational safety requirements and, in the opinion of the RPR, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the RPR, be removed immediately by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the RPR.

Should the Contractor fail to remove such person or persons, or fail to furnish suitable and sufficient personnel for the proper execution of the work, the RPR may suspend the work by written notice until compliance with such orders.

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall not cause injury to previously completed work, adjacent property, or existing airport facilities due to its use.

When the methods and equipment to be used by the Contractor in accomplishing the work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the contract, plans, and specifications.

When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless otherwise authorized by the RPR. If the Contractor desires to use a method or type of equipment other than specified in the contract, the Contractor may request authority from the RPR to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the RPR determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the RPR may direct. No change will be made in basis of payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this paragraph.

**80-06 Temporary suspension of the work.** The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods the Owner may deem necessary, due to unsuitable weather, or other conditions considered unfavorable for the execution of the work, or for such time necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the contract.

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The RPR will forward the Contractor's claim to the Owner for consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

If it becomes necessary to suspend work for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way. The Contractor shall take every precaution to prevent damage or deterioration of the work performed and provide for normal drainage of the work. The Contractor shall erect temporary structures where necessary to provide for traffic on, to, or from the airport.

**80-07 Determination and extension of contract time.** It is an essential part of this Contract that the Contractor shall perform fully, entirely and in an acceptable manner the Work required within the time stated in this Contract. The maximum time limit for the satisfactory completion of the Work set forth in the Special Provisions, Division II of the Contract is based upon the requirements of public convenience and upon the assumption that the Contractor will prosecute the Work efficiently and with the least possible delay in accordance with the maximum working time per week.

The Contract period has been carefully considered and has been established for reasons of importance to the Authority. This time limit will be enforced and any prospective Bidder who is not willing to accept this Contract with the intention of complying with the time limit is cautioned not to submit a bid. No request for an extension of time that is based on any claim that the Contract period as originally established was inadequate will be considered.

A. Grounds for Extensions of Time

The time provided in the Special Provisions, Division II of this Contract for completion of the Work (or for completion of a designated part of the Work) shall be extended (subject to the provisions of this Article) only if in the opinion of the Director of Capital Programs and Environmental Affairs of the Authority, the Contractor is necessarily delayed in completing the Work (or such designated part thereof) by such time solely and directly by a cause that is

- (1) Beyond the Contractor's control and arises without his/her fault; and
- (2) Came into existence after the written approval of the Authority of the CPM Schedule.

Variations in temperature and precipitation, which are within normal limits for the particular month in question, shall be conclusively deemed to have been anticipated before the opening of proposals on this contract. Such normal limits shall be ascertained by reference to the official records of the United States Weather Bureau applicable to the particular locality for the previous three years.

Whenever the Contractor claims an extension of the time stated in its Contract for completion of the Work, only the necessary delay caused to completion of the Work as a whole (a "Critical Path Delay") shall be considered in measuring or evaluating the extent of the delay, and any extension will be granted only to the extent that the effect of such cause cannot be (or could not have been)

avoided or mitigated by the exercise of all reasonable precautions, efforts and measures (including planning, scheduling and rescheduling), whether before or after the occurrence of the cause of delay. No extension shall be granted for a cause of delay which would not have affected the performance of the Work were it not for the fault of the Contractor.

The Contractor hereby agrees that it shall have no claim for damages of any kind against the Authority or its agents or representatives, including the Architect and Engineer, on account of any delay in the commencement or progress of the Work and/or any delay or suspension of any portion of the Work, whether such delay is caused by the Authority, Architect, Engineer, or any of their agents, representatives or employees, except as expressly provided in the Contract Documents

#### B. Procedure for Determining Extensions of Time

The Contractor shall give written notice to the Engineer within forty eight hours after the time that s/he knows or should know of any cause which will result (or has resulted) in delay for which s/he claims an extension of time (including those causes which the Authority is responsible for or has knowledge of). Any such written notice shall (1) state that an extension is claimed; (2) identify the cause of delay, and (3) describe as fully as practicable at the time, the nature and expected duration of the delay and its effect on the various portions of the Work.

The submission of such written notice within the time period provided above shall be a condition precedent to any extension of time. The Engineer shall have no authority to modify or waive, expressly or by implication, such condition precedent, and any action or statements by the Engineer to such effect shall not be binding upon the Authority. Since the possible necessity for an extension of time might materially alter the scheduling, plans and other actions of the Authority, and since, with sufficient opportunity, the Authority might (if it knew of the Contractor's claim) attempt to mitigate the effect of a delay for which an extension of time was to be claimed, and since merely oral notice might cause disputes as to the existence or substance thereof and notice long after the event would seriously hinder, if not prevent, the Authority's investigation of the pertinent facts, the giving of written notice within the time period stated above shall be of the essence of the Contractor's obligations and failure of the Contractor to comply with these requirements shall be a conclusive waiver of a claim for extension of time.

It shall in all cases be presumed that no extension or further extension of time is due unless the Contractor shall affirmatively demonstrate to the satisfaction of the Director of Capital Programs and Environmental Affairs of the Authority that it is. To this end the Contractor shall maintain adequate records supporting any claim for an extension of time, and in the absence of such records the foregoing presumption shall be deemed conclusive.

After written notice has been given by the Contractor as provided above, the Engineer may, at such time as s/he deems appropriate, require the Contractor to submit to the Engineer



and to the Director of Capital Programs and Environmental Affairs of the Authority, on or before a date specified in writing whatever records, data and explanation support, in the Contractor's view, his claim for extension of time. Within a reasonable time (to be determined by the Director of Capital Programs and Environmental Affairs of the Authority) after the date on which the Contractor submitted or should have submitted such records, data and explanation, the Director of Capital Programs and Environmental Affairs of the Authority shall in the exercise of his/her independent judgment render a decision in writing with respect to the Contractor's claim for extension of time. The decision shall include a statement as to the number of days, if any, by which the time stated in the Contract for completion of the Work (or for completion of a designated portion of the Work) is extended.

The decision of the Director of Capital Programs and Environmental Affairs of the Authority shall be final and conclusive with respect to all questions relating to an extension of the time stated in the Contract for completion of the Work (or a designated portion thereof), including, in particular, (1) whether a claim by the Contractor for an extension of time should be granted, and (2) if so, the appropriate size of any such extension. The Director of Capital Programs and Environmental Affairs of the Authority may in his/her discretion, but need not, defer any such decision until after completion of the Work, but any such decision shall be made before payment of the final estimate by the Authority.

**80-08 Failure to complete on time.** For each calendar day or working day, as specified in the contract, that any work remains uncompleted after the contract time (including all extensions and adjustments as provided in paragraph 80-07, *Determination and Extension of Contract Time*) the sum specified in the contract and proposal as liquidated damages (LD) will be deducted from any money due or to become due the Contractor or their own surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract. Refer to Division IIB, Section 5 for Liquidated Damages provisions and amounts.

Schedule	Liquidated Damages Cost	Allowed Time	Construction

**80-09 Default and termination of contract.** The Contractor shall be considered in default of their contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

- a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or
- b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or
- c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or
- d. Discontinues the execution of the work, or
- e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or
- f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or
- g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or
- h. Makes an assignment for the benefit of creditors, or
- i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

Should the Owner consider the Contractor in default of the contract for any reason above, the Owner shall immediately give written notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the contract.

If the Contractor or surety, within a period of 10 days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the RPR of the facts of such delay, neglect, or default and the Contractor's failure to comply with such notice, have full power and authority without violating the contract, to take the execution of the work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable and may enter into an agreement for the completion of said contract according to the terms and provisions thereof, or use such other methods as in the opinion of the RPR will be required for the completion of said contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under contract, will be deducted from any monies due or which may become due the Contractor. If such expense exceeds the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of such excess.

**80-10 Termination for national emergencies.** The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

When the contract, or any portion thereof, is terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained or ordered by the Contractor for the work and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the RPR.

Termination of the contract or a portion thereof shall neither relieve the Contractor of their responsibilities for the completed work nor shall it relieve their surety of its obligation for and concerning any just claim arising out of the work performed.

**80-11 Work area, storage area and sequence of operations.** The Contractor shall obtain approval from the RPR prior to beginning any work in all areas of the airport. No operating runway, taxiway, or air operations area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate work in accordance with the approved CSPP and SPCD.

**END OF SECTION 80**

## **Section 90 Measurement and Payment**

**90-01 Measurement of quantities.** All work completed under the contract will be measured by the RPR, or their authorized representatives, using United States Customary Units of Measurement .

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 square feet (0.8 square meters) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the RPR.

Unless otherwise specified, all contract items which are measured by the linear foot such as electrical ducts, conduits, pipe culverts, underdrains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

The term “lump sum” when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure or structural unit (in effect, “lump sum” work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

When requested by the Contractor and approved by the RPR in writing, material specified to be measured by the cubic yard (cubic meter) may be weighed, and such weights will be converted to cubic yards (cubic meters) for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the RPR and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

### **Measurement and Payment Terms**

<b>Term</b>	<b>Description</b>
<b>Excavation and Embankment Volume</b>	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
<b>Measurement and Proportion by Weight</b>	The term “ton” will mean the short ton consisting of 2,000 pounds (907 kg) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, independently certified scales by competent, qualified personnel at locations designated by the RPR. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such

Term	Description
	times as the RPR directs, and each truck shall bear a plainly legible identification mark.
<b>Measurement by Volume</b>	Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable for the materials hauled, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.
<b>Asphalt Material</b>	Asphalt materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60°F (16°C) or will be corrected to the volume at 60°F (16°C) using ASTM D1250 for asphalts. Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when asphalt material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work. When asphalt materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, will be used for computing quantities.
<b>Cement</b>	Cement will be measured by the ton (kg) or hundredweight (km).
<b>Structure</b>	Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.
<b>Timber</b>	Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.
<b>Plates and Sheets</b>	The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.
<b>Miscellaneous Items</b>	When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.
<b>Scales</b>	Scales must be tested for accuracy and serviced before use. Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end. Scales shall be accurate within 0.5% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the

Term	Description
	<p>observation of the RPR before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed 0.1% of the nominal rated capacity of the scale, but not less than one pound (454 grams). The use of spring balances will not be permitted.</p> <p>In the event inspection reveals the scales have been “overweighing” (indicating more than correct weight) they will be immediately adjusted. All materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of 0.5%.</p> <p>In the event inspection reveals the scales have been under-weighing (indicating less than correct weight), they shall be immediately adjusted. No additional payment to the Contractor will be allowed for materials previously weighed and recorded.</p> <p>Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them.</p> <p>Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment.</p> <p>All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.</p>
<p><b>Rental Equipment</b></p>	<p>Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 <i>Payment for Extra Work</i>.</p>
<p><b>Pay Quantities</b></p>	<p>When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the RPR. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.</p>

**90-02 Scope of payment.** The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing all materials, for performing all work under the contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the execution thereof, subject to the provisions of Section 70, paragraph 70-18, *No Waiver of Legal Rights*.

When the “basis of payment” subsection of a technical specification requires that the contract price (price bid) include compensation for certain work or material essential to the item, this same work or material will not also be measured for payment under any other contract item which may appear elsewhere in the contract, plans, or specifications.

**90-03 Compensation for altered quantities.** When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in Section 40, paragraph 40-02, *Alteration of Work and Quantities*, will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from their own unbalanced allocation of overhead and profit among the contract items, or from any other cause.

**90-04 Payment for omitted items.** As specified in Section 40, paragraph 40-03, *Omitted Items*, the RPR shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

Should the RPR omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed and acceptable prior to the RPR’s order to omit or non-perform such contract item.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the RPR’s order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the RPR’s order. Such additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs.

**90-05 Payment for extra work.** Extra work, performed in accordance with Section 40, paragraph 40-04, *Extra Work*, will be paid for at the contract prices or agreed prices specified in the change order authorizing the extra work.

**90-06 Partial payments.** Partial payments will be made to the Contractor at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the RPR, of the value of the work performed and materials complete and in place, in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with paragraph 90-07, *Payment for Materials on Hand*. No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars.

a. From the total of the amount determined to be payable on a partial payment, 5% percent of such total amount will be deducted and retained by the Owner for protection of the Owner's interests. Unless otherwise instructed by the Owner, the amount retained by the Owner will be in effect until the final payment is made except as follows:

(1) Contractor may request release of retainage on work that has been partially accepted by the Owner in accordance with Section 50-14. Contractor must provide a certified invoice to the RPR that supports the value of retainage held by the Owner for partially accepted work.

(2) In lieu of retainage, the Contractor may exercise at its option the establishment of an escrow account per paragraph 90-08.

b. The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 10 days after the Contractor has received a partial payment. Contractor must provide the Owner evidence of prompt and full payment of retainage held by the prime Contractor to the subcontractor within 10 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

c. When at least 95% of the work has been completed to the satisfaction of the RPR, the RPR shall, at the Owner's discretion and with the consent of the surety, prepare estimates of both the contract value and the cost of the remaining work to be done. The Owner may retain an amount not less than twice the contract value or estimated cost, whichever is greater, of the work remaining to be done. The remainder, less all previous payments and deductions, will then be certified for payment to the Contractor.

It is understood and agreed that the Contractor shall not be entitled to demand or receive partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess quantities have been determined by the RPR to be a part of the final quantity for the item of work in question.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in paragraph 90-09, *Acceptance and Final Payment*.

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the Contractor may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any potential lien or other such claim. The bond or



collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

**90-07 Payment for materials on hand.** Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

a. The material has been stored or stockpiled in a manner acceptable to the RPR at or on an approved site.

b. The Contractor has furnished the RPR with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

c. The Contractor has furnished the RPR with satisfactory evidence that the material and transportation costs have been paid.

d. The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material stored or stockpiled.

e. The Contractor has furnished the Owner evidence that the material stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials shall in no way relieve the Contractor of their responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications.

In no case will the amount of partial payments for materials on hand exceed the contract price for such materials or the contract price for the contract item in which the material is intended to be used.

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

**90-08 Payment of withheld funds.** At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *Partial Payments*, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

a. The Contractor shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.

b. The Contractor shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the retainage that would otherwise be withheld from partial payment.

c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.

d. The Contractor shall obtain the written consent of the surety to such agreement.

**90-09 Acceptance and final payment.** When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *Final Acceptance*, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *Claims for Adjustment and Disputes*.

After the Contractor has approved, or approved under protest, the RPR's final estimate, and after the RPR's receipt of the project closeout documentation required in paragraph 90-11, *Contractor Final Project Documentation*, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the Contractor has filed a claim for additional compensation under the provisions of Section 50, paragraph 50-16, *Claims for Adjustments and Disputes*, or under the provisions of this paragraph, such claims will be considered by the Owner in accordance with local laws or ordinances. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

**90-10 Construction warranty.**

a. In addition to any other warranties in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the Contractor or any subcontractor or supplier at any tier.

b. This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession. However, this will not relieve the Contractor from corrective items required by the final acceptance of the project work. Light Emitting Diode emitting diode (LED) light fixtures

with the exception of obstruction lighting, must be warranted by the manufacturer for a minimum of four (4) years after date of installation inclusive of all electronics.

c. The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Owner real or personal property, when that damage is the result of the Contractor's failure to conform to contract requirements; or any defect of equipment, material, workmanship, or design furnished by the Contractor.

d. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement.

e. The Owner will notify the Contractor, in writing, within seven (7) days after the discovery of any failure, defect, or damage.

f. If the Contractor fails to remedy any failure, defect, or damage within 14 days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for the benefit of the Owner.

h. This warranty shall not limit the Owner's rights with respect to latent defects, gross mistakes, or fraud.

**90-11 Contractor Final Project Documentation.** Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the RPR approves the Contractor's final submittal. The Contractor shall:

a. Provide two (2) copies of all manufacturer warranties specified for materials, equipment, and installations.

b. Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors.

c. Complete final cleanup in accordance with Section 40, paragraph 40-08, *Final Cleanup*.

d. Complete all punch list items identified during the Final Inspection.

e. Provide complete release of all claims for labor and material arising out of the Contract.

f. Provide a certified statement signed by the subcontractors, indicating actual amounts paid to the Disadvantaged Business Enterprise (DBE) subcontractors and/or suppliers associated with the project.

- g.** When applicable per state requirements, return copies of sales tax completion forms.
- h.** Manufacturer's certifications for all items incorporated in the work.
- i.** All required record drawings, as-built drawings or as-constructed drawings.
- j.** Project Operation and Maintenance (O&M) Manual(s).
- k.** Security for Construction Warranty.
- l.** Equipment commissioning documentation submitted, if required.

**END OF SECTION 90**

**Section/Article 100. Non Discrimination and Affirmative Action.**

General Explanation

Division IIA contains Massachusetts Port Authority federal DBE provisions.

This Article contains additional Federal Requirements which are hereby made a part of these General Conditions regardless of whether the Contract is federally funded or not.

**Forms for Use With Section 10/Article 79**

**Form 79A I. Contractor's Certification**

A Contractor will not be eligible for award of a contract unless such Contractor has submitted the following certification, which is deemed a part of the resulting contract:

**CONTRACTOR'S CERTIFICATION**

\_\_\_\_\_ Certifies that:  
Contractor

1. It intends to use the following listed construction trades in the Work under the contract:  
; and \_\_\_\_\_
2. Will comply with the minority manpower ratio and specific affirmative action steps contained herein; and
3. Will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor certification required by these bid conditions.

\_\_\_\_\_  
(Signature of authorized representative of Contractor)

**Form 79A-2. Subcontractors' Certification**

Prior to the award of any subcontract, regardless of tier, the prospective subcontractor must execute and submit to the Prime Contractor the following certification, which will be deemed a part of the resulting subcontract:

**SUBCONTRACTORS' CERTIFICATION**

\_\_\_\_\_ certifies that:  
Sub-contractor

- 1. It intends to use the following listed construction trades in the Work under the contract:  
; and \_\_\_\_\_
- 2. Will comply with the minority manpower ratio and specific affirmative action steps contained herein; and
- 3. Will obtain from each of its subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this contract the subcontractor certification required by these bid conditions.

\_\_\_\_\_  
(Signature of authorized representative of Sub-contractor)

Note: In accordance with Article 79A, Paragraph 7, In order to ensure that the said subcontractors' certification becomes a part of all subcontracts under the prime contract, no subcontract shall be executed until an authorized representative of the Authority has determined, in writing, that the said certification has been incorporated in such subcontract, regardless of tier. Any subcontract executed without such written approval shall be void.

**79. C Contract Specifications Required by the Secretary of Labor Pursuant to 41 CFR Sec. 6014(b)**

During the performance of this Contract, the Contractor agrees as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin, such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.
3. The Contractor will send to each labor union or representative of Workers with which s/he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or Workers' representatives of the contractor's commitments under this Section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
5. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
6. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations or orders, this contract may be canceled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.
7. The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the of paragraphs (1) through (7) in every subcontract or purchase order unless exempted



by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order in the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

8. The Contractor will submit all Standard Forms 257, Monthly Employment Utilization Report, which are required by Executive Order 11246, directly to Office of Federal Contract Compliance Programs Regional Office at the address listed below.

**U.S. Department of Labor**  
**JFK Federal Building, Room 1612 C**  
**Government Center**  
**Boston, MA 02203**  
**Tel: 617-223 4232**

**79. D Contract Specifications Required by the Secretary of Labor Pursuant to 41 CFR Section 60 4.3.**

Standard Federal Equal Employment Opportunity Construction Contract Specifications  
(Executive Order 11246)

1. As used in these specifications:
  - a. "Covered area" means the geographical area described in the solicitation from which this Contract resulted;
  - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
  - c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
  - d. "Minority" includes:
    - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
    - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
    - (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
    - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the Work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this Contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60 4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all Work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other

Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.
5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
  - a. Ensure and maintain a Working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to Work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents and other on-site supervisory personnel are aware of and carry out the Working Contractor's obligation to maintain such a Working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
  - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

- c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off the street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
- d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- e. Develop on the job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
- f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement, by publicizing it in the company newspaper, annual report, etc., by specific review of the policy with all management personnel and with all minority and female employees at least once a year, and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction Work is performed.
- g. Review at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction Work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

- i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
  - j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's Work force.
  - k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60 3.
  - l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
  - m. Ensure that seniority practices, job classifications, Work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
  - n. Ensure that all facilities and company activities are non-segregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
  - o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
  - p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor union, contractor community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female Workforce participation,

makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these Specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these Specifications, the Director shall proceed in accordance with 41 CFR 60 4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation, if any, employee identification number when assigned, social security number, race, sex, status (e.g. mechanic apprentice trainee, helper or laborer) dates of changes in status, hours Worked per week in the indicated trade, rate of pay, and locations at which the Work was performed. Records shall be maintained in an easily understandable and retrievable form, however, to the degree that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws, which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program.)

## APPENDIX A

The following goals and timetables for female utilization shall be included in all Federal and federally assisted construction contracts and subcontracts in excess of \$10,000. The goals are applicable to the Contractor's aggregate on site construction Workforce whether or not part of that Workforce is performing Work on a Federal or federally assisted construction contract or subcontract.

### AREA COVERED

Goals for Women apply nationwide

### GOALS AND TIMETABLES

Timetable	Goals (percent)
From Apr. 1, 1978 until Mar. 31, 1979	3.1
From Apr. 1, 1979 until Mar. 31, 1980	5.1
From Apr. 1, 1980 until further notice.	6.9



## APPENDIX B

Until further notice, the following goals and timetables for minority utilization shall be included in all Federal or federally assisted construction contracts and subcontracts in excess of \$10,000 to be performed in the respective covered areas. The goals are applicable to the contractor's aggregate on site construction Workforce whether or not part of that Workforce is performing Work on a Federal or federally assisted construction contract or subcontract.

### REGION

#### BOSTON, MASSACHUSETTS AREA

Area covered - Arlington, Boston, Belmont, Brookline, Burlington, Cambridge, Canton, Chelsea, Dedham, Everett, Malden, Medford, Wakefield, Westwood, Winthrop, Winchester, Woburn, and the Islands of Boston Harbor, Massachusetts.

#### GOALS AND TIMETABLES

<u>Timetable</u>	<u>Trade</u>	<u>Goal (percent)</u>
	Asbestos Workers	10.8 to 10.12
	Boilermakers	9.6 to 12.0
	Bricklayers	8.0 to 10.0
	Carpenters	11.6 to 14.5
	Cement Masons	25.5 to 27.5
	Electricians	6.0 to 7.0
	Elevator Constructors	9.5 to 11.4
	Glaziers	8.8 to 11.0
	Ironworkers	5.9 to 6.9
	Lathers	6.9 to 8.9
	Operating Engineers	14.1 to 15.0
	Painters	9.1 to 11.1
	Pipefitters	11.0 to 12.1
	Plasterers	20.5 to 22.5
	Plumbers	9.8 to 11.8
	Roofers	8.4 to 10.5
	Sheetmetal Workers	10.1 to 12.1
	Sprinkler Fitters	12.3 to 15.6
	All other trades	10.3 to 12.3

**79. E Certification of Non Segregated Facilities Required by 41 CFR Section 60 1.8**

CERTIFICATION OF NON-SEGREGATED FACILITIES

The Federally assisted construction contractor certifies that s/he does not maintain or provide for his employees any segregated facilities at any of his/her establishments, and that s/he does not permit his/her employees to perform their services at any location, under his/her control, where segregated facilities are maintained. The federally assisted construction contractor certifies further that s/he will not maintain or provide for his/her employees segregated facilities at any of his/her establishments, and that s/he will not permit his/her employees to perform their services at any location, under his/her control, where segregated facilities are maintained. The Federally assisted construction contractor agrees that a breach of this certification is a violation of the equal opportunity clause in this contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, Work areas, rest rooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment area, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion or national origin, because of habit, local custom, or any other reason. The Federally assisted construction contractor agrees that (except where s/he has obtained identical certifications from proposed subcontractors for specific time periods), s/he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the equal opportunity clause, and that s/he will retain such certifications in his files.

Certification The information above is true and complete to the best of my knowledge and belief.

\_\_\_\_\_  
Name and Title of Signer (Please type)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

## **Article 80. Contractor Record Keeping Requirements**

Pursuant to Massachusetts General Law Chapter 30, Section 39K, if this Contract is an agreement or Contract which is for an amount or estimated amount greater than \$100,000 and is awarded or executed pursuant to c.149 Sec. 44A through H the following terms are part of this Contract:

1. The Contractor shall make, and keep for at least six years after final payment, books, records, and accounts which in reasonable detail accurately and fairly reflect the transactions and dispositions of the Contractor, and
2. Until the expiration of six years after final payment, the Authority, the Office of the Inspector General, and the Deputy Commissioner of Capital Planning and Operations shall have the right to examine any books, documents, papers or records of the Contractor or of his/her subcontractors that pertains to and involves transactions relating to, the Contractor or his/her subcontractors, and
3. If the agreement is a Contract, the Contractor shall describe any change in the method of maintaining records or recording transactions which materially affect any statements filed with the Authority, including in his/her description the date of the change and reasons therefor, and shall accompany said description with a letter from the Contractor's independent certified public accountant approving or otherwise commenting on the changes, and
4. If the agreement is a Contract, the Contractor has filed a statement of management on internal accounting controls as required by G.L. c.30 Sec. 34R(c) prior to the execution of the Contract, and
5. If the agreement is a Contract, the Contractor has filed prior to the execution of the contracts and will continue to file annually, an audited financial statement for the most recent completed fiscal year as required by G.L. c.30 Sec. 39R(d).

Chapter 30 Sec. 39R also requires all Contractors awarded a Contract pursuant to c.149 Sec. 44A through H for an amount or estimated amount greater than \$100,000 to make the following filings:

A. Contractor awarded a Contract shall file with the Authority a statement of management as to whether the system or internal accounting controls of the Contractor and its subsidiaries reasonably assures that:

- (1) transactions are executed in accordance with management's general and specific authorization;
- (2) transactions are recorded as necessary;
  - i. to permit preparation of financial statements in conformity with generally accepted accounting principles, and

- ii. to maintain accountability for assets;
- (3) access to assets is permitted only in accordance with management's general or specific authorization; and
- (4) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference.

B. Every Contractor awarded a Contract shall also file with the Authority a statement prepared and signed by an independent certified public accountant, stating that s/he has examined the statement of management on internal accounting controls and expressing an opinion as to

- (1) whether the representations of management in response to this paragraph and to paragraph (b) of c.30 Sec. 39R (contract provisions) above are consistent with the result of management's evaluation of the system of internal accounting controls; and
- (2) whether such representations of management are, in addition, reasonable with respect to transactions and assets in amounts, which would be material when measured in relation to the applicant's financial statements.

**Section 101/Article 81. Massachusetts Right to Know Act**

The Contractor shall comply fully with the provisions of G.L. c. 111F (Massachusetts Right to Know Act), hereinafter the "Act." The Contractor acknowledges that the Authority is subject to the "Act" and agrees to provide the statutory required Material Safety Data Sheet relative to each hazardous or toxic substance brought onto the Authority's property in connection with the services to be performed by the Contractor. In addition, the Contractor agrees to provide, at the Authority's request, statutory required safety and preventive training to the Authority's designated employees who may be exposed to such substances in the Workplace.

**Section 102/Article 82. Security Identification Requirements**

Please refer to Division II, Special Provisions, for applicable security identification requirements.

**Section 103/Article 83. Claims**

Claims, Counterclaims, Disputes:

- i. All claims, counterclaims, disputes, and any other matters in question arising under, or relating to, the Contract Documents or the breach thereof shall be processed in accordance with the provisions of the Contract and this Article 83, and are subject to audit by the Authority.
- ii. A "Claim" means a written demand or assertion by the Contractor seeking an adjustment in the Contract Amount and payment of monies so due, an extension or shortening in Milestone or Contract completion dates, the adjustment or interpretation of Contract terms, or other relief arising under or relating to the Contract. A written

demand or assertion by the Contractor seeking the payment of money is not a Claim under this Article until certified as required under Article 83.2, below.

- iii. A Claim arising under the Contract, unlike a Claim relating to the Contract, is a Claim that can be resolved under an existing Contract provision that provides for or excludes the relief sought by the Contractor (including, but not limited to, claims for alteration in the work, extra work, or extensions of time). A Claim arising under the Contract shall be resolved under the applicable provisions of the Contract. A Claim relating to the Contract must meet all requirements of this Article and any request for an increase in the Contract Amount shall be evaluated and calculated pursuant to, and limited by, the provisions of this Contract and this Article 83.
  
- iv. Contractor shall not be entitled to any damages or an adjustment in the Contract Amount, and neither Authority nor its designated representatives shall be liable to Contractor or its lower-tier suppliers or subcontractors in tort (including negligence) or contract, except as specifically provided in this Contract.

For Claims relating to the Contract, the following provisions shall govern:

83.1. When Notice and Claim Submittal Become Due:

- i. For any Claim relating to the Contract under this Article to be valid, it shall be based upon written notice delivered by the Contractor to the Engineer and the Authority promptly, but in no event later than fourteen (14) days, after the occurrence of the event giving rise to the Claim and stating the general nature of the Claim. The Claim submittal with all supporting cost data shall be delivered by the Contractor to the Engineer within sixty (60) days after that occurrence (unless the Engineer allows an additional period of time to ascertain more accurate data in support of the Claim). The responsibility to substantiate a Claim shall rest with the party making the Claim.

83.2. Requirements for Contractor Claims:

- i. For all Contractor Claims seeking an increase in the Contract Amount, the Contractor shall submit with the Claim an affidavit certifying that:
  - a. the Claim is made in good faith, and the amount claimed accurately reflects the adjustments in the Contract Amount for which the Contractor can prove the Authority is liable, and covers all direct, supplemental, indirect, consequential, and serial and cumulative costs to which the Contractor is entitled because of the occurrence of the claimed event
  - b. supporting cost and pricing data are current, accurate, complete and represent the best of the Contractor's knowledge and belief; and
  - c. if the Contractor is an individual, the affidavit shall be executed by that individual; if the Contractor is not an individual, the affidavit shall be executed by a senior company

official in charge at the Contractor's plant or location involved, or a responsible officer or general partner of the Contractor.

- ii. The attention of the Contractor is drawn to state and federal laws regarding penalties for false claims. The Authority will take any or all actions available to it against the Contractor to the fullest extent of the law for Contractor's submission of a false, fictitious or unsubstantiated Claim.

83.3. Determination on a Claim:

- i. For Contractor-certified claims of \$50,000.00 or less, the Engineer will, if requested in writing by the Contractor, render a determination within fifteen (15) days of the request. For Contractor-certified claims over \$50,000.00, the Engineer will, within fifteen (15) days decide the Claim or notify the Contractor of the date by which the decision will be made. The Engineer will review with the Contractor the results of the evaluation before rendering a determination. The Engineer's final determination shall be final and binding on the Contractor.

83.4 Failure to Provide Notice is a Waiver:

The Authority must receive notice in strict compliance with the Contract of all Claims in order to investigate such Claims and to make decisions that will eliminate or minimize any additional costs or delays to the Work, the Project or to the Authority's overall capital program. Contractor acknowledges that it has no right in law or equity to seek any increase to the Contract Amount unless Contractor strictly complies with all requirements of the Contract and this Article 84. Failure by Contractor to meet all of the requirements of the Contract and this Article 84 shall be deemed an intentional waiver by Contractor of any right to file a Claim or to seek relief.

**Section 104/Article 84. Force Majeure**

Definition: Force Majeure shall mean (a) adverse weather conditions not reasonably foreseeable or unusually severe weather; (b) acts of God, including, without limitation, floods, hurricanes, tornadoes, landslides, earthquakes, epidemics, quarantine and pestilence; (c) freight embargoes; (d) governmental actions, restrictions or moratorium; (e) acts of a public enemy, civil commotion, riots insurrections, acts of war, blockades, terrorism, security alert, effects of nuclear radiation or national internal calamities; (f) condemnation or other exercise of the power of eminent domain; (g) delays in any approval process of any governmental authority to the extent such delays are not due to any fault, negligence, or lack of diligence of Contractor or its Subcontractors; (h) inconvenience, delays, inefficiencies or loss caused by the presence and operations of other Authority Contractors or Contractors working within the limits of the project; and (i) restraint or other act by court or public authority to the extent such delays are not due to the gross negligence or willful misconduct of Contractor or its and Subcontractors. Force Majeure shall in any event exclude: (a) lack of sufficient funds or any other financial difficulty of the Contractor or its Subcontractors, and (b) adverse weather (1) occurring during non-work periods or on any day which is not a business day, unless it can be demonstrated that said weather impeded the Work the

following days; or (2) which shall not result in a direct and actual delay in the performance of Work at the time of such inclement weather and (c) strikes, labor disputes, work stoppages, or picketing (legal or illegal).

Extensions for Force Majeure:

If the Work is delayed at any time in the commencement or progress of the Work by reason of Force Majeure or by other causes which the Authority in its discretion may determine justifies an extension of the time for Contract Completion, then the time for Contract Completion shall be extended by written agreement for such reasonable time as the Authority may determine that the Project's completion, or the achievement of any Contract Milestones, is delayed by the Force Majeure, but only (i) if and to the extent such event or circumstance is beyond the reasonable control of the Contractor or its Subcontractors, (ii) if and to the extent Contractor or its Subcontractors shall have taken all reasonable precautions to prevent delays by reason of such event or circumstance if such event or circumstance was actually known in advance, (iii) if and to the extent such event or circumstance is not caused by Contractor's employees' gross negligence or willful misconduct, (iv) if and to the extent that such event caused a delay to activities on the critical path of the Contract Schedule, and (v) if Contractor or its Subcontractors strictly complied with the requirements of the Contract.

Notice of Force Majeure:

If prevented or delayed by reason of Force Majeure, Contractor shall provide to the Engineer within 7 days after the commencement of the Force Majeure, written notice of the Force Majeure and shall, within seven (7) days after the Force Majeure event has ended, provide to Engineer a written description of the impact caused on the performance of the Work by the Force Majeure. The description of the impact shall include U.S. Weather Bureau Climatological Reports for the months involved plus a report indicating weather events over those months for the past ten years from the nearest reporting station. The ten-year average will determine the number of adverse weather days which should normally be expected.

Sole Remedy for Force Majeure:

For delays in the construction of the Project caused by reason of Force Majeure, an extension in the time Contract Completion shall be the sole and exclusive remedy for any such delay

**Section 105/Article 85. Required Use of Internet-based Compliance Management System**

As part of the Authority's commitment to assist Contractors to conveniently comply with legal and contractual compliance reporting requirements, the Authority maintains an online Compliance Management Software (CMS) system (System). The System is designed to help reduce Contractor's administrative costs and to provide various Work-flow automation features that improve the required project compliance reporting processes.

Utilizing the System will reduce the amount of administrative time currently required to submit hard copy documentation of contract compliance reporting information. The System is provided for use by the Contractor and subcontractors of every tier, at no cost, and System training is also provided at no cost. The System provides functionality for the following compliance reporting processes:

- Prompt Payment Process
- Minority and Women Business Enterprise (M/WBE) Process
- Disadvantaged Business Enterprise (DBE) Process
- Small Business (SB) Program Process
- Workforce Utilization/EEO Process
- Prevailing Wage Process

The Contractor and all subcontractors of every tier are responsible to provide legal and contractually required compliance information and reports using the CMS system. The Authority may require additional information related to contract compliance to be provided electronically through the System at any time before, during or after contract award. If the Authority grants any Contractor or subcontractor a waiver from using the System, the Contractor or subcontractor shall be required to use the paper forms for compliance reporting under the contract.

Apparent low bidders, trained on the CMS system, are encouraged to utilize CMS for the required timely submission of Schedule(s) for Participation/Letter(s) of Intent in accordance with the bidding requirements.

Information regarding Contractor access to the CMS system will be provided to a designated point of contact for each Contractor and subcontractor of every tier upon award of the contract. The Compliance Management Software System is Internet-based and can be accessed at the following Internet addresses: <http://www.massport.mwdbe.com> for the Prompt Payment Reporting Process and the MBE/WBE/DBE and SB Reporting Process, and <http://www.lcptracker.net> for the Workforce Utilization/EEO Reporting Process and the Prevailing Wage Reporting Process.

### **Section 106/Article 86. Building Information Modeling (BIM)**

The Contractor shall comply with the requirements of the Authority's Building Information Modeling (BIM) Guidelines for Design Bid Build projects, incorporated herein by reference and found on the Authorities external portal.

### **Section 107/Article 87. Project Management System**

It is the Owner's intent to limit the amount of paper documents utilized on the Project. Therefore, the Contractor shall be required to utilize the Owner's Project Management System ("PMWeb") relative to the management and administration of the Project. The Owner shall provide the



Contractor and its Subcontractors and Subconsultants with a non-exclusive, revocable license to utilize the Project Management System, which shall be used to generate all forms of communications, including, deliverables, meeting minutes, monthly invoices, RFIs, submittals, change order reviews, inspection reports, and other types of typical correspondence. The generation and/or maintenance of documents shall automatically create a document log so the tracking of, and response to documents can be maintained electronically. The Owner shall provide training to the Contractor and, if necessary, its Subcontractors and/or Subconsultants, so that the Project Management System can be learned and used effectively.

If the Contract is terminated, such license shall automatically terminate as of the effective date of Contract termination; provided that the Owner shall, for a period of six (6) years following the effective date of such termination, provide the Contractor with reasonable access to those documents that were on the Project Management System as of the date of termination and to which the Contractor had access before such termination. If the Contract is not terminated, such license shall automatically terminate as of the date of final payment to the Contractor; provided the Owner shall, for a period of six (6) years following the date of final payment, provide the Contractor with reasonable access to those documents that were on the Project Management System as of the date of final payment and to which the Contractor had access before such date of final payment.

The Owner reserves the right to adopt written procedures and guidelines regarding the use of the Project Management System by the Contractor and its Subcontractors and Subconsultants. The Contractor and its Subcontractors and Subconsultants shall be bound by such written procedures and guidelines upon receipt thereof.

**-END OF DIVISION I-**

**MASSACHUSETTS PORT AUTHORITY  
EAST BOSTON, MASSACHUSETTS**

**DIVISION IIA**

**SPECIAL PROVISIONS**

**Disadvantaged Business Enterprise Participation Program**

**DIVISION IIA**

**SPECIAL PROVISIONS FOR  
DISADVANTAGED BUSINESS ENTERPRISE PROGRAM,  
AS REQUIRED BY 49 CFR PART 26,  
FOR CONTRACTS FUNDED IN WHOLE OR IN PART  
BY THE UNITED STATES DEPARTMENT OF TRANSPORTATION (“DOT”)**

**Policy Statement**

It is the policy of the Authority to ensure that Disadvantaged Business Enterprises (DBEs), as defined in 49 CFR Part 26, have an equal opportunity to receive and participate in DOT-assisted contracts. It is also the Authority’s policy:

1. To ensure nondiscrimination in the award and administration of DOT-assisted contracts;
2. To create a level playing field on which DBEs can compete fairly for DOT-assisted contracts;
3. To ensure that the DBE Program is narrowly tailored in accordance with the Regulations and other applicable law;
4. To ensure that only firms that fully meet 49 CFR Part 26 eligibility standards are permitted to participate as DBEs;
5. To help remove barriers to the participation of DBEs in DOT-assisted contracts;
6. To promote the use of DBEs in all types of federally assisted contracts and procurement activities;
7. To assist the development of firms that can compete successfully in the marketplace outside the DBE Program; and
8. To provide appropriate flexibility to the Authority in establishing and providing opportunities for DBEs

The Director of Diversity and Inclusion/Compliance, or designee has been appointed as the Authority’s DBE Liaison Officer. In that capacity, the Director of Diversity, Equity, and Inclusion/Compliance is responsible for implementing all aspects of the DBE Program. Implementation of the DBE Program is accorded the same priority as compliance with all other legal obligations incurred by the Authority in its financial assistance agreements with the Department of Transportation.

I. Basis for Inclusion:

Because this Contract is partially funded with United States Department of Transportation (“DOT”) financial assistance, the following provisions relating to encouraging contracting opportunities for DBEs are included in this Contract pursuant to regulations issued by the Department of Transportation, 49 CFR Part 26:

II. Non-Discrimination:

Pursuant to 49 CFR Part 26 requirements, the Contractor agrees as follows:

The Contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT- assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy as the Authority deems appropriate, which may include, but is not limited to:

- 1.) Withholding monthly progress payments;
- 2.) Assessing sanctions;
- 3.) Liquidated damages;
- 4.) Disqualifying Contractor from future bidding as non-responsible;
- 5.) Specific performance;
- 6.) Contract suspension;
- 7.) Withholding a portion of final payment in the amount of the DBE goal shortfall; and/or
- 8.) Such other remedies as may be available to the Authority by law.

The Contractor shall include the above non-discrimination assurance in all subcontracts and agreements relating to this Contract.

III. DBE Percentage Participation Goal:

1. DBE Percentage Participation Goal (“DBE Goal”) on this Contract: The DBE Goal for work to be performed on this Contract has been set at \_\_\_\_\_ percent ( \_\_\_%) of the total Contract price. The Contractor’s attainment of and compliance with this \_\_\_% DBE Goal shall be computed in accordance with the requirements of 49 CFR Part 26 and the manner set forth in “Counting DBE Participation” attached hereto as Appendix A.

2. Bid Requirement: To be deemed a responsible and eligible bidder for award of the Contract, the apparent low bidder must commit to the DBE Goal established in the Contract Documents by properly submitting its Form of General Bid; or, if the bidder is unable to commit to all or any part of the DBE Goal, it must submit with its bid, a properly completed Good Faith Efforts form attached hereto as **Appendix B**.

3. Letter of Intent/Schedule of Participation: The apparent low bidder, as determined by the Authority, shall submit to the Authority within five (5) business days of bid opening: a completed Letter of Intent/Schedule of Participation (“Letter/Schedule”), attached hereto as **Appendix C** setting forth by trade and numbered section of the Contract specifications the work to be performed by DBEs, and associated price, used to achieve the DBE Goal set forth herein. The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the Contractor obtains the Authority’s consent as provided in section VII. Unless the Authority’s consent is provided under section VII, the Contractor shall not be entitled to any payment for work or material committed to a DBE unless it is performed or supplied by the listed DBE.

4. Apparent Low Bidder: The Authority shall review the Letter/Schedule submitted by the apparent low bidder to determine the bidder’s compliance with the DBE Program requirements set forth in these Special Provisions, including the requirement to make Good Faith Efforts to meet the established goal. If the Authority, in its sole discretion, determines the bidder’s Letter/Schedule fails to satisfy the DBE requirements of these Special Provisions, the Authority may hold discussions with the apparent low bidder to clarify or correct the bidder’s DBE submission as follows: If the apparent low bidder’s Letter/Schedule(s) is incorrect, incomplete or ambiguous in the sole judgment of the Authority in respects that are not material, the Authority may treat the bid as informal as to form and may waive the informalities upon the bidder’s satisfactory correction or provision of the required information. If, in the sole judgment of the Authority, the bidder’s DBE submission is materially incorrect, incomplete or ambiguous, the Authority shall deem the apparent low bidder non-responsive and ineligible for award of the Contract. In such instance(s), the Authority shall require the apparent second low bidder to provide the information and documentation required in these Special Provisions.

5. Satisfaction of DBE Goal or Adequate Good Faith Efforts: To be deemed responsible and eligible by the Authority, a Contractor must demonstrate to the Authority’s satisfaction that it will attain the DBE Goal as described above, or, if it is unable to meet this goal, that it has made sufficient “Good Faith Efforts” to meet this goal including but not limited to those efforts set forth in 49 CFR part 26, and outlined in “Guidance Concerning Good Faith Efforts” attached hereto as **Appendix D**. In the event the Authority determines that a bidder has 1) failed to obtain sufficient DBE participation to meet the DBE Goal, and 2) failed to make good faith efforts to achieve the DBE Goal, the Authority shall afford the bidder(s) the opportunity to have such determination reconsidered by an Authority representative who did not take part in the original determination. A bidder’s request for such reconsideration must be received in writing by the Chief Legal Counsel, Massachusetts Port Authority, Logan Office Center, One Harborside Drive, Suite 200S, East Boston, MA 02128, within five (5) business days of the Authority’s notification to bidder that its failure to make Good Faith Efforts to meet the DBE Goal requires rejection of its bid.

6. Joint Venture Bidders Including DBE and non-DBE Firms:

If the apparent low bidder or a proposed DBE subcontractor is a joint venture between a non-DBE and a DBE partner, the joint venture must also submit an application for joint venture eligibility which is available upon request to the Authority's Diversity and Inclusion/Compliance (D&I/Compliance) Department. This application must include a valid DBE certification for the DBE joint venture partner, from the Supplier Diversity Office ("SDO"), One Ashburton Place, 1313, Boston, Mass. 02108; telephone (617) 720-3300; internet address: <https://www.sdo.osd.state.ma.us>. These documents must be submitted within five (5) business days of bid opening, unless the Authority in its sole judgment determines a different deadline. A bidder seeking joint venture approval shall provide any other information the Authority requests for the purpose of evaluating the joint venture's eligibility under these Special Provisions and 49 CFR Part 26. Award of the contract will be conditioned on meeting the requirements of this section.

#### 7. Bidders List:

The Department of Transportation regulations under 49 CFR Part 26 requires the Authority to collect and maintain a list identifying all firms (**both DBEs and non-DBEs**) who attempted to participate as subcontractors or suppliers on this federally assisted Contract. All bidders shall complete and submit with their bids the Bidders List attached hereto as **Appendix E**, including all firms, both DBEs and non-DBEs, that provided either verbal or written quotes or bids to the bidder on potential subcontracts and supply agreements under this Contract. Bidders are further advised that they must submit the DBE Regular Dealer/Distributor Affirmation Form ("Affirmation Form") appended to the Bid Form, with their bids. Instructions to fill out the Affirmation Form are also attached to the Bid Form attached as Appendix H. The Authority, in its sole discretion, may consider any deficiencies in a bidder's Bidders List of Affirmation Form, including failure to submit such Bidders List or Affirmation Form with its bid, to be informalities as to form, which the Authority may, in its sole discretion, waive upon the bidder's satisfactory explanation, correction upon provision of the required information.

#### IV. DBE Certification:

1. For the purposes of these Special Provisions, a bidder claiming DBE status for itself and any subcontractors or suppliers must submit with its Letter/Schedule a copy of a valid certification letter from the Massachusetts Unified Certification Program ("UCP").

2. Bidders should refer to the Massachusetts UCP Directory of Certified Businesses at internet address <https://www.sdo.osd.state.ma.us/BusinessDirectory/BusinessDirectory.aspx> for assistance in meeting the requirements of these Special Provisions.

#### V. Definitions:

The definitions as set forth in 49 CFR Part 26 shall apply only for the purposes of these Special Provisions relating to the use of DBEs under this Contract. Such definitions are set forth in part for bidders' convenience in **Appendix F** attached hereto.

#### VI. Prompt Payment:

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The Authority shall hold retainage from the Contractor pursuant to the pertinent provisions of Article 82 of Division I of the contract documents, shall provide for prompt and regular incremental acceptances of portions of the Work, and shall pay retainage to Contractor based on these acceptances. The Contractor agrees to pay each subcontractor under this Contract for satisfactory performance of its subcontract forthwith, or in any event, no later than thirty (30) days from the Contractor's receipt of each payment Contractor receives from the Authority. The Contractor agrees further to release retainage payments to subcontractor(s) within thirty (30) days after the subcontractor's work is satisfactorily completed, including punch list items. The Contractor further agrees to ensure that each subcontract contains these prompt payment provisions so that they flow to all lower tier subcontractors. Any delay or postponement of payment from the above-referenced time frame may occur only for good cause and with written approval of the Authority. **This clause applies to both DBE and non-DBE subcontractors under this Contract.**

The Authority will consider a subcontractor's work satisfactorily complete when all tasks called for in the subcontract have been accomplished and accepted as required by the Authority. When the Authority has made an incremental acceptance of a portion of the Contractor's work, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

The Authority shall monitor and enforce the prompt payment provisions set forth in this section VI. If the Contractor fails to comply with these provisions the Authority may, in its sole discretion, impose any or all of the sanctions set forth in section X of these Special Provisions.

VII. Termination or Replacement of DBEs on a Contract:

The Contractor shall notify the DE&I/Compliance Department in writing immediately of a DBE's inability or unwillingness to perform its subcontract work and Contractor's intention to terminate the DBE and shall provide reasonable documentation in evidence of the DBE's deficient performance. A termination includes any reduction or underrun in work listed for a DBE not caused by a material change to the prime contract by the recipient in which case the Contractor shall notify the DE&I/Compliance Department. The Authority will evaluate the Contractor's reasons for requesting termination of a DBE and determine, in its sole discretion, whether the Contractor's proposed termination of the DBE is based on good cause and warranted. For purposes of this section VII, good cause includes the following circumstances:

- 1.) The listed DBE subcontractor fails or refuses to execute a written contract;
- 2.) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the Contractor;
- 3.) The listed DBE subcontractor fails or refuses to meet the Contractor's reasonable, nondiscriminatory bond requirements;
- 4.) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;

- 5.) The listed DBE subcontractor is ineligible to work on public projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1,200 or applicable state law;
- 6.) A determination by the Contractor, agreed to by the Authority, that the DBE subcontractor is not a responsible contractor;
- 7.) The listed DBE subcontractor voluntarily withdraws from the project and provides written notice of its withdrawal;
- 8.) The listed DBE is ineligible to receive DBE credit for the type of work required;
- 9.) A DBE owner dies or becomes disabled with the result that the listed DBE contractor is unable to complete its work on the contract; or
- 10.) Other documented good cause that the Authority determines compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the Contractor can self-perform the work for which the DBE contractor was engaged or so that the Contractor can substitute another DBE or non-DBE contractor after contract award.

Before transmitting to the Authority its request to terminate and/or substitute a DBE subcontractor, the Contractor must give notice in writing to the DBE subcontractor, with a copy to the Authority, of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor must give the DBE five days to respond to the Contractor's notice and advise the Authority and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Authority should not approve the Contractor's action.

The Contractor shall make good faith efforts to replace a DBE that is terminated, or has otherwise failed to complete its work under a subcontract, with another certified DBE to the extent needed to continue to satisfy the Contract goal provided in Article III of these Special Provisions. All good faith efforts made by the Contractor shall be documented by the Contractor and, if requested by the Authority, the Contractor shall submit the documentation to the Authority within seven days. The Authority shall provide a written determination to the Contractor stating whether or not good faith efforts have been demonstrated.

In the circumstances described above in this Article VII, the Contractor shall obtain the Authority's prior written approval of the substitute DBE and provide copies of new or amended subcontracts. In instances where the Contractor is unable to locate a substitute, it shall provide documentation of good faith efforts to obtain a substitute DBE within a reasonable time period as determined by the Authority. If the Contractor fails or refuses to comply in the time specified, the Authority may employ one or all of the Sanctions set forth in Article X herein until the Contractor undertakes remedial actions satisfactory to the Authority.

In addition to post-award terminations, the provisions of this section VII apply to preaward deletions of or substitutions for DBE firms put forward by proposers in negotiated procurements.

Failure by the Contractor to carry out the requirements of this section VII is a material breach of the Contract and may result in the termination of the Contract or such other remedies or

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sanctions set forth in these Special Provisions as the Authority deems appropriate if the Contractor fails to comply with the requirements of this section.

Contract Performance Requirements:

- (a) The Contractor shall not perform with its own organization or subcontract to any other contractor any work designated for the named DBE(s) on the Letter/Schedule submitted by the Contractor under Article III, paragraph 3 without the Authority's written approval.
- (b) A Contractor's compliance with the percentage requirement in Article III shall continue to be determined by reference to the percentage of the total executed Contract price even though the total of actual Contract payments may be greater or less than the executed Contract price.
- (c) Each month, the Contractor shall submit through the Authority's B2G software program a DBE Monthly Expenditure Report containing all the information requested in the form attached hereto as **Appendix G** reporting payments made to each DBE, or stating that no payments were made, on this Contract during that month. The Authority may withhold payments on Contractor invoices if the Contractor fails to submit such DBE Expenditure Reports within 15 business days of the close of each month. The Contractor shall maintain records and documents of payments to DBEs for at least three (3) years following the later of the date of completion of performance of this Contract or receipt of Final Payment and these records shall be made available for inspection upon request by any authorized representative of the Authority or DOT/FAA. This reporting requirement shall also extend to any certified DBE subcontractor.
- (d) The Contractor shall notify the Authority's DE&I/Compliance Department of any facts which come to its attention indicating that it will be unable for any reason to comply with the requirements of these Special Provisions.
- (e) If during performance of this Contract, for reasons beyond its control, the Contractor cannot comply with its DBE commitment in accordance with the Letter/Schedule and the terms of these Special Provisions, the Contractor shall submit to the Authority the reasons for its inability to comply with these obligations, and request approval of a revised Letter/Schedule. If, in its sole discretion, the Authority approves this revised Letter/Schedule, such revised Letter/Schedule shall govern the Contractor's performance in meeting its obligations under these Special Provisions.
- (f) The Contractor awarded the Contract shall submit a copy of all DBE and non-DBE subcontracts. The Contractor shall ensure that all subcontracts or agreements with DBEs to supply labor or materials require that the subcontract and all lower tier subcontractors be performed in accordance with these Special Provisions.

VIII. Information:

Upon the request of either the Authority or the United States Department of Transportation ("DOT"), any bidder, Contractor or subcontractor shall promptly provide such information as the

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Authority or DOT deems necessary to ascertain such entity's compliance with the terms of these Special Provisions.

All participants in the DBE Program (including, but not limited to recipients, DBE firms and applicants for DBE certification, complainants and appellants, and contractors using DBE firms to meet contract goals) shall be required to cooperate fully and promptly with DOT and recipient compliance reviews, certification reviews, investigations, and other requests for information. Failure to do so shall be a ground for appropriate action against the party involved (e.g., with respect to recipients, a finding of noncompliance; with respect to DBE firms, denial of certification or removal of eligibility and/or suspension and debarment; with respect to a complainant or appellant, dismissal of the complaint or appeal; with respect to a contractor which uses DBE firms to meet goals, findings of non-responsibility for future contracts and/or suspension and debarment.

The Authority, contractor, or any other participant in the Program will not intimidate, threaten, coerce, or discriminate against any individual or firm for the purpose of interfering with any right or privilege secured by this part or because the individual or firm has made a complaint, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing under this part.

#### IX. Sanctions

1. If the Contractor fails to comply with these Special Provisions or 49 CFR Part 26, the Authority may, in its sole discretion, impose any or all of the following sanctions:

A. The Authority may: (1) suspend any payment to Contractor for work that should have been performed by a DBE pursuant to the Contractor's Letter/Schedule, or (2) be entitled to specific performance of the Contractor's obligation(s) by requiring the Contractor to subcontract with any other DBE approved by the Authority, for the subcontract or other portion of the Contract to meet the percentage of the total contract price established in Article III of these Special Provisions.

B. The Authority may retain in connection with Final Acceptance and Final Payment under Article 83 - Division I of the contract documents, an amount determined by multiplying the contract price of this Contract by the percentage in Article III, less any amounts paid to DBEs for work performed under the Contract and any payment already suspended per paragraph 1.A of this Article X.

C. Notwithstanding the sanctions set forth under paragraphs A and B of this Article, the Authority may suspend, terminate or cancel this Contract, in whole or in part, or may call upon the Contractor's surety to perform all terms and conditions in the Contract, unless the Contractor is able to demonstrate its compliance with the terms of this DBE Participation Program pursuant to 49 CFR Part 26, and may further deny to the Contractor the right to participate in any further contracts awarded by the Authority for a period of up to three (3) years.

The Authority shall afford the Contractor notice and an opportunity to be heard prior to denying the Contractor the right to participate in future Contracts.

D. The Authority may refer the Contractor to the United States Department of Transportation for enforcement proceedings based on noncompliance with 49 CFR Part 26.

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**LIST OF APPENDICES TO DIVISION IIA, DBE SPECIAL PROVISIONS**

- A. Counting DBE Participation
- B. DBE Good Faith Efforts Form
- C. Letter of Intent/Schedule of Participation
- D. Guidance Concerning Good Faith Efforts
- E. Bidders List
- F. Selected Definitions from 49 CFR Part 26
- G. DBE Monthly Expenditure Report
- H. DBE Regular Dealer Distributor Affirmation Form

**MASSACHUSETTS PORT AUTHORITY**

**DIVISION IIA**

**APPENDIX A**

**COUNTING DBE PARTICIPATION**

**(A) As set forth in 49 CFR Part 26, when a DBE participates in a contract, the Authority shall count the DBE's participation in the following manner so that only the value of the work actually performed by the DBE is counted toward DBE goals (excerpted from 49 CFR §26.55 "How is DBE participation counted toward goals?"):**

(1) Count the entire amount of that portion of a construction contract (or other contract not covered by paragraph (A)(2) of this section) that is performed by the DBE's own forces. Include the cost of supplies and materials obtained by the DBE for the work of the contract, including supplies purchased or equipment leased by the DBE (except supplies and equipment the DBE subcontractor purchases or leases from the prime contractor or its affiliates).

(2) Count the entire amount of fees or commissions charged by a DBE firm for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, toward DBE goals, provided the Authority determines the fee to be reasonable and not excessive as compared with fees customarily allowed for similar services.

**(3) When a DBE subcontracts part of the work of its subcontract to another firm, the value of the subcontracted work may be counted toward DBE goals only if the DBE's subcontractor is itself a DBE.** Work that a DBE subcontracts to a non-DBE firm does not count toward the DBE goal. For example, if a DBE subcontracts 20% of the work to a non-DBE, the dollar amount represented by the 20% does not count toward the DBE goal, and it is the prime contractor's responsibility to make up for this short fall with actual DBE participation.

**(B) When a DBE performs as a participant in a joint venture, count a portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work of the contract that the DBE performs with its own forces toward DBE goals.**

**(C) The Authority shall count expenditures to a DBE subcontractor toward DBE goals only if the DBE is performing a commercially useful function on that contract in accordance with the following:**

(1) A DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE must also be responsible, with respect to

materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, you must evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work, and other relevant factors.

- (2) A DBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of DBE participation. In determining whether a DBE is such an extra participant, you must examine similar transactions, particularly those in which DBEs do not participate.
- (3) If a DBE does not perform or exercise responsibility for at least 30 percent of the total cost of its contract with its own work force, or the DBE subcontracts a greater portion of the work of a contract than would be expected on the basis of normal industry practice for the type of work involved, you must presume that it is not performing a commercially useful function.
- (4) When a DBE is presumed not to be performing a commercially useful function as provided in paragraph (C)(3) of this section, the DBE may present evidence to rebut this presumption. The Authority may determine that the firm is performing a commercially useful function given the type of work involved and normal industry practices.
- (5) The Authority's decisions on commercially useful function matters are subject to review by the Federal Aviation Administration, but are not administratively appealable to DOT.

**(D) The Authority shall use the following factors in determining whether a DBE trucking company is performing a commercially useful function:**

- (1) The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there cannot be a contrived arrangement for the purpose of meeting DBE goals.
- (2) The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
- (3) The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
- (4) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.

- (5) The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE.
- (6) The DBE may lease trucks without drivers from a non-DBE truck leasing company. If the DBE leases trucks from a non-DBE truck leasing company and uses its own employees as drivers, it is entitled to credit for the total value of these hauling services.
- (7) For purposes of this paragraph (D), a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

**(E) The Authority shall count expenditures with DBEs for materials or supplies toward DBE goals as provided in the following:**

(1)(i) If the materials or supplies are obtained from a DBE manufacturer, 100 percent of the cost of the materials or supplies shall be counted toward DBE goals.

(ii) For purposes of this paragraph (e)(1), a manufacturer is a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract and of the general character described by the specifications. Manufacturing includes blending or modifying raw materials or assembling components to create the product to meet contract specifications. When a DBE makes minor modifications to the materials, supplies, articles, or equipment, the DBE is not a manufacturer. Minor modifications are additional changes to a manufactured product that are small in scope and add minimal value to the final product.

(2)(i) If the materials or supplies are purchased from a DBE regular dealer, count 60 percent of the cost of the materials or supplies (including transportation costs).

(ii) For purposes of this section, a regular dealer is a firm that owns (or leases) and operates, a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in sufficient quantities, and regularly sold or leased to the public in the usual course of business.

(iii) Items kept and regularly sold by the DBE are of the “general character” when they share the same material characteristics and application as the items specified by the contract.

(iv) You must establish a system to determine that a DBE regular dealer per [paragraph \(e\)\(2\)\(iv\)\(A\)](#) of this section, over a reasonable period of time, keeps

sufficient quantities and regularly sells the items in question. This system must also ensure that a regular dealer of bulk items per (e)(2)(iv)(B) of this section owns/leases and operates distribution equipment for the products it sells. This requirement may be administered through questionnaires, inventory records reviews, or other methods to determine whether each DBE supplier has the demonstrated capacity to perform a commercially useful function (CUF) as a regular dealer prior to its participation. The system you implement must be maintained and used to identify all DBE suppliers with capacity to be eligible for 60 percent credit, contingent upon the performance of a CUF. This requirement is a programmatic safeguard apart from that described in [§ 26.53\(c\)\(1\)](#).

(A) To be a regular dealer, the firm must be an established business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question. A DBE supplier performs a CUF as a regular dealer and receives credit for 60 percent of the cost of materials or supplies (including transportation cost) when all, or at least 51 percent of, the items under a purchase order or subcontract are provided from the DBE's inventory, and when necessary, any minor quantities delivered from and by other sources are of the general character as those provided from the DBE's inventory.

(B) A DBE may be a regular dealer in such bulk items as petroleum products, steel, concrete or concrete products, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as provided in [paragraph \(e\)\(2\)\(ii\)](#) of this section if the firm both owns and operates distribution equipment used to deliver the products. Any supplementing of regular dealers' own distribution equipment must be by a long-term operating lease and not on an ad hoc or contract-by-contract basis.

(C) A DBE supplier of items that are not typically stocked due to their unique characteristics (*e.g.*, limited shelf life or items ordered to specification) should be considered in the same manner as a regular dealer of bulk items per [paragraph \(e\)\(2\)\(iv\)\(B\)](#) of this section. If the DBE supplier of these items does not own or lease distribution equipment, as described above, it is not a regular dealer.

(D) Packagers, brokers, manufacturers' representatives, or other persons who arrange, facilitate, or expedite transactions are not regular dealers within the meaning of [paragraph \(e\)\(2\)](#) of this section.

(3) If the materials or supplies are purchased from a DBE distributor that neither maintains sufficient inventory nor uses its own distribution equipment for the products in question, count 40 percent of the cost of materials or supplies (including transportation costs). A DBE distributor is an established business that engages in the regular sale or lease of the items specified by the contract. A DBE distributor assumes responsibility for the items it purchases once they leave the point of origin (*e.g.*, a manufacturer's facility), making it liable for any loss or damage not covered by the carrier's insurance. A DBE distributor performs a CUF when it demonstrates ownership of the items in question and assumes all risk for loss or damage during



transportation, evidenced by the terms of the purchase order or a bill of lading (BOL) from a third party, indicating Free on Board (FOB) at the point of origin or similar terms that transfer responsibility of the items in question to the DBE distributor. If these conditions are met, DBE distributors may receive 40 percent for drop-shipped items. Terms that transfer liability to the distributor at the delivery destination (*e.g.*, FOB destination), or deliveries made or arranged by the manufacturer or another seller do not satisfy this requirement.

(4) With respect to materials or supplies purchased from a DBE that is neither a manufacturer, a regular dealer, nor a distributor, count the entire amount of fees or commissions charged that you deem to be reasonable, including transportation charges for the delivery of materials or supplies. Do not count any portion of the cost of the materials and supplies themselves.

(5) You must determine the amount of credit awarded to a firm for the provisions of materials and supplies (*e.g.*, whether a firm is acting as a regular dealer, distributor, or a transaction facilitator) on a contract-by-contract basis.

- (F) If a firm is not currently certified as a DBE in accordance with the standards of subpart D of 49 CFR part 26 at the time of the execution of the contract, the firm's participation toward any DBE goals shall not be counted, except as provided for in 49 CFR §26.87(j)).**
- (G) The participation of a DBE subcontractor toward the prime contractor DBE achievements or Authority's overall goal shall not be counted until the amount being counted toward the goal has been paid to the DBE.**

**MASSACHUSETTS PORT AUTHORITY**

**DIVISION IIA**

**APPENDIX B**

**DBE GOAL**

**GOOD FAITH EFFORTS**

This form must be completed if a bidder cannot meet, in whole or in part, the DBE subcontracting requirements as set forth in these Division IIA Special Provisions. A bidder's Good Faith Efforts ("GFE") documentation must report and evidence the bidder's efforts to solicit and consider DBEs for participation and clearly outline the bidder's reasons why some or all of the DBE Goal cannot be met. Bidders must review Appendices A and D of these Special Provisions and the provisions of 49 CFR part 26 before submitting this Request for GFE review.

A blanket statement that there are no DBE businesses to provide services or materials related to the proposal is INADEQUATE. An explanation of how that conclusion was reached must be provided.

**1. BIDDER'S STATEMENT OF DBE UNAVAILABILITY:**

I, \_\_\_\_\_, \_\_\_\_\_ of  
(Name) (Title)  
\_\_\_\_\_, certify  
(Bidder's Company)

I contacted the following DBEs to obtain a quote for work items to be performed on MPA Project Number \_\_\_\_\_:

<b><u>DBE (Name of Firm)</u></b>	<b><u>Date of Contact - Work Items Sought</u></b>
_____	_____
_____	_____
_____	_____

(Use additional sheets, if necessary)

To the best of my knowledge and belief, said DBEs were unavailable for work on this project or unable to prepare a proposal for the following reason(s)\*:

<b><u>NAME OF DBE</u></b>	<b><u>REASON FOR UNAVAILABILITY</u></b>
_____	_____
_____	_____
_____	_____

Signature \_\_\_\_\_ Date \_\_\_\_\_

\*Further explanation of unavailability (including unavailability due to lack of agreement on price) must be explained in paragraph 3, "Bidder's Explanation of Request for Waiver."

**3. BIDDER'S EXPLANATION OF GOOD FAITH EFFORTS**

\_\_\_\_\_ (the Bidder) hereby certifies that the attached good faith efforts were made to identify potential DBE subcontractors (please attach a detailed explanation of all efforts made, including ads, communications, follow-up calls, bids/quotes received, reason for rejecting any bids/quotes, etc.). An evaluation of the bidder's good faith efforts will be made based on the totality of efforts. A finding that the bidder has not met the goal or made good faith efforts to meet the goal will be cause for finding the bidder nonresponsive. The bidder will be offered an opportunity for reconsideration. The results of such reconsideration will be final.

\_\_\_\_\_  
(Bidder's Authorized Representative)

\_\_\_\_\_  
(Title)

---

(Date)

Note: All advertisements, records of telephone conversations and other documentation to support this statement should be attached.

**MASSACHUSETTS PORT AUTHORITY**

**DIVISION IIA**

**APPENDIX C**

**DISADVANTAGED BUSINESS ENTERPRISE (DBE) PARTICIPATION  
LETTER OF INTENT/SCHEDULE OF PARTICIPATION**

(Required of low bidder within five working days of Bid Opening)

MPA Contract No.: \_\_\_\_\_

MPA Contract Title: \_\_\_\_\_

To: \_\_\_\_\_  
(Name of Contractor)

From: \_\_\_\_\_  
(Name of DBE Contractor\*)

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone No.: \_\_\_\_\_

1. My company will perform work in connection with the above referenced contract as: (check one)

- an individual                       a partnership                       a corporation  
 a joint venture with \_\_\_\_\_  
 other (explain) \_\_\_\_\_

2. The undersigned affirms that s/he is a duly authorized official representing the proposed disadvantaged business enterprise and affirms that its certification has not expired nor been revoked, nor has there been any change in the status of said disadvantaged business enterprise. \*\* A copy of certification letter is attached.

3. If you are awarded the Contract, my company intends to enter into a subcontract with your firm to perform the work described on the following sheet for the prices indicated.

\* If more than one DBE firm is to be utilized on the contract, use a separate form for each firm.

\*\* Certification must be completed at the time the above contract was advertised and prior to submission of the Schedule of Participation. See contract documents and "Instructions to Bidder".



# MASSACHUSETTS PORT AUTHORITY

## DIVISION IIA

### APPENDIX D

#### GUIDANCE CONCERNING GOOD FAITH EFFORTS

**The following lists types of actions bidders should consider in undertaking good faith efforts to obtain DBE participation. This information is provided as guidance only; it is not intended to be exclusive or exhaustive. Other factors or types of evidence may be relevant in appropriate cases.**

A. Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.

B. Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.

C. Providing interested DBEs with adequate information about the plans, specifications and requirements of the contract in a timely manner to assist them in responding to a solicitation.

D. (1) Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.

(2) A bidder using good judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities, as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Prime contractors are not, however, required to accept higher quotes from DBEs if the price is excessive or unreasonable.

E. Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the contractor's efforts to meet the project goal.

F. Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.

G. Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

H. Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.

In determining whether a bidder has made good faith efforts, the Authority may take into account the performance of other bidders in meeting the contract. For example, when the apparent successful bidder fails to meet the contract goal, but others meet it, the Authority may reasonably raise the question of whether, with additional reasonable efforts, the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the goal, but meets or exceeds the average DBE participation obtained by other bidders, the Authority may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made good faith efforts.



**MASSACHUSETTS PORT AUTHORITY  
DIVISION IIA  
APPENDIX E  
BIDDER'S LIST COLLECTION FORM**

Prime Contractor (Bidder) Name	Bidder Address/ Phone #	DBE or Non-DBE Status	Race and Gender of Firm's Majority Owner(s)	NAICS Code Applicable to the Work Bid for this Contract	Age of Firm	Annual Gross Receipts
		<input type="checkbox"/> DBE  <input type="checkbox"/> Non-DBE	<input type="checkbox"/> Female <input type="checkbox"/> Male  <input type="checkbox"/> Black American <input type="checkbox"/> Hispanic American <input type="checkbox"/> Native American <input type="checkbox"/> Asian Pacific American <input type="checkbox"/> Subcontinent Asian American <input type="checkbox"/> Other		<input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1- 3 years <input type="checkbox"/> 4-7 years <input type="checkbox"/> 8-10 years <input type="checkbox"/> More than 10 years	<input type="checkbox"/> Less than \$1 million <input type="checkbox"/> \$1-3 million <input type="checkbox"/> \$3-6 million <input type="checkbox"/> \$6-10 million <input type="checkbox"/> Greater than \$10 million

Subcontractor/ Supplier Firm Name	Firm Address/ Phone #	DBE or Non-DBE Status (verify via State's UCP Directory)	Race and Gender of Firm's Majority Owner(s)	NAICS Code Applicable to the Work Bid for this Contract (see NAICS.com)	Age of Firm	Annual Gross Receipts
		<input type="checkbox"/> DBE  <input type="checkbox"/> Non-DBE	<input type="checkbox"/> Female <input type="checkbox"/> Male  <input type="checkbox"/> Black American <input type="checkbox"/> Hispanic American <input type="checkbox"/> Native American <input type="checkbox"/> Asian Pacific American <input type="checkbox"/> Subcontinent Asian American <input type="checkbox"/> Other		<input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1- 3 years <input type="checkbox"/> 4-7 years <input type="checkbox"/> 8-10 years <input type="checkbox"/> More than 10 years	<input type="checkbox"/> Less than \$1 million <input type="checkbox"/> \$1-3 million <input type="checkbox"/> \$3-6 million <input type="checkbox"/> \$6-10 million <input type="checkbox"/> Greater than \$10 million
		<input type="checkbox"/> DBE  <input type="checkbox"/> Non-DBE	<input type="checkbox"/> Female <input type="checkbox"/> Male  <input type="checkbox"/> Black American <input type="checkbox"/> Hispanic American <input type="checkbox"/> Native American <input type="checkbox"/> Asian Pacific American <input type="checkbox"/> Subcontinent Asian American <input type="checkbox"/> Other		<input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1- 3 years <input type="checkbox"/> 4-7 years <input type="checkbox"/> 8-10 years <input type="checkbox"/> More than 10 years	<input type="checkbox"/> Less than \$1 million <input type="checkbox"/> \$1-3 million <input type="checkbox"/> \$3-6 million <input type="checkbox"/> \$6-10 million <input type="checkbox"/> Greater than \$10 million
		<input type="checkbox"/> DBE  <input type="checkbox"/> Non-DBE	<input type="checkbox"/> Female <input type="checkbox"/> Male  <input type="checkbox"/> Black American <input type="checkbox"/> Hispanic American <input type="checkbox"/> Native American <input type="checkbox"/> Asian Pacific American <input type="checkbox"/> Subcontinent Asian American <input type="checkbox"/> Other		<input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1- 3 years <input type="checkbox"/> 4-7 years <input type="checkbox"/> 8-10 years <input type="checkbox"/> More than 10 years	<input type="checkbox"/> Less than \$1 million <input type="checkbox"/> \$1-3 million <input type="checkbox"/> \$3-6 million <input type="checkbox"/> \$6-10 million <input type="checkbox"/> Greater than \$10 million
		<input type="checkbox"/> DBE	<input type="checkbox"/> Female <input type="checkbox"/> Male  <input type="checkbox"/> Black American		<input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1- 3 years	<input type="checkbox"/> Less than \$1 million <input type="checkbox"/> \$1-3 million <input type="checkbox"/> \$3-6 million

Subcontractor/ Supplier Firm Name	Firm Address/ Phone #	DBE or Non-DBE Status (verify via State's UCP Directory)	Race and Gender of Firm's Majority Owner(s)	NAICS Code Applicable to the Work Bid for this Contract (see NAICS.com)	Age of Firm	Annual Gross Receipts
		<input type="checkbox"/> Non-DBE	<input type="checkbox"/> Hispanic American <input type="checkbox"/> Native American <input type="checkbox"/> Asian Pacific American <input type="checkbox"/> Subcontinent Asian American <input type="checkbox"/> Other		<input type="checkbox"/> 4-7 years <input type="checkbox"/> 8-10 years <input type="checkbox"/> More than 10 years	<input type="checkbox"/> \$6-10 million <input type="checkbox"/> Greater than \$10 million
		<input type="checkbox"/> DBE <input type="checkbox"/> Non-DBE	<input type="checkbox"/> Female <input type="checkbox"/> Male  <input type="checkbox"/> Black American <input type="checkbox"/> Hispanic American <input type="checkbox"/> Native American <input type="checkbox"/> Asian Pacific American <input type="checkbox"/> Subcontinent Asian American <input type="checkbox"/> Other		<input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1- 3 years <input type="checkbox"/> 4-7 years <input type="checkbox"/> 8-10 years <input type="checkbox"/> More than 10 years	<input type="checkbox"/> Less than \$1 million <input type="checkbox"/> \$1-3 million <input type="checkbox"/> \$3-6 million <input type="checkbox"/> \$6-10 million <input type="checkbox"/> Greater than \$10 million
		<input type="checkbox"/> DBE <input type="checkbox"/> Non-DBE	<input type="checkbox"/> Female <input type="checkbox"/> Male  <input type="checkbox"/> Black American <input type="checkbox"/> Hispanic American <input type="checkbox"/> Native American <input type="checkbox"/> Asian Pacific American <input type="checkbox"/> Subcontinent Asian American <input type="checkbox"/> Other		<input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1- 3 years <input type="checkbox"/> 4-7 years <input type="checkbox"/> 8-10 years <input type="checkbox"/> More than 10 years	<input type="checkbox"/> Less than \$1 million <input type="checkbox"/> \$1-3 million <input type="checkbox"/> \$3-6 million <input type="checkbox"/> \$6-10 million <input type="checkbox"/> Greater than \$10 million
		<input type="checkbox"/> DBE <input type="checkbox"/> Non-DBE	<input type="checkbox"/> Female <input type="checkbox"/> Male  <input type="checkbox"/> Black American <input type="checkbox"/> Hispanic American <input type="checkbox"/> Native American <input type="checkbox"/> Asian Pacific American <input type="checkbox"/> Subcontinent Asian American <input type="checkbox"/> Other		<input type="checkbox"/> Less than 1 year <input type="checkbox"/> 1- 3 years <input type="checkbox"/> 4-7 years <input type="checkbox"/> 8-10 years <input type="checkbox"/> More than 10 years	<input type="checkbox"/> Less than \$1 million <input type="checkbox"/> \$1-3 million <input type="checkbox"/> \$3-6 million <input type="checkbox"/> \$6-10 million <input type="checkbox"/> Greater than \$10 million

# MASSACHUSETTS PORT AUTHORITY

## DIVISION IIA

### APPENDIX F

#### Selected Definitions from 49 CFR part 26

**Contractor** means one who participates, through a contract or subcontract (of any tier), in a DOT-assisted highway, transit, or airport program.

**Department** or **DOT** means the U.S. Department of Transportation, including the Office of the Secretary, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the Federal Aviation Administration (FAA).

**Disadvantaged business enterprise** or **DBE** means a for-profit small business concern--

(1) That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals; and

(2) Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.

**Good faith efforts** means efforts to achieve a DBE goal or other requirement of this section which efforts, by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement.

**Joint venture** means an association of a DBE firm and one or more other firms to carry out a single, for-profit business enterprise, for which the parties combine their property, capital, efforts, skills and knowledge, and in which the DBE is responsible for a distinct, clearly defined portion of the work of the contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.

**Personal net worth** means the net value of the assets of an individual remaining after total liabilities are deducted. An individual's personal net worth does not include the individual's ownership interest in an applicant or participating DBE firm or the individual's equity in his or her primary place of residence. An individual's personal net worth includes only his or her own share of assets held jointly or as community property with the individual's spouse.

**Small Business Administration** or **SBA** means the United States Small Business Administration.

**Small business concern** means, with respect to firms seeking to participate as DBEs in DOT-assisted contracts, a small business concern as defined pursuant to section of the Small Business Act and Small Business Administration regulations implementing it (13 CFR part 121) that also does not exceed the cap on average annual gross receipts specified in §26.65(b).

**Socially and economically disadvantaged individual** means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is --

(1) Any individual who is found to be a socially and economically disadvantaged individual on a case-by-case basis.

(2) Any individual in the following groups, members of which are rebuttably presumed socially and economically disadvantaged:

(i) "Black Americans," which includes persons having origins in any of the Black racial groups of Africa;

(ii) "Hispanic Americans," which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;

(iii) "Native Americans," which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;

(iv) "Asian-Pacific Americans," which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Burunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kirbati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;

(v) "Subcontinent Asian Americans," which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;

(vi) Women;

(vii) Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

**MASSACHUSETTS PORT AUTHORITY**  
**APPENDIX G**  
**DISADVANTAGED BUSINESS ENTERPRISE (DBE)**  
**MONTHLY EXPENDITURE REPORT**

MPA Contract No. and Name: \_\_\_\_\_  
 Name of Prime Contractor: \_\_\_\_\_  
 Contract Amount: \$ \_\_\_\_\_  
 Name of DBE: \_\_\_\_\_  
 Date DBE Work Began: \_\_\_\_\_ Est. Date of DBE Completion: \_\_\_\_\_

***NOTE: A separate report must be submitted for each Disadvantaged Business Enterprise. Reports are to be submitted MONTHLY for the duration of the project and are due the 15<sup>th</sup> calendar day of the following month.***

Reports can be faxed to the Office of Diversity & Inclusion/Compliance at 617-568-3199, sent via e-mail to [compliance@massport.com](mailto:compliance@massport.com) or sent via U.S. Mail to Massport, Office of Diversity & Inclusion/Compliance, Attn: Compliance, One Harborside Dr., Suite 200S East Boston, MA 02128-2909. If you have any questions, please call 617-568-3190.

Monthly Report: Begin \_\_\_\_\_ End \_\_\_\_\_ Final Report? Yes:  No:

- 1. DBE Contract Amount: \$ \_\_\_\_\_
- 2. Amount paid to DBE during the month: \$ \_\_\_\_\_
- 3. Total amount paid to DBE to date: \$ \_\_\_\_\_
- 4. Balance Due DBE: \$ \_\_\_\_\_

5. Comments (including justifiable explanation for any differences between the "DBE Contract Amount" and the total monies paid to the DBE, if "Final Report"): \_\_\_\_\_

Under the pains and penalties of perjury we hereby certify that the information supplied herein is correct and complete.

Prime Contractor:  Signed: _____ Print Name: _____ Title: _____ Tel. No.: _____ E-Mail: _____ Date: _____ Fax: _____	Disadvantaged Business Enterprise:  Signed: _____ Print Name: _____ Title: _____ Tel. No.: _____ E-Mail: _____ Date: _____ Fax: _____
--	---

**COPIES OF CANCELLED CHECKS AND INVOICES MUST BE SUBMITTED WITH THE REPORT FOR EACH DBE COMPANY.**

**MASSACHUSETTS PORT AUTHORITY  
DIVISION IIA  
APPENDIX H**

OMB Approval Pending 04/17/2024



U.S. Department of  
Transportation

**DBE Regular Dealer/Distributor  
Affirmation Form**

Bidder Name:

Contract Name/Number:

Sections 26.53(c)(1) of Title 49 Code of Federal Regulations requires recipients to make a preliminary counting determination for each DBE listed as a regular dealer or distributor to assess its eligibility for 60 or 40 percent credit, respectively, of the cost of materials and supplies based on its demonstrated capacity and intent to perform as a regular dealer or distributor, as defined in section 26.55(c)(2)(iv)(A),(B),(C), and (3) under the contract at issue. The regulation requires the recipient's preliminary determination to be made based on the DBE's written responses to relevant questions and its affirmation that its subsequent performance of a commercially useful function will be consistent with the preliminary counting of such participation. The U.S. Department of Transportation is providing this form as a tool for recipients, prime contractors, regular dealers, and distributors to use to carry out their respective responsibilities under this regulation. The form may be used by each DBE supplier whose participation is submitted by a bidder for regular dealer or distributor credit on a federally-assisted contract with a DBE participation goal. The form may also be used by prime contractors in connection with DBE regular dealer or distributor participation submitted after a contract has been awarded provided such participation is subject to the recipient's prior evaluation and approval. If this form is used, it should be accompanied by the bidder's commitment, contract, or purchase order showing the materials the DBE regular dealer or distributor is supplying. Use of this tool is not mandatory. If a recipient chooses a different method for complying with Section 26.53(c)(1), it must include that method in its DBE Program Plan. **DISCLAIMER: This form has not yet received OMB/PRA approval and is subject to change. We are making it available for your voluntary use.**

DBE Name:	Total Subcontract/Purchase Order Amount: <div style="border: 1px solid black; height: 20px; width: 100%;"></div>
Authorized DBE Representative (Name and Title):	NAICS Code(s) Related to the Items to be Sold/Leased:

1. Will all items sold or leased be provided from the on-hand inventory at your establishment?  YES  NO

(If "YES," you have indicated that your performance will satisfy the regular dealer requirements and may be counted at 60%. STOP here. Read and sign the affirmation below. If "NO" Continue.)

- a) Are you selling bulk items (e.g., petroleum products, steel, concrete, concrete products, sand, gravel, asphalt, etc.) or items not typically stocked due to their unique characteristics (aka specialty items)?  YES  NO (If "YES," Go to Question 2. If "NO" Continue.)
- b) Will at least 51% of the items you are selling be provided from the inventory maintained at your establishment, and will the minor quantities of items delivered from and by other sources be of the general character as those provided from your inventory?  YES  NO\* (If "YES," you have indicated that your performance will satisfy the regular dealer requirements and may be counted at 60%. STOP here. Read and sign the affirmation below.)

\* If 1., 1.a), and 1. b) above are "NO," your performance on the whole will not satisfy the regular dealer requirements; therefore, only the value of items to be sold or leased from inventory can be counted at 60%. (Go to Question 3. to determine if the items delivered from and by other sources are eligible for Distributor credit.)

2. Will you deliver all bulk or specialty items using distribution equipment you own (or under a long-term lease) and operate?  YES  NO<sup>1</sup>

(If "YES," you have indicated that your performance will satisfy the requirements for a regular dealer of bulk items and may be counted at 60%. STOP here. Read and sign the affirmation below.)

<sup>1</sup> If "NO," your performance will not satisfy the requirements for a regular dealer of bulk items; the value of items to be sold or leased cannot be counted at 60%. (Go to Question 3.)

3. Will the written terms of your purchase order or bill of lading from a third party transfer responsibility, including risk for loss or damage, to your company at the point of origin (e.g. a manufacturer's facility)?  YES<sup>2</sup>  NO<sup>3</sup>

a) Will you be using sources other than the manufacturer (or other seller) to deliver or arrange delivery of the items sold or leased?  YES<sup>2</sup>  NO<sup>3</sup>

<sup>2</sup> If your responses to 3 and 3.a) are "YES," you have indicated that your performance will satisfy the requirements of a distributor; therefore, the value of items sold or leased may be counted at 40%.

<sup>3</sup> If you responded "NO" to either 3 or 3.a), counting of your participation is limited to the reasonable cost of fees or commissions charged, including transportation charges for the delivery of materials or supplies; the cost of materials or supplies may not be counted.

I affirm that the information that I provided above is true and correct and that my company's subsequent performance of a commercially useful function will be consistent with the above responses. I further affirm that my company will independently negotiate price, order specified quantities, and pay for the items listed in the bidder's commitment. This includes my company's responsibility for the quality of such items in terms of necessary repairs, exchanges, or processing of any warranty claims for damaged or defective materials.

Printed Name and Signature of DBE Owner/Authorized Representative:

The bidder acknowledges its responsibility for verifying the information provided by the DBE named above and ensuring that the counting of the DBE's participation is accurate. Any shortfall caused by errors in counting are the responsibility of the bidder.

Printed Name and Signature of Bidder's Authorized Representative:

This form must be submitted with the Bid (See Division IIA, Article III)

## SPECIAL INSTRUCTIONS/REQUIREMENTS FOR DBE SUPPLIERS

The federal regulations governing the DBE Program (49 CFR part 26) were revised on April 9, 2024 and became effective on May 9, 2024. Rules for counting DBE participation of suppliers have changed significantly. The Bidder/Proposer is responsible for ensuring that suppliers are counted in strict compliance with the regulatory requirements. Bidders must complete the attached Regular Dealer/Distributor Affirmation form for each supplier that it proposes to count at 60% or 40%. Failure to properly count supplier participation could result in a determination that the DBE or SBE goal has not been met and may render a bid/proposal non-responsive. Supplier participation is credited towards DBE participation as follows:

- 1. Manufacturer** - a manufacturer is a firm that owns (or leases) and operates a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract and of the general character described by the specifications. Manufacturing includes blending or modifying raw materials or assembling components to create the product to meet contract specifications. **When a DBE makes minor modifications to the materials, supplies, articles, or equipment, the DBE is not a manufacturer. If the materials or supplies are obtained from a DBE manufacturer, count 100 percent of the cost of the materials or supplies provided the purchase meets the above requirements.**
  
- 2. Regular Dealer** - a regular dealer is a firm that owns (or leases) and-operates, a store, warehouse, or other establishment in which the materials, supplies, articles, or equipment of **the general character** described by the specifications and required under the contract are bought, **kept in sufficient quantities**, and regularly sold or leased to the public in the usual course of business. Items kept and regularly sold by the DBE are of the “general character” when they share the same material characteristics and application as the items specified by the contract. To be a regular dealer, the firm must be an established business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question. A DBE supplier performs a commercially useful function as a regular dealer and receives credit for 60 percent of the cost of materials or supplies (including transportation cost) when all, or **at least 51 percent of**, the items under a purchase order or subcontract are provided **from the DBE's inventory**, and when necessary, any minor quantities delivered from and by other sources are of the general character as those provided from the DBE's inventory. A DBE may be a regular dealer in such bulk items as petroleum products, steel, concrete or concrete products, gravel, stone, or asphalt without owning, operating, or maintaining a place of business if the firm both **owns and operates distribution equipment** used to deliver the products. **Any supplementing of regular dealers' own distribution equipment must be by a long-term operating lease and not on an ad hoc or contract-by-contract basis.** A DBE supplier of items that are not typically stocked due to their unique characteristics ( *e.g.*, limited shelf life or items ordered to specification) should be considered in the same manner as a regular dealer of bulk items. However, if the DBE supplier of these items does not own or lease distribution equipment it is not a regular dealer. **If the materials or supplies are purchased from a DBE regular dealer, count 60 percent of the cost of the materials or supplies (including transportation costs) provided the purchase meets the above requirements.**

- 3. Distributor** - A DBE distributor is an established business that engages in the regular sale or lease of the items specified by the contract. A DBE distributor assumes responsibility for the items it purchases once they leave the point of origin ( *e.g.*, a manufacturer's facility), making it liable for any loss or damage not covered by the carrier's insurance. A DBE distributor performs a CUF when it demonstrates **ownership of the items in question and assumes all risk for loss or damage during transportation**, evidenced by the terms of the purchase order or a bill of lading (BOL) from a third party, indicating Free on Board (FOB) at the point of origin or similar terms that transfer responsibility of the items in question to the DBE distributor. If these conditions are met, DBE distributors may receive 40 percent for drop-shipped items. Terms that transfer liability to the distributor at the delivery destination ( *e.g.*, FOB destination), or deliveries made or arranged by the manufacturer or another seller do not satisfy this requirement. **If the materials or supplies are purchased from a DBE distributor that neither maintains sufficient inventory nor uses its own distribution equipment for the products in question, count 40 percent of the cost of materials or supplies (including transportation costs) provided the purchase meets the above requirements.**
- 4. Broker/Facilitator** - With respect to materials or supplies purchased from a DBE that is neither a manufacturer, a regular dealer, nor a distributor, **count the entire amount of fees or commissions charged that you deem to be reasonable, including transportation charges** for the delivery of materials or supplies. **Do not count any portion of the cost of the materials and supplies themselves.**



**MASSACHUSETTS PORT AUTHORITY  
EAST BOSTON, MASSACHUSETTS**

**DIVISION IIB**

**SPECIAL PROVISIONS**

**Chapter 149 and 30 Contracts**

**MPA PROJECT NO. H296-C1**

**PROJECT NAME:  
REHABILITATE TAXIWAY E FROM TAXIWAY M TO RUNWAY 11-29  
AND CONSTRUCT TAXIWAY E5**

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LEAN DESIGN AND CONSTRUCTION

SOIL BORING REPORT

## **DIVISION IIB**

### **SPECIAL PROVISIONS**

1. Description and Location of Work:

1.1 Project Location:

Laurence G. Hanscom Field Airport  
200 Hanscom Dr.  
Bedford, MA 01730

1.2 The Work to be performed under this Contract includes:

1. Pavement Milling
2. Earthwork (Excavation and Embankment)
3. Hot Mix Asphalt Paving
4. Crack Repairs
5. Adjustment of Airfield Light Fixtures
6. Light Fixture Installation
7. Pavement Sealing
8. Pavement Markings
9. Airfield Guidance Sign Modifications
10. Topsoiling and Seeding

1.3 Building Information Modeling:

The Authority recognizes the numerous benefits Building Information Modeling, Models and Model Applications can provide to each phase of a building's life cycle. The Contractor shall comply with the requirements of the Authority's Appendix, BUILDING INFORMATION MODELING.

1.4 Lean Approaches and Tools:

The Contractor shall work collaboratively with the Authority and the Project's Engineer/Architect and other key stakeholders to develop, implement and manage the use of LEAN DESIGN AND CONSTRUCTION. A more detailed description of the Contractor's Lean services is annexed hereto as an appendix.

2. Contract Drawings:

The Contract Drawings are as follows:

<b>SHEET NO</b>	<b>DRAWING NO</b>	<b>DRAWING TITLE</b>
1	T001	TITLE SHEET
2	G001	GENERAL PLAN & NOTES
3	G002	PHASING & SAFETY PLAN NOTES
4	G100	OVERALL PHASING & SAFETY PLAN
5	G101	PHASING & SAFETY PLAN – PHASE 1
6	G102	PHASING & SAFETY PLAN – PHASE 2
7	G103	PHASING & SAFETY PLAN – PHASE 3
8	G003	PHASING DETAILS
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10	V101	EXISTING CONDITION PLAN – 2 OF 6
11	V102	EXISTING CONDITION PLAN – 3 OF 6
12	V200	OVERALL PAVEMENT CORING PLAN
13	V201	PAVEMENT CORE RESULTS
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15	C102	ALIGNMENT PLAN – 2
16	C103	ALIGNMENT PLAN – 3
17	C201	TAXIWAY E PROFILE PLAN STA 308+50 STA 328+00
18	C202	TAXIWAY E PROFILE PLAN STA 500+00 TO 507+16.86
19	C211	GRADING PLAN -1
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21	C301	SPOT GRADE PLAN – 1
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23	C401	TYPICAL SECTIONS – 1
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25	C501	UTILITY STRUCTURE ADJUSTMENT PLAN AND SCHEDULE
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32	C711	MARKING AND SIGN DETAILS - 1
33	E101	ELECTRICAL NOTES
34	E102	ELECTRICAL ABBREVIATIONS AND LEGEND
35	E201	ELECTRICAL DEMOLITION PLAN – 1
36	E202	ELECTRICAL DEMOLITION PLAN – 2
37	E211	ELECTRICAL PLAN - 1
38	E212	ELECTRICAL PLAN - 2
39	E213	ELECTRICAL PLAN – 3 (CIRCUITING HOMERUNS)
40	E231	ELECTRICAL DETAILS
41	E301	LIGHT INSTALL AND ADJUSTMENT DETAILS -1

SHEET NO	DRAWING NO	DRAWING TITLE
42	E302	LIGHT INSTALL AND ADJUSTMENT DETAILS -2
43	E303	LIGHT INSTALL AND ADJUSTMENT DETAILS -3
44	E401	VAULT PLAN

3. Authority’s Representatives:

In accordance with the definitions of DIVISION I, Section 10, of these Contract Documents, the Authority has designated the **Capital Programs and Environmental Affairs Department**, to perform the duties of the Engineer for this Contract.

4. Commencement and Completion of Work:

4.1 The Contractor shall commence Work within five (5) calendar days after the date of Notice to Proceed (NTP) and shall complete the Work fully and acceptably as herein prescribed within **eighty five (85)** calendar days after Notice to Proceed for construction and in accordance with the following milestones. It is anticipated a notice to proceed with mobilization will be issued on or about **July 1<sup>st</sup>, 2025**. Mobilization period is intended to complete pre-construction activities (i.e., procurement of long lead time items, approval of submittals, survey, badging, paving test strip(s), etc.) necessary to begin phased construction activities when the Construction NTP is issued.

Extensive coordination with Massport operations and all stakeholders was conducted to determine the most efficient schedule between construction and operational impacts. Therefore, phased construction activities shall begin on or about **August 4<sup>th</sup>, 2025**.

4.2 The following are the Contract Milestones for the Project.

a. **Milestone 1: 30 Calendar Days**

- **Phase 1** must be completed within 20 calendar days of the construction notice to proceed.
- **Phase 2** must be completed within 10 calendar days of the construction to proceed.

b. **Milestone 2: 41 Calendar Days (Spring 2026)**

- **Phase 3** (inclusive of all light adjustments) must be completed within 36 night and 2 weekend runway closure, which begins on the day of construction notice to proceed. The night runway closure is

defined as the closure of runway 11-29 that prohibits all landing and takeoff operations on the runway between the hours of 10:00 pm to 6:00 am Monday to Friday. Weekend runway closures are from Friday 10:00 pm to Sunday 2:00 pm where landing and takeoff operations on the runway 11-29 are prohibited.

After 30 days curing, finish final pavement marking for taxiway E5. Runway closure to finish this work will need to be coordinated with airport operations.

4.3 The following restrictions apply to the project schedule:

- a. Notice to Proceed dates are subject to grant award from FAA
- b. Weekend and holiday work is allowed with only Hanscom Field operations approval
- c. Work within the Runway 11-29 Safety Area shall be completed during overnight hours only. This includes pavement milling, paving, loam and seeding.
- d. All work on the AOA is subject to approval of Airport operations. Airport Operations may suspend work or order work, and the contractor must comply with all requests of Airport Operations.

5. Liquidated Damages:

- 5.1 The completion of each activity and milestone, as indicated above, is critical to the overall Project Schedule. If the Work, as specified above, is not substantially complete after the duration specified for completion of the Work or for the milestones defined in Paragraph 4, or after any authorized extension of such stipulated time, Liquidated Damages will be assessed and the Contractor shall pay to the Authority the sum of **Five Thousand Dollars (\$5,000) per calendar day** per calendar day for each and every day that the Contractor is in default in completing the Work and the Work described for each milestone.
- 5.2 In addition, for each and every hour or any portion thereof that the Contractor fails to complete Work for the opening and safe operation of Massport facilities, including airfield pavements and lighting circuits if an airport project, by the time stipulated or designated by the Engineer for any individual phase or after a day, night, or weekend runway/taxiway closure, the Contractor shall pay the sum of **One Thousand Dollars (\$1,000) per hour**.
- 5.3 Further, when the Authority closes an active operations area at the request of the Contractor, to do project Work, the Contractor shall be required to immediately move his/her people and equipment into the area and begin work within five (5) minutes of receiving the closure from Aviation Operations. If the Contractor fails to begin work in the closed area within five (5) minutes, the closure will be forfeited. The Contractor shall pay the Authority the sum of **Three Thousand Dollars (\$3,000) for each additional closure** for each additional closure beyond



the allotted closures required to complete this phase of the Work.

- 5.4 The Authority's right to collect liquidated damages shall not be exclusive, but shall be in addition to any and all rights and/or remedies reserved to the Authority under this Contract.

6. Prevailing Wage Rates:

- 6.1 The Contractor and all Subcontractors of every tier are required to pay workers on the Project no less than the prevailing wage rates set forth in this Contract. The Commonwealth of Massachusetts Department of Labor Standards Wage Rate Schedule is to be used for this Contract and is shown on the schedules attached at the end of DIVISION IIB. There are two sets of Prevailing Wage rates contained in this document. In addition to the Commonwealth of Massachusetts rates, the Davis-Bacon prevailing wage rates as determined by U.S. Department of Labor also apply and are included in DIVISION IIC of these specifications. In the event of conflict between the state and federal prevailing wage schedules for any classification, the greater amount for the classification shall prevail as the required prevailing wage rate.

If the Contractor, during the progress of the Work, requires a prevailing wage rate for some additional classification, a request shall be made to the Authority, who in turn will obtain the additional classification and corresponding prevailing wage rate from the Department of Labor Standards or U.S. Department of Labor, as applicable and advise the Contractor of the same. These additional classifications and prevailing wage rates are then to be considered a part of the Contract and the Contractor shall have no claim for additional compensation because of the additional classification or any increase in the prevailing wage rates.

7. Material Substitution:

- 7.1 Where products or materials are specified by the manufacturers' name, or catalog reference, the words "or approved equal" shall be understood to follow. An item shall be considered equal to the item so named or described if:
- a. It is at least equal in quality, durability, appearance, strength and design.
  - b. It performs at least equal to the function imposed by the general design for the Work.
  - c. It conforms substantially, even with deviations, to the detailed requirements for the item as indicated by the Specifications.
- 7.2 The Contractor's proposal however, shall be based on the use of any products or material specified, and where two or more products or materials are specified, the choice of these shall be optional with the Contractor.

- 7.3 Should the Contractor, after award of the Contract, wish to substitute or use any product or materials other than those specified or indicated in the contract documents, the contractor shall request in writing permission for the substitution. The request shall present and fully describe, with product data, shop drawings, and test results, the proposed substitution. The requests shall state the difference, if any, in contract price associated with the substitution, should it be accepted. The Contractor's request for materials substitution shall also include a statement of the contractor's acceptance of responsibility for costs, time, and coordination with other trades, associated with the requested substitution.

Upon receipt of the complete substitution request information, the Engineer will consider the request and advise the Contractor in writing of the decision.

## 8. Shop Drawings, Samples, Product Data, and Work Plans:

- 8.1 The Contractor shall review, verify, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the Work of the Authority or any separate Contractor, seven (7) copies of all Shop Drawings, Product Data and Samples required by the Contract Documents and/or the Engineer. The Contractor is allowed to electronically submit the Shop Drawings to the Engineer for review. The Engineer can require the Contractor to submit hard copies of any shop drawing if the full-size documents are drawn to scale that might otherwise be impacted by electronically submitting the Shop Drawings.

This paragraph outlines procedural requirements for Work related to submittals and shall include, but not be limited to, the following:

- a. Shop Drawings
  - b. Product Data
  - c. Samples
  - d. Miscellaneous Submittals
  - e. Submittal Logs
  - f. Work Schedules and Detailed Work Plans
  - g. Certifications
  - h. Subcontractor Qualifications
- 8.2 Coordination and Sequencing: Contractor shall coordinate preparation and processing of submittals with performance of the Work, so that Work will not be delayed by submittals. Contractor shall coordinate and sequence different categories of submittals for the same Work, and for interfacing units of Work, so that one will not be delayed for coordination with another. No incomplete submittals shall be accepted. The Engineer reserves the right to withhold action on any submittal requiring coordination with other submittals until related submittals are forthcoming. No extension of time will be allowed because of failure to provide properly coordinated and sequenced submittals.

- 8.3 Reviews and Approvals: Contractor shall coordinate all submittals and review them for accuracy, completeness, and compliance with Contract requirements, and shall indicate his/her approval thereon prior to submittal to the Engineer. Submittals delivered to the Engineer without evidence of Contractor approval will be returned without action. Upon receipt of an approved submittal, the Engineer will review said submittal for conformance with the intent of the design only. Results of the review shall be noted on the submittal transmittal form attached to each package returned by the Engineer to the Contractor. Any Work done prior to such review shall be at Contractor's risk. Review by the Engineer shall not relieve Contractor of responsibility for complying with the requirements of this contract.
- 8.4 Submittal Register: Contractor shall prepare and submit a submittal register within seven (7) calendar days after receipt of Notice to Proceed. This register shall be submitted for the Engineer's approval and resubmitted within five (5) calendar days after incorporating Engineer's comments. The following information shall be furnished on the register:
- a. Submittal identification.
  - b. Specification section reference.
  - c. The approximate dates when the submittals will be transmitted.
  - d. The dates by which Contractor needs reviews complete on submittals.

Contractor shall prioritize submittals as follows:

- a. High – Engineer Review of 1 to 5 calendar days
- b. Medium – Engineer Review of 5 to 10 calendar days
- c. Low – Engineer Review of 10 to 15 calendar days.

Contractor will revise the information on the submittal register necessary after any approved Change Order.

Contractor shall post all actual dates of submittal actions and approval as they occur. The submittal register shall be updated and reviewed on a bi-weekly basis. Revisions shall be made as necessary to keep the submittal register in agreement with the scheduled dates shown. Submittals status will be reviewed as a regular project meeting agenda item.

- 8.5 Submittals Requirements: Submittals shall be complete and shall contain all required information, including name of Contractor or Subcontractor, Contract number, project name, drawings number or numbers, and the respective sections and paragraphs of the Specification under which submittals are required. If the Specifications allow Contractor the option of using one or more standards, the drawings, lists or schedules shall indicate the standards to which the items conform.

All Contractor submittals shall be subject to review by the Authority's

Representative at any time during the course of the Contract. Any Contractor submittal found to contain errors or omissions shall be resubmitted as one requiring “approval” action. No adjustments for time or money will be allowed for corrections required as a result of noncompliance with plans or specifications.

**Certification:** Contractor shall certify, by approved stamp and signature, with each submittal page, that it has been reviewed, and that it is correct and in strict conformance with the Contract Documents, except as otherwise explicitly stated.

**Shop Drawing Information:** Information required on shop drawings includes dimensions, identification of specific products and materials that are included in the Work, compliance with specified standards, and notifications of coordination requirements with other Work. Contractor shall provide special notation of dimensions that have been established by field measurement. The Contractor shall highlight, circle or otherwise indicate deviations from the Contract Documents on the shop drawings.

**Composite Shop Drawings:** Prepare composite shop drawings and installation layouts for areas of intersecting trades, ceiling finishes, trades above ceilings, exposed in occupied spaces, and elsewhere as directed by the Engineer to depict proposed solutions for tight field conditions. These composite shop drawings and field installation layouts shall be coordinated in the field and also utilized the composite BIM/CAD/Civil 3D working model for proper relationship to the Work for all other trades, based on field conditions.

**Coordination Drawings:** Coordination drawings are shop drawings that detail the relationship and integration of different construction elements that require careful coordination during fabrication or installation. Prepare and submit coordination drawings of involved trades in a scale of not less than  $\frac{1}{4}$  inch = 1 foot or larger for integration of different construction elements. Show sequences and relationships of separate components to avoid conflicts in use of space. For any Work installed prior to review of coordination drawings subsequent relocations required to avoid interference shall be made at no additional cost to the Authority.

**Preparation of Shop Drawings:** Information shall be drawn to appropriate scale on sheets not less than 8  $\frac{1}{2}$ " x 11", and the maximum sheet size shall not exceed 30" x 42". Contractor shall indicate the name of the firm that prepared each shop drawing and provide appropriate project identification in the title block. Each drawing shall be stamped by the Contractor, indicating his/her review and approval, before submission. Contractor shall provide a space no less than 20 square inches beside the title block for marking the record of the review process and Engineer's "Action" marking.

Contractor shall not reproduce Contract documents or copy standard printed information as the basis of shop drawings. However, if requested by the Contractor, some electronic drawing files may be provided to the Contractor by

the Engineer for reference purposes.

- 8.6 Product Data: General Information required specifically as product data includes manufacturer's standard printed recommendations for application and use, compliance with recognized standards of trade associations and testing agencies and the application of their labels and seals (if any), special notation of dimensions that have been verified by way of field measurement, and special coordination requirements for interfacing the material, product or system with other Work.

Preparation of Product Data: Contractor shall collect required product data into a single submittal for each system or unit of Work. Contractor shall mark each copy to show which choices and options are applicable to the Project. Where product data have been printed to include information on several similar products, some of which are not required for use on the Project or are not included in a given submittal, Contractor shall mark the copies to show clearly that such information is not applicable.

Contractor shall not allow the product data to be used on the Project until compliance with the requirements of the Contract has been confirmed by the Engineer.

- 8.7 Samples: Samples required by the Specifications shall be submitted, after the award of the contract, to the Engineer. No material for which samples are required shall be fabricated or delivered to the site for use until representative samples of same have been approved in writing by the Engineer. Such samples shall be furnished in duplicate, one to the Engineer and one to the Resident Engineer, and delivered by the Contractor without change.

Each sample shall be labeled to designate the material or product, the name of its producer, the name of the Contractor, and the name and number of the project; and each submission shall be accompanied by a certificate describing each sample submitted for approval, certifying that the material, equipment or accessory submitted complies with contract requirements, and include the name and brand of products, the name and address of manufacturer, the name of the Contractor, and the name of the project.

Approved samples, unless incorporated in the Work otherwise specified, shall be kept on file by the General Contractor in the field and accessible for inspection by the Resident Engineer until final acceptance of the Project.

Such samples as may be required for material testing shall be furnished by the General Contractor without extra charge. As required by DIVISION I, Section 60-02 tests will be made on materials delivered for use only as frequently as the Engineer considers necessary to ensure compliance of materials used with contract requirements. The cost of testing materials, or equipment, or accessories to check for compliance with specific requirements shall be borne by the Contractor.

- 8.8 Returns: Any submittal that does not have the Contractor's stamp or is not in the form stated above shall be returned without review.
- 8.9 Copies: Unless the Contractor has electronically submitted the shop drawings as noted in 8.0, they shall submit to the Engineer two (2) high-quality reproducible and five (5) prints of all shop drawings. Catalog cuts and other descriptive data not available in reproducible form shall be submitted in seven (7) copies.
- 8.10 Approval: One (1) set of approved shop drawing reproducible, catalog cuts, and other descriptive data will be returned to the Contractor. If approved by the Engineer, each copy of the shop drawings, catalog cuts, and other descriptive data will be identified as having received such approval by being so stamped and dated. Contractor shall make any corrections required by the Engineer and resubmit as required.
- 8.11 Submittal Review: Except for the record and similar purposes, where action and return of submittals is required or requested, the Engineer will review each submittal marked with the appropriate "Action". Where submittals are found to be lacking required coordination, the submittal will be returned without action. At the Contractor's request, the submittals will be held for submittal of required coordination information. No extension of contract time will be allowed for time associated with submittals held for coordination purposes. Engineer will stamp each submittal to be returned with a uniform, self-explanatory stamp, appropriately marked and executed to indicate the action to be taken: Reviewed, Not Reviewed, Reviewed as Noted, Approved, Approved as Noted (Resubmission Not Required), Approved as Noted with Resubmission Required, Revise and Resubmit, Disapproved.
- 8.12 Contractor's Responsibility: The approval of submittals by Engineer shall not be construed as a complete check, but will indicate only that the general methods of construction and detailing are satisfactory. Approval by Engineer shall not relieve Contractor from responsibility for complying with the requirements of this contract. Payment will not be made for any material or equipment that does not comply with Contract requirements.

Payment will not be allowed for materials at the site for which appropriate submittals have not been made and approved.

Certifications: Where the Contractor proposes submittals of certification in lieu of materials testing, the Contractor shall submit for approval THREE (3) notarized copies of the Manufacturers' or Suppliers' statement for each kind of material furnished, which shall certify compliance with the specifications and shall contain the following information:

- a. Contract Number and Location.
- b. Name of General Contractor.
- c. Name of Contractor or Subcontractor to which the materials are being supplied.
- d. Material description and contract specification section number for which the material applies.
- e. Quantity of material represented by the certification.
- f. Means of identifying the consignment, such as label, marking, seal number, etc.
- g. Date and method of shipment.
- h. Statement to the effect that the material has been tested and found in conformity with the pertinent parts of the Contract:
- i. Results of all required tests including the chemical analysis in the case of metal; or
- j. In lieu of furnishing the results a statement that results of all required tests pertinent to the certificate and not submitted shall be maintained available by the undersigned for a period of not less than three years from date of final acceptance.

8.13 Work Plans: Detailed Work Plans may be required of the Contractor for different components of the Work. Contractor will be advised when a detailed Work Plan shall be required for review and approval. When required, submittal of a detailed Work Plan shall be required at least 5 days before Work is planned. Work Plans will be required when Contractor's Work may have an impact on the following:

- a. Life safety whether it is Worker's safety or the general public,
- b. Operations, including tenants and/or the general public,
- c. existing utilities,
- d. Airspace (i.e., crane impacts),
- e. Any other critical Work activity the Engineer, or the Authority feels more information is required to fully understand the Work.

Work Plans shall also be submitted by the Contractor for all Work that involves coordination with City of Boston, Commonwealth of Massachusetts, or private abutting entity, including Work on private or public utilities.

Contractor's attention is drawn to the Appendices for a WORK PLAN TEMPLATE FORM AND WORK PLAN SAMPLE. The Work Plan shall address all the topics outlined on the form in sufficient detail that will allow the Authority and the Engineer to review the proposed Work. Upon approval of the Engineer, the Contractor shall provide six (6) copies of the completed Work Plan and associated attachments and an electronic submission shall be made in PMWeb.

9. Identification of Equipment:

All electrical, mechanical, and HVAC equipment shall be properly identified including

manufacturer's nameplate, serial number, model, capacity, size, etc., as appropriate for the equipment. The Contractor shall also furnish a copy on-site of the manufacturer's operating instructions and preventive maintenance manual and recommendations.

10. Operations and Maintenance:

10.1 Operations and Maintenance (O&M) is the term used to define those actions by the Contractor that will provide the owner with the necessary documents, training, tools and spare parts necessary to maintain and operate the facility.

10.2 Submittal Requirements: The Contractor is responsible for obtaining source information for all equipment furnished. Contractor will submit all material to the Engineer. In accordance with DIVISION I, Section 107/Article 87. PROJECT MANAGEMENT SYSTEM, Contractor will submit all material to the Engineer in both electronic format using PMWeb, electronically on CDs, and two hard bound copies. Material to be submitted includes:

- a. Replacement Products Procurement Manual: Submit data on equipment reliability, spare parts inventory, including sources of spare parts closest to the Facility. Source suppliers shall include name, address, telephone number and fax number of the supplier. In addition, provide a copy of each product data submittal. Provide complete data on the product used, such as model number, color, etc., the supplier's and manufacturer's names, addresses and fax numbers.
- b. Operations and Maintenance Manuals: Submit in 3-ring, vinyl-covered binders with pocket folders. The binders shall be identified, as appropriate, on both the front and spine. Submit manuals for all major assemblies, equipment, devices and systems specified in Divisions III of the contract. In addition, O&M Manuals shall be submitted electronically in PMWeb and on CDs.

10.3 The following types of information shall be included in each Operations and Maintenance Manual:

- a. Emergency Instructions
- b. Spare Parts Listing
- c. Copies of Warranties
- d. Wiring Diagrams
- e. Parts Breakdown
- f. Start-Up Procedures
- g. Shut-Down Procedures
- h. Inspection Procedures
- i. Maintenance Instructions
- j. Maintenance Schedule
- k. Other Manufacturer's Literature

Also include in O&M Manuals appropriate system diagrams that provide a basis of



equipment identification and troubleshooting. Such diagrams will clearly define all interfaces between the various pieces of equipment in the system and interface controls.

- 10.4 The Engineer will review the O&M Manuals for compliance with the specifications. Upon incorporation of Engineer's comments, the final O&M Manuals will be submitted to the Authority for distribution.
- 10.5 Training: The Contractor shall be responsible for instruction and training of operations and maintenance personnel as specified below.
  - a. Contractor will be responsible for training operations and maintenance personnel on all equipment and systems installed in this facility. Contractor's initial submittal on training will include a schedule and suggested time frames for the instructions. Engineer will review and approve this submittal.
  - b. Operations and Maintenance Training: The Contractor will provide competent instructors for training of personnel designated by the Authority. Such training will consist of classroom and on-the-equipment training. This training must be completed prior to acceptance of a system or equipment. The instructor(s) will have no other duties during this training period. Classroom instruction will not exceed fifty (50%) percent of the total training time, with the balance devoted to on-the-equipment demonstration and familiarization.
  - c. Warranties/Guarantees: A list of all required guarantees/warranties, required by DIVISION III Specifications, and the terms of those warranties will be provided by the General Contractor in accordance with the Submittals section of these specifications. This requirement does not relieve Contractor of the enforcement of any other warranty/guarantee provisions of this contract.
  - d. Refer to DIVISION III Technical Specifications for additional requirements.

#### 11. Drawings and Specifications Furnished

Electronic versions of the Contract Drawings and Specifications have been furnished by the Authority. The Contractor shall supply one set of bound documents at the site for reference by authorized representatives of the Authority.

#### 12. Guarantee of Materials and Workmanship:

All materials, services, equipment and workmanship furnished shall be guaranteed for a period of one year after the date of acceptance unless otherwise specified elsewhere in the contract documents. All Work rejected must be redone at the Contractor's expense.

#### 13. Information and Coordination:

- 13.1 The Contractor shall obtain detailed information from the manufacturers of materials and equipment which is to be furnished and/or installed as to the proper method of installing and connecting same. The Contractor shall also obtain all information which may be necessary to facilitate the Work and the completion of the whole project.

The Contractor shall keep fully informed, as to size, shape and location of all openings required for the equipment and shall give full information to other Contractors.

Confer with all other trades relative to location of all materials and equipment to be installed and select locations so as not to conflict with Work of other Sections. Any conflicts shall be referred immediately to the Engineer. All Work and materials placed in violation of this clause shall be readjusted to the Engineers satisfaction at no expense to the Authority.

The Contractor shall refer to all drawings for a full comprehension of the extent and detail of the Work to be performed. These drawings are complementary with the specification, and any Work indicated, mentioned or required in either is considered as specified by both.

Wherever conflicts occur between materials and equipment to be installed by any of these Contractors, they shall be adjusted prior to proceeding with the installation of Work to the approval of the Engineer. All coordination efforts will NOT be for any extra compensation.

14. Visit to Premises:

- 14.1 Examination of the site and pertinent existing buildings shall be made by the Contractor who shall compare it with the contract drawings and specifications to determine the exact amount of Work including that to be removed, altered and/or reconnected. The Contractor shall be satisfied as to the condition under which the Work is to be performed and gain complete knowledge of the Scope of the Work to provide for a complete and operable systems. No allowances shall subsequently be made for any extra expense to which the Contractor may be accountable due to failure to make such examination and to include the required materials and labor in the bid.

- 14.2 The Contractor will be held to have examined the premises before submitting the proposal for the Work and to have knowledge as to the existing conditions under which the Work is to be accomplished.

15. Geotechnical Data:

Boring Logs of subsurface explorations conducted on the site of the Work are included as

part of DIVISION II, APPENDIX, SOIL BORING REPORT.

16. Cooperation and Coordination with all Trades:

16.1 The distribution of Work in these specifications is intended to be described under the appropriate trade. The Work may be redistributed, except as directed herein, provided no controversy will arise among the trades and progress will not be delayed. The distribution of Work in these specifications shall not impose on the Authority or its agents any responsibility for omissions or duplications.

16.2 The Contractor shall fully coordinate Contractor's Work and the Work of subcontractors of any tier to avoid any conflicts of equipment and conditions. All Work of the sub trades shall be fully coordinated and installed to conform to the requirements of the Contract Documents.

16.3 Contractor shall coordinate, sequence and schedule the Work of each trade so that the progress of the entire project will not be delayed or interfered with and to avoid the need of moving into an area more than once.

17. Partnering:

The Authority encourages, in all its projects, a cohesive partnership among the stakeholders (owner, designer, construction contractor, subcontractors, other impacted organizations, etc.).

18. Schedule of Values:

18.1 Before any allowance will be made in a partial payment estimated on any item for which a lump sum price was bid, the Contractor shall submit to the Engineer, for his review and approval, within 10 days of the date of the Notice to Proceed, a cost breakdown showing in detail the estimated quantities of the various items of Work to be performed and the total cost of such items. The sum of the total costs must equal the lump sum price bid for the Work. The Schedules of Values shall be prepared in conjunction with the preparation of the progress schedules. Correlate preparation of schedules of values and progress schedule. Correlate line items with other administrative schedules and forms required for the Work, including the progress schedule, payment request form, listing of subcontractors, schedule of alternates, listing of products and principal suppliers and fabricators, and schedule of submittals. Provide breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of payment requests and progress reports. For each item, provide quantities, labor cost, material cost, and equipment cost. Break down principal subcontract amounts into several line items and distribute to sub-schedules as appropriate. Round off to nearest whole dollar, but with the total equal to Contract Sum.

18.2 Not Used

18.3 Not Used

18.4 Schedule Updating: Update and resubmit schedules of values when change orders affect listing and when actual performance of the Work involves necessary changes of substance to the values previously listed. List each change order as a new line item to the schedules of values.

19. Project Management System

It is the Owner's intent to limit the amount of paper documents utilized on the Project. Therefore, the Contractor shall be required to utilize the Owner's Project Management System (the Project Management System) relative to the management and administration of the Project. The Owner shall provide the Contractor and his/her Subcontractors and Subconsultants with a non-exclusive, revocable license to utilize the Project Management System, which shall be used to generate all forms of communications including: deliverables, meeting minutes, monthly requisitions, RFIs, submittals, change order requests, and other types of typical correspondences. The generation of documents shall automatically create a document log so the tracking of, and response to documents can be maintained electronically. The Owner shall provide training to the Contractor and, if necessary, his/her Subcontractors and/or Subconsultants, so that the Project Management System can be learned and used effectively.

If the Contract is terminated, such license shall automatically terminate as of the effective date of Contract termination; provided that the Owner shall, for a period of six (6) years following the effective date of such termination, provide the Contractor with reasonable access to those documents that were on the Project Management System as of the date of termination and to which the Contractor had access before such termination. If the Contract is not terminated, such license shall automatically terminate as of the date of final payment to the Contractor; provided the Owner shall, for a period of six (6) years following the date of final payment, provide the Contractor with reasonable access to those documents that were on the Project Management System as of the date of final payment and to which the Contractor had access before such date of final payment.

The Owner reserves the right to adopt written procedures and guidelines regarding the use of the Project Management System by the Contractor and his/her Subcontractors and Subconsultants. The Contractor and his/her Subcontractors and Subconsultants shall be bound by such written procedures and guidelines upon receipt thereof.

20. Project Schedule:

20.1 General Requirements – The Project Schedule is as follows and as further defined in Project Schedule Toolkit

a. The Contractor shall furnish the Authority with a complete and practicable

Critical Path Method (CPM) Project Schedule. This schedule shall be the Contractor’s working schedule and shall be used to plan, organize, and execute the Work, record and report actual performance and progress, and show how the Contractor plans to complete all remaining Work as of the end of each progress report period. The Contractor shall utilize the Project Schedule in planning, scheduling, coordinating, and performing the Work including all activities of subcontractors, vendors, and suppliers.

- b. The Project Schedule shall clearly define the entire scope of the project as defined in the contract documents and include all necessary project phases included but not limited to: design, design submittal process, permitting, procurement, preconstruction, construction, start-up, commissioning, and close-out.
- c. The Contractor shall use Primavera Project Planner P6 release 15.2 or later version software to prepare, maintain and revise CPM (Critical Path Method) schedules using precedence diagramming methods.
- d. The Contractor shall adhere to the following schedule standards and software settings, as defined in Massport’s Schedule Toolkit. The toolkit (available at Massport’s website) defines schedule requirements as well as provides a schedule file and layout file templates (XER and PLF) that supports each of these requirements:
  - i. Project ID requirement
  - ii. Milestone requirements
  - iii. Activity ID requirements
  - iv. WBS requirements
  - v. Calendar requirements
  - vi. Cost Loading requirements
  - vii. Software setting requirements
  - viii. Layout setting requirements
- e. The CPM schedule is required to support ‘level 3’ schedule detail, as defined below.

<b><u>Level</u></b>	<b><u>Name</u></b>	<b><u>Characteristics</u></b>
<b>I</b>	Executive Summary/ Project Master Schedule Information	- Major milestones/ Typically one page - Highlights major project activities, milestones, and key deliverables
<b>II</b>	Management Summary/ Summary Master Schedule Information	- Summary of the project coordination schedule(s) - Depicts the overall project broken

		down into its major components by area
<b>III</b>	Project Coordination Schedule Information	- Includes all major milestones/ Work packages, construction, testing, commissioning and/or start-up. developed via Last Planner™ System
<b>IV</b>	Execution Schedule/ Working Level Schedule Information	- Detailed information by each Work package developed via Last Planner™ System
<b>V</b>	Detailed Schedule Information	- Detailed tasks needed to coordinate day to day Work in a specific area developed via Last Planner™ System

- f. The Contractor shall a furnish the Authority with Lean Pull Planning schedules and other requirements, as defined in Last Planner™ System Minimum Standards Guide (available at Massport’s website). [https://www.massport.com/media/3156/last\\_planner\\_system\\_guide\\_final-2019.pdf](https://www.massport.com/media/3156/last_planner_system_guide_final-2019.pdf)
- g. The CPM schedule will serve as the primary measurement tool for contract schedule performance against the contract milestones, as well as serving as the primary tool for time impact analysis and resolution as supported by Last Planner™ System elements.

20.2 Project Schedule Reporting Requirements

- a. Schedule Narrative – The intent of the narrative is to provide a summary of the contents of the schedule, discuss progress, changes to project performance or critical path Work and highlight areas of concern. At a minimum the Contractor should describe the sequencing of the Work in terms of area and Work activities and provide the rationale for the sequence selected by the Contractor.
  - i. The schedule narrative shall itemize and describe the flow of Work for all activities.
  - ii. As part of the schedule submission process, the Contractor shall prepare a Narrative Report describing:
    - 1 The physical progress during the report period (if applicable),
    - 2 Clearly identify and describe the Work on the critical (or longest path).
    - 3 Plans for the Work during the forthcoming report period,
    - 4 Actions planned to correct any slip in the schedule,

- 5 An explanation of potential delays and/or problems and their estimated impact on performance and project completion dates, including providing status to all notice of delays.
  - 6 Proposed revisions to logic, activity durations and costs,
  - 7 A general explanation of the alternatives for schedule recovery to mitigate any potential delay and/or cost increases.
  - 8 Anticipated crew and equipment projections.
- iii. A narrative may also be required for specific Work of high complexity and sensitivity as requested by Engineer and/or Resident Engineer.
- b. Classic Schedule Reports - The Contractor shall provide a schedule report that include the activity columns and bar chart diagram on 11 x 17 sheets using a scale that yields readable plans and organized to be consistent with the format described herein. These reports should also be submitted in PDF form.
- c. The Contractor should include following schedule reports with all schedule submissions:
- i. All Activities
  - ii. Critical Paths/Longest Paths report
  - iii. Monthly Cash Flow
- d. Definitions - The critical path is defined as the sequence of activities which add up to the longest overall project duration where total float is equal to or less than zero (0) days. Alternatively, the longest path is defined as the sequence of activities which add up to the longest overall project duration where the total float is greater than or equal zero (0) days.
- e. The Contractor is required to use the provided Primavera Layout Files (Kit01 to Kit03), available within the Schedule Toolkit to prepare these reports. The layout files have been created by the Authority to meet specific data and formatting requirements.
- f. All schedule reports shall include the following information:
- i. Activity ID
  - ii. Activity Name
  - iii. Activity OD, RD
  - iv. Start and Finish Dates (Primavera Start & Finish Dates)
  - v. Total Float
  - vi. Calendar ID
  - vii. Target Schedule Information for both the previous schedule update and the current accepted baseline, including the

following fields: Start date, Finish date and Finish Variance

- g. Schedule reports shall be submitted on a medium suitable for reproduction with a title and revision block. The submission shall include one (1) hard copy and electronic copies of the narrative and all schedule reports.
- h. The native schedule file, in XER format, shall be submitted as part of each schedule submission.
- i. The Authority will review the above referenced Narrative, Schedule Reports, XER file, as well as the overall content and integrity of the Contractor's proposed schedule for prosecution of Work and for compliance with the contract.

### 20.3 Project Baseline Schedule

The Project Baseline Schedule shall be submitted within 15 days after the Contract Execution. This submittal shall reflect the entire Work as awarded to the Contractor and shall not include any delays or any Work involving change orders. The Engineer will return the schedule with comments or acceptance within seven (7) calendar days. If not accepted by the Engineer, the Contractor shall revise the schedule in accordance with the Engineer's comments, and re-submit for the Engineer's acceptance within seven (7) calendar days of the receipt by the Contractor of the Engineer's comments. Until such time as the Engineer grants acceptance, the Contractor shall resubmit the schedule by the same time frames and in the same format as required in this paragraph for the initial submission. The Authority may withhold all or a portion of the progress payments until the Contractor submits a complete CPM schedule acceptable to the Engineer.

### 20.4 Progress Schedule

- a. The Progress Schedule shall be statused monthly and submitted to the Authority by the 10<sup>th</sup> of each month. The Authority will review and issue comments prior to the monthly schedule status meeting. The schedule status meeting will occur within 5 to 10 calendar days of the monthly schedule submission or reviewed during the weekly project progress meeting
- b. The Progress Schedule review and acceptance timeline will follow the review and acceptance timeline as described in the Baseline Schedule process.
- c. The Progress Schedule shall be based upon the approved Baseline Schedule. However, if the Baseline Schedule has not been approved within 30 calendar days following the time of the Contract Execution, the Contractor is still required to provide an Interim Progress-Only Progress Schedule submission. The intent is to document field progress during each month of the project, regardless of acceptance of the Baseline Schedule.



## 20.5 Other:

- a. The Contractor shall come to the weekly project progress meeting prepared to provide, as of the end of the updating period, a complete and accurate report of current procurement and construction progress and a depiction of how the Contractor plans to continue the Work to meet contract completion dates.
- b. The Contractor shall provide a detailed three week look ahead schedule. The three week look ahead shall be a separate and distinct file from the CPM file, however, it should align with the dates provided within the CPM and Lean Pull Planning schedules.
- c. The Authority reserves the right to request additional information that will demonstrate the accuracy and feasibility of the CPM schedule. This may include man power loaded schedule, and further breakdown of schedule detail by specific areas/locations, etc.
- d. Restrictions
  - i. Float suppression techniques are not allowed in the Project Schedule. Project total float is available on a first come first serve basis.
  - ii. Activity constraints are not allowed in the Project Schedule.

## 20.6 Impacted Schedules

- a. Notice of Delay
  - i. The Contractor shall notify the Authority in writing, within three (3) Calendar Days of the start of any delay to the Critical Path that is not within the control of the Contractor. Written delay notification is required. All other means will not be recognized as contractual notice in the determination of any Time Extension related said delay.
  - ii. The Authority will evaluate the alleged delay and its impact and will respond to the Contractor within ten (10) Calendar Days after receipt of a notice of delay.
  - iii. The Schedule Narrative should address and update all notice of delays until such time that the delay has been resolved.
- b. Time Entitlement Analysis
  - i. A Time Entitlement Analysis (TEA) shall consist of a descriptive narrative, and a CPM schedule (which may include a schedule fragnet and the project's Contract Progress

Schedule of Record), and illustrates the impact of a delay to the Critical Path and Contract Completion Date.

- ii. TEA must be submitted with 14 calendar days from request by the Authority. TEA must be submitted as part of any Extra Work Order that may impact the Contract Time.
- iii. A TEA fragnet must start with a specific new activity describing the Work contained in either a Notice of Delay previously submitted to the Authority or through an Extra Work Order (EWO).
- iv. A TEA must address the following:
  - v. Accurately reflects all past event and delays.
  - vi. The TEA must also demonstrate a plan for the efficient completion of all of the remaining Work through a complete and reasonable CPM Schedule.
    - 1 TEAs shall incorporate any proposed activities, logic ties, resource considerations, and activity costs required to most efficiently demonstrate the schedule impacts in addition to detailing all impacts to existing activities, logic ties, the Critical Path, Contract Milestones and the Contract Completion Date. In addition, TEAs shall accurately reflect any changes made to activities, logic ties, restraints and activity costs, necessitated by an Extra Work Order or other schedule impact, for the completion of the remaining Work.
    - 2 Demonstrate that all delays have been mitigated to the fullest extent possible without requiring an Equitable Adjustment to the original bid basis.
- vii. The TEA analysis will consider include all project delays, including Contractor-caused delays.
- viii. Following acceptance by the Authority, changes represented in accepted TEA Schedules shall be incorporated into the next Progress Schedule.
- ix. During the review of any TEA, the Contractor must continue to update and submit Progress Schedules.

c. Recovery Schedule

- i. The Contractor shall submit a Recovery Schedule within ten (10) Calendar Days of a Progress Schedule submission that shows failure to meet the Contract Dates.
- ii. Recovery Schedules shall clearly indicate any proposed

overtime hours, additional shifts, and the resources that are proposed to be incorporated in to the schedule.

- iii. The Authority shall have final discretion over the use of overtime hours and additional shifts and shall have the right to require that these resource be used to minimize the duration of Time Extensions, without additional compensation for any Contractor delays, if it is determined to be in the best interest of the Authority to do so.
- iv. Following acceptance by the Authority, changes represented in accepted Recovery Schedules shall be incorporated into the next Progress Schedule.
- v. During the review of any Recovery Schedule, the Contractor must continue to update and submit Progress Schedules.

d. Proposal Schedule

- i. A Proposal Schedule is an alternative schedule used to evaluate proposed changes to the Contract scope or significant alternatives to previously approved approaches to complete the Work, which may include changes to activity durations, logic and sequence.
- ii. A Proposal Schedule may be requested by the Authority at any time or may be offered by the Contractor.
- iii. The Authority may request that the Contractor prepare a Proposal Schedule to further mitigate any delays that are shown in an accepted TEA/Contract Progress Schedule.
- iv. The Contractor shall submit the Proposal Schedule within thirty (30) Calendar Days of a request from the Authority.
- v. The Proposal Schedule shall not be considered a Schedule of Record until the logic, durations, narrative and basis of the Proposal Schedule have been accepted by the Authority.
- vi. Following acceptance by the Authority, changes represented in accepted Proposal Schedules shall be incorporated into the next Progress Schedule.
- vii. During the review of any Proposal Schedule, the Contractor must continue to update and submit Progress Schedules.

e. Disputes

- i. All schedules shall be submitted, reviewed, dispositioned and accepted in the timely manner specified herein so as to provide the greatest possible benefit to the execution of this Contract.
- ii. Any dispute concerning the acceptance of a schedule or any other question of fact arising under this subsection shall be determined by the Authority. Pending resolution of any

dispute, the last schedule accepted by the Engineer will remain the Contract Schedule of Record.

21. Photographic Record of Construction:

Use of any progress photographs is strictly limited by the Authority and cannot be distributed without the Authority's written approval. No articles or stories for commercial publication are permitted without prior written approval from the Authority. No photographs of any aspect of the construction process may be taken without the written approval of the Authority. This approval must be obtained from the Director of Media Relations and the Director of Capital Programs. For any projects performed at Authority Airports, failure to comply with this requirement shall constitute a direct violation of Massport's rules and regulations and the TSA-Approved Airport Security Program, and shall be subject to the penalty set forth for each violation.

22. Prompt Payment:

Notwithstanding the requirements of Section 90-06 of DIVISION I GENERAL REQUIREMENTS AND COVENANTS included herein, Contractors shall make payment to all subcontractors in accordance with DIVISION IIA SPECIAL PROVISIONS for Disadvantaged Business Enterprise Participation Program, paragraph VI Prompt Payment which applies to DBE and non-DBE subcontractors.

23. Variance in Specified Amounts of Materials:

The quantities of units specified in the Proposal are merely estimates of the quantities required to perform the Work contemplated by this Contract, and the Authority reserves the right to increase or reduce the quantities of any such units as it may deem necessary without change of price per unit. It is expressly understood and agreed that there will be no adjustment in unit price if the quantities actually required are less than the quantities estimated.

24. Review of Contract Documents and Field Conditions by the Contractor:

24.1 Before starting Work and at frequent intervals during the progress thereof, the Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Authority, shall take field measurements, examine and verify field conditions before commencing Work, and shall at once report to the Engineer errors, inconsistencies or omissions discovered. The Contractor shall not proceed with any Work if any errors, inconsistencies, or omission exist, or if any doubt or ambiguities exist regarding materials, methods, procedure or result, and shall contact the Engineer for clarification. Failure to do so will result in the Contractor bearing the full responsibility for any required corrections in the Work.

24.2 If detailed information is lacking and the Contractor fails to request the required

information from the Engineer, no excuse will be thereafter entertained for failure to carry out Work in a manner satisfactory to the Engineer. Should the conflict be evident between contract documents, the Contractor is deemed to have estimated the more expensive way of doing the Work unless s/he shall have asked for, and obtained, a written decision prior to submittal of bid as to which method or materials will be required.

- 24.3 Any claim by the Contractor or Subcontractors that, in submitting their respective bids, they did not include all items as shown in the Contract Documents, will be given no consideration for an adjustment of any kind. If any item is specified in a Section which would not normally furnish this item, it shall be the responsibility of the Contractor to coordinate the situation with the Subcontractor, and if the item under consideration is not to be provided by the Subcontractor, it shall be the responsibility of the Contractor to provide the Work in question, without any additional cost to the Authority.
25. Specifications:
- 25.1 The Contractor shall construct the Work in accordance with the requirements of the Contract Documents and referenced standards.
- 25.2 Where references are made in these Specifications to standard specifications, codes, etc., of the U.S. Government, State or local authorities, or professional and industrial societies and associates, the applicable portions thereof shall govern as fully as if they were recited at length herein, and shall include all revisions thereto issued as of the date of the Notice to Contractors, except to the extent that said standards or requirements may be in conflict with applicable law, ordinances or requirements.
- 25.3 Attention is directed to the fact that all applicable Federal and State Laws, municipal codes, ordinances and by-laws and the rules and regulations of all agencies and authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract as if therein written out in full.
26. Permits, Fees and Notices:
- 26.1 The Contractor is responsible for and shall obtain all permits, licenses, and approval required for the Work. All costs and fees associated therewith shall be paid by the Contractor.
- 26.2 The Authority has, in conjunction with the Department of Public Safety, established a process for permitting for all the Authority's Projects. The Contractor shall contact the DPS representative at the Authority's Logan Office Center located at Logan Airport to confirm all permitting requirements for this project and the process and timetable involved.

- 26.3 Contact: *Paul DiChiara*, Massachusetts Department of Public Safety,  
(617) 568-5950
- 26.4 Other permits required for the construction (e.g., City of Boston Electrical Permit) shall also be the responsibility of the Contractor. Coordinate all permitting requirements through the MPA/DPS representative and MPA Environmental Management Unit in Capital Programs Department.
- 26.5 The Contractor shall provide the Authority with copies of all permits, licenses, and inspection reports upon receipt.
- 26.6 The Contractor shall comply with all notices, directives or orders issued to the Contractor by all public agencies having jurisdiction over the project.
- 26.7 All Contractors or Subcontractors performing drilling, boring, auguring, jetting, sheeting or pile installation, soil preloading for consolidation, demolition, excavation or like Work shall, prior to commencement of these activities, contact utility companies having responsibility for underground transmission systems for information relative to locations of existing underground utilities and/or an appropriate dig safe damage prevention and notification agency.
27. Supplement Insurance Requirements:
- 27.1 The Contractor's attention is directed to DIVISION I, Insurance Provisions of these Specifications, pertaining to the specific requirements for insurance for the Contract. All DIVISION I insurance requirements apply to the Contract and may not be waived or amended except as provided below. This paragraph contains additional insurance requirements which apply to the Contract.
- 27.2 For Insurance purposes, the site of Work and/or the project site includes not only the limited physical Work areas involved but also certain other areas of operations set up for utility, sanitary, electrical, water, pollution control, disposal and cleaning purposes; to furnish materials for the Work including storage and stock pile areas and all routes between and among them.
- 27.3 The insurance specified under DIVISION I, Section 70-21A.3. a. i, is changed as follows:
- i. "Each Occurrence Limit \$1,000,000"*
- 27.4 The insurance specified under DIVISION I, Section 70-21A.3. a. ii, is changed as follows:
- ii. "General Aggregate Limit \$2,000,000"*
- 27.5 The insurance specified under DIVISION I, Section 70-21B.1, is changed as follows:
- "Contractor shall provide a Business Auto policy with a minimum limit of*

*\$10,000,000, Each Accident for owned, non-owned, and hired vehicles.”*

All Automobile Liability Insurance Coverage shall (a) be written on an occurrence basis, (b) include Owned, Non-Owned and Hired Car coverage for all vehicles used in connection with the Project by the Contractor, each of his/her Subcontractors, and Vendors (as hereinafter defined), and (c) include a blanket contractual liability endorsement covering all liabilities assumed by the Contractor under the Contract Documents, including without limitation the Contractor’s obligations under the indemnification provisions of the Contract Documents. The required Automobile Liability Insurance limits may be satisfied by a combination of a primary policy and an excess or umbrella policy. For purposes of this Section, Vendors (a) shall collectively refer to vendors, suppliers, material persons, owner/operators, and firms whose sole function is to transport materials, supplies, tools, equipment, parts or other items to or from the Project Worksite, and (b) shall not be considered Subcontractors as defined in DIVISION I, Section 10.

- 27.6 The Authority shall be named as an Additional Insured on all policies of liability insurance.
- 27.7 In the event the Contractor should discover asbestos during the course of construction, Work in that area shall be stopped immediately and the Authority advised of the condition. All asbestos removal will be done by the Authority under separate contract.
- 27.8 The insurance specified under DIVISION I, Section 70-21D, is not required under this contract.
- 27.9 The insurance specified under DIVISION I, Section 70-21E, is not required under this contract.
- 27.10 Not Used
- 27.11 Not Used
- 28. Project Progress Meetings:
  - 28.1 Weekly Project Progress Meetings shall be held. A representative of the Contractor shall attend these meetings. A time and location shall be determined by the Authority for the meetings that is agreeable to all parties: The Authority, the Engineer, and the Contractor.
  - 28.2 The Contractor shall attend weekly Massport Operations meetings to coordinate construction activities with other on-going Massport projects in the vicinity.
- 29. Project Closeout:
  - 29.1 Project closeout is the term used to describe certain collective project requirements that are to be fulfilled near the end of the contract in preparation for final acceptance

and occupancy of the facilities described in this section and prior payment.

Time of closeout is directly related to Substantial Completion; therefore, the time of closeout may be either a single time period for the entire Work or a series of time periods for individual elements of the Work that have been certified as substantially complete.

#### 29.2 Prerequisites to Substantial Completion:

The Contractor shall complete the following before requesting Engineer's inspection for certification of substantial completion, either for the entire Work or for portions of the Work. The Contractor shall list known exceptions in the request. Along with the request for Temporary Certificate of Occupancy (TCO) turnover and an inspection by the Engineer, the Contractor will prepare and submit to the Authority a binder that contains the following documentation and certificates. The binder (Closeout Binder) will be reviewed and, upon verification by the Authority that all requirements have been met, insert the Construction Control documents and submit the request for TCO to the State Building Inspector and Massport. Refer to 780 CMR 9<sup>TH</sup> EDITION – PROJECT CLOSEOUT MATERIALS & REQUEST FOR OCCUPANCY attached to this DIVISION IIB.

- a. A financial statement showing a full accounting of changes, if any, to the contract sum.
- b. Specific warranties, maintenance agreements, final certifications, and similar documents.
- c. Obtain and submit releases enabling the Authority's full, unrestricted use of the Work and access to services and utilities. Where required, Contractor shall include occupancy permits, operating certificates, and similar releases.

Submit As-Built drawings, BIM / CAD / Civil 3D models, final project photographs, damage or settlement survey, property survey, and similar final record information.

- d. Deliver tools, spare parts, extra stock of material, and similar physical items to, or where directed by, the Engineer.
- e. Complete start-up and testing of systems and instruction of the Authority's management and operating and maintenance personnel. Contractor shall remove temporary facilities and services, construction equipment and plant, mockups and similar elements from the area of the Project site to be occupied by the Authority.
- f. List of items not completed and schedule for completion. Contractor shall complete final clean-up requirements.



- g. Contractor shall touch up and otherwise repair and restore marred.
  - h. Final changeover of locks and transmit the keys directly to the Authority.
  - i. Complete the training, as required, of the Authority's personnel associated with the operations and maintenance of the new system(s) installed/upgraded.
- 29.3 In the progress payment request that coincides with, or is the first request following, the date substantial completion is claimed, Contractor shall show either 100% completion for the portion of the Work claimed as substantially complete\ or list incomplete items, the value of incomplete Work and reasons for the Work being incomplete.
- 29.4 Inspection Procedures: Upon receipt of Contractor's request for inspection, Engineer will either proceed with inspection or advise the Contractor of unfulfilled prerequisites.
- a. Following initial inspection, Engineer will either prepare the certificate of substantial completion or will advise the Contractor of Work that must be performed before the certificate will be issued. Engineer will repeat the inspection when requested and when assured that the Work has been substantially completed.
  - b. Results of the completed inspection will form the initial punch list for final acceptance.
- 29.5 Prerequisites to Final Acceptance:

The Contractor shall complete the following activities before requesting Engineer's final inspection for certification of final acceptance and final payment as required by the General Conditions. Contractor shall list known exceptions, if any, in the request.

- a. Contractor shall submit an updated final statement, accounting for final additional changes to the contract sum.
- b. Contractor shall submit a certified copy of Engineer's final punch list of itemized Work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
- c. Contractor shall submit final meter readings for utilities, a measured record of stored fuel, and similar data either as of the date of substantial completion, or else when the Authority takes possession of and responsibility for corresponding elements of the Work.
- d. Contractor shall submit consent of surety.
- e. Contractor shall submit the final payment request with final releases and supporting documentation not previously submitted and accepted.

- 29.6 Re-inspection Procedure: Engineer will re-inspect the Work upon receipt of the Contractor's notice that the Work, including punch list items resulting from earlier inspections, has been completed, except for those items whose completion has been delayed because of circumstances that are acceptable to the Engineer.

Upon completion of re-inspection, Engineer will either prepare a certificate of final acceptance, or will advise the Contractor of Work that is incomplete.

30. As-Built Drawings: NOT USED

31. Federal Participation

It is anticipated that this project will involve Federal Funds under the Airport Improvement Program. The contract will be awarded by the Authority to the lowest responsible and eligible bidder within thirty (30) days (Saturdays, Sundays, and legal holidays excluded) after the opening of bids or within thirty (30) days (Saturdays, Sundays, and legal holidays excluded) after the approval of a federal agency when federal funds are involved. The successful bidder will be notified in writing, by mail or otherwise, that their bid has been accepted and that they have been awarded the contract. **Award of Contract**, which states that the contract will not be awarded until after the approval of a federal agency when federal funds are involved.

32. Fire and Safety Procedures:

Prior to any type of Hot Work operation, the Contractor shall justify to the Project Engineer and the Resident Engineer the need to conduct the operation. Hot Work is any temporary operation involving an open flame or one that produces heat, sparks, or hot slag. This includes, but is not limited to; brazing, cutting, grinding, soldering, thawing pipes, torch applied roofing, and welding.

- 32.1 If the Project Engineer or Resident Engineer approves the need, the Contractor must then obtain the permission of Massport Fire Department and adhere to all procedures including obtaining permits, daily notifications before undertaking any operations.

- 32.2 The Contractor shall adhere to the requirements of the MPA Fire Department regarding all issues of fire safety and public protection including but not limited to burning and welding, equipment and fuels for temporary heating, handling and storage of compressed gases, fire lanes and access, storage of flammable liquids, etc.

- 32.3 The Contractor shall adhere to the MPA Fire Department requirements for all permits, notifications, safety measures including fire extinguishers, fire watches (i.e., Contractor provided dedicated person) and paid Fire Details, throughout the Work as required.

- 32.4 The Authority reserves the right to disallow any Work should the weather conditions prove to be adverse to the safe operation in regards to the proposed hot Work.
- 32.5 Adherence to the MPA Fire Department requirements as outlined above shall be at the Contractor's expense.
33. Smoking Restrictions
- No person shall smoke or carry lighted cigars, cigarettes, pipes, matches or any open flame in any place where smoking is specifically prohibited by signs, upon any open space within fifty feet of any fuel servicing vehicle which is not in motion, or other place under such circumstances as may or might be likely to endanger persons or property. For all projects smoking is not permitted by the Contractor, his/her Subcontractors, or his/her staff.
34. Restriction on the Use of Grounds:
- 34.1 The Contractor shall conduct the Work in a manner that does not interfere with or interrupt the daily operations of the Authority or with the orderly and safe passage of the public or employees.
- 34.2 The Contractor shall confine his/her operations to the actual Work sites, access routes and storage areas designated by the Authority.
- 34.3 The Contractor shall have sole responsibility for providing all materials, equipment, or tools and any storage required. The Authority will not assume responsibility for any loss of materials, equipment, or tools stored on its property. Off-site storage areas, required by the Contractor to stage suitable amounts of materials and equipment to meet the project requirements, shall be the complete and full responsibility of the Contractor for the life of the project.
- 34.4 Contractor's construction equipment and clearly marked company vehicles shall be parked in designated areas only.
35. Vehicle Traffic/Work Site Control and Access at Authority Airports
- 35.1 Not Used
- 35.2 Not Used
- 35.3 Not Used
- 35.4 All vehicles, storage of materials and debris, and the operations of the Contractor in connection with the activities under this Section shall be confined to limits of the contract as shown on the drawings.
- 35.5 The Work shall be conducted in a manner that will not interrupt or interfere with

daily operations of the Authority, the building's tenants or with the orderly and safe passage of the general public.

- 35.6 Drivers of work vehicles shall be instructed as to proper access roads and shall be cautioned that unauthorized use of aircraft pavements or other areas outside the designated Work area may lead to their arrest and subsequent payment of fines.
- 35.7 Contractor shall arrange for, provide and maintain, for all safety barricades, temporary work enclosures and posting of safety/hazard signs in the Work areas as outlined in Article 52.
- 35.8 Airport security is extremely important and should not be treated indifferently by the Contractor. The State Police and the Authority will strictly enforce all rules and regulations.
- 35.9 If any of the Contractor's employees violate the airport's security or driving rules and regulations, they will be cited by the Authority, and the employee may be arrested, fined and banned from the airport secured areas for the duration of the project. Because of this action, if there are any delays in the Contractor's Work schedule, the Authority will not consider any time extensions or claims for extra costs.
- 35.10 If more than two employees are banned from working on the secured areas of the airport, then the Work will be subject to shut down until the Contractor can prove to the Public Safety Officer that the employees have been retrained to work safely within the rules and regulations of the Authority. No time extensions or claims for extra costs will be considered by the Authority for this type of delay caused by the Contractor's forces. It is the Contractor's responsibility to properly instruct, and to assign responsible employees to this project who take direction, are courteous to the Authority staff operating the airport and recognize the importance of working safely within the secured areas of the Airport.
- 35.11 Any Contractor not conforming to these requirements will be considered in direct violation of the FAA-approved Airport Security Program and the Work will be stopped until approval is given by the public safety officer to once again start. No time extension for the contract will be given, nor will any consideration for extra cost claims be given relative to security violations. It is the responsibility of the Contractor to instruct, monitor and supervise work staff so that this condition never occurs.
- 35.12 Security measures at the Authority's airports require that the Contractor remove all vehicles and equipment from the airport upon the completion of Work each day unless otherwise approved. Contractor employee and personal cars will not be permitted within the secured areas of the airport. The Contractor, as a subsidiary obligation, shall provide adequate and safe transportation for employees.
- 35.13 The Contractor shall assure that, all vehicles, without permits, needing to enter the

airfield for construction purposes are escorted by approved escort vehicles to the Work area. The Contractor shall provide adequate security, adjacent to the BOB airfield gates, to properly identify, regulate and escort all construction vehicles during all work hours. Costs incurred by the Contractor for the above shall be considered incidental to the various project items of the Contract. All orders for material shall instruct the supplier of the procedures to be followed.

- 35.14 All vehicles and Workers destined to or from the airfield gates, or from the Work area shall be escorted by a Contractor's vehicle specifically assigned for the purpose. The Contractor shall provide signs to properly direct his/her employees and delivery trucks to the proper field office area. There shall be a person on duty in the Contractor's field office during all hours which materials may be delivered to properly escort vehicles to their destination.
- 35.15 The Contractor shall submit to the Engineer within 10 days after signing of the contract a written method of operations detailing the precautions s/he proposes for the control of vehicle traffic including flag people, signs, escorts, and any other measures s/he proposes. **The Contractor must submit the specific names of the proposed flag people and escorts they are proposing to use on the project.** No Work shall start until this Operations Plan is approved by the Engineer, the Authority Capital Programs Department, and the Authority Aviation Operations Department. No contract time extensions or claims for extra costs will be allowed because of the Contractor's inability to get approval for his/her Operations Plan. If the Contractor submits a reasonable vehicular traffic control plan based on Authority rules and regulations given to him/her by the Authority and these Specifications, there will be no approval delays. A weekly escort plan including names, work shift hours, and Work locations must be submitted to the Engineer and Aviation Operations. Failure to do so will result in Work being canceled and no consideration of extra time will be made.
- 35.16 All persons are prohibited from using a cell phone for personal purposes while driving any vehicle or operating any equipment on Authority Property. Use of a cell phone is strictly limited to immediate business usage and only when the vehicle or equipment in question is stationary. In addition, all other electronic devices, excluding radio equipment required for safe operation of the project, are also prohibited. Unauthorized usage of such devices while on duty can constitute a violation of common safety rules and endanger the safety of fellow employees, customers, and/or the traveling public.

In the case of a personal emergency, the Contractor employees are encouraged to furnish those in need of contacting him or her with the telephone number of the Contractor's field office.

Violations of this requirement related to cellular phone and/or electronic device usage may result in disciplinary action up to and including removal from the project.

- 35.17 Contractor shall make every effort to obtain project Movement Area – Class 3 SIDA badges for all personnel requiring repeat access to the airfield, including sub-contractors and delivery drivers. Multiple Temporary Visitor’s Pass (TVP) requests for the same individual may result in delayed approvals and/or rejections for airfield access. No contract time extensions or claims for extra costs will be allowed because of delays incurred obtaining airfield access resulting from multiple/repeat TVP requests.
- 35.18 No separate payment will be made for these items, the cost of which is considered a subsidiary part of the contract.
- 35.19 No arrangements for parking of personal vehicles will be made and employees are encouraged to take public transportation. Arrangements for temporary storage or parking of Contractor's trucks, cranes and other vehicles must be made through the appropriate Massport representative but there is no guarantee that such requests will be fulfilled. The adequacy and security of any area provided by the Authority to the Contractor for his/her equipment is not guaranteed or warranted. The Contractor is fully responsible for his/her equipment, and hereby waives any claim arising from or related to the suitability of any Authority provided area.
- 35.20 All Contractor and Subcontractor diesel-powered non-road construction equipment with engine horsepower (HP) ratings of 60 HP and above, which are used on the project for a period in excess of thirty days, shall be retrofitted with Emission Control Devices, in order to reduce diesel emissions. In addition, all motor vehicles and construction equipment shall comply with all pertinent local, state and Federal regulations covering exhaust emission controls and safety.
- a. The reduction of emissions of volatile organic compounds (VOCs), carbon monoxide (CO) and particulate matter (PM) from diesel-powered equipment shall be accomplished by installing Retrofit Emission Control Devices.
  - b. The acceptable Retrofit Emission Control Devices for the project shall consist of oxidation catalysts that (1) are included on the Environmental Protection Agency (EPA) *Verified Retrofit Technology List* and (2) are verified by the EPA or certified by the manufacturer to provide a minimum emissions reduction of 42% for VOCs, 31% for CO and 23% for PM. Attainment of the required reduction in PM emissions can also be accomplished by using less polluting Clean Fuels (e.g., PuriNOx).
  - c. The reduction of emissions of nitrous oxide (NOx) and particulate matter to the atmosphere shall be accomplished by using diesel fuel with a sulfur content not to exceed 15 ppm (parts per million) in all construction equipment.
  - d. **Construction shall not proceed until the Contractor has submitted a certified list of the non-road diesel-powered construction equipment that will be retrofitted with emission control devices.** The list shall include (1)

the equipment number, type, make and Contractor/Subcontractor name and (2) the emission control device make, model and EPA verification number. The Contractor shall also identify any vehicles that will use Clean Fuels. Equipment that has been retrofitted with an emission control device shall be stenciled or otherwise clearly marked as Low Emission Equipment.

- e. **The Contractor shall submit monthly reports, updating the same information stated above, including the quantity of Clean Fuel utilized. The addition or deletion of non-road diesel equipment shall be indicated in the report.**
- f. In addition to installing the required emission control devices, the Contractor shall use methods to control nuisance odors associated with diesel emissions from construction equipment, including without limitation the following: (1) turning off diesel combustion engines on construction equipment not in active use and on trucks that are idling for five minutes or more, while waiting to load or unload material (2) locating diesel equipment away from the general public and sensitive receptors (e.g., fresh air intakes, air conditioners and windows) and (3) utilizing electronically-powered scissors/man lifts.
- g. Any costs associated with implementing the dust controls and diesel equipment emissions controls as specified in this Section shall be included in the general cost of the Contract.

35.21 All motor vehicles used wholly or in part within the Commonwealth by the Contractor or any Subcontractor, or by any persons directly or indirectly employed by him/her or them in the execution of the Contract, shall be registered in the Commonwealth of Massachusetts and bear Massachusetts registration plates, or shall be operated under a permit issued by the Registrar of Motor Vehicles in accordance with the provisions of Chapter 90 of the General Laws and 520 C.M.R. 6.00, and amendments thereto, or be registered and bear the required plates for the state where the Contractor's/Subcontractor's applicable office is located. Any person operating a vehicle for the contractor shall be properly licensed. This may include, but is not limited to a state issued driver's license, a state issued commercial driver's license (CDL) with appropriate endorsements or a hoisting engineer's license.

### 36. Security of the Work Site

The Federal Aviation Administration has issued an Emergency Amendment (EA) 107-01-01 that mandates increased security at US airports. In accordance with Contract Specifications, DIVISION I, GENERAL REQUIREMENTS AND COVENANTS, Section 70-01, all Contractors are required to comply with the security provisions provided below. The following security provisions shall be enforced for this particular construction project:

- 36.1 Contractor and their employees should be aware of, and cooperate with, the heightened security at the airport. Report anything suspicious to the appropriate authorities. (State Police 617-568-7300, Fire Department 617-567-2020, and Aviation Operations 617-561-1919).
- 36.2 Contractor shall maintain clean and orderly Work sites and laydown areas. Contractor must be able to positively identify all tools, equipment, stored materials, and vehicles on Work sites. The Contractor shall be solely responsible for coordinating the security of all materials used in the Work including all tools and equipment. The Contractor is responsible for developing a Site Security Plan which shall be submitted to the Engineer for approval.
- 36.3 Contractor shall perform frequent security-related job site inspections. At a minimum, three inspections per day should be performed occurring at the start of the shift, during the Work period, and just before Work ceases.
- 36.4 Contractor shall assign a security point of contact for the project. This person shall be a responsible person and be on site at all times when Work is ongoing. This person shall monitor radio transmissions on the Massport construction frequency. This person shall keep a list of all persons working on the site during a shift and shall designate a point more than 300 feet where all employees are to meet in the case of an emergency evacuation. Escort drivers shall be provided with copies of current employee lists.
- 36.5 For projects performed at Authority Airports, any unattended unidentified vehicle that parks landside, within 300 feet of a terminal, must have a parking permit issued by the Massport Aviation Public Safety Department. Parking of company vehicles will only be permitted within your Work sites; parking along a terminal curbside shall not be allowed unless approved by the Authority, in advance.
- 36.6 Contractor must regularly check the Workers to ensure that their badges are current and are being worn appropriately and by the right person.
- 36.7 For projects performed at Authority Airports, unescorted-Access security badged escorts (Radio Escorts) are required to carry with them a list of those individuals being escorted and always have them in sight and close proximity. The escort must continuously accompany and monitor the person(s) being escorted while in the Security Identification Display Area (SIDA) in a manner sufficient to ensure that the escorted person(s) is/are engaged in activities for which escorted access was granted, and, if not, take immediate corrective action. The escort must remain with the escorted person until the escorted person's departure from the SIDA. Violation of this requirement is subject to enforcement action under the Authority's Zero Tolerance Policy as set forth in the SECURITY IDENTIFICATION REQUIREMENTS which can be found as an appendix.

If Workers are carrying tools or supplies required for airside Work, airside access shall be through the North or South Security Gate as designated on the Contract



### Drawings.

Unescorted-Access security badged Workers, without tools or supplies, may be allowed to access airside through the terminal security checkpoints if approved in advance by the Engineer.

Absolutely no tools can be left airside or in secure areas. The only exception is if the tools are in a company identified locked gang box.

Unattended tools cannot be left in public areas. Landside construction staging areas are considered public areas.

Contractor shall not be allowed in Terminal hold rooms.

For deliveries of equipment or materials that must access Work areas via airside, prior approval must be secured from the Engineer who in turn will obtain approval from Aviation Operations.

Construction Work sites must remain secure. Construction gates must be locked at the end of each day or each work shift. Any landside Work sites within 300 feet of a terminal shall have a locked gate/door when not occupied. While Work is underway within a Work area within 300 feet of a terminal, the gate/door shall normally be closed and either locked with an emergency egress pedestrian gate/door, or unlocked and manned by a Contractor provided gate guard to maintain security of the Work site.

Nothing may be stored, nor will vehicles be permitted to park within 10 feet of either side of the airport security wall/fence.

No separate payment will be made for providing all necessary security measures, all of which are considered a subsidiary obligation of the Contractor and shall be included in the contract prices for the various items.

### 37. Utilities for Construction:

The Contractor shall provide or arrange for, at his/her own expense, water, heat, and electricity for construction purposes, sanitary facilities for Workmen, telephone, and other facilities and services as found necessary for his/her own operations, and throughout the construction duration.

37.1 Separate individual telephone service shall be provided and maintained in the field offices at the Contractor's expenses.

37.2 For projects performed at Authority Airports, water for all construction use may be obtained from the airside fire hydrant system, but will require the Contractor to obtain a fire hydrant permit that shall be issued by the MPA Fire Rescue Department. A fire hydrant as noted on the plans will be designated for Contractor

use. Hydrants designated for Contractor use are marked with green and white paint. A long-term fire hydrant permit (e.g. project duration) for the use of this hydrant will be issued by the MPA Fire Rescue Department upon request. For any other hydrant only a short-term permit may be obtained. The specific approval and duration of a short-term hydrant permit is at the discretion of the MPA Fire Rescue Department. For auditing purposes, it is intended that the water obtained from the hydrant system be metered. MPA shall provide the meter for use by the Contractor. It will be the obligation of the Contractor, through the Resident Engineer, to notify the MPA Utility Management Unit in a timely fashion as to when a meter is needed. The Contractor shall provide quick closing valves on both sides of the hydrant to use in filling his/her tank trucks. Drinking water shall be provided by the Contractor to all Workmen and shall be satisfactorily cooled. The Contractor shall make any necessary connections required from the MPA existing supply and satisfactorily remove these at the completion of this Work.

- 37.3 Electricity for Contractor's Work will be the responsibility of the Contractor. Electrical connections, meters, transformers (if required) for the Contractor's Work site will be the responsibility of the Contractor. The location of these connections must be approved in advance by the Engineer who shall obtain the Authority's Facilities Department's approval. If portable power units are used for Work during the hours of darkness, they shall be suitably muffled to adhere to the pre-specified sound levels of 55 decibels maximum. The cost associated with furnishing such units and usage of the electricity shall be the responsibility of the Contractor.
- 37.4 Maintain existing site lighting at all times. When removal of existing lighting is necessary to advance the Work, provide temporary lighting to illuminate site areas to lighting levels equal to existing lighting levels. Provide adequate construction lighting at all times.
- 37.5 Buildings for the sanitary necessities of all persons employed on the Work, beginning with the first Workman at the site, shall be provided and maintained by the Contractor;
- a. At approved locations near the Work;
  - b. On the basis of not less than 1 unit for each 15 persons;
  - c. In a clean, sanitary condition at all times;
  - d. Of an approved chemical type, or water closets, if permitted;
  - e. Adequately screened to be inaccessible to flies.

The use of existing facilities will not be permitted.

- 37.6 All temporary utilities shall be removed at the end of the Project.

38. Underground Utilities:

- 38.1 The Contractor shall refer to the Drawings and these Specifications covering the utilities and include in his/her bid all Work required in connection with them.

- 38.2 The utility lines and other underground structures shown on the Contract Drawings have been compiled from available record plans of the Authority, but the accuracy of the locations shown and the completeness of information is not guaranteed.
- 38.3 The Contractor shall check and verify the location of all existing utilities both underground and overhead before proceeding to begin the Work or to order materials. Excavation shall be in accordance with Chapter 502 of the Acts of 1980 entitled AN ACT FURTHER REGULATING EXCAVATION IN PUBLIC WAYS, which became effective in the Commonwealth of Massachusetts on October 12, 1980, and all other statutes, ordinances, rules and regulations of any city, state or Federal Agency that may be applicable. Any damage to the existing utilities caused by negligence on the part of the Contractor, and any other costs arising out of said excavation or by reason thereof, shall be the Contractor's sole responsibility.
- 38.4 Approximate locations of known underground utility lines, drains and pipe lines are shown on the contract drawings. Should any phase of the Work require excavating under existing utilities or otherwise endanger their support, the Contractor shall furnish and install at his/her own expense such temporary supports as may be required to prevent damage to or interruption of the utility or utilities involved. Extreme care shall be used in working in areas where buried cable is known to exist. The Contractor shall have on the site, at all times, proper equipment for locating buried cable and such cable shall be located by hand-dug or vacuum excavation test pits before power equipment is permitted to Work in the area. **See DIVISION IIB, for additional information on utility locating.**
- 38.5 The Contractor shall contact FAA AOC Center (866-432-2622) a minimum of 48 hours prior to excavation in the vicinity of FAA underground equipment.
- 38.6 Should any other underground utility line be encountered, the Engineer may make a field check and direct such additional procedure as may be necessary to maintain or eliminate the interfering utility.
- 38.7 Contractor is responsible for installing protective structures as necessary to prevent damage from Contractor's operations. Protected utilities shall be capable of withstanding an HS-20 truck loading applied at grade in accordance with the American Association of State Highway and Transportation Officials (AASHTO) requirements. If utilities are damaged, the Contractor shall be responsible for all costs necessary for repair and operational impact.
39. Utility Location
- 39.1 Existing underground electrical circuits and utilities have been compiled from available as-built plans, and field investigations, and are shown on the Contract Drawings. It is the Contractor's responsibility to locate and mark out these existing utilities to the best of his/her ability prior to beginning any excavation. The

Contractor shall provide a utility locating service to locate and verify utility locations. **No excavation shall begin until the Engineer is satisfied that the Contractor has exhausted every method available to him/her to locate and mark out existing utilities.** These methods shall include, but will not be limited to, opening manholes, handholes, and light bases to determine the orientation of existing circuits, measuring cable insulation resistances and using a utility locator device capable of locating both metallic and nonmetallic utilities (as manufactured by Radio Detector, Inc., Metrotech, Inc., or Biddle Instrument) to trace existing underground raceways, cables, and other utilities. Once existing utilities have been located and marked on the ground, the Contractor shall hand excavate or vacuum excavate all material within three feet of any known existing utility. The Contractor shall also megger the cable of the appropriate circuit in the field lighting vault (at the output of the regulator) to verify the integrity of the circuit before and after excavation. If damage does occur to the existing known utilities, verified by either a visual inspection or by the megger readings, the Contractor is responsible for repairing the damaged utility immediately by the Contractor and at his/her own expense. There shall be no additional compensation beyond unit price Work for hand excavation or vacuum excavation.

39.2 For projects performed at any of the Authority's airport properties, the Contractor shall **notify a FAA site representative at (617) 561-5799** a minimum of 48 hours prior to commencing Work under this project and also prior to crossing existing FAA utilities to coordinate his/her Work with the FAA. The Contractor shall also contact FAA Aviation Office of Communications (AOC) as noted in DIVISION IIB, Article 38.5.

39.3 Utility Locating Service shall be measured and paid for in accordance with DIVISION I, Section 90-05. The amount paid shall be considered full compensation for all labor, equipment and materials required to provide utility locating services. Contractor has full responsibility to locate and mark all utilities within his/her Work area and shall be responsible for all costs associated with repairing utilities damaged by his/her personnel, equipment and his/her subcontractor's personnel and/or equipment. An allowance has been made for this item of Work as indicated in Article 64.4.

40. Debris and Surplus Materials:

40.1 All debris and waste material generated by the construction shall be removed daily from the Massport property by the Contractor. Authority dumpsters are not to be used by the Contractor. Debris shall not be permitted to accumulate at the Project Site and the Work shall be kept clean at all times. Final clean-up is covered by Division III of these Specifications.

40.2 It shall be the responsibility of the Contractor to arrange and be responsible for the Contractor's own off-site disposal area. The Contractor shall also keep all trucking routes clear of dirt, rubbish and unnecessary obstructions resulting from the

construction operations. Equipment and materials storage shall be confined to areas approved by the Engineer. All surplus materials resulting from the construction operations shall become the property of the Contractor, and shall be taken by the Contractor, at his/her own expense, off Massport property and disposed of in accordance with all codes and ordinances governing locations and the methods of disposal. Waste material shall not be disposed of in water, nor by burning.

#### 41. Disposal of Materials/Construction Waste Management

41.1 All suitable materials excavated shall be used as part of the construction of embankments or other structures in accordance with the contract documents before the Contractor brings any off-site materials.

41.2 All unsuitable materials excavated, or removed for purposes of constructing the project shall be disposed of in accordance with applicable local, state and federal law. MPA dumpsters and the designated Contractor staging area are not to be used by the Contractor for disposal. With prior approval by the Engineer, the Contractor may temporarily store unsuitable material at the designated staging area in an area designated by the Engineer. The Contractor shall remove and legally dispose of all debris and unsuitable material from the Work area and the Contractor's staging area to a location off Massport property daily. **Failure to do so shall result in a \$1,000 per day fine and monthly partial payments not being processed until such time that the unsuitable material is removed to the satisfaction of the Engineer.**

41.3 No stockpiling of materials will be allowed within the project area without prior approval of the Engineer. No stockpiling of material will be allowed within the staging area during non-working hours. Restrictions for location, height, and dust control measures as directed by the Resident Engineer shall be adhered to at all times.

41.4 Construction Waste Management. The Contractor shall comply with the Massachusetts Construction and Demolition (C&D) Materials Waste Bans in accordance with 310 CMR 19.017. As of July 1, 2006, construction and demolition materials including asphalt pavement, brick, concrete, metal, and wood are banned from disposal at solid waste facilities. **The Contractor shall report to the Authority's Environmental Management Unit the total tonnage of C&D waste disposed of and total tons of recycled every month during the Work under this Contract (see attached RECYCLED MATERIALS FORM in DIVISION IIB Appendices).** To locate C&D Processing facilities in Massachusetts, please refer to MassDEP's web page at <http://www.mass.gov/dep/recycle/solid/swfacil.htm> See the list titled Active Handling Facilities and Transfer Stations.

#### 42. Construction Environmental Control:

42.1 The Contractor shall be responsible for ensuring that the Work has been installed in accordance with environmental constraints set forth in the Contract Documents or in manufacturer's printed literature, such as acceptable temperature and humidity

limits. Work not so installed shall be considered non-conforming and shall be corrected in accordance with provisions of Article 40 of the GENERAL REQUIREMENTS AND COVENANTS.

42.2 Not Used

43. Occupational Safety and Health Regulations:

- 43.1 The Contract Documents are to be governed, at all times, by applicable federal, state and local law, rules and regulations, including but not limited to, the latest amendments of the following:
- a. William-Steiger Occupational Safety & Health Act of 1970, Pub. Law 91-596.
  - b. Part 1910 – Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations.
  - c. Part 1518-Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations.
- 43.2 The Contractor shall designate a responsible member of his/her on-site staff as a Competent Safety Person among whose responsibilities shall be the administration of the Contractor's occupational safety and health program. The Competent Person shall be capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, the public and the environment. Further, the Competent Person shall have the responsibility and authorization to take prompt corrective measures to eliminate those conditions.
- 43.3 The Contractor shall submit qualifications of the Competent Safety Person, including any designated alternate(s), in writing to the Authority's Project Manager for approval by the Authority's Safety Unit prior to the start of any of the Work. The Competent Safety Person and any designated alternate(s) shall not be changed without the prior written approval of the Authority's Project Manager. During the prosecution of the Work, the Authority reserves the right to direct the Contractor to replace the Competent Safety Person in its sole discretion and at no additional cost to the Authority.
- 43.4 The Contractor shall develop and submit to the Authority's Project Manager a Site-specific Project Safety Plan. The Project Safety Plan shall describe specific safe-work procedures for the Work that the Contractor is expected to perform. For example, if excavations are expected, the Project Safety Plan shall describe in detail the safe-work procedures that the Contractor will implement to ensure employee safety during excavation Work. The Project Safety Plan shall discuss pre-shift meetings and Safety Huddles and address participation, expectations and

compliance. The Project Safety Plan shall be maintained on-site. It shall be updated as conditions change on the project, best safety practices change or new technology becomes available.

- 43.5 Each Subcontractor shall also designate a qualified member of his/her on-site staff as a Safety Coordinator. The Safety Coordinator shall be responsible to ensure their employees are trained in and are in compliance with the Project Safety Plan. The Contractor shall maintain an up-to-date list of all Subcontractors' Safety Coordinators.
- 43.6 The Project Safety Plan shall meet or exceed the aforementioned legal requirements, including but not limited to the Occupational Safety and Health Act of 1970, as amended (OSHA).
- 43.7 The Contractor and all sub-contractors shall immediately report all personal injury, property damage, chemical spills, fires, and crane, automobile or mobile equipment vehicle accidents to the Authority Engineer or their designated representative. This shall not obviate any mandatory reporting required under OSHA. The Contractor shall investigate any accident; analyze causes and implement corrective actions to eliminate similar incidents. A completed Contractor accident investigation report shall be forwarded to the Authority Engineer within 48 hours of the time of the accident.
- 43.8 In accordance with Massachusetts General Law Chapter 30, sec. 39S, all Contractors that are awarded a bid for more than \$10,000.00 must certify that all employees to be employed at the Worksite have successfully completed a 10-hour course in construction safety approved by the United States Occupational Safety and Health Administration (OSHA), referred to as the OSHA 10 course. In order to demonstrate compliance, the Act requires persons to submit documentation of successful completion of the OSHA 10 course with the submission of the first prevailing wage certified payroll report (CPR) for each employee. All employees must carry their OSHA 10-Hour Card when on the project site. Any employee found on the construction site without proof of successful completion of the OSHA 10 training may be removed from the Worksite.
- 43.9 The contractor shall ensure that each newly-hired employee of the Contractor or Sub-Contractor attends a safety orientation session prior to starting Work on the Authority Site. This orientation shall describe the scope of the Work s/he will perform, the Contractor's Project Safety Plan, Emergency Procedures and Notifications and applicable laws and requirements. The Contractor shall have documentation available on-site confirming each Worker's attendance.
- 43.10 Contractor and sub-contractors performing Work on Massport property shall have an inventory of hazardous materials which may be brought on site, a safety data sheet (SDS) for each chemical on the inventory, a description of the labeling system in use, a clear explanation of the potential hazard(s) inherent to the project, and

protective measures to be taken and the safe handling procedures to be used in compliance with the Hazard Communication Standard HCS (29 CFR 1910.100(g)). These items will be maintained onsite for review by Authority Personnel.

- 43.11 The Project Safety Plan shall require toolbox safety meetings to be held on a weekly basis. The topics of toolbox safety meeting shall be relevant to the Work being performed on the project. The toolbox meetings shall be documented by the Contractor's Full-Time Safety Person and shall be available for review by the Authority at any time.
- 43.12 The Contractor Superintendent(s), Assistant Superintendent(s), Resident Engineer(s), Contractor Safety Personnel, Trade Superintendent(s), Foremen and all Workers shall meet prior to the start of the Work shift to discuss project safety. Project leadership shall come to the meeting prepared to explain the Work activities intended for the upcoming shift and identify potential conflicts of trades working in the same location. Other potential topics may be: how to report a safety incident, the location of emergency muster areas, controlled access zones, road closures, impacts that could affect other trades or the traveling public. If the size or complexity of the project does not allow for a single meeting to be held with all project personnel at the beginning of each shift, the contractor may submit a plan to the Project Manager to assure all project personnel attend a pre-shift safety meeting. The pre-shift meetings shall be documented by the Contractor's Full-Time Safety Person and shall be available for review by the Authority at any time.
- 43.13 The contractor shall continually inspect their Work areas to consistently ensure that adequate safety and loss prevention compliance has been planned for each job task and that all site employees are complying fully with the Contractor's job safety requirements. The contractor shall conduct documented safety audits, at least weekly, to include the identification of hazards and corrective actions taken to minimize or eliminate them. All newly identified site hazards, or hazards created by contractor Work shall be reported to the Project Engineer.
- 43.14 All employees of the Contractor, Subcontractors and all other persons entering onto Massport property in connection with the Work shall wear (100% utilization): hard hats, safety glasses with side shields, proper work shoes and proper work clothing. Contractors must assess the workplace for existing and potential hazards to which employees may be exposed during routine and non-routine work tasks to minimize employee exposure to hazards and reduce employee injuries. After performing a Personal Protective Equipment (PPE) assessment, the Contractor shall provide such personal protective equipment and safety equipment for all affected Contractor employees. Additional items may include: high visibility clothing when exposed to any vehicle traffic, hearing protection devices, respiratory protection devices, fall protection devices, temperature protection equipment, hand protection equipment, life-lines and safety harnesses, full-face protection devices, special illumination equipment, U.S.C.G. approved life jackets when working over/near water or any other special equipment/devices required to be worn in their Work.



The contractor shall ensure the equipment is provided, used, and maintained in a sanitary and reliable condition wherever it is necessary. Employees shall be aware of how to select appropriate PPE, wear, maintain, and store PPE and know the limitations of the PPE they are using.

- 43.15 All personnel shall wear, over his/her outermost garment, an ANSI Type 2 standard high visibility reflective vest. Reflective vests that have reduced reflectivity due to age, wear or soiling must be replaced immediately.
- 43.16 All Contractor and all Subcontractors (of any trade) working on Massport Property shall utilize one hundred percent fall protection for all Work at elevations of six (6) feet or more. Contractors must provide, as a part of the Project Safety and Health Plan, a specifically designed fall protection plan to ensure that each employee is protected from falls and are trained and understands their responsibility regarding fall protection guidelines. A conference shall take place prior to starting Work involving all members of the crew and supervisors of any other concerned contractors. During the pre-Work conference, procedures and sequences pertinent to this job will be thoroughly discussed and safety fall protection practices to be used throughout the project will be specified. All personnel will be informed that the controlled access zones are off limits to all personnel other than those designated and specifically trained to Work in that area.
- 43.17 Contractors and/or Sub-contractors who perform Work in confined spaces on Massport property shall certify in writing that all Work will be performed in compliance with the requirements of OSHA standards and this Massport Confined Space Entry Policy. It is the policy of the Authority to eliminate, whenever possible all confined space hazards in order to reclassify a Permit-required confined space to a Non-permit confined space. It is the responsibility of each Contractor and/or Sub-contractor to: maintain communication with emergency response personnel, provide confined space training to their employees and sub-contract employees, provide required entry equipment including: flashlights, multi-gas meter(s), escape respirators tripods, etc., communicate with the Authority's Project Engineer, arranging meeting dates, times, locations and methods of contact, identify communication with entrants using radios, cellular phones, etc. or manually by human relay, coordinate with the Authority to identify the equipment taken out of service, unique restrictions, and known changes to the environment impacting the confined space to be entered, and contact the Project Manager when the confined space permit is closed.
- 43.18 In accordance with Massachusetts General Law Chapter 520, sec. 14.00 all contractors shall obtain a permit prior to the excavation of a trench made for a construction-related purpose. In addition to the permitting requirements mandated by statute, the trench safety regulations require that all excavators take specific precautions to protect the general public and prevent unauthorized access to unattended trenches. Accordingly, unattended trenches must be covered, barricaded or backfilled. Covers must be road plates at least ¾" thick or equivalent;

barricades must be fences at least 6' high with no openings greater than 4" between vertical supports; backfilling must be sufficient to eliminate the trench. Alternatively, excavators may choose to attend trenches at all times, for instance by hiring a police detail, security guard or other attendant who will be present during times when the trench will be unattended by the excavator. The Authority, the Department of Public Safety, or the Division of Occupational Safety may order an immediate shutdown of a trench in the event of a death or serious injury; the failure to obtain a permit; or the failure to implement or effectively use adequate protections for the general public.

Please reference the TRENCH PERMIT APPLICATION package found in the appendices.

- 43.19 Notwithstanding any provision in this Section, the Contractor shall be solely responsible for compliance with all applicable federal, state and local laws, rules and regulations pertaining to project safety and to the health and safety of all persons on the Site during the prosecution of the Work under this Contract.

44. Noise Control Measures:

The Contractor shall implement the following measures to minimize nighttime noise level increases in residential areas:

- 44.1 The Contractor shall, when possible, use noise minimizing techniques to include using quieter equipment when this option exists; altering the mode of operation to minimize noise generation; ensuring that all equipment is properly tuned and equipped with appropriate mufflers.
- 44.2 The Contractor shall use reasonable means to minimize noise generated during nighttime hours.
- 44.3 The Contractor shall disconnect backup beepers and prevent banging tailgates during nighttime operations. The Contractor will be required to use flaggers to direct equipment movement in staging areas during nighttime hours.
- 44.4 Fencing shall be installed around the perimeter of all staging areas. All exterior lighting used within a staging area shall be directed downwards and shall be shielded from or directed away from any roadway and any residential community.
- 44.5 Noise control techniques shall be used to reduce noise from pile driving by at least five (5) A-weighted decibels (dBA) below its unmitigated level.
- 44.6 Not Used
- 44.7 Not Used

- 44.8 The Contractor shall provide enclosures to control noise or operating equipment located in community sensitive areas (within 100 feet of homes or within staging areas). The Contractor shall locate noisy equipment as far from sensitive locations as feasible or provide adequate shielding.
- 44.9 The Contractor shall limit (1) the numbers and duration of equipment idling on the site; (2) the use of annunciators or public address systems; (3) the use of air or gasoline-driven hand tools.
- 44.10 The Contractor shall prohibit trucks delivering bituminous concrete or other materials from slamming their tail gates to clean out truck beds after dumping.
- 44.11 During paving operations, the Contractor will be required to turn off the vibratory compactors prior to exiting the newly placed pavement onto the old pavement.
45. Dust Control, Street Cleaning and Wheel Wash:
- 45.1 Designated wash down areas shall be established by the Contractor on site for the control of dust tracking from vehicles leaving the site. All trucks or other vehicles leaving the site shall be hosed and washed clean of mud clinging to the wheels and exterior body surfaces. Wheel wash installation shall be provided with a gravel base arranged to assure adequate drainage and to prevent puddles. Measures shall be taken to prevent any silt laden runoff from entering the storm drains.
- 45.2 The Contractor shall provide a road cleaning/sweeping plan to the Engineer for approval prior to commencing the Work. Such plan shall provide detailed information about Contractor's routine cleaning or sweeping procedure, the cleaning/sweeping subcontractor, frequency of cleaning, etc. At the minimum, the Contractor shall provide roadway cleaning/sweeping once a day at the end of the Work through the duration of the project.
- The plan shall also provide an emergency cleaning plan in case of soil spills or accidents during trucking operations. The emergency cleaning plan shall establish the procedure and steps that Contractor will follow in handling emergency situations, as well as how fast the cleaning Work can be completed. The Contractor shall be responsible for the cost associated with the routine road cleaning and emergency cleaning operations.
- 45.3 Trucks loaded in the construction area shall have loads trimmed and covered as necessary to assure that no particles, stones, or debris will fall off.
- 45.4 All paved haul roads or access roads shall be kept clean at all times to prevent the accumulation of dirt and mud and the generation of dust by sweeping, washing or other methods directed by the Engineer. Unpaved haul roads shall be maintained by blading and filling as directed/approved by the Engineer. **Dust control shall be maintained at all times.**

- 45.5 Any damage to existing surfaces, caused by the Contractors operations shall be repaired and the areas involved restored to their previous condition, without cost to the Authority.
- 45.6 The Contractor shall control dust at all times during this Contract, including all Work shifts, non-working hours, weekends, and holidays. The Contractor shall submit a Dust Control Plan to the Engineer within thirty (30) days after the award of the Contract. The Plan shall include contact information for the responsible individual(s) from the Contractor, who have authority to implement necessary controls and mitigative measures. The Plan should detail dust control procedures for activities that may typically generate dust (e.g., jack hammering, saw-cutting concrete, haul roads, material storage, etc.).
- 45.7 Fugitive dust shall be controlled through wetting, sweeping, and other suppression techniques. Contractor shall maintain on-site water trucks or other equipment to suppress dust. Trucks hauling materials and excavated materials from the site shall be covered.
- 45.8 The Contractor shall maintain at the job site at all times, while the construction under this contract is in progress, a **minimum of 2** self-propelled, self-contained vacuum sweepers with dedicated operator with not less than a 10-foot broom and not less than 4 cubic yard capacity, approved by the Engineer. The sweeper shall operate as necessary to keep active pavements, access roads and the Work areas clean. At the close of each Work shift, all active pavements and paved roads, including ramps to and from highways, used or dirtied by the Contractor shall again be swept. In addition, the Contractor is required to have a minimum of one sweeper with dedicated operator assigned to each active Work area during all Work hours. A dedicated operator is defined as a person solely assigned to the sweeper with no splitting of time between another piece of equipment. The Authority will take a credit, from the total Contract Price paid for the Work, of \$100.00 for each hour during construction activity that the required minimum of **2** sweepers with dedicated operators are not on-site. This credit will be accrued during each hour that the Contractor is working, days, nights, and weekends included. Actual Work hours for sweepers with dedicated operators on site shall be delivered to and approved by the Authority's Engineer on a daily basis. Should the Contractor only supply a sweeper without an operator or an operator without a sweeper, the Authority will take the full \$100.00 per hour credit for that given time period. Failure to turn in actual on-site hours, on a daily basis, will result in the Authority taking a full credit for the particular Work hours for that 24-hour period.
- 45.9 If in the Contractor's opinion, a sweeper is not needed for a portion of Work, the Contractor may submit a request for waiver of the sweeper requirements, in writing, to the Engineer no less than 48 hours in advance of the Work. The minimum requirement for sweeper(s) with dedicated operator(s), may be waived, if in the opinion of the Engineer, construction activities for a particular day or portion of a day, do not require the use of sweepers.

- 45.10 No separate payment will be made for the construction, repair, sweeping and maintenance of haul and access roads, and all costs thereof shall be included in the contract prices for the various items of Work in the Proposal.
- 45.11 **Pavement sweepings shall be disposed of legally** offsite, in accordance with applicable technical specifications in DIVISION III, and as approved by the Authority. No separate payment shall be made for disposal of pavement sweepings and shall be considered incidental to the various items of Work.
46. Storage of Hazardous Materials on the Staging Area and Emergency Response:
- 46.1 Generally, no hazardous waste, either a listed waste per 310 CMR 30.00 or characteristic waste, shall be stored at the staging area at any time.
- 46.2 The storage of fuel for equipment shall be in an area designated by the Authority. All fuel storage tanks and containers must be installed and maintained in full compliance with all State Codes and Fire Prevention Regulations, in particular, Fire Prevention Regulation 527 CMR 9.00, which addresses Fuel Storage Tanks and Containers and applicable NFPA Codes, especially NFPA 30. No fuel storage shall be permitted within 25 feet of any combustible material, including construction storage trailers, office trailers, equipment, and stored materials.
- The fuel shall be kept in above ground containers approved for use by the Massport Fire Rescue Department. All tanks and containers shall be clearly marked with approved DOT Hazard Placards, No Smoking and Flammable signs as well as product identification signs that indicate the type of fuel stored.
- 46.3 The Authority-approved 20-pound ABC dry chemical type fire extinguishers shall be maintained in working order at each fuel storage area. The Contractor shall also provide the Authority-approved 20-pound ABC dry chemical type fire extinguishers for all trailers used by the Contractor and the Engineer.
- 46.4 Dikes shall be constructed around the fuel storage area and be of sufficient size to contain a maximum spill.
- 46.5 Immediate action must be taken by the person responsible for any fuel spillage to prevent said fuel spillage from entering into drainage ditches, gutters, bodies of water, or into sewer systems or storm water drains of the Authority.
- 46.6 No hazardous waste or hazardous materials including but not limited to petroleum products, chemicals, contaminated soil, demolitions, demolition debris, including any vessels containing such materials, are allowed to be stored on the Worksite or staging area. The Contractor may seek permission from the Authority to have hazardous material on Authority property. Such a request shall be made by the Contractor through the Engineer to the Authority's Environmental Management Unit. If approved by the Assistant Director of Environmental Management, the

Massport Fire Rescue Department and Aviation Facilities, the Contractor must follow all the requirements in the approval and is totally responsible for compliance with the conditions and terms of the approval and for any cleanup and remediation, in accordance with applicable regulations, that may result from releases to the environment. The Contractor shall ensure that neither soil nor ground water have become contaminated from his/her activities. In the event of a release to the environment, the Contractor shall ensure that appropriate notifications to the Engineer, the Assistant Director of Environmental Management, the Massachusetts Department of Environmental Protection, and other agencies with jurisdiction are made immediately and that all appropriate and required remedial actions are undertaken by the Contractor at his/her expense. The Contractor will be held legally and financially responsible for all spills and releases of hazardous materials to the environment.

- 46.7 All fuel spills must be immediately reported to the Massport Fire Rescue Department.
  - 46.8 The Contractor shall provide to the Massport Fire Rescue Department the location, and a list of all flammable materials stored at the staging area. In addition to providing the Massport Fire Rescue Department with a listing of all flammable liquids, gases, etc., this listing shall include any other hazardous materials on site. Appropriate material safety data sheets for each hazardous product in storage must accompany the listing.
  - 46.9 No flammable gases, including but not limited to, propane, acetylene, hydrogen, etc., are to be kept in storage unless appropriate permits for same are issued by the Massport Fire Rescue Department.
  - 46.10 No explosive storage of any nature is authorized within the Staging area. Fire lanes into and around all staging areas, including trailers and storage areas, must be maintained at all times.
  - 46.11 Only clearly marked State Fire Marshal approved fuel storage safety containers, not exceeding five- gallon capacity, are to be utilized for fuel storage not exceeding five-gallon capacity.
  - 46.12 Any waste material temporarily stored at the staging area, with the approval of the Engineer, shall be removed on a weekly basis and disposed of properly. No materials shall be stored within 100 feet of the harbor at any time.
47. Stormwater Pollution Prevention
- 47.1 The Contractor shall be responsible for and develop a **project specific** Stormwater Pollution Prevention Plan (SWPPP). The Contractor shall prepare the SWPPP in conjunction with the Authority. The Authority shall review and approve the SWPPP prior to working commencing.

- 47.2 The Contractor shall identify Best Management Practices (BMPs) to be implemented during construction. BMPs are designed to minimize potential contamination of stormwater as a result of contact with soil stockpiles, materials, equipment, and vehicles.
- 47.3 The Contractor shall be responsible to prepare and submit a Notice of Intent (NOI) to the U.S. Environmental Protection Agency (EPA) for a general permit for Stormwater Discharge from Construction sites under the NPDES program.
- 47.4 No separate measurement for payment shall be made for a customized Stormwater Pollution Prevention Plan and submittal of the Notice of Intent to the U.S. EPA.

48. Emergency Response

The Contractor shall retain an Emergency Response Contractor (ERC) capable of immediately responding to a release of oil or hazardous material at the construction site for which it caused. In the event of a spill or release of oil or hazardous material, the Contractor shall be responsible for containing the material and immediately notifying the Engineer, the Massport Fire and Rescue Department, and the ERC. In addition, the Contractor shall be responsible for notifying the Massachusetts Department of Environmental Protection and the US Coast Guard. In the event of a spill, the Contractor is responsible for complying with all requirements of the Massachusetts Contingency Plan (310 CMR 40.0000), and shall retain the services of a Licensed Site Professional in order to complete all response actions and reporting requirements in accordance with the MCP. **All documents shall be copied to the Authority at the time of submission to regulatory agencies. Refer to DIVISION III, G-002 *Emergency Response* for additional details.**

49. Owner Supplied Engineer's Field Office Furnishings

- 49.1 **There is no additional compensation associated with the Owner Office Furnishings; it is considered a subsidiary obligation.**
- 49.2 The Contractor shall supply and maintain the following items for the duration of the project. All furnishings shall be removed by the contractor at the project completion:

Furnishings

- a. Internet Connection. One portable Wi-Fi hot spot
- b. Photocopier/Printer/Scanner. A photocopier/printer capable of making black and white and color reproductions of 8 ½" by 11" and 11" by 17" sheets on plain paper for the exclusive use of the Engineer. Scanner shall be capable of scanning 11" by 17" sheet in black and white and color. Contractor shall supply toner as necessary and maintain the copier in good working order for the life of the project and shall remain the property of the Contractor at the completion of the Project.

Services

- a. The Contractor shall maintain all furnished equipment in good working condition.

## 50. Contractor's Field Office, Staging Area and Equipment Yard:

- 50.1 The Contractor shall erect a temporary office at the North Campsite as designated by the Engineer to serve as the Contractor's Field Office. This office shall be adequately furnished and maintained in a clean, orderly condition by the Contractor for his/her field at which his/her authorized representative shall be present at all times while the Work is in progress. Instructions received there from the Engineer shall be considered as delivered to the Contractor. **There is no additional compensation associated with the Contractor's Field Office; it is considered a subsidiary obligation.** This office belongs to the contractor and shall be removed by him/her at the conclusion of the Work, including utility connections of water, sewer, and electricity. The Contractor, shall be responsible for all utility charges. Any utilities shall be connected, disconnected as directed and approved by the Engineer. Sewer and water service lines, if connected, shall be removed and capped below the frost line, or at the main. The Contractor shall be responsible for obtaining all the required permits for both his/her field office and as required, the Engineer's field office.
- 50.2 The areas for the location of the Contractor's Field Offices, for storing materials and for servicing, repairing and parking construction equipment are located as shown on the Contract Drawings. All materials to be used in the Work shall be stored in these areas. The Contractor's attention is alerted to the fact that a limited amount of area is available within the designated areas and that exact limits are subject to the approval of the Engineer.
- 50.3 The Contractor may be permitted to store equipment needed for the immediate Work on hand adjacent to the Work area as approved by the Engineer. When approved by the Engineer, low profile equipment and temporary stockpiles for materials to be re-used for construction may be permitted to remain overnight or weekends or at other times the Work is proceeding subject to the following restrictions:

For projects performed at any of the Authority's airport properties, no storage within 400 feet of a runway centerline or 160 feet of a taxiway centerline or within the limits of active runway approach/departure surfaces/zones.

No storage within 100 feet of wetland/coastal buffer zones.

For projects performed at any of the Authority's airport properties, no storage within critical area of any FAA Navigational Aids (coordinate through local FAA Facilities Maintenance Office).



All equipment booms shall be lowered at the close of each day's Work or when stored.

Equipment or materials stored in the field shall be located as directed by the Engineer and approved by Massport Operations where it will not interfere with any airport operations or the operations of any other contractor's Work on the airfield.

Height of stored equipment or materials shall not penetrate the various runway approach and/or departure surfaces, see plans for limits and details of these areas.

- 50.4 Equipment not immediately being used shall be stored in the area designated on the Drawings as Contractor's Field Office and Storage area. The Authority will not be responsible for any vandalized equipment or material stored on or off Authority property.
- 50.5 Storage of flammable/combustible materials requires permits from the various state/local agencies and the Authority. The contractor shall acquire all the necessary permits prior to storing any of the regulated materials within the campsite.
- 50.6 Any area occupied by the Contractor shall be maintained in a clean and orderly condition satisfactory to the Engineer. Contractor shall be required to eliminate weeds and other unwanted vegetative growth within the Contractor's field office and storage areas, as directed by the Engineer. Particular attention shall be given to the elimination of combustible rubbish or debris in the areas and none shall be left exposed overnight or at other periods of time the Work is shut down.
- 50.7 The Stormwater Pollution Prevention Plan shall include any laydown areas and shall include Best Management Practices that shall be implemented in this Area.

No separate payment will be made for the establishment of the Contractor's storage area and equipment yard or for any costs in connection with its maintenance. This Work is considered a subsidiary obligation of the Contractor and shall be included in the contract prices for the various items.

51. Hoisting Equipment and Machinery:

- 51.1 All hoisting equipment and machinery required for the proper and expeditious execution and progress of the Work shall be furnished, installed operated and maintained in safe condition by the Contractor and such subcontractor for his/her own use. Contractor shall submit a list of equipment proposed for this project to the Engineer for approval. No approved equipment taller than 35 feet shall be raised without prior approval from the Authority.
- 51.2 Written notification of all deliveries must be provided to the Engineer 72 hours in advance by the Contractor and each Subcontractor. Written approval must be obtained from the Authority at least 72 hours prior to delivery of cranes or hoists to

the project.

- 51.3 Before any crane, pile driver, drill, or similar equipment can be utilized on the airside or in landside areas affecting aircraft safety as defined by FAA regulations, an FAA Form 7460-1 (Notice of Proposed Construction or Alterations) must be submitted to, and approval received from FAA. The Authority will submit the Form to FAA based on information supplied by the Contractor on the proposed heights/operating areas, and operating schedules of all cranes, pile drivers, and similar equipment. As approval by FAA cannot be controlled by the Authority, the Contractor shall have no claim for delay or damages based on an FAA approval occurring later than expected by the Contractor, if the Authority has promptly submitted the 7460-1 Form after receipt of information by the Contractor. All tall equipment shall either have booms lowered or shall be moved out of areas affecting aircraft operations when not in operation or when directed for safety reasons. Such equipment shall, at all times, be provided with flags and operating lights at their tallest points.
- 51.4 The Contractor shall affix a red Fresnel globe beacon and alternating rectangles of aviation orange and white checkerboard banner on top of all hoisting equipment. The red beacon light shall comply with the requirements of the FAA L-810.
- 51.5 Crane inspection standards shall be based on the latest OSHA requirements found in Subpart N, 29CFR 1926 550.
- 51.6 Crane inspection, testing and maintenance shall also comply with applicable ASME/ANSI and PCSA standards. For the purpose of this document ASME/ANSI B30.5, Mobile and Locomotive Cranes Chapter 5-2 shall be the referenced document for the crane inspection criteria.
- 51.7 For additional details refer to the CRANE OPERATIONS REVIEW & EVALUATION PROGRAM FORM found in the appendices to this DIVISION IIB.

52. Police/Traffic Management Personnel (TMP) Details: NOT USED

53. Existing Roads and Pavements:

- 53.1 Existing paved surfaces adjacent to and within the Contract limit lines shall be properly maintained and protected and any damage caused by this construction operation shall be repaired immediately.
- 53.2 Existing roads and pavements will be used jointly with the Authority, other Contractors and Subcontractors engaged in performing Work for the Authority and with the public. Roads and pavements within the Work of this Contract shall be kept open at all times, unless otherwise directed by the Engineer.

- 53.4 Existing paved roads shall be cleaned and protected at all times from debris, mud and any foreign materials that could cause a hazard or a nuisance. Adequate wash down areas shall be provided for cleaning vehicles entering such areas.
- 53.5 Warning signs shall be provided at entrances to the Work from existing roads and pavements. Warning signs and lights shall be provided as directed by the Engineer, to guard against any hazards caused by the Work.
54. Protection, Repair and Replacement of Existing Work:
- 54.1 The Contractor shall repair and replace, at no cost to the Authority, all items of existing Work which are to remain and are damaged or removed on account of Work done under this contract. Repaired and replaced Work shall match existing adjacent Work in all respects. All such repairs shall be shown by the Contractor on the record drawings. The decision on whether an item must be repaired or replaced shall be binding.
- 54.2 Contractor shall repair immediately any damage to existing Work caused by construction operations to the approval of the Authority.
- 54.3 Upon completion of each activity, the Contractor shall remove, at his/her own expense, from the site of the Work and from adjoining property, all temporary structures and all surplus material and rubbish which may have accumulated during the execution of the Work, and shall leave the Work in a neat and orderly condition. The Contractor shall ensure that neither soil nor groundwater have become contaminated from his/her activities and, if it has, that appropriate notifications to the Authority and agencies with jurisdiction be made immediately, and in the event of a release to the environment that all appropriate and required remedial actions are taken by the Contractor at his/her expense.
55. Cutting and Patching:
- The Contractor shall do all cutting, chasing, grooving, drilling, grouting and patching of new and existing construction necessary to fit together all parts of the Work except where specified to the contrary in DIVISION III of these specifications. Contractor shall not cut or alter any other Work without consent of the Engineer.
56. Security Identification Requirements
- Please refer to SECURITY IDENTIFICATION REQUIREMENTS attached hereto. No separate payment will be made for security media requirements, the cost of which is considered a subsidiary part of the contract.
57. Airport Operation and Safety Requirements for Projects Performed at Authority Airports

- 57.1 Normal airport operations will be conducted on the airfield during construction and the Work shall be carried on in such a manner so as not to interfere with the necessary operation of the airport. The Contractor shall take all precautions necessary to ensure the safety of operating aircraft as well as his/her own equipment and personnel. The Contractor shall follow FAA Advisory Circular 150/5370-2, Operational Safety on Airports During Construction, latest version, with respect to safety requirements for this project as well as any other requirements set forth by the Authority. The Contractor will be required to **submit a Safety Plan Compliance Document (SPCD)** prior to the Notice to Proceed and in conformance with the aforementioned Advisory Circular and any other Authority requirements.
- 57.2 The Contractor shall identify a safety officer who is responsible for Airport safety to monitor construction activities and to coordinate immediate response to correct any construction related activity that may adversely affect the operational safety of the Airport.
- 57.3 No construction or disposal area operations shall be carried on within 160 feet from the centerline of any active taxiway or within 250 feet of the centerline of any active runway or within the limits of active runway approach zones. When permission has been granted to work inside these limits, no equipment shall be left within the limits when not actually working. During lunch break or other breaks in the daily Work schedule, nights, weekends and the days when Work is not permitted or is not progressing, the equipment shall be located outside of these restriction limits. Contractor shall submit a list of equipment proposed for this project to the Engineer for approval. No approved equipment taller than 35 feet shall be raised without prior approval from the Operations shift manager. All booms shall be lowered when the equipment is not in operation. Booms that cannot be lowered shall be stored where they do not penetrate the various runway airspace surfaces and as approved/directed by the Engineer. All booms shall be equipped with standard FAA checkered orange and white flags and obstruction lights which shall be lighted at all times. No construction operations including an open flame, such as welding or burning, shall be carried on near any aircraft.
- 57.4 The Contractor shall obey all instructions as to the operation and routes to be taken by equipment traveling on airport property. Any signs, lights, signals, markings, traffic control and other devices that may be required by the Authority shall be provided and maintained by the Contractor during the course of the Work, subject to the approval of the Engineer. Lighted channelizer cones shall be provided by the Contractor and must be maintained by the Contractor for the duration of the project. No aircraft pavement or navigation aid currently lighted shall be left unlighted overnight unless closed to all airport operations. The Contractor shall check all temporary lighting to assure its operating condition before leaving the job each day.
- 57.5 The Contractor shall stake and permanently mark on the ground with a readily recognizable marking (football field marking or similar material) the restriction

lines parallel to the taxiways and runways adjacent to the Work and the approach zone limits so that Workers can readily recognize the limitations.

- 57.6 The Contractor shall coordinate his/her Work with the Engineer so that no less than 48 hours' notice will be given before he/she starts Work in any area. No trenches or other excavation shall be left open within runway or taxiway safety areas when the runway/taxiway is to be returned for aircraft at the end of the Work shift. The use of steel plates is prohibited on the airfield.
- 57.7 Vehicles will not be permitted to cross intersecting active runways unless such operations have been approved in advance and then only when the crossings are approved/coordinated under the control of Aviation Operations, the ATCT and with an approved radio escort vehicle.
- 57.8 Logan International Airport Projects: Not Used
- 57.9 When the weather degrades so that the line of sight between the Air Traffic Control Tower and the Work area is lost or visibility degrades to 1 mile or less with a ceiling of 500 feet or less, based on National Weather Bureau observations, the Contractor shall work only with the approval of the Engineer. The Contractor shall also cease work if the FAA and MPA operations determine that weather or any other condition warrants ceasing construction activities until the arrival of favorable weather/other conditions. The Contractor shall not consider such a stop to construction activities a valid reason for any claim for extra compensation.

## 58. Standard Operating Procedures for Construction

Operations must continue in full throughout periods of construction Work. Where the operation of the Authority's services, utilities, function, spaces and facilities conflict with Contractor's activities, the operations of the Airport will take precedence. Authority personnel will work with the Contractor, Authority tenants and other impacted parties, so long as operations are not adversely affected.

These Standard Operating Procedures (SOP) specify requirements and limitations imposed on construction activity for Authority Airports within the Air Operations Area (AOA), the purpose of which is to allow the safe and efficient operation of the Airport.

These Standard Operating Procedures were prepared to assist contractors during construction projects, and supplement the Project construction specifications, but in no way are intended to be all-encompassing.

There are other rules and regulations published by various agencies that also place constraints on construction activities on airports. The rules and regulations of the Authority, Federal, State or local authorities, when in conflict with these rules and regulations, will govern.

The Contractor is responsible for ensuring compliance with the SOP. The Authority

Aviation Operations Department will check on the enforcement of the SOP and will issue fines to contractors who do not comply with the SOP (Fines start at \$100.00). Any exception requires specific authorization by the Aviation Operations Department on a case-by-case basis.

If a conflict should arise on the interpretation of the SOP, the Aviation Operation Department's interpretation of the SOP is final. Any questions or comments on these SOP should be directed to the Aviation Operations Department through the Engineer.

#### 58.1 Security Identification Requirements

The AOA at Authority Airports is a secured area. No person may enter upon the AOA without the permission of the Authority. Those persons granted permission from the Authority to work on the AOA must have issued to them a Security Identification Display Area (SIDA) Badge in accordance with SECURITY IDENTIFICATION REQUIREMENTS found in the attached appendix. While on the AOA, the security badge must be visible, that is, prominently displayed on the badge holder. The badge will include the name, the employer's name, and expiration date, badge number, area of the Airport where the person will be working, and a color code indicating the type of the Authority driver's license.

#### 58.2 Operation of Vehicles on the AOA

No vehicle shall be permitted upon the AOA unless it shall be in sound mechanical order, shall have adequate headlights, horn and brakes, and clear vision from the driver's seat. Trailers and semi-trailers shall not be permitted upon the Airport unless they are equipped with reflector buttons placed upon the rear of such vehicles and unless they shall be equipped with proper brakes so that when disengaged from a towing vehicle, neither aircraft propeller wash nor jet blast nor wind will cause the trailer to become free-rolling. Positive locking couplings will be required for all towed equipment.

No vehicle shall be operated on the Airport if such vehicle is so constructed, equipped, or loaded as to deposit foreign material on the surfaces of the pavements or endanger or to be likely to endanger persons or property.

No person shall operate a vehicle on the Airport in a careless manner, or in disregard of the rights and safety of others, or without due caution or circumspection or at a speed or in a manner which endangers or is likely to endanger persons or property, or while under the influence of intoxicating liquor, or any narcotic or habit forming drug.

No vehicle or equipment shall be located so as to prevent free access to, and the normal use of, gates, doors, passageways or vehicle service road (VSR), or within a radius of twenty feet of any fire hydrant.

Any vehicle transporting hazardous materials, including, but not limited to,

flammable liquids, gases, solids, compressed gases, corrosives, radioactive materials, etc., must be provided with the appropriate DOT hazard placards identifying the hazard.

- a. Vehicles operated on the VSR shall not exceed 20 MPH.
- b. Vehicles that exit the VSR shall do so perpendicular to the VSR.
- c. Vehicles operated on the Perimeter Road shall not exceed 25 MPH.
- d. Aircraft and emergency vehicles have the right of way at all times.
- e. If an operator of a vehicle is in doubt they must stop.
- f. No vehicle may be driven between or under aircraft.
- g. A vehicle may not be left unattended with the engine running.
- h. Any vehicle left unattended within a construction area must be unlocked and the keys left in the ignition.
- i. Vehicles shall be prominently marked on the sides to identify ownership.
- j. Vehicles which routinely operate on the AOA shall be equipped with lighted beacons
- k. Escort Vehicles shall be equipped with lighted beacons and orange and white checkered flags.

For more comprehensive requirements for vehicles, consult the Authority's Comprehensive Rules and Regulations (740 CMR, Section 22.05)

58.3 Emergency Telephone Numbers

The Contractor shall prominently display at his/her field office the following emergency telephone numbers:

ALL EMERGENCIES .....911

For Projects Performed at Logan Airport:

STATE POLICE .....617-568-7300

MASSPORT FIRE RESCUE DEPARTMENT .....617-567-2020

AVIATION OPERATIONS .....617-561-1919

OPERATIONS SHIFT MANAGER .....617-561-1847

Before any Work is started on the Project, the Contractor shall supply to the Engineer a list of emergency telephone numbers.

The emergency telephone numbers are necessary so that the Authority can contact persons responsible for the construction Work during an emergency.

The list shall include:

- The person's name
- Position of responsibility
- Daytime telephone number

- Home telephone number
- Cellular telephone number
- Radio call signs, if applicable

Persons that should be included are, but are not limited to:

- Contractor's Project Manager
- Project Superintendent
- Safety Coordinator
- Project Foreman
- Radio Escort Drivers
- One of each Subcontractor's representatives

#### 58.4 Construction Coordination

Coordination of all construction activities on the AOA will be done on a daily basis with the Engineer. There will be weekly meetings with Operations personnel to discuss the Contractor's scheduled Work for the coming two weeks. The time and place for these meetings will be designated by the Engineer in coordination with Aviation Operations.

The Contractor is required to complete the Standard Format for Contractor Submittal at Weekly Project Job/Operations Meetings form. The form shall be completed in its entirety. If any item does not apply, the Contractor shall so state this on the form.

The Contractor shall briefly describe the Work to be completed during the coming two weeks and any special equipment impacts, such as having tall equipment within the safety areas.

For each day of the week, the Contractor shall list his/her primary Work schedule and an alternate Work schedule than can be implemented when the primary Work cannot be accomplished because the areas are not available due to wind/weather or aircraft operation. The Contractor shall list for each day the area requested for closure, the date, the time the closure will begin, duration of closure, the recall time necessary for the Contractor to return the area into service, and the radio call sign assigned to the Work area.

The Contractor will provide a detailed explanation for escorts. Refer to Article 57.

The entire Operations Plan must be discussed with the Contractor prior to submittal of this plan to the Operations Department, FAA Tower Chief and Airline Tenants.

The Contractor shall list comments as required, such as, but not limited to:

- a. a change in the haul route;
- b. the necessity of working within a safety area;
- c. any temporary gates that may be used onto the AOA



The Contractor's field supervisor shall provide company name, supervisor's name and title. These forms shall be prepared and distributed to persons in attendance at the weekly Operations meeting.

The Contractor shall also prepare a colored sketch or sketches showing the areas where construction Work will be performed. The sketch shall show any phasing, haul routes depending on runway use, and the area to be barricaded by the Contractor for its operation.

The Contractor shall complete the above-mentioned forms and submit copies to the Engineer two days prior to the weekly operations meeting. The forms will then be revised, as necessary, based upon the Engineer's comments and presented at the weekly Operations meeting.

Failure of the Contractor to submit these forms in a timely manner will result in suspension of any construction operations for the following week.

Once the Operations Plan has been approved at the weekly operations meeting, the Contractor shall follow this plan. If a situation arises that prohibits the Contractor from following its schedule, the Contractor shall notify the Engineer immediately, and, if possible, an alternate Work plan may be implemented after coordination with Aviation Operations.

Each and every morning, prior to the start of construction operations for that day, the Engineer will coordinate closures with the Operations Shift Manager. No requests for closures by the Contractor, or Radio Escorts, will be accepted by the Authority's Shift Managers or Air Traffic Control Tower personnel.

If the Contractor is found to be conducting operations in areas other than those scheduled with the Shift Manager, the Contractor's operations for the entire Project will be suspended.

The Contractor shall be fully prepared to conduct the scheduled construction operations. The Contractor must have on site, at least the minimum operational specified sweepers, operators and radio escorts for the Project.

No area of the Airport will be closed for construction operations until the contractor's Workforce is in position to start Work in the Project area. The Contractor must be prepared to begin construction activity for which it requested closure within five minutes of receiving approval.

#### 58.5 Haul Routes

If a haul route is not designated within the Contract Documents, a haul route will be established by Aviation Operations. Any variation or deviation to the established haul route must be approved by Aviation Operations. No vehicle may travel haul routes unless properly escorted. All haul routes shall be properly

protected and maintained and any damage caused by the construction operation shall be repaired by the Contractor immediately. Existing roads and pavements will be used jointly with the Authority, other contractors and subcontractors engaged in performing Work, tenants and the FAA. Roads, aircraft access areas and pavements shall be kept open at all times, cleaned and protected from debris, mud and any foreign materials that could cause a hazard or a nuisance. If a Contractor fails to maintain haul roads or construction areas as stated above, the Authority will correct any deficiencies and the Contractor will be assessed the cost for corrective measures.

#### 58.6 Temporary Construction Barricades and Lights

When the Contractor is working on taxiway, apron, or runway areas and these areas are closed for his/her operations, airport approved lighted channelizer cones and barricades shall be placed across the taxiway/apron/runway areas at the locations as shown on the Contract Drawings, spaced not more than 4 feet on center and/or as directed by the Engineer and maintained in place as long as the area is closed, after which they shall be removed promptly. The cones and barricades shall only be removed after the Work area has been inspected and deemed ready to be returned to service by Aviation Operations and the Engineer. The cones and barricades shall be the last items removed from the Work area before it is reopened. The Contractor shall use lighted channelizer cones and barricades to delineate the areas of Work and closed airfield pavements according to Contract Drawings. The lighted channelizer cones and barricades shall be in accordance with the detail on the Contract Drawings. The placement and location of all channelizer cones and barricades shall be subject to the approval of the Engineer and Aviation Operations.

The Authority maintains a supply of lighted channelizer cones and barricades for contractor use but the Contractor is required to provide all the battery powered flashing red barricade lights. Should additional lighted channelizer cones be required, they shall be provided by the Contractor under the allowance item for cones barricades and signs.

All temporary barricades and lights described above shall be made to withstand jet blast up to 100 MPH by weighing them down with weighted rings or other methods approved by the Engineer.

No separate payment will be made for transporting, setting, maintaining, installing and removing barricade lights, relocation or removal, or returning to the Authority channelizer cones, barricades, signs, etc. required by the Engineer or MPA Operations to satisfactorily designate an area as closed to aircraft operations all of which is considered a subsidiary obligation of the Contractor and shall be included in the contract prices for the various items. At the completion of the project, the Contractor shall remove the flashing lights, neatly stack the channelizer cones, barricades and signs at the North Campsite. The channelizer cones, barricades and signs shall be turned over in good condition, and unbroken, as approved by the Engineer. The Contractor is responsible to dispose, replace, in kind, at no additional

cost to the Authority, any MPA supplied items that are damaged during construction.

#### 58.7 Lighted Portable Runway Closure Markers

- a. The Contractor shall supply 2 lighted portable runway closure markers for use for the duration of the project. For closures greater than two hours, lighted and portable runway closure markers are required. These markers shall be placed at locations as approved by the Engineer and MPA Operations.
- b. The lighted closure markers shall meet the requirements of FAA Advisory Circular 150/5345-55, Specification for *L-893 Lighted Visual Aid to Indicate Temporary Runway Closure* and shall be powered by a liquid cooled diesel generator. The Contractor is responsible for transporting the closure markers to and from the required locations and ensuring that these markers remain in operation at all times during the required closure. The cost for supplying, installing, maintaining, and removing the runway closure markers shall be considered a subsidiary obligation of the Contractor and shall be included in the contract prices for the various items and will not be paid for separately under the allowance for signs and barricades. At the conclusion of the project, the lighted portable runway closure markers shall remain the property of the Contractor.

#### 58.8 Safety and Other Protected Areas for Projects Performed at Authority Airports

The alignment of departing and landing aircraft has developed three-dimensional surfaces in which aircraft operate. Some of the surfaces are known as approach, approach transition, safety areas, object free areas and obstacle-free zones. These areas must remain clear of obstacles at all times. Every runway and taxiway has a safety area which is described as the graded area surrounding and upon which the runway or taxiway was constructed. The safety area enhances the safety of aircraft which undershoot, overrun, or veer off the pavement.

All construction activities must remain clear of these safety areas for the protection of construction personnel and equipment as well as ensuring safe operating areas for aircraft.

The Contractor will be required to clearly mark the limits of these safety areas prior to the start of any construction. If the marking becomes obscured, the Contractor shall remark the limits immediately.

When a runway/taxiway is closed for construction, and it becomes necessary for the Contractor to clear the area temporarily, the safety area marking will show the minimum distance the Contractor must move his/her Workers and equipment.

The type and location of safety area marking must be approved by the Engineer and/or the Operations Shift Manager.

In general, the safety area for a runway is 250 feet from the centerline of the runway and 160 feet (for Group V and 193 feet for Group VI aircraft) from the centerline of a taxiway.

At no time will the Contractor be allowed, at the end of a day, to leave the Work area in a condition that creates a hazard to aircraft or ground personnel.

The Contractor shall be responsible for repairing any damage it has caused, including damage to infield areas.

There shall be no equipment left in the Work area when Work is not in progress. All equipment shall be stored at the Contractor's designated or accepted staging area. From time to time, equipment may be temporarily parked on the AOA, at an area other than the staging area, but only when permitted by the Operations Shift Manager. Any equipment parked temporarily overnight shall be marked with lighted barricades.

No objects shall be located within any Object Free Area, except for objects that need to be located within the Object Free Area because of their function.

There shall be no drop off or rise in excess of three inches at the edge of a runway or taxiway pavement surface. There shall be no ruts, depressions, or holes deeper than 3" left in the graded safety areas.

There shall be no trenches left open at the completion of the work day.

There shall be no stockpiled materials at the Work site that cannot be used during the work day. No stockpiles of material shall be left within any Object Free Area.

All construction areas must be cleaned of all materials and debris before returning the area for aircraft operations. The Contractor shall not leave the Work site until the area has been inspected and accepted by the Operations Shift Manager.

The Contractor shall not operate cranes or boom trucks on the AOA until approval is obtained from Aviation Operations.

The Contractor shall not perform any Work in, on, or around any navigational aid unless prior approval is given by the Authority and FAA Facilities. The Contractor shall notify the Authority and FAA Facilities at least 48 hours prior to any Work being performed at FAA Navaids.

Any electrical Work performed must be coordinated with the Authority Facilities Department (see Appendices for the ADVISORY NOTIFICATION ELECTRICAL SHUTDOWN FORM). If power is shut off because of Work being performed by the Contractor, it is the responsibility of the Contractor to witness the shut-off by Authority personnel as well as the energizing of the system by Authority personnel.

At no time will a Contractor be allowed to independently interrupt any electrical or communication service.

The Contractor shall not leave the Work area until all electrical Work has been inspected and returned to full operation.

The Contractor shall not use an open flame on the AOA unless and until approved by the Massport Fire Rescue Department. This includes, but is not limited to, cutting torches, welding equipment, tar kettles, heating salamanders and smudge pots.

The Contractor's equipment, as well as the area where the Work is to be performed, shall be inspected by the Massport Fire Rescue Department prior to the Contractor starting any Work using the above-mentioned equipment. If it is deemed necessary by the Fire Chief or his/her designee, a Fire Department Detail may be required, depending upon the extent and nature of the Work to be performed. The cost for this paid fire detail shall be paid by the Authority.

#### 58.9 Night Operations

Because of the heavy use of certain areas of the airfield by aircraft, Contractors may be required to conduct construction operations at night.

Generally, the hours for night time construction are from 11:00 PM until 5:00 AM.

Lighting of construction vehicles is of extreme importance. All escort vehicles must be equipped with strobe lights or lighted beacons. Depending upon the location of the Work area, either some or all other vehicles and equipment may be required to have warning light devices.

Some construction areas are very close to the residential areas of East Boston and Winthrop and therefore Contractors must take special precautions to mitigate any unnecessary noise, dust and light that may cause a negative impact on these areas.

Construction areas are to be lighted with portable lighting units. These light units must adequately illuminate the Work area. The Contractor shall ensure that enough portable light units are available for the construction area. If, in the opinion of the Contractor, the Contractor has not provided enough portable light units to adequately light the area of construction, the Contractor shall supply additional lighting units or the Contractor will reduce the Work area to ensure adequate lighting for safety.

Portable light units shall be located in a manner that will not direct a beam of light directly at the Air Traffic Control Tower, landing or departing aircraft, or in any manner that will cause light to be directed toward the residential areas surrounding the Airport.

The Contractor shall instruct its Workforce, including subcontractors and delivery trucks, to refrain from directing vehicle headlights into the surrounding residential neighborhoods.

The Contractor shall also ensure that all vehicles and equipment be equipped with mufflers to minimize noise. Also delivery trucks are prohibited from banging tailgates, revving up engines or performing any operation that unnecessarily increases the noise level.

When construction operations are conducted in areas adjacent to the VSR, which may cause the VSR to be temporarily relocated, the Contractor shall clearly delineate the relocated VSR with beacons and provide flag persons to direct vehicle traffic. The flag persons shall also be equipped with reflectorized safety vests and flash lights for directing traffic.

59. Radio Control and Sign For Projects Performed At Logan Airport:

59.1 Radio control of construction operations will be required when the Contractor is crossing an active taxiway or runway, or is working on any air operational areas, including taxiways, runways, and aprons. All Work in infield areas (grass or pavement areas surrounded by taxiway, runway, and/or aprons) shall also be performed under approved radio control. A minimum of one (1) radio escort shall be assigned to each active Work area. A Work area is defined as an area where Work is being performed by Workmen/women within earshot distance and sight of the radio escort. The boundaries of Work areas may not cross active runways or taxiways. Radio escorts shall not simultaneously, be assigned to multiple active Work areas. Radio escorts shall continuously monitor all construction activities within the assigned Work area and ensure that no personnel or equipment violates runway/taxiway safety area criteria or penetrates the various runway surfaces. When activities in any given Work area are such that they cannot be satisfactorily monitored by one escort, the contractor shall either provide additional escorts or reduce the Work activities, as approved by the Engineer.

59.2 The Contractor shall have on the site at all times a minimum of **three (3) radio-equipped** vehicle(s) with operator(s) (radio escorts) who shall monitor the radio during all working hours. The radio vehicles shall each have a two-way radio on the FAA frequency, a two-way radio on the Massachusetts Port Authority frequencies and a radio on the Contractor's own frequency. The Contractor's superintendent shall carry at all times a portable 2-way radio on the Massachusetts Port Authority frequencies. The radios shall be monitored by the radio escorts and the superintendent at all times during construction to coordinate the Work with airfield operations and receive instructions from the Engineer.

Should the Contractor's construction schedule require concurrent Work activities on the airfield, an additional minimum of two (2) radio equipped vehicles and two (2) escort drivers with red class 3 aerodrome licenses shall be provided for each

active construction Work area unless otherwise approved by the Authority. Additional escorts shall be provided at no additional cost to the Authority.

59.3 The Contractor is required to purchase, install and maintain the following radios;

- a. **Three (3) Massachusetts Port Authority Mobile Radios** – Motorola Model Astro Digital APX 6500 7/800 MHz Mid Power Mobile, with Massachusetts Port Authority Software Option (SmartZone Public Safety), dash mount configuration with APX O5 Control Head, palm microphone, speaker and 3dB gain antenna. The radios must have enhanced AES and ADP encryption as well as TDMA and the full MPA package as prescribed in Motorola contract. They must also be supplied with the warranty plan. These radios shall be used in the Contractor's radio escort vehicles and residents for the duration of the contract.
- b. **Three (3) FAA Radios** - ICOM Model IC-A120 mobile radios, universal mount assembly with remote speaker and microphone. These radios shall be used in the Contractor's radio escort vehicles and by the Resident Engineer's vehicle for the duration of the contract.
- c. **Three (3) Massachusetts Port Authority Portable Radios** - Motorola Model Astro Digital APX 6000 Model 3 700/800 Model 2.5 (or Model 3.0) Portable with Massachusetts Port Authority Software options (SmartZone Public Safety). Including belt clip, battery, spare battery, antenna, and single unit charger and speaker microphone. The radios must have enhanced AES and ADP encryption as well as TDMA and the full MPA package as prescribed in Motorola contract. They must also be supplied with the warranty plan. Two (2) radios shall be turned over to the Engineer for use by the Engineer for the duration of the contract. Two (2) radio will be used by the Contractor (Superintendent and Foreman).
- d. Radio equipment may be purchased directly from Motorola under the Massachusetts State Radio Procurement Contract ITT57. Contractor may contact Rep Mr. Brad Graci @508-685-2300 for additional details on the purchase of the radios. No used or refurbished equipment will be allowed. The Massachusetts Port Authority Radio shop will program the radios prior to use. *Prior to ordering any radios, the Contractor shall verify radio model/software and accessories with Authority's Radio Shop through the Engineer.*

59.4 The Contractor shall purchase, install, maintain, and remove all radios required for the Contractor's radio escort vehicles, the Contractor's Superintendent, and the Resident Engineer's vehicles. The Contractor shall operate these radios, at his/her expense, and at the completion of the Work all radios shall be turned over to the Authority in operating condition. Final payment for Work performed under this Contract will not be made until all radios have been returned to the Authority.

- 59.5 An allowance is provided in the Bid Form of the Contract proposal for the estimated purchase cost of the radios. The amount paid to the Contractor shall be the exact amount indicated on the Contractor's purchase invoice without markup. At the completion of the project the Contractor shall return all radios purchased under this Contract to the Resident Engineer.
- 59.6 The Contractor shall, before the start of construction requiring radio control, test his/her radios with the appropriate agencies to demonstrate their capabilities and to demonstrate the performance of the equipment to their satisfaction. The operators of the radio escort vehicles shall be qualified and approved by the Authority. Radio control and flag people will be required when construction equipment or vehicles are crossing an active taxiway or other aircraft operation area.
- 59.7 At his/her own expense, the Contractor shall also have radio communication between his/her escort vehicles and either his/her field office or superintendent's vehicle. This shall be the Contractor's own radio frequency. No FAA or Authority frequency may be used for this purpose.
- 59.8 At the Contractor's own expense, he/she shall also install Citizen Band (CB) radios in all escort vehicles for radio communication with the Contractor or Subcontractor escorted vehicles as applicable.
- 59.9 At the completion of the Contract, the Contractor shall return all radios purchased under this Contract to the Resident Engineer.
- 59.10 Signs
- The Contractor shall provide install/remove two (2) signs that state Stop Wait for Escort at each Work area exit point. The signs shall be provided and maintained by the Contractor for the duration of Work at no additional compensation and shall be turned over to the Authority upon completion of Work. No separate payment will be made for providing all additional necessary markings, lights, signals, traffic control and radios, all of which are considered a subsidiary obligation of the Contractor and shall be included in the contract prices for the various items.

## 60. Authority's Airport Escort Program Requirements

The following standards and procedures comprise the Authority's Escort Program and shall pertain to construction Work in movement areas at the Authority's airports.

- 60.1 The Contractor shall be required to employ drug/alcohol tested and experienced escorts for construction activities in the movement area. The movement area is the region that consists of the taxiways, runways, and safety areas that are under the control of the Air Traffic Control Tower.



- 60.2 It is the responsibility of the Contractor to ensure that all escort drivers have successfully completed all federal, state and Authority required AOA driver safety and security training and have received authorization to Work in airside designated areas. No escort driver shall be eligible to Work as an escort without having met the aforementioned requirements. No escort driver shall be eligible to obtain a Red (Class 3) badge without having prior experience as a Red/Yellow (Class 2) badged escort. All costs associated with escort drivers successfully completing the aforementioned requirements shall be the responsibility of the Contractor.
- 60.3 As part of the Authority's Escort Program, the Contractor must have implemented his/her own Escort Driver Training Program for review and approval by the Authority. Components of an approved Contractor provided training program shall include, but not be limited to: classroom training and onsite training. Training shall include situational awareness and familiarity with Federal Aviation Administration standard airport signage and marking, radio communication protocol, followed by practical on-the job training. All costs associated with Contractor's own escort driver training program shall be at no additional cost to the Authority.
- 60.4 Prior to becoming eligible to participate in the Authority's Escort Program, each escort in training (escort trainee) must participate in an Authority approved minimum number of hours of on-the-job training with a qualified escort driver and/or contractor employee. The Authority has the sole right to determine specific elements of the on-the-job training and shall include at minimum that such training occur on the escort trainee's own time and/or at the expense of the Contractor, shall occur at Logan Airport during hours approved by the Authority, and shall occur in the applicable contractor's vehicles. All costs associated with escort drivers successfully completing the aforementioned training requirements shall be at no additional cost to the Authority.
- 60.5 The Contractor shall be responsible for documenting and retaining any and all information related to an individual's on-the-job escort training and, upon request by the Authority, the Contractor shall provide and make available any and all records/documents related to an individual member's on-the-job training.
- 60.6 The Authority reserves the right to review and comment on any training requirements a Contractor provided escort driver must successfully complete prior to participating in the Authority Escort Program. All costs associated with future additions, deletions and/or amendments to the training requirements shall be the responsibility of the individual member and/or the Contractor.
- 60.7 All Contractor provided escort drivers actively participating in the Authority's Escort Program shall be required to attend Contractor conducted daily safety awareness briefings prior to the start of each shift. All costs associated with members attending the aforementioned briefings shall be the responsibility of the Contractor. The Contractor shall be responsible for documenting and retaining any and all information related to an individual's attendance at the daily safety briefing

and the contents of each daily briefing. Upon request by the Authority, the Contractor shall provide and make available any and all records/documents related to a daily briefing(s).

- 60.8 All Contractor provided escort drivers actively participating in the Authority's Escort Program shall be required to participate in contractor weekly safety (tool box) meetings and Authority approved escort drivers shall provide driver safety awareness briefings to all in attendance. The Contractor shall be responsible for documenting and retaining any and all information related to an individual's attendance at the Contractor weekly safety (tool box) meeting, his/her attendance at the approved escort driver's driver safety awareness briefing and the contents of each weekly meeting and briefing. Upon request by the Authority, the Contractor shall provide and make available any and all records/documents related to a weekly Contractor meeting(s) and Escort Driver briefing(s).
- 60.9 All escort drivers eligible to participate in the Authority's Escort Program shall be subject to pre-employment, post-accident, reasonable suspicion and random drug and alcohol testing pursuant to procedures and a testing facility to be approved by the Authority at no additional cost to the Authority.
- 60.10 For purposes of the agreement the term pre-employment shall mean an escort driver shall undergo drug/alcohol testing at any time within two (2) weeks of the start of any project he/she has been selected to perform escort Work for, i.e., each time an individual is selected to perform escort Work for a particular project he/she will undergo a pre-employment test.
- 60.11 For purposes of this agreement the term post-accident shall mean an escort driver shall undergo testing immediately after an accident or safety-related incident involving the escort and/or a vehicle and/or equipment and regardless of whether injury or property damage occurred and the escort driver will be removed from performing any Work on Authority property. Aerodrome permits will be temporarily suspended pending the results of the test.
- 60.12 For purposes of this agreement the term reasonable suspicion shall mean that whenever the Authority and/or a contractor has reasonable suspicion to believe that the actions, appearance, speech or body odors of an escort driver are indicative of the use of alcohol or controlled substances, the escort driver immediately will be required to submit to a drug and/or alcohol test, and will be removed from performing any Work on Authority property pending the results of the test. Aerodrome permits will be temporarily suspended pending the results of the test. Whenever possible, more than one person shall be involved in making the decision to request a reasonable suspicion test.
- 60.13 For purposes of this agreement, random drug and alcohol testing may be conducted on a monthly basis where ten percent (10%) or a minimum of one, whichever is

greater, of all active escorts (those escorts assigned to projects) will be randomly tested.

- 60.14 It is understood that contractor may impose his/her own drug and alcohol testing requirements as a matter of company policy. The Authority's testing requirements for his/her Escort Program are independent of such contractor testing and cannot not serve as a substitute for a contractor testing requirement nor can a contractor testing requirement serve as a substitute for the Authority's testing requirements for his/her Escort Program.
- 60.15 Any escort driver who tests positive pursuant to a pre-employment, post-accident, reasonable suspicion and/or random drug and alcohol test under the Authority's Escort Program and/or a contractor drug and alcohol testing program shall be permanently banned from performing escort Work on Massport property.
- 60.16 The Authority has the sole right at any time to remove and/or exclude a Contractor provided escort driver from participation in the Authority's Escort Program.
- 60.17 If any portion of this special provision shall in any manner conflict or contravene any federal law or statute, or any law of statute of the Commonwealth of Massachusetts, or the rules and regulations of the Authority promulgated pursuant thereto, such provisions shall be considered null and void, and shall not be binding on the parties hereto; in such event, the remaining portions of this special provision shall remain in full force and effect.
61. Escorts/Flagmen for Projects Performed at Authority's Airports
- 61.1 See additional requirements in Special Provision Article 60. Authority's Escort Program Requirements.
- 61.2 The Contractor shall assure that all vehicles without permits needing to enter the airfield for construction purposes are escorted by approved radio escort vehicles to and from the Work area. **The Contractor shall provide adequate security adjacent to the Security Gate Checkpoint to properly identify, regulate and direct all construction vehicles during all Work hours of the project.** Escorts shall be available at all times and the vehicle be properly equipped as required by the Authority and the driver shall be trained and able to obtain a security badge as defined in this Article.
- 61.3 The Contractor shall provide a **minimum of 3 radio escort vehicles** at all times and shall also provide at least **3** licensed radio escort drivers with Aerodrome Vehicle Operators Permits for the duration of the contract.
- The 3 radio escort drivers** must have, as a minimum, a red, Class 3 Aerodrome license. The Authority will take a credit from the total contract price paid for the Work of **\$125.00** per hour per each radio escort vehicle with licensed driver under

the required minimum of **3** that is not on airport property during construction Work hours. This credit will be accrued during each hour that the Contractor is working on the airport, days, nights or weekends included. Radio escort vehicles with licensed drivers' Work hours shall be delivered to and approved by the Authority's Engineer on a daily basis. Should the Contractor only supply a radio vehicle without a driver or a driver without a vehicle, the Authority will take the full \$125.00 per hour per radio escort credit for that given time period. The licensed radio escort driver shall not be allowed to operate any equipment other than the radio vehicle.

Should the Contractor's construction schedule require concurrent Work activities on the airfield, an additional minimum of two (2) radio equipped vehicles and two (2) escort drivers with red class 3 aerodrome licenses shall be provided for each active construction Work area unless otherwise approved by the Authority. Additional escorts shall be provided at no additional cost to the Authority

- 61.4 Should construction operations, in the opinion of the Engineer or Authority, not require the use of **3** radio escorts, the **3** radio escorts requirement may be waived. The Contractor shall request a waiver in writing 48 hours in advance of Work. However, the number of radio escorts required shall never be less than one during all Contractor Work hours.
- 61.5 **No escort driver shall work in excess of either twelve (12) consecutive hours or sixteen (16) hours in any 24-hour period without a minimum of eight hours of rest prior to returning to escorting duties. A log of the hours actually worked by each escort driver shall be provided to the Authority on a daily basis. The log shall include the MPA project number, the Contractor in charge, and all escort drivers' names. Each escort driver may work for more than one contractor in a day; however, s/he shall not exceed the time limit under any circumstances. Failure to turn in actual on-site hours for each radio escort, on a daily basis, will result in the Authority taking a full credit for the particular work hours for that 24-hour period.**
- 61.6 Each Contractor's escort vehicle shall be a late model full size pickup truck type in good operating condition; it shall be equipped with air conditioning and shall be subject to the approval of the Engineer. The call sign of the escort vehicle shall either be painted on or in decal form, in a contrasting color to the vehicle color, on both front side doors, the tailgate, and on the roof of the vehicle. The fonts shall be 12" high. The Authority will assign the call sign for each radio escort to the Contractor. In addition, each Contractor's escort vehicle and all vehicles and equipment entering the airfield may be equipped with a yellow flashing beacon or a 3-foot square flag consisting of international orange and white squares not less than one foot square displayed in full view above the vehicles.
- 61.7 A Contractor's escort vehicle will accompany vehicles on all trips to and from the work area and all other vehicles making airside trips to other areas of the airport. **The escort vehicle shall escort no more than two vehicles per escort trip, unless**

**specifically approved in advance by Aviation Operations.**

- 61.8 The Contractor will be required to have a dedicated Flagman (Record Keeper) to maintain a Worksite Manifest (see Appendices for a WORKSITE MANIFEST SAMPLE) of all personnel that access or egress the worksite. If the project has more than one active worksites, the Contractor shall provide dedicated Flagmen for each worksite. Worksite Manifests shall be submitted to the Engineer on a daily basis. The dedicated Flagman policy may be waived, solely at the discretion of the Authorities' Operations Division, if the Contractor can demonstrate that another member of his/her personnel can perform this task without compromising safety.
- 61.9 The Contractor's superintendent, or their designee, shall on a daily basis coordinate with the Engineer and Aviation Operations Shift Manager (Port 25 at Logan, Airport-10 at Worcester, and Hanscom-3) as to the proposed scheduled Work. The discussion should confirm the general scope of work to be performed that shift, the location(s), the runway configuration, proposed haul route, names/call signs of the escorts, and any other specific safety/operational requirements. The escort is specifically not allowed to coordinate, manage, inspect, or schedule Work for the contractor. Any changes to the originally agreed upon Work must be done by the Contractor's superintendent or their designee and that information shared with the escort.
- 61.10 The escorts must stop at all runway crossings, regardless if the runway is open or closed, and receive verbal permission to cross either by contacting the FAA Air Traffic Control Tower or the Aviation Operations Shift Manager.
- 61.11 The escort shall listen to the runway configuration broadcast by MPA Operations at the top of each hour and individually acknowledge to the Aviation Operations Shift Manager any broadcast runway configuration change and haul route change. At the end of his/her shift the escort shall notify the Aviation Operations Shift Manager of same as they exit the Air Operations Area (AOA).
- 61.12 The escort shall report to the Aviation Operations Shift Manager any vehicles (other than MPA) that are in the Movement Area without dedicated escort. Prior to escorting a vehicle, he/she shall explain the rules and haul route to each escortee. The designated escort areas for picking up personnel and materials shall be the Airport access gate, as designated by MPA Operations.
- 61.13 Costs incurred by the Contractor for the above shall be considered incidental to the various project items of the Contract.
62. Contractor's Field Records

The Contractor shall maintain a log or record of events transpiring during the construction operation. The log shall contain all information as is normally entered for construction operations together with the labor, equipment and material used. This log shall be available

for inspection by the Engineer or his/her representative and duplicated as requested.

63. Standby Time: NOT USED

64. Measurement and Payment for SPECIAL PROVISIONS Requirements:

With the exception of the items specifically listed below for measurement and payment, no separate measurement and payment will be made for the requirements listed in these SPECIAL PROVISIONS and the cost of all requirements shall be included in and considered incidental to the other pay items listed in the contract documents.

64.1 Mobilization – SEE DIVISION III, C105

64.2 Allowance for Radios - An allowance of **\$30,000.00** is provided in the Bid Form of the Contract proposal for the estimated purchase cost of the radios. The amount paid to the Contractor shall be the exact amount indicated on the Contractor's purchase invoice without markup.

64.3 Allowance for Cones, Barricades, and Signs - An allowance of **\$25,000.00** is provided in the Bid Form of the Contract Proposal for the estimated furnishing cost of cones, barricades, and signs. The amount paid to the Contractor shall be the exact amount indicated on the Contractor's purchase invoice without mark-up.

64.4 Allowance for Utility Locating Service. An allowance of **\$ 15,000.00** is provided in the Bid Form for the costs of providing a Utility Locating Service. The amount to be paid shall be determined in accordance with DIVISION I, Section 90-05. Actual work hours for Utility Locating Service shall be submitted to the Engineer for approval at the end of each shift that requires the services of the Utility Locating Service.

64.5 Not Used.

Payment will be made under:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
Item IIB.01	Allowance for Radios_____	\$30,000.00 Allowance
Item IIB.02	Allowance for Cones, Barricades, and Signs_____	\$25,000.00 Allowance
Item IIB.03	Allowance for Utility Locating Service_____	\$15,000.00 Allowance

**END OF DIVISION IIB**

## **MA PREVAILING WAGE RATES**

"General Decision Number: MA20250008 03/14/2025

Superseded General Decision Number: MA20240008

State: Massachusetts

Construction Types: Heavy (Heavy and Marine)

Counties: Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth and Suffolk Counties in Massachusetts.

HEAVY AND MARINE CONTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<ul style="list-style-type: none"> <li>. Executive Order 14026 generally applies to the contract.</li> <li>. The contractor must pay all covered workers at least \$17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.</li> </ul>
<p>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</p>	<ul style="list-style-type: none"> <li>. Executive Order 13658 generally applies to the contract.</li> <li>. The contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.</li> </ul>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number      Publication Date



0	01/03/2025
1	03/07/2025
2	03/14/2025

\* BOIL0029-001 01/01/2025

	Rates	Fringes
BOILERMAKER.....	\$ 50.62	28.82

-----  
BRMA0001-011 02/01/2023

FOXBORO CHAPTER

BRISTOL (Attleboro, Berkley, Dighton, Mansfield, North Attleboro, Norton, Raynham, Rehoboth, Seekonk, Taunton); NORFOLK, (Bellingham, Canton, Dedham, Foxboro, Franklin, Norfolk, Norwood, Plainville, Sharon, Walpole, Westwood, Wrentham); and PLYMOUTH (Lakeville)

	Rates	Fringes
Bricklayer/Cement Mason.....	\$ 60.35	34.40

-----  
BRMA0001-012 02/01/2023

LOWELL CHAPTER

MIDDLESEX (Acton, Ashby, Ayer, Bedford, Billerica, Boxboro, Carlisle, Chemsford, Dracut, Dunstabale, Ft Devens, Groton, Littleton, Lowell, North Acton, Pepperell, Shirley, South Acton, Tewksbury, Townsend, Tyngsboro, West Acton, Westford, Wilmington)

	Rates	Fringes
BRICKLAYER.....	\$ 58.21	33.71

-----  
BRMA0001-013 08/01/2023

LOWELL CHAPTER

MIDDLESEX (Ashland, Framingham, Holliston, Hopkinton, Hudson, Maynard, Natick, Sherborn, Stow); and NORFOLK (Medfield, Medway, Millis)

	Rates	Fringes
BRICKLAYER.....	\$ 62.40	34.40

-----  
BRMA0003-001 08/01/2024

	Rates	Fringes
Marble & Tile Finisher.....	\$ 49.32	35.26
Marble, Tile & Terrazzo Workers.....	\$ 64.52	37.51
TERRAZZO FINISHER.....	\$ 63.44	37.33

-----  
BRMA0003-003 08/01/2024

BOSTON CHAPTER

MIDDLESEX (Arlington, Cambridge, Everett, Malden, Medford,

Melrose, Somerville); NORFOLK (Brookline, Milton); and SUFFOLK

	Rates	Fringes
BRICKLAYER.....	\$ 64.50	37.54

-----  
BRMA0003-011 08/01/2024

LYNN CHAPTER

ESSEX (Amesbury, Andover, Beverly, Boxford, Danvers, Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill, Ipswich, Lawrence, Lynn, Lynnfield, Manchester, Marblehead, Merrimac, Methuen, Middleton, Nahant, Newbury, Newburyport, North Andover, Peabody, Rockport, Rowley, Salisbury, Salem, Saugus, Swampscott, Topsfield, Wakefield, Wenham, West Newbury); and MIDDLESEX (North Reading, Reading, Wakefield)

	Rates	Fringes
Bricklayer/Cement Mason.....	\$ 64.50	37.54

-----  
BRMA0003-012 08/01/2024

	Rates	Fringes
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BRICKLAYER

WALTHAM CHAPTER -  
MIDDLESEX (Belmont, Burlington, Concord, Lexington, Lincoln, Stoneham, Sudbury, Waltham, Watertown, Wayland, Weston, Winchester, Woburn).....

	\$ 64.50	37.54
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BRMA0003-014 08/01/2024

QUINCY CHAPTER

PLYMOUTH COUNTY (Abington, Bridgewater, Brockton, Carver, Duxbury, East Bridgewater, Halifax, Hanover, Hanson, Hingham, Hull, Kingston, Marshfield, Middleboro, Norwell, Pembroke, Plymouth, Rockland, Scituate, West Bridgewater, Whitman)

	Rates	Fringes
Bricklayer/Cement Mason.....	\$ 64.50	37.54

-----  
BRMA0003-025 08/01/2024

NEW BEDFORD CHAPTER

BARNSTABLE; BRISTOL (Acushnet, Darmouth, Fairhaven, Fall River, Freetown, New Bedford, Somerset, Swansea, Westport); DUKES; NANTUCKET; PLYMOUTH (Marion, Mattapoisett, Rochester, Wareham)

	Rates	Fringes
Bricklayer/Cement Mason.....	\$ 64.50	37.54

BRMA0003-033 08/01/2024

NEWTON CHAPTER  
MIDDLESEX (Newton); NORFOLK (Dover, Needham, Wellesley)

	Rates	Fringes
Bricklayer, Plasterer.....	\$ 64.50	37.54

-----  
CARP0056-001 08/01/2024

All of SUFFOLK COUNTY; and those areas of BARNSTABLE, BRISTOL, ESSEX, MIDDLESEX, NORFOLK, and PLYMOUTH COUNTIES situated INSIDE Boston Beltway (I-495) and North of Cape Cod Canal. ALL of DUKES and NANTUCKET COUNTIES

	Rates	Fringes
PILEDRIVERMAN.....	\$ 55.79	35.47

-----  
CARP0056-002 08/01/2024

The areas of BARNSTABLE, BRISTOL, PLYMOUTH, and NORFOLK COUNTIES situated OUTSIDE Boston Beltway (I-495) and South of Cape Cod Canal

	Rates	Fringes
PILEDRIVERMAN.....	\$ 51.97	35.47

-----  
CARP0056-003 08/01/2024

Those areas of ESSEX and MIDDLESEX COUNTIES situated OUTSIDE Boston Beltway (I-495)

	Rates	Fringes
PILEDRIVERMAN.....	\$ 49.19	35.47

-----  
CARP0056-004 08/01/2024

	Rates	Fringes
DIVER TENDER.....	\$ 61.70	35.47
DIVER.....	\$ 78.11	35.47

-----  
CARP0327-002 09/01/2024

MIDDLESEX (Belmont, Cambridge, Everett, Malden, Medford, Somerville); NORFOLK (Brookline, Dedham, Milton); AND SUFFOLK COUNTIES

	Rates	Fringes
CARPENTER.....	\$ 58.69	31.05

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CARP0339-002 09/01/2024

BRISTOL (Attleborough, North Attleborough); ESSEX; MIDDLESEX (Except Belmont, Cambridge, Everett, Malden, Medford,

Somerville); AND NORFOLK (Bellingham, Braintree, Canton, Cohasset, Foxboro, Franklin, Medfield, Medway, Millis, Needham, Norfolk, Norwood, Plainville, Quincy, Sharon, Walpole, Wellesley, Westwood, Weymouth, Wrentham) COUNTIES

	Rates	Fringes
CARPENTER.....	\$ 48.10	30.95
-----		
CARP0346-001 09/01/2024		

NORFOLK (Braintree, Quincy, Cohasset, Weymouth, etc.) PLYMOUTH (Duxbury, Hanover, Hull, Hingham, Marshfield, Norwell, Pembroke Rockland, Scituate)

	Rates	Fringes
CARPENTER.....	\$ 48.10	30.95
-----		
CARP0624-002 09/01/2017		

DUKES; NANTUCKET

	Rates	Fringes
CARPENTER.....	\$ 46.43	28.35
-----		
CARP0624-006 09/01/2017		

BARNSTABLE; BRISTOL (Except Attleboro & North Attleboro); NORFOLK (Avon, Holbrook, Randolph, Stoughton); PLYMOUTH (Bridgewater, Kingston, Lakeville, Middleboro, Plymouth, S. Hanover, Whitman)

	Rates	Fringes
CARPENTER.....	\$ 39.28	27.90
-----		
* CARP1121-001 01/06/2025		

SUFFOLK COUNTY

	Rates	Fringes
MILLWRIGHT.....	\$ 50.47	33.50
-----		
* CARP1121-005 01/06/2025		

BARNSTABLE, BRISTOL, DUKES, ESSEX, MIDDLESEX, NANTUCKET, NORFOLK and PLYMOUTH COUNTIES

	Rates	Fringes
MILLWRIGHT.....	\$ 45.03	33.25
-----		
ELEC0096-001 09/01/2024		

MIDDLESEX (Ashby, Ashland, Ayer, Ft. Devens, Groton, Hopkinton, Hudson, Marlboro, Pepperell, Shirley, Stow, Townsend)

	Rates	Fringes
ELECTRICIAN.....	\$ 45.99	33.06
Teledata System Installer.....	\$ 35.29	32.98

-----  
ELEC0099-001 06/01/2024

BRISTOL (Attleboro, North Attleboro, Seekonk)

	Rates	Fringes
ELECTRICIAN.....	\$ 52.11	47.25%
Teledata System Installer.....	\$ 39.09	11.02%+15.31

-----  
ELEC0103-002 09/01/2024

ESSEX (Amesbury, Andover, Boxford, Georgetown, Groveland, Haverhill, Lawrence, Merrimac, Methuen, Newbury, Newburyport, North Andover, Rowley, Salisbury, West Newbury); MIDDLESEX (Bedford, Billerica, Boxboro, Burlington, Carlisle, Chelmsford, Dracut, Dunstable littleton, Lowell, North Reading, Tewksbury, Tyngsboro, Westford, Wilmington)

	Rates	Fringes
ELECTRICIAN.....	\$ 63.78	36.22

-----  
ELEC0103-004 09/01/2024

ESSEX (Beverly, Danvers, Essex, Gloucester, Hamilton, Ipswich, Manchester, Marblehead, Middleton, Peabody, Rockport, Salem, Topsfield, Wenham)

	Rates	Fringes
ELECTRICIAN.....	\$ 63.78	36.22

-----  
ELEC0103-005 09/01/2024

ESSEX (Lynn, Lynnfield, Nahant, Saugus, Swampscott); MIDDLESEX (Acton, Arlington, Belmont, Cambridge, Concord, Everett, Framingham, Holliston, Lexington, Lincoln, Malden, Maynard, Medford, Melrose, Natick, Newton, Reading, Sherborn, Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown, Wayland, Weston, Winchester, Woburn); NORFOLK (Bellingham, Braintree, Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Franklino, Medfield, Medway, Millis, Milton, Needham, Norfolk, Norwood, Quincy, Sharon, Walpole, Wellesley, Westwood, Weymouth, Wrentham); PLYMOUTH (Hingham and Hull);SUFFOLK

	Rates	Fringes
ELECTRICIAN.....	\$ 63.78	36.22

-----  
\* ELEC0104-001 09/01/2024

	Rates	Fringes
Line Construction:		
Cableman.....	\$ 58.41	30.19+A
Equipment Operator.....	\$ 49.65	26.72+A
Groundman.....	\$ 32.13	12.70+A

Lineman.....\$ 58.41 30.19+A

A. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Christmas Day and Columbus Day, provided the employee has been employed 5 working days prior to any one of the listed holidays.

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ELEC0223-002 09/01/2024

BARNSTABLE, BRISTOL (Except Attleboro, North Attleboro, Seekonk); DUKES; NANTUCKET; PLYMOUTH (Except Hingham and Hull Twp); NORFOLK (Avon, Halbrook, Randolph, Sloughton)

	Rates	Fringes
ELECTRICIAN.....	\$ 50.02	31.09%+15.50

-----  
ENGI0004-009 12/01/2024

	Rates	Fringes
Power equipment operators:		
Group 1.....	\$ 57.03	33.20
Group 2.....	\$ 56.40	33.20
Group 3.....	\$ 36.67	33.20
Group 4.....	\$ 45.96	33.20
Group 5.....	\$ 24.92	33.20
Group 6.....	\$ 30.63	33.20

HOURLY PREMIUM FOR BOOM LENGTHS (Including Jib):

Over 150 ft.	+2.18
Over 185 ft.	+3.84
Over 210 ft.	+5.39
Over 250 ft.	+8.16
Over 295 ft.	+11.29
Over 350 ft.	+13.14

FOOTNOTE FOR POWER EQUIPMENT OPERATORS:

A. PAID HOLIDAYS: New Year's Day, Washington,s Birthday, Labor Day, Memorial Day, Independence Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day, Christmas Day

POWER EQUIPMENT OPERATORS CLASSIFICATIONS [HEAVY CONSTRUCTION]

GROUP 1: Power shovel; crane; truck crane; derrick; pile driver; trenching machine; mechanical hoist pavement breaker; cement concrete paver; dragline; hoisting engine; three drum machine; pumpcrete machine; loaders; shovel dozer; front end loader; mucking machine; shaft hoist; steam engine; backhoe; gradall; cable way; fork lift; cherry picker; boring machine; rotary drill; post hole hammer; post hole digger; asphalt plant on job site; concrete batching and/or mixing plant on job site; crusher plant on job site; paving concrete mixer; timber jack

GROUP 2: Sonic or vibratory hammer; grader; scraper; tandem scraper; bulldozer; tractor; mechanic - maintenance; York rake; mulching machine; paving screed machine;stationary steam boiler; paving concrete finishing machine; grout pump; portable steam boiler; portable steam generator; roller; spreader; asphalt paver; locomotives or machines used in place thereof; tamper (self propelled or tractor-draw); cal tracks; ballast regulator;rail anchor

machine; switch tamper; tire truck  
 GROUP 3: Pumps (1-3 grouped); compressor; welding machines (1-3 grouped); generator; sighting plant; heaters (power driven, 1- 5); syphon-pulsometer; concrete mixer; valves controlling permanent plant air steam, conveyor, wellpoint system (operating)  
 GROUP 4: Assitant engineer (fireman)  
 GROUP 5: Oiler (other than truck cranes and gradalls)  
 GROUP 6: Oiler (on truck cranes and gradalls)

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 IRON0007-001 03/16/2024

AREA 1: BRISTOL (Easton); ESSEX (Beverly,Gloucester,Lynn, Lynnfield, Manchester,Marblehead, Nahant, Rockport, Salem, Saugus, Swampscott); MIDDLESEX (Arlington, Bedford, Belmont, Burlington, Cambridge, Carlisle, Concord, Dunstable, Everett, Framingham, Lexington, Lincoln, Malden, Maynard, Medford, Melrose, Natick, Newton, Reading, Sherborn, Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown, Wayland, Weston, Winchester, Woburn); NORFOLK (Except Medway); PLYMOUTH (Abington, Bridgewater, Brocton, Duxbury, East Bridgewater, Halifax, Hanover, Hanson, Hingham, Hull, Kingston, Marshfield, Norwell, Pembroke, Plymouth, Plympton, Rockland, Scituate, West Bridgewater, Whitman); SUFFOLK

AREA 2: ESSEX (Amesbury, Andover, Boxford, Danvers, Essex, Georgetown, Hamilton, Haverhill, Ipswich, Lawrence, Merrimac, Methuen, Newbury, Newburyport, North Andover, Rowley, Salisbury, Topsfield, Wenham, West Newbury); MIDDLESEX (Action,Billerica, Chelmsford, Dracut, Groton, Groveland, Littleton, Lowell, Middleton, North Reading, Pepperell, Tewksbury, Tyngsboro, Westford, Wilminton)

	Rates	Fringes
IRONWORKER		
AREA 1.....	\$ 54.68	36.48
AREA 2.....	\$ 50.27	36.48

-----  
 IRON0007-010 03/16/2024

MIDDLESEX (Ashby, Ashland, Ayer, Boxboro, Holliston, Hopkinton, Hudson, Marlboro, Shirley, Stow, Townsend); NORFOLK (Medway)

	Rates	Fringes
IRONWORKER.....	\$ 54.38	36.48

-----  
 IRON0037-002 09/16/2024

BARNSTABLE; BRISTOL (Acushnet, Attleboro, Berkley, Dartmouth, Dighton, Fairhaven, Fall River, Freetown, Mansfield, New Bedford, North Attleboro, Norton, Raynham, Rehoboth, Seekonk, Somerset, Swansea, Taunton, Westport); DUKES; NANTUCKET; NORFOLK (Billingham, Franklin, Plainville, Wrentham); PLYMOUTH (Lakeville, Marion, Mattapoisett, Middleboro, Rochester, Wareham)

	Rates	Fringes
IRONWORKER.....	\$ 41.59	32.98

\* LAB00022-006 12/01/2024

SUFFOLK COUNTY (Boston, Chelsea, Revere, Winthrop, Deer & Nut Islands); MIDDLESEX COUNTY (Arlington, Belmont, Burlington, Cambridge, Everett, Malden, Medford, Melrose, Reading, Somerville, Stoneham, Wakefield, Winchester, Winthrop and Woburn only); NORFOLK COUNTY (Brookline, Dedham, and Milton only)

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 46.20	29.70
GROUP 2.....	\$ 46.20	29.70
GROUP 3.....	\$ 46.20	29.70
GROUP 4.....	\$ 46.20	29.70
GROUP 5.....	\$ 27.01	29.70
GROUP 6.....	\$ 46.20	29.70

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; carpenter tenders; cement finisher tenders

GROUP 2: Asphalt raker; fence and guard rail erector; laser beam operator; mason tender; pipelayer; pneumatic drill operator; pneumatic tool operator; wagon drill operator

GROUP 3: Air track operator; block paver; rammer; curb setter

GROUP 4: Blaster; powderman

GROUP 5: Flagger

GROUP 6: Asbestos Abatement; Toxic and Hazardous Waste Laborers

\* LAB00022-012 12/01/2024

Counties of BARNSTABLE; BRISTOL; DUKES; ESSEX; NANTUCKET; PLYMOUTH; MIDDLESEX (With the exception of Arlington, Belmont, Burlington, Cambridge, Everett, Malden, Melrose, Reading, Somerville, Stoneham, Wakefield, Winchester, Winthrop and Woburn); NORFOLK (With the exception of Brookline, Dedham, and Milton)

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 38.95	29.70
GROUP 2.....	\$ 38.95	29.70
GROUP 3.....	\$ 38.95	29.70
GROUP 4.....	\$ 38.95	29.70
GROUP 5.....	\$ 27.01	29.70
GROUP 6.....	\$ 46.10	29.70

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; carpenter tenders; cement finisher tenders



GROUP 2: Asphalt raker; fence and guard rail erector; laser beam operator; mason tender; pipelayer; pneumatic drill operator; pneumatic tool operator; wagon drilloperator

GROUP 3: Air track operator; block paver; rammer; curb setter; hydraulic & similar self powere drills

GROUP 4: Blaster; powderman

GROUP 5: Flagger

GROUP 6: Asbestos Abatement; Toxic and Hazardous Waste Laborers

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 \* LAB0022-013 12/01/2024

	Rates	Fringes
Laborers:		
(FREE AIR OPERATION):		
SHIELD DRIVEN AND LINER		
PLATE IN FREE AIR)		
GROUP 1.....	\$ 50.50	29.70
GROUP 2.....	\$ 50.50	29.70
(OPEN AIR CASSONS,		
UNDERPINNING AND TEST		
BORING INDUSTRIES):		
TEST BORING & WELL DRILLING		
Driller.....	\$ 50.20	29.70
Laborer.....	\$ 46.20	29.70
(OPEN AIR CASSONS,		
UNDERPINNING AND TEST		
BORING INDUSTRIES):		
OPEN AIR CASSON,		
UNDERPINNING WORK & BORING		
CREW		
Bottom man.....	\$ 47.35	29.70
Laborers; Top man.....	\$ 46.20	29.70
(TUNNELS, CAISSON &		
CYLINDER WORK IN		
COMPRESSED AIR)		
GROUP 1.....	\$ 47.95	29.70
GROUP 2.....	\$ 58.43	29.70
GROUP 3.....	\$ 58.43	29.70
GROUP 4.....	\$ 58.43	29.70
GROUP 5.....	\$ 58.43	29.70
GROUP 6.....	\$ 58.43	29.70
CLEANING CONCRETE AND		
CAULKING TUNNEL (Both New		
& Existing)		
GROUP 1.....	\$ 50.50	29.70
GROUP 2.....	\$ 50.50	29.70
ROCK SHAFT, CONCRETE		
LINING OF SAME AND TUNNEL		
IN FREE AIR		
GROUP 1.....	\$ 47.95	29.70
GROUP 2.....	\$ 50.50	29.70
GROUP 3.....	\$ 50.50	29.70
GROUP 4.....	\$ 50.50	29.70
GROUP 5.....	\$ 52.50	29.70

LABORERS CLASSIFICATIONS for TUNNELS, CAISSON & CYLINDER WORK  
IN COMPRESSED AIR

GROUP 1: Powder watchman; Top man on iron bolt; change house attendant

GROUP 2: Brakeman; trackman; groutman; tunnel laborer; outside lock tender; lock tender; guage tender

GROUP 3: Motorman, miner

GROUP 4: Blaster

GROUP 5: Mucking machine operator

GROUP 6: Hazardous Waste work within the ""HOT"" zone. (A premium of two dollars \$2.00 per hour over the basic wage rate.

LABORERS CLASSIFICATIONS for (FREE AIR OPERATION): SHIELD  
DRIVEN AND LINER PLATE IN FREE AIR

GROUP 1: Miner; miner welder; conveyor operator; motorman; mucking machine operator; nozzle man; grout man-; pumps, shaft and tunnel steel and rodman; shield and erector arm operators, mole nipper, outside motorman, burner, TBM operator, safety miner; laborer topside; heading motormen; erecting operators; top signal men

GROUP 2: Brakeman; trackman

LABORERS CLASSIFICATIONS FOR CLEANING CONCRETE AND CAULKING  
TUNNEL (Both New & Existing)

GROUP 1: Concrete workers; strippers and form movers (wood & steel), cement finisher

GROUP 2: Form erector (wood & steel and all accessories)

LABORERS CLASSIFICATIONS for ROCK SHAFT, CONCRETE LINING OF  
SAME AND TUNNE IN FREE AIR

GROUP 1: Change house attendants

GROUP 2: Laborers, topside, bottom men (when heading is 50 ft. from shaft) and all other laborers

GROUP 3: Brakeman; trackman; tunnel laborers; shaft laborers

GROUP 4: Miner; cage tender; bellman

GROUP 5: Hazardous Waste work within the ""HOT"" zone. (A premium of two dollars \$2.00 per hour over the basic wage rate)

FOOTNOTE FOR LABORERS:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Patriot's Day, Memorial Day, Independence Day, Labor Day,

Columbus Day, Veteran's Day, Thanksgiving Day, and Christmas Day

\* LAB01421-001 12/02/2024

WRECKING LABORERS:

	Rates	Fringes
Laborers: (Wrecking)		
Group 1.....	\$ 46.25	29.70
Group 2.....	\$ 47.00	29.70
Group 3.....	\$ 47.25	29.70
Group 4.....	\$ 42.25	29.70
Group 5.....	\$ 45.35	29.70
Group 6.....	\$ 46.25	29.70

Group 1: Adzeman, Wrecking Laborer.

Group 2: Burners, Jackhammers.

Group 3: Small Backhoes, Loaders on tracks, Bobcat Type Loaders, Hydraulic ""Brock"" Type Hammers Operators, Concrete Cutting Saws.

Group 4: Yardman (Salvage Yard Only).

Group 5: Yardman, Burners, Sawyers.

Group 6: Asbestos, Lead Paint, Toxic and Hazardous Waste.

PAIN0035-001 07/01/2024

BARNSTABLE BRISTOL; DUKES; ESSEX; NANTUCKET; PLYMOUTH (Remainder of NORFOLK; MIDDLESEX AND SUFFOLK COUNTIES)

	Rates	Fringes
PAINTER		
NEW CONSTRUCTION:		
Bridge.....	\$ 50.36	30.25
Brush, Taper.....	\$ 39.86	30.25
Spray, Sandblast.....	\$ 41.26	30.25
REPAINT:		
Bridge.....	\$ 56.76	36.00
Brush, Taper.....	\$ 37.92	30.25
Spray, Sandblast.....	\$ 39.32	30.25

PAIN0035-015 07/01/2024

MIDDLESEX (Cambridge, Everett, Malden, Medford, Somerville) SUFFOLK COUNTY (Boston, Chelsea) NORFOLK COUNTY (Brookline)

	Rates	Fringes
PAINTER		
NEW CONSTRUCTION:		
Brush, Taper.....	\$ 46.26	36.00
Spay, Sandblast.....	\$ 47.66	36.00
Spray, Sandblast.....	\$ 47.05	30.25
REPAINT:		
Bridge.....	\$ 56.76	36.00
Brush, Taper.....	\$ 44.32	36.00
Spray, Sandblast.....	\$ 45.72	36.00

PLAS0534-001 07/01/2024

ESSEX; MIDDLESEX; NORFOLK AND SUFFOLK COUNTY

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 49.19	40.86
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PLUM0004-001 03/01/2025		

MIDDLESEX (Ashby, Ayer-West of Greenville branch of Boston and  
Maine Railroad, Ft. Devens, Groton, Shirley, Townsend)

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 55.00	30.17
-----		
* PLUM0012-001 03/02/2025		

ESSEX (Ames, Andover, Beverly, Boxford, Byfield, Danvers, Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill, Ipswich, Lawrence, Manchester, Marblehead, Merrimac, Methuen, Middleton, Newbury, Newburyport, North Andover, Peabody, Rockport, Rowley, Salem, Salisbury, Topsfield, Wenham, West Newbury)

	Rates	Fringes
PLUMBER.....	\$ 69.84	36.43
-----		
* PLUM0012-003 03/02/2025		

ESSEX (Ames, Andover, Beverly, Boxford, Byfield, Danvers, Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill, Ipswich, Lawrence, Manchester, Marblehead, Merrimac, Methuen, Middleton, Newbury, Newburyport, North Andover, Peabody, Rockport, Rowley, Salem, Salisbury, Topsfield, Wenham, West Newbury)

	Rates	Fringes
Plumber, Pipefitter, Steamfitter.....	\$ 69.84	36.43
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* PLUM0012-006 03/02/2025		

ESSEX (Lynn, Lynnfield, Nahant, Saugus, and Swampscott);  
MIDDLESEX (Acton, Arlington, Ashland, Ayer - except W. of  
Greenville Branch of Boston & Maine RR, Bedford, Belmont,  
Billerica, Boxboro, Burlington, Cambridge, Carlisle,  
Chelmsford, Concord, Dracut, Dunstable, Everett, Framingham,  
Hudson, Holliston, Hopkinton, Lexington, Lincoln, Littleton,  
Lowell, Malden, Marlboro, Maynard, Medford, Melrose, Natick,  
Newton, North Reading, Pepperell, Reading, Sherborn,  
Somerville, Stoneham, Stow, Sudbury, Tewksbury, Tyngsboro,  
Wakefield, Waltham, Watertown, Wayland, Westford, Wilmington,  
Winchester, Woburn); NORFOLK (Bellingham, Braintree,  
Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Franklin,  
Medfield, Medway, Millis, Milton, Needham, Norfolk, Norwood,  
Plainville, Quincy, Sharon, Walpole, Wellesley, Westwood,  
Weymouth, Wrentham); PLYMOUTH (Hingham, Hull, Scituate);  
SUFFOLK

	Rates	Fringes
PLUMBER.....	\$ 69.84	36.43

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PLUM0051-005 08/26/2024

BARNSTABLE; BRISTOL; DUKES; NANTUCKET; NORFOLK (Avon, Holbrook, Randolph, Stoughton) PLYMOUTH(Remainder of County)

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 52.49	33.60

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PLUM0537-001 09/01/2024

MIDDLESEX (Arlington, Cambridge, Everett, Malden, Medford, Melrose, Reading, Wakefield, Winchester and Woburn); NORFOLK (Bellingham, Braintree, Brookline, Canton Cashasset, Dedham, Foxboro, Franklin, Millis, Milton, Sharon, Walpole, Westwood, and Wrenthan); PLYMOUTH (Hingham, Hull, Scituate); ESSEX (Ames, Andover, Beverly, Boxford, Byfield, Danvers, Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill, Ipswich, Lawrence, Lynn, Lynnfield, Manchester, Marblehead, Merrimac, Methuen, Middleton, Nahant, Newbury, Newburyport, North Andover, Peabody, Rockport, Rowley, Salem, Salisbury, Saugus, Swampscott, Topsfield, Wenham, West Newbury)

	Rates	Fringes
PIPEFITTER.....	\$ 65.53	38.47

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TEAM0379-001 06/01/2024

	Rates	Fringes
Truck drivers:		
Group 1.....	\$ 39.78	35.24+a+b
Group 2.....	\$ 39.95	35.24+a+b
Group 3.....	\$ 40.02	35.24+a+b
Group 4.....	\$ 40.14	35.24+a+b
Group 5.....	\$ 40.24	35.24+a+b
Group 6.....	\$ 40.53	35.24+a+b
Group 7.....	\$ 40.82	35.24+a+b

POWER TRUCKS \$.25 DIFFERENTIAL BY AXLE  
TUNNEL WORK (UNDERGROUND ONLY) \$.40 DIFFERENTIAL BY AXLE  
HAZARDOUS MATERIALS (IN HOT ZONE ONLY) \$2.00 PREMIUM

TRUCK DRIVERS CLASSIFICATIONS

Group 1: Station wagons; panel trucks; and pickup trucks

Group 2: Two axle equipment; & forklift operator

Group 3: Three axle equipment and tireman

Group 4: Four and Five Axle equipment

Group 5: Specialized earth moving equipment under 35 tons other than conventional type trucks; low bed; vachual; mechanics, paving restoration equipment

Group 6: Specialized earth moving equipment over 35 tons

Group 7: Trailers for earth moving equipment (double hookup)

FOOTNOTES:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day and Christmas Day

B. PAID VACATION: Employees with 4 months to 1 year of service receive 1/2 day's pay per month; 1 week vacation for 1 - 5 years of service; 2 weeks vacation for 5 - 10 years of service; and 3 weeks vacation for more than 10 years of service

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

-----  
The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than

""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

#### Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

#### Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

#### State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination.

The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

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WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to [davisbaconinfo@dol.gov](mailto:davisbaconinfo@dol.gov) or by mail to:

Branch of Wage Surveys  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to [BCWD-Office@dol.gov](mailto:BCWD-Office@dol.gov) or by mail to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to [dba.reconsideration@dol.gov](mailto:dba.reconsideration@dol.gov) or by mail to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
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The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor



200 Constitution Avenue, N.W.  
Washington, DC 20210.

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END OF GENERAL DECISION"

"General Decision Number: MA20250024 03/14/2025

Superseded General Decision Number: MA20240024

State: Massachusetts

Construction Type: Highway

County: Suffolk County in Massachusetts.

HIGHWAY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<ul style="list-style-type: none"> <li>. Executive Order 14026 generally applies to the contract.</li> <li>. The contractor must pay all covered workers at least \$17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.</li> </ul>
<p>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</p>	<ul style="list-style-type: none"> <li>. Executive Order 13658 generally applies to the contract.</li> <li>. The contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.</li> </ul>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/03/2025
1	03/14/2025

ELEC0103-003 09/01/2024

	Rates	Fringes
ELECTRICIAN (Includes Traffic Signalization).....	\$ 63.78	36.22

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ENGI0004-020 12/01/2024

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Group 1.....	\$ 57.03	33.20
Group 2.....	\$ 56.40	33.20

FOOTNOTE FOR POWER EQUIPMENT OPERATORS:  
 A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Labor Day, Memorial Day, Independence Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day, Christmas Day

POWER EQUIPMENT OPERATORS CLASSIFICATIONS  
 Group 1: Backhoe/Excavator/Trackhoe; Broom/Sweeper; Crane; Gradall; Loader; Paver (Asphalt, Aggregate, and Concrete); Post Driver (Guardrail/Fences)  
 Group 2: Bulldozer; Grader/Blade; Milling Machine; Roller

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IRON0007-026 03/16/2024

	Rates	Fringes
IRONWORKER (ORNAMENTAL AND STRUCTURAL).....	\$ 54.68	36.48

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\* LAB00022-008 12/01/2024

	Rates	Fringes
LABORER		
Fence Erection.....	\$ 46.20	29.70
Guardrail Installation.....	\$ 46.20	29.70
Landscape.....	\$ 46.20	29.70

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\* LAB00133-001 12/01/2024

	Rates	Fringes
LABORER (Concrete Surfacers).....	\$ 46.20	29.85

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PAIN0035-023 07/01/2024

	Rates	Fringes
PAINTER (Steel).....	\$ 56.76	36.00

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SUMA2014-014 01/11/2017

	Rates	Fringes
CARPENTER, Includes Form Work....	\$ 66.59	15.41
CEMENT MASON/CONCRETE FINISHER...	\$ 56.70	21.08
IRONWORKER, REINFORCING.....	\$ 57.39	19.17

LABORER: Asphalt, Includes Raker, Shoveler, Spreader and Distributor.....	\$ 33.65	17.32
LABORER: Common or General.....	\$ 44.97	16.07
LABORER: Concrete Saw (Hand Held/Walk Behind).....	\$ 44.43	14.18
LABORER: Jack Hammer.....	\$ 38.69	17.33
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 64.67	15.70
OPERATOR: Forklift.....	\$ 64.67	0.00
OPERATOR: Mechanic.....	\$ 48.74	11.79
OPERATOR: Piledriver.....	\$ 42.56	17.34
PAINTER: Spray (Linestriping)....	\$ 47.30	6.42
TRAFFIC CONTROL: Flagger.....	\$ 23.00	20.44
TRAFFIC CONTROL: Laborer-Cones/ Barricades/Barrels - Setter/Mover/Sweeper.....	\$ 53.35	12.78
TRUCK DRIVER: Concrete Truck....	\$ 33.69	15.79
TRUCK DRIVER: Dump Truck.....	\$ 37.74	11.86
TRUCK DRIVER: Flatbed Truck.....	\$ 48.53	0.00

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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#### WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

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 Wage and Hour Division  
 U.S. Department of Labor  
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 Washington, DC 20210

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Washington, DC 20210.

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END OF GENERAL DECISION"

## **SECURITY IDENTIFICATIONS REQUIREMENTS**



The ID badge process entails several steps: the application completion and submission, a Criminal Offender Record Information (CORI) check performed by the Massachusetts State Police, Security (SIDA) Training, and ID badge issuance. The mandatory security training will explain the Hanscom SIDA Badge program and should answer any questions you may have.

Hanscom Field Security Badge Office (SBO):	781-869-8020 or <a href="mailto:BEDSBO@Massport.com">BEDSBO@Massport.com</a>
SBO Office Hours:	Monday 0900-1400, Wednesday 1200-1700, & Thursday 0900-1400, excluding holidays.
SBO Office Location:	Civil Air Terminal 200 Hanscom Drive 2 <sup>nd</sup> floor Bedford, MA 01730

To apply for a SIDA badge at Hanscom Field, please perform the following:

### **Step 1: Application Package Completion**

- Complete the enclosed application (type or print legibly).
- Have your Authorized Signatory fill in Section 1 of the application. If you are unsure of whom your Authorized Signatory is, contact the Security Badge Office.
- **Attach to the application photocopies of two forms of valid identification.** All applicants must show proof of citizenship. See attached guidance to determine applicable identification.
- Names on badge applications must match the names presented on the required documents and must be the full legal name of the applicant. Names on all submitted documents must match exactly. Previously used names must be listed in the Alias section and documentation of the name change must be submitted.

### **Step 2: Application Package Submission**

- Submit completed application, with ID copies, to the Massport Security Badge Office. **Email applications are not accepted.**
- Submit a check or credit card (Visa/MC) payment for \$81.00, payable to the Massachusetts Port Authority, for each applicant. Application fees are non-refundable and are subject to change at any time at the sole discretion of the Members of the Authority. Cash payments are not accepted.

### **Step 3: Schedule and Complete Training**

- Once your CORI check is approved and confirmed by the Massachusetts State Police, the Massport Security Badge Office will contact you via email with instructions to schedule interactive computer based SIDA training.
- When the security badge office is open you must make an appointment in order to use the badge training room computers. When the security badge office is not open, the training computers are available on a first come, first serve basis, available 24 hours a day. A valid SIDA badge or escort by your Authorized Signatory is required for entry into the secure training room, located on the 2<sup>nd</sup> floor of the Civil Air Terminal.

### **Step 4: Badge Issuance**

- Applicants must present the same two original forms of valid identification to the Security Badge Office administrator at the time of badge issuance.
- Badge renewal applicants must return the expired badge to receive a replacement. There will be a \$50 lost badge fee if an applicant cannot produce the expiring SIDA badge.
- After your training is complete, your ID will be issued, and valid for 2 years unless otherwise pre-empted by contract expiration, VISA/Passport expiration, or annual Movement Area Driver Training restriction.

**It is imperative that you complete this application process in a timely fashion.**

**Applications older than 90 days will be void and you will be required to resubmit another application and fee.**

If you have any questions on the SIDA Badge process, please contact our office at 781-869-8020 or [BEDSBO@massport.com](mailto:BEDSBO@massport.com).

\*Valid identification is described as a government issued ID. Refer to the required documentation instructions attached to this document.

**L.G. HANSCOM FIELD**  
**AVIATION SECURITY DEPARTMENT**  
**SECURITY BADGE APPLICATION**



*This Application Must Be Typed or Printed CLEARLY in Black or Blue Ink. Errors Will Delay the Application Process.  
Use Of Previous Revisions Of This Form Is Not Authorized.*

**SECTION 1 – To Be Completed By Security Badge Authorized Signatory or Massport Official**  
**Applicant's Access Requirements:**

- Requires **Secured Area** access (Airline/Secured operations area only)
- Requires **Hanscom AFB** access
- Authorized Signatory
- Ramp/Apron Non-Movement Area (Class 1)
- Law Enforcement Officer
- Restricted T-hangar/Tiedown Non-Movement Area (Class 2)
- Flight School: **Student Pilot**
- Movement Area (Class 3)
- Contractor - Provide contract expiration: \_\_\_\_\_
- Class 1 Pending Upgrade to Movement Area (Class 3)

Security Badge Authorized Signatory Name (Print): \_\_\_\_\_ Signature: \_\_\_\_\_

Company: \_\_\_\_\_ Phone: \_\_\_\_\_ Date: \_\_\_\_\_

**SECTION 2 – To Be Completed Only By Applicant**

Name: \_\_\_\_\_  
Last First Middle

Birthdate:   /   /     Social Security No    -   -     Gender:  M  F

Country of Birth: \_\_\_\_\_ Country of Citizenship: \_\_\_\_\_ State of Birth: \_\_\_\_\_

Aliases (if any): \_\_\_\_\_

Home Address: \_\_\_\_\_  
Street City State Zip Code

Phone (Work): \_\_\_\_\_ Phone (Home): \_\_\_\_\_

Phone (Cell): \_\_\_\_\_ E-Mail: \_\_\_\_\_

Driver's License #: \_\_\_\_\_ State: \_\_\_\_\_ Class: \_\_\_\_\_ Expiration: \_\_\_\_\_  No Driver's License

Height (ft., in.): \_\_\_\_\_ Weight (lbs.): \_\_\_\_\_ Eye Color: \_\_\_\_\_ Hair Color: \_\_\_\_\_

Employer or Sponsor: \_\_\_\_\_ Position: \_\_\_\_\_

Employer Address: \_\_\_\_\_  
Street City State Zip Code

Aircraft parking location (include tie-down or t-hangar # if applicable): \_\_\_\_\_ Aircraft N-number: \_\_\_\_\_

Are you a US Citizen?  Yes  No If No, list applicable USINS information below, and attach copies of authorizing documents:

US VISA# \_\_\_\_\_ Resident Alien # \_\_\_\_\_ Exp. Date: \_\_\_\_\_

Do you have an active Massport Security Badge at another facility?  No  Yes / If Yes, List Airport & Badge# \_\_\_\_\_

The information I have provided on this application is true, complete and correct to the best of my knowledge and is provided in good faith. I understand that a knowing and willful false statement on this application can be punished by fine or imprisonment or both and automatic denial or revocation of unescorted access privileges.

I hereby authorize the Massachusetts Port Authority and its agents to receive and to conduct a review and assessment of my criminal offender record information (CORI) records, any available records necessary to confirm the biographical data and work history I have provided in my badge application, as well as any documentation I have provided as proof of citizenship or authorization to work in the U.S.

I further authorize the Massachusetts Port Authority and its agents, at any time during the term of any access privilege granted to me by the Massachusetts Port Authority, to receive any such records and to conduct any such additional reviews and assessment that it deems necessary and appropriate to ensure my continued suitability for the access privileges it has granted to me.

I understand and agree, at all times while on the Airport, abide by all Airport Rules and Regulations, Transportation Security Administration (TSA) security regulations, Federal, State and Local Laws. Any violation of the Airport Rules and Regulations, TSA Security Regulations, Federal, State and Local Laws, may result in fines/penalties, a suspension, revocation, and/or denial of access privileges.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**SECTION 3 – To Be Completed By Massport**

Badge Issued: \_\_\_\_\_ Date Issued: \_\_\_\_\_ Initials: \_\_\_\_\_

Paid: \_\_\_\_\_ Check Number: \_\_\_\_\_ Credit Card Type: \_\_\_\_\_ Date: \_\_\_\_\_ Initials: \_\_\_\_\_



**L.G. HANSCOM FIELD  
 AVIATION SECURITY DEPARTMENT  
 APPLICATION FOR: MASSACHUSETTS STATE POLICE  
 CRIMINAL OFFENDER RECORD INFORMATION (CORI) CHECK**

**Notice to Applicant**

In accordance with Massport policy and procedure, unescorted access privileges to the Security Identification Display Area (SIDA) and Secured Area of Hanscom Field require the satisfactory completion of a criminal offender record information (CORI) check. Criminal history records results are kept confidential and used only for determining the disposition of this application for unescorted access authority. Copies of the results of criminal history records checks will be provided upon written request by the applicant. If, after being advised that the results of your CORI check disqualify you from being approved unescorted access authority, you have 30 days to correct your record by contacting the agency that reported the disqualifying conviction or arrest, and you must advise the Airport Security Coordinator in writing of your intent to correct said records. The Airport Security Coordinator is your point of contact if you have any questions about the results of the CORI check.

**SECTION 1 – To Be Completed Only By Applicant:  
 Arrests, Convictions and the Criminal Offender Record Information (CORI) Check**

Have you been, in any jurisdiction, in the past ten (10) years:

Arrested for any crime?  No  Yes  
 Indicted for any crime?  No  Yes  
 Summoned for any crime?  No  Yes  
 Convicted for any crime?  No  Yes

If you answered "Yes" to any of the questions above, please provide a brief description of each such event: \_\_\_\_\_

In accordance with the disqualifying offenses pursuant to 49 CFR 1542.209(d), unescorted access authority will be denied if the CORI check reveals you have been arrested, convicted, or found not guilty by reason of insanity for any of the following crimes, in any jurisdiction, during the past ten (10) years:

- Forgery of certificates, false marking of aircraft, and other aircraft registration violation
- Unlawful possession, use, sale, distribution, or manufacture of an explosive or weapon
- Extortion
- Interference with flight crewmembers or flight attendants
- Commission of certain crimes aboard aircraft in flight
- Carrying a weapon or explosive aboard aircraft
- Conveying false information and threats
- Aircraft piracy outside the special aircraft jurisdiction of the United States
- Lighting violations involving transportation of controlled substances
- Unlawful entry into an aircraft or airport area that serves air carriers or foreign air carriers contrary to established security requirements
- Felony involving dishonesty, fraud, or misrepresentation
- Felony involving possession or distribution of stolen property
- Felony involving aggravated assault
- Felony involving bribery
- Kidnapping or hostage taking
- Rape or aggravated sexual abuse
- Interference with air navigation
- Felony involving illegal possession of a controlled substance punishable by a maximum term of imprisonment of more than 1 year
- Aircraft piracy
- Improper transportation of a hazardous material
- Armed or felony unarmed robbery
- Distribution of, or intent to distribute, a controlled substance
- Felony arson
- Felony involving a threat
- Felony involving willful destruction of property
- Felony involving importation or manufacture of a controlled substance
- Felony involving burglary
- Felony involving theft
- Destruction of an aircraft or aircraft facility
- Murder
- Assault with intent to murder
- Espionage
- Sedition
- Violence at international airports
- Treason
- Conspiracy or attempt to commit any of the criminal acts listed here

Note: Convictions or arrests for offenses other than those listed above may or may not automatically result in disqualification. HOWEVER, FAILURE TO DISCLOSE A CONVICTION OR AN ARREST FOR ANY OFFENSE WILL RESULT IN DISQUALIFICATION.

I understand and acknowledge that once granted unescorted access privileges, I shall disclose to the Airport Operator (Massport), within 24 hours, an arrest for or conviction of any of the crimes described above. Additionally, in the event of a conviction for a crime listed above, I shall surrender to Massport the SIDA badge issued to me within 24 hours of such conviction.

The information I have provided on this application is true, complete, and correct to the best of my knowledge and is provided in good faith. I understand that a knowing and willful false statement on this application can be punished by fine or imprisonment or both and automatic denial or revocation of unescorted access privileges.

I hereby authorize the Massachusetts Port Authority and its agents to perform a criminal offender record information (CORI) check. This CORI check is for the sole purpose of determining approval for unescorted access authority into the SIDA and/or Secured Area of Hanscom Field. This authorization is valid for one year from the date of my signature. I understand that the Massport and its agents may conduct subsequent CORI checks within one year of this application. I understand that a copy of the CORI record will be provided to me upon my written request. I further authorize the Massachusetts Port Authority and its agents, at any time during the term of any access privilege granted to me by the Massachusetts Port Authority, to receive any such records and to conduct any such additional reviews and assessment that it deems necessary and appropriate to ensure my continued suitability for the access privileges it has granted to me.

Applicant's Name: (Print) \_\_\_\_\_

Social Security No:    -   -

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**SECTION 2 – To Be Completed By Massachusetts State Police**

Two forms of identification presented: 1. Type and Document Number (if applicable): \_\_\_\_\_

2. Type and Document Number (if applicable): \_\_\_\_\_

Description of Results:  Results disclosed a disqualifying crime  Results did not disclose disqualifying crime

Signature of Official: \_\_\_\_\_

Date: \_\_\_\_\_

## Required Document Information

Minimum age required to apply for a SIDA badge is 17 years of age.

Minimum age required to apply for a SIDA badge with driving privileges on the airport is 18 years of age.

**Proof of citizenship must be submitted with all applications.**

**The documents that are highlighted on the following page are accepted as proof of citizenship.**

Copies of 2 IDs must be submitted with the badge application.

Originals of same 2 IDs in application must be shown at time of badging.

All IDs must be valid and unexpired. One ID must be a government or state issued photo ID.

- **If the applicant was born in the US**, one of the documents must be a US Passport, US Passport Card or original or certified copy of a US birth certificate. Puerto Rican birth certificates issued prior to 7/1/10 are not acceptable.
- **If the applicant was born outside the US and the applicant is now a US Citizen** one of the documents must be a US Passport, US Passport Card, DS1350 Certification of Birth Abroad or FS545 Certificate of Birth Abroad. A Naturalization Certificate is not an acceptable document.
- **If applicant is not a US citizen** one of the documents must be an INS approved document to work in the US; Employment Authorization Card, Permanent Resident Card or Foreign Passport with I-94.
- **If the applicant presents a proof of citizenship document from list A**, the second document can be from List B or C.
- **If the applicant presents a proof of citizenship document only from list C**, then the second document must be from List B.
- **If ramp driving privileges are requested or job position indicates driving (van driver, bus driver etc.)**, a driver's license must be one of the documents.

Please note:

- Names on badge applications must match the names presented on the required documents and must be the full legal name of the applicant. Names on all submitted documents must match exactly.
- All name changes must be accompanied by legal documents verifying the new name (legal name change form, marriage/ divorce certificates etc). All ID documents must reflect new names within 12 months of name change. Example of a scenario when the names on the IDs will not match; the name on a birth certificate and driver's license do not match due to marriage. A marriage certificate is required also.
- Passports and Social Security cards are not valid unless signed by the applicant.
- If the applicant is not a US citizen: While working, the applicant must carry their valid documents allowing them to work (Employment Authorization card, Resident Alien card etc). Audits are conducted on a regular basis.

## LIST OF ACCEPTABLE DOCUMENTS FOR HANSCOM FIELD SIDA BADGES

- Every badge applicant must present two forms of valid, unexpired acceptable documents.
- Proof of citizenship must be submitted with all applications.
- The documents that are highlighted below are accepted as proof of citizenship.

### List A

1. US Passport or US Passport Card
2. Permanent Resident Card or Alien Registration Receipt Card (Form-I-551)
3. Foreign Passport that contains a temporary I-551 stamp or temporary I-551 printed notation on a machine-readable immigrant visa
4. Employment Authorization document that contains a photograph (Form I-766)
5. For a nonimmigrant alien authorized to work for a specific employer because of his or her status:
  - a. Foreign Passport; and
  - b. Form I-94 or Form I-94A that has the following:
    - (1) The same name as the passport; and
    - (2) An endorsement of the alien's nonimmigrant status as long as that period of endorsement has not yet expired and the proposed employment is not in conflict with any restrictions or limitations identified on the form.
6. Passport from the Federated States of Micronesia (FSM) or the Republic of the Marshall Islands (RMI) with Form I-94 or Form I-94A indicating nonimmigrant admission under the Compact of Free Association Between the United States and the FSM or RMI

### List B

1. Driver's license or ID card issued by a State or outlying possession of the United States provided it contains a photograph or information such as name, date of birth, gender, height, eye color, and address
2. ID card issued by Federal, State or local government agencies or entities, provided it contains a photograph or information such as name, date of birth, gender, height, eye color, and address
3. School ID card with a photograph
4. Voter's registration card
5. U.S. Military card or draft record
6. Military dependent's ID card
7. U.S. Coast Guard Merchant Mariner Card
8. Native American tribal document
9. Driver's license issued by a Canadian government authority

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### List C

1. A Social Security Account Number card unless the card includes one of the following restrictions:
  - (1) NOT VALID FOR EMPLOYMENT
  - (2) VALID FOR WORK ONLY WITH INS AUTHORIZATION
  - (3) VALID FOR WORK ONLY WITH DHS AUTHORIZATION
2. Certification of Birth Abroad issued by the Department of State (Form FS-545)
3. Certification of Report of Birth issued by the Department of State (Form DS-1350)
4. Original or certified copy of a birth certificate issued by a State, county, municipal authority, or territory of the United States bearing an official seal
5. Native American tribal document
6. U.S. Citizen ID Card (USCIS Form I-197)
7. Identification Card for use of Resident Citizen in the United States (Form I-179)
8. Employment authorization document issued by the DHS

## TRENCH PERMIT APPLICATION



# Capital Programs & Environmental Affairs Trenching Application Check List

TAA/MPA Project Number and Name: \_\_\_\_\_

Date Submitted: \_\_\_\_\_ Start Date: \_\_\_\_\_ End Date: \_\_\_\_\_

- 1. MPA/TAA Project Name & Number
- 2. Start Date/End Date
- 3. Dig Safe Number
- 4. Date submitted
- 5. Excavating Company Name
- 6. Competent Person's Information
- 7. Trench Site Location and Address
- 8. General Contractors' Information
- 9. Construction License Information
- 10. Insurance Information
- 11. Location of Trench(s), Description of Type, Length and Depth of Proposed Trench and its Purpose
- 12. Excavator Operator's Signature
- 13. Authorized Excavation Company Representative's Signature
- 14. MPA Project Manager's Signature

### **Attachments Required**

- 15. Copy of Excavator Operator's License
- 16. Copy of Excavators Operator's Medical Card
- 17. Copy of Excavator Operator's OSHA Card (10 HR minimum)
- 18. Copy of Insurance Certificate with Massport Named as Additional Insured
- 19. Work Plan Describing Work to be Done, How Excavation is Protected, Location and Signage to be Posted.
- 20. Site Location Plan
- 21. Drawings of Proposed Excavation(s)

\* **Authorization:** All the information listed above has been reviewed and confirmed to be valid and accurate.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
MPA Project Manager

Return-Additional Information Required Date: \_\_\_\_\_

Comments





*Capital Programs and Environmental Affairs*

*Trench Permit Application*

Massachusetts Port Authority  
 One Harborside Drive  
 East Boston, MA 02128-2909  
 Telephone (617) 568-5000  
 Fax (617) 568-3515  
[www.massport.com](http://www.massport.com)

Pursuant to G.L.C.82A § 1 and 520 CMR 7.00 et seq. (as amended)

MPA/TAA Project Name and Number:	Start Date	End Date	Dig Safe Number	Date Submitted
#1)	#2)		#3)	#4)

**A hard copy of this Permit Application must be completed, with attachments, and submitted two weeks in advance of proposed date of excavation by MPA project manager. Leave copy in Trench Permit Inbox on cubicle wall between M. Gwaltney & A. Papotto desks for review process.**

**Excavator Operator's Information**

Excavating Company Name:		Street Address:			
#5)					
City/Town:		State:	Zip:	Phone:	
Excavation Company's Contact Person Name & Title		Office Phone:	Cell Phone:	Home Phone:	
Excavators Name:	24 hr. Phone Number:	Hoisting License Number:	License Grade	Expiration Date	
Name of Competent Person on Excavation Site: (as defined by 520CMR7.02)		24 hr Phone Number:			
#6)					
Trench Site Location:	Street Address:	City:	Zip:		
#7)					
General Contractor Name and Address: (if different than excavator)		Contact Persons Name		24 hr Phone Number:	
#8)					

**Construction License Information**

Name of Construction License Holder:	Title:	License Number:	Class:	Expiration Date:
#9)				

**Insurers Information**  
 Attach required Certificate of Insurance  
 With Massport Named as Additional Insured

Insurer's Company Name:		Street Address:			
#10)					
City/Town:		State:	Zip:	Phone:	
Insurance Certificate Number:	Policy Limits:	Policy Expiration Date:			





Capital Programs and Environmental Affairs

Project Trenching Permit Application

Please describe the length, width, depth and purpose of trench(s) and how excavation will be protected.

#11)

Attach work plan, site location plan and drawings(s) of proposed excavations.

BY SIGNING THIS FORM, THE APPLICANT, OWNER, AND EXCAVATOR ALL ACKNOWLEDGE AND CERTIFY THAT BEFORE COMMENCEMENT OF THE WORK, THEY ARE FAMILIAR WITH ALL LAWS AND REGULATIONS APPLICABLE TO WORK PROPOSED, INCLUDING OSHA REGULATIONS, G.L. c. 82A, 520 CMR 7.00 et seq., AND ANY APPLICABLE ORDINANCES, BY-LAWS AND REGULATIONS AND COVENANT AND AGREE THAT ALL WORK DONE UNDER THE PERMIT ISSUED FOR SUCH WORK WILL COMPLY THEREWITH IN ALL RESPECTS AND WITH THE CONDITIONS SET FORTH BELOW.

THE UNDERSIGNED OWNER AUTHORIZES THE APPLICANT TO APPLY FOR THE PERMIT AND THE EXCAVATOR TO UNDERTAKE SUCH WORK ON THE PROPERTY OF THE OWNER, AND ALSO, FOR THE DURATION OF CONSTRUCTION, AUTHORIZES PERSONS DULY APPOINTED BY MASSPORT TO ENTER UPON THE PROPERTY TO MONITOR AND INSPECT THE WORK FOR CONFORMITY WITH THE CONDITIONS ATTACHED HERETO AND THE LAWS AND REGULATIONS GOVERNING SUCH WORK.

THE UNDERSIGNED APPLICANT, OWNER AND EXCAVATOR AGREE JOINTLY AND SEVERALLY TO REIMBURSE MASSPORT FOR ANY AND ALL COSTS AND EXPENSES INCURRED BY MASSPORT IN CONNECTION WITH THIS PERMIT AND THE WORK CONDUCTED THERE UNDER, INCLUDING BUT NOT LIMITED TO ENFORCING THE REQUIREMENTS OF STATE LAW AND CONDITIONS OF THIS PERMIT, INSPECTIONS MADE TO ASSURE COMPLIANCE THEREWITH, AND MEASURES TAKEN BY MASSPORT TO PROTECT THE PUBLIC WHERE THE APPLICANT OWNER OR EXCAVATOR HAS FAILED TO COMPLY THEREWITH INCLUDING POLICE DETAILS AND OTHER REMEDIAL MEASURES DEEMED NECESSARY BY MASSPORT.

THE UNDERSIGNED APPLICANT, OWNER AND EXCAVATOR AGREE JOINTLY AND SEVERALLY TO DEFEND, INDEMNIFY, AND HOLD HARMLESS MASSPORT AND ALL OF ITS AGENTS AND EMPLOYEES FROM ANY AND ALL LIABILITY, CAUSES OR ACTION, COSTS, AND EXPENSES RESULTING FROM OR ARISING OUT OF ANY INJURY, DEATH, LOSS, OR DAMAGE TO ANY PERSON OR PROPERTY DURING THE WORK CONDUCTED UNDER THIS PERMIT.

#12) EXCAVATOR'S SIGNATURE DATE PLEASE PRINT NAME

#13) COMPANY REPRESENTATIVE SIGNATURE DATE PLEASE PRINT NAME

#14) MASSPORT'S PROJECT MANAGER'S SIGNATURE DATE PLEASE PRINT NAME

Massport Closeout Information

Table with 4 columns: Reviewed by, Title, Phone Number, Date



*Capital Programs and Environmental Affairs*

*Project Trenching Permit Application*

Comments:

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## Capital Programs & Environmental Affairs

### Summary of State and OSHA Trenching Requirements

#### CONDITIONS AND REQUIREMENTS PURSUANT TO G.L.C.82A AND 520 CMR 7.00 et seq. (as amended)

By signing the application, the applicant understands and agrees to comply with the following:

- i.** No trench may be excavated unless the requirements of sections 40 through 40D of chapter 82, and any accompanying regulations, have been met and this permit is invalid unless and until said requirements have been complied with by the excavator applying for the permit including, but not limited to, the establishment of a valid excavation number with the underground plant damage prevention system as said system is defined in section 76D of chapter 164 (DIG SAFE);
- ii.** Trenches may pose a significant health and safety hazard. Pursuant to Section 1 of Chapter 82 of the General Laws, an excavator shall not leave any open trench unattended without first making every reasonable effort to eliminate any recognized safety hazard that may exist as a result of leaving said open trench unattended. Excavators should consult regulations promulgated by the Department of Public Safety in order to familiarize themselves with the recognized safety hazards associated with excavations and open trenches and the procedures required or recommended by said department in order to make every reasonable effort to eliminate said safety hazards which may include covering, barricading or otherwise protecting open trenches from accidental entry.
- iii.** Persons engaging in any trenching operation shall familiarize themselves with the federal safety standards promulgated by the Occupational Safety and Health Administration on excavations: 29 CFR 1926.650 et.seq., entitled Subpart P “Excavations”.
- iv.** Excavators engaging in any trenching operation who utilize hoisting or other mechanical equipment subject to chapter 146 shall only employ individuals licensed to operate said equipment by the Department of Public Safety pursuant to said chapter and this permit must be presented to said licensed operator before any excavation is commenced;
- v.** By applying for, accepting and signing this permit, the applicant hereby attests to the following: (1) that they have read and understands the regulations promulgated by the Department of Public Safety with regard to construction related excavations and trench safety; (2) that he has read and understands the federal safety standards promulgated by the Occupational Safety and Health Administration on excavations: 29 CMR 1926.650 et.seq., entitled Subpart P “Excavations” as well as any other excavation requirements established by this municipality; and (3) that he is aware of and has, with regard to the proposed trench excavation on private property or proposed excavation of a city or town public way that forms the basis of the permit application, complied with the requirements of sections 40-40D of chapter 82A.
- vi.** This permit shall be posted in plain view on the site of the trench.

For additional information please visit the Department of Public Safety’s website at [www.mass.gov/dps](http://www.mass.gov/dps)



# Capital Programs & Environmental Affairs

## Summary of State and OSHA Trenching Requirements

### *Summary of Excavation and Trench Safety Regulation (520 CMR 14.00 et seq.)*

This summary was prepared by the Massachusetts Department of Public Safety pursuant to G.L.c.82A and does not include all requirements of the 520 CMR 14.00. To view the full regulation and G.L.c.82A, go to [www.mass.gov/dps](http://www.mass.gov/dps). Pursuant to M.G.L. c. 82, § 1, the Department of Public Safety, jointly with the Division of Occupational Safety, drafted regulations relative to trench safety. The regulation is codified in section 14.00 of title 520 of the Code of Massachusetts Regulations. The regulation requires all excavators to obtain a permit prior to the excavation of a trench made for a construction-related purpose on public or private land or rights-of-way. All municipalities must establish a local permitting authority for the purpose of issuing permits for trenches within their municipality. Trenches on land owned or controlled by a public (state) agency requires a permit to be issued by that public agency unless otherwise designated.

In addition to the permitting requirements mandated by statute, the trench safety regulations require that all excavators, whether public or private, take specific precautions to protect the general public and prevent unauthorized access to unattended trenches. Accordingly, unattended trenches must be covered, barricaded or backfilled. Covers must be road plates at least ¾” thick or equivalent; barricades must be fences at least 6’ high with no openings greater than 4” between vertical supports; backfilling must be sufficient to eliminate the trench. Alternatively, excavators may choose to attend trenches at all times, for instance by hiring a police detail, security guard or other attendant who will be present during times when the trench will be unattended by the excavator.

The regulations further provide that local permitting authorities, the Department of Public Safety, or the Division of Occupational Safety may order an immediate shutdown of a trench in the event of a death or serious injury; the failure to obtain a permit; or the failure to implement or effectively use adequate protections for the general public. The trench shall remain shut down until re-inspected and authorized to re-open provided, however, that excavator shall have the right to appeal an immediate shutdown. Permitting authorities are further authorized to suspend or revoke a permit following a hearing. Excavators may also be subject to administrative fines issued by the Department of Public Safety for identified violations.



# Capital Programs & Environmental Affairs

## Summary of State and OSHA Trenching Requirements

### Summary of 1926 CFR Subpart P -OSHA Excavation Standard

This is a worker protection standard, and is designed to protect employees who are working inside a trench. This summary was prepared by the Massachusetts Division of Occupational Safety and not OSHA for informational purposes only and does not constitute an official interpretation by OSHA of their regulations, and may not include all aspects of the standard. For further information or a full copy of the standard go to [www.osha.gov](http://www.osha.gov)

- **Trench Definition per the OSHA standard:**
  - An excavation made below the surface of the ground, narrow in relation to its length.
  - In general, the depth is greater than the width, but the width of the trench is not greater than fifteen feet.
- **Protective Systems** to prevent soil wall collapse are always required in trenches deeper than 5', and are also required in trenches less than 5' deep when the competent person determines that a hazard exists. Protection options include:
  - Shoring. Shoring must be used in accordance with the OSHA Excavation standard appendices, the equipment manufacturer's tabulated data, or designed by a registered professional engineer.
  - Shielding (Trench Boxes). Trench boxes must be used in accordance with the equipment manufacturer's tabulated data, or a registered professional engineer.
  - Sloping or Benching. In Type C soils (what is most typically encountered) the excavation must extend horizontally 1 ½ feet for every foot of trench depth on both sides, 1 foot for Type B soils, and ¾ foot for Type A soils.
  - A registered professional engineer must design protective systems for all excavations greater than 20' in depth.
- **Ladders** must be used in trenches deeper than 4'.
  - Ladders must be inside the trench with workers at all times, and located within 25' of unobstructed lateral travel for every worker in the trench.
  - Ladders must extend 3' above the top of the trench so workers can safely get onto and off of the ladder.
- **Inspections** of every trench worksite are required:
  - Prior to the start of each shift, and again when there is a change in conditions such as a rainstorm.
  - Inspections must be conducted by the competent person (see below).
- **Competent Person(s) is:**
  - Capable (i.e., trained and knowledgeable) in identifying existing and predictable hazards in the trench, and other working conditions which may pose a hazard to workers, and
  - Authorized by management to take necessary corrective action to eliminate the hazards. Employees must be removed from hazardous areas until the hazard has been corrected.
- **Underground Utilities** must be:
  - Identified prior to opening the excavation (e.g., contact Digsafe).
  - Located by safe and acceptable means while excavating.
  - Protected, supported, or removed once exposed.
- **Spoils** must be kept back a minimum of 2' from the edge of the trench.
- **Surface Encumbrances** creating a hazard must be removed or supported to safeguard employees. Keep heavy equipment and heavy material as far back from the edge of the trench as possible.



# Capital Programs & Environmental Affairs

## Summary of State and OSHA Trenching Requirements

- **Stability of Adjacent Structures:**
  - Where the stability of adjacent structures is endangered by creation of the trench, they must be underpinned, braced, or otherwise supported.
  - Sidewalks, pavements, etc. shall not be undermined unless a support system or other method of protection is provided.
- **Protection from water accumulation hazards:**
  - It is not allowable for employees to work in trenches with accumulated water. If water control such as pumping is used to prevent water accumulation, this must be monitored by the competent person.
  - If the trench interrupts natural drainage of surface water, ditches, dikes or other means must be used to prevent this water from entering the excavation.
- **Additional Requirements:**
  - For mobile equipment operated near the edge of the trench, a warning system such as barricades or stop logs must be used.
  - Employees are not permitted to work underneath loads. Operators may not remain in vehicles being loaded unless vehicles are equipped with adequate protection as per 1926.601(b)(6).
  - Employees must wear high-visibility clothing in traffic work zones.
  - Air monitoring must be conducted in trenches deeper than 4' if the potential for a hazardous atmosphere exists. If a hazardous atmosphere is found to exist (e.g., O<sub>2</sub> <19.5% or >23.5%, 20% LEL, specific chemical hazard), adequate protections shall be taken such as ventilation of the space.
  - Walkways are required where employees must cross over the trench. Walkways with guardrails must be provided for crossing over trenches > 6' deep.
  - Employees must be protected from loose rock or soil through protections such as scaling or protective barricades.

### ***Q. What do the Trench Safety Regulations (520 CMR 14.00) require?***

**A.** Generally, the Trench Safety Regulations require that ***unattended*** trenches be made safe for the General Public. Pursuant to the regulations enabling statute, [MGL c. 82A](#), the Trench Safety Regulations, included in 520 CMR 14.00, require excavators to obtain a permit prior to creating a trench on public or private property; require excavators to undertake certain safety precautions to make unattended trenches safe for the general public and prevent unauthorized access; and subject excavators to penalties, including fines, for the failure to comply with the regulations. An “unattended trench” is defined as “a trench where neither the permit holder, excavator, or any of the people who work in or at the trench are present.” It is important to note that these regulations require action to be taken by permit holders ahead of time to secure unattended trenches. These regulations do not prescribe worker safety regulations for employees in or at trenches, nor are the regulations intended to protect the general public from hazards inherent in trenches while the trenches are attended.



# Capital Programs & Environmental Affairs

## Summary of State and OSHA Trenching Requirements

### ***Q. What is a trench?***

A. According to [MGL c. 82A, §4](#) and 520 CMR 14.02, a trench is defined as “an excavation which is narrow in relation to its length, made below the surface ground in excess of three feet below grade and the depth of which is, in general, greater than the width, but the width of the trench, as measured at the bottom, is not greater than 15 feet.” It is important to note that this definition differs from the definition of “trench” included in the OSHA Regulation 1926 Subpart P—Excavations. Below, please find a side-by-side comparison of the definitions for what constitutes a trench and what the different regulations require when a trench exists:

OSHA Regulation 1926 Subpart P—Excavations	520 CMR 14.02
Protective systems not required for excavations less than 5’ in depth (1926.652)	General Public protections not required when excavations are less than 3’ below grade or the depth is less than the width
A trench may consist completely of soil walls or may consist of a soil wall and another barrier, such as the wall of a placed foundation.	A trench is composed wholly of soil walls for purposes of this regulation, including permitting; the placement of a foundation implies the necessity of a building permit and adherence to the State Building Code, which incorporates many of the same or similar protections for the General Public.
Requires the use of a “protective system” such as trench boxes or shoring to protect employees from cave-ins which may result in injuries or death.	Requires a permit and the implementation of protections to protect the General Public from unauthorized access to trenches, which may result in injuries or death.

### ***Q. Why do the regulations require a permit to create a trench?***

A. The regulations require excavators to obtain a permit because the statute requires excavators to obtain permit. See [MGL c. 82A, §2](#). The permit ensures that the city, town or public agency is aware of trenches being created within its jurisdiction and also ensures that excavators are put on notice with regard to the safety requirements for trenches because permitting authorities are required to attach summaries of OSHA Regulation 1926 Subpart P-Excavations and the Excavation and Trench Safety Regulations included at 520 CMR 14.00, passed pursuant to [MGL c. 82A](#).

### ***Q. What is a permitting authority?***

A. A permitting authority is defined within the regulations as “a city, town or public agency required to administer the provisions of 520 CMR 14.03 [Permitting Requirements].” The statute, [MGL c. 82A, §2](#), states that “each city, town, or public agency shall designate 1 board or officer to issue permits for the excavation of trenches on privately owned land and for the excavation of a public way of a city or town.” Under Article 89 of the Massachusetts Constitution, municipalities may choose to enact a by-law or regulation designating the board or officer that will act as the permitting authority for that city or town. While there are no prerequisites for designation as the permitting authority, the Department of Public Safety and the Division of Occupational Safety recommend the delegation to an individual or board/department presumed to have knowledge of excavation safety already, which may include local building officials or the building department; the fire chief or fire department; a DPW supervisor or board; or the city/town engineer.





## Capital Programs & Environmental Affairs Summary of State and OSHA Trenching Requirements

### ***Q. I am an excavator. Where may I obtain a permit and what is required?***

A. Who you obtain the permit from will depend on who owns or, in the case of a state agency, who owns or has care and control of the land on which you wish to make a trench. If the land is owned by a municipality or is private property, then the excavator must obtain a permit from the permitting authority as designated by the city or town. Cities and towns are authorized by statute to charge a reasonable fee for the permit. If the land is owned or controlled by a public agency or a public agency otherwise has a property interest in the land, such as in the case of an easement, then the excavator must obtain a permit from the permitting authority designated by that state agency.

To obtain a permit, the excavator must submit a completed application; a certificate of insurance indicating general liability coverage of \$100,000 per person and \$300,000 per claim or evidence of self-insurance in an equal amount (pursuant to MGL c. 82A, §2); and the required fee, where applicable. The regulations at 520 CMR 14.03(4) require the excavator to provide the following information on the permit application:

- the Dig Safe number;
- Name & contact information for the permit holder (the person filing for the permit);
- Name and contact information of the excavator (the company performing the excavation);
- Name of the competent person;
- Name of the person(s) performing the excavation of the trench;
- Massachusetts hoisting license number for each person operating hoisting machinery during the excavation;
- Permit expiration date (where applicable);
- Specific location of the trench;
- Name and contact information of the insurer

The trench permit is similar to a street opening permit and the application for a trench permit may be included with that permit. Once issued, the permit must be posted in plain view at the trench worksite, such as in the window of a construction trailer.

### ***Q. May permitting authorities charge fees for trench permits?***

A. Yes. Municipal permitting authorities may charge a reasonable fee to cover the administrative costs of permitting the trench excavation. See [MGL c. 82A, §2](#) and 520 CMR 14.03(6). This fee is at the discretion of the municipality to determine what is reasonable in light of its administrative needs.

### ***Q. Can permitting authorities impose time restrictions on issuing permits, such as requiring applicants to apply for the permit at least three days prior the planned excavation?***

A. There is no explicit prohibition in the regulations, and the permitting authority is allowed to impose stricter regulations.





## Capital Programs & Environmental Affairs Summary of State and OSHA Trenching Requirements

### ***Q. Are excavators expected to obtain a permit before responding to an emergency, such as a water main break?***

**A. NO.** Permits are not required prior to creating a trench in response to an emergency. “Emergency” is defined in 520 CMR 14.02 as “an unforeseen condition in which the safety of the public is in imminent danger because of a threat to life or health or where immediate correction is required to maintain or restore essential public utility service.” However, the excavator should complete a permit application with the permitting authority by the next business day, at the latest.

### ***Q. I own a large construction company that frequently performs large jobs and may use multiple sub-contractors. I don’t always know who the individual operating the excavation equipment or competent person will be at any one time on a complex project that may take several weeks or more, so how am I supposed to complete the permit application?***

**A.** The Department of Public Safety and Division of Occupational Safety anticipate that the scope may vary from project to project. Accordingly, the permitting authority should realize that the specific competent person and person performing the excavation may change on complex projects. Therefore, information may be updated as necessary during the course of the project, provided however, that by pulling the permit, the permit holder impliedly agrees to act reasonably to ensure that up-to-date information is provided to the permitting authority.

### ***Q. What are the permitting requirements if I am creating a trench for a project that crosses municipal lines or jurisdictional lines, such as from state-owned land onto private property?***

**A.** You must obtain a permit from each relevant permitting authority.

### ***Q. What is a competent person and who on the excavation crew should this person be?***

**A.** A “competent person” is defined in the regulations as: “A person or persons who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to people, and who has authorization to take prompt corrective measures to eliminate them. A competent person must be able to demonstrate that he or she has been trained in and is knowledgeable about: soil analysis, the use of protections for the General Public and the requirements of this regulation.” The first sentence of the definition is taken directly from OSHA’s regulations.

The competent person should be an individual who is well-versed in the procedures for reporting problems and knows where to obtain assistance to take corrective action. The Division of Occupational Safety, the agency responsible for oversight of worker safety in the Commonwealth, recommends that the competent person at a trench worksite be an individual that holds a Massachusetts hoisting license because this individual must already be familiar with the laws relevant to excavations, including the pertinent state and federal regulations.



## Capital Programs & Environmental Affairs Summary of State and OSHA Trenching Requirements

### ***Q. What are municipalities and public agencies required to do under the trench regulations?***

A. Municipalities and public agencies are required to 1) establish a permitting authority; 2) require permits for the creation of a trench on a public way, public property, or private property located within the municipality; 3) shut down trenches where violations are found; and 4) regulate municipal departments that create trenches. Municipalities or public agencies that act as excavators are not exempt from these regulations and must adhere to the same standards for obtaining a permit and implementing protections for the General Public required of other excavators. Municipalities and state agencies are ***not*** required to inspect trenches and excavators are not required to “pass” a municipal or state inspection to be allowed to receive a trench permit. Nevertheless, when permitting authorities, the DOS, or the DPS are put on notice of a potential violation of chapter 82A or 520 CMR 14.00, they are authorized to investigate the possible violation and take action where a violation is determined to exist. Actions that municipal permitting authorities may take include immediately shutting down a trench site where a violation is found. Permitting authorities may further suspend or revoke a permit following the opportunity for an administrative hearing.

### ***Q. What are the safety precautions that I must take as an excavator?***

A. Whenever a trench will be ***unattended*** an excavator must take measures to provide adequate protections for the general public that will prevent unauthorized access to the unattended trench. According to 520 CMR 14.02, an “unattended trench” is “a trench where neither the permit holder, excavator, nor any of the people who work in or at the trench are present.” When a trench is going to be unattended, excavators may choose one of 4 options to make the trench safe:

- erect a fence that is at least 6’ tall with openings no greater than 4” between vertical supports;
- use a roadplate that is at least 3/4” thick steel;
- post an attendant such as a police detail or flag man at the trench; or
- backfill the trench before leaving.

### ***Q. I own a private construction company that already adheres to the OSHA requirements for protecting my employees’ safety when they work in trenches. Aren’t these Trench Safety regulations redundant?***

A. No. OSHA’s regulations apply to worker safety and require the use of a “protective system” such as a trench box or shoring to protect employees from cave-ins. The trench regulations do not regulate worker safety. Rather, the Excavation and Trench Safety regulations at 520 CMR 14.00 regulate protections that construction companies, municipalities, state agencies, or any person that creates a trench must adhere to for the purpose of protecting the General Public. Moreover, while OSHA’s regulations apply while workers are present in, at, or around the trench, the regulations at 520 CMR 14.00 apply when the trench is unattended. By definition, an “unattended trench” is one where workers are not present in or at the trench. For a side-by-side comparison of the OSHA regulations and 520 CMR 14.00 see the table, above.

### ***Q. Is a trench permit required for cemetery burials?***

A. No. According to the statute, [MGL c. 82A, §1](#), the regulations and the requirement for a permit apply to “all construction related excavations and trench safety.” Cemetery burials are not “construction related” and therefore do not require a permit.



## Capital Programs & Environmental Affairs Summary of State and OSHA Trenching Requirements

### ***Q. Is a trench permit required for farms?***

A. Yes, if the trench is construction related. Whenever a construction related trench is created a permit is required under [MGL c. 82A, §1](#).

### ***Q. What action, if any, may a permitting authority take if it finds a violation of 520 CMR 14.00?***

A. If the permitting authority or an inspector from DPS or DOS identifies a serious threat to public safety, he or she may order an immediate shutdown of the trench worksite. Conditions warranting the immediate shutdown of a trench include a fatality of serious injury to a member of the General Public; the failure to use effective protections for the General Public; the failure to obtain a permit; or any other condition that constitutes a serious threat to life, limb, or property of the General Public as determined by the permitting authority. An appeal from the immediate shutdown may be made to the permitting authority or DPS/DOS. The appeal must be made within 10 calendar days of the shutdown. The trench worksite may not operate again until such time as the entity ordering the shutdown has reinspected the worksite and is satisfied that protections for the General Public are in use.

Where the permitting authority determines that the threat to public safety may warrant the suspension or revocation of the trench permit, the permitting authority may convene a hearing in accordance with the [Massachusetts Administrative Procedures Act, MGL c. 30A](#).

In addition to a post-hearing suspension or revocation, the DPS is statutorily authorized to also assess administrative fines against an excavator. See [MGL c. 82A, §1](#). The Department of Public Safety sends a written notice of intent to impose administrative fines, which may be up to \$5,000.00 per violation, to the violator. The party alleged to have violated the regulations may then request a hearing. Hearings are not held prior to the assessment of a fine, but must be requested in writing and must be filed with the Department of Public Safety within 10 calendar days of receipt of the notice of violation. The failure to make a timely request for a hearing shall constitute a waiver of the right to a hearing. All hearings shall be convened by a Hearing Officer of the Department of Public Safety and shall be held in accordance with MGL c. 30A.

## PROJECT WASTE TRACING SHEET



**WORKSITE MANIFEST**







## Employee Roster

MPA Project No. \_\_\_\_\_

	NAME	ROLE	COMMENTS
1			
2			
3			
4			
5			
SUBCONTRACTORS		TIME ON SITE	TIME OFF SITE

### AOA Access/Egress Manifest

<b>Gate Monitor:</b>	Yes	No	<b>In-bound to AOA</b>	
Identification Confirmation			Gate Monitor Name: _____	
Vehicle Safety Check Escort Procedures Review			Gate Monitor Signature: _____	_____
Release to Mobile Escort			Time: _____	_____
<b>Mobile Escort:</b>			<b>In-bound to Work Site</b>	
Mobile Escort Signature: Date: _____			_____	_____
Release to Static Escort			Time: _____	_____
<b>Static Escort:</b>			<b>At Work Site</b>	
			Static Escort Signature: Date: _____	_____
			Time: _____	_____
Release to Mobile Escort				_____
<b>Mobile Escort:</b>			<b>Out-bound to Gate 15</b>	
			Mobile Escort Signature: Date: _____	_____
			Time: _____	_____
Release to gate Monitor				_____
<b>Gate Monitor:</b>			<b>Exiting the AOA</b>	
			Gate Monitor Signature: Date: _____	_____
			Time Out: _____	_____
				_____

\* 1 - Copy must be given to the Gate Monitor upon entry

## **ADVISORY NOTIFICATION ELECTRICAL SHUTDOWN FORM**





# ADVISORY NOTIFICATION ELECTRICAL IMPAIRMENT PLAN

Location of Work: \_\_\_\_\_  
 Project Name & Number: \_\_\_\_\_  
 Associated MPA Work Plan: \_\_\_\_\_  
 Key Contact Person: \_\_\_\_\_  
 Date & Time of Impairment: \_\_\_\_\_

**Detailed Summary of Scope of Work:**

**Emergency Contact Information:**

Contact Name	Cell Phone

**Infrastructure Systems Impacted:**




Other \_\_\_\_\_

**Support Unit Contact Information:**

Infrastructure	Contact Name	Home Phone No.	Cell Phone No.



# ADVISORY NOTIFICATION ELECTRICAL IMPAIRMENT PLAN

**Authorizations:**

<b>Signature:</b> _____ Capital Programs Project Manager	<b>Date:</b> _____
<b>Signature:</b> _____ Massport Capital Programs and Environmental	<b>Date:</b> _____
<b>Signature:</b> _____ Massport Electrical Department	<b>Date:</b> _____

## **WORK PLAN TEMPLATE FORM AND WORK PLAN SAMPLE**

**MASSACHUSETTS PORT AUTHORITY  
PROJECT WORK PLAN**

<b>Date Submitted:</b>	09/23/09	<b>MPA Contract/TAA No.:</b>	L951- C2
<b>Project Name:</b>	Terminal E Gate 1 Area Modifications		
<b>General Contractor:</b>	Suffolk Construction	<b>Work Plan Number :</b>	WP-L951C2-011
<b>Work Plan Title:</b>	Mobilization for Phase II – Construction Management Plan		

**DESCRIPTION OF WORK :**

The work under this work plan will include capturing an area between Gate E1C and E1B, determining the location of dumpsters, identifying the location of the loading dock, and briefly describing other logistics of the job site.

**DATE & SHIFT OF WORK:**

Suffolk can mobilize as noted as soon as this work plan is approved. Work for Phase II will occur primarily between the hours of 7 am and 3 pm. The duration of the work will be from October of 2009, until July of 2010

**SCHEDULE & SEQUENCE OF OPERATIONS:**

***General Comments:***

1. All work to be scheduled and coordinated with MPA Capital Programs, MPA Operations, Port 32, and Terminal Manager. State police to be notified as necessary.
2. All airport emergency medical and fire notifications will be maintained (see attached emergency contact list).
3. All relevant OSHA safety requirements shall be implemented.
4. Notifications to relevant parties (Port 32) will be made on a daily basis prior to and upon completion of the work for the day.

***Logistics & Specifics:***

1. Waste Management: All trash created during construction will be placed in dumpsters daily as shown on the attached plan. The trash will be controlled via netting that will encompass the dumpster, preventing debris from blowing around on the ramp area.
2. Loading Dock: A loading dock will be created as shown in section A, on Plan 2. The loading dock will be for trash disposal and receiving of deliveries. Employees on this loading dock will be required to be tied off 100%. A tie off point will be established for all lanyards to be attached to. The tie-off point will be selected by a qualified/competent person.
3. Site Security (Ramp): The site perimeter will be created using plastic jersey barriers topped with flashing red lights, in accordance with FAA regulations. The barriers will be spaced at approximately 8-10 feet on center, and will be partially filled with water to prohibit movement.
4. Site Security (Terminal Work Area): Please see attached Plans 1 and 2. The work area will be classified as secure. No workers will be in contact with any screened passengers for this work. Three ACS doors will be taken off line (see separate work plan) to create a large work area in which MPA/Suffolk have control via MPA construction core locks/padlocks. Locations of site entry are identified on the attached plans.
5. Tool Management: All tools shall be kept in locked gang boxes, with company and emergency contact painted on the outside. Tool Inventory checklists will be posted inside the gang boxes, and reviewed on a daily basis. See attached Tool Management Plan for more details.
6. Site Access: Please see the attached plans for access and egress locations. A stair tower will be erected airside to minimize the use of extension ladders for access to the Arrivals Level low roof. For security, the stair tower will be surrounded with plywood from grade to 8 foot above grade. A door will be created and locked with an MPA padlock. In addition, please see note the locations of the existing bathrooms to be used for construction. Bathrooms will be monitored and cleaned on a daily basis to help maintain a sanitary environment. Also attached are: a copy of Suffolk's Emergency Evacuation Procedure for all Construction workers, and Suffolk Management Team's Response Procedure.
7. Site Signage: All site access points to be identified with signs reading: "Construction Area- Hard Hats/Safety Glasses/Hi-Vis Vests Required at all times Authorized Personnel Only" Separately there will be a project sign having the following information on it: MPA Capital Programs Project Number, Design Team, Emergency Contact. Locations identified on the attached plan.

***Areas of Operations:***

1. Terminal C, Sectors 1, 2, and 3, Arrivals and Departures Levels

**OPERATIONAL IMPACT:**

1. No intrusive operations.

**WORK PERFORMED BY :**

All work under the supervision of Suffolk Construction

**RELEVANT ATTACHMENTS:**

- Emergency contact list
- Plan 1- Staging/Laydown/Set-up Area Between E1B and E1C- Arrivals Level
- Plan 2- Staging/Laydown/Construction Management Plan- Departures Level
- Copy of Suffolk Emergency Evacuation Procedure.
- Copy of Suffolk Management Team- Emergency Response Procedure
- Tool Management Plan

Prepared by: \_\_\_\_\_  
General Contractor Representative

Reviewed by: \_\_\_\_\_  
Consultant Representative

Reviewed by: \_\_\_\_\_  
MPA Project Manager /Tenant Manager

Reviewed by: \_\_\_\_\_  
MPA Construction Representative



ACS DOORS TO BE TAKEN OFF LINE.

NEW ADA/SECURE WALL. CONSTRUCTION UNDER SEPARATE WORKPLAN TO BE ISSUED.

GLASS TO BE REMOVED AND REPLACED WITH PLYWOOD DOORS. MPA PADLOCK ON INSIDE.

LOADING DOCK

(A)

STAIR TOWER - BOARDED WITH PLYWOOD AT GROUND LEVEL.

STAIR OUT OF SERVICE. SIGNAGE AND BARRICADE AS REQ'D AT TOP OF STAIR. SEE PLAN #1.

ACS DOOR TO BE PUT IN TIMED OVERLIDE AS NEEDED FOR TRASH REMOVAL.

SITE ACCESS / EGRESS

BAGGAGE CART PARKING

EMERGENCY EGRESS

EXISTING BATHROOMS TO BE USED FOR CONSTRUCTION.

ACS DOOR TO BE TAKEN OFF LINE

DEPARTURES LEVEL

STAGING / LAYDOWN / CONSTRUCTION MANAGEMENT PLAN

2

NTS

EXISTING FACADE

PLATFORM TO BE CUT BACK AS NEEDED FOR NEW FACADE CONSTRUCTION

3/4" PLYWOOD OVER 2x10s OVER 4x4 SLEEPERS AS NEEDED

EXISTING ROOF

DRYWALL SOFFIT

ENGINEERED SCAFFOLDING / SHORING SYSTEM TO BE SUBMITTED FOR RECORD

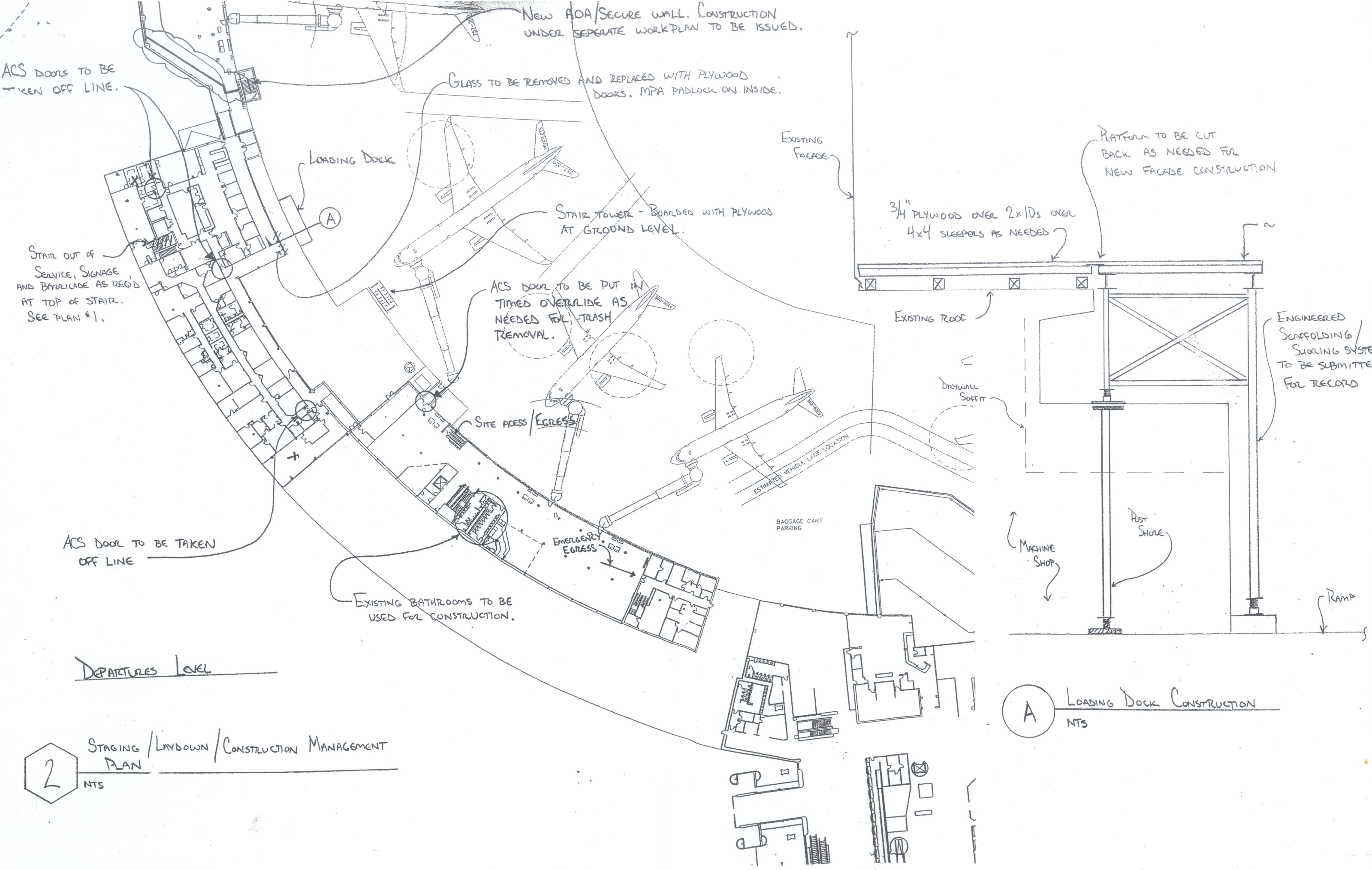
MACHINE SHOP

POST SHORE

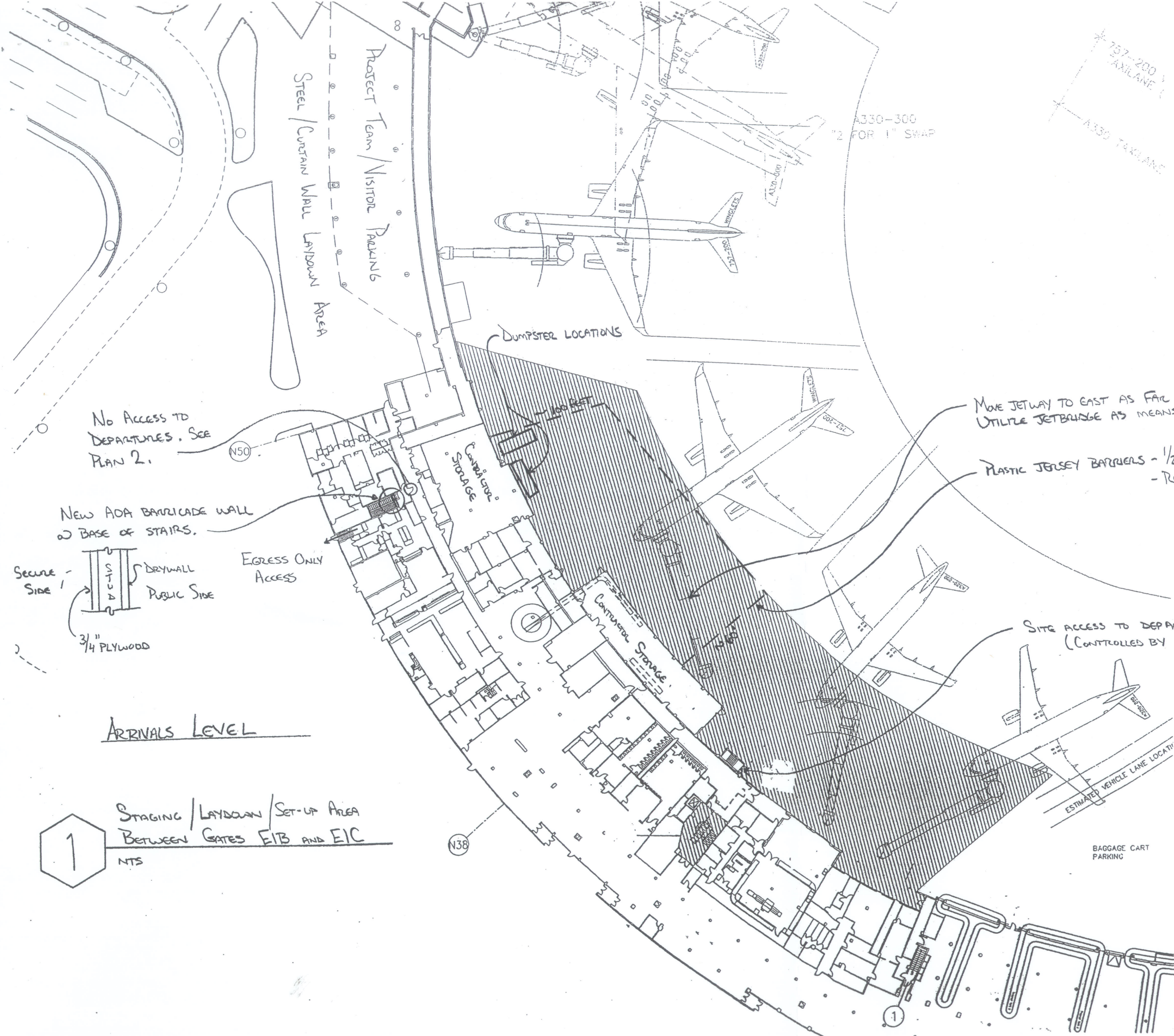
RAMP

(A)

LOADING DOCK CONSTRUCTION  
NTS





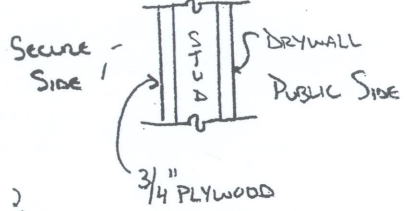


NOTES

- SIGNAGE ON ALL DOORS LEADING INTO WORK AREAS
- "AUTHORIZED PERSONNEL ONLY  
HAND HATS, SAFETY GLASSES, REFLECTIVE VESTS REQUIRED  
CONSTRUCTION AREA"
- MPA PROJECT L951-C2
- SUFFOLK CONSTRUCTION
- EMERGENCY CONTACT: GREG SAWIN  
(617) 593-0746

No Access to DEPARTURES. See PLAN 2.

New AOA BARRICADE WALL @ BASE OF STAIRS.



EGRESS ONLY ACCESS

MOVE JETWAY TO EAST AS FAR AS POSSIBLE. UTILIZE JETBRIDGE AS MEANS TO REMOVE TRASH DURING STEEL ERECTION.

PLASTIC JERSEY BARRIERS - 1/2 FILLED w/ WATER  
- RED FLASHING LIGHT MOUNTED TO TOP.

SITE ACCESS TO DEPARTURES (CONTROLLED BY MPA LOCK)

- CONSTRUCTION SIGN POSTED
- MPA CAPITAL PROGRAMS SIGN POSTED

ARRIVALS LEVEL

STAGING / LAYDOWN / SET-UP AREA BETWEEN GATES E1B AND E1C  
NTS



**MASSACHUSETTS PORT AUTHORITY  
PROJECT WORK PLAN**

**Date Submitted:**

**MPA Contract/TAA No.:**

**Project Name:**

**General Contractor:**

**Work Plan Number :**

**Work Plan Title:**

**DESCRIPTION OF WORK :**

**DATE & SHIFT OF WORK:**

**SCHEDULE & SEQUENCE OF OPERATIONS:**

*General Comments:*

*Logistics & Specifics:*

*Areas of Operations:*

**OPERATIONAL IMPACT:**

**WORK PERFORMED BY:**

**RELEVANT ATTACHMENTS:**

Prepared by: \_\_\_\_\_  
General Contractor Representative

Reviewed by: \_\_\_\_\_  
Consultant Representative

Reviewed by: \_\_\_\_\_  
MPA Project Manager /Tenant Manager

Reviewed by: \_\_\_\_\_  
MPA Construction Representative

## **CRANE OPERATIONS REVIEW & EVALUATION PROGRAM FORM**



## *Capital Programs & Environmental Affairs*

### *Crane Operations Review & Evaluation Program*

#### **PURPOSE**

This program outlines Massport's requirements for control, inspection and operation of Contractor cranes and other hoisting equipment. The Crane Operations Review & Evaluation form that follows is intended to be used for the pre-planning of any cranes or hoisting machinery being used on property under Massport's jurisdiction. This procedure does not relieve any contractor or crane operator of their responsibility to comply with OSHA crane standards or other provisions of Industry Standards.

#### **REQUIREMENTS**

The following documents will be required before any determination can be made for a crane operation on Massport Property, see the sections below for details on what is required for each document:

- Work plan
- The Crane Operations Review & Evaluation form
- Pre-lift meeting
- FAA Form 7460 final determination to be submitted in this package

#### **WORK PLAN**

A MPA work plan is required to accompany this form with the following information:

- Detailed description of work proposed
- Sequence of operations
- Impacts to airport operations
- Potential hazards
- Diagrams of the lift that provides geometrical conditions of the load, rigging, and all crane positions during the lift. The drawing shall provide the following:
  - Safety Zone.
  - Equipment on site that will assist the lift and all other adjacent equipment
  - Locations of all components to be lifted prior, during and after the lift are completed.
  - Radius points with the pick points and set points.
  - In the event that the lift must be aborted, positions where the load may be safely landed.
  - Areas where any personnel, public, and vehicles must be evacuated during the lift and identify any access ways and doors that will be affected during the operation.
- Impact on environment
- Load handling equipment

- Rigging diagram
- Lift Plan Check list
- Identify any impairments caused due to this operation including but not limited to:
  - Door restrictions
  - Access ways and walk walks
  - MEP Systems
  - Tenant spaces
- List any restrictions that are necessary because of weather limitations, time of day and/or temperature restrictions
- List any Temporary Traffic Controls
- Emergency Contact list

## **THE CRANE OPERATIONS REVIEW & EVALUATION FORM**

This form is used to obtain the required information regarding the crane operation and load handling. This form is to be filled out entirely and signed by the appropriate parties. The form will include at least the following information:

- Information about the contractor and subcontractor
- Exact location and description of the work. This is to supplement the description required in the work plan.
- Crane logistics and scheduling
- Lift plan (see below for additional information required under each type of lift plan)
- Notifications
- Additional Notes or Special Conditions

See blank form attached

### ***LIFT PLANS***

Crane lifts will be categorized under the following categories; Critical Lifts, General Lifts, & Production Lifts. Select the lift plan that supports the type of pick required and submit the following information for the crane lift category specified.

#### **Critical Lifts**

A critical lift is defined by any lift utilizing multiple cranes, the weight of the equipment to be lifted as compared to the allowable lift, the swing area of the lift, the overall risk, difficulty or complexity of the lift, toxicity of the product being lifted and other considerations at the discretion of Massport.

#### **Critical Lift Plan**

Where a critical lift will be performed, a written critical lift plan shall be submitted to Massport prior to commencing with the lift. The written plan shall include the following:

- 1) Load chart data for the crane to be used to make the lift.
- 2) Total calculated weight of the load to be lifted including all rigging and other deductions consistent with the manufacturer's load chart. Include a detailed rigging diagram.
- 3) Soil and subsurface data and information pertaining to the location on which the crane used for the critical lift will be positioned. This information shall be procured from an authoritative source such as a geotechnical engineer or a professional civil engineer registered in Massachusetts.
- 4) An engineer shall use the data provided in #3 above to verify and confirm the following:
  - a) That the soil and subsurface conditions are capable of supporting all loads imposed during the critical lift.
  - b) That the designs of cribbing and other supports used under the crane load points are appropriate to safely transfer such loads

- 5) The following roles shall be defined and assigned:
  - a) Crane assembly director
  - b) Lift director
  - c) Rigging director
  - d) Site Supervisor
  - e) Signal Person
- 6) Signature and stamp on the plan by a registered professional engineer licensed in Massachusetts, evidencing review of the plan as meeting the requirements set forth in this manual and that all loads and load information and calculations contained in the plan are approved, acceptable and safe to perform.
- 7) Method by which communication will be provided to the crane operator. (Designated signal person, two-way radio, hard wire phone system, etc.)
- 8) A critical lift hazard analysis which identifies the particular hazards associated with the lift and the means and methods to reduce, mitigate, or eliminate the hazards.
- 9) list any restrictions that are necessary because of weather limitations, time of day and/or temperature restrictions
- 10) Emergency action plan.

The written plan shall be submitted 10 business days prior to any critical lift for review by Massport. No critical lifts shall be conducted prior to such review.

#### General Lift Plan

Lifts that are neither Critical nor Production fall in this category. For example, the unloading of miscellaneous supplies or the delivery of lumber to a carpenter crew are general lifts.

The general lift plan should:

- List any restrictions that are necessary because of weather limitations, time of day and/or temperature restrictions;
- Require that the weight of the load be known;
- Give a description of the general arrangement and use of rigging equipment
- Outline the procedures used to assure that rigging equipment has been inspected properly;
- Require that there be a lift director in charge of each lift.
- A signal person shall be assigned and clearly identified as such to the operator. If multiple signal persons are required, a thorough briefing on the sequential communication with the crane operator is required.

The General Lift Plan shall be submitted with the work plan.

#### Production Lift Plan

Production lifts are repetitive and do not fall into the classification of a critical lift. Production lifts may all be covered by one lift plan that outlines the parameters and the equipment to be utilized as well as the procedures.

The production lift plan is an extension of the general lift plan and should:

- contain a physical description of the class or group of items to be repetitively lifted including size, shape, weight and center of gravity. The description for a class or group must include the most adverse properties for crane operation such as the heaviest or largest that will occur in the class;
- List operational factors such as lifting and swing speeds, and the travel path;
- address hazards from failure of the rigging and/or collision. A hazard evaluation should be performed in order to identify and eliminate these potential hazards. Hazards associated with lifting over personnel and congested areas should be eliminated by either controlling access to the area or by changing the path of the lifting operation;
- List specific restrictions over and above those for the general lift plan that are necessary because of weather limitations, time of day and/or temperature restrictions;
- identify the specific type and minimum capacity of the lifting equipment required.
- identify the specific arrangement of rigging equipment;



- identify any special rigging fixtures which might be required. The fixtures should be designed in accordance with applicable regulations and standards;
- require that rigging and lifting equipment be subject to specified inspection intervals and that a documented trail of the history of inspections and/or certifications be maintained;
- require that a designated leader of the rigging crew be appointed. This leader may be a foreman of the Service Provider or other party specifically designated to perform the leadership functions needed by the rigging crew.

The Production Lift Plan shall be submitted with the work plan.

#### **PRE-LIFT MEETING**

After all of the above information has been submitted and reviewed by Massport a Pre-Lift meeting will be held. This meeting is intended to review the crane package with all of the appropriate parties to go over final coordination and logistic issues. At minimum the following should be in attendance:

- Crane assembly director
- Lift director
- Crane Company Representative
- GC Representative
- MPA PM
- MPA RE

***ALL APPLICABLE SECTIONS OF THE FORM THAT FOLLOWS MUST BE COMPLETED PRIOR TO WORK COMMENCING. IF REQUIRED SECTIONS ARE LEFT BLANK OR ARE INCOMPLETE MASSPORT WILL NOT REVIEW THE PLAN.***

#### **DAILY OPERATIONAL PROCEDURE**

Once all of the above information has been submitted, reviewed and Massport has found the crane submission acceptable the following will be the procedure for the daily crane operation.

- Once a crane is on site the Resident Engineer must call Hanscom operations at 617-212-6592 to give the operator the coordinates of the crane location and the ASN number (if applicable) from the FAA 7460.
- When the crane is ready to boom up and begin work the onsite Resident Engineer will call “Hanscom 3” and Clearly indicate the Following to get permission to boom up the crane:
  - Crane Location
  - Boom Height
  - Flag and Beacon
  - What time the operation will go until
  - Indicate the lat/long have been given to operations.
- The resident engineer as well as the crane supervisor or the competent person supervising the crane picks will be required to monitor the Massport Operations radio at all times. Weather, Runway Configurations or Emergencies may require the crane to boom down immediately.
- At the end of the work shift the Resident Engineer will call “Hanscom 3” to indicate that the crane has boomed down.

#### **DEFINITIONS**



1. **Crane:** A Crane is a lever and the simple principles of movement apply. The weight of the load, times the distance from the fulcrum, is the overturning moment.
2. **Critical Lift:** A critical lift is defined by any lift utilizing multiple cranes, the weight of the equipment to be lifted as compared to the allowable lift, the swing area of the lift, the overall risk, difficulty or complexity of the lift, toxicity of the product being lifted and other considerations at the discretion of Massport.
3. **Outrigger:** Extendable or fixed members attached to the mounting base that rest on supports at the outer ends used to support the crane.
4. **Qualified Person:** One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience has successfully demonstrated ability to solve or resolve problem relating to the subject matter, the work, or the project. (OSHA definition)
5. **Radius:** The horizontal distance between the centerline of rotation and the center of gravity of a suspended load.
6. **Rated Capacity:** The maximum allowable lift for the crane. A crane can safely operate at rated capacity only when operating at the minimum lifting radius which is the horizontal distance from the center of the rotation of the crane to the center of gravity of the load; with minimum boom length. In the industry the size of the crane is commonly referred to as the rated capacity
7. **Lift Director:** Responsible for each lift or series of lifts on a jobsite. Ensures compliance with crane safety plan and appropriate lift plan.
8. **Assembly Director:** Responsible for assembly of the crane. Ensures compliance with crane safety plan and appropriate lift plan
9. **Safety Coordinator:** Coordinates all crane activities and control operations on the site. Only one safety coordinator on a job site. Safety Coordinator may be responsible for multiple Lift Directo



# Capital Programs and Environmental Affairs – Construction Management Unit

## CRANE OPERATIONS REVIEW AND EVALUATION FORM

### Section 1.0: General Information

Reference Work Plan No.

Project Name:

MPA/TAA Contract Number:

<input type="text"/>	<input type="text"/>
----------------------	----------------------

Project Contact Information:

<input type="checkbox"/> General Contractor	<input type="checkbox"/> Construction Manager	<input type="checkbox"/> Tenant
---	---	---------------------------------

Company Name	Contact Name	Title	24- Hour Emergency Phone Number

Subcontractor Performing Work:

Company Name	Contact Name	Title	24- Hour Emergency Phone Number

### Section 2.0: Description of Work

Provide a brief description of work to supplement the work plan description:



**Capital Programs and Environmental Affairs – Construction Management Unit**

CRANE OPERATIONS REVIEW AND EVALUATION FORM

**Section 3.0: Crane Logistics and Scheduling**

Crane Company	Contact Name	Phone Number

Manufacturer	Model	Type	Maximum Capacity

What is the FAA 7460 ASN# (include determination)	
---	--

Coordinates of the Point where the crane will be set up or description of location (Include drawing)		
Latitude	Longitude	Elevation
Building #/Terminal/Runway/Taxiway	Distance from Nearest Runway	
Location:		

What is the anticipated operational height that the crane will be working at?	
---	--

**Crane Usage:**

One Day Use			
Date:	Day:	Start Time:	End Time:
Reoccurring or Continuous Use			
Start Date:	End Date:	Daily Start Time:	Daily End Time:

**Crane Placement & Considerations:**

Adequate support & degree of level?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Soil bearing capacity verified?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Mat, plates, cribbing required?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Subsurface Encumbrance? (Utilities, Tunnels)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
High voltage or electrical hazards?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Obstacles or obstructions to lift or swing?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Travel with load required?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Weather/environmental restrictions?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Signals used? (Hand, voice, radio)		



**Capital Programs and Environmental Affairs – Construction Management Unit**

CRANE OPERATIONS REVIEW AND EVALUATION FORM

**Crane Type:**

Identify the Type of Crane. The following documentation must be submitted for approval prior to crane use.

Tower Crane	<input type="checkbox"/>
Lattice/Friction Crane	<input type="checkbox"/>
Mobile Hydraulic Crane	<input type="checkbox"/>
Truck Mounted Crane	<input type="checkbox"/>
Other type of Hoisting Equipment	<input type="checkbox"/>

**Documentation:**

The following documentation must be submitted for review prior to crane use.

**Lift Plan Category**

CRITICAL  / GENERAL  / PRODUCTION

Crane Operators License	<input type="checkbox"/>	Crane Operators OSHA 10 hour card	<input type="checkbox"/>
Crane Operators Medical Certificate	<input type="checkbox"/>	Annual 3 <sup>rd</sup> party Inspection	<input type="checkbox"/>
Valid Insurance Certificate with Massport Named as Additional Insured	<input type="checkbox"/>	3 <sup>rd</sup> Party Post-Assembly Inspection **Required for all cranes assembled onsite**	<input type="checkbox"/>
FAA 7460 Notification	<input type="checkbox"/>	Approved Lift Plan	<input type="checkbox"/>
FAA Flag & Beacon	<input type="checkbox"/>	Load Chart	<input type="checkbox"/>
Assembly Supervisors Training Documentation	<input type="checkbox"/>	Signalman Training Documentation	<input type="checkbox"/>
Qualified Rigger Training Documentation	<input type="checkbox"/>	Daily Inspection Form Maintained on File	<input type="checkbox"/>
Foundation Plan – PE Stamp Required	<input type="checkbox"/>	Spill Kit Onsite	<input type="checkbox"/>

Please describe what the crane activity (type of load, purpose for pick, etc):

**If NO, the crane contractor must get authorization to proceed from the MPA Representative and the GC/CM/Tenant.**

GC/CM/Tenant Supervisor

Name:

Signature:

Date:

MPA Representative

Name:

Signature:

Date:



**Capital Programs and Environmental Affairs – Construction Management Unit**

CRANE OPERATIONS REVIEW AND EVALUATION FORM

<u>Crane Information</u>		<u>Rigging Information</u>	
Manufacturer:		Sling Type and Size:	
Model:		Number of Slings:	
Type:		Hitch Type/Connection:	
Maximum Capacity:		Sling Rated Capacity:	
Radius @ Pickup:	<b>Ft</b>	<b>Weight of Slings:</b>	<b>lbs</b>
Maximum Capacity @ Radius:	<b>lbs</b>	Shackle Type & Size:	
Maximum Expected Load:	<b>lbs</b>	Number of Shackles:	
<b>Percentage of Crane Capacity</b>	<b>%</b>	Shackle Rated Capacity:	
		<b>Weight of Shackles:</b>	<b>lbs</b>
<b>Maximum Expected Load</b>		Lifting Beam Capacity: <b>lbs</b>	
Weight of Load-Empty	<b>lbs</b>	Weight of Lifting Beam:	<b>lbs</b>
Weight of Contents: (if any)	<b>lbs</b>	<b>Total Weight of Rigging:</b>	<b>lbs</b>
Weight of Main Block:	<b>lbs</b>		
Weight of Aux Block:	<b>lbs</b>	<b>Hoist Rope Information</b>	
Weight of Lift Beam:(if any)	<b>lbs</b>	Rope Diameter:	in
Weight of Rigging Equipment:	<b>lbs</b>	Number of Parts x Length:	x ft
Weight of Hoist rope:	<b>lbs</b>	Capacity based on Parts:	lbs
Weight of Jib:	<b>lbs</b>	<b>Weight of Hoist Rope:</b>	<b>lbs</b>
Other:	<b>lbs</b>		
<b>Maximum Expected Load</b>	<b>lbs</b>		

**Section 5.0: Notifications**



# Capital Programs and Environmental Affairs – Construction Management Unit

CRANE OPERATIONS REVIEW AND EVALUATION FORM

<input type="checkbox"/>	Capital Programs Review Required	<input type="checkbox"/>	Advisory Required
<input type="checkbox"/>	BED Operations Hanscom 3 (617-212-6592)	<input type="checkbox"/>	Facilities
<input type="checkbox"/>	State Police 911 or (617-568-7300)	<input type="checkbox"/>	Fire & Rescue 911 or (781-869-8080)
<input type="checkbox"/>	Tenant	<input type="checkbox"/>	Other:

---

**Section 6.0: Additional Notes or Special Conditions**

**780 CMR 9TH EDITION – PROJECT CLOSEOUT MATERIALS &  
REQUEST FOR OCCUPANCY**



Massachusetts Port Authority  
 One Harborside Drive, Suite 200S  
 East Boston, MA 02128-2090  
 Telephone (617) 568-5950  
 www.massport.com

**780 CMR 9<sup>th</sup> Edition – Project Closeout Materials & Request for Occupancy**

Applicant: \_\_\_\_\_

MPA Project or TAA#: \_\_\_\_\_

Project Name: \_\_\_\_\_

Date Submitted to Massport: \_\_\_\_\_

<b>For Massport Use Only</b>	
Reviewed By:	_____
Review Dates:	_____
Recommended for Final Inspection & CO:	_____

Complete ALL sections of checklists below (applicant shall mark each box with either- **X** = (information included) or **NA** = (not applicable)) and submit this document with all required closeout materials to Capital Programs. One original copy of the closeout binder and all attachments are required. Upon receipt, these materials will be reviewed for completeness and a recommendation for final inspection and CO will be made by Capital Programs to Department of Public Safety and Massport Fire Rescue once approved by Massport. Contact Jill Queenan ([jqueenan@massport.com](mailto:jqueenan@massport.com)) at (617)568-5928 with any questions associated with completing this document.

Use Tab # and names in bold below for closeout binder index and labeling.

<b>Project Closeout &amp; Request for Occupancy Checklist</b>				
Tab #	Topic	X or NA	For MPA Use Only	
			Reviewed	Comments
<b>1</b>	<b>Building Permit</b> (with all inspections signed off as FINAL)	<input type="checkbox"/>	<input type="checkbox"/>	
<b>2</b>	<b>Construction Control</b>	<input type="checkbox"/>	<input type="checkbox"/>	
2a	Primary Construction Control Professional (PCCP) Final Affidavit	<input type="checkbox"/>	<input type="checkbox"/>	
2b	Field Reports/Site Inspection Reports from Architect (PCCP)	<input type="checkbox"/>	<input type="checkbox"/>	
2c	PCCP punch list - marked as complete to close out project	<input type="checkbox"/>	<input type="checkbox"/>	
2d	Contractor's Affidavit (addressed to PCCP) (780 CMR 107.6.3)	<input type="checkbox"/>	<input type="checkbox"/>	
2e	Evacuation Plan(s) (780 CMR 111.5.2)	<input type="checkbox"/>	<input type="checkbox"/>	
<b>3</b>	<b>MPA FR Sprinkler Permit</b>	<input type="checkbox"/>	<input type="checkbox"/>	
3a	Sprinkler NFPA Contractor's Material and Test Certificate	<input type="checkbox"/>	<input type="checkbox"/>	
3b	Fire Protection PE Final Affidavit & Reports	<input type="checkbox"/>	<input type="checkbox"/>	
<b>4</b>	<b>MPA FA Fire Alarm Permit</b>	<input type="checkbox"/>	<input type="checkbox"/>	
4a	Simplex NFPA Record of Completion Testing Report as Approved	<input type="checkbox"/>	<input type="checkbox"/>	
4b	Fire Alarm PE Final Affidavit & Reports	<input type="checkbox"/>	<input type="checkbox"/>	
<b>5</b>	<b>Electrical Permit &amp; PE Final Affidavit</b>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>6</b>	<b>Plumbing/Gas Permit &amp; PE Final Affidavit</b>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>7</b>	<b>Sheet Metal Permit &amp; Air Balancing Report, PE Final Affidavit</b>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>8</b>	<b>Letter from Roofing Company</b> (not for new roofing installations)	<input type="checkbox"/>	<input type="checkbox"/>	





9	<b>Commercial Kitchens</b>	<input type="checkbox"/>	<input type="checkbox"/>	
9a	Ansul permit and test report	<input type="checkbox"/>	<input type="checkbox"/>	
9b	Schematic of Exhaust Hood System (one line route diagram, hood to outlet)	<input type="checkbox"/>	<input type="checkbox"/>	
9c	Kitchen Exhaust Cleaning Contract (to certify the entire hood exhaust duct is accessible for cleaning without removing the exhaust fan)	<input type="checkbox"/>	<input type="checkbox"/>	
10	<b>Special Testing &amp; Inspections</b>	<input type="checkbox"/>	<input type="checkbox"/>	
10a	Structural Tests and Special Inspections – final test and inspection reports with PE Final Affidavit (780 CMR 107.6.2.3)	<input type="checkbox"/>	<input type="checkbox"/>	
10b	Non-Structural Tests and Inspection - final test and inspection reports with PE Final Affidavit (780 CMR 107.6.2.4)	<input type="checkbox"/>	<input type="checkbox"/>	
	<b>After final inspections have been completed:</b>			
11	<b>As Built</b> copies of “red lined” field markups. Final as-built to be submitted according to TAA/CP requirements (within 30 days)	<input type="checkbox"/>	<input type="checkbox"/>	
-	1 Complete Closeout Binder ( original documents) 1- ½ set of as built drawings and 3 discs/thumbdrives containing as built drawings and all documents in binder	<input type="checkbox"/>	<input type="checkbox"/>	

*By signing my name below, I confirm that the project closeout checklist documents have been reviewed for completeness to the best of my knowledge and understanding.*

Applicant Signature: \_\_\_\_\_

**LEAN DESIGN AND CONSTRUCTION**

## EXHIBIT B

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### LEAN DESIGN AND CONSTRUCTION (DBB PROJECTS)

#### I. GENERAL

##### A. Application of Exhibit

This Exhibit is a Contract Document and is intended to supplement (1) the Consultant Agreement between the Massachusetts Port Authority (“Authority”) and the Authority’s Prime Design Consultant (“Consultant”) and (2) the Preconstruction Services Agreement and the Construction Services Agreement between the Authority and its Construction Manager (“CM”). References herein to the “Project Team” refers to representatives of the Authority, the Consultant, and the CM (as applicable depending on the phase of the Project).

##### B. Lean Project Delivery

The Authority expects that the Project will benefit by implementing Lean Project Delivery, which includes:

1. collaboration among all members of the Project Team;
2. planning and managing the Project as a network of commitments across organizational boundaries;
3. optimizing the Project as a whole, rather than any particular piece; and
4. promoting continuous improvement throughout the life of the Project.

The Authority intends that the Project Team, to the maximum extent possible, utilize Lean Project Delivery to facilitate design and construction of the Project. Specific Lean Tools available to the Project Team in support of Lean Project Delivery are set forth in this Exhibit.

##### C. Lean Deployment Plan

This Lean Design and Construction Exhibit provides the basis for development by the Project Team of a Lean Deployment Plan (“LDP”) for the Project. The LDP shall be developed by the Project Team within thirty (30) days after execution of the Agreement to which this Exhibit is appended. The LDP shall be updated, at a minimum, at the start of each Project phase (Project Definition, Preliminary Design, Final Design, and Construction), using a template that the Authority will supply to each Project Team. The Project LDP and all updates shall be subject to Authority approval.

The Designer and CM shall provide personnel with knowledge and experience of the Lean Tools selected for inclusion in the LDP. The Designer and CM each shall designate a person as its Lean representative for purposes of implementing, tracking, and updating the LDP.

## II. REQUIRED LEAN TOOLS

### A. Project Planning and Tracking Tools

1. Last Planner® System: For planning its activities and deliverables the Project Team shall use the framework of the Lean Construction Institute's Last Planner® System ("LPS") consisting of: collaborative development of a milestone schedule; phase or progression production plans; "make-ready" look ahead plans; weekly work plans; maintenance of variance and constraint logs; and methods for recording, measuring, and improving the reliability of Project planning and production.
2. Pull Planning Approach: Following the LPS framework, the Project Team shall use a pull planning approach to planning, scheduling, and tracking its work to ensure that preceding activities are not started sooner than is needed to assure the continuous performance of subsequent activities. Where the work of one Project Team member is dependent upon the prior performance of another Project Team member, the Project Team member whose work is dependent shall request of, and receive from, the prior performer a reliable commitment as to when the precedent work shall be finished. As part of the pull planning process, appropriate Project Team members shall agree on the criteria for hand-off and acceptance of items of work.
3. LPS Guide: The Project Team shall follow the *Massport Last Planner® System Guide*, including the following specific elements:
  - a. Master Schedule Alignment: The Project Team shall collaboratively review the Milestone Schedule to align the team on the major milestones, major phases of work, basic dependencies and durations, and major constraints or risk factors. The Milestone Schedule Alignment shall also include identification of pull planning phases and an action plan for initiating the Last Planner® System on the Project. Master Schedule Alignment update sessions shall be held periodically (usually prior to the beginning of new major phases of work).
  - b. Phase Production Planning: Phase planning shall be based on the collaborative efforts of all those performing work during a given period and shall indicate when work should be done to meet milestone dates.
  - c. Make-Ready/Look Ahead Planning: Make-ready look ahead plans shall be developed by the Project Team, identifying (i) each item of work that can be performed and completed during the given planning period; (ii) whether factors exist that would constrain performance and completion as planned; and (iii) the actions to be taken to negate or mitigate any such constraints. The Project Team shall maintain a Constraint Log to track constraints to planned activities and an action plan (what, when, who) for Constraint removal or resolution.
  - d. Weekly Work Planning: Weekly work plans shall be developed by the Project Team members to show the day on which specific activities will be completed. The weekly work plans shall indicate whether an assignment has been completed as scheduled and, if not, a reason shall be assigned for variance from the plan. The Project Team shall maintain a

Variance Log and take action to address Variances so that they do not impede the production plan in the future. The Project Team also shall record the overall and weekly Plan Percent Complete (PPC) for the Project and display this for management review.

4. Project Dashboard: The Project Team shall weekly submit to the Authority appropriate information from LPS in the Design and Construction Dashboards, as provided in the *Massport Last Planner® System Guide*.

## B. Other Required Lean Tools

1. Conditions of Satisfaction (CoS): At the project level, CoS are measurable statements that tell the Project Team what tests the Project must pass to be a success. The Project Team shall develop project-level CoS, including using stakeholder engagement to identify stakeholder CoS. Project-level CoS also should be used by a project team to develop its LDP so that the Lean Tools it selects support delivery of the project-level CoS. The Project Team should update its project-level CoS, at a minimum, at the beginning of each Project phase (Project Definition, Preliminary Design, Final Design, and Construction).

At an individual activity level, a CoS is a detailed description by a customer of an activity specifying all requirements that must be satisfied by the performer in order for the customer to accept that he or she received exactly what was wanted, when it was needed. Individual activity-level CoS should be used as part of the LPS approach described in Section II (A) above.

2. A3 Process and Report: The A3 Process has six main elements that follow one another in a progressive and logical sequence:
  - a. problem statement;
  - b. background/current conditions;
  - c. future state desired (usually listed as CoS relating to the A3 subject matter);
  - d. root cause (gap) analysis;
  - e. proposed actions/implementation plan; and
  - f. performance metrics and follow up steps to review results and make adjustments as needed.

An A3 Report is a one-page report prepared on an 11 x 17 sheet of paper that can be used for (1) collaborative problem solving/decision-making, (2) strategy development, or (3) reporting. The Authority will furnish the Project Team with an A3 Report template to be used for the Project. All information in a A3 Report should be relatively simple, providing only what is needed for decision making (detailed backup information and data can be provided by hyperlinks). As part of its LPS approach, Project Teams shall consider whether the A3 Process can be used to support decision-making that is part of the Project's production planning.

3. Choosing by Advantages (CBA): Project teams shall consider the use of CBA as a decision-making system for determining and documenting the "best value" decision by comparing the

advantages of each option. For example, CBA can be used as a decision-making tool in the A3 Process. CBA's five phases of decision-making are:

- a. Stage-setting: establish the purpose and context for the decision
  - b. Innovation: formulate an adequate set of alternatives
  - c. Decision-making: choose the alternative with the greatest total importance of advantages
  - d. Reconsideration: change the decision if it should be revised or can be improved on
  - e. Implementation: make the decision happen, adjust as needed, and evaluate the process and results
4. Lean/BIM Coordination: To the extent possible, Lean and BIM shall be coordinated so that Lean Tools support the use of BIM, and BIM supports the use of Lean Tools. Both the LDP and the BIMxP shall expressly describe how Lean and BIM will be coordinated by the Project Team to maximize the value of each set of tools.
5. Lean SOPs: The Project Team shall implement the Authority's Lean SOPs:
- a. Expected Outcomes Agendas for meetings/work sessions and
  - b. Continuous Improvement (Plus/Deltas and Periodic Retrospectives).

The LDP should describe how these SOPs will be integrated into the Project Team's implementation of Lean Tools.

### III. Other Lean Tools (Optional)

1. Big Room Approach: Project Teams may use a Big Room Approach to provide a platform for the Project Team to collaborate on, innovate, and implement Project planning and production. The Big Room Approach can range from physical co-location, to periodic Project Team in-person sessions, to virtual sharing/coordination. If a Big Room Approach is used, it should include a written Big Room Management Plan, and the Project Team should designate a Big Room Manager to plan and oversee the Big Room Approach.
2. Focus Groups: A Focus Group is a cross-functional and cross-organizational team of designated representatives of the Project Team collaborating on the design, development, assessment, or implementation of major Project components, systems, or deliverables. In particular, during the design phase the Project Team should consider using Focus Groups to develop recommendations that meet CoS and address cost/schedule constraints of the Project. If used, each Focus Group should have a designated Focus Group Leader who is responsible for planning and managing the activities of the Focus Group, including reporting periodically to the project management team (typically the PM level for the Authority, Consultant and CM) tracking all project metrics (scope, budget, and schedule). Immediately after a CM is on board, the CM should be integrated into Focus Groups to provide real time constructability, cost and schedule inputs.

3. Target Value Design (TVD): TVD is a design methodology that requires Project values, cost, quality, schedule, and constructability to be integrated components of basis of design criteria. TVD uses cost targets to drive innovation and reduce waste in designing a project that provides optimum value to the Authority. If TVD is used, the Project Team should develop a TVD plan that sets out the strategies for value analysis, including carrying multiple design options forward using Set-based Design and deferring decisions until the Last Responsible Moment to maximize the value of each Project element. Cost and schedule analysis should be the byproduct of the continuous TVD process, including the CM and trade/subcontractors providing ongoing cost and schedule information for portions of the work, systems, and details as they are developed or considered.
  
4. Miscellaneous Lean Tools: The Authority may, in its discretion, require the Designer and/or the CM to use other Lean Tools, such as Value Stream Mapping, Rapid Improvement Events, Visual Management, and Root Cause Analysis. Project Teams shall supply persons with knowledge of and experience in these Tools if the Authority selects them for use on any particular project.

## **SOIL BORING REPORT**





December 9, 2024

Report No. 25.14099.080-1

Mr. Joseph Rooney  
Massachusetts Port Authority  
One Harborside Drive, Suite 200S  
East Boston, MA 02128

Re: Hanscome AFB

Dear Mr. Rooney:

As requested this laboratory performed a subsurface investigation at the above referenced project on 11/14/24. The investigation included soil borings, sampling the underlying soils and hot mix asphalt (HMA) coring. Enclosed you will find the following information.

- Soil Boring Logs
- Laboratory Test Results
- HMA Core Pictures


Should you have any questions or require additional information, please do not hesitate to call.


Sincerely,

A handwritten signature in blue ink, appearing to read "Thomas Bowker". The signature is fluid and cursive.


Thomas Bowker  
Area Manager


TB/sjm

<b>ATLAS</b>		 <b>SOIL X, Corp.</b> 148 Pioneer Drive, Leominster, MA 01453 (978) 840-0391		Boring No. <b>B-1</b> Sheet 1 of 1 Scale: N.T.S.		
City / Town: Hanscom AFB, MA		Assignment: N/A		Project File No. 24-10028		
Location: 55 Grenier Street		Date and Time Started: 11/14/2024		Contract No. N/A		
Groundwater Depth: 11'		Date & Time: 11/14/2024				
Coordinates: By Plan		N: W:		Driller's Name: CT		
Ground Elevation: N/A		Inspector's Name (Print): N/A		Inspector's Signature: N/A		
Inspector's Company:						
Sample Number	Depth Range (Feet)	Blows per 6 Inches	Recovery (inches)	Field Description		Strata Changes
		Coring Times (Min/Ft)				
1	0'0"-2'0"	5-12-13-15	16"	Medium dense, dry, brown, fine to coarse SAND.		
2	2'0"-4'0"	14-13-16-19	13"	Very soft, grey, dry, SILT.		
3	5'0"-7'0"	8-10-11-10	19"			
4	7'0"-9'0"	9-8-10-10	14"			
5	10'0"-12'0"	3-4-5-5	22"	Stiff, wet, grey, SILT.		
				EOB @ 12' BGS GW @ 11' BGS upon completion.		
Remarks:		GW = Groundwater		Protective Device: <input checked="" type="checkbox"/> None <input type="checkbox"/> Stand <input type="checkbox"/> Box		
EOB = End of Boring		No Wells installed		Well Depth: Solid Pipe:		
BGS = Below Grade Surface				Stick Up Pipe: Screen Pipe:		
Penetration Resistance (N) Guide				Type of Drill Rig: Truck Mounted Rig		
Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)		Hollow Stem Auger 4 ¼		
Relative Density:	Penetration Resistance:	Consistency	Penetration Resistance	Casing Type:	Size:	
Very Loose	0 - 4	Very Soft	0 - 2	Depth:	Fall:	
Loose	4 - 10	Soft	2 - 4	Hammer Weight:		
Medium Dense	10 - 30	Medium Stiff	4 - 8	Sampler Type: Size:		
Dense	30 - 50	Stiff	8 - 15	Automatic Hammer Weight: 140lbs		
Very Dense	Over 50	Very Stiff	15 - 30	Safety Hammer Weight: NONE		
				Donut Hammer Weight: NONE		
N = Sum of Second and Third 6" Blow Counts				Fall: 30"		
Terms Used for Second Entry of Descriptions: and = 40-50% Some = 10-40% trace = 10% or less				Core Barrel Type: Size:		

<b>ATLAS</b>		 <b>SOIL X, Corp.</b> 148 Pioneer Drive, Leominster, MA 01453 (978) 840-0391			Boring No. <b>B-2</b> Sheet 1 of 1		
City / Town: Hanscom AFB, MA		Assignment: N/A		Project File No. 24-10028		Scale: N.T.S.	
Location: 55 Grenier Street			Date and Time Started: 11/14/2024			Contract No. N/A	
Groundwater Depth: 6'			Date & Time: 11/14/2024			Date and Time Completed: 11/14/2024	
Coordinates: By Plan			N: W:		Driller's Name: CT		Helper's Name: JV
Ground Elevation: N/A		Inspector's Name (Print): N/A			Inspector's Signature: N/A		Inspector's Company:
Sample Number	Depth Range (Feet)	Blows per 6 Inches		Recovery (inches)	Field Description		Strata Changes
		Coring Times (Min/Ft)					
1	0'0"-2'0"	2-4-7-8		19"	Medium dense, dry, brown, fine SAND.		
2	2'0"-4'0"	7-7-9-7		15"	Medium dense, moist, brown, fine SAND, some silt.		
3	5'0"-7'0"	5-4-4-4		12"	Loose, wet, brown, fine SAND, some silt.		
4	7'0"-9'0"	4-4-5-7		10"			
5	10'0"-12'0"	2-2-3-4		10"			
Remarks: EOB = End of Boring BGS = Below Grade Surface				GW = Groundwater No Wells installed		Protective Device: <input checked="" type="checkbox"/> None <input type="checkbox"/> Stand <input type="checkbox"/> Box Well Depth: Solid Pipe: Stick Up Pipe: Screen Pipe:	
Penetration Resistance (N) Guide					Type of Drill Rig: Truck Mounted Rig		
Cohesionless Soils (Sands, Gravels)			Cohesive Soils (Silts, Clays)		Hollow Stem Auger 4 ¼		
Relative Density:	Penetration Resistance:		Consistency	Penetration Resistance	Casing Type:		Size:
Very Loose	0 - 4		Very Soft	0 - 2	Depth:		Fall:
Loose	4 - 10		Soft	2 - 4	Hammer Weight:		
Medium Dense	10 - 30		Medium Stiff	4 - 8	Sampler Type:		Size:
Dense	30 - 50		Stiff	8 - 15	Automatic Hammer Weight: 140lbs		
Very Dense	Over 50		Very Stiff	15 - 30	Safety Hammer Weight: NONE		
			Hard	Over 30	Donut Hammer Weight: NONE		
N = Sum of Second and Third 6" Blow Counts					Fall: 30"		
Terms Used for Second Entry of Descriptions: and = 40-50% Some = 10-40% trace = 10% or less					Core Barrel Type:		Size:



<b>ATLAS</b>		 <b>SOIL X, Corp.</b> 148 Pioneer Drive, Leominster, MA 01453 (978) 840-0391		Boring No. <b>B-3</b> Sheet 1 of 1 Scale: N.T.S.		
City / Town: Hanscom AFB, MA		Assignment: N/A		Project File No. 24-10028		
Location: 55 Grenier Street		Date and Time Started: 11/14/2024		Contract No. N/A		
Groundwater Depth: 5'		Date & Time: 11/14/2024				
Coordinates: By Plan		N: W:		Driller's Name: CT		
Ground Elevation: N/A		Inspector's Name (Print): N/A		Inspector's Signature: N/A		
Inspector's Company:						
Sample Number	Depth Range (Feet)	Blows per 6 Inches Coring Times (Min/Ft)	Recovery (inches)	Field Description		Strata Changes
1	0'0"-2'0"	2-3-4-5	12"	Loose, dry, brown, fine SAND.		
2	2'0"-4'0"	5-5-7-7	20"	Medium dense, moist, brown, fine SAND.		
3	5'0"-7'0"	4-4-5-5	10"	Loose, wet, brown, fine to coarse SAND.		
4	7'0"-9'0"	4-2-2-3	17"	Very loose, wet, brown, fine SAND.		
5	10'0"-12'0"	2-2-4-3	6"	Loose, brown, wet, fine SAND, some silt.		
				EOB @ 12' BGS		
				GW @ 5' BGS upon completion.		
Remarks:		GW = Groundwater		Protective Device: <input checked="" type="checkbox"/> None <input type="checkbox"/> Stand <input type="checkbox"/> Box		
EOB = End of Boring		No Wells installed		Well Depth: Solid Pipe:		
BGS = Below Grade Surface				Stick Up Pipe: Screen Pipe:		
Penetration Resistance (N) Guide				Type of Drill Rig: Truck Mounted Rig		
Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Silts, Clays)		Hollow Stem Auger 4 ¼		
Relative Density:	Penetration Resistance:	Consistency	Penetration Resistance	Casing Type:	Size:	
Very Loose	0 - 4	Very Soft	0 - 2	Depth:	Fall:	
Loose	4 - 10	Soft	2 - 4	Hammer Weight:		
Medium Dense	10 - 30	Medium Stiff	4 - 8	Sampler Type: Size:		
Dense	30 - 50	Stiff	8 - 15	Automatic Hammer Weight: 140lbs		
Very Dense	Over 50	Very Stiff	15 - 30	Safety Hammer Weight: NONE		
				Donut Hammer Weight: NONE		
N = Sum of Second and Third 6" Blow Counts				Fall: 30"		
Terms Used for Second Entry of Descriptions: and = 40-50% Some = 10-40% trace = 10% or less				Core Barrel Type: Size:		

<b>ATLAS</b>		 <b>SOIL X, Corp.</b> 148 Pioneer Drive, Leominster, MA 01453 (978) 840-0391		Boring No. <b>B-4</b> Sheet 1 of 1 Scale: N.T.S.		
City / Town: Hanscom AFB, MA		Assignment: N/A		Project File No. 24-10028		
Location: 55 Grenier Street		Date and Time Started: 11/14/2024		Contract No. N/A Total Hours:		
Groundwater Depth: 7'		Date & Time: 11/14/2024				
Coordinates: By Plan		N: W:		Driller's Name: CT		
Ground Elevation: N/A		Inspector's Name (Print): N/A		Inspector's Signature: N/A		
Inspector's Company:						
Sample Number	Depth Range (Feet)	Blows per 6 Inches Coring Times (Min/Ft)	Recovery (inches)	Field Description		Strata Changes
1	0'0"-2'0"	6-13-15-12	14"	Medium dense, brown, dry, fine to coarse SAND.		
2	2'0"-4'0"	17-17-14-16	16"	Dense, brown, dry, fine to coarse SAND.		
3	5'0"-7'0"	10-11-11-50/4"	18"	Medium dense, wet, brown, dry, fine to coarse SAND.		
4	7'0"-9'0"	5-2-4-4	8"	Loose, brown, wet, fine to coarse SAND.		
5	10'0"-12'0"	3-2-2-2	10"	Very loose, brown, wet, fine SAND.		
				EOB @ 12' BGS GW @ 7' BGS upon completion.		
Remarks:		GW = Groundwater		Protective Device: <input checked="" type="checkbox"/> None <input type="checkbox"/> Stand <input type="checkbox"/> Box		
EOB = End of Boring		No Wells installed		Well Depth: Solid Pipe:		
BGS = Below Grade Surface				Stick Up Pipe: Screen Pipe:		
<b>Penetration Resistance (N) Guide</b>				Type of Drill Rig: Truck Mounted Rig		
Cohesionless Soils (Sands, Gravels)		Cohesive Soils (Sils, Clays)		Hollow Stem Auger 4 ¼		
Relative Density:	Penetration Resistance:	Consistency	Penetration Resistance	Casing Type:	Size:	
Very Loose	0 - 4	Very Soft	0 - 2	Depth:	Fall:	
Loose	4 - 10	Soft	2 - 4	Hammer Weight:		
Medium Dense	10 - 30	Medium Stiff	4 - 8	Sampler Type:	Size:	
Dense	30 - 50	Stiff	8 - 15	Automatic Hammer Weight: 140lbs		
Very Dense	Over 50	Very Stiff	15 - 30	Safety Hammer Weight: NONE		
				Donut Hammer Weight: NONE		
N = Sum of Second and Third 6" Blow Counts				Fall: 30"		
Terms Used for Second Entry of Descriptions: and = 40-50% Some = 10-40% trace = 10% or less				Core Barrel Type: Size:		

## Laboratory Test Results

### A. Sample Description

<u>Sample No.</u>	<u>Description</u>	<u>Classification</u>	<u>Source</u>
B1-S1	Silty Sand	SP-SM	Boring No. 1 0"-24"
S2	Silt trace Sand	ML	Boring No. 1 24"-48"
S3	Silt trace Sand	ML	Boring No. 1 60"-84"
B2-S1	Sand some Silt	SM	Boring No. 2 0"-24"
S2	Sand some Silt	SM	Boring No. 2 24"-48"
S3	Sand some Silt	SM	Boring No. 2 6"-84"
B3-S1	Sand trace Gravel, Silt	SP-SM	Boring No. 3 0"-24"
S2	Sand	SP	Boring No. 3 24"-48"
S3	Sand	SP	Boring No. 3 60"-84"
B4-S1	Silty Sand w/Gravel	SM	Boring No. 3 0"-24"
S2	Sandy Gravel	SP-SM	Boring No. 3 24"-48"
S3	Sandy Gravel	SP-SM	Boring No. 3 60"-84"

B. Washed Sieve Analysis (% passing by weight)

<u>Sieve Size (mm)</u>	<u>B-1</u>			<u>B-2</u>		
	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S1</u>	<u>S2</u>	<u>S3</u>
3/8" ( 9.5)	100			100		
#4 (4.75)	99			99	100	100
10 (2.00)	97		100	97	100	99
20 (.850)	89	100	99	81	99	98
40 (.425)	66	99	99	43	98	96
50 (.300)	49	99	98	27	87	95
80 (.180)	28	97	96	12	41	70
200 (.075)	13.8	95.4	94.9	7.7	7.5	9.4

<u>Sieve Size (mm)</u>	<u>B-3</u>			<u>B-4</u>		
	<u>S1</u>	<u>S2</u>	<u>S3</u>	<u>S1</u>	<u>S2</u>	<u>S3</u>
1" ( 25.0)				100		
3/4 ( 19.0)				91	100	
1/2 ( 12.5)	100			86	94	100
3/8 ( 9.5)	98	100	100	86	90	97
#4 (4.75)	97	99	99	81	83	88
10 (2.00)	95	98	96	73	71	74
20 (.850)	89	95	84	81	65	56
40 (.425)	59	78	47	54	29	36
50 (.300)	32	60	28	48	18	24
80 (.180)	12	27	13	35	11	12
200 (.075)	5.6	4.3	4.8	14.0	5.9	7.1



C. Laboratory CBR Test Results (12"-24" BFG)

	<u>B-1</u>	<u>B-2</u>	<u>B-3</u>
Maximum Dry Density (pcf)	124.8	119.6	132.6
Optimum Moisture (%)	10.0	11.8	8.0
Dry Density before Soaking (pcf)	123.9	119.4	131.8
Moisture Content before Soaking (%)	9.8	11.6	7.4
Dry Density after Soaking (pcf)	124.2	119.6	132.2
Moisture Content after Soaking (%)	12.0	13.1	7.8
Swell (%)	0.0	0.01	0.0
CBR @ 0.1"	19	9	28
CBR @ 0.2"	22	13	30

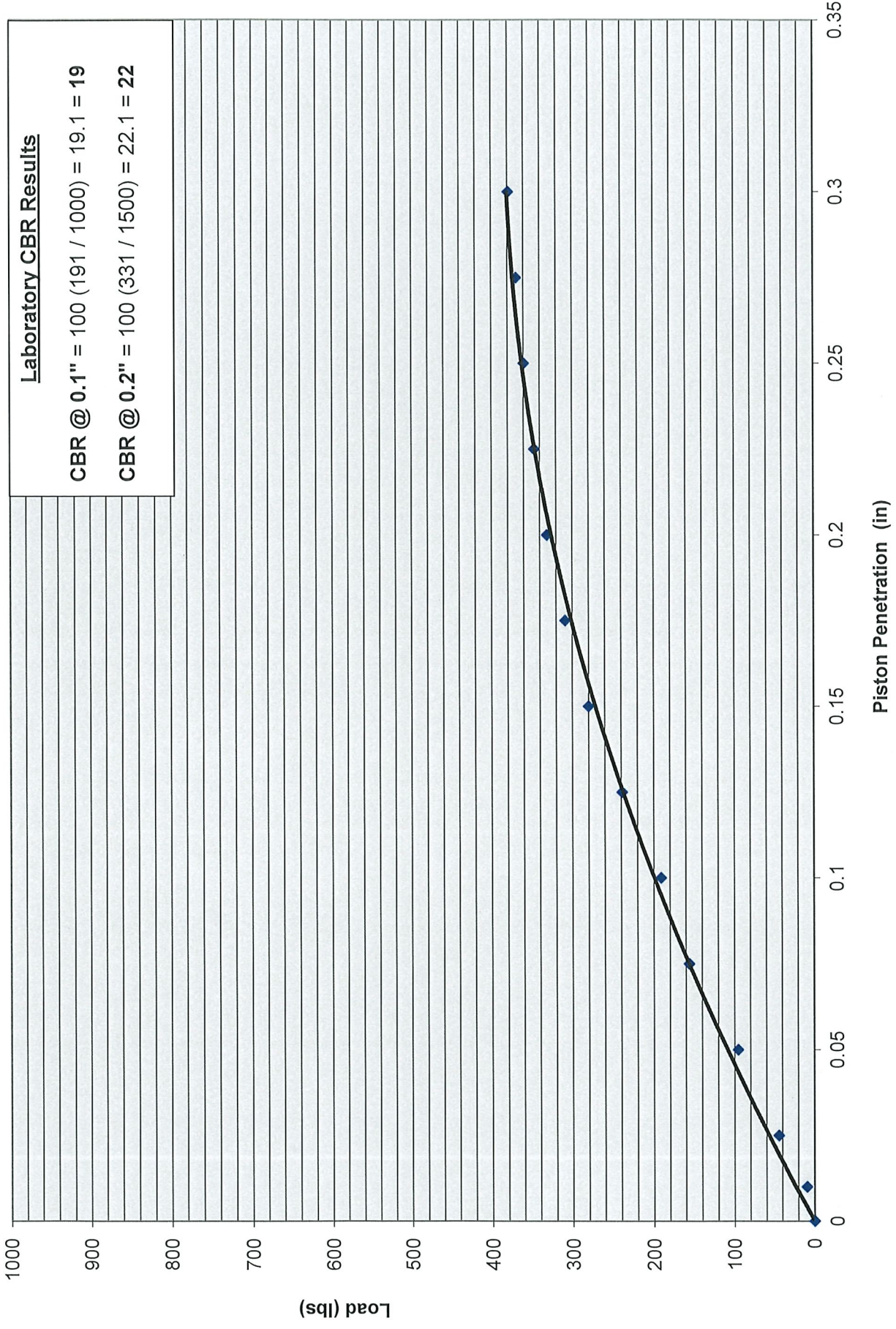
D. HMA Core Thickness Test Results

<u>Core</u>	<u>Thickness (in.)</u>
1	6 1/2
2	5 1/2
3	7
4	6
5	10
6	6
7	8 1/4





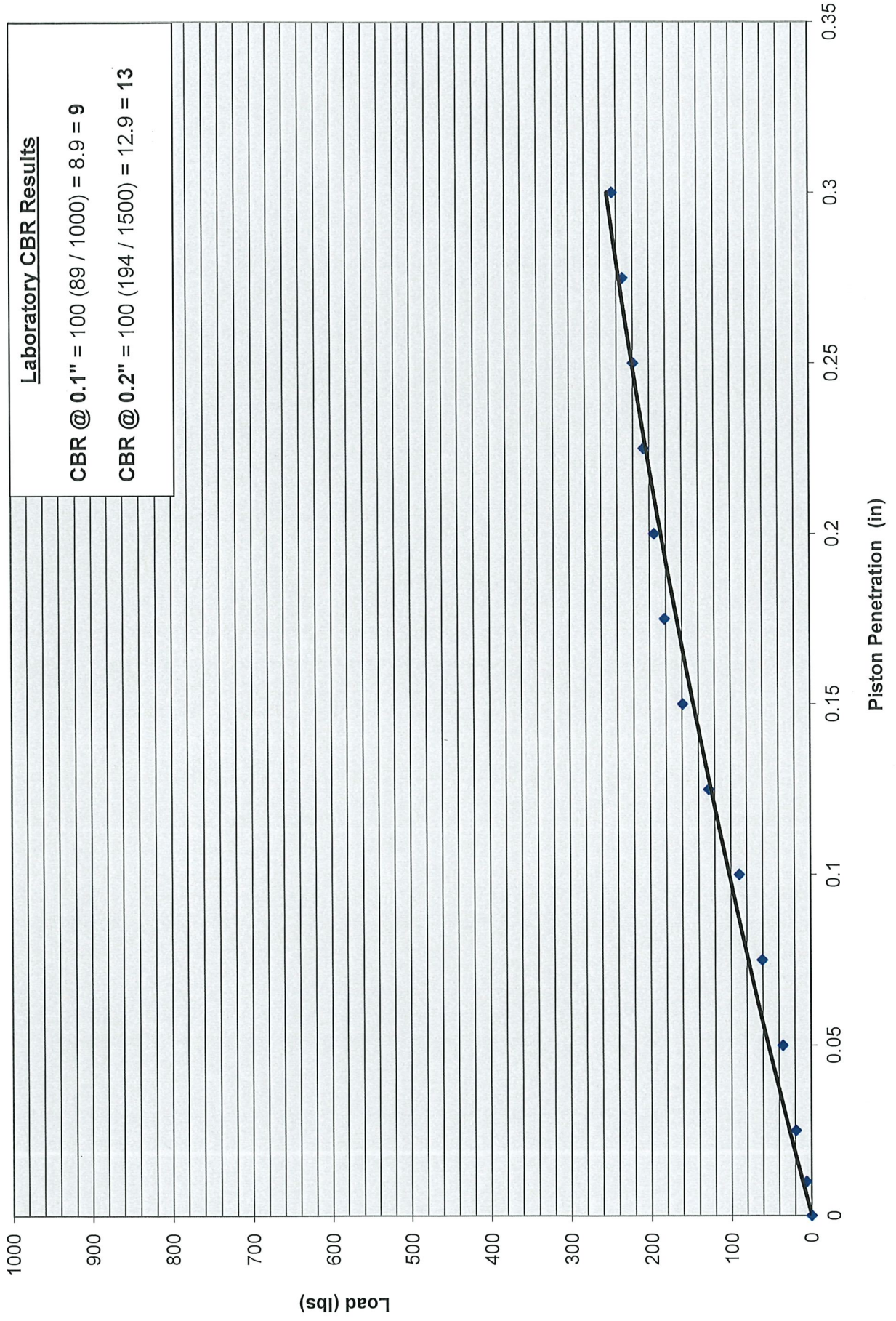
# MPA #H296-C1 Hancorn Airfield Taxiway E Rehab Laboratory CBR Graph Sample B-1







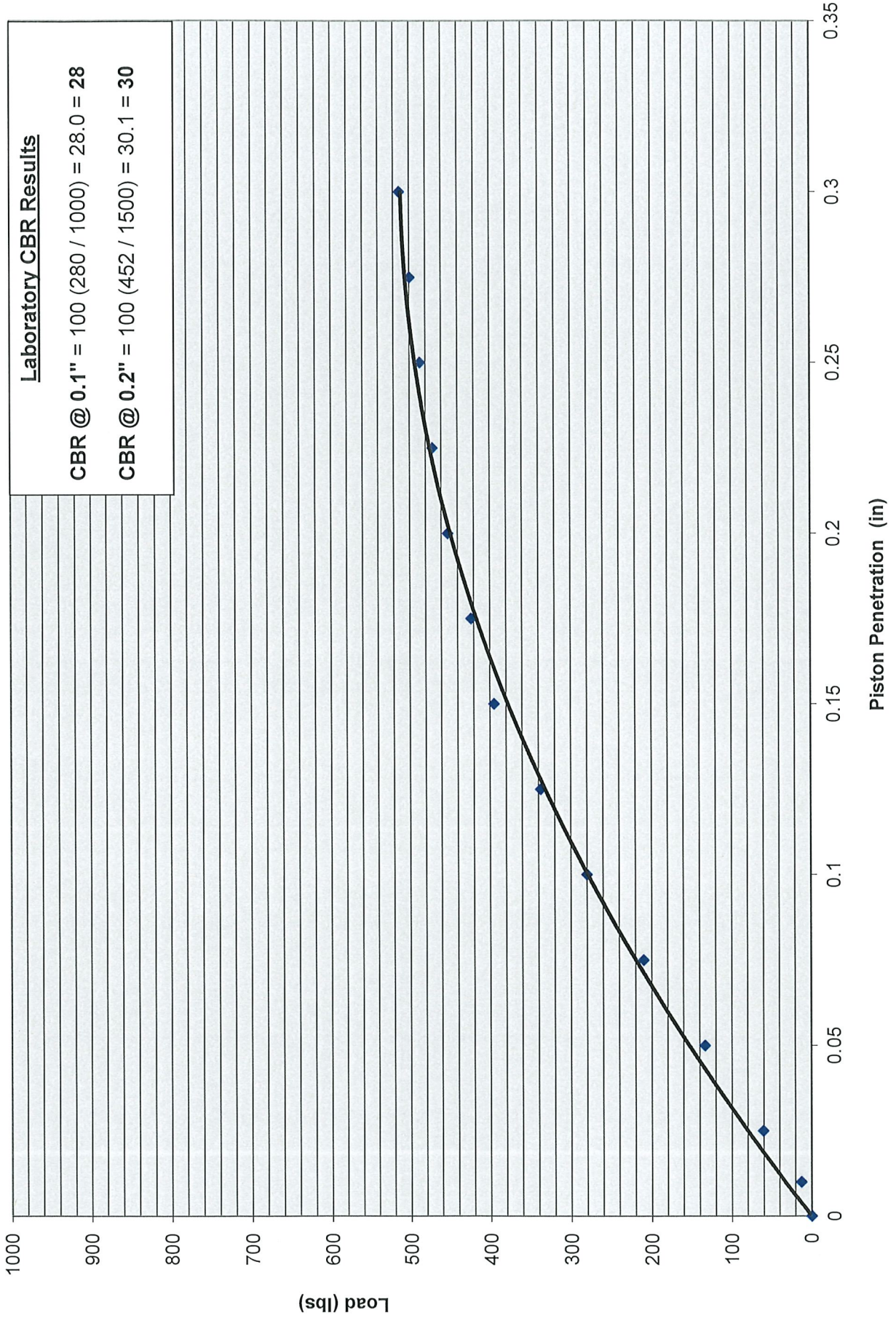
MPA #H296-C1 Hancorn Airfield Taxiway E Rehab  
Laboratory CBR Graph Sample B-2







# MPA #H296-C1 Hancom Airfield Taxiway E Rehab Laboratory CBR Graph Sample B-4



**Massachusetts Port Authority  
MPA #H296-C1  
Hanscom Airfield Taxiway E Rehab  
Core Photos**



**Core No. C-1**





Core No. C-2



Core No. C-3





Core No. C-4



Core No. C-5





Core No. C-6



Core No. C-7

**MASSACHUSETTS PORT AUTHORITY**  
**BOSTON, MASSACHUSETTS**

**DIVISION IIC**

**FEDERAL REGULATIONS**



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## DIVISION IIC

### FEDERAL REGULATIONS

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**DIVISION IIC**

**FEDERAL REGULATIONS**

I. In the performance of the work of this Contract, the Contractor and subcontractors shall be governed by the attached Federal Regulations for Airport Improvement Program Projects.

Where provisions for inserting Airport Improvement Program Project numbers and Sponsor's name in the various subparagraphs of these regulations occur, insert the following:

Airport Improvement Program Project Number .....3-25-0003-XX

Sponsor .....Massachusetts Port Authority

Wherever these regulations refer to Federal Aid projects, it will be taken to mean Airport Improvement Program Projects under the Airport and Airway Development Act of September 1982.

A. CIVIL RIGHTS TITLE VI ASSURANCES

I. Title VI Clauses for Compliance with Nondiscrimination Requirements: During the performance of this Contract, the Contractor, for itself, its assignees and successors in interest (hereinafter referred to as "Contractor") agrees as follows:

1. Compliance with Regulations: The Contractor shall comply with the Title VI List of Pertinent Nondiscrimination Statutes and Authorities set forth below, as they may be amended from time to time (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this Contract.
2. Nondiscrimination: The Contractor, with regard to the work performed by it during the Contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the Contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.
3. Solicitations for Subcontracts, Including Procurement of Materials and Equipment: In all solicitations, either by competitive bidding, or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier shall be notified by the Contractor of the Contractor's obligations under this Contract and the Acts and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
4. Information and Reports: The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Acts, Regulations,

and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the Sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

5. Sanctions for Noncompliance: In the event of a Contractor's noncompliance with the nondiscrimination provisions of this Contract, the Sponsor shall impose such Contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to
    - a. Withholding of payments to the Contractor under the Contract until the Contractor complies, and/or
    - b. Cancelling, terminating, or suspending a Contract, in whole or in part.
  6. Incorporation of Provisions: The Contractor will include the provisions of Paragraphs 1 through 6 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Sponsor to enter into any litigation to protect the interests of the Sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.
- II. Title VI List of Pertinent Nondiscrimination Authorities: During the performance of this Contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor") agrees to comply with the following non-discrimination statutes and authorities, including but not limited to:
1. Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);
  2. 49 CFR Part 21 (Non-discrimination In Federally-Assisted Programs of The Department of Transportation – Effectuation of Title VI of The Civil Rights Act of 1964);
  3. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
  4. Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
  5. The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);

6. Airport and Airway Improvement Act of 1982, (49 U.S.C. § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
7. The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
8. Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 CFR Parts 37 and 38;
9. The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
10. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
11. Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
12. Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 *et seq.*).

**B. IN ACCORDANCE WITH POLICIES ADOPTED BY THE MASSACHUSETTS PORT AUTHORITY, CONTRACTOR FURTHER AGREES:**

1. The Contractor shall not discriminate by segregation or otherwise against any employee or applicant for employment because of race, color, creed, national origin, ancestry, age, sexual orientation, handicap, Vietnam era status, or membership in any legally protected class and shall undertake affirmative equal employment opportunity for all persons.
2. The Contractor will provide all information and reports pertinent to the Authority's Equal Employment, Anti-Discrimination and Affirmative Action requirements requested by the Authority and will permit access to its facilities and any books, records, accounts or other sources of information, which may be determined by the Authority to affect the Contractor's obligation herein.

3. The Contractor shall comply with all Federal and state laws and Authority regulations pertaining to civil rights, non-discrimination, and equal opportunity, including executive orders and rules and regulations of appropriate Federal and state agencies unless otherwise exempt therein.
4. The Contractor's non-compliance with the provision of this Article shall constitute a material breach of this Contract for which the Authority may, in its discretion, upon failure to cure said breach within thirty (30) days of written notice thereof, terminate this Contract upon ten (10) days written notice.
5. The Contractor shall identify and hold harmless the Authority from any claims and demands of third persons resulting from Contractor's non-compliance with any of the provisions of this Article and in case of termination or cancellation of this Contract, the Contractor shall indemnify the Authority during the remainder of the original term against any loss and damage suffered by reason of such termination.

C. CIVIL RIGHTS – GENERAL – 49 U.S.C. 47123

The Contractor agrees that it will comply with pertinent statutes, Executive Orders and such rules as are promulgated to ensure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or handicap be excluded from participating in any activity conducted with or benefiting from Federal assistance. This provision binds the Contractors from the bid solicitation period through the completion of the Contract. This provision is in addition to that required under Title VI of the Civil Rights Act of 1964. This provision also obligates the Contractors for the period during which Federal assistance is extended to the airport through the Airport Improvement Program, except where Federal assistance is to provide, or is in the form of personal property; real property or interest therein; structures or improvements thereon. In these cases the provision obligates the party or any transferee for the longer of the following periods: (a) the period during which the property is used by the airport Sponsor or any transferee for a purpose for which Federal assistance is extended, or for another purpose involving the provision of similar services or benefits; or (b) the period during which the airport Sponsor or any transferee retains ownership or possession of the property.

D. ACCESS TO RECORDS AND REPORTS – 2 CFR § 200.326, 2 CFR § 200.333)

The Contractor must maintain an acceptable cost accounting system. The Contractor agrees to provide the Sponsor, the FAA, and the Comptroller General of the United States or any of their duly authorized representatives, access to any books, documents, papers, and records of the Contractor which are directly pertinent to the specific Contract for the purpose of making audit, examination, excerpts, and transcriptions. The Contractor agrees to maintain all books, records and reports required under this Contract for a period of not less than three (3) years after final payment is made and all pending matters are closed.

E. RIGHT TO INVENTIONS – 2 CFR § 200 Appendix II (F)

All rights to inventions and materials generated under this Contract are subject to requirements and regulations issued by the FAA and the Sponsor of the Federal grant under which this Contract is executed.

F. BREACH OF CONTRACT TERMS

FOR ALL CONTRACTS THAT EXCEED \$250,000.00 –2 CFR § 200 Appendix II (A)

Any violation or breach of terms of this Contract on the part of the Contractor or its subcontractors may result in the suspension or termination of this Contract or such other action that may be necessary to enforce the rights of the parties of this Contract. The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder are in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

G. DISADVANTAGED BUSINESS ENTERPRISE - 49 CFR PART 26

See Division IIA of this Contract for these provisions. Contractor and subcontractors' attention is directed to the following provisions:

1. Contract Assurance (49 CFR § 26.13): The Contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy, as the recipient deems appropriate.
2. Prompt Payment (49 CFR § 26.29): The Prime Contractor agrees to pay each subcontractor under this Contract for satisfactory performance of its contract no later than 30 days from the receipt of each payment the Prime Contractor receives from the Sponsor. The Prime Contractor agrees further to return retainage payments to each subcontractor within 30 days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Sponsor. This clause applies to both DBE and non-DBE subcontractors.

H. TRADE RESTRICTION – 49 CFR PART 30

The Contractor or subcontractor, by submission of an offer and/or execution of a Contract, certifies that it:

1. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR);
2. has not knowingly entered into any Contract or subcontract for this Project with a person that is a citizen or national of a foreign country on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list;
3. has not procured any product nor subcontracted for the supply of any product for use on the Project that is produced in a foreign country on said list.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to a Contractor or subcontractor who is unable to certify to the above. If the Contractor knowingly procures

or subcontracts for the supply of any product or service of a foreign country on said list for use on the project, the Federal Aviation Administration may direct through the Sponsor cancellation of the Contract at no cost to the Government.

Further, the Contractor agrees that, if awarded a Contract resulting from this solicitation, it will incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The Contractor may rely on the certification of a prospective subcontractor unless it has knowledge that the certification is erroneous.

The Contractor shall provide immediate written notice to the Sponsor if the Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The subcontractor agrees to provide written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

This certification is a material representation of fact upon which reliance was placed when making the award. If it is later determined that the Contractor or any subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration may direct through the Sponsor cancellation of the Contract or subcontract for default at no cost to the Government.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a Contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code, Section 1001.

I. DEBARMENT AND SUSPENSION FOR ALL CONTRACTS AND SUBCONTRACTS THAT EXCEED \$25,000.00 – 2 CFR Part 180 (Subpart C), 2 CFR Part 1200, DOT Order 4200.5 DOT Suspension & Debarment Procedures and Ineligibility

1. Certificate Regarding Debarment and Suspension (Bidder or Offeror): By submitting a bid/proposal under this solicitation, the bidder or offeror certifies that at the time the bidder or offeror submits its proposal that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.
2. Certification Regarding Debarment and Suspension (Successful Bidder Regarding Lower Tier Participants: The successful bidder, by administering each lower tier subcontract that exceeds \$25,000 as a “covered transaction”, must verify each lower tier participant of a “covered transaction” under the project is not presently debarred or otherwise disqualified from participation in this Federally assisted project. The successful bidder will accomplish this by:
  - (a) Checking the System for Award Management at website: <http://www.sam.gov>.



- (b) Collecting a certification statement similar to the Certificate Regarding Debarment and Suspension (Bidder or Offeror), above.
  - (c) Inserting a clause or condition in the covered transaction with the lower tier contract.
3. If the FAA later determines that a lower tier participant failed to tell a higher tier that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedy, including suspension and debarment.

J. VETERAN'S PREFERENCE – TITLE 49 U.S.C. 47112(c)

In the employment of labor (except in executive, administrative and supervisory positions), preference must be given to Vietnam era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns owned and controlled by disabled veterans as defined in Title 49 United States Code, Section 47112. However, this preference shall apply only where the individuals are available and qualified to perform the work to which the employment relates.

K. TERMINATION OF CONTRACT FOR ALL CONTRACTS AND SUBCONTRACTS THAT EXCEED \$10,000.00 – 2 CFR § 200 Appendix II (B)

1. The Sponsor may, by written notice, terminate this Contract in whole or in part at any time, either for the Sponsor's convenience or because of failure to fulfill the Contract obligations. Upon receipt of such notice, services must be immediately discontinued (unless the notice directs otherwise) and all materials as may have been accumulated in performing this Contract, whether completed or in progress, delivered to the Sponsor.
2. If the termination is for the convenience of the Sponsor, an equitable adjustment in the Contract price shall be made, but no amount will be allowed for anticipated profit on unperformed services.
3. If the termination is due to failure to fulfill the Contractor's obligations, the Sponsor may take over the work and prosecute the same to completion by contract or otherwise. In such case, the Contractor shall be liable to the Sponsor for any additional cost occasioned to the Sponsor thereby.
4. If, after notice of termination for failure to fulfill Contract obligations, it is determined that the Contractor had not so failed, the termination shall be deemed to have been effected for the convenience of the Sponsor. In such event, adjustment in the Contract price shall be made as provided in paragraph 2 of this clause.
5. The rights and remedies of the Sponsor provided in this clause are in addition to any other rights and remedies provided by law or under this Contract.

L. CLEAN AIR AND WATER POLLUTION CONTROL REQUIREMENTS FOR ALL CONSTRUCTION CONTRACTS AND SUBCONTRACTS EXCEEDING \$100,000.00 – 49 CFR §18.36 (i) (12)

Contractors and subcontractors agree:

1. That any facility to be used in the performance of the Contract or subcontract or to benefit from the Contract is not listed on the Environmental Protection Agency (EPA) List of Violating Facilities;
2. To comply with all the requirements of Section 114 of the Clean Air Act, as amended, 42 U.S.C. 1857 *et seq.* and Section 308 of the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 *et seq.* relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in Section 114 and Section 308 of the Acts, respectively, and all other regulations and guidelines issued thereunder;
3. That, as a condition for the award of this Contract, the Contractor or subcontractor will notify the awarding official of the receipt of any communication from the EPA indicating that a facility to be used for the performance of or benefit from the Contract is under consideration to be listed on the EPA List of Violating Facilities;
4. To include or cause to be included in any construction Contract or subcontract which exceeds \$100,000 the aforementioned criteria and requirements.

M. DAVIS BACON REQUIREMENTS FOR ALL CONSTRUCTION CONTRACTS AND SUBCONTRACTS THAT EXCEED \$2,000.00 – 29 CFR § 200 Appendix II (D)

1. Minimum Wages

- (i) All laborers and mechanics employed or working upon the site of the Work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1) (iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under

1.(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can easily be seen by the workers.

- (ii) (a) The Contracting Officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the Contract shall be classified in conformance with the wage determination. The Contracting Officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
  - (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
  - (2) The classification is utilized in the area by the construction industry; and
  - (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (b) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the Contracting Officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the Contracting Officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify or disapprove every additional classification action within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.
- (c) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives and the Contracting Officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits where appropriate), the Contracting Officer shall refer the questions, including the views of all interested parties and the recommendation of the Contracting Officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.
- (d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1) (ii) (b) or (c) of this

paragraph, shall be paid to all workers performing work in the classification under this Contract from the first day on which work is performed in the classification.

- (iii) Whenever the minimum wage rate prescribed in the Contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
  - (iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program: provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis- Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
2. Withholding. The FAA or the Sponsor shall, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this Contract or any other Federal contract with the same Prime Contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the Contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of work, all or part of the wages required by the Contract, the Federal Aviation Administration may, after written notice to the Contractor, Sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.
3. Payrolls and Basic Records.
- (i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the Work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his/her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show

that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

- (ii) (a) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Federal Aviation Administration if the agency is a party to the Contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, Sponsor, or owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/agencies/whd/government-contracts/construction/payroll-certification> or its successor site. The Prime Contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the Federal Aviation Administration if the agency is a party to the Contract, but if the agency is not such a party, the Contractor will submit them to the applicant, Sponsor, or owner, as the case may be, for transmission to the Federal Aviation Administration, the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a Prime Contractor to require a subcontractor to provide addresses and social security numbers to the Prime Contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, Sponsor, or owner)..
- (b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the Contract and shall certify the following:
  - (1) That the payroll for the payroll period contains the information required to be provided under 29 CFR § 5.5(a)

- (3) (ii), the appropriate information is being maintained under 29 CFR § 5.5 (a ) (3) (i) and that such information is correct and complete;
- (2) That each laborer and mechanic (including each helper, apprentice and trainee) employed on the Contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations 29 CFR Part 3;
  - (3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the Contract.
- (c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3(ii) (b) of this Section.
  - (d) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.
- (iii) The Contractor or subcontractor shall make the records required under paragraph (3) (i) of this section available for inspection, copying or transcription by authorized representatives of the Sponsor, the Federal Aviation Administration or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, Sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### 4. Apprentices and Trainees

- (i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate

specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate that is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (iii) Equal Employment Opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.
5. Compliance with Copeland Act Requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this Contract.
  6. Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR Part 5.5(a)(1) through (10) and such other clauses as the Federal Aviation Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The Prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
  7. Contract Termination: Debarment. A breach of the contract clauses in paragraphs 1 through 10 of this section may be grounds for termination of the Contract, and for the debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
  8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this Contract.



9. Disputes Concerning Labor Standards. Disputes arising out of the labor standards provisions of this Contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6 and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the Contracting Agency, the U.S. Department of Labor, or the employees or their representatives.
10. Certification of Eligibility.
  - (i) By entering into this Contract, the Contractor certifies that neither it (nor he/she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3 (a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
  - (ii) No part of the Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12 (a) (1).
  - (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

N. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT REQUIREMENTS FOR ALL CONSTRUCTION CONTRACTS AND SUBCONTRACTS THAT EXCEED \$100,000.00 – 2 CFR § 200 Appendix II (E)

1. Overtime Requirements. No Contractor or subcontractor contracting for any part of the Contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic, including watchmen and guards, in any workweek in which he/she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
2. Violation; Liability for Unpaid Wages; Liquidated Damages. In the event of any violation of the clause set forth in paragraph 1 above, the Contractor or any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1. above, in the sum of \$29 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1 above.
3. Withholding for Unpaid Wages and Liquidated Damages. The Federal Aviation Administration or the Sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any monies payable on account of work performed by the

Contractor or subcontractor under any such Contract or any other Federal contract with the same Prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same Prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 above.

4. Subcontractors. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs 1 through 4 above, and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1 through 4.

- O. EQUAL OPPORTUNITY CLAUSE AND SPECIFICATIONS - 41 CFR § 60 - 1.4, Executive Order 11246 FOR ALL CONSTRUCTION CONTRACTS AND SUBCONTRACTS THAT EXCEED \$10,000.00

See Division I, Article 79 of this Contract for these provisions.

- P. NOTICES TO BE POSTED FOR PARAGRAPHS (1) AND (3) OF THE EEO CLAUSE - 41 CFR PART 60-1.4(b)

Equal Employment Opportunity is the Law - Discrimination is Prohibited by the Civil Rights Act of 1964 and by Executive Order No. 11246.

Title VII of the Civil Rights Act of 1964 - Administered by:

The Equal Employment Opportunity Commission

Prohibits discrimination because of Race, Color, Religion, Sex, or National Origin by Employers with 25 or more employees, by Labor Organizations with a hiring hall of 25 or more members, by Employment Agencies, and by Joint Labor-Management Committees for Apprenticeship or Training.

Any person who believes he/she has been discriminated against should contact:

The Office of Federal Contract Compliance Programs  
U.S. Department of Labor  
Washington, D.C. 20210

- Q. AFFIRMATIVE ACTION REQUIREMENT FOR ALL CONSTRUCTION CONTRACTS AND SUBCONTRACTS THAT EXCEED \$10,000.00 - 41 CFR PART 60-4, Executive Order 11246

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

<u>Timetables</u>	<b>Goals for Minority Participation for Each Trade</b>	<b>Goals for Female Participation for Each Trade</b>
Effective until further notice	10%	6.9%

These goals are applicable to all of the Contractor's construction work (whether or not it is Federal or Federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both Federally funded and non-federally funded construction regardless of the percentage of Federal participation in funding.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training shall be substantially uniform throughout the length of the Contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project, for the sole purpose of meeting the Contractor's goals, shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director, Office of Federal Contract Compliance Programs (OFCCP) within ten (10) working days of award of any construction subcontract in excess of \$10,000.00 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.
4. As used in this notice, and in the Contract resulting from this solicitation, the "covered area" is Massachusetts, Suffolk, Boston.

**R. NONSEGREGATED FACILITIES REQUIREMENT – 41 CFR PART 60.18 FOR ALL CONSTRUCTION CONTRACTS AND SUBCONTRACTS THAT EXCEED \$10,000.00**

**Notice to Prospective Federally Assisted Construction Contractors**

1. A Certification of Non-segregated Facilities shall be submitted prior to the award of a Federally-assisted construction contract exceeding \$10,000.00 which is not exempt from the provisions of the Equal Opportunity Clause.

2. Contractors receiving Federally-assisted construction contract awards exceeding \$10,000.00 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the following notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000.00 and are not exempt from the provisions of the Equal Opportunity Clause. NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Notice to Prospective Subcontractors of Requirements for Certification of Non-Segregated Facilities

1. A Certification of Non-segregated Facilities shall be submitted prior to the award of a subcontract exceeding \$10,000.00, which is not exempt from the provisions of the Equal Opportunity Clause.
2. Contractors receiving subcontract awards exceeding \$10,000.00 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000.00 and are not exempt from the provisions of the Equal Opportunity Clause. NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

**CERTIFICATION TO BE SUBMITTED BY FEDERALLY ASSISTED CONSTRUCTION CONTRACTORS AND THEIR SUBCONTRACTORS (APPLICABLE TO FEDERALLY ASSISTED CONSTRUCTION CONTRACTS AND RELATED SUBCONTRACTS EXCEEDING \$10,000.00 WHICH ARE NOT EXEMPT FROM THE EQUAL OPPORTUNITY CLAUSE IS SET FORTH IN DIVISION I, ARTICLE 79 OF THIS CONTRACT.**

S. BUY AMERICAN PREFERENCE – 49 U.S.C. 50101

1. Applicability: The Buy America requirements flow down from the Sponsor to first tier Contractors, who are responsible for ensuring that lower tier contractors and subcontractors are in compliance.
2. Requirements: The Buy American preference requirements established within 49 U.S.C. § 50101 require that all steel and manufactured goods used on AIP projects must be produced in the United States. It also gives the FAA the ability to issue a waiver to the Sponsor to use other materials on the AIP funded project. The FAA requires that these waivers be requested in advance of use of the materials on the AIP funded project. The Sponsor may request that the FAA issue a waiver from the Buy American preference requirements if the FAA finds that:
  - a.) applying the provision is not in the public interest;
  - b.) the steel or manufactured goods are not available in sufficient quantity or quality in the United States;
  - c.) the cost of components and subcomponents produced in the United States is more than 60 percent of the total components of a facility or equipment, and final assembly has taken place in the United States. Items that have an FAA standard

specification item number (such as specific airport lighting equipment) is considered the equipment in this case. For construction of a facility, the application of this subsection is determined after bid opening; or

d.) applying this provision would increase the cost of the overall project by more than 25 percent.

3. National Buy American Waivers Website: The FAA Office of Airports maintains a list of equipment that has received waivers from the Buy American preference requirements on the [http://www.faa.gov/airports/aip/buy\\_american/website](http://www.faa.gov/airports/aip/buy_american/website). Products listed on the Nationwide Buy American Waivers Issued list do not require a project specific Buy American preference requirement waiver from the FAA.
4. The Contractor agrees to comply with 49 U.S.C. § 50101, which provides that Federal funds may not be obligated unless all steel and manufactured goods used in AIP-funded projects are produced in the United States, unless the FAA has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.
5. A bidder or offerer must submit the appropriate Buy American certification (see attached Appendix IIC-1 or IIC-2) with all bids or offers on AIP funded projects. Bids or offers that are not accompanied by a completed Buy American certification must be rejected as nonresponsive.
6. Type of Certification is Based on Type of Project: There are two types of Buy American certifications:
  - a.) For projects for a facility, the Certificate of Compliance Based on Total Facility (Terminal or Building Project) must be submitted (IIC-1).
  - b.) For all other projects, the Certificate of Compliance Based on Equipment and Materials Used on the Project (Non-building construction projects such as runway or roadway construction; or equipment acquisition projects) must be submitted (IIC-2).

T. ENERGY CONSERVATION REQUIREMENTS – 2 CFR § 200 Appendix II (H)

The Contractor agrees to comply with mandatory standards and policies relating to energy efficiency that are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Public Law 94-163)

U. LOBBYING AND INFLUENCING FEDERAL EMPLOYEES – 49 CFR Part 20, Appendix A

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

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

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

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

V. COPELAND "ANTI-KICKBACK" ACT FOR ALL CONSTRUCTION CONTRACTS AND SUBCONTRACTS THAT EXCEED \$2,000.00 – 2 CFR § 200 Appendix II (D), 29 CFR Parts 3 & 5

The United States Department of Labor Wage and Hours Division oversees the Copeland "Anti-Kickback" Act requirements. All Contracts and subcontracts must meet and comply with the requirements set forth in 29 CFR Parts 3 and 5.

W. TEXTING WHEN DRIVING – Executive Order 13513 and DOT Order 3902.10

1. In accordance with Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving" (10/1/2009) and DOT Order 3902.10, "Text Messaging While Driving" (12/30/2009), FAA encourages recipients of Federal grant funds to adopt and enforce safety policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving when performing work related to a grant or sub-grant.
2. The Contractor must promote policies and initiatives for employees and other work personnel that decrease crashes by distracted drivers, including policies to ban text messaging while driving. The Contractor must include these policies in each third party subcontract involved on this project.

X. FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE) – 29 U.S.C. § 201, et seq.

1. The Federal minimum wage provisions are contained in the Fair Labor Standards Act (FLSA) which is administered by the United States Department of Labor Wage

and Hour Division. All Contracts and subcontracts must meet and comply with the FLSA, including the recordkeeping standards of the Act.

2. All Contracts and subcontracts that result from this solicitation incorporate the following provisions by reference, with the same force and effect as if given in full text. The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that pertain to a referenced requirement directly with the Federal Agency with enforcement responsibilities.

Requirement: Federal Fair Labor Standards Act (29 U.S.C. 201)

Federal Agency with Enforcement Responsibilities: U.S. Department of Labor – Wage and Hour Division

#### Y. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 – 20 CFR PART 1910

1. The United States Department of Labor Occupational Safety & Health Administration (OSHA) oversees the workplace health and safety standards wage provisions from the Occupational Safety and Health Act of 1970. All Contracts and subcontracts must meet and comply with the Occupational Safety and Health Act of 1970.
2. All Contracts and subcontracts that result from this solicitation incorporate the following provisions by reference, with the same force and effect as if given in full text. The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that pertain to a referenced requirement directly with the Federal Agency with enforcement responsibilities.

Requirement: Occupational Safety and Health Act of 1970 (20 CFR Part 1910)

Federal Agency with Enforcement Responsibilities: U.S. Department of Labor – Occupational Safety and Health Administration.

#### Z. FEDERAL WAGE RATES

The minimum rates of wages for work performed under this Contract shall be as determined from the most recent decision of the United States Department of Labor, General Wage Decision for the State of Massachusetts.

Federal wage rates for work performed under this Contract are shown in the following Section. The higher of the two wage rates (state or Federal) shall be used as the minimum wage rate for work performed under this Contract.

#### AA. PROCUREMENT OF RECOVERED MATERIAL

The Contractor and all subcontractors agree to comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, and the regulatory provisions of 40 CFR Part 247. In the performance of this Contract, the

Contractor and all subcontractors are to use products containing the highest percentage of recovered materials for items designated by the EPA under 40 CFR Part 247 whenever: (i) the contract requires procurement of \$10,000 or more of the designated item during the fiscal year or (ii) the Contractor has procured \$10,000 or more of a designated item using federal funds during the previous fiscal year. Information about this requirement, along with the list of EPA designated items, is available at EPA's Comprehensive Procurement Guidelines web <https://www.epa.gov/smm/comprehensiveprocurement-guideline-cpg-program>.

**BB. SEISMIC SAFETY**

The Contractor agrees to ensure that all work performed under this Contract, including work performed by subcontractors, conform to a building code standard that provides a level of seismic safety substantially equivalent to standards established by the National Earthquake Hazards Reduction Program. Local building codes that model their code after the current version of the International Building Code meet the NEHRP equivalency for seismic safety.

**CC. PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE EQUIPMENT**

Contractor and all subcontractors agree to comply with mandatory standards and policies relating to the use and procurement of certain telecommunications and video surveillance equipment in compliance with the National Defense Authorization Act (Public Law 115-232 Section 889(f)(1).)

**DD. CERTIFICATION REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS**

As required by sections 744 and 745 of Title VII, Division D of the Consolidated Appropriations Act, 2019 (Pub. L. 116-66), and implemented through USDOT Order 4200.6, Contractor or subcontractor certifies, by entering into the Contract that Contractor/Subcontractor: (1) Does not have any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability, where the awarding agency is aware of the unpaid tax liability, unless a Federal agency has considered suspension or debarment of the corporation and made a determination that suspension or debarment is not necessary to protect the interests of the Government; or (2) Has not been convicted of a felony criminal violation under any Federal law within the preceding 24 months.

**- END OF DIVISION IIC -**





## Appendix IIC-1

### Certificate of Buy American Compliance for Construction Projects (Buildings such as Terminal, SRE, ARFF, etc.)

#### American Preference – Construction Projects

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with its proposal. The bidder or offeror must indicate how it intends to comply with 49 USC § 50101, BABA and other related Made in America Laws, U.S. statutes, guidance, and FAA policies, by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e., not both) by inserting a checkmark (✓) or the letter “X”.

- Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:
- a) Only installing iron, steel and manufactured products produced in the United States;
  - b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.
  - c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
  - d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

- a) To provide to the Airport Sponsor or the FAA evidence that documents the source and origin of the iron, steel, and/or manufactured product.
  - b) To faithfully comply with providing U.S. domestic products.
  - c) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
  - d) Certify that all construction materials used in the project are manufactured in the U.S.
- The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

- a) To submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.
- b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
- c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
- d) To furnish U.S. domestic product for any waiver request that the FAA rejects.
- e) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

### **Required Documentation**

**Type 2 Waiver (Nonavailability)** - The iron, steel, manufactured goods or construction materials or manufactured goods are not available in sufficient quantity or quality in the United States. The required documentation for the Nonavailability waiver is

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire
- b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;
- c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

**Type 3 Waiver** – The cost of components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the “facility/project.” The required documentation for a Type 3 waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
- b) Listing of all manufactured products that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
- c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
- d) Percentage of non-domestic component and subcomponent cost as compared to total “facility” component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

**Type 4 Waiver (Unreasonable Costs)** - Applying this provision for iron, steel, manufactured goods or construction materials would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

- a) A completed Content Percentage Worksheet and Final Assembly Questionnaire from
- b) At minimum two comparable equal bids and/or offers;

- c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;
- d) Completed waiver applications for each comparable bid and/or offer.

**False Statements:** Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Title

## Appendix IIC-2

### **Certificate of Buy American Compliance for Manufactured Products** (Non-building construction projects, equipment acquisition projects)

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101, and other Made in America Laws, U.S. statutes, guidance, and FAA policies by selecting one on the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (not both) by inserting a checkmark (✓) or the letter “X”.

- Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:
- a) Only installing steel and manufactured products produced in the United States;
  - b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.
  - c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
  - d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

- a) To provide to the Airport Sponsor or FAA evidence that documents the source and origin of the steel and manufactured product.
  - b) To faithfully comply with providing U.S. domestic product.
  - c) To furnish U.S. domestic product for any waiver request that the FAA rejects.
  - d) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
- The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for a Type 3 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:
- a) To submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.

- b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
- c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
- d) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

### **Required Documentation**

**Type 2 Waiver (Nonavailability)** - The iron, steel, manufactured goods or construction materials are not available in sufficient quantity or quality in the United States. The required documentation for the Nonavailability waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire
- b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;
- c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

**Type 3 Waiver** – The cost of the item components and subcomponents produced in the United States is more that 60 percent of the cost of all components and subcomponents of the “item”. The required documentation for a Type 3 waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
- b) Listing of all product components and subcomponents that are not comprised of 100 percent U.S. domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108 (products of unknown origin must be considered as non-domestic products in their entirety).
- c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
- d) Percentage of non-domestic component and subcomponent cost as compared to total “item” component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

**Type 4 Waiver (Unreasonable Costs)** - Applying this provision for iron, steel, manufactured goods or construction materials, would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

- a) Completed Content Percentage Worksheet and Final Assembly Questionnaire from
- b) At minimum two comparable equal bidders and/or offerors;
- c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;

d) Completed waiver applications for each comparable bid and/or offer.

**False Statements:** Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Title



**MASSACHUSETTS PORT AUTHORITY  
EAST BOSTON, MASSACHUSETTS**

**DIVISION III**

**TECHNICAL SPECIFICATIONS**

**MPA PROJECT NO. H296-C1**

**PROJECT NAME:  
REHABILITATE TAXIWAY E FROM TAXIWAY M TO RUNWAY 11-29  
AND CONSTRUCT TAXIWAY E5**

# TECHNICAL SPECIFICATIONS

## DIVISION III

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PROJECT ITEM	DESCRIPTION
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G-002	Emergency Response
G-003	Soil Management
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C-100	Contractor Quality Control Program (CQCP)
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PROJECT ITEM	DESCRIPTION
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## **ITEM G-001 HEALTH AND SAFETY PLAN DESCRIPTION**

### **G-001-1.1 GENERAL PROVISIONS**

- A. Attention is directed to the GENERAL REQUIREMENTS AND COVENANTS – DIVISION I, and the SPECIAL PROVISIONS – DIVISION IIA AND IIB, and the SAMPLE CONTRACTS FORMS – DIVISION IV, which are hereby made a part of this Section.
- B. Examine all Drawings and all Project Items of the Specifications for requirements and Provisions affecting the work of this Section.
- C. There is no payment associated with this item, it shall be considered incidental to the various Project Items contained within these Technical Specifications.

### **G-001-1.2 WORK INCLUDED**

- A. Work Included: Without intending to limit or restrict the extent of Work involved, the work includes:
  - 1. The preparation and implementation of a Contractor's Health and Safety Plan (HASP) when there is a potential for employees, the general public or the environment to be exposed to contaminated soil or groundwater. The HASP shall address all activities performed within the Contract including but not limited to soil excavation, dewatering and stockpile management.
  - 2. The Contractor shall develop a detailed HASP using this Section and the site inspection as a basis for delineating additional details and requirements as the Contractor determines necessary. The HASP must detail the protocols necessary for protecting workers, on-site personnel, visitors and potential off-site receptors from potential hazards related to hazardous materials encountered during stockpiling, removing and handling of potentially contaminated soils and groundwater. The HASP should outline any health and safety training programs provided to workers, visitors, and on-site personnel, as well as provide plans for maintaining site and information security related to this project.
- B. Related Sections:
  - 1. G-002 – Emergency Response
  - 2. G-003 – Soil Management
  - 3. G-007 – Sustainability

### **G-001-1.3 SAFETY AND HEALTH PLAN**

- A. Construction health and site safety is the sole responsibility of the Contractor.
- B. Comply with *Safety and Health Requirements Manual (EM 385-1-1)* latest edition, published by the U.S. Army Corps of Engineers (USCOE). Copies of EM 385-1-1 may be obtained from the Government Printing Office: Superintendent of Documents, Government Printing Office, Washington, D.C. 20402-9325, phone: 202-783-3238.
- C. Occupational Safety and Health Administration Standards and Regulations contained in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926), including amendments as stated in Federal Register March 6, 1989: 9294-9336 (Final Rule, 29 CFR 1910.120 “Hazardous Waste Operations and Emergency Response”).
- D. National Institute of Occupational Safety and Health (NIOSH)/OSHA/United States Coast Guard (USCG)/EPA Occupational Safety and Health Guidance Manual for Hazardous Site Activities, October 1985, Department of Health and Human Services (DHHS) NIOSH Publication Number 85-115.
- E. Conduct work to prevent any laborer, mechanic, or other employee from exposure to conditions that are unsanitary, hazardous, or dangerous to health and safety, as determined under construction safety and health standards promulgated by the Secretary of Labor under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327 et seq.) as amended. Construction safety and health standards promulgated by the Secretary of Labor may be obtained from the regional or area office of the Occupational Safety and Health Administration of the U.S. Department of Labor.
- F. Immediately correct violations of the safety and health requirements contained in these specifications or standards referenced above. Notification of violations noted by the Engineer or Owner may be verbal or written. Failure of the Owner or Engineer to provide notification of health or safety violations does not relieve the Contractor from responsibility for conformance with the regulations and the safety of personnel and property.
- G. If the contractor fails to promptly correct violations of the safety and health standards and requirements noted by the Owner, the Owner will issue an order to stop all or part of the work. When satisfactory corrective action is taken, an order to resume work will be issued. The Contractor shall not be entitled to any extension of time or to any claim for damage or additional compensation by reason of either the notification of a violation or the stop work order.

**G-001-1.4 SUBMITTALS**

- A. Submit Contractor's Health and Safety Plan. The Health and Safety Plan submittal is for information and records purposes. The Engineer and Owner will review the Health and Safety Plan for completeness. Work will not be allowed to proceed prior to receipt of the Health and Safety Plan.

**MEASUREMENT AND PAYMENT**

**G-001-2.1 GENERAL**

There is no separate measurement and payment for labor, materials and equipment for the preparation of the Project-specific Health and Safety Plan and its implementation. It is considered incidental to the proposed Contract.

**END OF ITEM G-001**

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## ITEM G-002 EMERGENCY RESPONSE

### DESCRIPTION

#### GENERAL

##### **G-002-1.1 RELATED DOCUMENTS**

- A. THE GENERAL CONDITIONS, DIVISION I, and SPECIAL PROVISION, DIVISION II, and SAMPLE CONTRACT FORMS, DIVISION IV are hereby made part of this Section.
- B. Examine all Drawing and all Sections of the Specifications for requirements and provisions affecting the work of this Section.

##### **G-002-1.2 SCOPE OF WORK**

There is no payment associated with this item, it shall be considered incidental to the various Project Items contained within these Technical Specifications.

The Contractor's requirements for responding to releases or spills of oil and hazardous materials (OHM) during construction including:

- A. Immediate containment of the OHM spill or release with cleanup being initiated immediately but no later than within one and one-half (1-1/2) hours from the time of the actual incident in full compliance with the Massachusetts Contingency Plan (310 CMR 40.0000).
- B. Work to be performed by the Contractor's Environmental Emergency Response Contractor (EERC) under this Section, without limiting the generality thereof, consists of furnishing all materials, equipment, and labor required for the execution of work as stipulated in the specifications and as reasonably implied. This includes but is not limited to the following:
  - 1. The Contractor's EERC shall provide labor, materials and equipment for emergency response to OHM spills due to the Contractor's activities, equipment, and/or negligence at the Contractor's expense.
  - 2. The Contractor shall retain a Massachusetts Licensed Site Professional (LSP) who shall prepare, on behalf of the Contractor, all verbal and written notifications and other relevant documentation concerning reportable releases of OHM to the Authority and the Massachusetts Department of Environmental Protection (MassDEP) within the MCP prescribed report notification time frames.
  - 3. The Contractor shall select the appropriate disposal/recycling options for the OHM wastes resulting from hazardous material spills. The Contractor shall arrange for transport and disposal/recycling of these



OHM wastes to the approved facility (ies) in accordance with the MCP and other applicable Federal and state regulations.

4. Incidental materials necessary for the completion of this work shall be furnished by the Contractor whether or not specifically mentioned.

**G-002-1.3 RELATED WORK IN OTHER SECTIONS**

- A. Item G-001 – Health and Safety Plan

**G-002-1.4 CODES, STANDARDS, ORDINANCES AND PERMITS**

- A. Perform all work in strict accordance with all rules, regulations, standards, codes, ordinances, and laws of Federal and state authorities having lawful jurisdiction and be responsible for compliance therewith. Such authorities and standards include but are not limited to the following:

1. The Massachusetts Port Authority Comprehensive Rules and Regulations (740 CMR)
2. The Commonwealth of Massachusetts Hazardous Waste Regulations (310 CMR 30.000)
3. Occupational Safety & Health Administration (OSHA) Regulations (29 CFR 1910.120 - Hazardous Waste Operations and Emergency Response)
4. Environmental Protection Agency Hazardous Waste Management Regulations (40 CFR 260-263, 268, & 270-272)
5. The Commonwealth of Massachusetts Contingency Plan (310 CMR 40.0000)

**G-002-1.5 SUBMITTALS**

- A. The Contractor shall submit, in writing, the following for review and approval by the Authority. The submittal must be approved by the Authority prior to the start of construction. The Authority requires approximately one week to approve submittals.

1. Emergency Contact List.
2. The name of a qualified EERC who will provide the emergency response services presented in Paragraph 3.01. Submit certifications, qualifications, and experience of the EERC.
3. The EERC shall have experience with conducting emergency response activities for projects of similar nature, duration and magnitude, as this Project requires. The EERC shall demonstrate familiarity with applicable Federal and state regulations regarding

emergency response activities. The EERC shall be certified to conduct emergency response activities in Massachusetts.

- B. The Contractor shall submit to the Engineer, a summary of all EERC personnel, equipment and materials used, copies of all field logs including time spent on-site, mobilization, demobilizations, manifests, and a summary report suitable to be used for cost recovery that may be undertaken by the Authority. All documentation shall be submitted to the Engineer within five (5) days from completing the response action(s).

#### **G-002-1.6 RESPONSIBILITY OF THE CONTRACTOR**

- A. The Contractor shall adhere to regulations, Specifications and recognized standard practices related to the execution of emergency response activities. The Authority will not be responsible at any time for the Contractor's violation of pertinent regulations or endangerment of laborers, passers-by or any others.
- B. The Contractor shall post the Authority-approved Environmental Emergency Response Contact List in areas readily accessible to Supervisors and all other Contractor and sub-contractor personnel who have the authority to initiate emergency response activities. The Emergency Response Contact List shall be posted in all construction trailers and all other appropriate locations.
- C. The Contractor's emergency response activities must not adversely or otherwise affect any Authority operations.
- D. The Authority shall not be held negligent or liable for any spills or releases of **OHM caused by the Contractor nor inadequacies or deficiencies in the Contractor's** implementation of the emergency response activities.

#### **G-002-1.7 EMERGENCY RESPONSE PROTOCOL**

- A. If a release or spill of oil or hazardous materials (OHM) occurs regardless of quantity, the Contractor shall immediately contact Hanscom Emergency at 781- 869-8080. If the spill is too large to be cleaned up by Contractor personnel, the Contractor shall immediately mobilize its Environmental Emergency Response Contractor for cleanup. Contract requirements mandate immediate containment of the OHM spill/release with cleanup being initiated immediately, but no later than, within one and one-half (1-1/2) hours from the time of the actual incident pursuant to Massachusetts Department of Environmental Protection (MassDEP) approval pursuant to the Massachusetts Contingency Plan (MCP).
- B. If the spill is fuel or oil and the quantity is **ten (10) gallons or more or if the spill enters a storm drain regardless of quantity**, the Contractor shall immediately contact:

1. **MassDEP Emergency Response Branch: 888.304.1133** (24 hour/7 days per week) to obtain approval to clean up the spill. The Massachusetts Contingency Plan only allows for containment of the OHM spill prior to DEP approval.
  - a. When DEP is notified, the Contractor shall provide the following information:
    - i. Date and Time of Spill.
    - ii. Project name.
    - iii. Precise location of the spill (i.e., Building Number/Terminal; airfield location)
    - iv. Contact person, telephone number and mailing address.
    - v. Description of the spill (fuel type; estimated quantity; drain impact);
    - vi. Name of Emergency Response Contractor.
    - vii. Response Actions taken (containment; specific cleanup actions);
    - viii. Name of LSP and telephone number.
    - ix. Names of other Federal/state agencies notified (i.e., US Coast Guard)
  - b. Release Tracking Number issued by DEP (i.e., RTN: 2-xxxxx).
2. Authority's Environmental Management Unit: 617-568-3525 or 617-455-1553 and,
3. Email a completed Spill Status Form to [msoule@massport.com](mailto:msoule@massport.com). (Page G- 002-7).

## **PRODUCTS**

### **G-002-2.1 EMERGENCY RESPONSE EQUIPMENT AND SUPPLIES**

- A. The Contractor shall have the following materials at the construction site at all times to ensure containment of OHM spill is not delayed.
  1. Containment Booms
  2. 100 Bags oil dry
  3. Absorbent pillows and pads
- B. The EERC shall immediately deploy all necessary equipment and materials on-site and initiate cleanup no later than 1-½ hours from the time of the incident pending MassDEP approval for complete OHM cleanup.

## **EXECUTION**

### **G-002-3.1 GENERAL**

- A. This Section specifies the work to be conducted by the Contractor's EERC and LSP as a result of spills/releases of OHM due to the Contractor's equipment failure, negligence or oversight during construction activities on Massport property.
- B. Upon notice from the Contractor that a release has occurred, the EERC shall provide the labor, materials and equipment for emergency response to hazardous materials spills occurring as a result of construction activities within one and one-half (1-½) hours of the incident. If there is no response to the spill within one and one-half (1-½) hours of notification, the Authority will impose a \$1000.00 fine per hour or quarter hour on the Contractor for emergency response time exceedance.
- C. The Contractor shall notify the Engineer and Hanscom Emergency of all OHM spills regardless of quantity.
- D. The Contractor shall notify the Authority's Environmental Management Unit, the Massachusetts Department of Environmental Protection Emergency Response Branch and Hanscom Emergency of oil/fuel spills of ten gallons or more, or if there has been a release to the storm drain, regardless of quantity. Contractor shall verify the chemical-specific reportable quantities for other hazardous materials that it uses.
- E. The Contractor shall provide all necessary Emergency Response training to its own personnel at all levels to ensure the proper implementation of Environmental Emergency Response. The Contractor shall demonstrate through written documentation that appropriate Environmental Emergency Response training has been performed for all Contractor personnel, and sub-contractors, as appropriate. EERC shall provide all crew training and Health and Safety equipment as required by 29 CFR 1910 for any level of cleanup required. Materials and equipment must be capable of containing and collecting hazardous liquids, such as absorbent pads, booms or vacuum pickup, in order to minimize the spread of contamination at the spill site.
- F. The EERC shall place contaminated materials or liquids in appropriately labeled and marked DOT-approved containers for the off-site transport and disposal of waste materials. The Contractor shall provide off-site transport and disposal of all remediation waste associated with the incident in an expeditious manner.
- G. Contaminated waste materials generated during emergency response activities shall be temporarily stored by the Contractor in a designated area approved by the Engineer until an off-site receiving facility has accepted

the shipment. All containers shall be marked and labeled with the appropriate project-related information (MPA Contract No., Contractor Name, Contractor Contact No., Container Contents, Date of Generation).

- H. The Contractor shall identify an appropriately permitted receiving facility for the disposal of the cleanup wastes. Costs incurred from the disposal of the cleanup waste shall be at the sole expense of the Contractor.
- I. The Contractor's LSP shall prepare all written documents that are required under the MCP. All documents shall be copied to the Authority's Environmental Management at the time the documents are transmitted to the MassDEP. **The Contractor shall cleanup the release or spill to pre-construction contamination levels at its own expense.**

## **MEASUREMENT AND PAYMENT**

### **G-002-4.1 GENERAL**

- A. There is no separate measurement and payment for labor, materials and equipment for emergency response activities by the Contractor, Contractor's EERC or LSP associated with OHM spills due to the Contractor's equipment failure, negligence or fault. The Contractor shall be liable for all costs.
- B. The Contractor shall be fully liable for any penalties that any regulatory agency may impose as a result of improper or inadequate response to releases of Oil and Hazardous Materials that occur from the Contractor's activities, negligence or fault.

**END OF ITEM G-002**



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## **ITEM G-003 SOIL MANAGEMENT DESCRIPTION**

### **G-003-1.1 GENERAL PROVISIONS**

- A. Attention is directed to the GENERAL REQUIREMENTS AND COVENANTS - DIVISION I, and the SPECIAL PROVISIONS - DIVISION IIA AND IIB, and the SAMPLE CONTRACT FORMS - DIVISION IV.
- B. Examine all Drawings and Sections of the Specifications for requirements and provisions affecting the work of this Section.

### **G-003-2.1 WORK INCLUDED**

- A. This Section specifies the management of excavated soil during construction activities and identifies procedures for the evaluation, handling, transporting and backfilling of soil.
- B. Contractor shall prepare the following under the guidance of a qualified Environmental Consultant:
  - 1. A Notice of Intent (NOI) for a Construction General Permit to be filed with the US Environmental Protection Agency (US EPA)
  - 2. Construction Storm Water Pollution Prevention Plan (SWPPP).
- C. Construction activities and soil excavation shall be in accordance with the US EPA Construction General Permit and in accordance with the Authority-approved Construction SWPPP.
- D. Backfill or reuse soils shall be in specific on-airport locations identified by the Engineer. All excess soil and Potentially Contaminated soils will be classified by the Authority. Excess soil that is found to be unsuitable for reuse at the airport shall be transported offsite by the Contractor in accordance with this Project Item.
- E. The Engineer shall be notified immediately if Potentially Contaminated Soil is encountered (soil has visual or olfactory evidence of contamination). The Authority will mobilize its Environmental Consultant to assess the finding.
- F. Potentially Contaminated Soil shall be segregated and transported to a designated paved area on the airport as directed by the Engineer. All stockpiled soil shall be staked with project number and specific origin of material. The Authority will conduct confirmatory soil testing to determine soil classification and how it is to be disposed of. All soils shall be shipped off-site for disposal at an Authority-approved off-site receiving facility using a Material Shipping Record or Bill of Lading. Massport will sign the manifests as Generator.
- G. Excess soil from the project site shall be hauled to a location directed by the Authority for testing by the Authority and disposed off-site by the Contractor.



## **G-003-2.2 RELATED WORK**

- A. G-001 - Health and Safety

## **G-003-2.3 SUBMITTALS**

The following submittals shall be transmitted for review and approval by the Authority:

- A. Name and qualifications of a professional Environmental Consultant (EC) with demonstrated experience preparing project-specific Construction Storm Water Pollution Prevention Plans (SWPPPs) and Off-Site Soil Management Plans. The submission shall be made a minimum of four (4) weeks prior to initiating excavation activities.
- B. Construction Storm Water Pollution Prevention Plan prepared in accordance with US EPA guidelines and providing Best Management Practices (BMPs) on the installation, maintenance and inspection of soil erosion and sedimentation controls to reduce pollutants in storm water runoff and include details for soil management. The Construction SWPPP shall be completed, submitted and approved by the Authority prior to filing the Notice of Intent a minimum of three (3) weeks prior to initiating excavation activities.
- C. Construction General Permit (CGP) for Stormwater a minimum of two (2) weeks before excavation is scheduled to begin. A Notice of Intent (NOI) shall be completed and filed with the US EPA to obtain authorization to discharge storm water under the EPA Construction General Permit (CGP). Refer to US EPA's web page ([www.epa.gov/npdes/stormwater](http://www.epa.gov/npdes/stormwater)) for program guidance, instructions for filing eNOI and additional information.
- D. Copy of the NOI and Construction General Permit upon receipt. Said permit shall be displayed on-site in the Contractor's trailer along with the Construction SWPPP and all associated documentation pertaining to SWPPP implementation.
- E. Soil Management Plan which shall include:
  - 1. Proposed off-site disposal/reuse/recycling facilities of excess soil for the following categories in accordance with Department of Environmental Protection Policy # COMM-97-001:
    - a. Soil reuse at Lined Landfills: Soil may contain contaminant concentrations in accordance with the requirements of COMM-97- 001 Table 1 Allowable Contaminant Levels for Soil Reuse at Lined Landfills.

- b. Soil recycling at an asphalt batch recycling facility (MCP regulated soils). Soil, which is not suitable for unlined or lined landfills, may contain allowable contaminant concentrations specified in the receiving facility's permit.
  - c. Soil reuse at Unlined Landfills: Soil may contain contaminant concentrations in accordance with the requirements of COMM-97- 001 Table 1 Allowable Contaminant Levels for Soil Reuse at Unlined Landfills.
  - d. Out of State Lined Landfill: Soil which is RCRA non-hazardous and contains contaminant concentrations which exceed COMM-97-001 and facility acceptance limits of asphalt batch facilities.
2. Proposed list of off-site disposal/reuse/recycling facilities shall include:
- a. Facility name, owner, address, phone number, and contact name.
  - b. Certification of operating permit and compliance status.
  - c. Material acceptance criteria.
3. Within seven (7) days after transport off site, submit completed Material Shipping Record, Bill of Lading Log Sheets or Hazardous Waste Manifests signed by the transporter and receiving location to the Engineer. Include copies of receiving facility's weight slips.
4. Submit completed Authority Recycled Materials Monthly Reports to the Engineer.

**G-003-2.4 RESPONSIBILITY OF THE CONTRACTOR**

- A. Contractor shall adhere to State and Federal regulations, Specifications, and recognized standard practices related to soil management and storm water pollution prevention.
- B. Soil excavation and management activities must not adversely or otherwise affect any Airport operations.

***THE AUTHORITY IS NOT RESPONSIBLE AT ANY TIME FOR THE CONTRACTOR'S VIOLATION OF PERTINENT STATE OR FEDERAL REGULATIONS OR ENDANGERMENT OF LABORERS, PASSERS-BY OR ANY OTHERS.***

**G-003-2.5 EXCAVATION AND SEGREGATION OF SOILS**

- A. Soil segregation during excavation shall be performed when visual and olfactory evidence of discoloration and odor exists.

**G-003-2.6 SOIL SCREENING DURING EXCAVATION**

- A. If visual or olfactory evidence of contamination is encountered during excavation, Potentially Contaminated Soil shall be segregated from uncontaminated soil.
- B. Contractor shall notify the Engineer immediately if Potentially Contaminated Soil has been encountered.
- C. Potentially Contaminated Soil shall be transported immediately to a designated paved area on the airport as directed by the Engineer. Potentially contaminated soil shall be covered with polyethylene sheeting if requested by the Engineer. Contractor shall inspect covered piles daily to ensure that covering is secure until such time material is shipped off-site for recycling/disposal or determined suitable for on-site use.

**G-003-2.7 MANAGEMENT AND DISPOSAL OF EXCAVATED SOIL**

- A. Excavation and soil handling shall be performed in a manner that eliminates mixing Potentially Contaminated Soil with uncontaminated soil. Co-mingled soils generated by the Contractor's careless or unauthorized procedures for excavation or soil handling shall be disposed of at the sole expense of the Contractor. Re-handling of soil pending receipt of screening results, if necessary, shall be incidental to the work.
- B. On-site management of excess excavation:
  - 1. Contractor shall transport excess soil and Potentially Contaminated Soil to a designated paved area on the airport as directed by the Engineer. All project generated stockpiles shall be marked and staked with project number. A site sketch with estimated volume of material and photos shall be submitted to the Engineer as soon as placement is made. Information shall remain current until such time the material is transported off site for disposal.
  - 2. All excess soil and Potentially Contaminated Soil will be sampled by the Authority in increments specified by the proposed off-site receiving facilities in accordance with the Department of Environmental Protection Bureau of Waste Prevention Policy No. COMM-97-001.
  - 3. The Authority will provide the analytical results to the Contractor upon receipt, typically within two (2) weeks.
- C. Off-site management of soil:

1. If soil is unsuitable for reuse on airport, the soil shall be transported by the Contractor to an Authority-approved disposal/reuse/recycling facility.
  2. Contractor shall prepare the required shipping documents for soil to be transported off-site. The Authority will sign the generator certification and shipping documents as the Generator and the Authority's environmental consultant will sign as the LSP, if required.
- D. Transfer of materials from the excavation shall be conducted in such a manner as to prevent the spread of Potentially Contaminated Soil or other excavated materials across the construction site and other areas of the airport.
- E. Miscellaneous Debris - Contractor shall mobilize necessary equipment to remove miscellaneous debris from excavated soil (mechanical screening or manual picking). The Contractor shall stockpile these materials in Authority-designated areas at the project site. The Contractor shall dispose of these materials, including potentially contaminated debris. Refuse, coal ash, cinders, glass, wood and other "non-chemical" waste products as regulated by the DEP Division of Solid Waste Management (DSWM) shall be disposed/recycled by the contractor in accordance with 310 CMR 19.000.
1. Contractor shall screen debris and dispose of accordingly.
  2. Contractor shall dispose of miscellaneous debris, including potentially contaminated debris, at an Authority-approved off-site location in accordance with all applicable Federal and state regulations in an expeditious manner.

## **EXECUTION**

### **G-003-3.1 GENERAL REQUIREMENTS**

- A. Contractor shall implement the project-specific Construction Storm Water Pollution Prevention Plan and file a Notice of Intent to obtain authorization under the US EPA Construction General Permit.

## **METHOD OF MEASUREMENT**

- G-003-4.1** Payment will be made at the contract unit price per Ton for all soil brought offsite to an approved facility. This shall include all work required to haul the materials offsite. Payment will not be issued until documentation from the off-site receiving facility has been received with weight slips.

- G-003-4.2** No separate measurement for payment will be made for handling, stockpiling, soil segregation, backfilling, or compacting excavated soils. All costs in connection therewith are incidental to the items of work to which they pertain.
- G-003-4.3** No separate measurement for payment will be made for the development of the project specific Construction Storm Water Pollution Prevention Plan nor for the preparation and submission of a Notice of Intent to the US EPA under the Construction General Permit.
- G-003-4.4** No separate measurement for payment will be made for the development of a project- specific Soil Management Plan.
- G-003-4.5** Excavation for the Contractor’s convenience will not be measured for payment.
- G-003-4.6** Re-excavation and/or re-handling of soil will not be separately measured for payment; it is incidental to the work to which it pertains.
- G-003-4.7** No separate measurement or payment will be made for visual or olfactory observations as soil is being excavated.
- G-003-4.8** No separate measurement or payment will be made for the transport of soil a designated paved area on the airport as directed by the Engineer for temporary stockpiling while awaiting analytical results for soil characterization.

**BASIS OF PAYMENT**

- G-003-5.1** The estimated quantity of excess excavates requiring off-site disposal/recycling at an Authority-approved off-site receiving facility shall be made at the contract unit price per ton. This price shall be full compensation for furnishing all materials, labor, equipment, tools, including grading, disposal, stockpiling, excavating, and incidentals necessary to complete this item. This shall also include grading stockpile area in accordance with the Contract Drawings and as directed by the Engineer.

<u>ITEM</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
G-003.01	Soil Reuse at Out-Of-State Lined Landfill _____	per Ton
G-003.02	Soil Reuse at Lined Landfill _____	per Ton
G-003.03	Soil Recycling at Asphalt Batch Facility _____	per Ton

**END OF ITEM G-003**

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## **ITEM G-004 CONSTRUCTION ODOR CONTROL**

### **DESCRIPTION**

#### **G-004-1.1 GENERAL PROVISIONS**

- A. A. Attention is directed to the GENERAL REQUIREMENTS AND COVENANTS - DIVISION I, and the SPECIAL PROVISIONS - DIVISIONS IIA and IIB, which are hereby made a part of this Specification Section.
- B. Examine all Drawings and all Sections of the Specifications for requirements and provisions affecting the Work of this Section.
- C. The Contractor is responsible for controlling hazardous odors and nuisance odors encountered or created during Work of this Contract, including odors associated with site-sanitation.
- D. The Contractor shall investigate odor complaints, ascertain the odor source and promptly implement appropriate odor control measures.
- E. There is no payment associated with this item, it shall be considered incidental to the various Project Items contained within these Technical Specifications.

#### **G-004-1.2 DESCRIPTION OF WORK**

- A. This Section specifies requirements for controlling odors generated during Work of this Contract.

#### **G-004-1.3 DEFINITIONS**

- A. Hazardous odor – Odor that is determined to be hazardous or toxic.
- B. Nuisance odor – Odor that is determined to be non-hazardous or non-toxic.
- C. The Contractor is responsible for controlling hazardous odors and nuisance odors encountered or created during Work of this Contract, including odors associated with site-sanitation.

#### **G-004-1.4 RELATED WORK**

- A. Project Item G-001 – Health and Safety Plan
- B. Project Item G-003 – Soil Management
- C. Project Item C-102 – Temporary Air and Water Pollution, Soil Erosion, and Siltation Control

#### **G-004-1.5 REGULATORY REQUIREMENTS**

- A. The Contractor shall also perform Work in compliance with the Massachusetts Department of Environmental Protection, Code of Massachusetts Regulations (CMR) 310 CMR 7.00, “Air Pollution Control Regulations” specifically 310 CMR 7.09, “Dust, Odor, Construction and Demolition” and 310 CMR 7.11, “Transportation Media.”
- B. The Contractor shall also perform Work in compliance with the City of Boston’s Air Pollution Control Commission “Regulations for the Control of Atmospheric

Pollution” as adopted under the provisions of Section 31C, Chapter 3, and “General Laws.”

**G-004-1.6 SUBMITTALS**

- A. Prior to the use of an odor suppression agent, submit pertinent literature and Material Safety Data Sheet to the MPA Resident Engineer for review
- B. Submit odor control program that shall outline in detail the measures to be implemented by the Contractor to comply with this Section.
- C. Furnish monitoring results and logs of complaints as specified under Construction Methods.

**MATERIALS**

**G-004-2.1 ODOR SUPPRESSION AGENTS**

- A. Odor suppression agents shall be water soluble, non-toxic, non-reactive, and non-volatile.
- B. The use of petroleum-based products for odor suppression is strictly prohibited in this Contract.

**G-004-2.2 COVERS**

- A. If specifically requested by the MPA Resident Engineer, covers for excavated areas and stockpiled material shall be at least 10-mil thick polyethylene sheets and shall be properly secured at all times. Covers shall be replaced and or repaired if cover failure is evident.

**CONSTRUCTION METHODS**

**G-004-3.1 NUISANCE ODOR CONTROL**

- A. Methods that shall be used by the Contractor to control nuisance odors associated with earthwork include:
  - 1. Improving site drainage and preventing standing water from remaining in excavated areas.
  - 2. If requested by the MPA Resident Engineer, covering stockpiles of excavated material with polyethylene sheeting and securing it with sandbags or an equivalent method to prevent the cover from being dislodged by the wind. The Contractor shall repair or replace covers whenever damaged or dislodged, at no additional cost to the Authority.
  - 3. Reducing the amount of time that excavated material is exposed to the open atmosphere.
  - 4. Chemically treating the excavated areas and stockpile material. Approval of the MPA Resident Engineer shall be obtained prior to the use of any chemical application for controlling odor. This method shall be used only when other methods are impractical.
  - 5. Maintaining the construction site free of trash, garbage, and debris.



6. Fully covering and securing haul truck cargos during material transport on public and airport roadways.
  7. Covering the loads of trucks hauling demolition materials and excavation from the site and thoroughly washing wheels prior to allowing the trucks to leave the construction site.
  8. Cleaning-up and properly disposing of excavated material that is odorous. If odorous material is located on public roadways or walkways, clean-up methods shall consist of wet spray sweeping or vacuuming only.
- B. Methods that shall be used to control nuisance odors associated with diesel emissions from construction equipment include:
1. Turning off diesel combustion engines on construction equipment not in active use and dump trucks that are idling while waiting to load or unload material for 5 minutes or more.
  2. Establishing a staging zone for trucks that are waiting to load or unload material at the contract area, in a location where the diesel emissions from the truck will not be noticeable to the public.
  3. Locating combustion engines away from sensitive receptors such as fresh air intakes, air conditioners, and windows.
  4. Using diesel fuel with a sulfur content (ultra-low sulfur diesel) not to exceed 15 ppm (parts per million).
  5. Utilizing electronically-powered scissors/man lifts.
  6. All Contractor and Subcontractor diesel-powered non-road construction equipment with engine horsepower (HP) ratings of 60 HP and above, which is used on the Project for a period in excess of 30 days, shall be retrofitted with Emission Control Devices in order to reduce diesel emissions. In addition, all motor vehicles and construction equipment shall comply with all pertinent local, state and federal regulations covering exhaust emission controls and safety.
    - a. The reduction of emissions of volatile organic compounds (VOCs), carbon monoxide (CO), and particulate matter (PM) from diesel-powered equipment shall be accomplished by installing Retrofit Emission Control Devices.
    - b. The acceptable Retrofit Emission Control Devices for the project shall consist of oxidation catalysts that (1) are included on the Environmental Protection Agency (EPA) Verified Retrofit Technology List; and (2) are verified by EPA or certified by the manufacturer to provide a minimum emissions reduction of 42 percent for VOCs, 31 percent for CO and 23 percent for PM. Attainment of the required reduction in PM emissions can also be accomplished by using less polluting Clean Fuels (e.g. PuriNOx).

- c. Construction shall not proceed until the Contractor has submitted a certified list of the non-road diesel-powered construction equipment that will be retrofitted with emission control devices. The list shall include
  - (1) the equipment number, type, make and Contractor/Subcontractor name; and
  - (2) the emission control device make, model and EPA verification number. The Contractor shall also identify any vehicles that will use Clean Fuels. Equipment that has been retrofitted with an emission control device shall be stenciled or otherwise clearly marked as “Low Emission Equipment”.

The Contractor shall submit monthly reports, updating the same information stated above, including the quantity of Clean Fuel utilized. The addition or deletion of non- road diesel equipment shall be indicated in the report.

**G-004-3.2 ODOR MONITORING**

- A. Sensory Detection
  - 1. Sensory detection of odors (i.e. smelling) shall only be performed to determine a “boundary” of potential odor source(s).
- B. Instrumentation Monitoring
  - 1. As directed by the MPA Resident Engineer, the Contractor shall monitor odors to determine potential hazards using industry standard instrumentation.
  - 2. The Contractor shall document and submit to the MPA Resident Engineer all data on odor monitoring concentrations.

**G-004-3.3 CONTRACTOR COMPLAINTS**

- A. The Contractor shall notify the MPA Resident Engineer of all internal complaints originated from Contractor personnel regarding odors at the construction site. The MPA Resident Engineer will notify the Contractor of all external complaints from regulatory agencies or the public.
- B. The Contractor shall document and maintain a log of all complaints originated from Contractor personnel and from the MPA Resident Engineer, regarding odors at the construction site.
- C. For odors that are being produced from materials that are determined to be hazardous, the Contractor shall comply with the requirements of Section 013529 – Health and Safety Plan.
- D. For odors that are determined to be non-hazardous, (i.e., nuisance odors), the Contractor shall implement appropriate control measures.

**G-004-4.1 METHOD OF MEASUREMENT AND BASIS OF PAYMENT**

There is no separate measurement for the materials, labor, tools, equipment and incidentals required for odor control. They are considered incidental to the Contract.

**END OF ITEM G-004**

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## ITEM C-100 CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)

### C-100-1 GENERAL

Quality is more than test results. Quality is the combination of proper materials, testing, workmanship, equipment, inspection, and documentation of the project. Establishing and maintaining a culture of quality is key to achieving a quality project. The Contractor shall establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

**The CQCP total cost shall be limited to 1 percent of the total amount of relevant project pay items. Relevant project items for this Contract are defined as:**

- P-401
- P-209
- P-154

The Contractor shall establish a CQCP that will:

- a. Provide qualified personnel to develop and implement the CQCP.
- b. Provide for the production of acceptable quality materials.
- c. Provide sufficient information to assure that the specification requirements can be met.
- d. Document the CQCP process.

The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the CQCP has been reviewed and approved by the Resident Project Representative (RPR). No partial payment will be made for materials subject to specific quality control (QC) requirements until the CQCP has been reviewed and approved.

The QC requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the quality assurance (QA) testing requirements. QA testing requirements are the responsibility of the RPR or Contractor as specified in the specifications.

A Quality Control (QC)/Quality Assurance (QA) workshop with the Engineer, Resident Project Representative (RPR), Contractor, subcontractors, testing laboratories, and Owner's representative must be held prior to start of construction. The QC/QA workshop will be facilitated by the Contractor. The Contractor shall coordinate with the Airport and the RPR on time and location of the QC/QA workshop. Items to be addressed, at a minimum, will include:

- a. Review of the CQCP including submittals, QC Testing, Action & Suspension Limits for

Production, Corrective Action Plans, Distribution of QC reports, and Control Charts.

b. Discussion of the QA program.

c. Discussion of the QC and QA Organization and authority including coordination and information exchange between QC and QA.

d. Establish regular meetings to discuss control of materials, methods and testing.

e. Establishment of the overall QC culture.

## **C-100-2 DESCRIPTION OF PROGRAM.**

**a. General description.** The Contractor shall establish a CQCP to perform QC inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. The CQCP shall ensure conformance to applicable specifications and plans with respect to materials, off-site fabrication, workmanship, construction, finish, and functional performance. The CQCP shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of QC.

**b. Contractor Quality Control Program (CQCP).** The Contractor shall describe the CQCP in a written document that shall be reviewed and approved by the RPR prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the RPR for review and approval at least 10 calendar days before the CQCP Workshop. The Contractor's CQCP and QC testing laboratory must be approved in writing by the RPR prior to the Notice to Proceed (NTP).

The CQCP shall be organized to address, as a minimum, the following:

1. QC organization and resumes of key staff
2. Project progress schedule
3. Submittals schedule
4. Inspection requirements
5. QC testing plan
6. Documentation of QC activities and distribution of QC reports
7. Requirements for corrective action when QC and/or QA acceptance criteria are not met
8. Material quality and construction means and methods. Address all elements applicable to the project that affect the quality of the pavement structure including subgrade, subbase, base, and surface course. Some elements that must be addressed include, but is not limited to mix design, aggregate grading, stockpile management, mixing and transporting, placing and finishing, quality control testing and inspection, smoothness, laydown plan, equipment, and temperature management plan.

The Contractor must add any additional elements to the CQCP that is necessary to adequately control all production and/or construction processes required by this contract.

### **C-100-3 CQCP ORGANIZATION**

The CQCP shall be implemented by the establishment of a QC organization. An organizational chart shall be developed to show all QC personnel, their authority, and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all QC staff by name and function and shall indicate the total staff required to implement all elements of the CQCP, including inspection and testing for each item of work. If necessary, different technicians can be used for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the CQCP, the personnel assigned shall be subject to the qualification requirements of paragraphs 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The QC organization shall, as a minimum, consist of the following personnel:

**a. Program Administrator.** The Contractor Quality Control Program Administrator (CQCPA) must be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The CQCPA must have a minimum of five (5) years of experience in QC pavement construction with prior QC experience on a project of comparable size and scope as the contract.

Included in the five (5) years of paving/QC experience, the CQCPA must meet at least one of the following requirements:

- (1) Professional Engineer with one (1) year of airport paving experience.
- (2) Engineer-in-training with two (2) years of airport paving experience.
- (3) National Institute for Certification in Engineering Technologies (NICET) Civil Engineering Technology Level IV with three (3) years of airport paving experience.
- (4) An individual with four (4) years of airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

The CQCPA must have full authority to institute any and all actions necessary for the successful implementation of the CQCP to ensure compliance with the contract plans and technical specifications. The CQCPA authority must include the ability to immediately stop production until materials and/or processes are in compliance with contract specifications. The CQCPA must report directly to a principal officer of the construction firm. The CQCPA may supervise the Quality Control Program on more than one project provided that person can be at the job site within two (2) hours after being notified of a problem.

**b. QC technicians.** A sufficient number of QC technicians necessary to adequately implement the CQCP must be provided. These personnel must be either Engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II

in Civil Engineering Technology or higher and shall have a minimum of two (2) years of experience in their area of expertise.

The QC technicians must report directly to the CQCPA and shall perform the following functions:

- (1) Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by paragraph C-100-6.
- (2) Performance of all QC tests as required by the technical specifications and paragraph C-100-8.
- (3) Performance of tests for the RPR when required by the technical specifications.

Certification at an equivalent level of qualification and experience by a state or nationally recognized organization will be acceptable in lieu of NICET certification.

**c. Staffing levels.** The Contractor shall provide sufficient qualified QC personnel to monitor each work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians shall be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The CQCP shall state where different technicians will be required for different work elements.

#### **C-100-4 PROJECT PROGRESS SCHEDULE**

Critical QC activities must be shown on the project schedule as required by Division IIB.20.

#### **C-100-5 Submittals schedule**

The Contractor shall submit a detailed listing of all submittals (for example, mix designs, material certifications) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include as a minimum:

- a. Specification item number
- b. Item description
- c. Description of submittal
- d. Specification paragraph requiring submittal
- e. Scheduled date of submittal

#### **C-100-6 INSPECTION REQUIREMENTS**

QC inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by paragraph C-100-9.



Inspections shall be performed as needed to ensure continuing compliance with contract requirements until completion of the particular feature of work. Inspections shall include the following minimum requirements:

**a.** During plant operation for material production, QC test results and periodic inspections shall be used to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications. All equipment used in proportioning and mixing shall be inspected to ensure its proper operating condition. The CQCP shall detail how these and other QC functions will be accomplished and used.

**b.** During field operations, QC test results and periodic inspections shall be used to ensure the quality of all materials and workmanship. All equipment used in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The CQCP shall document how these and other QC functions will be accomplished and used.

#### **C-100-7 CONTRACTOR QC TESTING FACILITY**

**a.** For projects that include Item P-401, Item P-403, and Item P-404, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM D3666, *Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials*:

- 8.1.3 Equipment Calibration and Checks.
- 8.1.9 Equipment Calibration, Standardization, and Check Records.
- 8.1.12 Test Methods and Procedures

**b.** For projects that include P-501, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM C1077, *Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation*:

- 7 Test Methods and Procedures
- 8 Facilities, Equipment, and Supplemental Procedures

#### **C-100-8 QC TESTING PLAN**

As a part of the overall CQCP, the Contractor shall implement a QC testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by each technical specification Item, as well as any additional QC tests that the Contractor deems necessary to adequately control production and/or construction processes.

The QC testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

- a. Specification item number (e.g., P-401)
- b. Item description (e.g., Hot Mix Asphalt Pavements)
- c. Test type (e.g., gradation, grade, asphalt content)
- d. Test standard (e.g., ASTM or American Association of State Highway and Transportation Officials (AASHTO) test number, as applicable)
- e. Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated)
- f. Responsibility (e.g., plant technician)
- g. Control requirements (e.g., target, permissible deviations)

The QC testing plan shall contain a statistically based procedure of random sampling for acquiring test samples in accordance with ASTM D3665. The RPR shall be provided the opportunity to witness QC sampling and testing.

All QC test results shall be documented by the Contractor as required by paragraph C-100-9.

#### **C-100-9 DOCUMENTATION**

The Contractor shall maintain current QC records of all inspections and tests performed. These records shall include factual evidence that the required QC inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the RPR daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCPA.

Contractor QC records required for the contract shall include, but are not necessarily limited to, the following records:

**a. Daily Inspection Reports.** Each Contractor QC technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. These technician's daily reports shall provide factual evidence that continuous QC inspections have been performed and shall, as a minimum, include the following:

- (1) Technical specification item number and description
- (2) Compliance with approved submittals

- (3) Proper storage of materials and equipment
- (4) Proper operation of all equipment
- (5) Adherence to plans and technical specifications
- (6) Summary of any necessary corrective actions
- (7) Safety inspection.
- (8) Photographs and/or video

The daily inspection reports shall identify all QC inspections and QC tests conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible QC technician and the CQCPA. The RPR shall be provided at least one copy of each daily inspection report on the workday following the day of record. When QC inspection and test results are recorded and transmitted electronically, the results must be archived.

**b. Daily Test Reports.** The Contractor shall be responsible for establishing a system that will record all QC test results. Daily test reports shall document the following information:

- (1) Technical specification item number and description
- (2) Test designation
- (3) Location
- (4) Date of test
- (5) Control requirements
- (6) Test results
- (7) Causes for rejection
- (8) Recommended remedial actions
- (9) Retests

Test results from each day's work period shall be submitted to the RPR prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical QC charts. When QC daily test results are recorded and transmitted electronically, the results must be archived.

#### **C-100-10 CORRECTIVE ACTION REQUIREMENTS**

The CQCP shall indicate the appropriate action to be taken when a process is deemed, or believed,

to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the CQCP as a whole, and for individual items of work contained in the technical specifications.

The CQCP shall detail how the results of QC inspections and tests will be used for determining the need for corrective action and shall contain clear rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Contractor shall establish and use statistical QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.

### **C-100-11 INSPECTION AND/OR OBSERVATIONS BY THE RPR**

All items of material and equipment are subject to inspection and/or observation by the RPR at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate QC system in conformance with the requirements detailed here and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to inspection and/or observation by the RPR at the site for the same purpose.

Inspection and/or observations by the RPR does not relieve the Contractor of performing QC inspections of either on-site or off-site Contractor's or subcontractor's work.

### **C-100-12 NONCOMPLIANCE.**

**a.** The Resident Project Representative (RPR) will provide written notice to the Contractor of any noncompliance with their CQCP. After receipt of such notice, the Contractor must take corrective action.

**b.** When QC activities do not comply with either the CQCP or the contract provisions or when the Contractor fails to properly operate and maintain an effective CQCP, and no effective corrective actions have been taken after notification of non-compliance, the RPR will recommend the Owner take the following actions:

**(1)** Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or

**(2)** Order the Contractor to stop operations until appropriate corrective actions are taken.

## **METHOD OF MEASUREMENT**

### **C-100-13 BASIS OF MEASUREMENT AND PAYMENT**

Contractor Quality Control Program (CQCP) is for the personnel, tests, facilities and documentation required to implement the CQCP. The CQCP total cost shall be limited to 1 percent of the total amount of relevant project pay items. Relevant project items for this Contract are defined as (P-401).

The CQCP will be paid as a lump sum with the following schedule of partial payments:

- a. With first pay request, 25% with approval of CQCP and completion of the Quality Control (QC)/Quality Assurance (QA) workshop.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 20%.
- d. When 75% or more of the original contract is earned, an additional 20%
- e. After items relevant to this spec are complete and accepted, and all punch list items complete, the final 10%.

**BASIS OF PAYMENT**

**C-100-14 Payment will be made under:**

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
C-100.01	Contractor Quality Control Program (CQCP)	per Lump Sum

**REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

National Institute for Certification in Engineering Technologies (NICET)

ASTM International (ASTM)

ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

**END OF ITEM C-100**

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**ITEM C-102 TEMPORARY AIR AND WATER POLLUTION,  
SOIL EROSION, AND SILTATION CONTROL**

**DESCRIPTION**

**C-102-1.1** This item shall consist of temporary control measures as shown on the plans or as ordered by the Resident Project Representative (RPR) during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

Temporary erosion control shall be in accordance with the approved erosion control plan; the approved Construction Safety and Phasing Plan (CSPP) and AC 150/5370-2, Operational Safety on Airports During Construction. The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

Temporary control measures shall be designed, installed and maintained to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near public-use airports.

Any dust control operations shall meet the requirements of the Commonwealth of Massachusetts Department of Environmental Protection "310 CMR 7.09: Air Pollution Control Regulations." There shall be no additional compensation for associated costs and shall be the responsibility of the Contractor.

**MATERIALS**

**C-102-2.1 DRAIN INLET PROTECTORS.** Drain inlet protectors shall be provided in accordance with the details shown on the drawings. Drain inlet protectors shall be capable of holding in-excess of 1 gallon of sediment, shall include overflow provisions, and shall conform to the requirements of NPDES, 40 CFR 122.26. Inlet protectors shall be Ultra DrainGuard™ as manufactured by UltraTech International, Inc., Siltsack® as manufactured by ACF Environmental, Streamguard™ as manufactured by Foss Environmental Services, or approved equal.

**C-102-2.2 FIBER ROLLS.** Fiber rolls shall be provided in accordance with the details shown on the drawings. Fiber rolls shall be 9" diameter seed-free straw rolls bound tightly into a tubular roll. Fiber rolls shall be Ultra-StormWattle™ as manufactured by UltraTech International, Inc., Earth Saver® Wattle as Manufactured by R.H.Dyck Inc., Erosion Control Logs as manufactured by GreenSolutions™, or approved equal.

**C-102-2.3 SUBMITTALS.** The Contractor shall submit product data and manufacturer's literature for the drain inlet protectors, and fiber rolls for approval prior to installation of any erosion control measures.

**C-102-2.4 TRAINING.** The Contractor shall attend Stormwater Pollution Prevention Training conducted by the Authority prior to commencing on-site construction operations/disturbance.

## CONSTRUCTION REQUIREMENTS

**C-102-3.1 GENERAL.** All erosion control measures shall be installed and approved by the RPR and the Authority prior to starting work.

In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

The RPR shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

The erosion control features installed by the Contractor shall be acceptably maintained by the Contractor during the construction period and subject to the ongoing approval of the Engineer, project Environmental Monitor and/or Independent Observer.

Erosion control devices installed as required by the SWPPP, will not be paid for separately but are considered a subsidiary obligation of the cost of the SWPPP. In addition, erosion control devices installed as directed by the Engineer to address Contractor negligence or carelessness will not be measured separately for payment and all costs shall be borne by the Contractor.

**C-102-3.2 SCHEDULE.** Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the RPR.

**C-102-3.3 AUTHORITY OF ENGINEER.** The Engineer has the authority to limit the surface area of erodible earth material exposed by excavation, borrow and fill operations, and to direct the Contractor to provide immediate permanent or temporary pollution control measures to minimize contamination of wetland resource areas.

**C-102-3.4 CONSTRUCTION DETAILS.** The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The RPR shall limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such



coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the RPR.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the RPR. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the RPR, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period. The Contractor shall inspect all erosion control features immediately after each rainfall and at least once each day.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

In the event that temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or ordered by the RPR, such work shall be performed by the Contractor at his/her own expense.

Fueling, washing or other maintenance of vehicles and construction equipment and storage of oil and hazardous materials shall not take place within the 100-foot Buffer Zone to Bank or Bordering Vegetated Wetland.

In the event of a significant rainfall event, extra erosion control measures shall be taken, such as the use of additional fiber rolls so as not to further disturb any additional areas in accordance with the project-specific Stormwater Pollution Prevention Plan.

All areas where temporary erosion controls are installed must be repaired and restored to their original condition until project completion or as directed by the Engineer, Environmental Monitor or Independent Observer. Also, all other areas disturbed or affected by construction shall be restored to their original condition. All siltation barriers installed shall be removed and disposed of legally off airport property at project completion or as directed by the Engineer.

Erosion control devices shall be placed where shown on the Contract Drawings or as directed by the Engineer pursuant to the project specific Stormwater Pollution Prevention Plan. Devices shall be placed in accordance with the details shown on the Contract Drawings and the manufacturer's recommendations. The Contractor shall frequently inspect the erosion control devices after installation and repair or replace any devices that become damaged or when directed by the Environmental Monitor or Independent Observer.

**C-102-3.5 FIBER ROLLS.** Fiber rolls shall be placed where shown on the Contract Drawings or as directed by the Engineer. The rolls shall be placed in accordance with the details shown on the Contract Drawings. Each roll shall be embedded in the soil a minimum of 2 inches and shall be anchored securely in place with wooden stakes.

The Contractor shall frequently inspect the fiber rolls after installation and repair or replace any fiber rolls that become damaged and remove any silt that accumulates behind the rolls.

**C-102-3.6 DRAIN INLET PROTECTORS.** Drain inlet protectors shall be placed where shown on the Contract Drawings or as directed by the Engineer in accordance with manufacturer's recommendations.

The Contractor shall frequently inspect the drain inlet protectors after installation and repair or replace any drain inlet protectors that become damaged at no additional cost. The Contractor shall clean out the silt and sediment from the drain inlet protector when it is half-full with silt and sediment. The Contractor shall inspect each drain inlet protector after each rainfall event, and repair/clean out as needed.

**C-102-3.7 ENVIRONMENTAL REQUIREMENTS.** No additional compensation will be made for compliance with the approved environmental requirements, they shall be considered incidental to the various project items.

**C-102-3.8 STORM WATER POLLUTION PREVENTION.**

- A. The project-specific Stormwater Pollution Prevention Plan will be prepared by the Authority and shall be accepted in its entirety by the Contractor.
- B. The Contractor shall implement Best Management Practices (BMPs) during construction taking into consideration the BMP design to minimize the potential contamination of storm water as a result of contact with soil stockpiles, materials, equipment and vehicles.
- C. The Contractor shall identify locations where erosion is likely and where other construction related pollutants may be generated. The Contractor shall identify appropriate BMPs and implement them in these areas.
- D. The Contractor shall handle nuisance water such as storm water and surface runoff by directing runoff to specified catch basins at the construction site. Drain inlet protectors and fiber rolls shall be installed by the Contractor at the down gradient end of all open excavations. The Contractor shall inspect the drain inlet protectors and the fiber rolls daily and replace damaged sections at no additional cost to the Authority.
- E. The Contractor shall maintain a daily log of active discharges and record this information on the stormwater pollution prevention work sheet contained in the SWPP Plan along with daily inspection information. The Contractor shall notify the Engineer, the Authority whenever discharges to the storm drainage system are made.

The Contractor shall designate a primary and an alternative individual to comprise the SWPP Plan team who shall participate in SWPPP inspections with the Environmental Monitor and/or Independent Observer. The designated individuals shall have the authority to implement the resources necessary to maintain and repair erosion control equipment and devices. Personnel selected for the SWPPP shall have been previously trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used on site in good working order.

## **METHOD OF MEASUREMENT**

**C-102-4.1** Temporary erosion and pollution control work required will be performed as scheduled or directed by the RPR. Completed and accepted work will be measured as follows:

- a. The quantity of “Drain Inlet Protectors” to be paid for shall be the number of installed drain inlet protectors furnished, installed and accepted, measured in place.
- b. The quantity of “Fiber Rolls” to be paid for shall be the number of linear feet of fiber roll, furnished, installed and accepted, measured in place.

**C-102-4.2** Control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor.

**C-102-4.3** Temporary erosion and pollution control work required which is not attributed to the Contractor's negligence, carelessness, or failure to install permanent controls will be performed as scheduled or ordered by the Engineer.

**C-102-4.4** On hand erosion control devices for use on this project shall not be paid for separately. In the event these are installed, they will be paid for under the appropriate item.

**C-102-4.5** There shall be no separate payment for the implementation of a project-specific SWPPP, nor will there be any separate payment for the preparation of the NOI or NOT for this project; they are considered subsidiary obligations of the Contractor.

**C-102-4.6** All erosion control measures required by the Contractor's SWPPP will not be measured separately for payment but will be incidental to the cost of the SWPPP implementation.

Costs shall include all materials necessary to install the erosion control measures, all maintenance and upkeep required of the controls including removal upon completion of the project including restoration of the site. The costs include all labor, materials and all incidentals necessary to install the erosion control measures at the locations noted on the plans.

## **BASIS OF PAYMENT**

**C-102-5.1** Payment for “Drain Inlet Protectors” shall be made at the contract unit price per each, measured as specified above, which price and payment thereof shall constitute full compensation for all labor, materials, equipment, expenses and incidentals for placing the drain inlet protectors, maintenance during construction, and removal when so directed.

**C-102-5.2** Payment for “Fiber Rolls” shall be made at the contract unit price per linear foot, measured as specified above, which price and payment thereof shall constitute full compensation for all labor, materials, equipment, expenses and incidentals for placing the fiber roll, maintenance during construction, and removal when so directed.

Payment will be made under:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
C-102.01	Drain Inlet Protectors _____	per Each
C-102.02	Fiber Rolls _____	per Linear Foot

#### **MATERIAL REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5370-2      *Operational Safety on Airports During Construction*

**END OF ITEM C-102**

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## **ITEM C-105 MOBILIZATION**

### **105-1 DESCRIPTION**

This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

### **105-2 MOBILIZATION LIMIT**

Mobilization shall be limited to **5 percent (5%)** of the total project cost.

### **105-3 POSTED NOTICES**

Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster "Equal Employment Opportunity is the Law" in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL "Notice to All Employees" Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

### **105-4 ENGINEER/RPR FIELD OFFICE**

An engineer/RPR field is not required.

## **METHOD OF MEASUREMENT**

### **105-5 BASIS OF MEASUREMENT AND PAYMENT**

Based upon the contract lump sum price for "Mobilization" partial payments will be allowed as follows:

- a. With first pay request, 25%.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 40%.
- d. After Final Inspection, staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation*, the final 10%.

## **BASIS OF PAYMENT**

### **105-6 Payment will be made under:**

Item C-105	Mobilization	Per Lum Sum
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## **REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

United States Department of Labor, Wage and Hour Division (WHD)

WH 1321 – Employee Rights under the Davis-Bacon Act Poster

**END OF ITEM C-105**

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## **ITEM C-110 METHOD OF ESTIMATING PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL)**

### **C-110-1 GENERAL**

When the specifications provide for acceptance of material based on the method of estimating percentage of material within specification limits (PWL), the PWL will be determined in accordance with this section. All test results for a lot will be analyzed statistically to determine the total estimated percent of the lot that is within specification limits. The PWL is computed using the sample average ( $\bar{X}$ ) and sample standard deviation ( $S_n$ ) of the specified number ( $n$ ) of sublots for the lot and the specification tolerance limits,  $L$  for lower and  $U$  for upper, for the particular acceptance parameter. From these values, the respective Quality index,  $Q_L$  for Lower Quality Index and/or  $Q_U$  for Upper Quality Index, is computed and the PWL for the lot for the specified  $n$  is determined from Table 1. All specification limits specified in the technical sections shall be absolute values. Test results used in the calculations shall be to the significant figure given in the test procedure.

There is some degree of uncertainty (risk) in the measurement for acceptance because only a small fraction of production material (the population) is sampled and tested. This uncertainty exists because all portions of the production material have the same probability to be randomly sampled. The Contractor's risk is the probability that material produced at the acceptable quality level is rejected or subjected to a pay adjustment. The Owner's risk is the probability that material produced at the rejectable quality level is accepted.

It is the intent of this section to inform the Contractor that, in order to consistently offset the Contractor's risk for material evaluated, production quality (using population average and population standard deviation) must be maintained at the acceptable quality specified or higher. In all cases, it is the responsibility of the Contractor to produce at quality levels that will meet the specified acceptance criteria when sampled and tested at the frequencies specified.

### **C-110-2 METHOD FOR COMPUTING PWL**

The computational sequence for computing PWL is as follows:

- a. Divide the lot into  $n$  sublots in accordance with the acceptance requirements of the specification.
- b. Locate the random sampling position within the subplot in accordance with the requirements of the specification.
- c. Make a measurement at each location or take a test portion and make the measurement on the test portion in accordance with the testing requirements of the specification.
- d. Find the sample average ( $\bar{X}$ ) for all subplot test values within the lot by using the following formula:

$$\bar{X} = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

Where:  $\bar{X}$  = Sample average of all subplot test values within a lot

$x_1, x_2, \dots, x_n$  = Individual subplot test values

$n$  = Number of subplot test values

- e. Find the sample standard deviation ( $S_n$ ) by use of the following formula:

$$S_n = [(d_1^2 + d_2^2 + d_3^2 + \dots + d_n^2)/(n-1)]^{1/2}$$

Where:  $S_n$  = Sample standard deviation of the number of subplot test values in the set

$d_1, d_2, \dots, d_n$  = Deviations of the individual subplot test values  $x_1, x_2, \dots$  from the average value  $X$

that is:  $d_1 = (x_1 - X), d_2 = (x_2 - X) \dots d_n = (x_n - X)$

$n$  = Number of subplot test values

- f. For single sided specification limits (i.e., L only), compute the Lower Quality Index  $Q_L$  by use of the following formula:

$$Q_L = (X - L) / S_n$$

Where: L = specification lower tolerance limit

Estimate the percentage of material within limits (PWL) by entering Table 1 with  $Q_L$ , using the column appropriate to the total number (n) of measurements. If the value of  $Q_L$  falls between values shown on the table, use the next higher value of PWL.

- g. For double-sided specification limits (i.e., L and U), compute the Quality Indexes  $Q_L$  and  $Q_U$  by use of the following formulas:

$$Q_L = (X - L) / S_n$$

and

$$Q_U = (U - X) / S_n$$

Where: L and U = specification lower and upper tolerance limits

Estimate the percentage of material between the lower (L) and upper (U) tolerance limits (PWL) by entering Table 1 separately with  $Q_L$  and  $Q_U$ , using the column appropriate to the total number (n) of measurements, and determining the percent of material above  $P_L$  and percent of material below  $P_U$  for each tolerance limit. If the values of  $Q_L$  fall between values shown on the table, use the next higher value of  $P_L$  or  $P_U$ . Determine the PWL by use of the following formula:

$$PWL = (P_U + P_L) - 100$$

Where:  $P_L$  = percent within lower specification limit

$P_U$  = percent within upper specification limit

### EXAMPLE OF PWL CALCULATION

**Project:** Example Project

**Test Item:** Item P-401, Lot A.

#### A. PWL Determination for Mat Density.

1. Density of four random cores taken from Lot A. A-1 = 96.60

A-2 = 97.55

A-3 = 99.30

$$A-4 = 98.35$$

$$n = 4$$

2. Calculate average density for the lot.  $X = (x_1 + x_2 + x_3 + \dots + x_n) / n$

$$X = (96.60 + 97.55 + 99.30 + 98.35) / 4$$

$$X = 97.95\% \text{ density}$$

3. Calculate the standard deviation for the lot.

$$S_n = [((96.60 - 97.95)^2 + (97.55 - 97.95)^2 + (99.30 - 97.95)^2 + (98.35 - 97.95)^2) / (4 - 1)]^{1/2}$$

$$S_n = [(1.82 + 0.16 + 1.82 + 0.16) / 3]^{1/2}$$

$$S_n = 1.15$$

4. Calculate the Lower Quality Index  $Q_L$  for the lot. ( $L=96.3$ )  $Q_L = (X - L) / S_n$

$$Q_L = (97.95 - 96.30) / 1.15$$

$$Q_L = 1.4348$$

5. Determine PWL by entering Table 1 with  $Q_L = 1.44$  and  $n = 4$ .

$$PWL = 98$$

## B. PWL Determination for Air Voids.

1. Air Voids of four random samples taken from Lot A.  $A-1 = 5.00$

$$A-2 = 3.74$$

$$A-3 = 2.30$$

$$A-4 = 3.25$$

2. Calculate the average air voids for the lot.

$$X = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

$$X = (5.00 + 3.74 + 2.30 + 3.25) / 4$$

$$X = 3.57\%$$

3. Calculate the standard deviation  $S_n$  for the lot.

$$S_n = [((3.57 - 5.00)^2 + (3.57 - 3.74)^2 + (3.57 - 2.30)^2 + (3.57 - 3.25)^2) / (4 - 1)]^{1/2}$$

$$S_n = [(2.04 + 0.03 + 1.62 + 0.10) / 3]^{1/2}$$

$$S_n = 1.12$$

4. Calculate the Lower Quality Index  $Q_L$  for the lot. ( $L = 2.0$ )

$$Q_L = (X - L) / S_n$$

$$Q_L = (3.57 - 2.00) / 1.12$$

$$Q_L = 1.3992$$

5. Determine  $P_L$  by entering Table 1 with  $Q_L = 1.41$  and  $n = 4$ .

$$P_L = 97$$

6. Calculate the Upper Quality Index  $Q_U$  for the lot. ( $U = 5.0$ )

$$Q_U = (U - X) / S_n$$

$$Q_U = (5.00 - 3.57) / 1.12$$

$$Q_U = 1.2702$$

7. Determine  $P_U$  by entering Table 1 with  $Q_U = 1.29$  and  $n = 4$ .

$$P_U = 93$$

8. Calculate Air Voids PWL

$$PWL = (P_L + P_U) - 100$$

$$PWL = (97 + 93) - 100 = 90$$

### **XAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E178)**

**Project:** Example Project

**Test Item:** Item P-401, Lot A.

#### **A. Outlier Determination for Mat Density.**

1. Density of four random cores taken from Lot A arranged in descending order.

$$A-3 = 99.30$$

$$A-4 = 98.35$$

$$A-2 = 97.55$$

$$A-1 = 96.60$$

2. From ASTM E178, Table 1, for  $n=4$  an upper 5% significance level, the critical value for test criterion = 1.463.

3. Use average density, standard deviation, and test criterion value to evaluate density measurements.

- a. For measurements greater than the average:

If  $(\text{measurement} - \text{average}) / (\text{standard deviation})$  is less than test criterion, then the measurement is not considered an outlier.

For A-3, check if  $(99.30 - 97.95) / 1.15$  is greater than 1.463.

Since 1.174 is less than 1.463, the value is not an outlier.

- b. For measurements less than the average:

If  $(\text{average} - \text{measurement}) / (\text{standard deviation})$  is less than test criterion, then the measurement is not considered an outlier.

For A-1, check if  $(97.95 - 96.60) / 1.15$  is greater than 1.463.

Since 1.435 is less than 1.463, the value is not an outlier.

**Note:** In this example, a measurement would be considered an outlier if the density were:

Greater than  $(97.95 + 1.463 \times 1.15) = 99.63\%$

OR

less than  $(97.95 - 1.463 \times 1.15) = 96.27\%$ .

**Table 1. Table for Estimating Percent of Lot Within Limits (PWL)**

Percent Within Limits (P <sub>L</sub> and P <sub>U</sub> )	Positive Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
99	1.1541	1.4700	1.6714	1.8008	1.8888	1.9520	1.9994	2.0362
98	1.1524	1.4400	1.6016	1.6982	1.7612	1.8053	1.8379	1.8630
97	1.1496	1.4100	1.5427	1.6181	1.6661	1.6993	1.7235	1.7420
96	1.1456	1.3800	1.4897	1.5497	1.5871	1.6127	1.6313	1.6454
95	1.1405	1.3500	1.4407	1.4887	1.5181	1.5381	1.5525	1.5635
94	1.1342	1.3200	1.3946	1.4329	1.4561	1.4717	1.4829	1.4914
93	1.1269	1.2900	1.3508	1.3810	1.3991	1.4112	1.4199	1.4265
92	1.1184	1.2600	1.3088	1.3323	1.3461	1.3554	1.3620	1.3670
91	1.1089	1.2300	1.2683	1.2860	1.2964	1.3032	1.3081	1.3118
90	1.0982	1.2000	1.2290	1.2419	1.2492	1.2541	1.2576	1.2602
89	1.0864	1.1700	1.1909	1.1995	1.2043	1.2075	1.2098	1.2115
88	1.0736	1.1400	1.1537	1.1587	1.1613	1.1630	1.1643	1.1653
87	1.0597	1.1100	1.1173	1.1192	1.1199	1.1204	1.1208	1.1212
86	1.0448	1.0800	1.0817	1.0808	1.0800	1.0794	1.0791	1.0789
85	1.0288	1.0500	1.0467	1.0435	1.0413	1.0399	1.0389	1.0382
84	1.0119	1.0200	1.0124	1.0071	1.0037	1.0015	1.0000	0.9990
83	0.9939	0.9900	0.9785	0.9715	0.9671	0.9643	0.9624	0.9610
82	0.9749	0.9600	0.9452	0.9367	0.9315	0.9281	0.9258	0.9241
81	0.9550	0.9300	0.9123	0.9025	0.8966	0.8928	0.8901	0.8882
80	0.9342	0.9000	0.8799	0.8690	0.8625	0.8583	0.8554	0.8533
79	0.9124	0.8700	0.8478	0.8360	0.8291	0.8245	0.8214	0.8192
78	0.8897	0.8400	0.8160	0.8036	0.7962	0.7915	0.7882	0.7858

Percent Within Limits (P <sub>L</sub> and P <sub>U</sub> )	Positive Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
77	0.8662	0.8100	0.7846	0.7716	0.7640	0.7590	0.7556	0.7531
76	0.8417	0.7800	0.7535	0.7401	0.7322	0.7271	0.7236	0.7211
75	0.8165	0.7500	0.7226	0.7089	0.7009	0.6958	0.6922	0.6896
74	0.7904	0.7200	0.6921	0.6781	0.6701	0.6649	0.6613	0.6587
73	0.7636	0.6900	0.6617	0.6477	0.6396	0.6344	0.6308	0.6282
72	0.7360	0.6600	0.6316	0.6176	0.6095	0.6044	0.6008	0.5982
71	0.7077	0.6300	0.6016	0.5878	0.5798	0.5747	0.5712	0.5686
70	0.6787	0.6000	0.5719	0.5582	0.5504	0.5454	0.5419	0.5394
69	0.6490	0.5700	0.5423	0.5290	0.5213	0.5164	0.5130	0.5105
68	0.6187	0.5400	0.5129	0.4999	0.4924	0.4877	0.4844	0.4820
67	0.5878	0.5100	0.4836	0.4710	0.4638	0.4592	0.4560	0.4537
66	0.5563	0.4800	0.4545	0.4424	0.4355	0.4310	0.4280	0.4257
65	0.5242	0.4500	0.4255	0.4139	0.4073	0.4030	0.4001	0.3980
64	0.4916	0.4200	0.3967	0.3856	0.3793	0.3753	0.3725	0.3705
63	0.4586	0.3900	0.3679	0.3575	0.3515	0.3477	0.3451	0.3432
62	0.4251	0.3600	0.3392	0.3295	0.3239	0.3203	0.3179	0.3161
61	0.3911	0.3300	0.3107	0.3016	0.2964	0.2931	0.2908	0.2892
60	0.3568	0.3000	0.2822	0.2738	0.2691	0.2660	0.2639	0.2624
59	0.3222	0.2700	0.2537	0.2461	0.2418	0.2391	0.2372	0.2358
58	0.2872	0.2400	0.2254	0.2186	0.2147	0.2122	0.2105	0.2093
57	0.2519	0.2100	0.1971	0.1911	0.1877	0.1855	0.1840	0.1829
56	0.2164	0.1800	0.1688	0.1636	0.1607	0.1588	0.1575	0.1566
55	0.1806	0.1500	0.1406	0.1363	0.1338	0.1322	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057	0.1049	0.1042
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0793	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264	0.0262	0.0260
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Percent Within Limits (P <sub>L</sub> and P <sub>U</sub> )	Positive Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
Percent Within Limits (P <sub>L</sub> and P <sub>U</sub> )	Negative Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042
45	-0.1806	-0.1500	-0.1406	-0.1363	-0.1338	-0.1322	-0.1312	-0.1304
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1588	-0.1575	-0.1566
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855	-0.1840	-0.1829
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122	-0.2105	-0.2093
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477	-0.3451	-0.3432
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753	-0.3725	-0.3705
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4030	-0.4001	-0.3980
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4355	-0.4310	-0.4280	-0.4257
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592	-0.4560	-0.4537
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877	-0.4844	-0.4820
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164	-0.5130	-0.5105
30	-0.6787	-0.6000	-0.5719	-0.5582	-0.5504	-0.5454	-0.5419	-0.5394
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747	-0.5712	-0.5686
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044	-0.6008	-0.5982
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344	-0.6308	-0.6282
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649	-0.6613	-0.6587
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958	-0.6922	-0.6896

Percent Within Limits (P <sub>L</sub> and P <sub>U</sub> )	Positive Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271	-0.7236	-0.7211
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590	-0.7556	-0.7531
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915	-0.7882	-0.7858
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245	-0.8214	-0.8192
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583	-0.8554	-0.8533
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928	-0.8901	-0.8882
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9315	-0.9281	-0.9258	-0.9241
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9671	-0.9643	-0.9624	-0.9610
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015	-1.0000	-0.9990
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399	-1.0389	-1.0382
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794	-1.0791	-1.0789
13	-1.0597	-1.1100	-1.1173	-1.1192	-1.1199	-1.1204	-1.1208	-1.1212
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630	-1.1643	-1.1653
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075	-1.2098	-1.2115
10	-1.0982	-1.2000	-1.2290	-1.2419	-1.2492	-1.2541	-1.2576	-1.2602
9	-1.1089	-1.2300	-1.2683	-1.2860	-1.2964	-1.3032	-1.3081	-1.3118
8	-1.1184	-1.2600	-1.3088	-1.3323	-1.3461	-1.3554	-1.3620	-1.3670
7	-1.1269	-1.2900	-1.3508	-1.3810	-1.3991	-1.4112	-1.4199	-1.4265
6	-1.1342	-1.3200	-1.3946	-1.4329	-1.4561	-1.4717	-1.4829	-1.4914
5	-1.1405	-1.3500	-1.4407	-1.4887	-1.5181	-1.5381	-1.5525	-1.5635
4	-1.1456	-1.3800	-1.4897	-1.5497	-1.5871	-1.6127	-1.6313	-1.6454
3	-1.1496	-1.4100	-1.5427	-1.6181	-1.6661	-1.6993	-1.7235	-1.7420
2	-1.1524	-1.4400	-1.6016	-1.6982	-1.7612	-1.8053	-1.8379	-1.8630
1	-1.1541	-1.4700	-1.6714	-1.8008	-1.8888	-1.9520	-1.9994	-2.0362



## **REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM E178                      Standard Practice for Dealing with Outlying Observations

**END OF ITEM C-110**

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## ITEM P-101 SURFACE PREPARATION

### DESCRIPTION

#### P-101-1.1 GENERAL

This item shall consist of preparation of existing pavement surfaces for overlay/inlay, removal of existing bituminous pavement, sawing and sealing of pavement joints and other miscellaneous items. The work shall be accomplished in accordance with these specifications, all applicable drawings and as directed by the Resident Project Representative (RPR).

#### P-101-1.2 DEFINITIONS

Milling/excavating to remove pavements and sawing and sealing of pavement joints are defined as follows.

- a. **Milling, 0 to 4 Inch Nominal** consists of excavating existing heavy-duty pavement in areas where the total depth of bituminous pavement to be removed is less than 4 inches. Milling shall vary in depth up to the maximum depth of 4 inches, as measured from the existing pavement surface, as shown on the Contract drawings. Any milling performed beyond the 4 inches depth shall be at the direction of the RPR or Massport Capital Programs and shall be paid at the contract unit price for Milling, 4 Inches.
- b. **Bituminous Pavement Removal.** Existing bituminous pavement to be removed shall be cut to the full depth of the bituminous material around the perimeter of the area to be removed. Bituminous pavement may be removed by means of excavation with prior approval of the RPR.
- c. **Bituminous to Bituminous Joint Sawing and Sealing** consists of sawing joints between new and old bituminous concrete pavements as well as filling saw kerf with a joint sealing filler, as specified under Item P-605, Joint Sealing Filler of these Specifications.

### EQUIPMENT

#### P-101-2.1 GENERAL

All equipment shall be specified hereinafter or as approved by the RPR. The equipment shall not cause damage to the pavement to remain in place. Refer to Construction Methods below for specific equipment requirements related to milling.

#### P-101-2.2 MILLING

The machine shall have a minimum nominal width of 7 feet. It shall be equipped with electronic grade control devices on both sides that will cut the surface to the grade and tolerances specified. The machine shall cut vertical edges and shall be capable of discharging the millings in a truck.

The milling machine shall operate without tearing or gouging the underlying surface. A positive method of dust control shall be provided. All equipment shall be in first class working order, properly maintained, and subject to the approval of the RPR. A vacuum sweeper will be required for all milling operations.

## CONSTRUCTION METHODS

### P-101-3.1 MILLING

- a. **General.** It shall be the sole responsibility of the Contractor to ensure the completion of all milling operations within sufficient time remaining to overlay/inlay the pavements within the scheduled time.
- b. **Grade Control.** The Contractor shall provide construction layout and mill depths survey in accordance with the Contract drawings. The contractor shall re-establish the construction layout and mill depths survey between each milling pass. Should the remaining pavement be unsuitable to provide an adequate base for the overlay, it shall be removed by further milling and replaced with P-401 Asphalt Mix Pavement as directed by the RPR. Contractor shall record spot grades at top of milled surface and turn over survey to the RPR for review.
- c. **Grade.** Existing pavement shall be milled to within a tolerance of no more than ½” beyond what is noted on the plans or a depth approved by the RPR. Any milling in excess of ½” tolerance or what has been approved by the RPR shall be considered incidental to milling pay items. Additional P-401HMA required to fill in excess milling areas in areas in excess of ½” tolerance or what has been approved by the RPR shall be considered incidental to the milling pay items.  
*It is possible that aircraft will operate on milled pavement. The Contractor shall provide and operate milling equipment that produces a uniform surface texture on the remaining pavement that is acceptable to the RPR. Any refilling of areas which will be subject to aircraft operations that are deemed unacceptable by the RPR shall be re-milled at the Contractor's expense.*
- d. **Transitions.** Where the new bituminous concrete overlay abuts existing bituminous pavement, a neat straight line shall be cut with suitable power-driven equipment before commencing with pavement removal for the transition with a milling machine. It is the intention of this operation and the obligation of the Contractor to produce a uniform straight line and smooth transition at the joint between the new and existing pavement. Suitable line controls shall be established by the Contractor to guide the cutting operations.
- e. **Protection of Cut Edges.** The Contractor shall protect the cut edges of the pavement from damage and edge breakdown resulting from construction operations. Any edge breakdown resulting from the Contractor's operations after the final cut is made shall be corrected at the Contractor's expense.
- f. **Disposal.** All pavement milling wastes shall become the property of the Contractor and shall be properly loaded and transported to a licensed facility for recycling by the Contractor. Any milling wastes not loaded onto trucks by conventional methods shall be removed by the Contractor using self-propelled power sweepers, vacuums, hand sweepers or any other method necessary to leave a suitable pavement for a

bituminous overlay. Accumulation of the milling wastes on paved or grass shoulders will not be permitted without the permission of the RPR. The pavement shall be left clean and dust free to the satisfaction of the RPR. This cleaning operation shall take place at the end of every milling operation or as directed by the RPR. ALL MILLINGS SHALL LEAVE AIRPORT PROPERTY AS THEY ARE GENERATED. THERE IS NO AVAILABILITY FOR STOCKPILING MILLINGS ON AIRPORT PROPERTY.

**P-101-3.2 BITUMINOUS PAVEMENT REMOVAL**

- a. **Bituminous Pavement Removal.** Bituminous concrete pavement to be removed shall be cut to the full depth of the bituminous material around the perimeter of the area to be removed.

**P-101-3.3 PREPARATION OF CRACKS**

All cracks shall be cleaned and sealed in accordance with Item P-102 Crack Repairs for Bituminous Pavements.

**P-101-3.4 JOINT SAWING AND SEALING**

- a. **Joint Sawing.** Construction joints in bituminous pavement shown on the contract drawings or directed by the RPR shall be cut to the depth shown on the drawings. The Contractor shall take special care to exactly locate the construction joint prior to sawing operations and not to damage existing Portland cement concrete during sawing of PCC-to-bituminous joints.
- b. **Preparation of Joints.** Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, and other foreign material. Cleaning shall be accomplished by sandblasting. Sandblasting shall be accomplished in a minimum of two passes. One pass per joint face with the nozzle held at an angle directly toward the joint face and not more than 3 in from it. Upon completion of cleaning, the joints shall be blown out with compressed air free of oil and water. Only air compressors with operable oil and water traps shall be used to prepare the joints for sealing. The joint faces shall be surface dry when the seal is applied.
- c. **Joint Sealing.** Joint sealant material shall be as specified in Item P-605.

**METHOD OF MEASUREMENT**

**P-101-4.1** The quantity of Milling, 0 to 4 Inches will be measured based on the number of square yards of bituminous pavement milled to meet the line and grade of the new overlay to existing pavement. There will be no additional payment for over milling the areas to a depth greater than what is outlined within these Specifications or in the Contract Drawings unless directed by the Engineer nor for the disposal of the milled material.

Milling that is required to remove a previous paving operation's transition area will not be measured nor paid for separately but will be considered incidental to the paving operation.

**P-101-4.3** Joint sawing and sealing between new and old pavement shall be measured by the linear foot of each type of sawed and sealed joint in place, complete, and accepted by the RPR. Sawing of pavement edges prior to paving operations shall not be measured separately for payment but shall be considered incidental to Item P-401 Asphalt Mix Pavement. Longitudinal joint sawing and sealing required because of longitudinal joints left exposed due to a cold joint or after a paving

shift will not be measured for payment but will be performed at the Contractor's expense. No measurement will be made for saw and seal for conduit trenches, pavement patches/crack repairs or on construction joints between paving phases beyond what is shown on the approved Contract Drawings.

**P-101-4.4** The quantity of Bituminous Excavation shall be measured for payment for by cubic yard, measured in place prior to excavation, to the depth indicated on the plans. Bituminous pavement excavated beyond the lines and sections shown on the plans without authorization will not be measured for payment.

### **BASIS OF PAYMENT**

**P-101-5.1** Payment for various bituminous concrete milling items shall be made at the contract unit price per square yard milled and approved by the RPR, which shall be full compensation for saw cutting, milling, cleaning for all materials, disposal of milled material, labor, equipment and incidentals necessary to complete the work.

**P-101-5.3** Payment for various pavement joint sawing and sealing items shall be made at the contract unit price per linear foot for each pay item. The prices shall be full compensation for furnishing all materials, for all preparation, delivering, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

**P-101-5.4** Payment for Bituminous Excavation shall be made at the contract unit price per cubic yard and approved by the RPR, which shall be full compensation for saw cutting, excavating, cleaning for all materials, disposal of material, labor, equipment and incidentals necessary to complete the work.

Payment will be made under:

<u>UNIT</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
P-101.01	Pavement Milling, Variable Depth (0" – 4") _____	per Square Yard
P-101.03	Bituminous to Bituminous Joint Sawing and Sealing_____	per Linear Foot
P-101.04	Bituminous Pavement Excavation_____	per Cubic Yard

**END OF ITEM P-101**

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## ITEM P-102 CRACK REPAIRS FOR BITUMINOUS PAVEMENTS

### DESCRIPTION

#### P-102-1.1 GENERAL

This work consists of milling, excavating, reshaping, cleaning, filling, repairing and reconstructing cracked bituminous concrete pavement, including the application of a stress relieving membrane over the cracks, as required, and installing pavement patches where necessary, in accordance with these specifications and as directed by the Resident Project Representative (RPR). The RPR shall determine location and type of all crack repairs to be completed under this item.

#### P-102-1.2 DEFINITIONS

Miscellaneous pavement repairs are defined as follows:

- a. **Type 1A Crack Repair - Fiber Modified Cracksealer.** Applying hot pumped asphalt crack sealer containing polyester modified fibers as shown on the Drawings for Type 1A crack filling on pavement to be overlaid.
- b. **Type 1B Crack Repair - Fiber Modified Cracksealer with Stress Absorbing Membrane.** Type 1B crack filling shall be prepared and filled using the same treatment as specified for Type 1A repair except the surface shall be primed and a 12-inch-wide stress absorbing membrane shall be installed over the crack sealer.
- c. **Type 1C Crack Repair - Stress Absorbing Membrane.** Type 1C Crack Repair consists of priming the surface and installing a stress absorbing membrane centered over a crack or joint of an existing trench or patch in areas to be overlaid.
- d. **Type 1D Crack Repair - Mill and Inlay Repair (LF).** Remove a 24" wide strip of pavement by milling. Shape, clean, dry and fill crack with crack sealer, install a 12-inch-wide stress absorbing membrane centered over the crack, tack coat bottom and sides of milled area and fill with bituminous concrete pavement surface course. Prime surface and apply stress-absorbing membrane around the perimeter of the patch.

### MATERIALS

**P-102-2.1 STRESS ABSORBING MEMBRANE.** Stress absorbing membrane shall conform to the following requirements:

Property		Value	Test Method
Thickness (mils)		75	ASTM D1777
Grab tensile (lbs)	(MD)	180	ASTM D1682

Elongation (%)	(MD)	85	ASTM D1682
	(XMD)	75	
Strip tensile (lbs/in)		60	ASTM D882 (modified)
Puncture resistance (lbs)		215	ASTM E154
Puncture resistance (lbs)		80	CW 022 Corps of Engineers
Permanence Perms		0.10	ASTM E96 Method B (maximum)
Pliability (1/4-inch mandrel)		No cracks in fabric	ASTM D146 (modified)
		or rubberized asphalt	
Peel adhesion (lbs/in) in 180 degree		3	PSTC angle without primer

Primer shall be compatible with membrane and shall be supplied by membrane manufacturer.

### **P-102-2.2 FIBER REINFORCED ASPHALT CRACK SEALER**

Fiber reinforced asphalt crack sealer materials shall be short-length polyester fibers having the following properties

Length	7 mm
Diameter	0.008 inch plus or minus 0.001 inch
Specific Gravity	1.32 to 1.40
Melt Temperature	480-degrees Fahrenheit minimum
Ignition Temperature	1000-degrees Fahrenheit minimum
Tensile Strength	75,000 PSI plus or minus 5,000 PSI
Break Elongation	33% plus or minus 9% they are fully drawn

Asphalt fiber compound shall be mixed at a rate of 6-8% fiber weight to weight asphalt cement. Asphalt cement shall be PG 64-28.

### **P-102-2.3 BITUMINOUS CONCRETE**

Bituminous concrete shall conform to Item P-401 Asphalt Mix Pavement of these Specifications.

### **P-102-2.4 TACK COAT**

Tack coat shall conform to the requirements described in Project Item P-603 of these Specifications.

## **CONSTRUCTION METHODS**

### **P-102-3.1 WEATHER LIMITATIONS**

No crack repair material shall be applied in wet cracks or where frost, snow or ice is present nor when ambient temperature is below 45° F.

### **P-102-3.2 TIME LIMITATIONS**

The Contractor shall schedule operations so that all crack filling and pavement repairs will be performed ahead of the paving operation and within the schedule identified in Division IIB of the Contract Documents and on the Phasing Drawings.

### **P-102-3.3 EQUIPMENT**

Equipment used in the performance of the work shall be as subject to the approval of the Engineer and maintained in first class working conditions at all times. Saws for sawcutting shall be capable of following the path of the crack to form a precise saw reservoir to provide structurally sound crack interfaces. Saws shall be capable of interchangeable diamond blades to readily adjust widths to field conditions or as directed by the RPR. No wet sawing method will be allowed.

Air compressor shall be portable and capable of furnishing not less than 100 cubic feet of air per minute at not less than 90 pounds per square inch pressure at the nozzle. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water.

Manually operated, gas powered, air-broom or self-propelled vacuum sweeper designed especially for use in cleaning highway pavements shall be used to remove debris, dirt and dust from routed cracks.

Hand tools shall consist of brooms, shovels, metal bars with chisel-shaped ends, and any other tools which may be satisfactorily used to accomplish the work.

The melting kettle used to melt the crack sealing compound shall be a double boiler, indirect fired type. The space between the inner and outer shells shall be filled with a suitable heat transfer oil or substitute having a flash point of not less than 600° F. The kettle shall be equipped with a satisfactory means of agitating the crack sealer at all times. This may be accomplished by continuous stirring with mechanically operated paddles and/or by a continuous circulating gear pump attached to the heating unit. The kettle shall be equipped with thermostatic control calibrated between 200 and 550° F (93 and 288°C).

Equipment for blowing clean, drying and rejuvenating sidewall of cracks shall be a propane torch unit which operates at 3000 °F . and gas velocity 3000 feet per second.

### **P-102-3.4 STRESS ABSORBING MEMBRANE**

Membrane shall be installed after crack filling or as specified herein and shown on the detailed drawings. The pavement surface shall be thoroughly cleaned and dried and shall be primed in

accordance with the manufacturer's instructions prior to placement of the membrane.

The primer will be placed on the surface at the rate specified by the manufacturer of the primer, it shall extend two inches wider than the membrane and will be allowed to dry until tack-free before applying the membrane. Sections, which are primed, shall be covered with membrane within the same day.

The membrane shall be centered over the crack or joint within a one-inch tolerance and shall extend 6" beyond the crack. Transverse cracks shall be sealed first in any area. The longitudinal cracks will be sealed after the transverse cracks. Laps will be permitted in both the transverse and longitudinal membrane with a minimum overlay of 3 inches.

The material shall be laid smooth, straight and wrinkle-free, with no uplifted edges. Any wrinkles over 3/8-inches in width shall be slit and folded down. After the membrane has been placed, the edges shall be sealed with a fiber modified crack sealing material and then shall be pressed against the asphalt surface by means of a hand roller or other suitable equipment to ensure proper bonding. Special attention should be given to ensure that the edges or corners of the strips are securely bonded to the surface. Any strips with loose edges or corners should be rebounded or replaced prior to placement of the overlay at the expense of the Contractor.

All membrane shall be surface dry before placement of the bituminous concrete patch or overlay.

#### **P-102-3.5 FILLING TYPE 1A CRACKS - FIBER MODIFIED CRACKSEALER**

Type 1A Cracks in areas to be overlaid or where directed by the Engineer shall be clean and dry before installing hot applied fiber reinforced crack sealer. All cracks shall be blown clean by high- pressure air. All loose material shall be removed from the cracks and from the pavement surfaces. The cracks shall be sterilized by use of propane torch to eliminate all vegetation, moisture and dirt.

No crack sealing material shall be applied in wet cracks or where frost, snow, or ice is present, or when the ambient temperature is below 40 ° F. Fiber modified crack sealing material shall be heated and applied at a temperature specified by the manufacturer and approved by the Engineer. Minimum application temperature shall be 320° F. Sealer shall be delivered to the pavement surface through a pressure hose line and applicator shoe.

All cracks shall be sealed as specified herein, and the sealer shall be well bonded to the pavement. Unless otherwise directed, the cracks shall be completely filled flush with the pavement, not more than 1/8 inch below surface, without formation of voids or trapped air. More than one application of crack sealer may be necessary to fill cracks to required level. When an over band of material is required, it shall be placed over the crack as shown on the Drawings.

Excess or spilled sealer shall be removed from the pavement by approved methods and discarded.

#### **P-102-3.6 FILLING TYPE 1B CRACKS - FIBER MODIFIED CRACKSEALER WITH STRESS ABSORBING MEMBRANE**

Type 1B cracks in areas to be overlaid shall be repaired using the same treatment as Type 1A

except the surface shall be primed and a 12-inch-wide stress absorbing membrane shall be installed over the cracks as specified in Paragraph 102-3.4.

#### **P-102-3.7 TYPE 1C CRACK REPAIR - STRESS ABSORBING MEMBRANE**

Type 1C crack repair in areas to be overlaid shall include installation of a stress absorbing membrane centered over the crack or joint of an existing trench or patch. The membrane shall be as specified in Paragraph 102-3.4.

#### **P-102-3.8 TYPE 1D CRACK REPAIR - MILL AND INLAY REPAIR (LF)**

Type 1D repair shall include removing the existing pavement to a minimum depth of 4-inches and a width of 24 inches symmetrical about the centerline of the crack by milling. Prepare and fill crack using Type 1B sealer and membrane treatment, tack coat bottom and sides of trench, place and compact bituminous concrete patch. Install stress-absorbing membrane as specified in Paragraph 102-3.4.

All excavated material shall be legally disposed of offsite. Locations of cracks to be repaired will be located in the field by the Engineer.

A bituminous concrete pavement patch will be installed and compacted to match the adjacent pavement grade. The tack coat and bituminous concrete patch shall conform to the requirements of Item P-603 Bituminous Tack Coat and Item P-401 Hot Mix Asphalt of these Specifications.

As directed by the RPR, a 12-inch-wide stress relieving membrane shall be installed over the perimeter of the trench patch extending 6 inches on either side of the joint. Cleaning of pavement surface, priming and installation of the membrane will be specified for in Paragraph 102-3.4 and as shown on the Drawings.

#### **P-102-3.9 SURFACE PREPARATION**

Milling and saw cutting, as required shall conform to the requirements of Item P-101, Surface Preparation of these Specifications.

#### **P-102-3.10 CERTIFICATIONS**

Manufacturer's certificates of all materials used shall be required.

### **METHOD OF MEASUREMENT**

**P-102-4.1** The quantity of Type 1A crack repair shall be measured by the gallon of fiber modified crack repair measured in place, completed, ready for overlay and accepted by the Engineer.

**P-102-4.2** The quantity of Type 1B, Type 1C and Type 1D crack repair will be measured by the linear feet of crack repair, of the type specified, measured in place, completed, ready for overlay and accepted by the Engineer.

**BASIS OF PAYMENT**

**P-102-5.1** Payment will be made at the contract unit price per gallon of fiber modified cracksealer for Crack Repair Type 1A. This price shall be full compensation for all cleaning and preparation, crack sealer, rolling, and for all materials, labor, equipment and incidentals necessary to complete the work.

**P-102-5.2** Payment will be made at the contract unit price per linear foot for Crack Repair Types 1B, 1C and 1D. This price shall be full compensation for all cleaning and preparation, milling (where required), crack sealer, primer, tack coat and bituminous patch (where required), membrane, rolling, and for all materials, labor, equipment and incidentals necessary to complete the work.

Payment will be made under:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
P-102.01	Type 1A Crack Repair _____	per Gallon
P-102.02	Type 1B Crack Repair _____	per Linear Foot
P-102.03	Type 1C Crack Repair _____	per Linear Foot
P-102.04	Type 1D Crack Repair _____	per Linear Foot

**END OF ITEM P-102**

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## ITEM P-152 EXCAVATION AND EMBANKMENT

### DESCRIPTION

**P-152-1.1** This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work.

Excavation and stockpile areas shall be treated as required to prevent the formation of dust. The use of calcium chloride shall not be used on the project. The Contractor shall control dust at all times during this Contract, including all work shifts, non-working hours, weekends and holidays. The Contractor shall submit a Dust Control Plan to the Engineer within thirty (30) days after Contract award, according to Division IIB, Article 45. The Plan shall include contact information of the Contractor's responsible individual(s), who has the authority to implement necessary controls and mitigative measures. The Plan shall detail dust control procedures for dust generating activities (e.g., jack hammering, saw-cutting concrete, haul roads, material storage, etc.). Fugitive dust shall be controlled through wetting, sweeping and other suppression techniques. Contractor shall maintain on-site water trucks. Trucks hauling materials and excavate shall be covered. Designated wash-down areas shall be established by the Contractor on site for the control of dust tracking from vehicles leaving the site. All trucks or other vehicles leaving the site shall be hosed and washed clean of mud clinging to the wheels.

**P-152-1.2 CLASSIFICATION.** All material excavated shall be classified as defined below:

- (a) **Unclassified Excavation.** Unclassified excavation shall consist of excavation and disposal of all material, regardless of its nature, which is not otherwise classified and paid for under the following items or noted as being incidental to other project items. Unclassified excavation includes the stockpiling, and disposal of all the excavated soil shall be handled in accordance with specifications, section G003.
- (b) **Overexcavation.** This excavation shall include any additional trench or subgrade excavation necessary for either preparing a suitable subgrade, placing structures or the laying of all utilities at the location shown on the drawings and/or as directed by the Engineer. Where a firm foundation for placing the subbase utility or utility structures is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and disposed of offsite. Depth of the unsuitable material excavation shall be as directed/approved by the Engineer. Backfill material shall be compacted to provide adequate support for the subbase, utility or utility structures.
- (c) **Bituminous Pavement Removal** shall be as defined in Contract Specification P-101 Surface Preparation.

### CONSTRUCTION METHODS

**P-152-2.1 GENERAL.** The suitability of material to be placed as subgrade or embankment material shall be subject to approval by the Engineer. All unsuitable excavated material shall be legally disposed by the contractor at his cost off the Airport site. Refer to Project Item G-003, Soil Management on the procedures associated with handling and possibly disposing of the soil material. All excess unclassified materials potentially to be used for the project shall be properly stockpiled by the Contractor at a temporary location on Airport as indicated on the plans, unless otherwise



directed by the Engineer, and any finally removed off the Airport site after final in place quantities have been achieved.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued. At the direction of the Engineer, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work. Those areas outside of the pavement areas in which the top layer of soil material has become compacted by hauling or other activities of the Contractor shall be scarified and disked to a depth of 4 inches in order to loosen and pulverize the soil.

Pavement cutting for sawed (butt) joints at the limits of pavement excavation shall be done with an approved saw. The existing pavement shall be sawed to its full depth at the locations shown on the plans and/or as directed/approved by the Engineer. Pavement cutting shall be considered incidental to the various project items.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the Engineer, who shall arrange for their removal if necessary. The Contractor shall, at his/her own expense, repair or pay the cost of all damage to such facilities or structures which may result from any of the Contractor's operations during the period of the contract. All repairs shall be subject to the approval of the Engineer.

Removal of above ground monitoring well appurtenances will be accomplished by cutting the existing appurtenances to an established elevation above ground approved by the RPR.

**P-152-2.2 EXCAVATION.** No excavation shall be started until the work has been staked out by the Contractor and the Engineer has obtained elevations and measurements of the ground surface. All suitable excavated material shall be approved by the Engineer for use in the formation of embankment, subgrade, or for other purposes shown on the plans. All unsuitable material shall be disposed of onsite as directed by the Engineer. When the volume of the excavation exceeds that required to construct the embankments to the grades indicated, the excess shall be used to grade the areas of ultimate development or disposed of as directed. When the volume of excavation is not sufficient for constructing the fill to the grades indicated, the deficiency shall be obtained from borrow areas. The grade shall be maintained so that the surface is well drained at all times. When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water, which may affect the work.

Before excavating the Contractor shall locate and mark on the pavement surface and in grass areas all existing underground utilities within the limits of the excavation with a cable tracer to the satisfaction of the Engineer. The Contractor shall provide/employ a utility locating service to perform this work. The Contractor shall hand dig and/or "vacuum" excavate near existing utilities to prevent any damage to them. The Contractor shall also Meggar the cable of the appropriate circuit in the field lighting vault (at the output of the regulator) to verify the integrity of the circuit before and after excavating. A copy of all Meggar readings shall be turned over to the Engineer prior to excavation. If damage does occur to the existing utilities verified by either a visual inspection or by the Meggar readings subsequent to work by the Contractor, the Contractor is

responsible to repair the damaged utility immediately and at his own expense. If there is no immediate emergency response to the repair, as determined by the Engineer, the Authority will impose a \$ 500 per hour fine on the Contractor for delaying the repair and compromising the safety of the airfield. For purposes of this paragraph “immediately” is a period of time less than ½ hour. No separate payment will be made for Meggaring of circuits. Utility Locating will be paid for in accordance with Division IIB. Refer to Division IIB, of these specifications for additional requirements/procedures to be taken prior to excavation and to repair damaged utilities.

All costs associated with de-watering the site during the installation of the pavement structures, utilities, and utility structures shall be considered incidental to the various project items.

The Contractor must provide adequate support of the walls of the excavation during the placement of the utilities, and utility structures. The Contractor is responsible for the design, installation, and maintenance of the excavation support during the life of the project. The support must comply with OSHA and all other applicable regulations.

- (a) **Undercutting.** Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation shall be removed to the depth indicated in the details and/or as directed by the Engineer. Unsuitable materials shall be disposed of offsite. This excavated material shall be paid for at the contract unit price per cubic yard for “Unclassified Excavation”. The excavated area shall be refilled with suitable material, obtained from the grading operations or borrow areas and thoroughly compacted by rolling. The necessary refilling will constitute a part of the embankment. Where rock cuts are made and refilled with selected material, any pockets created in the rock surface shall be permanently drained.
- (b) **Removal of Utilities.** The removal of existing structures and utilities which are abandoned or scheduled to be abandoned that are required to permit the orderly progress of work will be undertaken by the Contractor. All foundations thus excavated shall be backfilled with suitable material and compacted as specified herein.
- (c) **Compaction Requirements.** The subgrade shall be compacted to 100% proctor, in pavement areas and 95% in grass areas. In all other areas not to be paved the density requirement shall be determined by ASTM D 1557 and to the requirements stated on the plans. The in-place field density shall be determined in accordance with ASTM D 1556. In cuts, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line of finished grade of slope. All cut-and-fill slopes shall be uniformly dressed to the slope, cross section, and alignment shown on the plans or as directed by the Engineer.
- (d) **Blasting.** Blasting will not be permitted.
- (e) **Proof rolling.** After compaction is completed, the subgrade area shall be proof rolled with a vibratory pneumatic roller or other suitable equipment as approved by the Engineer. Proof rolling shall be completed in the presence of the Engineer. Apply a minimum coverage recommended by QC Technician, or as specified by the Engineer, to all paved areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch (25 mm) or show permanent deformation greater than 1 inch (25 mm) shall be removed and replaced

with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications.

**P-152-2.3 PREPARATION OF SUBGRADE (EMBANKMENT) AREA.** Where an embankment is to be constructed to a height of 4 feet (1.2 m) or less, all sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches (150 mm) and shall then be compacted as indicated in paragraph 152-2.2(c). When the height of fill is greater than 4 feet (1.2 m), sod not required to be removed shall be thoroughly disked and recompacted to the density of the surrounding ground before construction of embankment.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

**P-152-2.4 FORMATION OF SUBGRADE (EMBANKMENT).** Embankments shall be formed in successive horizontal layers of not more than 8 inches (200 mm) in loose depth for the full width of the cross-section, unless otherwise approved by the Engineer.

The layers shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the Engineer. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each layer shall be within  $\pm 2\%$  of optimum moisture content before rolling to obtain the prescribed compaction. To achieve a uniform moisture content throughout the layer, the material shall be moistened or aerated as necessary. Samples of all embankment materials for testing, both before and after placement and compaction, will be taken for each 1,000 SY of material placed. Based on these tests, the Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

Rolling operations shall be continued until the embankment is compacted to not less than 95% of maximum density as determined by ASTM D6938. Under all areas to be paved, the embankments shall be compacted to a density of not less than 100% of the maximum density as determined by ASTM D6938.

Compaction areas shall be kept separate, and no layer shall be covered by another layer until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each layer is placed. Layer placement shall begin in the deepest portion of the embankment fill. As placement progresses, the layers shall be constructed approximately parallel to the finished pavement grade line.

When rock and other embankment material are excavated at approximately the same time, the rock shall be incorporated into the outer portion of the embankment and the other material shall be incorporated under the future paved areas. Stones or fragmentary rock larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 6 inches (150 mm) of the subgrade. Rockfill shall be brought up in layers as specified or as directed by the Engineer and the finer material shall be used to fill the voids with forming a dense, compact mass. Rock or boulders shall not be disposed of outside the excavation or embankment areas, except at places and in the manner designated on the plans or by the Engineer.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in layers of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in layers not exceeding 2 feet (60 cm) in thickness. Each layer shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The layer shall not be constructed above an elevation 4 feet (1.2 m) below the finished subgrade.

**There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in layers, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation.**

**P-152-2.5 HAUL.** All hauling will be considered a necessary and incidental part of the work. Its cost shall be considered by the Contractor and included in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

**P-152-2.6 TOLERANCES.** In those areas upon which a subbase or base course is to be placed as indicated on the Plans, the top of the subgrade shall be of such smoothness that, when tested with a 16-foot straightedge applied parallel and at right angles to the centerline, it shall not show any deviation in excess of 1/2-inch, or shall not be more than 0.05-foot from true grade as established by grade hubs or pins. Any deviation in excess of these amounts shall be corrected by loosening, adding, or removing materials; reshaping; and recompacting by sprinkling and rolling.

In all other areas, the surface shall be of such smoothness that it will not vary more than 0.10 foot from true grade as established by grade hubs. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

No separate payment shall be made for any required reworking to meet tolerances.

**P-152-2.7 STRIPPINGS AND TOPSOIL.** Strippings and other materials which are unsuitable for subgrade construction shall be removed to the disposal area. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations where possible. The topsoil shall meet the requirements of Item T-905. If, at the time of excavation or stripping, the topsoil cannot be placed in its proper and final section of

finished construction, the material shall be stockpiled at locations approved by the Engineer. Stockpiles shall not be placed within 400 feet of a runway centerline or 160 feet of a taxiway centerline and shall not be placed on areas that subsequently will require any excavation or embankment. If, in the judgment of the Engineer, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further rehandling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as directed, or as required in Item T-905.

No direct payment will be made for topsoil as such under Item P-152. When stockpiling of topsoil and later re-handling of such material is directed by the Engineer, the material so re-handled shall be paid for at the contract unit price per square yard per Item T-905. There shall be no direct payment for re-handling of topsoil or strippings in order to place it in its final section of finished construction.

All hauling, stockpiling, grading and topsoil and seeding, associated with the on-site borrow/disposal area shall be incidental to the various excavation items or other project items from which excavated material is generated.

P-152-2.8 TESTING. During the course of the work, the Engineer will perform such tests as are required to identify materials, to determine compaction characteristics, to determine moisture content, and to determine density of subgrade in place. These tests performed by the Engineer will be used to verify that the embankments conform to the requirements of the specifications. Such tests are not intended to provide the Contractor with the information required by him/her for the proper execution of the work and their performance shall not relieve the Contractor of the necessity to perform tests for that purpose.

## **METHOD OF MEASUREMENT**

**P-152-3.1** Payment will be made at the contract unit price per cubic yard of unclassified excavation as well as any excavation associated with the removal of drainage structures and drainage pipes when directed by the RPR. The measurement of the quantity shall be based on actual measured or surveyed volume of the excavation and any drainage structures and drainage pipes structures shall be approved by the RPR prior to excavation. There is no separate payment for any other excavation and embankment and the furnishing, materials, labor, equipment, tools, and incidentals necessary to complete the item beyond drainage structures and drainage pipes structure removal at the direction of the RPR. No additional measurements will be made for stockpiled materials that is later placed as embankment or disposed of on-site.

**P-152-3.2** Offsite disposal of excavated material associated with excavation items, installation of utilities or utility structures will not be measured for payment under this item and shall be measured for payment under Item G-003.

**BASIS OF PAYMENT**

**P-152-4.1** Payment will be made at the contract unit price per cubic yard of unclassified excavation including drainage structure removal. This price shall be full compensation for all excavation and embankment and the furnishing, materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<b><u>ITEM</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>UNIT</u></b>
P-152.01	Unclassified Excavation_____	per Cubic Yard

**TESTING REQUIREMENTS**

ASTM D 698	Tests for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-pound Rammer and 12-inch Drop
ASTM D 1556	Test for Density of Soil In-Place by the Sand Cone Method
ASTM D 1557	Tests for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 10-pound Rammer and 18-inch Drop
ASTM D 2167	Test for Density of Soil In-Place by the Rubber Balloon Method.
ASTM D 6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

**END OF ITEM P-152**

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## ITEM P-154 SUBBASE COURSE

### DESCRIPTION

**154-1.1** This item shall consist of a subbase course composed of granular materials constructed on a prepared subgrade or underlying course in accordance with these specifications, and in conformity with the dimensions and typical cross-section shown on the plans.

### MATERIALS

**154-2.1 Materials.** The subbase material shall consist of hard durable particles or fragments of granular aggregates and recycled asphalt pavement (RAP) limited to maximum 30%. The material may be obtained from gravel pits, stockpiles, or may be produced from a crushing and screening plant with proper blending. The materials from these sources shall meet the requirements for gradation, quality, and consistency. The material shall be free from vegetative matter, excessive amounts of clay, and other objectionable substances; uniformly blended; and be capable of being compacted into a dense, stable subbase. Recycled materials should be used, where practicable, and percent of recycled materials used should be tracked.

The subbase material shall exhibit a California Bearing Ratio (CBR) value of at least 20 when tested in accordance with ASTM D1883. The subbase material shall meet the gradation specified in the table below.

### Subbase Gradation Requirements

Sieve designation	Percentage by weight passing sieves		Contractor's Final Gradation	Job Control Grading Band Tolerances <sup>1</sup> (Percent)
	Subbase Aggregate	Recycled pavement (RAP)		
3 inch (75 mm)	100		To be submitted by Contractor after contract award.	0
1 1/2 inch (37.5 mm)		100		0
3/4 inch (19.0 mm)	70-100	70-100		±10
No. 10 (2.00 mm)	20-100	20-100		±10
No. 40 (425 µm)	5-60	5-60		±5
No. 200 (75 µm)	0-10	0-10		±5

<sup>1</sup>The "Job Control Grading Band Tolerances" shall be applied to "Contractor's Final Gradation" to establish the job control grading band.



The portion of the material passing the No. 40 (425 μm) sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than six (6) when tested in accordance with ASTM D4318.

#### **154-2.2 Sampling and Testing.**

**a. Aggregate Base Materials.** Samples shall be taken by the Contractor per ASTM D75 for initial aggregate subbase requirements and gradation. Material shall meet the requirements in paragraphs 154-

2.1. The Contractor shall submit to the Resident Project Representative (RPR) certified test results showing that the aggregate meets the Material requirements of this section. Tests shall be representative of the material to be used for the project.

**b. Gradation Requirements.** The Contractor shall take at least one aggregate subbase sample per day in the presence of the RPR to check the final gradation. Samples shall be taken from the in-place, un- compacted material at sampling locations determined by the RPR on a random basis per ASTM D3665. Sampling shall be per ASTM D75 and tested per ASTM C136 and ASTM C117. Results shall be furnished to the RPR by the Contractor each day during construction. Material shall meet the requirements in paragraph 154-2.1.

**154-2.3 Separation Geotextile.** Separation geotextile shall be Class 2 ; 0.02 sec<sup>-1</sup> permittivity per ASTM D4491; Apparent opening size per ASTM D4751 with 0.60 mm maximum average roll value.

**154-2.4 Geogrid** The Geogrid shall be designed by a Geotechnical Engineer licensed in the Commonwealth of Massachusetts as a subcontractor to the Contractor. Acceptance will be based on ASTM D4759 and the following:

- a. Materials.** The geogrid shall conform to the Massachusetts Department of Transportation standards and the supplier's standards. The soil reinforcement shall be manufactured from high density polyethylene (HDPE) uniaxial, polypropylene (PP) biaxial resins, or high tenacity polyester (PET) fibers that can develop the Long-Term Allowable Strength and Pullout Resistance required per the Contractors approved design. The soil reinforcement shall be stored between -20 and 140 degrees F (-29 and 60 degrees C). The following standards shall be used to determine the soil reinforcement design properties:

ASTM D 638 Tensile Properties of  
Plastic ASTM D 1238 Melt Flow  
(HDPE and PP) ASTM D 1248  
Molding and Extrusion (HDPE)  
ASTM D 1505 Specific Gravity  
(HDPE) ASTM D 4218 Carbon  
Black Content (HDPE) ASTM D  
2455 Carboxyl End Group (PET)  
ASTM D 4603 Intrinsic Viscosity

(PET)

ASTM D 5262 Unconfined tension Creep Behavior of  
Geosynthetics GRI:GG1 Geogrid Rib Tensile Strength  
GRI:GG2 Geogrid Junction Strength  
GRI:GG4 Long Term Design Strength  
of Geogrid GRI:GG5 Evaluating  
Geogrid Pullout Behavior

- b. Design Criteria.** The design shall provide the minimum factors of safety using the soil reinforcement Long-Term Allowable Strength (T<sub>al</sub>) and Pullout Resistance, for the subbase. The Long-Term Allowable Strength shall be calculated using the following minimum reduction factors: For Polyester Geogrids minimum reduction factors are:

Creep – 1.6 reduction factor minimum or per manufacturer’s recommendations, whichever is greater

Installation Damage – 1.3 reduction factor minimum or per manufacturer’s recommendations, whichever is greater

Durability – 1.3 reduction factor minimum or per manufacturer’s recommendations, whichever is greater

The total reduction factor shall not be lower than 2.704 For HDPE Geogrids

minimum reduction factors are:

Creep – 2.6 reduction factor minimum or per manufacturer’s recommendations, whichever is greater

Installation Damage – 1.1 reduction factor minimum or per manufacturer’s recommendations, whichever is greater

Durability – 1.1 reduction factor minimum or per manufacturer’s recommendations, whichever is greater

The total reduction factor shall not be lower than 3.146

The design of the soil reinforcing system shall account for the strength reduction due to long-term creep, chemical and biological degradation, stage construction issues, and installation damage and shall insure stress levels are above the allowable at the end of a 75-year design life.

The soil reinforcement coefficient of interaction and mechanical interlock with the subbase material shall be selected and documented with appropriate test data. The soil reinforcement shall be dimensionally stable and able to retain its geometry under construction stresses and have high resistance to damage during installation considering ultraviolet degradation and all forms of chemical and biological degradation encountered in the subbase.

Splices shall consist of a standard method or device recommended by the manufacturer of the geogrid. Splices will not be allowed unless identified on the approved layout drawings.

Splices shall be at least 75 percent efficient. Demonstrate the splice efficiency through tests performed in accordance with GSI GRI GG4a or GSI GRI GG4b. Splicing may consist of overlaps, fusion wedge welding, sewing, or bodkin connections. Splicing methods that are dependent on installer experience and skill level, such as hot air and torch-applied open flame, are not acceptable. Construct overlap splices by placing a minimum of 50 mm 2 inches of soil between the layers of geogrid.

## CONSTRUCTION METHODS

**154-3.1 General.** The subbase course shall be placed where designated on the plans or as directed by the RPR. The material shall be shaped and thoroughly compacted within the tolerances specified.

Granular subbases which, due to grain sizes or shapes, are not sufficiently stable to support the construction equipment without movement, shall be mechanically modified to the depth necessary to provide stability as directed by the RPR. The mechanical modification shall include the addition of a fine- grained medium to bind the particles of the subbase material sufficiently to furnish a bearing strength, so the course will not deform under construction equipment traffic.

**154-3.2 Preparing Underlying Course.** Prior to constructing the subbase course, clean the underlying course or subgrade of all foreign substances. The surface of the underlying course or subgrade shall meet specified compaction and surface tolerances in accordance with Item P-152. Correct ruts, soft yielding spots in the underlying courses, and subgrade areas having inadequate compaction and/or deviations of the surface from the specified requirements, by loosening and removing soft or unsatisfactory material, adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses or subgrades containing sands or gravels, as defined in ASTM D2487, the surface shall be stabilized prior to placement of the overlying course by mixing the overlying course material into the underlying course and compacting by approved methods. The stabilized material shall be considered as part of the underlying course and shall meet all requirements for the underlying course. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained in a satisfactory condition until the overlying course is placed. The underlying course shall be checked and accepted by the RPR before placing and spreading operations are started.

To protect the subgrade and to ensure proper drainage, spreading of the subbase shall begin along the centerline of the pavement on a crowned section or on the high side of pavements with a one-way slope.

**154-3.3 Control Strip.** The first half-day of subbase construction shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment, and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full

production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

**154-3.4 Placement.** The material shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material.

Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted. The material shall not be placed when the underlying course is soft or yielding.

The material shall meet gradation and moisture requirements prior to compaction. Material may be free-draining and the minimum moisture content shall be established for placement and compaction of the material.

The material shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

**154-3.5 Compaction.** The subbase material shall be compacted, adjusting moisture as necessary, to be within  $\pm 2\%$  of optimum moisture. The field density of the compacted material shall be at least 100% of the maximum density as specified in paragraph 154-3.9a. If the specified density is not attained, the area of the lift represented by the test shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

**154-3.6 Weather Limitation.** Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on subbase course shall not be conducted when the subgrade is wet or frozen or the subbase material contains frozen material.

**154-3.7 Maintenance.** No base or surface course shall be placed on the subbase until the subbase has been accepted by the RPR. The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, the Contractor shall verify that materials still meet all specification requirements before placement of additional material. Equipment may be routed over completed sections of subbase course, provided the equipment does not damage the subbase course and the equipment is routed over the full width of the completed subbase course. Any damage to the subbase course from routing equipment over the subbase course shall be repaired by

the Contractor at their expense.

**154-3.8 Surface Tolerance.** In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

**a. Smoothness.** The finished surface shall not vary more than +/- ½ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

**b. Grade.** The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +/-0.05 feet (15 mm) of the specified grade.

**154-3.9 Acceptance Sampling and Testing.** The aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1200 square yards (1000 square meters). Sampling locations will be determined on a random basis per ASTM D3665.

**a. Density.** The RPR shall perform quality assurance (QA) density tests for acceptance.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D1557. The in-place field density shall be determined per ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test shall be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

When the material has greater than 30 percent retained on the ¾ inch (19.0 mm) sieve, use methods in ASTM D1557 and the procedures in AASHTO T180 Annex for correction of maximum dry density and optimum moisture for oversized particles.

**b. Thickness.** The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness as determined by survey. Survey shots will be taken by the Contractor at the same interval and same location (25-foot grid) as the spot grade elevation locations shown on the grading plan as indicated in the contract drawings. Surveyed grades shall be provided to the Engineer on a plan prepared by the Contractor as a submittal for review. Where the thickness is deficient by more than 1/2- inch (12 mm), the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompacted to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

**154-3.10 Installation of Separation Geotextile and Geogrid.** Installation of separation

geotextile and geogrid shall be in strict accordance with manufacturer's installation instructions.

### **METHOD OF MEASUREMENT**

**154-4.1** Subbase course shall be measured by the number of cubic yards (cubic meters) of subbase course material placed and compacted to specified density and plan thickness requirements in the completed course. The quantity of subbase course material shall be measured in final position based upon survey of the completed work computed from elevations to the nearest 0.01 foot (3 mm). On individual depth measurements, thicknesses more than 1/2 inch (12 mm) in excess of that shown on the plans shall be considered as the specified thickness plus 1/2 inch (12 mm) in computing the yardage for payment. Measurement of subbase materials included in other excavation and backfill quantities shall be considered incidental to the related item.

### **BASIS OF PAYMENT**

**154-5.1** Payment shall be made at the contract unit price per cubic yard (cubic meter) for subbase course. This price shall be full compensation for furnishing all materials; for all preparation, hauling, and placing of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

P-154.01      Subbase Course \_\_\_\_\_ per Cubic Yard

### **REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C117	Standard Test Method for Materials Finer than 75- $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft <sup>3</sup> (600 kN-m/m <sup>3</sup> ))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000

	ft-lbf/ft <sup>3</sup> (2,700 kN-m/m <sup>3</sup> )
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D4253	Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
ASTM D4759	Practice for Determining the Specification Conformance of Geosynthetics
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
	American Association of State Highway and Transportation Officials
(AASHTO) M 288	Geotextile Specification for Highway Applications

**END OF ITEM P-154**

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## **ITEM P-209 CRUSHED AGGREGATE BASE COURSE**

### **DESCRIPTION**

**209-1.1** This item consists of a base course composed of crushed aggregate base constructed on a prepared course in accordance with these specifications and in conformity to the dimensions and typical cross-sections shown on the plans.

### **MATERIALS**

**209-2.1 Crushed aggregate base.** Crushed aggregate shall consist of clean, sound, durable particles of crushed stone, crushed gravel, and shall be free from coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as consistent and uniform as practicable. Fine aggregate portion, defined as the portion passing the No. 4 (4.75 mm) sieve shall consist of fines from the coarse aggregate crushing operation. The fine aggregate shall be produced by crushing stone, gravel, that meet the coarse aggregate requirements for wear and soundness. Aggregate base material requirements are listed in the following table.

### Crushed Aggregate Base Material Requirements

Material Test	Requirement	Standard
<b>Coarse Aggregate</b>		
Resistance to Degradation	Loss: 45% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Percentage of Fractured Particles	Minimum 90% by weight of particles with at least two fractured faces and 98% with at least one fractured face <sup>1</sup>	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles <sup>2</sup>	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
<b>Fine Aggregate</b>		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

<sup>1</sup> The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

<sup>2</sup> A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

**209-2.2 Gradation requirements.** The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136. The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

### Gradation of Aggregate Base

Sieve Size	Design Range Percentage by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances <sup>1</sup> (Percent)
2 inch (50 mm)	100		0
1-1/2 inch (37.5 mm)	95-100		±5
1 inch (25.0 mm)	70-95		±8
3/4 inch (19.0 mm)	55-85		±8
No. 4 (4.75 mm)	30-60		±8
No. 40 <sup>2</sup> (425 µm)	10-30		±5
No. 200 <sup>2</sup> (75 µm)	0-5		±3

<sup>1</sup> The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

<sup>2</sup> The fraction of material passing the No 200 (75 µm) sieve shall not exceed two-thirds the fraction passing the No 40 (425 µm) sieve.

#### 209-2.3 Sampling and Testing.

**a. Aggregate base materials.** The Contractor shall take samples of the aggregate base in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraph 209-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

**b. Gradation requirements.** The Contractor shall take at least two aggregate base samples per day in the presence of the Resident Project Representative (RPR) to check the final gradation. Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 209-2.2. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the RPR.

### CONSTRUCTION METHODS

**209-3.1 Control strip.** The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved by the RPR.

**209-3.2 Preparing underlying subgrade and/or subbase.** The underlying subgrade and/or subbase shall be checked and accepted by the RPR before base course placing and spreading operations begin. Re-proof rolling of the subgrade or proof rolling of the subbase in accordance with Item P-152, at the Contractor's expense, may be required by the RPR if the Contractor fails to ensure proper drainage or protect the subgrade and/or subbase. Any ruts or soft, yielding areas due to improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

**209-3.3 Production.** The aggregate shall be uniformly blended and, when at a satisfactory moisture content per paragraph 209-3.5, the approved material may be transported directly to the placement.

**209-3.4 Placement.** The aggregate shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

**209-3.5 Compaction.** Immediately after completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the base material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D1557. The moisture content of the material during placing operations shall be within  $\pm 2$  percentage points of the optimum moisture content as determined by ASTM D1557. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

**209-3.6 Weather limitations.** Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

**209-3.7 Maintenance.** The base course shall be maintained in a condition that will meet all

specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at the Contractor's expense.

**209-3.8 Surface tolerances.** After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and recompact to grade until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

**a. Smoothness.** The finished surface shall not vary more than 3/8-inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

**b. Grade.** The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +0 and -1/2 inch (12 mm) of the specified grade.

**209-3.9 Acceptance sampling and testing.** Crushed aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1200 square yds (1000 m<sup>2</sup>). Sampling locations will be determined on a random basis per ASTM D3665

**a. Density.** The RPR shall perform Quality Assurance (QA) density tests for acceptance. Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D1557. The in-place field density shall be determined per ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompact and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

**b. Thickness.** The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness as determined by survey. Survey shots will be taken by the Contractor at the same interval and same location (25-foot grid) as the spot grade elevation locations shown on the grading plan as indicated in the contract drawings. Surveyed grades shall be provided to the Engineer on a plan prepared by the Contractor as a submittal for review. Where the thickness is deficient by more than 1/2- inch (12 mm), the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompact to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

### **METHOD OF MEASUREMENT**

**209-4.1** The quantity of crushed aggregate base course will be determined by measurement of the number of cubic yards of material constructed and accepted by the RPR as complying with the plans and specifications. Base materials shall not be included in any other excavation quantities.

### **BASIS OF PAYMENT**

**209-5.1** Payment shall be made at the contract unit price per cubic yard for crushed aggregate base course. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-209.01	Crushed Aggregate Base Course	per Cubic Yard
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## REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117 Sieve in	Standard Test Method for Materials Finer than 75- $\mu\text{m}$ (No. 200) Mineral Aggregates by Washing
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft <sup>3</sup> (600 kN-m/m <sup>3</sup> ))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft <sup>3</sup> (2700 kN-m/m <sup>3</sup> ))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction
Materials ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4643	Standard Test Method for Determination of Water Content of

	Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine- Grained Soils Using the Sedimentation (Hydrometer) Analysis
American Association of State Highway and Transportation Officials (AASHTO)	
M288	Standard Specification for Geosynthetic specification for Highway Applications

**END OF ITEM P-209**



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**ITEM P-401  
ASPHALT MIX PAVEMENT**

**DESCRIPTION**

**P-401-1.1** This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared base or stabilized course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

**MATERIALS**

**P-401-2.1 AGGREGATE.** Aggregates shall consist of crushed stone, crushed gravel, screenings, natural sand, and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 (4.75 mm) sieve. Fine aggregate is the material passing the No. 4 (4.75 mm) sieve.

**a. Coarse aggregate.** Coarse aggregate shall consist of sound, tough, durable particles, free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Coarse aggregate material requirements are given in the table below.

**Coarse Aggregate Material Requirements**

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Percentage of Fractured Particles	Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face <sup>1</sup>	ASTM D5821
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 <sup>2</sup>	ASTM D4791

<sup>1</sup> The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

<sup>2</sup> A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

**b. Fine aggregate.** Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, or gravel and shall be free from coatings of clay, silt, or other objectionable matter. Natural (non-manufactured) sand may be used to obtain the gradation of the fine aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table below.

**Fine Aggregate Material Requirements**

Material Test	Requirement	Standard
Liquid limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419

**c. Sampling.** ASTM D75 shall be used in sampling coarse and fine aggregate.

**P-401-2.2 MINERAL FILLER.** Mineral filler (baghouse fines) may be added in addition to material naturally present in the aggregate. Mineral filler shall meet the requirements of ASTM D242.

**Mineral Filler Requirements**

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ASTM D4318

**P-401-2.3 ASPHALT BINDER.** Asphalt binder shall conform to ASTM D6373 **Performance Grade (PG) 76-28**. The suppliers certified test report with test data indicating grade certification for the asphalt binder shall be provided to the Engineer for each load at the time of delivery to the mix plant. A certified test report with test data indicating grade certification for the asphalt binder shall also be provided to the Engineer for any modification of the asphalt binder after delivery to the mix plant and before use in the HMA.

**Asphalt Binder PG Plus Test Requirements**

Material Test	Requirement	Standard
Elastic Recovery	75% minimum	ASTM D6084 <sup>1</sup>

<sup>1</sup> Follow procedure B on RTFO aged binder

**P-401-2.4 ANTI-STRIPPING AGENT.** Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the Department of Transportation of the State in which the project is located. The Contractor is required to provide sufficient quantities of hydrated lime to be used in the preparation of the asphalt mix to act as the antistripping agent. The lime must be incorporated into the mix at a minimum of 1.0% by aggregate weight in the mix. The Contractor shall determine the exact percentage of hydrated lime based on their Job Mix Formula.

## **COMPOSITION**

**P-401-3.1 COMPOSITION OF MIXTURE(S).** The asphalt mix shall be composed of a mixture of aggregates, filler and anti-strip agent if required, and asphalt binder. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

**P-401-3.2 JOB MIX FORMULA (JMF) LABORATORY.** The laboratory used to develop the JMF shall possess a current certificate of accreditation, listing D3666 from a national accrediting authority and all test methods required for developing the JMF; and be listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Resident Project Representative (RPR) prior to start of construction.

**P-401-3.3 JOB MIX FORMULA (JMF).** No asphalt mixture shall be placed until an acceptable mix design has been submitted to the RPR for review and accepted in writing. The RPR's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

When the project requires asphalt mixtures of differing aggregate gradations and/or binders, a separate JMF shall be submitted for each mix. Add anti-stripping agent to meet tensile strength requirements.

The JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 401-3.2. The asphalt mixture shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition. Samples shall be prepared and compacted using the gyratory compactor in accordance with ASTM D6925.

Should a change in sources of materials be made, a new JMF must be submitted to the RPR for review and accepted in writing before the new material is used. After the initial production JMF has been approved by the RPR and a new or modified JMF is required for whatever reason, the subsequent cost of the new or modified JMF, including a new control strip when required by the RPR, will be borne by the Contractor.

The RPR may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications. 401-3.3 Reclaimed asphalt pavement (RAP). RAP shall not be used.

The JMF shall be submitted in writing by the Contractor at least 30 days prior to the start of paving operations. The JMF shall be developed within the same construction season using aggregates proposed for project use.

The JMF shall be dated, and stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items as a minimum:

- Manufacturer's Certificate of Analysis (COA) for the asphalt binder used in the JMF in accordance with paragraph 401-2.3. Certificate of asphalt performance grade is with modifier already added, if used and must indicate compliance with ASTM D6373. For plant modified asphalt binder, certified test report indicating grade certification of modified asphalt binder.
- Manufacturer's Certificate of Analysis (COA) for the anti-stripping agent if used in the JMF in accordance with paragraph 401-2.4.
- Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 401-2.1.
- Percent passing each sieve size for individual gradation of each aggregate cold feed and/or hot bin; percent by weight of each cold feed and/or hot bin used; and the total combined gradation in the JMF.
- Specific Gravity and absorption of each coarse and fine aggregate.
- Percent natural sand.
- Percent fractured faces.
- Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).
- Percent of asphalt.
- Number of blows or gyrations
- Laboratory mixing and compaction temperatures.
- Supplier-recommended field mixing and compaction temperatures.
- Plot of the combined gradation on a 0.45 power gradation curve.
- Graphical plots of air voids, voids in the mineral aggregate (VMA), and unit weight versus asphalt content. To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.
- Tensile Strength Ratio (TSR).
- Amount of Anti-strip agent (Hydrated lime) used.
- Asphalt Pavement Analyzer (APA) results.
- Date the JMF was developed. Mix designs that are not dated, or which are from a prior construction season shall not be accepted.

**Table 1. Asphalt Design Criteria**

<b>Test Property</b>	<b>Value</b>	<b>Test Method</b>
Number of blows or gyrations	75	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
Tensile Strength Ratio (TSR) <sup>1</sup>	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA) <sup>2</sup>	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

<sup>1</sup> Test specimens for TSR shall be compacted at  $7 \pm 1.0$  % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

<sup>2</sup> AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply; be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

**Table 2. Aggregate - Asphalt Pavements**

Sieve Size	Percentage by Weight Passing Sieves	
	Gradation 1 (Base Course)	Gradation 2 (Surface Course)
1 inch (25.0 mm)	100	--
3/4 inch (19.0 mm)	90-100	100
1/2 inch (12.5 mm)	68-88	90-100
3/8 inch (9.5 mm)	60-82	72-88
No. 4 (4.75 mm)	45-67	53-73
No. 8 (2.36 mm)	32-54	38-60
No. 16 (1.18 mm)	22-44	26-48
No. 30 (600 µm)	15-35	18-38
No. 50 (300 µm)	9-25	11-27
No. 100 (150 µm)	6-18	6-18
No. 200 (75 µm)	3-6	3-6
<b>Minimum Voids in Mineral Aggregate (VMA) <sup>1</sup></b>	14.0	15.0
Asphalt Percent:		
Stone or gravel	4.5-7.0	5.0-7.5
Slag	5.0-7.5	6.5-9.5
<b>Recommended Minimum Construction Lift Thickness</b>	3 inch	2 inch

<sup>1</sup>To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

**P-401-3.4 RECLAIMED ASPHALT PAVEMENT (RAP).** RAP shall not be used.

**P-401-3.5 CONTROL STRIP.** Full production shall not begin until an acceptable control strip has been constructed and accepted in writing by the RPR. The Contractor shall prepare and place a quantity of asphalt according to the JMF. The underlying grade or pavement structure upon which the control strip is to be constructed shall be the same as the remainder of the course represented by the control strip.

The Contractor will not be allowed to place the control strip until the Contractor quality control program (CQCP), showing conformance with the requirements of paragraph 401-5.1, has been accepted, in writing, by the RPR.

The control strip will consist of at least 250 tons (227 metric tons) or 1/2 subplot, whichever is greater. The control strip shall be placed in two lanes of the same width and depth to be used in production with a longitudinal cold joint. The cold joint must be cut back in accordance with paragraph 401-4.14 using the same procedure that will be used during production. The cold joint for the control strip will be an exposed construction joint at least four (4) hours old or when the mat has cooled to less than 160°F (71°C). The equipment used in construction of the control strip shall be the same type, configuration and weight to be used on the project.

The control strip will be considered acceptable by the RPR if the gradation, asphalt content, and VMA are within the action limits specified in paragraph 401-5.5a; and Mat density, air voids, and joint density meet the requirements specified in paragraphs 401-6.2.

If the control strip is unacceptable, necessary adjustments to the JMF, plant operation, placing procedures, and/or rolling procedures shall be made and another control strip shall be placed. Unacceptable control strips shall be removed at the Contractor's expense.

Payment will only be made for an acceptable control strip in accordance with paragraph 401-8.1 using a lot pay factor equal to 100.

*If more than one test section is required due to multiple paving sub-contractors and/or multiple paving crews and/or paving equipment, then the Contractor shall be prepared to perform all required test strips during the same work shift as approved/directed by the Engineer.*

*Any ancillary work (i.e. milling, saw-cutting, sealing, crack repair, etc.) associated with the initial test section, whether acceptable or unacceptable, and any subsequent acceptable test sections shall be measured and paid for at their respective Contract unit prices. Any ancillary work associated with additional unacceptable test sections shall be performed at the Contractor's expense. Contractor should anticipate that the test section(s) will be located within the limits of work and that ancillary airfield support will be required (i.e. escorts, barricades, cones, signage, etc.). There will be no additional compensation for providing these items, they are considered incidental to the various contract bid items.*

**P-401-3.6** Contractor shall submit Environmental Product Declaration for Final Product. Refer to Contract Specification G-007 for additional information.

## CONSTRUCTION METHODS

**P-401-4.1 WEATHER LIMITATIONS.** The asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the RPR, if requested; however, all other requirements including compaction shall be met.



**Table 4. Surface Temperature Limitations of Underlying Course**

Mat Thickness	Base Temperature (Minimum)	
	°F	°C
3 inches (7.5 cm) or greater	40	4
Greater than 2 inches (50 mm) but less than 3 inches (7.5 cm)	45	7

**P-401-4.2 ASPHALT PLANT.** Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items.

Requirements for all plants include:

**a. Inspection of plan.** The RPR, or RPR’s authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.

**b. Storage bins and surge bins.** The asphalt mixture stored in storage and/or surge bins shall meet the same requirements as asphalt mixture loaded directly into trucks. Asphalt mixture shall not be stored in storage and/or surge bins for a period greater than twelve (12) hours. If the RPR determines there is an excessive heat loss, segregation, or oxidation of the asphalt mixture due to temporary storage, temporary storage shall not be allowed.

**P-401-4.3 AGGREGATE STOCKPILE MANAGEMENT.** Aggregate stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the asphalt batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

A continuous supply of materials shall be provided to the work to ensure continuous placement.

**P-401-4.4 HAULING EQUIPMENT.** Trucks used for hauling asphalt shall have tight, clean, and smooth metal beds. To prevent the asphalt from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the RPR. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

**P-401-4.4.1 MATERIAL TRANSFER VEHICLE (MTV).** Material transfer vehicles used to transfer the material from the hauling equipment to the paver, shall use a self-propelled, material transfer vehicle with a swing conveyor that can deliver material to the paver without making contact with the paver. The MTV shall be able to move back and forth between the hauling equipment and the paver providing material transfer to the paver, while allowing the paver to operate at a constant speed. The Material Transfer Vehicle will have remixing and storage capability to prevent physical and thermal segregation.

**P-401-4.5 ASPHALT PAVERS.** Asphalt pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of asphalt that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The asphalt paver shall be equipped with a control system capable of automatically maintaining the specified screed grade and elevation. The asphalt paver shall be capable of paving to a minimum width as specified in P-401-4.12.

If the spreading and finishing equipment in use leaves tracks or indented areas or produces other blemishes in the pavement that are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued.

**P-401-4.6 ROLLERS.** The number, type, and weight of rollers shall be sufficient to compact the asphalt to the required density while it is still in a workable condition without crushing of the aggregate, depressions or other damage to the pavement surface. Rollers shall be in good condition, clean, and capable of operating at slow speeds to avoid displacement of the asphalt. All rollers shall be specifically designed and suitable for compacting asphalt concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used.

**P-401-4.7. DENSITY DEVICE.** The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall supply a qualified technician during all paving operations to calibrate the gauge and obtain accurate density readings for all new asphalt. These densities shall be supplied to the RPR upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

**P-401-4.8 PREPARATION OF ASPHALT BINDER.** The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt binder to the mixer at a uniform temperature. The temperature of unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles but shall not exceed 325°F (160°C) when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F (175°C) when added to the aggregate.

**P-401-4.9 PREPARATION OF MINERAL AGGREGATE.** The aggregate for the asphalt shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F (175°C) when the asphalt binder is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

**P-401-4.10 PREPARATION OF ASPHALT MIXTURE.** The aggregates and the asphalt binder shall be weighed or metered and mixed in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each

type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all asphalt upon discharge shall not exceed 0.5%.

**P-401-4.11 APPLICATION OF TACK COAT.** Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris. A tack coat shall be applied in accordance with Item P-603 to all vertical and horizontal asphalt and concrete surfaces prior to placement of the first and each subsequent lift of asphalt mixture

**P-401-4.12 LAYDOWN PLAN, TRANSPORTING, PLACING, AND FINISHING.** Prior to the placement of the asphalt, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width to minimize the number of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the RPR.

Deliveries shall be scheduled so that placing and compacting of asphalt is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to approximately ambient temperature. The Contractor, at their expense, shall be responsible for repair of any damage to the pavement caused by hauling operations.

Contractor shall survey each lift of asphalt surface course and certify to RPR that every lot of each lift meets the grade tolerances of paragraph 401-6.2d before the next lift can be placed.

Edges of existing asphalt pavement abutting the new work shall be saw cut and the cut off material and laitance removed. Apply a tack coat in accordance with P-603 before new asphalt material is placed against it.

The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Placement of the asphalt mix shall begin along the centerline of a crowned section or on the high side of areas with a one-way slope unless shown otherwise on the laydown plan as accepted by the RPR. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of 12.5 feet (3.8 m) except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least one foot (30 cm); however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet (3 m) from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet (3 m). On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the asphalt may be spread and luted by hand tools.

The RPR may at any time, reject any batch of asphalt, on the truck or placed in the mat, which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or overheated asphalt mixture. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of

the rejected material in the presence of the RPR, and if it can be demonstrated in the laboratory, in the presence of the RPR, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

Areas of segregation in the surface course, as determined by the RPR, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of the construction lift thickness as specified in paragraph 401-3.3, Table 2 for the approved mix design. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet (3 m) long.

**P-401-4.13 COMPACTION OF ASPHALT MIXTURE.** After placing, the asphalt mixture shall be thoroughly and uniformly compacted by self-propelled rollers. The surface shall be compacted as soon as possible when the asphalt has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any surface defects and/or displacement occurring as a result of the roller, or from any other cause, shall be corrected at the Contractor's expense.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross-section, and the required field density is obtained. To prevent adhesion of the asphalt to the roller, the wheels shall be equipped with a scraper and kept moistened with water as necessary.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power tampers.

Any asphalt that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

**P-401-4.14 JOINTS.** The formation of all joints shall be made to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid asphalt except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh asphalt against the joint.

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F (80°C); or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches (75 mm) to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project. Asphalt tack coat in accordance with P-603 shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint. The cost of this work shall be considered incidental to the cost of the asphalt.

The Contractor may provide additional joint density quality control by use of joint heaters at the Contractor's expense. Electrically powered infrared heating equipment should consist of one or more low-level radiant energy heaters to uniformly heat and soften the pavement joints. The heaters should be configured to uniformly heat an area up to 18 inches (0.5 m) in width and 3 inches (75 mm) in depth. Infrared equipment shall be thermostatically controlled to provide a uniform, consistent temperature increase throughout the layer being heated up to a maximum temperature range of 200 to 300°F (93 to 150°C).

Propane powered infrared heating equipment shall be attached to the paving machine and the output of infrared energy shall be in the one to six micron range. Converters shall be arranged end to end directly over the joint to be heated in sufficient numbers to continuously produce, when in operation, a minimum of 240,000 BTU per hour. The joint heater shall be positioned not more than one inch (25 mm) above the pavement to be heated and in front of the paver screed and shall be fully adjustable. Heaters will be required to be in operation at all times.

The heaters shall be operated so they do not produce excessive heat when the units pass over new or previously paved material.

**P-401-4.15 SAW-CUT GROOVING.** Saw cut grooves shall be provided as specified in Item P-621 and Item P-101.

**P-401-4.16 DIAMOND GRINDING.** Diamond grinding shall be completed prior to pavement grooving. Diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive.

Diamond grinding shall be performed with a machine designed specifically for diamond grinding capable of cutting a path at least 3 feet (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with a sufficient number of blades to create grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) higher than the bottom of the grinding cut. The actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Equipment or grinding procedures that cause ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted. Contractor shall demonstrate to the RPR that the grinding equipment will produce satisfactory results prior to making corrections to surfaces. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. The Contractor shall apply a surface treatment per P-608 to all areas that have been subject to grinding.

**P-401-4.17 NIGHTTIME PAVING REQUIREMENTS.** The Contractor shall provide adequate lighting during any nighttime construction. Paving during nighttime construction shall require the following:

**a.** All paving machines, rollers, distribution trucks and other vehicles required by the Contractor for his operations shall be equipped with artificial illumination sufficient to safely complete the work.

**b.** Minimum illumination level shall be twenty (20) horizontal foot-candles and maintained in the following areas:

**(1)** An area of 30 feet (9 m) wide by 30 feet (9 m) long immediately behind the paving machines during the operations of the machines.

(2) An area 15 feet (4.5 m) wide by 30 feet (9 m) long immediately in front and back of all rolling equipment, during operation of the equipment.

(3) An area 15 feet (4.5 m) wide by 15 feet (4.5 m) long at any point where an area is being tack coated prior to the placement of pavement.

c. As partial fulfillment of the above requirements, the Contractor shall furnish and use, complete artificial lighting units with a minimum capacity of 3,000 watt electric beam lights, affixed to all equipment in such a way to direct illumination on the area under construction.

d. A lighting plan shall be submitted by the Contractor and approved by the RPR prior to the start of any nighttime work. All work shall be in accordance with the approved CSPP and lighting plan.

If the Contractor places any out of specification mix in the project work area, he is required to remove it at his own expense, to the satisfaction of the RPR. If the Contractor has to continue placing non-payment hot mix asphalt on runways and taxiways, as directed by the RPR, to make the surfaces safe for aircraft operations, the Contractor shall do so to the satisfaction of the RPR. **IT IS THE CONTRACTOR'S RESPONSIBILITY TO LEAVE THE RUNWAY AND TAXIWAY SURFACES BEING PAVED IN A SAFE CONDITION READY FOR AIRCRAFT OPERATIONS. NO CONSIDERATION FOR EXTENDED CLOSURE TIME OF THE AREA BEING PAVED WILL BE GIVEN.**

As a first order of work for the next paving shift, the Contractor will remove and replace all out-of-specification material with approved material to the satisfaction of the RPR. When the above situations occur, there will be no consideration given for additional construction time or payment for extra costs.

### **CONTRACTOR QUALITY CONTROL (CQC)**

**P-401-5.1 GENERAL.** The Contractor shall develop a Contractor Quality Control Program (CQCP) in accordance with Item C-100. No partial payment will be made for materials without an approved CQCP.

**P-401-5.2 CONTRACTOR QUALITY CONTROL (QC) FACILITIES.** The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The RPR shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The RPR will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

**P-401-5.3 CONTRACTOR QC TESTING.** The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved CQCP. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A QC Testing Plan shall be developed as part of the CQCP.

**a. Asphalt content.** A minimum of two tests shall be performed per day in accordance with ASTM D6307 or ASTM D2172 for determination of asphalt content. When using ASTM D6307, the correction factor shall be determined as part of the first test performed at the beginning of plant

production; and as part of every tenth test performed thereafter. The asphalt content for the day will be determined by averaging the test results.

**b. Gradation.** Aggregate gradations shall be determined a minimum of twice per day from mechanical analysis of extracted aggregate in accordance with ASTM D5444, ASTM C136, and ASTM C117.

**c. Moisture content of aggregate.** The moisture content of aggregate used for production shall be determined a minimum of once per day in accordance with ASTM C566.

**d. Moisture content of asphalt.** The moisture content shall be determined once per day in accordance with AASHTO T329 or ASTM D1461.

**e. Temperatures.** Temperatures shall be checked, at least four times per day, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the asphalt at the plant, and the asphalt at the job site.

**f. In-place density monitoring.** The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D2950.

**g. Smoothness for Contractor Quality Control.** The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than ¼ inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot (3.7 m) “straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot (3.7m) straightedge approved by the RPR. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using either the FAA profile program, ProFAA, or FHWA ProVal, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

**(1) Transverse measurements.** Transverse measurements shall be taken for each day’s production placed. Transverse measurements shall be taken perpendicular to the pavement centerline each 50 feet (15 m) or more often as determined by the RPR. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

**(2) Longitudinal measurements.** Longitudinal measurements shall be taken for each day’s production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of

paving lanes when widths of paving lanes are less than 20 feet (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) or greater.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 401-6.1d(3). Areas that have been ground shall be sealed with a surface treatment in accordance with Item P-608. To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

**h. Grade.** Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to and after the placement of the first lift and after placement of the surface lift.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm) vertically and 0.1 feet (30 mm) laterally. The documentation will be provided by the Contractor to the RPR within 24 hours.

Areas with humps or depressions that exceed grade or smoothness criteria and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch (12 mm) less than the thickness specified on the plans. Grinding shall be in accordance with paragraph 401-4.16.

The Contractor shall repair low areas or areas that cannot be corrected by grinding by removal of deficient areas to the depth of the final course plus 1/2 inch and replacing with new material. Skin patching is not allowed.

**P-401-5.4 SAMPLING.** When directed by the RPR, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced, or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

**P-401-5.5 CONTROL CHARTS.** The Contractor shall maintain linear control charts for both individual measurements and range (i.e. difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day will be calculated and monitored by the QC laboratory.

Control charts shall be posted in a location satisfactory to the RPR and kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the



Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the RPR may suspend production or acceptance of the material.

**a. Individual measurements.** Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, and VMA. The control charts shall use the job mix formula target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

**Control Chart Limits for Individual Measurements**

Sieve	Action Limit	Suspension Limit
3/4 inch (19.0 mm)	±6%	±9%
1/2 inch (12.5 mm)	±6%	±9%
3/8 inch (9.5 mm)	±6%	±9%
No. 4 (4.75 mm)	±6%	±9%
No. 16 (1.18 mm)	±5%	±7.5%
No. 50 (300 µm)	±3%	±4.5%
No. 200 (75 µm)	±2%	±3%
<b>Asphalt Content</b>	±0.45%	±0.70%
<b>Minimum VMA</b>	-0.5%	-1.0%

**b. Range.** Control charts shall be established to control gradation process variability. The range shall be plotted as the difference between the two test results for each control parameter. The Suspension Limits specified below are based on a sample size of n = 2. Should the Contractor elect to perform more than two tests per lot, the Suspension Limits shall be adjusted by multiplying the Suspension Limit by 1.18 for n = 3 and by 1.27 for n = 4.

**Control Chart Limits Based on Range**

Sieve	Suspension Limit
1/2 inch (12.5 mm)	11%
3/8 inch (9.5 mm)	11%
No. 4 (4.75 mm)	11%
No. 16 (1.18 mm)	9%
No. 50 (300 µm)	6%
No. 200 (75 µm)	3.5%
<b>Asphalt Content</b>	0.8%

**c. Corrective Action.** The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum,

a process shall be deemed out of control and production stopped and corrective action taken, if:

- (1) One point falls outside the Suspension Limit line for individual measurements or range; or
- (2) Two points in a row fall outside the Action Limit line for individual measurements.

**P-401-5.6 QC REPORTS.** The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with Item C-100.

## **MATERIAL ACCEPTANCE**

**P-401-6.1 ACCEPTANCE SAMPLING AND TESTING.** Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the RPR at no cost to the Contractor except that coring as required in this section shall be completed and paid for by the Contractor.

**a. Quality assurance (QA) testing laboratory.** The QA testing laboratory performing these acceptance tests will be accredited in accordance with ASTM D3666. The QA laboratory accreditation will be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing will be listed on the lab accreditation.

**b. Lot size.** A standard lot will be equal to one day's production divided into approximately equal sublots of between 400 to 600 tons. When only one or two sublots are produced in a day's production, the sublots will be combined with the production lot from the previous or next day.

Where more than one plant is simultaneously producing asphalt for the job, the lot sizes will apply separately for each plant.

**c. Asphalt air voids.** Plant-produced asphalt will be tested for air voids on a subplot basis.

**(1) Sampling.** Material from each subplot shall be sampled in accordance with ASTM D3665. Samples shall be taken from material deposited into trucks at the plant or at the job site in accordance with ASTM D979. The sample of asphalt may be put in a covered metal tin and placed in an oven for not less than 30 minutes nor more than 60 minutes to maintain the material at or above the compaction temperature as specified in the JMF.

**(2) Testing.** Air voids will be determined for each subplot in accordance with ASTM D3203 for a set of compacted specimens prepared in accordance with ASTM D6925.

**d. In-place asphalt mat and joint density.** Each subplot will be tested for in-place mat and joint density as a percentage of the theoretical maximum density (TMD).

**(1) Sampling.** The Contractor will cut minimum 5 inch (125 mm) diameter samples in accordance with ASTM D5361. The Contractor shall furnish all tools, labor, and materials for cleaning, and filling the cored pavement. Laitance produced by the coring operation shall be removed immediately after coring, and core holes shall be filled within one day after sampling in a manner acceptable to the RPR.

**(2) Bond.** Each lift of asphalt shall be bonded to the underlying layer. If cores reveal that the surface is not bonded, additional cores shall be taken as directed by the RPR to determine the extent of unbonded areas. Unbonded areas shall be removed by milling and replaced at no additional cost as directed by the RPR.

**(3) Thickness.** Thickness of each lift of surface course will be evaluated by the RPR for compliance to the requirements shown on the plans after any necessary corrections for grade. Measurements of thickness will be made using the cores extracted for each subplot for density measurement. The maximum allowable deficiency at any point will not be more than 1/4 inch (6 mm) less than the thickness indicated for the lift. Average thickness of lift, or combined lifts, will not be less than the indicated thickness. Where the thickness tolerances are not met, the lot or subplot shall be corrected by the Contractor at his expense by removing the deficient area and replacing with new pavement. The Contractor, at his expense, may take additional cores as approved by the RPR to circumscribe the deficient area.

**(4) Mat density.** One core shall be taken from each subplot. Core locations will be determined by the RPR in accordance with ASTM D3665. Cores for mat density shall not be taken closer than one foot (30 cm) from a transverse or longitudinal joint. The bulk specific gravity of each cored sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each subplot sample by the TMD for that subplot.

**(5) Joint density.** One core centered over the longitudinal joint shall be taken for each subplot that has a longitudinal joint. Core locations will be determined by the RPR in accordance with ASTM D3665. The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

#### **P-401-6.2 ACCEPTANCE CRITERIA.**

**a. General.** Acceptance will be based on the implementation of the Contractor Quality Control Program (CQCP) and the following characteristics of the asphalt and completed pavements: air voids, mat density, joint density, grade and Profilograph roughness.

**b. Air Voids and Mat density.** Acceptance of each lot of plant produced material for mat density and air voids will be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment will be determined in accordance with paragraph 401-8.1.

**c. Joint density.** Acceptance of each lot of plant produced asphalt for joint density will be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot will be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint will be reduced by five (5) percentage points. This lot pay factor reduction will be incorporated and evaluated in accordance with paragraph 401-8.1.

**d. Grade.** The final finished surface of the pavement shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch (12 mm) vertically or 0.1 feet (30 mm) laterally.

Cross-sections of the pavement shall be taken at a minimum 50-foot (15-m) longitudinal spacing and at all longitudinal grade breaks. Minimum cross-section grade points shall include

grade at centerline, ± 10 feet of centerline, edge of full-strength (heavy duty) pavement and edge of shoulder pavement.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the subplot shall not be more than 95%.

**e. Profilograph roughness for QA Acceptance.** The final profilograph shall be the full length of the project to facilitate testing of roughness between lots. The Contractor, in the presence of the RPR shall perform a profilograph roughness test on the completed project with a profilograph meeting the requirements of ASTM E1274 or a Class I inertial profiler meeting ASTM E950. Data and results shall be provided within 48 hrs of profilograph roughness tests.

The pavement shall have an average profile index less than 15 inches per mile per 1/10 mile. The equipment shall utilize electronic recording and automatic computerized reduction of data to indicate “must grind” bumps and the Profile Index for the pavement using a 0.2-inch (5 mm) blanking band. The bump template must span one inch (25 mm) with an offset of 0.4 inches (10 mm). The profilograph must be calibrated prior to use and operated by a factory or State DOT approved, trained operator. Profilograms shall be recorded on a longitudinal scale of one inch (25 mm) equals 25 feet (7.5 m) and a vertical scale of one inch (25 mm) equals one inch (25 mm). Profilograph shall be performed one foot right and left of project centerline and 15 feet (4.5 m) right and left of project centerline. Any areas that indicate “must grind” shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing full depth of surface course. as directed by the RPR. Where corrections are necessary, a second profilograph run shall be performed to verify that the corrections produced an average profile index of 15 inches per mile per 1/10 mile or less.

**P-401-6.3 PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL).**

The PWL will be determined in accordance with procedures specified in Item C-110. The specification tolerance limits (L) for lower and (U) for upper are contained in Table 5.

**Table 5. Acceptance Limits for Air Voids and Density**

Test Property	Pavements Specification Tolerance Limits	
	L	U
<b>Air Voids Total Mix (%)</b>	2.0	5.0
<b>Surface Course Mat Density (%)</b>	92.8	-
<b>Base Course Mat Density (%)</b>	92.0	-
<b>Joint density (%)</b>	90.5	--

**a. Outliers.** All individual tests for mat density and air voids will be checked for outliers (test criterion) in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded, and the PWL will be determined using the remaining test values. The criteria in Table 5 is based on production processes which have a variability with the following standard deviations: Surface Course Mat Density (%), 1.30; Base Course Mat Density (%), 1.55; Joint Density (%), 1.55.

The Contractor should note that (1) 90 PWL is achieved when consistently producing a surface

course with an average mat density of at least 94.5% with 1.30% or less variability, (2) 90 PWL is achieved when consistently producing a base course with an average mat density of at least 94.0% with 1.55% or less variability, and (3) 90 PWL is achieved when consistently producing joints with an average joint density of at least 92.5% with 1.55% or less variability.

#### **P-401-6.4 RESAMPLING PAVEMENT FOR MAT DENSITY.**

**a. General.** Resampling of a lot of pavement will only be allowed for mat density, and then, only if the Contractor requests same, in writing, within 48 hours after receiving the written test results from the RPR. A retest will consist of all the sampling and testing procedures contained in paragraphs 401-6.1d and 401-6.2b. Only one resampling per lot will be permitted.

(1) A redefined PWL will be calculated for the resampled lot. The number of tests used to calculate the redefined PWL will include the initial tests made for that lot plus the retests.

(2) The cost for resampling and retesting shall be borne by the Contractor.

**b. Payment for resampled lots.** The redefined PWL for a resampled lot will be used to calculate the payment for that lot in accordance with Table 6.

**c. Outliers.** Check for outliers in accordance with ASTM E178, at a significance level of 5%.

### **METHOD OF MEASUREMENT**

**P-401-7.1 MEASUREMENT.** Asphalt shall be measured by the number of tons of asphalt used in the accepted work. Batch weights or truck scale weights will be used to determine the basis for the tonnage.

### **BASIS OF PAYMENT**

**P-401-8.1 PAYMENT.** Payment for a lot of asphalt meeting all acceptance criteria as specified in paragraph 401-6.2 shall be made based on results of tests for mat density and air voids. Payment for acceptable lots shall be adjusted according to paragraph 401-8.1c for mat density and air voids; and paragraph 401-6.2c for joint density, subject to the limitation that:

**a.** The total project payment for plant mix asphalt pavement shall not exceed 100 percent of the product of the contract unit price and the total number of tons of asphalt used in the accepted work.

**b.** The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

**c. Basis of adjusted payment.** The pay factor for each individual lot shall be calculated in accordance with Table 6. A pay factor shall be calculated for both mat density and air voids. The lot pay factor shall be the higher of the two values when calculations for both mat density and air voids are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either mat density or air voids is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both mat density and air voids are less than 100%. If PWL for joint density is less than 71% then the lot pay factor shall be reduced by 5% but be no higher than 95%.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 401-8.1a. Payment in excess of 100% for accepted lots of asphalt shall be used to offset payment for accepted lots of asphalt pavement that achieve a lot pay factor less than 100%.

Payment for sublots which do not meet grade in accordance with paragraph 401-6.2d after correction for over 25% of the sublot shall be reduced by 5%.

**Asphalt placed above the specified grade shall not be included in the quantities for payment.**

**Table 6. Price adjustment schedule<sup>1</sup>**

<b>Percentage of material within specification limits (PWL)</b>	<b>Lot pay factor (percent of contract unit price)</b>
96 – 100	106
90 – 95	PWL + 10
75 – 89	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject <sup>2</sup>

<sup>1</sup> Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment above 100% shall be subject to the total project payment limitation specified in paragraph 401-8.1a.

<sup>2</sup> The lot shall be removed and replaced. However, the RPR may decide to allow the rejected lot to remain. In that case, if the RPR and Contractor agree in writing that the lot shall not be removed, it shall be paid for at 50% of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.

**d. Profilograph Roughness.** The Contractor will receive full payment when the profilograph average profile index is in accordance with paragraph 401-6.2e. When the final average profile index for the entire length of pavement does not exceed 15 inches per mile per 1/10 mile, payment will be made at the contract unit price for the completed pavement.

Payment will be made under:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
P-401.01	Asphalt Surface Course _____	per Ton

## REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

- |            |   |
|------------|---|
| ASTM C29   | Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate  |
| ASTM C88   | Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate                                      |
| ASTM C117  | Standard Test Method for Materials Finer than 75- $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing                          |
| ASTM C127  | Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate                            |
| ASTM C131  | Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine |
| ASTM C136  | Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates   |
| ASTM C142  | Standard Test Method for Clay Lumps and Friable Particles in Aggregates   |
| ASTM C566  | Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying   |
| ASTM D75   | Standard Practice for Sampling Aggregates   |
| ASTM D242  | Standard Specification for Mineral Filler for Bituminous Paving Mixtures  |
| ASTM D946  | Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction                                       |
| ASTM D979  | Standard Practice for Sampling Asphalt Paving Mixtures  |
| ASTM D1073 | Standard Specification for Fine Aggregate for Asphalt Paving Mixtures   |
| ASTM D1188 | Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples                    |
| ASTM D2172 | Standard Test Method for Quantitative Extraction of Bitumen from Asphalt Paving Mixtures  |
| ASTM D1461 | Standard Test Method for Moisture or Volatile Distillates in Asphalt Paving Mixtures  |
| ASTM D2041 | Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures                             |
| ASTM D2419 | Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate  |
| ASTM D2489 | Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures  |
| ASTM D2726 | Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures                          |

ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5361	Standard Practice for Sampling Compacted Asphalt Mixtures for Laboratory Testing
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6084	Standard Test Method for Elastic Recovery of Bituminous Materials by Ductilometer
ASTM D6307	Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyrotory Compactor.
ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures



ASTM D6995 Standard Test Method for Determining Field VMA based on the Maximum Specific Gravity of the Mix (Gmm)

ASTM E11 Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

ASTM E178 Standard Practice for Dealing with Outlying Observations

ASTM E1274 Standard Test Method for Measuring Pavement Roughness Using a Profilograph

ASTM E950 Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference

ASTM E2133 Standard Test Method for Using a Rolling Inclinometer to Measure Longitudinal and Transverse Profiles of a Traveled Surface

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M156 Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

AASHTO T329 Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method

AASHTO T324 Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures

AASHTO T 340 Standard Method of Test for Determining the Rutting Susceptibility of Hot Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)

Asphalt Institute (AI)

Asphalt Institute Handbook MS-26, Asphalt Binder

Asphalt Institute MS-2 Mix Design Manual, 7th Edition

AI State Binder Specification Database

Federal Highway Administration (FHWA)

Long Term Pavement Performance Binder Program

Advisory Circulars (AC)

AC 150/5320-6 Airport Pavement Design and Evaluation

FAA Orders

5300.1 Modifications to Agency Airport Design, Construction, and Equipment Standards

Software

FAARFIELD

**END OF ITEM P-401**

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## ITEM P-603 EMULSIFIED ASPHALT TACK COAT

### DESCRIPTION

**P-603-1.1** This item shall consist of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

### MATERIALS

**P-603-2.1 ASPHALT MATERIALS.** The asphalt material shall be an emulsified asphalt as specified in ASTM D3628 as an asphalt application for tack coat appropriate to local conditions. The emulsified asphalt shall not be diluted. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt material to the Resident Project Representative (RPR) before the asphalt material is applied for review and acceptance. The furnishing of COA for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

### CONSTRUCTION METHODS

**P-603-3.1 WEATHER LIMITATIONS.** The tack coat shall be applied only when the existing surface is dry and the atmospheric temperature is 50°F (10°C) or above; the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the RPR.

**P-603-3.2 EQUIPMENT.** The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven hundred (700) feet per minute (213 m per minute).

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use. The distributor truck shall be equipped with a minimum 12-foot (3.7-m) spreader spray bar with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

A power broom and/or power blower suitable for cleaning the surfaces to which the asphalt tack coat is to be applied shall be provided.

**P-603-3.3 APPLICATION OF BITUMINOUS MATERIAL.** The emulsified asphalt shall not be diluted. Immediately before applying the emulsified asphalt tack coat, the full width of surface to be treated shall be swept with a power broom and/or power blower to remove all loose dirt and other objectionable material.

The emulsified asphalt material shall be uniformly applied with an asphalt distributor at the rates appropriate for the conditions and surface specified in the table below. The type of asphalt material and application rate shall be approved by the RPR prior to application.

**Emulsified Asphalt**

<b>Surface Type</b>	<b>Residual Rate, gal/SY (L/square meter)</b>	<b>Emulsion Application Bar Rate, gal/SY (L/square meter)</b>
<b>New asphalt</b>	0.02-0.05 (0.09-0.23)	0.03-0.07 (0.13-0.32)
<b>Existing asphalt</b>	0.04-0.07 (0.18-0.32)	0.06-0.11 (0.27-0.50)
<b>Milled Surface</b>	0.04-0.08 (0.18-0.36)	.06-0.12 (0.27-0.54)
<b>Concrete</b>	0.03-0.05 (0.13-0.23)	0.05-0.08 (0.23-0.36)

After application of the tack coat, the surface shall be allowed to cure without being disturbed for the period of time necessary to permit drying and setting of the tack coat. This period shall be determined by the RPR. The Contractor shall protect the tack coat and maintain the surface until the next course has been placed. When the tack coat has been disturbed by the Contractor, tack coat shall be reapplied at the Contractor's expense.

**P-603-3.4 FREIGHT AND WAYBILLS.** The Contractor shall submit waybills and delivery tickets, during progress of the work. Before the final statement is allowed, file with the RPR certified waybills and certified delivery tickets for all emulsified asphalt materials used in the construction of the pavement covered by the contract. Do not remove emulsified asphalt material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

## METHOD OF MEASUREMENT

**P-603-4.1** The emulsified asphalt material for tack coat shall be measured by the gallon (liter). Volume shall be corrected to the volume at 60°F (16°C) in accordance with ASTM D1250. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

## BASIS OF PAYMENT

**P-603.5-1** Payment shall be made at the contract unit price per gallon (liter) of bituminous tack coat material. This price shall be full compensation for furnishing all materials, for all preparation, delivery, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
P-603.01	Bituminous Tack Coat _____	per Gallon

## REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D1250	Standard Guide for Use of the Petroleum Measurement Tables
ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

**END OF ITEM P-603**

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## ITEM P-605 JOINT SEALANTS FOR PAVEMENTS

### DESCRIPTION

**605-1.1** This item shall consist of providing and installing a resilient and adhesive joint sealing material capable of effectively sealing joints in pavement; joints between different types of pavements; cracks in existing pavement; and around in-pavement airfield lights.

There is no payment associated with this item; it shall be considered incidental to the various Project Items contained within these Technical Specifications.

### MATERIALS

**605-2.1 Joint sealants.** Joint sealant materials shall meet the requirements of **ASTM D6690**.

Each lot or batch of sealant shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, the safe heating temperature, and shall be accompanied by the manufacturer's certification stating that the sealant meets the requirements of this specification.

**605-2.2 Backer rod.** The material furnished shall be a compressible, non-shrinking, non-staining, non-absorbing material that is non-reactive with the joint sealant in accordance with ASTM D5249. The backer-rod material shall be  $25\% \pm 5\%$  larger in diameter than the nominal width of the joint.

**605-2.3 Bond breaking tapes.** Provide a bond breaking tape or separating material that is a flexible, non-shrinkable, non-absorbing, non-staining, and non-reacting adhesive-backed tape. The material shall have a melting point at least 5°F (3°C) greater than the pouring temperature of the sealant being used when tested in accordance with ASTM D789. The bond breaker tape shall be approximately 1/8 inch (3 mm) wider than the nominal width of the joint and shall not bond to the joint sealant.

### CONSTRUCTION METHODS

**605-3.1 Time of application.** Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. The pavement temperature shall be 50°F (10°C) and rising at the time of application of the poured joint sealing material. Do not apply sealant if moisture is observed in the joint.

**605-3.2 Equipment.** Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and maintained in satisfactory condition at all times. Submit a list of proposed equipment to be used in performance of construction work including descriptive data, 14 days prior to use on the project.

**a. Tractor-mounted routing tool.** Provide a routing tool, used for removing old sealant from the joints, of such shape and dimensions and so mounted on the tractor that it will not damage the sides of the joints. The tool shall be designed so that it can be adjusted to remove the old material to varying depths as required. The use of V-shaped tools or rotary impact routing devices will not be permitted. Hand-operated spindle routing devices may be used to clean and enlarge random cracks.

**b. Hand tools.** Hand tools may be used, when approved, for removing defective sealant from a crack and repairing or cleaning the crack faces. Hand tools should be carefully evaluated for potential spalling effects prior to approval for use.

**c. Hot-poured sealing equipment.** The unit applicators used for heating and installing ASTM D6690 joint sealant materials shall be mobile and shall be equipped with a double-boiler, agitator-type kettle with an oil medium in the outer space for heat transfer; a direct-connected pressure-type extruding device with a nozzle shaped for inserting in the joint to be filled; positive temperature devices for controlling the temperature of the transfer oil and sealant; and a recording type thermometer for indicating the temperature of the sealant. The applicator unit shall be designed so that the sealant will circulate through the delivery hose and return to the inner kettle when not in use.

**605-3.3 Preparation of joints.** Pavement joints for application of material in this specification must be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

**a. Sawing.** All joints shall be sawed in accordance with specifications and plan details. Immediately after sawing the joint, the resulting slurry shall be completely removed from joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary.

**b. Sealing.** Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, filler, protrusions of hardened concrete, old sealant and other foreign material from the sides and upper edges of the joint space to be sealed. Cleaning shall be accomplished by tractor-mounted routing equipment as specified in paragraph 605-3.2. The newly exposed concrete joint faces and the pavement surface extending a minimum of 1/2 inch (12 mm) from the joint edge shall be sandblasted clean. Sandblasting shall be accomplished in a minimum of two passes. One pass per joint face with the nozzle held at an angle directly toward the joint face and not more than 3 inches (75 mm) from it. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave them completely free of debris and water. The joint faces shall be surface dry when the seal is applied.

**c. Backer Rod.** When the joint opening is of a greater depth than indicated for the sealant depth, plug or seal off the lower portion of the joint opening using a backer rod in accordance with paragraph 605-2.2 to prevent the entrance of the sealant below the specified depth. Take care to ensure that the backer rod is placed at the specified depth and is not stretched or twisted during installation.

**d. Bond-breaking tape.** Where inserts or filler materials contain bitumen, or the depth of the joint opening does not allow for the use of a backup material, insert a bond-separating tape breaker in accordance with paragraph 605-2.3 to prevent incompatibility with the filler materials and three-sided adhesion of the sealant. Securely bond the tape to the bottom of the joint opening so it will not float up into the new sealant.

**605-3.4 Installation of sealants.** Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by the RPR before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet (15 m) ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to 1/4 inch below



the top of pavement surface; or bottom of groove for grooved pavement. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the RPR. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

**605-3.5 Inspection.** The Contractor shall inspect the joint sealant for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids. Sealants exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified at no additional cost to the airport.

**605-3.6 Clean-up.** Upon completion of the project, remove all unused materials from the site and leave the pavement in a clean condition.

#### **METHOD OF MEASUREMENT**

**605-4.1** No separate measurement for payment will be made for Joint Sealants. Payment for this item shall be considered incidental to items requiring joint sealant filler.

#### **REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

##### ASTM International (ASTM)

ASTM D789	Standard Test Method for Determination of Relative Viscosity of Polyamide (PA)
ASTM D5249	Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt

##### Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
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**END ITEM P-605**

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**Item P-606 ADHESIVE COMPOUNDS, TWO-COMPONENT FOR SEALING  
WIRE AND LIGHTS IN PAVEMENTS**

**DESCRIPTION**

**606-1.1** This specification covers two types of material; a liquid suitable for sealing electrical wire in saw cuts in pavement and for sealing light fixtures or bases in pavement, and a paste suitable for embedding light fixtures in the pavement. Both types of material are two-component filled formulas with the characteristics specified in paragraph 606-2.4. Materials supplied for use with asphalt and/or concrete pavements must be formulated so they are compatible with the asphalt and/or concrete. There shall be no separate payment for this item.

**MATERIALS**

**606-2.1 Curing.** When pre-warmed to 77°F (25°C), mixed, and placed in accordance with manufacturer's directions, the materials shall cure at temperatures of 45°F (7°C) or above without the application of external heat.

**606-2.2 Storage.** The adhesive components shall not be stored at temperatures over 86°F (30°C), unless otherwise specified by the manufacturer.

**606-2.3 Caution.** Installation and use shall be in accordance with the manufacturer's recommended procedures. Avoid prolonged or repeated contact with skin. In case of contact, wash with soap and flush with water. If taken internally, call doctor. Keep away from heat or flame. Avoid vapor. Use in well-ventilated areas. Keep in cool place. Keep away from children.

**606-2.4 Characteristics.** When mixed and cured in accordance with the manufacturer's directions, the materials shall have the following properties shown in Table 1.

**Table 1. Property Requirements**

<b>Physical or Electrical Property</b>	<b>Minimum</b>	<b>Maximum</b>	<b>ASTM Method</b>
<b>Tensile</b>			
Portland cement concrete	1,000 psi (70 kg/sq cm)		D 638
Asphalt concrete	500 psi (35 kg/sq cm)		
<b>Elongation</b>			
Portland cement concrete		See note <sup>1</sup>	D 638
Asphalt concrete	50%		D 638
Coef. of cub. exp. cu. cm/cu. cm/°C	0.00090	0.00120	D 1168
Coef. of lin. exp. cm/cm/°C	0.000030	0.000040	D 1168
Dielectric strength, short time test	350 volts/mil.		D 149
Arc resistance	125 sec		
<b>Pull-off</b>			
Adhesion to steel	1,000 psi (70 kg/sq cm)		
Adhesion to Portland cement concrete	200 psi (14 kg/sq cm)		
Adhesion to asphalt concrete	No test available.		
Adhesion to aluminum	250 psi		

<sup>1</sup> 20% or more (without filler) for formulations to be supplied for areas subject to freezing.

### **SAMPLING, INSPECTION, AND TEST PROCEDURES**

**606-3.1 Tensile properties.** Tests for tensile strength and elongation shall be conducted in accordance with ASTM D638.

**606-3.2 Expansion.** Tests for coefficients of linear and cubical expansion shall be conducted in accordance with, Method B, except that mercury shall be used instead of glycerine. The test specimen shall be mixed in the proportions specified by the manufacturer and cured in a glass tub approximately 2 inch (50 mm) long by 3/8 inch (9 mm) in diameter. The interior of the tube shall be precoated with a silicone mold release agent. The hardened sample shall be removed from the tube and aged at room temperature for one (1) week before conducting the test. The test temperature range shall be from 35°F (2°C) to 140°F (60°C).

**606-3.3 Test for dielectric strength.** Test for dielectric strength shall be conducted in accordance with ASTM D149 for sealing compounds to be furnished for sealing electrical wires in pavement.

**606-3.4 Test for arc resistance.** Test for arc resistance shall be conducted for sealing compounds to be furnished for sealing electrical wires in pavement.

**606-3.5 Test for adhesion to steel.** The ends of two smooth, clean, steel specimens of convenient size (1 inch by 1 inch by 6 inch) (25 mm by 25 mm by 150 mm) would be satisfactory when bonded together with adhesive mixture and allowed to cure at room temperature for a period of time to meet formulation requirements and then tested to failure on a Riehle (or similar) tensile tester. The thickness of adhesive to be tested shall be 1/4 inch (6 mm).

**606-3.6 Adhesion to Portland cement concrete**

**a. Concrete test block preparation.** The aggregate grading shall be as shown in Table 2.

The coarse aggregate shall consist of crushed rock having a minimum of 75% of the particles with at least one fractured face and having a water absorption of not more than 1.5%. The fine aggregate shall consist of crushed sand manufactured from the same parent rock as the coarse aggregate. The concrete shall have a water-cement ratio of 5.5 gallons (21 liters) of water per bag of cement, a cement factor of 6, ±0.5, bags of cement per cubic yard (0.76 cubic meter) of concrete, and a slump of 2-1/2 inch (60 mm), ±1/2 inch (60 mm ±12 mm). The ratio of fine aggregate to total aggregate shall be approximately 40% by solid volume. The air content shall be 5.0%, ±0.5%, and it shall be obtained by the addition to the batch of an air-entraining admixture such as Vinsol® resin. The mold shall be of metal and shall be provided with a metal base plate.

Means shall be provided for securing the base plate to the mold. The assembled mold and base plate shall be watertight and shall be oiled with mineral oil before use. The inside measurement of the mold shall be such that several one inch (25 mm) by 2-inch (75 mm) by 3-inch (25 mm by 50 mm by 75 mm) test blocks can be cut from the specimen with a concrete saw having a diamond blade. The concrete shall be prepared and cured in accordance with ASTM C192.

**Table 2. Aggregate for Bond Test Blocks**

Type	Sieve Size	Percent Passing
<b>Coarse Aggregate</b>	3/4 inch (19.0 mm)	97 to 100
	1/2 inch (12.5 mm)	63 to 69
	3/8 inch (9.5 mm)	30 to 36
	No. 4 (4.75 mm)	0 to 3
<b>Fine Aggregate</b>	No. 4 (4.75 mm)	100
	No. 8 (2.36 mm)	82 to 88
	No. 16 (1.18 mm)	60 to 70
	No. 30 (600 µm)	40 to 50
	No. 50 (300 µm)	16 to 26
	No. 100 (150 µm)	5 to 9

**b. Bond test.** Prior to use, oven-dry the test blocks to constant weight at a temperature of 220°F to 230°F (104°C to 110°C), cool to room temperature, 73.4°F ±3°F (23°C ±1.6°C), in a desiccator, and clean the surface of the blocks of film or powder by vigorous brushing with a stiff-bristled fiber brush. Two test blocks shall be bonded together on the one inch by 3 inch (25 mm by 75 mm) sawed face with the adhesive mixture and allowed to cure at room temperature for a period of time

to meet formulation requirements and then tested to failure in a Riehle (or similar) tensile tester. The thickness of the adhesive to be tested shall be 1/4 inch (6 mm).

**606-3.7 Compatibility with asphalt mix.** Test for compatibility with asphalt in accordance with ASTM D5329.

**606-3.8 Adhesive compounds - Contractor's responsibility.** The Contractor shall furnish the vendor's certified test reports for each batch of material delivered to the project. The report shall certify that the material meets specification requirements and is suitable for use with portland cement Concrete bituminous asphalt concrete pavements. The report shall be provided to and accepted by the Resident Project Representative (RPR) before use of the material. In addition, the Contractor shall obtain a statement from the supplier or manufacturer that guarantees the material for one year. The supplier or manufacturer shall furnish evidence that the material has performed satisfactorily on other projects.

**606-3.9 Application.** Adhesive shall be applied on a dry, clean surface, free of grease, dust, and other loose particles. The method of mixing and application shall be in strict accordance with the manufacturer's recommendations. When used with Item P-605, such as light can installation, Item P-605 shall not be applied until the Item P-606 has fully cured.

#### **METHOD OF MEASUREMENT**

**606-4.1** No separate measurement or payment will be made for Adhesive Compound. Payment for this item shall be considered incidental to the light adjustment and installation payment items.

#### **REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C192	Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM D149	Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies
ASTM D638	Standard Test Method for Tensile Properties of Plastics
ASTM D5329	Standard Test Methods for Sealants and Fillers, Hot-applied, for Joints and Cracks in Asphaltic and Portland Cement Concrete Pavements

#### **END OF ITEM P-606**

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## ITEM P-610 STRUCTURAL PORTLAND CEMENT CONCRETE

### DESCRIPTION

**P-610-1.1** This item shall consist of concrete and reinforcement, as shown on the plans, prepared and constructed in accordance with these specifications. This specification shall be used for all concrete other than airfield pavement which are cast-in-place.

There is no payment associated with this item; it shall be considered incidental to the various Project Items contained within these Technical Specifications.

### MATERIALS

**P-610-2.1 GENERAL.** Only approved materials, conforming to the requirements of these specifications, shall be used in the work. Materials may be subject to inspection and tests at any time during their preparation or use. The source of all materials shall be approved by the Engineer before delivery or use in the work. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be stored and handled to ensure preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed in them.

The use of pit-run aggregates shall not be permitted unless the pit-run aggregate has been screened and washed, and all fine and coarse aggregates stored separately and kept clean. The mixing of different aggregates from different sources in one storage stockpile or alternating batches of different aggregates shall not be permitted.

- a. **Reactivity.** Fine and Coarse aggregates to be used in all concrete shall be evaluated and tested by the Contractor for alkali-aggregate reactivity in accordance with both ASTM C1260 and C1567. Aggregate and mix proportion reactivity tests shall be performed for each project.
  - (1) Coarse and fine aggregate shall be tested separately in accordance with ASTM C1260. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.10% at 28 days (30 days from casting).
  - (2) Combined coarse and fine aggregate shall be tested in accordance with ASTM C1567, modified for combined aggregates, using the proposed mixture design proportions of aggregates, cementitious materials, and/or specific reactivity reducing chemicals. If lithium nitrate is proposed for use with or without supplementary cementitious materials, the aggregates shall be tested in accordance with Corps of Engineers (COE) CRD C662. If lithium nitrate admixture is used, it shall be nominal 30%  $\pm$ 0.5% weight lithium nitrate in water.



- (3) If the expansion of the proposed combined materials test specimens, tested in accordance with ASTM C1567, modified for combined aggregates, or COE CRD C662, does not exceed 0.10% at 28 days, the proposed combined materials will be accepted. If the expansion of the proposed combined materials test specimens is greater than 0.10% at 28 days, the aggregates will not be accepted unless adjustments to

**P-610-2.2 COARSE AGGREGATE.** The coarse aggregate for concrete shall meet the requirements of ASTM C33. The Engineer may consider and reserve final approval of other State classification procedures addressing aggregate durability.

Coarse aggregate shall be well graded from coarse to fine and shall meet the following gradation shown in the table below when tested per ASTM C136.

Table 1. Gradation For Coarse Aggregate

Sieve Designation (square openings)	Percentage by Weight Passing Sieves						
	2"	1-1/2"	1"	3/4"	1/2"	3/8"	No.4
No. 4 to 3/4 in. (4.75-19.0 mm)			100	90-100		20-55	0-10
No. 4 to 1 in. (4.75-25.0 mm)		100	90-100		25-60		0-10
No. 4 to 1-1/2 in. (4.75-38.1 mm)	100	95-100		35-70		10-30	0-5

**P-610-2.3 FINE AGGREGATE.** The fine aggregate for concrete shall meet the requirements of ASTM C33.

The fine aggregate shall be well graded from fine to coarse and shall meet the requirements of the table below when tested in accordance with ASTM C136:

Table 2. Gradation For Fine Aggregate

Sieve Designation (square openings)	Percentage by Weight Passing Sieves
3/8 in (9.5 mm)	100
No. 4 (4.75 mm)	95-100
No. 16 (1.18 mm)	45-80
No. 30 (0.60 mm)	25-55
No. 50 (0.30 mm)	10-30
No. 100 (0.15 mm)	2-10

Blending will be permitted, if necessary, in order to meet the gradation requirements for fine aggregate. Fine aggregate deficient in the percentage of material passing the No. 50 mesh sieve may be accepted, provided that such deficiency does not exceed 5 percent and is remedied by the addition of pozzolanic or cementitious materials other than Portland cement, as specified in 610-2.6 on admixtures, in sufficient quantity to produce the required workability as approved by the Engineer.

**P-610-2.4 CEMENT.** Cement shall conform to the requirements of ASTM C 150 - Type II Moderate Sulfate Resistant or Type III High Early Strength. The Contractor shall furnish vendors' certified test reports for each carload, or equivalent, of cement shipped to the project. The report shall be delivered to the Engineer before permission to use the cement is granted. All such test reports shall be subject to verification by testing sample materials received for use on the project. The use of Rapid Set Cement for High Early P-610 Concrete is anticipated.

**P-610-2.5 WATER.** The water used in concrete shall be fresh, clean and potable; free from injurious amounts of oils, acids, alkalis, salts, organic materials or other substances deleterious to concrete.

**P-610-2.6 ADMIXTURES.** The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the Engineer may require the Contractor to submit complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests may be made of samples taken by the Engineer from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

Pozzolanic admixtures shall be flyash or raw or calcined natural pozzolans meeting the requirements of ASTM C 618, Class F or N with the exception of loss of ignition, where the maximum shall be less than 6 percent. Class F or N flyash for use in mitigating alkali-silica reactivity shall have a Calcium Oxide (CaO) content of less than 13 percent and a total equivalent alkali content less than 3 percent.

Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entrainment agent and any water reducer admixture shall be compatible.

Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D. ASTM C494, Type F and G high range water reducing admixtures and ASTM C1017 flowable admixtures shall not be used.

Accelerating admixtures shall meet the requirements of ASTM C 494. Accelerating admixtures shall be added in the amount necessary to produce the specified compressive strength and flexural strength noted below within the specified time frames.

**P-610-2.7 PREMOLDED JOINT MATERIAL.** Premolded joint material for expansion joints shall meet the requirements of ASTM D 1751 or ASTM D 1752.

**P-610-2.8 JOINT FILLER.** The filler for joints shall meet the requirements of Item P-605.

**P-610-2.9 STEEL REINFORCEMENT.** Reinforcing shall consist of Bar Mars conforming to the requirements of ASTM A 184 or A 704 or Welded Deformed Steel Fabric conforming to the requirements of ASTM A 497.

**P-610-2.10 DOWEL BARS.** Dowel bars shall be plain steel bars conforming to ASTM A 615 or ASTM A 966 and shall be free from burring or other deformation restricting slippage in the concrete. High strength dowel bars shall conform to ASTM A 714, Class 2, Type S, Grade I, II or III, Bare Finish. Before delivery to the construction site each dowel bar shall be painted with one coat of paint conforming to MIL-DTL-24441/20A.SSPC Paint 5 or SSPC Paint 25.Metal or plastic collars shall be full circular device supporting the dowel until the epoxy hardens.

**P-610-2.11 EPOXY-RESIN.** Epoxy-resin used to anchor dowels in pavements shall conform to the requirements of ASTM C 881, Type I, Grade 3, Class C. Class A or B shall be used when the surface temperature of the hardened concrete is below 60° F.

**P-610-2.12 PENETRATING SEALER.** Concrete sealer shall be a general-purpose surface penetrating mixture of non-toxic chemically reactive alkali silicates such as Surtreat TSP-II, as manufacturer by Surtreat Corporation, Pittsburgh, PA or approved equal. Application rate shall be 25-125 ft<sup>2</sup>/gal depending on the porosity of the concrete used.

**P-610-2.13 COVER MATERIALS FOR CURING.** Curing materials shall conform to one of the following specifications:

Waterproof paper for curing concrete	ASTM C 171
Polyethylene Sheeting for Curing Concrete	ASTM C 171
Liquid Membrane-Forming Compounds for Curing Concrete	ASTM C 309, Type 2

**P-610-2.14 MATERIAL ACCEPTANCE.** Prior to use of materials, the Contractor shall submit certified test reports, proposed mixing proportions (as part of the mix design) and history of past performance to the Engineer for those materials proposed for use during construction. The certification shall show the appropriate ASTM test(s) for each material, the test results, and a statement that the material passed or failed.

## **CONSTRUCTION METHODS**

**P-610-3.1 GENERAL.** The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified herein. All machinery and equipment owned or controlled by the Contractor, which he proposes to use on the work, shall be of sufficient size to meet the requirements of the work, and shall be such as to produce satisfactory work; all work shall be subject to the inspection and approval of the Engineer.

**P-610-3.2 CONCRETE COMPOSITION/MIX DESIGN** A Mix Design shall be developed by the Contractor for each type of concrete listed below subject to the approval of the Engineer. Mix Designs shall be submitted with history of past performance of the materials and proportions proposed.

- A. **Standard P-610 Concrete.** Unless otherwise noted on the plans, the concrete shall develop a compressive strength of 4,000 psi in 28 days as determined by test cylinders made in accordance with ASTM C 31 and tested in accordance with ASTM C 39. The concrete shall contain not less than 470 pounds of cement per cubic yard (280 kg per cubic meter). The concrete shall contain 5 percent of entrained air, plus or minus 1 percent, as determined by ASTM C 231 and shall have a slump of not more than 4 in (10 cm) as determined by ASTM C 143.
- B. **High Early P-610 Concrete.** The concrete shall develop a minimum compressive strength of 4,000 psi in 24 hours as determined by test cylinders made in accordance with ASTM C 31 and tested in accordance with ASTM C 39 and a minimum flexural strength of 600 psi in 24 hours as determined by specimens prepared in accordance with ASTM C 31 and tested in accordance with ASTM C 78. The high early concrete shall be designed with the use of admixtures and/or rapid set concrete. Mix design shall be submitted with history of past performance for approval by the Engineer.

**P-610-3.3 ACCEPTANCE SAMPLING AND TESTING.** Concrete for each placement will be accepted on the basis of the compressive strength and/or flexural strength specified in paragraph 3.2A and 3.2B. The concrete shall be sampled in accordance with ASTM C 172. Compressive strength specimens shall be made in accordance with ASTM C 31 and tested in accordance with ASTM C 39. Flexural strength specimens prepared in accordance with ASTM C 31 and tested in accordance with ASTM C 78.

The Contractor shall cure and store the test specimens under such conditions as directed to mimic actual curing conditions in the field. The Engineer will make the actual tests on the specimens at no expense to the Contractor.

- A. **Standard P-610 Concrete.** Concrete for each placement will be accepted on the basis of the compressive strength specified in paragraph 3.2. The concrete shall be sampled in

accordance with ASTM C 172. Compressive strength specimens shall be made in accordance with ASTM C 31 and tested in accordance with ASTM C 39.

- B. **High Early P-610 Concrete.** The concrete shall develop a minimum compressive strength of 4,000 psi in 24 hours as determined by test cylinders made in accordance with ASTM C 31 and tested in accordance with ASTM C 39 and a minimum flexural strength of 600 psi in 24 hours as determined by specimens prepared in accordance with ASTM C 31 and tested in accordance with ASTM C 78. The concrete shall be designed with the use of admixtures and/or rapid set concrete. Mix design shall be submitted with history of past performance for approval by the Engineer. Each day's placement shall require a minimum of one set of specimens comprised of the following:

<b>Specimens Required Per Placement of High Early PCC</b>	
Test Frequency	Compressive Strength # of Specimens
24 Hours	4
36 hours	2
48 hours	N/A
7 Days	N/A
28 Days	2
<b>Total</b>	<b>8</b>

Strength for each placement shall be computed by averaging the results of the test specimens for each set testing frequency. The samples will be transported while in the molds. The curing, except for the initial cure period, will be accomplished using the immersion in saturated lime water method. Slump, air content, and temperature tests will also be conducted by the quality assurance laboratory for each set of strength test samples, per ASTM C 31

**P-610-3.4 PROPORTIONING AND MEASURING DEVICES.** When package cement is used, the quantity for each batch shall be equal to one or more whole sacks of cement. The aggregates shall be measured separately by weight. If aggregates are delivered to the mixer in batch trucks, the exact amount for each mixer charge shall be contained in each batch compartment. Weighing boxes or hoppers shall be approved by the Engineer and shall provide means of regulating the flow of aggregates into the batch box so that the required and exact weight of aggregates can be readily obtained.

**P-610-3.5 CONSISTENCY.** The consistency of the concrete shall be checked by the slump test specified in ASTM C 143.

**P-610-3.6 MIXING.** Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C 94.

**P-610-3.7 MIXING CONDITIONS.** The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40 °F (4 °C) without permission of the Engineer. If permission is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50 °F (10 °C) nor more than 100 °F (38 °C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his/her expense.

Retempering of concrete by adding water or any other material shall not be permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

**P-610-3.8 FORMS.** Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the Engineer. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as designed on the plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports. The Contractor shall bear responsibility for their adequacy. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes.

The internal ties shall be arranged so that, when the forms are removed, no metal will show in the concrete surface or discolor the surface when exposed to weathering. All forms shall be wetted with water or with a non-staining mineral oil, which shall be applied shortly before the concrete is placed. Forms shall be constructed so that they can be removed without injuring the concrete or concrete surface. The forms shall not be removed before the expiration of at least 30 hours from vertical faces, walls, slender columns, and similar structures; forms supported by falsework under slabs, beams, girders, arches, and similar construction shall not be removed until tests indicate that at least 60% of the design strength of the concrete has developed.

**P-610-3.9 PLACING REINFORCEMENT.** All reinforcement shall be accurately placed, as shown on the plans, and shall be firmly held in position during concreting. Bars shall be fastened together at intersections. The reinforcement shall be supported by approved metal chairs. Shop drawings, lists, and bending details shall be supplied by the Contractor when required.

**P-610-3.10 EMBEDDED ITEMS.** Before placing concrete, any items that are to be embedded shall be firmly and securely fastened in place as indicated. All such items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The embedding of wood shall be avoided. The concrete shall be spaded and consolidated around and against embedded items.

**P-610-3.11 PLACING CONCRETE.** All concrete shall be placed during daylight, unless otherwise approved. The concrete shall not be placed until the depth and character of foundation, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved. Concrete shall be placed as soon as practical after mixing and in no case later than 1 hour after

water has been added to the mix. The method and manner of placing shall be such to avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. Dropping the concrete a distance of more than 5 ft (1.5 m), or depositing a large quantity at one point, will not be permitted. Concrete shall be placed upon clean, damp surfaces, free from running water, or upon properly consolidated soil.

The concrete shall be compacted with suitable mechanical vibrators operating within the concrete. When necessary, vibrating shall be supplemented by hand spading with suitable tools to assure proper and adequate compaction. Vibrators shall be manipulated so as to work the concrete thoroughly around the reinforcement and embedded fixtures and into corners and angles of the forms. The vibration at any joint shall be of sufficient duration to accomplish compaction but shall not be prolonged to the point where segregation occurs. Concrete deposited under water shall be carefully placed in a compact mass in its final position by means of a tremie, a closed bottom dump bucket, or other approved method and shall not be disturbed after being deposited.

**P-610-3.12 CONSTRUCTION JOINTS.** When the placing of concrete is suspended, necessary provisions shall be made for joining future work before the placed concrete takes its initial set. For the proper bonding of old and new concrete, such provisions shall be made for grooves, steps, keys, dovetails, reinforcing bars or other devices as may be prescribed. The work shall be arranged so that a section begun on any day shall be finished during daylight of the same day. Before depositing new concrete on or against concrete that has hardened, the surface of the hardened concrete shall be cleaned by a heavy steel broom, roughened slightly, wetted, and covered with a neat coating of cement paste or grout.

**P-610-3.13 EXPANSION JOINTS.** Expansion joints shall be constructed at such points and of such dimensions as may be indicated on the drawings. The premolded filler shall be cut to the same shape as that of the surfaces being joined. The filler shall be fixed firmly against the surface of the concrete already in place in such manner that it will not be displaced when concrete is deposited against it.

**P-610-3.14 DEFECTIVE WORK.** Any defective work discovered after the forms have been removed shall be immediately removed and replaced. If any dimensions are deficient, or if the surface of the concrete is bulged, uneven, or shows honeycomb, which in the opinion of the Engineer cannot be repaired satisfactorily, the entire section shall be removed and replaced at the expense of the Contractor.

**P-610-3.15 SURFACE FINISH.** All exposed concrete surfaces shall be true, smooth, and free from open or rough spaces, depressions, or projections. The concrete in horizontal plane surfaces shall be brought flush with the finished top surface at the proper elevation and shall be struck-off with a straightedge and floated. Mortar finishing shall not be permitted, nor shall dry cement or sand-cement mortar be spread over the concrete during the finishing of horizontal plane surfaces.

Finish of concrete shall match adjacent concrete, as indicated on the plans, or as directed/approved by the Engineer.

**P-610-3.16 CURING AND PROTECTION.** All concrete shall be properly cured and protected by the Contractor. The work shall be protected from the elements, flowing water, and from

defacement of any nature during the building operations. The concrete shall be cured as soon as it has sufficiently hardened by covering with an approved material. Water-absorptive coverings shall be thoroughly saturated when placed and kept saturated for a period of at least 3 days. All curing mats or blankets shall be sufficiently weighted or tied down to keep the concrete surface covered and to prevent the surface from being exposed to currents of air. Where wooden forms are used, they shall be kept wet at all times until removed to prevent the opening of joints and drying out of the concrete. Traffic shall not be allowed on concrete surfaces for 7 days after the concrete has been placed.

**P-610-3.17 DRAINS OR DUCTS.** Drainage pipes, conduits, and ducts that are to be encased in concrete shall be installed by the Contractor before the concrete is placed. The pipe shall be held rigidly so that it will not be displaced or moved during the placing of the concrete.

**P-610-3.18 COLD WEATHER PROTECTION.** Contractor shall obtain prior approval of the Engineer to place concrete when temperatures are below 40 °F (4 °C). When concrete is placed at temperatures below 40 °F (4 °C), the Contractor shall provide satisfactory methods and means to protect the mix from injury by freezing. The aggregates, or water, or both, shall be heated in order to place the concrete at temperatures between 50 °F and 100 °F (10 °C and 38 °C).

Calcium chloride may be incorporated in the mixing water when directed by the Engineer. Not more than 2 pounds (908 grams) of Type 1 nor more than 1.6 pounds (726 grams) of Type 2 shall be added per bag of cement. After the concrete has been placed, the Contractor shall provide sufficient protection such as cover, canvas, framework, heating apparatus, etc., to enclose and protect the structure and maintain the temperature of the mix at not less than 50 °F (10 °C) until at least 60% of the designed strength has been attained.

**P-610-3.19 FILLING JOINTS.** All joints that require filling shall be thoroughly cleaned, and any excess mortar or concrete shall be cut out with proper tools. Joint filling shall not be started until after final curing and shall be done only when the concrete is completely dry. The cleaning and filling shall be carefully done with proper equipment and in a manner to obtain a neat looking joint free from excess filler.

#### **METHOD OF MEASUREMENT & BASIS OF PAYMENT**

**P-610-4.1** There is no measurement or payment associated with this item, it shall be considered incidental to the Project Items contained within these Technical Specifications.



## **TESTING REQUIREMENTS**

ASTM C 31	Making and Curing Test Specimens in the Field
ASTM C 39	Compressive Strength of Cylindrical Concrete Specimens
ASTM C 136	Sieve Analysis of Fine and Coarse Aggregates
ASTM C 138	Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C 143	Slump of Hydraulic Cement Concrete
ASTM C 231	Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 666	Resistance of Concrete to Rapid Freezing and Thawing
ASTM C 1077	Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C 1260	Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)

## **MATERIAL REQUIREMENTS**

ASTM A 184	Specification for Fabricated Deformed Steel Bar or Rod Mats for Concrete Reinforcement
ASTM A 185	Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM A 497	Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement
ASTM A 615	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A 704	Welded Steel Plain Bars or Rod Mats for Concrete Reinforcement
ASTM C 33	Concrete Aggregates
ASTM C 94	Ready-Mixed Concrete
ASTM C 150	Portland Cement
ASTM C 171	Sheet Materials for Curing Concrete
ASTM C 172	Sampling Freshly Mixed Concrete
ASTM C 260	Air-Entraining Admixtures for Concrete
ASTM C 309	Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	Chemical Admixtures for Concrete

ASTM C 595	Blended Hydraulic Cements
ASTM C 618	Coal Flyash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM D 1751	Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
ASTM D 1752	Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
AASHTO T 26	Quality of Water to be Used in Concrete

**END OF ITEM P-610**

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## ITEM P-611 STRUCTURAL HYDRAULIC CEMENT CONCRETE

### DESCRIPTION

**P-611-1.1** This item shall consist of un-reinforced or reinforced structural hydraulic cement concrete, prepared and constructed in accordance with these specifications. The concrete shall be composed of aggregate, hydraulic cement and water. This item shall be required for conduit, catch basin repairs, adjustments and light can encasement in existing bituminous concrete where phasing time constraints require the use of hydraulic cement concrete.

There is no payment associated with this item; it shall be considered incidental to the various Project Items contained within these Technical Specifications. P-611 Structural Hydraulic Cement Concrete shall be used in all locations as required to meet schedule constraints shown on the phasing drawings. P-610 may be used in non-time sensitive areas with approval of the RPR.

### MATERIALS

**P-611-2.1 GENERAL.** Only approved materials, conforming to the requirements of these Specifications, shall be used in the work. They may be subjected to inspection and tests at any time during the progress of their preparation or use. The source of supply of each of the materials shall be approved by the RPR before delivery or use is started. The Contractor shall submit representative preliminary samples of the materials, when required, for examination and test. Materials shall be stored and handled to ensure the preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed therein.

In no case shall the use of pit-run or naturally mixed aggregates be permitted. Naturally mixed aggregate shall be screened and washed, and all fine and coarse aggregates shall be stored separately and kept clean. The mixing of different kinds of aggregates from different sources in one storage pile or alternating batches of different aggregates will not be permitted.

**P-611-2.2 AGGREGATE.** The aggregate for concrete shall meet the requirements of ASTM C 33. The aggregate shall be well graded from fine to coarse and shall meet the following grading requirements when tested in accordance with ASTM C 136.

Requirements for Gradation of Aggregate	
Sieve designation (square openings)	Percentage by weight passing Sieves
¾ inch	100
No. 4	95-100
No. 16	45-80
No. 30	25-55
No. 50	10-30
No. 100	2-10

Aggregate containing any materials that are deleteriously reactive with the alkalis in the blended hydraulic cement shall not be used under conditions conducive to reactions.

**P-611-2.3 CEMENT.** Cement shall be a blended hydraulic cement capable of producing a high-performance structural concrete with the following properties:

Compressive Strength - 1,000 psi at 2 hours and 5,000 psi at 28 days when tested in accordance with ASTM 39.

Shrinkage - less than 0.03% in accordance with ASTM C 157.

Chloride Permeability - less than 1,000 coulombs at 90 days in accordance with AASHTO T 277.

**P-611-2.4 ADMIXTURES.** Chemical and/or mineral admixtures, including air-entraining agents shall not be allowed.

**P-611-2.5 WATER.** The water used in concrete shall be free from sewage, oil, acid, strong alkalis, vegetable matter, and clay and loam. If the water is of questionable quality, it shall be tested in accordance with AASHTO T 26.

## CONSTRUCTION METHODS

**P-611-3.1 GENERAL.** The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the Contract Drawings and specified herein. All machinery and equipment owned or controlled by the Contractor, which he proposed to use on the work, shall be of sufficient size to meet the requirements of the work, and shall be such as to produce satisfactory work; all work shall be subject to the inspection and approval of the RPR. The Contractor shall employ, at all times, a sufficient force of workmen of such experience and ability that the work can be prosecuted in a satisfactory and workmanlike manner.

When ductbank, conduit, or light can is installed in runway and taxiway pavement during weekend closures, the Contractor is required to have an approved primary plant source and an approved back-up plant source with approved stockpiles available in the event of a breakdown of the primary plant.

**P-611-3.2 CONCRETE COMPOSITION.** The concrete shall consist of aggregate, hydraulic cement, and water capable of a 1,000-psi compressible strength in 2 hours and 5,000 psi in 28 days when tested in accordance with ASTM 39. The concrete shall contain 4 percent entrained air.

A concrete mix design shall be submitted to the RPR for approval prior to commencing and concrete work.

**P-611-3.3 ACCEPTANCE, SAMPLING AND TESTING.** Prior to beginning concrete placement operations, the Contractor shall prepare and place a quantity of structural hydraulic cement concrete according to the concrete mix design. The amount of concrete placed shall be

sufficient to place a test section 8 feet by 12 feet, 6 inches deep on 6 inches of crushed aggregate base. The Contractor shall use the same equipment that will be used during full production. Samples will be taken and tested as indicated below. The test section will be placed a minimum of seven (7) days prior to actual concrete production. There will be no separate payment for preparing and placing the test section, it is considered incidental and should be included in the various items of the contract.

The concrete shall be sampled in accordance with ASTM C 172. Concrete cylindrical test specimens shall be made in accordance with ASTM C 31 and tested in accordance with ASTM C 39. The Contractor shall cure and store the test specimens under such conditions as directed. The RPR will make the actual tests on the specimens at no expense to the Contractor.

**P-611-3.4 PROPORTIONING AND MEASURING DEVICES.** The Contractor shall use a volumetric measuring device in accordance with ASTM C685. The mobile volumetric concrete dispenser shall have separate bins for aggregate and sand, a watertight bin for cement and a tank for water. Material bins and tanks shall be approved by the RPR and shall provide a means for regulating the flow of aggregates, cement and water into a continuous mixer so that the required volume of material can be readily and accurately maintained.

**P-611-3.5 MIXING AND DISPENSING.** Concrete shall be mixed and dispensed at the site using a truck mounted mobile volumetric concrete dispenser with a continuous mixer. The dispensers shall meet the following minimum requirements:

Continuous Mixer Capacity	5 Cubic Yards
Aggregate Capacity	5 Cubic Yards
Cement Bin Capacity	40 Cubic Feet
Water Tank Capacity	200 Gallons
Production Rate	30 Cubic Yards Per Hour

**P-611-3.6 CONSISTENCY.** The consistency of the concrete shall be checked by the slump test specified in ASTM C 143.

**P-611-3.7 MIXING CONDITIONS.** The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40 F without permission of the RPR. If permission is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a concrete temperature not less than 50 F nor more than 100 F. The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material shall be permitted.

**P-611-3.8 PLACING CONCRETE.** The methods and manner of placing concrete shall be such to avoid segregation and displacement of the embedment. Concrete shall be placed upon clean, damp surfaces, free from running water.

The concrete shall be compacted with suitable mechanical vibrators operating within the concrete. When necessary, vibrating shall be supplemented by hand spading with suitable tools to assure proper and adequate compaction. Vibrators shall be manipulated so as to work the concrete thoroughly around the embedded fixtures and into corners and angles of the pour. The vibration at any joint shall be of sufficient duration to accomplish compaction but shall not be prolonged to the point where segregation occurs.

**P-611-3.9 COLD WEATHER PROTECTION.** When concrete is being placed and the air temperature is below 40 F, the Contractor shall provide satisfactory methods and means to protect the mix from injury by freezing. The aggregates, or water, or both shall be heated in order to place the concrete at temperatures between 50 F and 100 F.

### **MEASUREMENT AND PAYMENT**

**P-611-4.1 MEASUREMENT AND PAYMENT.** No separate measurement or payment will be made for Structural Hydraulic Cement Concrete. Payment for this item shall be included in appropriate individual Payment items.

### **TESTING AND MATERIAL REQUIREMENTS**

ASTM C 31 -	Test Cylinders
ASTM C 157 -	Shrinkage
ASTM C 33 -	Aggregate
ASTM C 172 -	Sampling
ASTM C 39 -	Cylinders
ASTM C 231 -	Air Content
ASTM C 94 -	Mixing
AASHTO T 277 -	Chloride Permeability
ASTM C 136 -	Gradation
ASTM C 143 -	Slump

**END OF ITEM P-611**

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## ITEM P-620 RUNWAY AND TAXIWAY MARKING

### DESCRIPTION

**P-620-1.1** This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, roadways, and aprons in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). It shall also consist of the removal of existing and temporary pavement markings in accordance with prescribed methods and at locations indicated on the construction drawings and as directed by the RPR.

The terms “paint” and “marking material” as well as “painting” and “application of markings” are interchangeable throughout this specification.

### MATERIALS

**P-620-2.1 MATERIALS ACCEPTANCE.** The Contractor shall furnish manufacturer's certified test reports for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer’s surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the RPR prior to the initial application of markings. The reports can be used for material acceptance or the RPR may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR. Material shall not be loaded into the equipment until inspected by the RPR.

### **P-620-2.2 MARKING MATERIALS.**

**Table 1. Marking Materials**

Paint <sup>1</sup>				Glass Beads <sup>2</sup>	
Type	Color	Fed Std. 595 Number	Application Rate Maximum	Type	Application Rate Minimum
Waterborne Type II	White	37925	115 ft <sup>2</sup> /gal (2.8 m <sup>2</sup> /l)	Type III	10 lb/gal (1.2 kg/l)
Waterborne Type II	Yellow	33538 or 33655	115 ft <sup>2</sup> /gal (2.8 m <sup>2</sup> /l)	Type III	10 lb/gal (1.2 kg/l)
Waterborne Type II	Black	37038	115 ft <sup>2</sup> /gal (2.8 m <sup>2</sup> /l)	No beads	N/A
Waterborne Type II	Red	31136	115 ft <sup>2</sup> /gal (2.8 m <sup>2</sup> /l)	Type IV	6 lb/gal (1.2 kg/l)
Waterborne Type II	Green	34108	115 ft <sup>2</sup> /gal (2.8 m <sup>2</sup> /l)	No beads	N/A

<sup>1</sup> See paragraph 620-2.2a

<sup>2</sup> See paragraph 620-2.2b

**a. PAINT.** Paint shall be waterborne and preformed thermoplastic in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595.

**Waterborne.** Paint shall meet the requirements of Federal Specification TT-P-1952F, Type II. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis.

**Preformed Thermoplastic Airport Pavement Markings.**

Markings must be composed of ester modified resins in conjunction with aggregates, pigments, and binders that have been factory produced as a finished product. The material must be impervious to degradation by aviation fuels, motor fuels, and lubricants.

- (1) The markings must be able to be applied in temperatures as low as 35°F without any special storage, preheating, or treatment of the material before application.
  - (a.) The markings must be supplied with an integral, non-reflectorized black border.
- (2) Graded glass beads.
  - (a.) The material must contain a minimum of 30% intermixed graded glass beads by weight. The intermixed beads shall conform to Federal Specification TT-B-1325D, Type I, gradation A and Federal Specification TT-B-1325D, Type IV.
  - (b.) The material must have factory applied coated surface beads in addition to the intermixed beads at a rate of one (1) lb (0.45 kg) (±10%) per 10 square feet (1 sq m). These factory-applied coated surface beads shall have a minimum of 90% true spheres, minimum refractive index of 1.50, and meet the following gradation.

**Preformed Thermoplastic Bead Gradation**

Size Gradation		Retained, %	Passing, %
U.S. Mesh	µm		
12	1700	0 - 2	98 - 100
14	1400	0 - 3.5	96.5 - 100
16	1180	2 - 25	75 - 98
18	1000	28 - 63	37 - 72
20	850	63 - 72	28 - 37

Size Gradation		Retained, %	Passing, %
U.S. Mesh	µm		
30	600	67 - 77	23 - 33
50	300	89 - 95	5 - 11
80	200	97 - 100	0 - 3

- (3) **Heating indicators.** The material manufacturer shall provide a method to indicate that the material has achieved satisfactory adhesion and proper bead embedment

during application and that the installation procedures have been followed.

(4) **Pigments.** Percent by weight.

(c.) White:

- Titanium Dioxide, ASTM D476, type II shall be 10% minimum.

(d.) Yellow and Colors:

- Titanium Dioxide, ASTM D476, type II shall be 1% minimum.
- Organic yellow, other colors, and tinting as required to meet color standard.

(5) **Prohibited materials.** The manufacturer shall certify that the product does not contain mercury, lead, hexavalent chromium, halogenated solvents, nor any carcinogen as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant federal regulations.

(6) **Daylight directional reflectance.**

(e.) White: The daylight directional reflectance of the white paint shall not be less than 75% (relative to magnesium oxide), when tested in accordance with ASTM E2302.

(f.) Yellow: The daylight directional reflectance of the yellow paint shall not be less than 45% (relative to magnesium oxide), when tested in accordance with ASTM E2302. The x and y values shall be consistent with the federal Hegman yellow color standard chart for traffic yellow standard 33538, or shall be consistent with the tolerance listed below:

x .462	x .470	x .479	x .501
y .438	y .455	y .428	y .452

(7) **Skid resistance.** The surface, with properly applied and embedded surface beads, must provide a minimum resistance value of 45 BPN when tested according to ASTM E303.

(8) **Thickness.** The material must be supplied at a nominal thickness of 65 mil (1.7 mm).

(9) **Environmental resistance.** The material must be resistant to deterioration due to exposure to sunlight, water, salt, or adverse weather conditions and impervious to aviation fuels, gasoline, and oil.

(10) **Retroreflectivity.** The material, when applied in accordance with manufacturer's guidelines, must demonstrate a uniform level of nighttime retroreflection when tested in accordance to ASTM E1710.

(11) **Packaging.** Packaging shall protect the material from environmental conditions until installation.

(12) **Preformed thermoplastic airport pavement marking requirements.**

- (g.) The markings must be a resilient thermoplastic product with uniformly distributed glass beads throughout the entire cross-sectional area. The markings must be resistant to the detrimental effects of aviation fuels, motor fuels and lubricants, hydraulic fluids, deicers, anti-icers, protective coatings, etc. Lines, legends, and symbols must be capable of being affixed to asphalt and/or Portland cement concrete pavements by the use of a large radiant heater. Colors shall be available as required.
- (h.) The markings must be capable of conforming to pavement contours, breaks, and faults through the action of airport traffic at normal pavement temperatures. The markings must be capable of fully conforming to grooved pavements, including pavement grooving per advisory circular (AC) 150/5320-12, current version. The markings shall have resealing characteristics, such that it is capable of fusing with itself and previously applied thermoplastics when heated with a heat source per manufacturer's recommendation.
- (i.) Multicolored markings must consist of interconnected individual pieces of preformed thermoplastic pavement marking material, which through a variety of colors and patterns, make up the desired design. The individual pieces in each large marking segment (typically more than 20 feet (6 m) long) must be factory assembled with a compatible material and interconnected so that in the field it is not necessary to assemble the individual pieces within a marking segment. Obtaining multicolored effect by overlaying materials of different colors is not acceptable due to resulting inconsistent marking thickness and inconsistent application temperature in the marking/substrate interface.
- (j.) The marking material must set up rapidly, permitting the access route to be re-opened to traffic after application.
- (k.) The marking material shall have an integral color throughout the thickness of the marking material.

- b. Reflective media.** Glass beads for white, green and yellow paint shall meet the requirement for Federal Specification TT-B-1325D Type III.  
Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.  
Glass beads shall not be used in black paint.  
Type III glass beads shall not be used in red and pink paint.

## CONSTRUCTION METHODS

**P-620-3.1 WEATHER LIMITATIONS.** Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer's recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed

exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers' recommendations for application and dry time.

**P-620-3.2 EQUIPMENT.** Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

**All mechanical marking equipment shall be provided with a digital tracking system that, at a minimum, measures, calculates and displays the following:**

- A. Application thickness measured in Mils**
- B. Mechanical marking equipment speed**
- C. Pressure at the paint nozzle**
- D. Distanced traveled by the mechanical marking equipment**
- E. Materials utilized measured in gallons**

A minimum of seven (7) days prior to the commencement of the application of any pavement markings, the contractor shall submit to the RPR, for approval, all calibration certificates, maintenance records and manufacturer's documentation for the specific marking equipment to be used. Equipment will also be inspected by the RPR prior to commencing the application of

pavement markings. Equipment deemed by the RPR to be in disrepair or in need of calibration shall NOT be utilized during the project until all repairs and calibrations have been made and the equipment inspected and accepted by the RPR. All repairs shall be made utilizing original manufactures or equivalent parts.

**P-620-3.3 PREPARATION OF SURFACES.** Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminates that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the RPR. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

**a. Preparation of new pavement surfaces.** The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the RPR to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.

**b. Preparation of pavement to remove existing markings.** Existing pavement

markings shall be removed by rotary grinding, water blasting, or by other methods approved by the RPR minimizing damage to the pavement surface. The removal area may need to be larger than the area of the markings to eliminate ghost markings. After removal of markings on asphalt pavements, apply a fog seal or seal coat to ‘block out’ the removal area to eliminate ‘ghost’ markings.

**c. Preparation of pavement markings prior to remarking.** Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the RPR. After removal, the surface shall be cleaned of all residue or debris.

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufactures application and surface preparation requirements must be submitted to the RPR prior to the initial application of markings.

**P-620-3.4 LAYOUT OF MARKINGS.** The proposed markings shall be laid out in advance of the paint application.

**P-620-3.5 APPLICATION.** An **initial** application of permanent paint at the rate specified in Table 1 shall be applied immediately upon completion of bituminous paving of each phase of the project. A **final** application of permanent paint at the rate specified in Table 1 shall be applied **30** days after the placement of bituminous surface course unless otherwise directed by the RPR. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the RPR.

Temporary markings, which are to be later removed may be applied at a lower application rate (30-50% of the specified application rate) but must meet the approval of the Engineer. Temporary markings must be maintained in a highly visible condition for the duration needed. Glass beads are not required for temporary markings.

The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

**Marking Dimensions and Spacing Tolerance**

<b>Dimension and Spacing</b>	<b>Tolerance</b>
36 inch (910 mm) or less	±1/2 inch (12 mm)
greater than 36 inch to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
greater than 60 feet (18.3 m)	±3 inch (76 mm)

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.

Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint or green paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made. Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed.

**P-620-3.6 APPLICATION--PREFORMED THERMOPLASTIC AIRPORT PAVEMENT MARKINGS.** To ensure minimum single-pass application time and optimum bond in the marking/substrate interface, the materials must be applied using a variable speed self-propelled mobile heater with an effective heating width of no less than 16 feet (5 m) and a free span between supporting wheels of no less than 18 feet (5.5 m). The heater must emit thermal radiation to the marking material in such a manner that the difference in temperature of 2 inches (50 mm) wide linear segments in the direction of heater travel must be within 5% of the overall average temperature of the heated thermoplastic material as it exits the heater. The material must be able to be applied at ambient and pavement temperatures down to 35°F (2°C) without any preheating of the pavement to a specific temperature. The material must be able to be applied without the use of a thermometer. The pavement shall be clean, dry, and free of debris. A non-volatile organic content (non-VOC) sealer with a maximum applied viscosity of 250 centiPoise must be applied to the pavement shortly before the markings are applied. The supplier must enclose application instructions with each box/package.

If lead time of thermoplastic markings is in excess of stated project completion time, temporary markings shall be applied for surface painted holding position signs. Contractor shall anticipate purchasing or fabricating stencils to match existing airfield surface painted holding position signs. Stencils shall be turned over to Massport at the completion of the project. The cost of fabricating/purchasing stencils shall be considered incidental to the project item P-620.06 Thermoplastic Pavement Markings. Preformed thermoplastic markings shall be applied once received and approved by Massport Operations and Capital Programs.

**P-620-3.7 CONTROL STRIP.** Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the RPR. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly embedded and evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

**P-620-3.8 RETRO-REFLECTANCE.** Reflectance shall be measured with a portable

retro- reflectometer meeting ASTM E1710 (or equivalent). A total of 6 reading shall be taken over a 6 square foot area with 3 readings taken from each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other.

**Minimum Retro-Reflectance Values**

Material	Retro-reflectance mcd/m <sup>2</sup> /lux		
	White	Yellow	Red
Initial Type I	300	175	35
Initial Type III	600	300	35
Initial Thermoplastic	225	100	35
All materials, remark when less than <sup>1</sup>	100	75	10

<sup>1</sup> ‘Prior to remarking determine if removal of contaminants on markings will restore retro- reflectance

**P-620-3.9 PROTECTION AND CLEANUP.** After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the RPR. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

**P-620-3.10 PAVEMENT MARKING REMOVAL.** If required, permanent and temporary painted markings on bituminous pavement shall be removed by grinding. Permanent and temporary painted markings on Portland Cement Concrete (PCC) pavement shall be removed by water blasting. Markings may also be removed by use of non-toxic environmentally safe chemicals. A small test area for each removal method shall be demonstrated to the Engineer before approval is given for removal of all designated markings. The Contractor shall ensure that pavement to remain at the completion of the contract is not damaged as a result of the paint removal procedure.

The physical removal of any marking shall include a pre-determined larger size and shape of removal area that encompasses the old marking and groups adjacent markings together into a larger rectangular removal area. For example, when removing a holding position marking consisting of a series of dashed and solid lines offset from each other, use a single rectangular removal area that is strikingly larger and encompasses the entire set of markings. Refer to FAA Advisory Circular AC 150/5340-1M, paragraph 1.3.6 for additional guidance.



**METHOD OF MEASUREMENT**

**P-620-4.1** The quantity of **initial** runway and taxiway markings applied as stripes, blocks, surface painted hold signs, numerals, hold bars, enhanced centerlines, and other airfield markings as shown on the plans, regardless of white, yellow, red or black, to be paid for shall be the number of square feet of painting performed in accordance with the specifications and accepted by the RPR. All markings except black and green markings shall require glass beads which shall not be measured separately.

**P-620-4.2** The quantity of **final** runway and taxiway markings applied as stripes, blocks, surface painted hold signs, numerals, hold bars, enhanced centerlines, and other airfield markings as shown on the plans, regardless of white, yellow, red or black, to be paid for shall be the number of square feet of painting performed in accordance with the specifications and accepted by the RPR. All markings except black and green markings shall require glass beads which shall not be measured separately.

**P-620-4.3** The quantity of pavement marking removal shall be measured per square foot of marking removed and approved by the RPR. All materials necessary to remove old marking, labor, equipment, and materials shall be incidental to P-620.03.

**P-620-4.4** The quantity of thermoplastic pavement markings to be paid for shall be the number of square feet of thermoplastics placed in accordance with the contract drawings and specifications and accepted by the RPR. Thermoplastic pavement markings include surface preparation and application of the thermoplastic markings.

**BASIS OF PAYMENT**

**620-5.1** Payment shall be made at the contract price per square foot for pavement markings. The installation of reflective media, when required, shall be considered as incidental to the price of the pavement markings for payment purposes. These prices shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

**620-5.2** Payment shall be made at the contract price per square foot for pavement marking removal. These prices shall be full compensation for furnishing all materials and for all labor, demolition, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
P-620.01	Initial Pavement Markings .....	per Square Foot
P-620.02	Final Pavement Markings.....	per Square Foot
P-620.03	Pavement Marking Removal.....	per Square Foot
P-620.04	Thermoplastic Pavement Markings .....	per Square Foot



## REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

### ASTM International (ASTM)

- ASTM D476 Standard Classification for Dry Pigmentary Titanium Dioxide Products
- ASTM D968 Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
- ASTM D1652 Standard Test Method for Epoxy Content of Epoxy Resins
- ASTM D2074 Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
- ASTM D2240 Standard Test Method for Rubber Property - Durometer Hardness
- ASTM D7585 Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
- ASTM E303 Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
- ASTM E1710 Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
- ASTM E2302 Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer
  
- ASTM G154 Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

### Code of Federal Regulations (CFR)

- 40 CFR Part 60, Appendix A-7, Method 24  
Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings
- 29 CFR Part 1910.1200 Hazard Communication Federal Specifications (FED SPEC)

- FED SPEC TT-B-1325D Beads (Glass Spheres) Retro-Reflective
- FED SPEC TT-P-1952F Paint, Traffic and Airfield Marking, Waterborne FED
  
- STD 595 Colors used in Government Procurement

### Commercial Item Description

- A-A-2886B Paint, Traffic, Solvent Based Advisory Circulars (AC)
  
- AC 150/5340-1 Standards for Airport Markings
- AC 150/5320-12 Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

**END OF ITEM P-620**

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## ITEM D-701 PIPE FOR STORM DRAINS AND CULVERTS

### DESCRIPTION

**701-1.1** This item shall consist of the construction of pipe culverts and storm drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

### MATERIALS

**701-2.1** Materials shall meet the requirements shown on the plans and specified below. Underground piping and components used in drainage systems for terminal and aircraft fueling ramp drainage shall be noncombustible and inert to fuel in accordance with National Fire Protection Association (NFPA) 415.

**701-2.2 Pipe.** The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements:

ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C1479	Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations

**701-2.3 Concrete.** Concrete for pipe cradles shall have a minimum compressive strength of 2000 psi (13.8 MPa) at 28 days and conform to the requirements of ASTM C94.

**701-2.4 Rubber gaskets.** Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C443. Rubber gaskets for PVC pipe, polyethylene, and polypropylene pipe shall conform to the requirements of ASTM F477. Rubber gaskets for zinc-coated steel pipe and precast galvanized pipe shall conform to the requirements of ASTM D1056, for the "RE" closed cell grades. Rubber gaskets for steel reinforced thermoplastic ribbed pipe shall conform to the requirements of ASTM F477

**701-2.5 Joint mortar.** Pipe joint mortar shall consist of one part Portland cement and two parts sand. The Portland cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

**701-2.6 Joint fillers.** Not used.

**701-2.7 Plastic gaskets.** Not used.

**701-2.8. Controlled low-strength material (CLSM).** Controlled low-strength material shall conform to the requirements of Item P-153. When CLSM is used, all joints shall have gaskets.

**701-2.9 Precast box culverts.** Manufactured in accordance with and conforming to ASTM C1433.

**701-2.10 Precast concrete pipe.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or American Concrete Pipe Association QCast Plant Certification program.

## CONSTRUCTION METHODS

**701-3.1 Excavation.** The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but it shall not be less than the external diameter of the pipe plus 12 inches (300 mm) on each side. The trench walls shall be approximately vertical.

The Contractor shall comply with all current federal, state and local rules and regulations governing the safety of men and materials during the excavation, installation and backfilling operations. Specifically, the Contractor shall observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching and shoring are strictly adhered to. The width of the trench shall be sufficient to permit satisfactorily jointing of the pipe and thorough compaction of the bedding material under the pipe and backfill material around the pipe, but it shall not be greater than the widths shown on the plans trench detail.

Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 8 inch (200 mm) or 1/2 inch (12 mm) for each foot of fill over the top of the pipe (whichever is greater) but for no more than three-quarters of the nominal diameter of the pipe. The excavation below grade should be filled with granular material to form a uniform foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The RPR shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

The excavation for pipes placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the pipe as shown on the plans.

**701-3.2 Bedding.** The bedding surface for the pipe shall provide a foundation of uniform density to support the pipe throughout its entire length.

**a. Rigid pipe.** The pipe bedding shall be constructed uniformly for the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 in when the bedding thickness is less than 6 inches, and 1-1/2 in when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed uncompacted material under the middle third of the pipe prior to placement of the pipe.

**b. Flexible pipe.** For flexible pipe, the bed shall be roughly shaped to fit the pipe, and a bedding blanket of sand or fine granular material shall be provided as follows:

*Flexible Pipe Bedding*

Pipe Corrugation Depth		Minimum Bedding Depth	
inch	mm	inch	mm
1/2	12	1	25
1	25	2	50
2	50	3	75
2-1/2	60	3-1/2	90

**c. Other pipe materials.** For PVC, polyethylene, polypropylene, or fiberglass pipe, the bedding material shall consist of coarse sands and gravels with a maximum particle size of 3/4 inches (19 mm). For pipes installed under paved areas, no more than 12% of the material shall pass the No. 200 (0.075 mm) sieve. For all other areas, no more than 50% of the material shall pass the No. 200 (0.075 mm) sieve. The bedding shall have a thickness of at least 6 inches (150 mm) below the bottom of the pipe and extend up around the pipe for a depth of not less than 50% of the pipe's vertical outside diameter.

**701-3.3 Laying pipe.** The pipe laying shall begin at the lowest point of the trench and proceed up grade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing up grade.

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

Elliptical and elliptically reinforced concrete pipes shall be placed with the manufacturer's reference lines designating the top of the pipe within five degrees of a vertical plane through the longitudinal axis of the pipe.

**701-3.4 Joining pipe.** Joints shall be made with (1) cement mortar, (2) cement grout, or (3) rubber gaskets.

Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Molds or runners shall be used for grouted joints to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible watertight seal.

**a. Concrete pipe.** Concrete pipe may be either bell and spigot or tongue and groove. Pipe sections at joints shall be fully seated and the inner surfaces flush and even

**b. Metal pipe.** Not Used.

**c. PVC, Polyethylene, or Polypropylene pipe.** Not Used.

**d. Fiberglass pipe.** Not Used.

**701-3.5 Embedment and Overfill.** Pipes shall be inspected before any fill material is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and re-laid or replaced at the Contractor's expense.

### **701-3.5-1 Embedment Material Requirements**

a. **Concrete Pipe.** Embedment material and compaction requirements shall be in accordance with the applicable Type of Standard Installation (Types 1, 2, 3, or 4) per ASTM C1479. If a concrete cradle or CLSM embedment material is used, it shall conform to the plan details.

b. **Plastic and fiberglass Pipe.** Not Used.

c. **Metal Pipe.** Not Used.

### **701-3.5-2 Placement of Embedment Material**

The embedment material shall be compacted in layers not exceeding 6 inches (150 mm) on each side of the pipe and shall be brought up one foot (30 cm) above the top of the pipe or to natural ground level, whichever is greater. Thoroughly compact the embedment material under the haunches of the pipe without displacing the pipe. Material shall be brought up evenly on each side of the pipe for the full length of the pipe.

When the top of the pipe is above the top of the trench, the embedment material shall be compacted in layers not exceeding 6 inches (150 mm) and shall be brought up evenly on each side of the pipe to one foot (30 cm) above the top of the pipe. All embedment material shall be compacted to a density required under Item P-152.

Concrete cradles and flowable fills, such as controlled low strength material (CLSM) or controlled density fill (CDF), may be used for embedment provided adequate flotation resistance can be achieved by restraints, weighing, or placement technique.

It shall be the Contractor's responsibility to protect installed pipes and culverts from damage due to construction equipment operations. The Contractor shall be responsible for installation of any extra strutting or backfill required to protect pipes from the construction equipment.

### **701-3.6 Overfill**

Pipes shall be inspected before any overfill is in place. Any pipes found to be out of alignment, unduly settled, or damaged shall be removed and re-laid or replaced at the Contractor's expense. Evaluation of any damage to RCP shall be evaluated based on AASHTO R73.

Overfill material shall be placed and compacted in layers as required to achieve compaction to at least 95 percent standard proctor per ASTM D1557. The soil shall contain no debris, organic matter, frozen material, or stones with a diameter greater than one half the thickness of the compacted layers being placed.

### **701-3.7 Inspection Requirements**

An initial post installation inspection shall be performed by the RPR no sooner than 30 days after completion of installation and final backfill. Clean or flush all lines prior to inspection.

### **701-3.8 Removal And Disposal Of Existing Storm Drain Pipe.**

Existing storm drain pipe shall be removed where shown on the plans or as directed by the RPR and legally disposed of off-site. All costs associated with the removal and proper disposal of pipe, concrete/steel trench drain and related materials shall be absorbed by the Contractor as incidental to P-152 Unclassified Excavation. The ends of storm drain pipes to be abandoned



shall be plugged watertight with high strength, non-shrink grout.

**701-3.9 Fill And Cap Abandoned Existing Storm drain Pipe.** Abandoned storm drain pipes shall be filled with CLSM as specified in Item P-153. The ends of storm drain pipes to be abandoned shall be wrapped with filter fabric and a sufficient amount (one cubic yard minimum) of concrete in accordance with P-610 shall be placed around entire pipe end ensuring a complete seal of the pipe all around. Contractor shall place additional concrete when directed by the resident project representative, and at no additional cost to the owner.

**701-3.10 Connections To Catch Basins.** Where required to connect new pipe to existing catch basins the Contractor shall core a hole of the appropriate size in the existing structure.

Method of cutting hole in structure must be approved by the RPR prior to cutting. New pipe connection shall be grouted with a water-tight non-shrink, high-strength grout.

Coring of existing structures, saw cutting, removing, and replacing bituminous pavement and base materials as required for connecting pipe to existing manholes/catch basins shall be incidental to the applicable pipe pay item.

#### **METHOD OF MEASUREMENT**

**701-4.1** The length of pipe shall be measured in linear feet (m) of pipe in place, completed, and accepted. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. All fittings shall be included in the footage as typical pipe sections in the pipe being measured.

**701-4.2.** Removal of existing storm drain pipes, drain structures, end sections, flared ends, etc. where indicated, shall be measured in linear feet of pipe removed. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable.

#### **BASIS OF PAYMENT**

**701-5.0** These prices shall fully compensate the Contractor for furnishing all materials and for all preparation, excavation, and installation of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

**701-5.1** Payment will be made at the contract unit price per linear foot (meter) for 12-inch Class V RCP pipe. This price shall fully compensate the Contractor for furnishing all materials and for all preparation, excavation, bedding, backfill, and installation of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item. Connections of proposed storm drain to existing or proposed drainage structures will be incidental to the respective pay items for the storm drain pipe.

**701-5.2** Payment will be made at the contract unit price per unit for the removal of existing storm drain pipe. This price shall fully compensate the Contractor for furnishing all materials and for all preparation, excavation, backfill, and removal of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item as show on the Contract Drawings or as directed by the RPR.

Payment will be made under:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
D-701.01	12-Inch Class V RCP Storm Drainpipe_____	per Linear Foot
D-701.02	Removal of Existing Storm Drainpipe_____	per Linear Foot

### REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M167	Standard Specification for Corrugated Steel Structural Plate, Zinc- Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M190	Standard Specification for Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M196	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M219	Standard Specification for Corrugated Aluminum Alloy Structural Plate for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M243	Standard Specification for Field Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe AASHTO M294 Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) Diameter ASTM International (ASTM)
ASTM A760	Standard Specification for Corrugated Steel Pipe, Metallic Coated for Sewers and Drains
ASTM A761	Standard Specification for Corrugated Steel Structural Plate, Zinc Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches

ASTM A762	Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM A849	Standard Specification for Post-Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe
ASTM B745	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
ASTM C14	Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C94	Standard Specification for Ready Mixed Concrete
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C506	Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
ASTM C655	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe
ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C1433	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
ASTM D1056	Standard Specification for Flexible Cellular Materials Sponge or Expanded Rubber
ASTM D3034	Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3212	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe
ASTM D3282	Standard Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes

ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F667	Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (DR PR) Based on Outside Diameter
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F894	Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F2435	Standard Specification for Steel Reinforced Polyethylene (PE) Corrugated Pipe
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
ASTM F2736	Standard Specification for 6 to 30 in. (152 to 762 mm) Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe
ASTM F2764	Standard Specification for 30 to 60 in. (750 to 1500 mm) Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications
ASTM F2881	Standard Specification for 12 to 60 in. (300 to 1500 mm) Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications National Fire Protection Association (NFPA)
NFPA 415	Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways

**END ITEM D-701**

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## ITEM D-751 MANHOLES, CATCH BASINS, INLETS AND INSPECTION HOLES

### DESCRIPTION

**751-1.1** This item shall consist of construction of manholes, catch basins, inlets, and inspection holes, in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the RPR. The Contractor shall provide shop drawings stamped by a professional engineer registered in the Commonwealth of Massachusetts for all aircraft rated structures and structural components.

### MATERIALS

**751-2.1 Brick.** The brick shall conform to the requirements of ASTM C32, Grade MS.

**751-2.2 Mortar.** Mortar shall consist of one part Portland cement and two parts sand. The cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

**751-2.3 Concrete.** Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

**751-2.4 Precast concrete pipe manhole rings.** Precast concrete pipe manhole rings shall conform to the requirements of ASTM C478. Unless otherwise specified, the risers and offset cone sections shall have an inside diameter of not less than 36 inches (90 cm) nor more than 48 inches (120 cm). There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole. Gaskets shall conform to the requirements of ASTM C443.

**751-2.5 Corrugated metal.** Corrugated metal shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M36.

**751-2.6 Frames, covers, and grates.** The castings shall conform to one of the following requirements:

- a. ASTM A48, Class 35B: Gray iron castings
- b. ASTM A47: Malleable iron castings
- c. ASTM A27: Steel castings
- d. ASTM A283, Grade D: Structural steel for grates and frames
- e. ASTM A536, Grade 65-45-12: Ductile iron castings
- f. ASTM A897: Austempered ductile iron castings

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings, aircraft gear configuration and/or direct loading, specified.

Each frame and cover or grate unit shall be provided with fastening members to prevent it from being dislodged by traffic but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

**751-2.7 Steps.** The steps or ladder bars shall be gray or malleable cast iron or galvanized steel. The steps shall be the size, length, and shape shown on the plans and those steps that are not galvanized shall be given a coat of asphalt paint, when directed.

**751-2.8 Precast inlet structures.** Manufactured in accordance with and conforming to ASTM C913.

## CONSTRUCTION METHODS

### 751-3.1 Unclassified excavation

- a. The Contractor shall excavate for structures and footings to the lines and grades or elevations, shown on the plans, or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximately only; and the RPR may direct, in writing, changes in dimensions or elevations of footings necessary for a satisfactory foundation.
- b. Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the RPR. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. Where concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed and excavation to final grade shall not be made until immediately before the concrete or reinforcing is placed.
- c. The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for the structure.
- d. All bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall not disturb, or damage finished masonry. The cost of removal shall be included in the unit price bid for the structure.
- e. After excavation is completed for each structure, the Contractor shall notify the RPR. No concrete or reinforcing steel shall be placed until the RPR has approved the depth of the excavation and the character of the foundation material.

### 751-3.2 Brick structures.

- a. **Foundations.** A prepared foundation shall be placed for all brick structures after the foundation excavation is completed and accepted. Unless otherwise specified, the base shall consist of reinforced concrete mixed, prepared, and placed in accordance with the requirements of Item P-610.
- b. **Laying brick.** All brick shall be clean and thoroughly wet before laying so that they will not absorb any appreciable amount of additional water at the time they are laid. All brick shall be laid in freshly made mortar. Mortar not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted. An ample

layer of mortar shall be spread on the beds and a shallow furrow shall be made in it that can be readily closed by the laying of the brick. All bed and head joints shall be filled solid with mortar. End joints of stretchers and side or cross joints of headers shall be fully buttered with mortar and a shoved joint made to squeeze out mortar at the top of the joint. Any bricks that may be loosened after the mortar has taken its set, shall be removed, cleaned, and re-laid with fresh mortar. No broken or chipped brick shall be used in the face, and no spalls or bats shall be used except where necessary to shape around irregular openings or edges; in which case, full bricks shall be placed at ends or corners where possible, and the bats shall be used in the interior of the course. In making closures, no piece of brick shorter than the width of a whole brick shall be used; and wherever practicable, whole brick shall be used and laid as headers.

- c. **Joints.** All joints shall be filled with mortar at every course. Exterior faces shall be laid up in advance of backing. Exterior faces shall be plastered or parged with a coat of mortar not less than 3/8 inch (9 mm) thick before the backing is laid up. Prior to parging, all joints on the back of face courses shall be cut flush. Unless otherwise noted, joints shall be not less than 1/4 inch (6 mm) nor more than 1/2 inch (12 mm) wide and the selected joint width shall be maintained uniform throughout the work.
- d. **Pointing.** Face joints shall be neatly struck, using the weather-struck joint. All joints shall be finished properly as the laying of the brick progresses. When nails or line pins are used, the holes shall be immediately plugged with mortar and pointed when the nail or pin is removed.
- e. **Cleaning.** Upon completion of the work all exterior surfaces shall be thoroughly cleaned by scrubbing and washing with water. If necessary to produce satisfactory results, cleaning shall be done with a 5% solution of muriatic acid which shall then be rinsed off with liberal quantities of water.
- f. **Curing and cold weather protection.** The brick masonry shall be protected and kept moist for at least 48 hours after laying the brick. Brick masonry work or pointing shall not be done when there is frost on the brick or when the air temperature is below 50°F (10°C) unless the Contractor has, on the project ready to use, suitable covering and artificial heating devices necessary to keep the atmosphere surrounding the masonry at a temperature of not less than 60°F (16°C) for the duration of the curing period.

**751-3.3 Concrete structures.** Concrete structures which are to be cast-in-place within the project boundaries shall be built on prepared foundations, conforming to the dimensions and shape indicated on the plans. The construction shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

All invert channels shall be constructed and shaped accurately to be smooth, uniform, and cause minimum resistance to flowing water. The interior bottom shall be sloped to the outlet.

**751-3.4 Precast concrete structures.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program.

Precast concrete structures shall conform to ASTM C478. The Contractor shall provide shop drawings stamped by a professional engineer registered in the Commonwealth of



Massachusetts for all aircraft rated structures and structural components. Precast concrete structures shall be constructed on prepared or previously placed slab foundations conforming to the dimensions and locations shown on the plans. All precast concrete sections necessary to build a completed structure shall be furnished. The different sections shall fit together readily. Joints between precast concrete risers and tops shall be full-bedded in cement mortar and shall: (1) be smoothed to a uniform surface on both interior and exterior of the structure or (2) utilize a rubber gasket per ASTM C443. The top of the upper precast concrete section shall be suitably formed and dimensioned to receive the metal frame and cover or grate, or other cap, as required. Provision shall be made for any connections for lateral pipe, including drops and leads that may be installed in the structure. The flow lines shall be smooth, uniform, and cause minimum resistance to flow. The metal or metal encapsulated steps that are embedded or built into the side walls shall be aligned and placed in accordance to ASTM C478. When a metal ladder replaces the steps, it shall be securely fastened into position.

**751-3.5 Corrugated metal structures.** Corrugated metal structures shall be prefabricated. All standard or special fittings shall be furnished to provide pipe connections or branches with the correct dimensions and of sufficient length to accommodate connecting bands. The fittings shall be welded in place to the metal structures. The top of the metal structure shall be designed so that either a concrete slab or metal collar may be attached to allow the fastening of a standard metal frame and grate or cover. Steps or ladders shall be furnished as shown on the plans. Corrugated metal structures shall be constructed on prepared foundations, conforming to the dimensions and locations as shown on the plans. When indicated, the structures shall be placed on a reinforced concrete base.

**751-3.6 Inlet and outlet pipes.** Inlet and outlet pipes shall extend through the walls of the structures a sufficient distance beyond the outside surface to allow for connections. They shall be cut off flush with the wall on the inside surface of the structure, unless otherwise directed. For concrete or brick structures, mortar shall be placed around these pipes to form a tight, neat connection.

**751-3.7 Placement and treatment of castings, frames, and fittings.** All castings, frames, and fittings shall be placed in the positions indicated on the plans or as directed by the RPR, and shall be set true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

When frames or fittings are placed on previously constructed masonry, the bearing surface of the masonry shall be brought true to line and grade and shall present an even bearing surface so the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the plans or as directed by the RPR. All units shall set firm and secure.

After the frames or fittings have been set in final position, the concrete or mortar shall be allowed to harden for seven (7) days before the grates or covers are placed and fastened down.

**751-3.8 Installation of steps.** The steps shall be installed as indicated on the plans or as directed by the RPR. When the steps are to be set in concrete, they shall be placed and secured in position before the concrete is placed. When the steps are installed in brick masonry, they shall be placed as the masonry is being built. The steps shall not be disturbed or used until the concrete or mortar has hardened for at least seven (7) days. After seven (7) days, the steps shall

be cleaned and painted, unless they have been galvanized.

When steps are required with precast concrete structures they shall meet the requirements of ASTM C478. The steps shall be cast into the side of the sections at the time the sections are manufactured or set in place after the structure is erected by drilling holes in the concrete and cementing the steps in place.

When steps are required with corrugated metal structures, they shall be welded into aligned position at a vertical spacing of 12 inches (300 mm).

Instead of steps, prefabricated ladders may be installed. For brick or concrete structures, the ladder shall be held in place by grouting the supports in drilled holes. For metal structures, the ladder shall be secured by welding the top support to the structure and grouting the bottom support into drilled holes in the foundation or as directed by the RPR.

### **751-3.9 Backfilling**

a. After a structure has been completed, the area around it shall be backfilled with approved material, in horizontal layers not to exceed 8 inches (200 mm) in loose depth and compacted to the density required in Item P-152. Each layer shall be deposited evenly around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

b. Backfill shall not be placed against any structure until approved by the RPR. For concrete structures, approval shall not be given until the concrete has been in place seven (7) days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill and placing methods.

c. Backfill shall not be measured for direct payment. Performance of this work shall be considered an obligation of the Contractor covered under the contract unit price for the structure involved.

**751-3.10 Cleaning and restoration of site.** After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as approved by the RPR. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

**751-3.11 Structure Removal.** The contractor shall demolish and remove the existing drainage structures as noted on the Contract Drawings. The existing maintenance pad and frame and cover shall be demolished, removed and dispose of off airport property. The contractor shall clean the interior of the handhole to remove any sludge and debris. All interior metal structures shall be removed. The contractor shall demolish the structure, remove all debris, and dispose of legally off-site. No part of the structure shall be buried or used as backfill. The contractor shall backfill the hole with suitable fill, in kind with the surrounding earth and restore the area.

**751-3.12 Castings/Fittings/Hardware.** Frames, grates, hoods shall be installed in accordance with details and the manufacturers recommendations.

## **METHOD OF MEASUREMENT**

**751-4.1** Manholes, catch basins, inlets, inspection holes, removal of structures, frames, and grates shall be measured by the unit per each, complete, in-place and accepted by the RPR.

## **BASIS OF PAYMENT**

**751-5.1** The accepted quantities of manholes, catch basins, inlets, inspection holes, removal of structures, change in type, frames, grates, drainage pads, and hoods will be paid for at the contract unit price per each in place when completed. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials; furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

<u><b>ITEM</b></u>	<u><b>DESCRIPTION</b></u>	<u><b>UNIT</b></u>
Item D-751.01	Manholes_____	per each
Item D-751.02	Catch Basins_____	per each
Item D-751.04	Frame and Grate (or Cover)_____	per each
Item D-751.05	Frame and Grate (or Cover) Removed and Discarded__	per each

## REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

### ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron
Castings ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C32	Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C144	Standard Specification for Aggregate for
Masonry Mortar ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C913	Standard Specification for Precast Concrete Water and Wastewater Structures.

### American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M36	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains
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**END OF ITEM D-751**

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## ITEM D-910 UTILITY ADJUSTMENTS AND MODIFICATIONS

### DESCRIPTION

**D-910-1.1** This item shall consist of adjusting existing utility (drainage, electrical, water, etc.) structures, in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the RPR.

### MATERIALS

**D-910-2.1 BRICK.** The brick shall conform to the requirements of ASTM C32, Grade MS.

**D-910-2.2 MORTAR.** Mortar shall consist of one part Portland cement and two parts sand. The cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

**D-910-2.3 CONCRETE.** Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

**D-910-2.4 HOT MIX ASPHALT.** Hot Mix Asphalt used in the support of structures shall conform to the requirements of Project Item P-401, Asphalt Mix Pavement of these specifications.

**D-910-2.5 CRUSHED AGGREGATE BASE COURSE.** NOT USED.

**D-910-2.6 CONCRETE BLOCKS.** The concrete blocks shall be airport rated and conform to the requirements of ASTM C139.

**D-910-2.7 STRUCTURAL HYDRAULIC CEMENT CONCRETE.** Structural Hydraulic Cement Concrete used in the support of structures shall conform to the requirements of Project Item P-611, Structural Hydraulic Cement Concrete of these specifications.

**D-910-2.8 PROTECTION OF WORK.** The Contractor will be held responsible for the protection of the castings. Any frames, grates, or covers damaged in any manner during the progress of construction shall be replaced with new castings by the Contractor, at their expense.

### CONSTRUCTION METHODS

**D-910-3.1 STRUCTURE ADJUSTMENTS.** Castings shall be adjusted to new elevations or reset by the use of airport strength brick and mortar. Castings shall be adjusted to new elevations or rebuilt by saw cutting and removing existing pavement, removing and carefully storing the existing casting, removing deteriorated setting bed material down to sound unyielding material as determined by the Engineer, raising, lowering or resetting the setting bed to required elevation using airport strength bricks and/or high early strength concrete, resetting the existing or setting the new casting on setting bed to finished elevation, installing the required anchor bolts and surrounding the casting with a collar of high early strength concrete. High early strength collar shall be set to an elevation 3" below finished grade.

**D-910-3.2 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES, AND FITTINGS**

All castings, frames, and fittings shall be placed in the positions indicated on the plans or as directed by the RPR and shall be set true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

When frames or fittings are placed on previously constructed masonry, the bearing surface of the masonry shall be brought true to line and grade and shall present an even bearing surface so the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the plans or as directed by the RPR. All units shall set firm and secure.

After the frames or fittings have been set in final position and the concrete or mortar has been allowed to harden, the grates and covers shall be placed and fastened down.

**D-910-3.3 CLEANING AND RESTORATION OF SITE**

The Contractor shall dispose of all surplus material and rubbish offsite. The Contractor shall restore all disturbed areas to the satisfaction of the Engineer. Interior of utility structures shall be cleaned of all debris prior to installing casting cover.

After all work is completed, the Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

**METHOD OF MEASUREMENT**

**D-910-4.1** Structures adjusted (raised or lowered) shall be measured by Each structure adjusted.

**BASIS OF PAYMENT**

**D-910-5.1** The accepted quantities of Structure Adjustments will be paid for at the contract unit price per each, complete in place and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation, excavation, pavement saw cutting and repair, cleaning and debris removal, and for all materials, labor, equipment, tools and incidentals necessary to complete the work as shown on the Drawings or as directed by the Engineer.

Payment will be made under:

<u>ITEM DESCRIPTION</u>	<u>UNIT</u>
D-910.01      Structure Adjustment _____	per Each

## REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

### ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM C32	Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C139	Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
	American Association of State Highway and Transportation Officials (AASHTO)
AASHTO M36	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains

**END OF ITEM D-910**



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## **ITEM T-905 TOPSOIL AND SEEDING**

### **DESCRIPTION**

**T-905-1.1** This item shall consist of soil preparation, seeding the areas shown on the plans or as directed by the RPR in accordance with these specifications.

**T-905-1.2** This item shall consist of preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the RPR. Topsoil obtained on-site shall be from the material stockpile located near the fence relocation limits.

### **MATERIALS**

**T-905-2.1 SAMPLES.** Samples of all materials to be provided under this Contract shall be submitted to the RPR for inspection and approval.

**T-905-2.2 TOPSOIL.** The suitability of onsite topsoil for use in preparation for the installation of seed will be determined by the RPR. Any material deemed unsuitable for use as topsoil by the RPR shall be legally disposed of off Airport property. Onsite or Offsite Topsoil shall be the surface layer of soil, and existing onsite stockpile shown on the plans, with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches or more in diameter), pavement rubble, clay lumps or similar objects. Brush and other vegetation shall be cut and removed and shall not be incorporated with the soil during handling operations. Ordinary sods and herbaceous growth such as grass and weeds are not to be removed but shall be thoroughly broken up and intermixed with the soil during handling operations. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall be not less than 3% nor more than 20% as determined by the wet-combustion method (chromic acid reduction). There shall be not less than 20% nor more than 80% of the material passing the 200-mesh sieve as determined by the wash test in accordance with ASTM C117.

Onsite topsoil may be amended by the Contractor with approved materials and methods to meet the above Specifications. Onsite topsoil which does not meet the above requirements must be tested and modified by the Contractor or disposed of onsite at no additional cost. Contractor should anticipate supplying off-site topsoil to supplement existing on-site topsoil.

**T-905-2.3 SEED.** The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. The Contractor may propose an alternate seed mixture for approval by the RPR. Seed shall conform to the requirements of Federal Specification JJJ-S-181. *Seed mixture shall not contain Millet or other large seed producing grass with a tendency to attract wildlife.*

Seed shall be furnished separately or in mixtures in standard containers with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the RPR duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within 6 months of date of delivery. This statement shall include name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed.

Grass seed shall be of the previous year’s crop and in no case shall the weed seed exceed 1% by weight. The grass seed shall conform to the requirements of the following:

Common Name <sup>1</sup>	Scientific Name	% in Mix (by Weight)
Little bluestem <sup>2</sup>	<i>Schizachyrium scoparium</i>	25
Common hairgrass	<i>Deschampsia flexuosa</i>	25
Poverty grass	<i>Danthonia spicata</i>	25
Annual ryegrass	<i>Lolium multiflorum</i>	25

<sup>1</sup> All seed must be locally sourced from plants grown in New England or New York.

<sup>2</sup> Little bluestem seed must be coated and inoculated.

Seed mixture shall be applied at a rate of 150lbs per acre.

**T-905-2.4 INSPECTION AND TESTS.** Within 10 days following contract award, the RPR shall be notified of the source of topsoil to be furnished by the Contractor. The topsoil shall be inspected to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the Contractor may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths, for testing purposes as specified above.

**T-905-2.5 LIME AND FERTILIZER.** Lime and fertilizer shall be in accordance with the seed supplier’s recommendations.

## CONSTRUCTION METHODS

**T-905-3.1 GENERAL.** Areas to be re-graded and topsoil and seeded shall be shown on the plans. Suitable equipment necessary for grading, proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the RPR before the various operations are started.

**T-905-3.2 GRADING THE GROUND SURFACE.** Infield area grading shall consist of re-grading grassed infield areas to the lines and grades shown in the Plans. There will be no separate measurement or payment for excavation/embankment associated with re-grading these infield areas. All excavation/embankment/on-site disposal of excess or unsuitable excavation associated with re-grading of infield areas will be incidental to the pay items.

**T-905-3.3 PREPARING THE GROUND SURFACE.** Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the RPR, to a minimum depth of 2 inches (50 mm) to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches (50 mm) in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

Grades on the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be smooth-graded and the surface left at the prescribed grades in an even and compacted condition to prevent the formation of low places or pockets where water will stand.

**T-905-3.4 OBTAINING TOPSOIL.** Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, asphalt, pavement rubble, rubbish or stones found on such areas, which may interfere with subsequent operations, shall be removed using methods approved by the RPR. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means shall be removed. Any debris and other material noted above which has been removed from the stockpile shall be legally disposed of offsite by the Contractor.

When suitable topsoil is available on the site, the Contractor shall remove this material from the designated areas and to the depth as directed by the RPR. The topsoil shall be spread on areas already tilled and smooth-graded or stockpiled in areas approved by the RPR. Any topsoil stockpiled by the Contractor shall be rehandled and placed without additional compensation. Any topsoil that has been stockpiled on the site by others, and is required for topsoiling purposes, shall be removed and placed by the Contractor. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding.

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the RPR. The Contractor shall notify the RPR sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

**T-905-3.5 PLACING TOPSOIL.** The topsoil shall be evenly spread to a minimum depth of 3” on the prepared areas as shown on the Plans, or as directed by the RPR. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work unless approved by the RPR. Spreading shall be carried on so that seeding operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2 inches or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the Contractor. After spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the RPR. The compacted topsoil surface shall conform to the required lines, grades, and cross sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

### **T-905-3.6 SEEDING BY WET APPLICATION METHOD**

#### **a. General**

The Contractor may elect to apply seed, fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified by the seed manufacturer.

#### **b. Spraying Equipment**

The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (180 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 pounds per square inch (690 kPa). The pump shall be mounted in a line which will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipelines shall be capable of providing clearance for 5/8-inch solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet. One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For ease of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet in length shall be provided to which the nozzles may be connected.

**c. Mixtures**

Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. Brackish water shall not be used at any time. The Contractor shall identify to the RPR all sources of water at least 2 weeks prior to use. The RPR may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source which is disapproved by the RPR following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within 2 hours from the time they were mixed, or they shall be wasted and disposed of at locations acceptable to the RPR.

**d. Spraying**

Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches, after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray which shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to ensure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area. Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon. All surfaces which are to be seeded and fertilized shall be mulched.

### **T-905-3.7 MAINTENANCE**

Maintenance shall begin immediately after each area is planted. Seeded areas shall be watered, mowed, weeded, replanted, fertilized, cultivated, and otherwise maintained and protected as necessary to establish a uniform stand of the specified grasses and until Final Inspection.

After the seed has started, all areas and parts of areas which fail to show a uniform stand of grass, for any reason whatsoever, shall be reseeded and such areas and parts of areas shall be reseeded repeatedly until all areas are covered with a satisfactory growth of grass.

Damage resulting from erosion, gullies, washouts or other causes shall be repaired by filling with approved topsoil, tamping, staking, refertilizing and reseeding by the Contractor at his expense if such damage occurs prior to acceptance of the turf area.

Upon completion of work and prior to Final Inspection, the Contractor shall remove from the site excess soil and debris and repair all damage resulting from seeding operations.

### **T-905-3.8 ACCEPTANCE**

To be acceptable, grass seeded and topsoiled areas shall show a good stand of grass of uniform color and density free from sizeable areas of thin or bare spots, and with a uniform count of at least 100 plants of grass per square foot. Any part of seeded areas which fail to show an acceptable stand of grass shall be reseeded until all areas are acceptably covered with grass at the Contractor's own expense. If at the time when the contract has been otherwise completed it is not possible to make an adequate determination of color, density and uniformity of such stand of grass, payment for the unaccepted portion of the areas will be withheld until such time as these requirements have been met.

### **T-905-3.9 SUSTAINABILITY**

At least 95% of post construction vegetated areas, including areas disturbed by development, shall be restored to support vegetative growth. Natural soils in vegetated areas shall be conserved and reused on site. Soils shall be reused for functions comparable to their original function. After initial landscaping establishment, fertilizer use will be discontinued.

## **METHOD OF MEASUREMENT**

**T-905-4.1** The quantity of seeding to be paid shall be paid by the square yards of the surface covered with seed, complete and accepted by the RPR. No separate measurement or payment will be made for fertilizing or mulching but shall be considered incidental to item T-905.01. No separate measurement or payment will be made for establishing turf to areas disturbed by the contractor's operations outside of the designated work areas.

**T-905-4.2** Topsoil obtained on the site shall be measured by the number of cubic yards of topsoil measured in its original position and stripped or excavated. Topsoil stockpiled by others and removed for topsoil by the Contractor shall be measured by the number of cubic yards (cubic meters) of topsoil measured in the stockpile. Topsoil shall be measured by volume in cubic yards (cubic meters) computed by the method of end areas.

**T-905-4.3** Topsoil obtained off the site shall be measured by the number of cubic yards of topsoil measured in its original position and stripped or excavated. Topsoil shall be measured by volume in cubic yards (meters) computed by the method of end areas.

**BASIS OF PAYMENT**

**T-905-5.1** Payment for will be made at the contract unit price per square yard of Seeding measured and approved by the RPR. This price shall be full compensation for furnishing and placing all material, including any required mulching of sprigged areas, and for all labor, equipment, staking, and incidentals necessary to complete the items as specified.

**T-905-5.2** Payment will be made at the contract unit price per cubic yard of Topsoil (Obtained On-Site) measured and approved by the RPR. This price shall be full compensation for re-grading grassed areas, screening existing stockpiles, disposing of any excess or unsuitable materials, furnishing, and placing all material, including any required mulching of sprigged areas, and for all labor, equipment, staking, and incidentals necessary to complete the items as specified.

**T-905-5.3** Payment will be made at the contract unit price per cubic yard for Topsoil (Furnished from Off-Site). This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
T-905.01	Seeding _____	Per Square Yard
T-905.02	Topsoil (Obtained On-Site)_____	Per Cubic Yard
T-905.03	Topsoil (Furnished from Off-Site)_____	Per Cubic Yard



## MATERIAL REQUIREMENTS

<b><u>Number</u></b>	<b><u>Title</u></b>
ASTM C 602	Agricultural Liming Materials
ASTM D 977	Emulsified Asphalt
Fed. Spec. A-A-2671	Seeds, Agricultural
Fed. Spec. A-A-1909	Fertilizer

## REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C117            Materials Finer than 75  $\mu$ m (No. 200) Sieve in Mineral Aggregates  
by Washing Advisory Circulars (AC)

AC 150/5200-33    Hazardous Wildlife Attractants on or Near Airports  
FAA/United States Department of Agriculture  
Wildlife Hazard Management at Airports, A Manual for Airport Personnel

**END OF ITEM T-905**

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## **L-100 MODIFICATIONS TO ALCMS EQUIPMENT**

### **DESCRIPTION**

**100-1.1** This work shall include the modifications to the existing Airport Lighting Control and Monitoring System (ALCMS) and Touchscreen Panels located in the Air Traffic Control Tower and Airfield Lighting Vault to incorporate proposed Taxiway E5 that will be part of the Taxiway E west circuit. This includes modifications, all labor, programming, modifications to graphic screens, reprogramming of Constant Current Regulator DCMUs as necessary, and all other work required to fully integrate the revised airfield lighting layout screen into the ALCMS.

All work done by the Contractor to assist the vendor with completion of this item including badging and escorting shall be considered incidental to the project and shall not be measured separately for payment.

Work shall also include all work within the Lighting Vault.

#### **100-1.2 Shop Drawings**

Contractor shall submit shop drawings in electronic (.pdf) format for approval by the RPR prior to implementing any software changes or installing any equipment. Proposed software changes shall be submitted to Airport Operations and the ATCT Manager for approval independent of the RPR. Contractor shall put his shop drawing check stamp on all shop drawings submitted for approval.

#### **100-1.3 As-Built Drawings**

The Contractor shall, at all times, maintain a complete accurate and up to date set of as built drawings. These as built drawings shall be available to the RPR at all times for his review. At the completion of the contract, the Contractor shall submit two (2) clean, legible and complete sets of as built drawings and O&M documentation to the Airport prior to his final request for payment.

#### **100-1.4 Codes, Permits, Fees**

- a. The Contractor is presumed to be knowledgeable of national and local code requirements. If he/she believes any requirement of the drawings or specifications is not in conformance with code or other applicable requirements, he/she shall so notify the RPR before the work is installed. The decision of the RPR in interpreting the drawings and specifications and code requirements relating thereto for a specific application under this contract shall be considered final.
- b. The Contractor shall give all necessary notices, obtain all permits, and pay all inspection and other fees required by governmental authorities having jurisdiction over the work under this contract. Receipt of all required approvals, clearances, and certificates by the Owner shall be a prerequisite to acceptance and final payment for the work.

#### **100-1.5 Materials and Workmanship**

Materials furnished shall be new, shall be undamaged when installed, and shall conform to all established and applicable standards and test requirements of Underwriters Laboratories (U.L.), National Electrical Manufacturers Association (NEMA), and American National Standards Institute (ANSI), and the Institute of Electrical and Electronics RPRs (IEEE).

### 100-1.6 Project Coordination

The ALCMS Manufacturer shall provide an experienced and qualified Engineering, Sales and Service staff to support the contractor and airport throughout the installation and life of the system.

The project shall follow this basic cycle of events. Some steps may be omitted based on scope of work required as approved by the RPR:

	<b>Milestone</b>	<b>Description</b>
1.	Submittal	The ALCMS Manufacturer shall submit ALCMS equipment specifications to the contractor.
2.	Submittal Review and Approval	Submittal is reviewed by the contractor, airport, and RPR(s).
3.	Production Release	The ALCMS Manufacturer shall release approved system to manufacturing.
4.	Demo CD 35% Software Completion	The ALCMS Manufacturer shall send to the contractor, airport, and RPRs a Demo CD of the planned layout of the touchscreen that will be used for the control of the ALCMS system.
5.	Production	System is manufactured.
6.	Production Testing	System is tested by the ALCMS Manufacturer.
7.	Factory Acceptance Testing	System is available for Factory Acceptance Testing (FAT) witnessed by airport/owner. NOT APPLICABLE
8.	Shipment of system	Approved system is shipped to installation site.
9.	Installation	Contractor installs equipment and completes external wiring.
10.	Commissioning	The ALCMS Manufacturer shall arrive at installation site to complete commissioning of system and verify contractor installation and wiring.
11.	System Readiness Check	The ALCMS Manufacturer shall perform a system readiness check to verify proper operation of all equipment prior to cut over.
12.	System Cut-over	The ALCMS Manufacturer and Contractor shall cut over the new system and bring it on-line and operational.
13.	System Acceptance Testing	System is available for System Acceptance Testing (SAT) which shall be witnessed the by airport/owner and/or RPR.
14.	Manuals / As-Built drawings	The ALCMS Manufacturer shall issue operator manuals, maintenance manuals and ATC manuals and final as-built drawings.
15.	On-Site Training	The ALCMS Manufacturer shall complete on-site training of maintenance, Operations, and ATC personnel.

16.	Final Owner Acceptance	Upon completion of all contractual requirements, system is accepted in writing by the airport/owner.
17.	Warranty and Support	The ALCMS Manufacturer shall provide warranty and support per the contractual requirements.

### **100-1.07 Contractor Installation Requirements**

- a. The installing contractor shall be responsible for the physical installation of all associated ALCMS components as required.
  - (1) The Contractor shall furnish, install, relocate, connect and test all equipment, equipment accessories, conduit cables, wires, buses, grounds and support necessary to insure a complete and operable electrical distribution facility for the airport lighting system as specified in the submittal package.
  - (2) The equipment installation and mounting shall comply with the requirements of the National Electrical Code and local code agency having jurisdiction.

### **100-1.08 Contractor Power-up and Initial Testing**

The Contractor shall perform the following power-up and commissioning tasks:

- a. Power up all assemblies.
- b. Verify communication is established between all assemblies.
- c. Initiate lighting commands from Tower Touchscreen and verify proper control operations are being executed at the Vault assembly.
- d. Test monitoring feedback to verify proper wiring and operation.  
 Inform ALCMS manufacturer in writing all mentioned power up tests are complete.

### **100-1.09 ALCMS Manufacturer PC Commissioning**

The ALCMS Manufacturer shall perform the following installation and commissioning tasks:

- a. Verify Contractor connections including power, control and monitoring.
- b. Verify proper labeling of equipment.
- c. Verify communication connections.
- d. Perform system testing including control, monitoring and diagnostics.
- e. Training on ALCMS related equipment.
- f. Perform System Acceptance Testing (SAT).

### **100-1.10 System Acceptance Test (SAT)**

Following the final installation and commissioning of the system, the ALCMS Manufacturer shall perform a demonstration of the system performance. This demonstration shall include the following:

- a. Lighting control functions
- b. Monitoring functions
- c. Alarm functions
- d. Print and Display functions

The ALCMS Manufacturer shall develop a SAT test plan in accordance with the specifications and issue this to the contractor for approval from the airport RPR.

The SAT shall be witnessed by owner representatives, the contractor and the RPR.

#### **100-1.11 Owner System Acceptance and Warranty Start Date**

Upon successful completion of the SAT and on-site training the owner shall issue the ALCMS Manufacturer a written notice of system acceptance within five (5) working days.

The date the final acceptance letter is received or five (5) days following successful completion of the SAT (whichever occurs first) represents the start of the warranty period. Please refer to the Warranty section for more information regarding the ALCMS warranty guarantee.

#### **100-1.12 System Warranty**

All equipment shall be warranted against defects in workmanship, hardware and software for a period of one (1) year from initial operation of the system but not more than eighteen (18) months from the manufacturer's shipment of the system.

During this time period the ALCMS manufacturer shall provide all parts, labor and technical support with the following conditions:

- a. The manufacturer shall correct by repair or replacement, at its option, equipment or parts which fail because of mechanical, electrical or physical defects, provided that the goods have been properly handled and stored prior to installation, properly installed and properly operated after installation, provided further that Buyer gives manufacturer written notice of such defects after delivery of the goods to Buyer.
- b. The manufacturer may examine any goods upon which a claim is made in the same condition as when defect therein is discovered, and may require the return of the goods to establish any claim.
- c. The manufacturer's liability under no circumstances shall exceed the contract price of goods claimed to be defective.
- d. Any returns under this guarantee are to be on a transportation charge prepaid basis. For products not manufactured by, but sold by the manufacturer, warranty is limited to that extended by the original manufacturer.

#### **100-1.13 System Service and Support**

- a. The ALCMS Manufacturer shall provide technical assistance and support during the warranty period.

### **EQUIPMENT AND MATERIALS**

#### **100-2.1 General**

Contractor shall submit shop drawings for approval by the RPR, prior to implementing any software changes. Proposed software changes shall be submitted to Airport Operations and the ATCT supervisor for

approval independent of the RPR. Contractor shall put his shop drawing check stamp on all shop drawings submitted for approval.

### **100-2.2 Existing Airfield Lighting Control and Monitoring System (ALCMS)**

The existing ALCMS as manufactured by ADB Safegate (Contact person: Galen Dixon 614-323-6242) shall be updated by the manufacturer to accurately reflect the modifications to circuit/screen layout. Consideration shall be given to the control of the airfield lighting system during the transition and provisions shall be made to operate the system manually during this time if necessary. The following modifications shall be made by the system manufacturer:

- a. Existing control points shall be modified for reconfigured Constant Current Regulators affected under this project. Revised CCR circuits include:
  - Taxiway Echo West (existing)

## **CONSTRUCTION METHODS**

### **100-3.1 Airfield Lighting Touchscreen Modifications**

The existing ALCMS system consists of a touchscreen in the Air Traffic Control Tower and Airfield Lighting Vault. The system is PC based and software controlled. The system will be updated to reflect changes at all locations by the system manufacturer under this Contract.

### **100-3.2 Contractor Support**

The Contractor shall support the manufacturer with the system commissioning. Effort to include escorting, installing equipment, terminations, badging, fees and any incidental required to complete the work.

Work shall include providing and installing all L-824 cable within the Lighting Vault.

## **METHOD OF MEASUREMENT**

**100-4.1** 'Modifications to ALCMS equipment' as required by the drawings and these specifications shall be measured for payment as part of this specification.

**100-4.2** Measurement shall not include work by the Contractor to assist vendor with the system commissioning. Effort to provide escorting, installing equipment, terminations, badging, fees and any incidental required to complete the ALCMS upgrades will be considered incidental to the project.

Installation of L-824 cable, ground cable, tagging of cable and CCR's within the Airfield Lighting Vault will not be measured for payment but shall be considered incidental to the project.

## **BASIS OF PAYMENT**

**100-5.1** Payment shall be made from the Contract Allowance of **\$30,000** for the complete and accepted ALCMS Modifications, approved and accepted by the RPR. The cost paid to the Contractor shall be the direct cost invoiced to the contractor by the ALCMS manufacturer without markup. This price shall be full

compensation for all services and items included in the designated allowance item, preparation, assembly, delivery, transportation, and installation of materials and equipment, labor, equipment, tools, and incidentals necessary to complete this item.

Payment shall be made under:

Project Item L-100.01 Modifications to ALCMS Equipment \_\_\_\_\_Per Allowance

**END OF ITEM L-100**



## **Item L-108 Underground Power Cable for Airports**

### **DESCRIPTION**

**108-1.1** This item shall consist of furnishing and installing power cables that are direct buried and furnishing and/or installing power cables within conduit or duct banks per these specifications at the locations shown on the plans. It includes excavation and backfill of trench for direct-buried cables only. Also included are the installation of counterpoise wires, ground wires, ground rods and connections, cable splicing, cable marking, cable testing, and all incidentals necessary to place the cable in operating condition as a completed unit to the satisfaction of the RPR. This item shall not include the installation of duct banks or conduit, trenching and backfilling for duct banks or conduit, or furnishing or installation of cable for FAA owned/operated facilities.

### **EQUIPMENT AND MATERIALS**

#### **108-2.1 General.**

**a.** Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program per AC 150/5345-53, current version.

**b.** All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the RPR.

**c.** Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

**d.** All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

**e.** The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format. The RPR reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.

**f.** All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall maintain a minimum insulation

resistance in accordance with paragraph 108-3.10e with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract warranty period when tested in accordance with AC 150/5340-26, *Maintenance Airport Visual Aid Facilities*, paragraph 5.1.3.1, Insulation Resistance Test.

**108-2.2 Cable.** Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits latest edition. Conductors for use on 6.6 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #8 American wire gauge (AWG), L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. Conductors for use on 20 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #6 AWG, L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type THWN-2, 75°C for installation in conduit and RHW-2, 75°C for direct burial installations. Conductors for parallel (voltage) circuits shall be type and size and installed in accordance with NFPA-70, National Electrical Code.

Unless noted otherwise, all 600-volt and less non-airfield lighting conductor sizes are based on a 75°C, THWN-2, 600-volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit/duct sizes are based on the use of THWN-2, 600-volt insulated conductors. The Contractor shall make the necessary increase in conduit/duct sizes for other types of wire insulation. In no case shall the conduit/duct size be reduced. The minimum power circuit wire size shall be #12 AWG.

Conductor sizes may have been adjusted due to voltage drop or other engineering considerations. Equipment provided by the Contractor shall be capable of accepting the quantity and sizes of conductors shown in the Contract Documents. All conductors, pigtails, cable step-down adapters, cable step-up adapters, terminal blocks and splicing materials necessary to complete the cable termination/splice shall be considered incidental to the respective pay items provided.

Cable type, size, number of conductors, strand and service voltage shall be as specified in the Contract Document.

**108-2.3 Bare copper wire (counterpoise, bare copper wire ground and ground rods).** Wire for counterpoise or ground installations for airfield lighting systems shall be No. 6 AWG bare solid copper wire for counterpoise and/or No. 6 AWG insulated stranded for grounding bond wire per ASTM B3 and ASTM B8, and shall be bare copper wire. For voltage powered circuits, the equipment grounding conductor shall comply with NEC Article 250.

Ground rods shall be copper-clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 10 feet long and 3/4 inch in diameter.

**108-2.4 Cable connections.** In-line connections or splices of underground primary cables shall be of the type called for on the plans, and shall be one of the types listed below. No separate payment will be made for cable connections.

**a. The cast splice.** A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3M™ Company, "Scotchcast" Kit No. 82-B, or an approved equivalent, used for potting the splice is acceptable.

**b. The field-attached plug-in splice.** Field attached plug-in splices shall be installed as shown on the plans. The Contractor shall determine the outside diameter of the cable to be spliced and furnish appropriately sized connector kits and/or adapters. Tape or heat shrink tubing with integral sealant shall be in accordance with the manufacturer's requirements. Primary Connector Kits manufactured by Amerace, "Super Kit", Integro "Complete Kit", or approved equal is acceptable.

**c. The factory-molded plug-in splice.** Specification for L-823 Connectors, Factory-Molded to Individual Conductors, is acceptable.

**d. The taped or heat-shrink splice.** Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape is acceptable. The rubber tape should meet the requirements of ASTM D4388 and the plastic tape should comply with Military Specification MIL-I-24391 or Commercial Item Description A-A-55809. Heat shrinkable tubing shall be heavy-wall, self-sealing tubing rated for the voltage of the wire being spliced and suitable for direct-buried installations. The tubing shall be factory coated with a thermoplastic adhesive-sealant that will adhere to the insulation of the wire being spliced forming a moisture- and dirt-proof seal. Additionally, heat shrinkable tubing for multi-conductor cables, shielded cables, and armored cables shall be factory kits that are designed for the application. Heat shrinkable tubing and tubing kits shall be manufactured by Tyco Electronics/ Raychem Corporation, Energy Division, or approved equivalent.

In all the above cases, connections of cable conductors shall be made using crimp connectors using a crimping tool designed to make a complete crimp before the tool can be removed. All L-823/L-824 splices and terminations shall be made per the manufacturer's recommendations and listings.

All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved equivalent, except that a light base ground clamp connector shall be used for attachment to the light base. All exothermic connections shall be made per the manufacturer's recommendations and listings.

**108-2.5 Splicer qualifications.** Every airfield lighting cable splicer shall be qualified in making airport cable splices and terminations on cables rated at or above 5,000 volts AC. The Contractor shall submit to the RPR proof of the qualifications of each proposed cable splicer for the airport cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

**108-2.6 Concrete.** Concrete shall be proportioned, placed, and cured per state department of transportation structural concrete with minimum 25% Type F fly ash, and a minimum allowable compressive strength of 4,000 psi (28 MPa).

**108-2.7 Flowable backfill.** Flowable material used to backfill trenches for power cable trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

**108-2.8 Cable identification tags.** Cable identification tags shall be made from a non-corrosive material with the circuit identification stamped or etched onto the tag. The tags shall be of the type as detailed on the plans.

**108-2.9 Tape.** Electrical tapes shall be Scotch™ Electrical Tapes –Scotch™ 88 (1-1/2 inch (38 mm) wide) and Scotch™ 130C® linerless rubber splicing tape (2-inch (50 mm) wide), as manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equivalent.

**108-2.10 Electrical coating.** Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equivalent.

**108-2.11 Existing circuits.** Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the RPR. When the work affecting the circuit is complete,

the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall record the results on forms acceptable to the RPR. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the existing circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

**108-2.12 Detectable warning tape.** Plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend tape shall be polyethylene film with a metalized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item. Detectable warning tape for communication cables shall be orange. Detectable warning tape color code shall comply with the APWA Uniform Color Code.

## **CONSTRUCTION METHODS**

**108-3.1 General.** The Contractor shall install the specified cable at the approximate locations indicated on the plans. Unless otherwise shown on the plans, all cable required to cross under pavements expected to carry aircraft loads shall be installed in concrete encased duct banks. Cable shall be run without splices, from fixture to fixture.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections unless otherwise authorized in writing by the RPR or shown on the plans.

In addition to connectors being installed at individual isolation transformers, L-823 cable connectors for maintenance and test points shall be installed at locations shown on the plans. Cable circuit identification markers shall be installed on both sides of the L-823 connectors installed and on both sides of slack loops where a future connector would be installed.

Provide not less than 3 feet (1 m) of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. Where provisions must be made for testing or for future above grade connections, provide enough slack to allow the cable to be extended at least one foot (30 cm) vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the RPR.

Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch (6 mm) in size. The cable circuit identification shall match the circuits noted on the construction plans.

**108-3.2 Installation in duct banks or conduits.** This item includes the installation of the cable in duct banks or conduit per the following paragraphs. The maximum number and voltage ratings of cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be per the latest version of the National Electric Code, or the code of the local agency or authority having jurisdiction.

The Contractor shall make no connections or splices of any kind in cables installed in conduits or duct banks.

Unless otherwise designated in the plans, where ducts are in tiers, use the lowest ducts to receive the cable first, with spare ducts left in the upper levels. Check duct routes prior to construction to obtain assurance that the shortest routes are selected and that any potential interference is avoided.

Duct banks or conduits shall be installed as a separate item per Item L-110, Airport Underground Electrical Duct Banks and Conduit. The Contractor shall run a mandrel through duct banks or conduit prior to installation of cable to ensure that the duct bank or conduit is open, continuous and clear of debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

The cable shall be installed in a manner that prevents harmful stretching of the conductor, damage to the insulation, or damage to the outer protective covering. The ends of all cables shall be sealed with moisture-seal tape providing moisture-tight mechanical protection with minimum bulk, or alternately, heat shrinkable tubing before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a conduit, all cable shall be pulled in the conduit at the same time. The pulling of a cable through duct banks or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's recommendations. A non-hardening cable-pulling lubricant recommended for the type of cable being installed shall be used where required.

The Contractor shall submit the recommended pulling tension values to the RPR prior to any cable installation. If required by the RPR, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the RPR. Cable pull tensions shall be recorded by the Contractor and reviewed by the RPR. Cables exceeding the maximum allowable pulling tension values shall be removed and replaced by the Contractor at the Contractor's expense.

The manufacturer's minimum bend radius or NEC requirements (whichever is more restrictive) shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the Contractor may submit a plan, for review by the RPR, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. When cable must be coiled, lay cable out on a canvas tarp or use other appropriate means to prevent abrasion to the cable jacket.

**108-3.3 Installation of direct-buried cable in trenches.** Unless otherwise specified, the Contractor shall not use a cable plow for installing the cable. Cable shall be unreeled uniformly in place alongside or in the trench and shall be carefully placed along the bottom of the trench. The cable shall not be unreeled and pulled into the trench from one end. Slack cable sufficient to provide strain relief shall be placed in the trench in a series of S curves. Sharp bends or kinks in the cable shall not be permitted.

Where cables must cross over each other, a minimum of 3 inches (75 mm) vertical displacement shall be provided with the topmost cable depth at or below the minimum required depth below finished grade.

**a. Trenching.** Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of surface is disturbed. Graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable

trenches shall be excavated to a minimum depth of 18 inches (0.5 m) below finished grade per NEC Table 300.5, except as follows:

- When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches (91 cm) unless otherwise specified.
- Minimum cable depth when crossing under a railroad track, shall be 42 inches (1 m) unless otherwise specified.

The Contractor shall excavate all cable trenches to a width not less than 6 inches (150 mm). Unless otherwise specified on the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill material may alternatively be used.

Duct bank or conduit markers temporarily removed for trench excavations shall be replaced as required.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

(1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.

(2) Trenching, etc., in cable areas shall then proceed, with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair or replacement.

**b. Backfilling.** After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall encompass all cables ; be 3 inches (75 mm) deep, loose measurement; and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. This layer shall not be compacted. The second layer shall be 5 inches (125 mm) deep, loose measurement, and shall contain no particles that would be retained on a one inch (25.0 mm) sieve. The remaining third and subsequent layers of backfill shall not exceed 8 inches (20 cm) of loose measurement and be excavated or imported material and shall not contain stone or aggregate larger than 4 inches (100 mm) maximum diameter.

The second and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent material. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be to a minimum of 100 percent of ASTM D1557.

Trenches shall not contain pools of water during backfilling operations. The trench shall be completely backfilled and tamped level with the adjacent surface, except that when turf is to be established over the trench, the backfilling shall be stopped at an appropriate depth consistent with the type of turfing operation to be accommodated. A proper allowance for settlement shall also be provided. Any excess excavated material shall be removed and disposed of per the plans and specifications.

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the RPR. If not

shown on the plans, the warning tape shall be located 6 inches (150 mm) above the direct-buried cable or the counterpoise wire if present. A 3-6 inch (75 - 150 mm) wide polyethylene film detectable tape, with a metalized foil core, shall be installed above all direct buried cable or counterpoise. The tape shall be of the color and have a continuous legend as indicated on the plans. The tape shall be installed 8 inches (200 mm) minimum below finished grade.

**c. Restoration.** Following restoration of all trenching near airport movement surfaces, the Contractor shall visually inspect the area for foreign object debris (FOD) and remove any that is found. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the topsoiling, seeding, and mulching as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be to a minimum of 100 percent of ASTM D1557. Restoration shall be considered incidental to the pay item of which it is a component part.

**108-3.4 Cable markers for direct-buried cable.** The location of direct buried circuits shall be marked by a concrete slab marker, 2 feet (60 cm) square and 4-6 inch (10 - 15 cm) thick, extending approximately one inch (25 mm) above the surface. Each cable run from a line of lights and signs to the equipment vault shall be marked at approximately every 200 feet (61 m) along the cable run, with an additional marker at each change of direction of cable run. All other direct-buried cable shall be marked in the same manner. Cable markers shall be installed directly above the cable. The Contractor shall impress the word "CABLE" and directional arrows on each cable marking slab. The letters shall be approximately 4 inches (100 mm) high and 3 inches (75 mm) wide, with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep. Stencils shall be used for cable marker lettering; no hand lettering shall be permitted.

At the location of each underground cable connection/splice, except at lighting units, or isolation transformers, a concrete marker slab shall be installed to mark the location of the connection/splice. The Contractor shall impress the word "SPLICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the RPR. All cable markers and splice markers shall be painted international orange. Paint shall be specifically manufactured for uncured exterior concrete. After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint as approved by the RPR. Furnishing and installation of cable markers is incidental to the respective cable pay item.

**108-3.5 Splicing.** Connections of the type shown on the plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

**a. Cast splices.** These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the RPR.

**b. Field-attached plug-in splices.** These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint or (3) On connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

**c. Factory-molded plug-in splices.** These shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) Wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half

lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint. or (3) On connector kits so equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

**d. Taped or heat-shrink splices.** A taped splice shall be made in the following manner:

Bring the cables to their final position and cut so that the conductors will butt. Remove insulation and jacket allowing for bare conductor of proper length to fit compression sleeve connector with 1/4 inch (6 mm) of bare conductor on each side of the connector. Prior to splicing, the two ends of the cable insulation shall be penciled using a tool designed specifically for this purpose and for cable size and type. Do not use emery paper on splicing operation since it contains metallic particles. The copper conductors shall be thoroughly cleaned. Join the conductors by inserting them equidistant into the compression connection sleeve. Crimp conductors firmly in place with crimping tool that requires a complete crimp before tool can be removed. Test the crimped connection by pulling on the cable. Scrape the insulation to assure that the entire surface over which the tape will be applied (plus 3 inches (75 mm) on each end) is clean. After scraping, wipe the entire area with a clean lint-free cloth. Do not use solvents.

Apply high-voltage rubber tape one-half lapped over bare conductor. This tape should be tensioned as recommended by the manufacturer. Voids in the connector area may be eliminated by highly elongating the tape, stretching it just short of its breaking point. The manufacturer's recommendation for stretching tape during splicing shall be followed. Always attempt to exactly half-lap to produce a uniform buildup. Continue buildup to 1-1/2 times cable diameter over the body of the splice with ends tapered a distance of approximately one inch (25 mm) over the original jacket. Cover rubber tape with two layers of vinyl pressure-sensitive tape one-half lapped. Do not use glyptol or lacquer over vinyl tape as they react as solvents to the tape. No further cable covering or splice boxes are required.

Heat shrinkable tubing shall be installed following manufacturer's instructions. Direct flame heating shall not be permitted unless recommended by the manufacturer. Cable surfaces within the limits of the heat-shrink application shall be clean and free of contaminants prior to application.

**e. Assembly.** Surfaces of equipment or conductors being terminated or connected shall be prepared in accordance with industry standard practice and manufacturer's recommendations. All surfaces to be connected shall be thoroughly cleaned to remove all dirt, grease, oxides, nonconductive films, or other foreign material. Paints and other nonconductive coatings shall be removed to expose base metal. Clean all surfaces at least 1/4 inch (6.4 mm) beyond all sides of the larger bonded area on all mating surfaces. Use a joint compound suitable for the materials used in the connection. Repair painted/coated surface to original condition after completing the connection.

**108-3.6 Bare counterpoise wire installation for lightning protection and grounding.** If shown on the plans or included in the job specifications, bare solid #6 AWG copper counterpoise wire shall be installed for lightning protection of the underground cables. The RPR shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.

**a. Equipotential.** The counterpoise size is as shown on the plans. The equipotential method is applicable to all airfield lighting systems; i.e. runway, taxiway, apron – touchdown zone, centerline, edge, threshold and approach lighting systems. The equipotential method is also successfully applied to provide lightning protection for power, signal and communication systems. The light bases, counterpoise, etc – all components - are bonded together and bonded to the vault power system ground loop/electrode.

Counterpoise wire shall be installed in the same trench for the entire length of buried cable, conduits and duct banks that are installed to contain airfield cables. The counterpoise is centered over the cable/conduit/duct to be protected.



The counterpoise conductor shall be installed no less than 8 inches (200 mm) minimum or 12 inches (300 mm) maximum above the raceway or cable to be protected, except as permitted below:

(1) The minimum counterpoise conductor height above the raceway or cable to be protected shall be permitted to be adjusted subject to coordination with the airfield lighting and pavement designs.

(2) The counterpoise conductor height above the protected raceway(s) or cable(s) shall be calculated to ensure that the raceway or cable is within a 45-degree area of protection, (45 degrees on each side of vertical creating a 90 degree angle).

The counterpoise conductor shall be bonded to each metallic light base, mounting stake, and metallic airfield lighting component.

All metallic airfield lighting components in the field circuit on the output side of the constant current regulator (CCR) or other power source shall be bonded to the airfield lighting counterpoise system.

All components rise and fall at the same potential; with no potential difference, no damaging arcing and no damaging current flow.

See AC 150/5340-30, Design and Installation Details for Airport Visual Aids and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Equipotential Method of lightning protection.

Reference FAA STD-019E, Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment, Part 4.1.1.7.][not used]

**b. Isolation.** Not used.

**c. Common Installation requirements.** When a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

When a nonmetallic light base is used, the grounding electrode shall be bonded to the metallic light fixture or metallic base plate with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the NFPA 70 (NEC) or NFPA 780.

Where raceway is installed by the directional bore, jack and bore, or other drilling method, the counterpoise conductor shall be permitted to be installed concurrently with the directional bore, jack and bore, or other drilling method raceway, external to the raceway or sleeve.

The counterpoise wire shall also be exothermically welded to ground rods installed as shown on the plans but not more than 500 feet (150 m) apart around the entire circuit. The counterpoise system shall be continuous and terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment external ground ring or other made electrode-grounding system. The connections shall be made as shown on the plans and in the specifications.

Where an existing airfield lighting system is being extended or modified, the new counterpoise conductors shall be interconnected to existing counterpoise conductors at each intersection of the new and existing airfield lighting counterpoise systems.

**d. Parallel Voltage Systems.** Provide grounding and bonding in accordance with NFPA 70, National Electrical Code.

**108-3.7 Counterpoise installation above multiple conduits and duct banks.** Counterpoise wires shall be installed above multiple conduits/duct banks for airfield lighting cables, with the intent being to provide a complete area of protection over the airfield lighting cables. When multiple conduits and/or duct banks for airfield cable are installed in the same trench, the number and location of counterpoise

wires above the conduits shall be adequate to provide a complete area of protection measured 45 degrees each side of vertical.

Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed above the duct bank. Reference details on the construction plans.

**108-3.8 Counterpoise installation at existing duct banks.** When airfield lighting cables are indicated on the plans to be routed through existing duct banks, the new counterpoise wiring shall be terminated at ground rods at each end of the existing duct bank where the cables being protected enter and exit the duct bank. The new counterpoise conductor shall be bonded to the existing counterpoise system.

**108-3.9 Exothermic bonding.** Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the RPR. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the RPR, the welding kits, materials and procedures to be used for welded connections prior to any installations in the field. The installations shall comply with the manufacturer's recommendations and the following:

a. All slag shall be removed from welds.

b. Using an exothermic weld to bond the counterpoise to a lug on a galvanized light base is not recommended unless the base has been specially modified. Consult the manufacturer's installation directions for proper methods of bonding copper wire to the light base. See AC 150/5340-30 for galvanized light base exception.

c. If called for in the plans, all buried copper and weld material at weld connections shall be thoroughly coated with 6 mm of 3M™ Scotchkote™, or approved equivalent, or coated with coal tar Bitumastic® material to prevent surface exposure to corrosive soil or moisture.

**108-3.10 Testing.** The Contractor shall furnish all necessary equipment and appliances for testing the airport electrical systems and underground cable circuits before and after installation. The Contractor shall perform all tests in the presence of the RPR. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the RPR. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase. The Contractor must maintain the test results throughout the entire project as well as during the warranty period that meet the following:

a. Earth resistance testing methods shall be submitted to the RPR for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the RPR. All such testing shall be at the sole expense of the Contractor.

b. Should the counterpoise or ground grid conductors be damaged or suspected of being damaged by construction activities the Contractor shall test the conductors for continuity with a low resistance ohmmeter. The conductors shall be isolated such that no parallel path exists and tested for continuity. The RPR shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

After installation, the Contractor shall test and demonstrate to the satisfaction of the RPR the following:

c. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.

d. That all affected circuits (existing and new) are free from unspecified grounds.

e. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than 100 megohms. Verify continuity of all series airfield lighting circuits prior to energization.

f. That the insulation resistance to ground of all new non-grounded conductors of new multiple circuits or circuit segments is not less than 100 megohms.

g. That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.

h. That all affected circuits (existing and new) are operable. Tests shall be conducted that include operating each control not less than 10 times and the continuous operation of each lighting and power circuit for not less than 1/2 hour.

i. That the impedance to ground of each ground rod does not exceed **25** ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be used, as described by American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81, to verify this requirement. As an alternate, clamp-on style ground impedance test meters may be used to satisfy the impedance testing requirement. Test equipment and its calibration sheets shall be submitted for review and approval by the RPR prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the RPR. Where connecting new cable to existing cable, insulation resistance tests shall be performed on the new cable prior to connection to the existing circuit.

There are no approved “repair” procedures for items that have failed testing other than complete replacement.

#### **METHOD OF MEASUREMENT**

**108-4.1** The cost of all excavation, backfill, dewatering and restoration regardless of the type of material encountered shall be included in the unit price bid for the work,

**108-4.2** Cable or counterpoise wire installed in trench, duct bank or conduit shall be measured by the number of linear feet (meters) installed and grounding connectors, and trench marking tape ready for operation, and accepted as satisfactory. Separate measurement shall be made for each cable or counterpoise wire installed in trench, duct bank or conduit. The measurement for this item shall not include additional quantities required for slack.

**108-4.3** No separate payment will be made for ground rods.

**108-4.4** There shall be no separate payment for any cable removed as part of this project; it is considered incidental to the various electrical items.

#### **BASIS OF PAYMENT**

**108-5.1** Payment will be made at the contract unit price for trenching, cable and bare counterpoise wire installed in trench (direct-buried), or cable and equipment ground installed in duct bank or conduit, in place by the Contractor and accepted by the RPR. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item.

Payment will be made under:

- |                |  |
|----------------|--|
| Item L-108-5.1 | No. 8 AWG, 5 kV, 600V, L-824, Type C Cable, Installed in Trench, Duct Bank or Conduit - per linear foot.   |
| Item L-108-5.2 | No. 6 AWG, Green, Insulated, Stranded Equipment Ground. Installed in Duct Bank or Conduit – per linear foot.                                     |
| Item L-108-5.3 | No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed Above the Duct Bank or Conduit, Including Connections/Terminations - per linear foot. |

## REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

### Advisory Circulars (AC)

AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-53	Airport Lighting Equipment Certification Program

### Commercial Item Description

A-A-59544A	Cable and Wire, Electrical (Power, Fixed Installation)
A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic

### ASTM International (ASTM)

ASTM B3	Standard Specification for Soft or Annealed Copper Wire
ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM D4388	Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes

### Mil Spec

MIL-PRF-23586F	Performance Specification: Sealing Compound (with Accelerator), Silicone Rubber, Electrical
MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive

### National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
NFPA-780	Standard for the Installation of Lightning Protection Systems

### American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
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### Federal Aviation Administration Standard

FAA STD-019E	Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment
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**END OF ITEM L-108**

## **Item L-110 Airport Underground Electrical Duct Banks and Conduits**

### **DESCRIPTION**

**110-1.1** This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

### **EQUIPMENT AND MATERIALS**

#### **110-2.1 General.**

**a.** All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR.

**b.** Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, that comply with these specifications, at the Contractor's cost.

**c.** All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.

**d.** The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.

**e.** All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

**110-2.2 Steel conduit.** Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mils of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth.”

**110-2.3 Plastic conduit.** Plastic conduit and fittings shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

a. Type I–Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.

b. Type II–Schedule 40 PVC suitable for either above ground or underground use.

c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.

d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

**110-2.4 Split conduit.** Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

**110-2.5 Conduit spacers.** Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

**110-2.6 Concrete.** Concrete shall be proportioned, placed, and cured per state department of transportation structural concrete with minimum 25% Type F fly ash, and a minimum allowable compressive strength of 4,000 psi (28 MPa).

**110-2.7 Precast concrete structures.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

**110-2.8 Flowable backfill.** Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

**110-2.9 Detectable warning tape.** Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with

continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

## CONSTRUCTION METHODS

**110-3.1 General.** The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill may alternatively be used

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.

Unless otherwise specified, excavated materials that are deemed by the RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

**a.** Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

**b.** Trenching, etc., in cable areas shall then proceed with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.



**110-3.2 Duct banks.** Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

**110-3.3 Conduits without concrete encasement.** Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 4 inches (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4-inch (6.3 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

**110-3.4 Markers.** The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

**110-3.5 Backfilling for conduits.** For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted per Item P-152 except that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during back filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

**110-3.6 Backfilling for duct banks.** After the concrete has cured, the remaining trench shall be backfilled and compacted per Item P-152 “Excavation and Embankment” except that the material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements of Item P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet (76 m) of duct bank or one work period’s construction, whichever is less.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

**110-3.7 Restoration.** Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include topsoiling, seeding, and mulching shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

#### **METHOD OF MEASUREMENT**

**110-4.1** Underground conduits and duct banks shall be measured by the linear feet (meter) of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated material, and restoration, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

#### **BASIS OF PAYMENT**

**110-5.1** Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, including trench and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for removal and disposal of existing duct banks and conduits as shown on the plans, furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

Payment will be made under:

Item L-110-5.1	Non-Encased Electrical Conduit, 1-Way 2-Inch - per linear foot
Item L-110-5.2	Concrete Encased Electrical Conduit, 1-Way 2-Inch, Minimum 48-inch cover - per linear foot
Item L-110-5.3	Concrete Encased Electrical Duct Bank, 6-Way 4-Inch - per linear foot

## REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

### Advisory Circular (AC)

AC 150/5340-30 Design and Installation Details for Airport Visual Aids

AC 150/5345-53 Airport Lighting Equipment Certification Program

### ASTM International (ASTM)

ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

### National Fire Protection Association (NFPA)

NFPA-70 National Electrical Code (NEC)

### Underwriters Laboratories (UL)

UL Standard 6 Electrical Rigid Metal Conduit - Steel

UL Standard 514B Conduit, Tubing, and Cable Fittings

UL Standard 514C Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers

UL Standard 1242 Electrical Intermediate Metal Conduit Steel

UL Standard 651 Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings

UL Standard 651A Type EB and A Rigid PVC Conduit and HDPE Conduit

## **Item L-115 Electrical Manholes and Junction Structures**

### **DESCRIPTION**

**115-1.1** This item shall consist of electrical manholes and junction structures (hand holes, pull boxes, junction cans, etc.) installed and adjusted per this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the RPR. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the RPR.

### **EQUIPMENT AND MATERIALS**

#### **115-2.1 GENERAL.**

**a.** All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the RPR.

**b.** Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

**c.** All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

**d.** The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

**e.** All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

**115-2.2 CONCRETE STRUCTURES.** Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Cast-in-place concrete structures shall be as shown on the plans.

**115-2.3 PRECAST CONCRETE STRUCTURES.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program. Provide precast concrete structures where shown on the plans.

Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand 100,000 lbs aircraft wheel loads, unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans.

Threaded inserts and pulling eyes shall be cast in as shown on the plans.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the RPR shall be submitted by the Contractor to allow for a full evaluation by the RPR. The RPR shall review per the process defined in the General Provisions.

**115-2.4 JUNCTION BOXES.** Junction boxes shall be L-867 Class 1 (non-load bearing) or L-868 Class 1 (load bearing) airport light bases that are encased in concrete. The light bases shall have a L-894 blank cover, gasket, and stainless steel hardware. All bolts, studs, nuts, lock washers, and other similar fasteners used for the light fixture assemblies must be fabricated from 316L (equivalent to EN 1.4404), 18-8, 410, or 416 stainless steel. If 18-8, 410, or 416 stainless steel is utilized it shall be passivated and be free from any discoloration. Covers shall be 3/8-inch (9-mm) thickness for L-867 and 3/4-inch (19-mm) thickness for L-868. All junction boxes shall be provided with both internal and external ground lugs.

**115-2.5 MORTAR.** The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

**115-2.6 CONCRETE.** Concrete shall be proportioned, placed, and cured per state department of transportation structural concrete with minimum 25% Type F fly ash, and a minimum allowable compressive strength of 4,000 psi (28 MPa).

**115-2.7 FRAMES AND COVERS.** The frames shall conform to one of the following requirements:

- a. ASTM A48      Gray iron castings
- b. ASTM A47      Malleable iron castings
- c. ASTM A27      Steel castings
- d. ASTM A283, Grade D    Structural steel for grates and frames
- e. ASTM A536      Ductile iron castings
- f. ASTM A897      Austempered ductile iron castings

All castings specified shall withstand a maximum load of 100,000 lbs.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

Each frame and cover unit shall be provided with fastening members to prevent it from being dislodged by traffic, but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

Each cover shall have the word "ELECTRIC" or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

Each manhole shall be provided with a "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" safety warning sign as detailed in the Contract Documents and in accordance with OSHA 1910.146 (c)(2).

**115-2.8 LADDERS.** Ladders, if specified, shall be galvanized steel or as shown on the plans.

**115-2.9 REINFORCING STEEL.** All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.

**115-2.10 BEDDING/SPECIAL BACKFILL.** Bedding or special backfill shall be as shown on the plans.

**115-2.11 FLOWABLE BACKFILL.** Flowable material used to backfill shall conform to the requirements of Item P-153, Controlled Low Strength Material.

**115-2.12 CABLE TRAYS.** Cable trays shall be of plastic. Cable trays shall be located as shown on the plans.

**115-2.13 PLASTIC CONDUIT.** Plastic conduit shall comply with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

**115-2.14 CONDUIT TERMINATORS.** Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

**115-2.15 PULLING-IN IRONS.** Pulling-in irons shall be manufactured with 7/8-inch (22 mm) diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2-inch (12 mm) diameter with an ultimate strength of 270,000 psi (1862 MPa)). Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.

**115-2.16 GROUND RODS.** Ground rods shall be one piece, copper clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 8 feet (2.4 m) long nor less than 5/8 inch (16 mm) in diameter.

## CONSTRUCTION METHODS

**115-3.1 UNCLASSIFIED EXCAVATION.** It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the RPR without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the RPR. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the RPR. Structures shall be placed after the RPR has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 inches (150 mm) of sand or a material approved by the RPR as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

**115-3.2 CONCRETE STRUCTURES.** Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

**115-3.3 PRECAST UNIT INSTALLATIONS.** Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

**115-3.4 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES AND FITTINGS.** All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the RPR and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the RPR and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor's expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

**115-3.5 INSTALLATION OF LADDERS.** Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.

**115-3.6 REMOVAL OF SHEETING AND BRACING.** In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully



refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The RPR may direct the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

**115-3.7 BACKFILLING.** After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches (150 mm) in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

Backfill shall not be placed against any structure until approval is given by the RPR. In the case of concrete, such approval shall not be given until tests made by the laboratory under supervision of the RPR establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the RPR may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

**115-3.8 CONNECTION OF DUCT BANKS.** To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

**115-3.9 GROUNDING.** A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 inches (150 mm) above the floor. The ground rod shall be installed within one foot (30 cm) of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4-inch (100 mm) diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

A grounding bus of 4/0 bare stranded copper shall be exothermically bonded to the ground rod and loop the concrete structure walls. The ground bus shall be a minimum of one foot (30 cm) above the floor of the structure and separate from other cables. No. 2 American wire gauge (AWG) bare copper pigtailed shall bond the grounding bus to all cable trays and other metal hardware within the concrete structure. Connections to the grounding bus shall be exothermic. If an exothermic weld is not possible, connections to the grounding bus shall be made by using connectors approved for direct burial in soil or concrete per UL 467. Hardware connections may be mechanical, using a lug designed for that purpose.

**115-3.10 CLEANUP AND REPAIR.** After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer's recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

**115-3.11 RESTORATION.** After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective Item L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

**115-3.12 INSPECTION.** Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

**115-3.13 MANHOLE ELEVATION ADJUSTMENTS.** The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.

The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

**115-3.14 DUCT EXTENSION TO EXISTING DUCTS.** Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

## **METHOD OF MEASUREMENT**

**115-4.1** Electrical manholes and junction structures shall be measured by each unit completed in place and accepted. The following items shall be included in the price of each unit: All required excavation and dewatering;; sheeting and bracing; all required backfilling with on-site materials; restoration of all surfaces and finished grading and turfing; all required connections; temporary cables and connections; and ground rod testing

**115-4.2 MANHOLE ELEVATION ADJUSTMENTS SHALL** be measured by the completed unit installed, in place, completed, and accepted. Separate measurement shall not be made for the various types and sizes.

## **BASIS OF PAYMENT**

**115-5.1** The accepted quantity of electrical manholes and junction structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

**115-5.2** Payment shall be made at the contract unit price for manhole elevation adjustments. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary, including but not limited to, spacers, concrete, rebar, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required, to complete this item as shown in the plans and to the satisfaction of the RPR.

Payment will be made under:

Item L-115-5.1	Electrical Manhole - Per Each
Item L-115-5.2	Existing Electrical Manhole/Junction Structure Elevation Adjustment – Per Each

## **REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
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Advisory Circular (AC)

AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation)
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ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products

ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C206	Standard Specification for Finishing Hydrated Lime
FAA Engineering Brief (EB)	
EB #83	In Pavement Light Fixture Bolts
Mil Spec	
MIL-P-21035	Paint High Zinc Dust Content, Galvanizing Repair
National Fire Protection Association (NFPA)	
NFPA-70	National Electrical Code (NEC)

**END OF ITEM L-115**

## **Item L-125 Installation of Airport Lighting Systems**

### **DESCRIPTION**

**125-1.1** This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

### **EQUIPMENT AND MATERIALS**

#### **125-2.1 GENERAL.**

**a.** Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not perform as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

**b.** Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

**c.** All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

**d.** The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format, tabbed by specification section. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR's opinion, does not meet the system design and the standards and codes, specified herein.

**e.** All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. All LED light fixtures, with the exception of obstruction lighting (AC 150/5345-43) must be warranted by the manufacturer for a minimum of 4 years after date of

installation inclusive of all electronics.” Obstruction lighting warranty is set by the individual manufacturer.

## **EQUIPMENT AND MATERIALS**

**125-2.2 CONDUIT/DUCT.** Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

**125-2.3 CABLE AND COUNTERPOISE.** Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

**125-2.4 TAPE.** Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

**125-2.5 CABLE CONNECTIONS.** Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

**125-2.6 RETROREFLECTIVE MARKERS.** Not required.

**125-2.7 RUNWAY AND TAXIWAY LIGHTS.** Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Runway and Taxiway lights have been pre-ordered and will be Owner provided.

**125-2.8 RUNWAY AND TAXIWAY SIGNS.** Runway and Taxiway Guidance Signs should conform to the requirements of AC 150/5345-44. Runway and Taxiway Guidance Signs have been pre-ordered and will be Owner provided. LED retrofit kits have been pre-ordered and will be owner supplied.

**125-2.9 RUNWAY END IDENTIFIER LIGHT (REIL).** Not required.

**125-2.10 PRECISION APPROACH PATH INDICATOR (PAPI).** Not required.

**125-2.11 CIRCUIT SELECTOR CABINET.** Not required.

**125-2.12 LIGHT BASE AND TRANSFORMER HOUSINGS.** Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. New light bases have been pre-ordered and will be owner supplied. Extensions and spacer rings shall be procured by the contractor.

**125-2.13 ISOLATION TRANSFORMERS.** Isolation Transformers shall be Type L-830 , size as required for each installation. Transformer shall conform to AC 150/5345-47. Isolation transformers have been pre-ordered and will be owner supplied.

**125-2.14 BOLTING HARDWARE.** All bolts used for mechanical connections shall be threaded for their entire length. Bolts shall be furnished with washers and locking nuts as required. Bolts used to retain fixtures or cover plates shall include two piece locking washers. An anti-seize compound shall be applied to a clean surface that is free of sand, water and any other debris.

- A. Spray citrus degreaser into threaded bolt openings ( When being reused) taking aim to wash away any grease/lubricant residue. Spray typically three (3) to four (4) bursts waiting approximately fifteen seconds (15 Sec); Spray until visible signs of grease/lubricant no longer appear. Solid particles shall be wiped away with a soft cloth to be certain of a clean thread.
- B. Verify all surfaces are dry before applying the Loctite (Or other approved material).
- C. For blank cover plate installation and initial reinstallation of the light fixture on the adjusted light base:
  1. Bolts may be required to be coated with an approved anti-seize coating, depending on manufacturer recommendations, and used with a 2-piece lock washer.

2. Fixture bolts and lock washers are limited to one installation and must be new each time a blank cover plate is installed.

D. For final bolt installation for all project adjusted light bases and pull cans:

Hexagon head bolts used to secure lighting fixtures to base cans for 3/8"-16 tapped holes. Bolts shall be Group 5, Carbon Steel, coated with a fluoropolymer that is fully compliant with all relevant FAA Advisory Circulars. Shall have chemical resistance to potassium acetate as per FAA AC 42G sec. 4.1.6. Shall meet or exceed FAA Engineering Brief No. 83 and complies with ASME/ANSI B 18.2.1. Bolts shall include 316 stainless steel two part locking washers. Bolts shall be shipped clean, dry, and free from all contaminants. All bolts 1/4 inch and larger shall be hex head type. All bolts smaller than 1/4 inch trade size shall be recessed Allen type. All bolted connections shall utilize an anti-rotational locking type device.

Torque all bolts to the torque specified by the light fixture manufacturer with a calibrated torque wrench.

**125-2.15 HARDWARE.** All bolts, "O"ring gaskets, and hardware used shall be in accordance with FAA Advisory Circular AC 150/534542, latest edition. Bolts used for all mechanical connections shall be grade 5 carbon steel fluoropolymer coated bolts and shall conform to FAA Engineering Brief No. 83A. The entire length of all bolts shall be threaded. Contractor shall maintain a supply of longer variable length bolts and 2 piece locking washers as required for all adjustments to accommodate multiple spacers/top flange while maintaining minimum 3/4" bolt protrusion. Bolts shall be furnished with washers and locking nuts, as required. Bolts used to retain fixtures or cover plates shall include two piece locking washers. Existing broken bolts shall be drilled and tapped. Drilling and tapping of broken bolts shall be considered incidental to this project item. Bolts shall be tightened to a maximum of torque recommended by the light manufacturer utilizing a torque wrench approved by Massport.

**125-2.16 ADHESIVE COMPOUND.** Adhesive Compound for backfilling core hole around light base extensions shall meet the requirements of Specification P-606.

**125-2.17 FLEXIBLE LIQUID SEALER.** Flexible liquid sealer for sealing around light fixtures shall meet the requirements of Specification P-605.

**125-2.18 ELECTRICAL CABLE.** Underground cable shall be as specified in Contract Specification Section L-108, and supplied by the Contractor.

**125-2.19 SAFETY (EQUIPMENT) GROUND.** The Safety Ground wire shall be as specified in Contract Specification Section L-108.

**125-2.20 DELIVERY/STORAGE OF OWNER FURNISHED MATERIALS.** The Contractor shall provide sufficient people and equipment to offload, inventory, store, handle, transport, lift, rig, and place the materials supplied by the Owner. The Contractor shall coordinate with the manufacturer's to establish a delivery date for these materials suitable for the Contractor. The Contractor is responsible for utilizing proper equipment and personnel to safely complete the offloading and storage of the owner furnished materials.

Within 3 days of the NTP, the Contractor shall make arrangements to inventory the owner supplied materials delivered to the Airport. Quantity discrepancies or damage shall immediately be reported to the Engineer and Massport Capital Programs. Once inventoried, pre-ordered materials shall become the responsibility of the Contractor and shall be stored and protected in a safe manner. There shall be no payment associated with this effort and all costs shall be considered incidental to the various project items.

## **INSTALLATION**

**125-3.1 INSTALLATION.** The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

The Contractor shall verify light adjustment heights for each light and be prepared to correct any abnormalities encountered. The verifications process is considered incidental to the adjustment process. When base extensions are added, a new gasket or sealant shall be installed between the existing base and base extension, and another gasket between the base extension, light plate or cover plate.

The Contractor shall furnish all materials, labor, services, tools, equipment and other facilities necessary to complete the installations in strict accordance with the applicable Specifications and Drawings.

All new bolts and locking washers shall be used. No bolts or locking washers, especially for in-pavement light fixtures shall be re-used.

Torque all bolts to the torque specified by the light fixture manufacturer with a calibrated torque wrench. Do not use impact wrenches – they are not designed for the bolt torques required for the in-pavement light fixtures. All torque wrenches must be approved by the Engineer and Massport Electrical prior to use. The Contractor shall refer to FAA Engineering Brief #83, In-Pavement Light Fixture Bolts for further information.

As part of project acceptance, Massport or the Engineer will verify that the bolts have been installed to the proper torque, and if necessary, the Contractor shall adjust any fixtures needing attention at no additional compensation.

**125-3.2 TESTING.** All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

**125-3.3 SHIPPING AND STORAGE.** Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

**125-3.4 ELEVATED AND IN-PAVEMENT LIGHTS.** Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.



## METHOD OF MEASUREMENT

**125-4.1** Runway and taxiway lights will be measured by the number of each type installed, reinstalled, or reset as completed units in place, ready for operation, tested, and accepted by the RPR.

**125-4.2** Signs will be measured by the number of each type and size retrofit as completed units, in place, ready for operation, tested, and accepted by the RPR.

## BASIS OF PAYMENT

**125-5.1** Payment will be made at the Contract unit price for each complete runway or taxiway light, guidance sign, reflective marker, runway end identification light, precision approach path indicator, or abbreviated precision approach path indicator installed by the Contractor and accepted by the RPR. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

Payment will be made under:

L-125.5.1	Remove and Install Relocated L-861-T Taxiway Edge Light, Quartz, Elevated, On Existing Base Can	Each
L-125.5.2	Remove and Install Relocated L-861(L) Runway Edge Light, Quartz, Elevated, On New Owner Supplied Base Can	Each
L-125.5.3	Remove and Install Relocated L-850C Semi-Flush Runway Edge Light, Quartz, Elevated, On New Owner Supplied Base Can	Each
L-125.5.4	Remove Existing Quartz Taxiway Edge Light and Replace with New Owner Supplied LED Edge Light on Existing Base Can, Install New Owner Supplied Transformer	Each
L-125.5.5	Remove and Install Existing L-861-T Taxiway Edge Light and Base Can at New Grade	Each
L-125.5.6	Install Owner Supplied L-861(L) Taxiway Edge Light, LED, Elevated, On Owner Supplied Base Can	Each
L-125.5.7	Install Owner Supplied L-861-T Taxiway Edge Light, Quartz, Elevated, On Owner Supplied Base Can	Each
L-125.5.8	Remove Existing Guidance Sign and Foundation	Each
L-125.5.9	Remove and Install Relocated L-858 Airfield Guidance Sign On New Foundation, Install New Owner Supplied LED Conversion Kit	Each
L-125.5.10	Install Owner supplied L-858(L) Sign – Single/Double Face, LED, Size 3 - 2 Module, Furnish Foundation	Each

L-125.5.11	Install Owner supplied L-858(L) Sign – Single/Double Face, LED, Size 3 - 3 Module, Furnish Foundation	Each
L-125.5.12	Install Owner supplied L-858(L) Sign – Single/Double Face, LED, Size 3 - 4 Module, Furnish Foundation	Each

### REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

#### Advisory Circulars (AC)

AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program

#### Engineering Brief (EB)

EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures
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**END OF ITEM L-125**

**MASSACHUSETTS PORT AUTHORITY  
EAST BOSTON, MASSACHUSETTS**

**DIVISION IV**

**SAMPLE CONTRACT DOCUMENTS**

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**DIVISION IV**  
**SAMPLE CONTRACT FORMS**

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NOTE:           Above forms are included in these specifications merely as examples and are not to be filled out when submitting proposals.

**MASSACHUSETTS PORT AUTHORITY  
ONE HARBORSIDE DRIVE, SUITE 209S  
EAST BOSTON, MASSACHUSETTS 02128-2909**

**CONTRACT**

Clause 1. This Contract is made as of this \_\_\_\_ day of \_\_\_\_\_, 200\_\_, between the Massachusetts Port Authority (“Authority”) and \_\_\_\_\_ (“Contractor”) for work to be completed by the Contractor in accordance with the Contract Documents (as hereinafter defined).

Clause 2. In consideration of the mutual promises herein contained, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Authority and the Contractor, each for itself and its successors and assigns, agree as follows:

The Contractor agrees to furnish all equipment, machinery, tools and labor, furnish and deliver all materials, complete all work, and fulfill all legal and contractual obligations, for the project denominated and described in MPA Contract No. \_\_\_\_\_, entitled,

\_\_\_\_\_  
 (“Contract”), in strict conformity with the provisions set forth in this Contract and the Notice to Contractors, Instructions to Bidders, Proposal, Proposal Guaranty, Contract Bond, Payment Bond, Specifications (including General Requirements and Covenants), Special Provisions, Construction Details, Addendum No.(s)\_\_\_\_\_, Plans, Notice to Proceed, Extra Work Orders, and mutual agreements required to complete the work (together with authorized alterations or extensions of the aforesaid, “Contract Documents”). All of the Contract Documents are hereby specifically made a part of this Contract as fully and with the same effect as if the same had been set forth in their entirety herein.

Clause 3. The Authority agrees to pay, and the Contractor agrees to receive, as full compensation for all items furnished and delivered, all work completed properly, and all obligations fulfilled, by the Contractor under this Contract, for all loss or damage arising out of the work under this Contract, for all risks associated with such work, and for all expenses incurred in connection with the suspension or discontinuance of such work, payment in the amount of

\_\_\_\_\_  
\_\_\_\_\_ Dollars (\$\_\_\_\_\_),  
which payment shall be made by the Authority in accordance with the requirements of the Contract Documents.

Clause 4. This Contract shall be effective as of the date recited above, and shall remain in effect for the time period set forth in the Contract Documents, unless extended or terminated by the Authority in accordance with the Contract Documents. Time is of the essence for this Contract, and the completion date(s) for the work hereunder (or certain phases of the work, if any) may be extended only as provided in the Contract Documents.

IN WITNESS WHEREOF, the parties have executed this Contract as of the day and year first written above.

MASSACHUSETTS PORT AUTHORITY

By: \_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_  
(Contractor Name)

By: \_\_\_\_\_

Title: \_\_\_\_\_

## PERFORMANCE BOND

Know all by these presents, that \_\_\_\_\_, a corporation duly organized under the laws of the State of \_\_\_\_\_ and having a usual place of business in \_\_\_\_\_ (hereinafter the "Principal") and \_\_\_\_\_ a corporation duly organized and existing under the laws of \_\_\_\_\_ and having a usual place of business in \_\_\_\_\_ (hereinafter the "Surety") are held and firmly bound unto the Massachusetts Port Authority in the sum of \_\_\_\_\_ (\$ \_\_\_\_\_) to be paid to the Authority, for which payment Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly, severally, firmly by these presents.

The condition of this obligation is such, that if the above Principal, its heirs, executors, administrators, and assigns, shall in all respects fulfill and perform the covenants, conditions, and agreements in the Contract entitled "MPA Contract No. \_\_\_\_\_

\_\_\_\_\_, and any alteration or amendment thereto (hereinafter the "Contract"), at the time and in the manner therein specified, and in all respects according to their true intent and meaning and shall indemnify and hold harmless the Authority, its officers and agents, as therein stipulated, and shall pay for all labor performed or furnished, for all materials used or employed in the work thereunder, and for the rental or hire of vehicles, tools and other appliances and equipment employed in the work thereunder, then this obligation shall become and be null and void; otherwise it shall be and remain in full force and effect.

Provided, however, that if the Contract becomes subject to termination and/or cancellation by the Authority for any of the reasons stated therein, upon the declaration of the Principals default by the Authority, the Surety shall either remedy the default of the Principal and, with the consent of the Authority, arrange for the Principal to perform and complete the Contract, or shall complete the work under the Contract itself or through qualified independent contractors acceptable to the Authority in accordance with its terms at the Surety's own cost and expense in return for which the Authority shall pay the Surety in accordance with the Contract any balance of funds that would have been due the Principal except for its default; and further provided that time being of the essence of the Contract, it shall be the duty of the Surety to give to the Authority in writing within thirty (30) days after receipt of the declaration of default from the Authority an unequivocal notice of the Surety's election' either to: (a) remedy the default promptly and/or to perform and complete

the Contract promptly, pursuant to the above-stated terms or (b) to pay the Authority the penal sum of the bond. In such notice of election, the Surety shall stipulate a date not later than sixty (60) days from its receipt of such a declaration of default on which the remedy and/or performance shall be commenced and by whom. It shall further be the duty of the Surety to give the Authority written notice immediately upon the completion of the remedy of each default and the performance and completion of the Contract. The Surety shall not assert the solvency of the Principal or the Principal's denial of default as justification for its failure to give notice of such election or for its failure to promptly remedy the default or for its failure to perform the Contract.

In the event that the Surety shall fail to give notice of its election within such 30-day period or to commence any such remedy or performance hereunder within such 60-day period, the Authority shall have the right to cause the work under the Contract to be performed by others, and the Principal and the Surety hereby agree to pay the cost to complete the work under the Contract, up to the penal sum of the bond.

IN WITNESS WHEREOF, we hereunto set our hands and seals this \_\_\_\_\_ day of \_\_\_\_\_ A.D., Two Thousand and \_\_\_\_\_.

PRINCIPAL:

\_\_\_\_\_ Seal

By: \_\_\_\_\_

Title: \_\_\_\_\_

In the presence of:

\_\_\_\_\_ SURETY:

\_\_\_\_\_ Seal

WITNESS:

By: \_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_



**PAYMENT BOND**

Know all by these presents, that \_\_\_\_\_ as Principal, and \_\_\_\_\_ as Surety, are held and firmly bound unto the Massachusetts Port Authority in the sum of \_\_\_\_\_ (\$\_\_\_\_\_) lawful money of the United States of America, to be paid to the Massachusetts Port Authority, for which payments, well and truly to be made we bind ourselves, our respective heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

Whereas, the said Principal has made a Contract with the Massachusetts Port Authority bearing date of \_\_\_\_\_, Two Thousand and \_\_\_\_\_ for the construction of MPA Contract No. \_\_\_\_\_.

Now, the condition of this obligation is such, that if the Principal, shall pay for all labor performed or furnished and for all materials used or employed in said Contract and in any and all duly authorized modifications, alterations, extension of time, changes, or additions to said Contract that may hereinafter be made, notice to the Surety of such modifications, alterations, extensions of time, changes, or additions being hereby waived, the foregoing to include any other purposes or items set out in, and to be subject to, the provisions of the Massachusetts General Laws, Chapter 30, Section 39-A, and Chapter 149, Section 29, as amended, then this obligation shall become null and void; otherwise it shall remain in full force and virtue.

IN WITNESS WHEREOF, we hereunto set our hands and seals this \_\_\_\_\_ day of \_\_\_\_\_ A.D., Two Thousand and \_\_\_\_\_.

PRINCIPAL:

SURETY:

\_\_\_\_\_ Seal

\_\_\_\_\_ Seal

By:: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Title: Attorney-in-Fact

Signed and Sealed in the Presence of: \_\_\_\_\_

**MASSACHUSETTS PORT AUTHORITY  
ONE HARBORSIDE DRIVE  
EAST BOSTON, MASSACHUSETTS 02128-2909**

**SUBCONTRACT**

THIS AGREEMENT made this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_, by and between \_\_\_\_\_ a corporation organized and existing under the laws of \_\_\_\_\_ a partnership consisting of \_\_\_\_\_ an individual doing business as \_\_\_\_\_ hereinafter called the "Contractor" and \_\_\_\_\_ a corporation organized and existing under the laws of \_\_\_\_\_ a partnership consisting of \_\_\_\_\_ an individual doing business as \_\_\_\_\_ hereinafter called the "Subcontractor".

WITNESSETH, that the Contractor and the Subcontractor for the considerations hereafter named, agree as follows:

1. The Subcontractor agrees to furnish all labor and materials required for the completion of all work specified in Section No. \_\_\_\_\_ of the Specifications for \_\_\_\_\_ (Name of Sub-trade) and the plans referred to therein and Addenda No. \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ for the

\_\_\_\_\_  
\_\_\_\_\_

(Complete Title of the Contract and Contract Number taken from the Title Page of Specifications)

all as prepared by \_\_\_\_\_

(Name of Architect or Engineer) for the sum of \_\_\_\_\_

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_), and the

Contractor agrees to pay the Subcontractor said sum for said work. This price includes the following alternates (and other items set forth in the sub-bid):

Alternate No.(s) \_\_\_\_\_ .

- a. The Subcontractor agrees to be bound to the Contractor by the terms of the hereinbefore described plans, specifications, (including all general conditions stated therein) and Addenda Nos., \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_, and to assume to the Contractor all the obligations and responsibilities that the Contractor by those documents assumes to the Massachusetts Port Authority, hereinafter called the "Authority", except to the extent that provisions contained therein are by their terms or by law applicable only to the Contractor.
  - b. The Contractor agrees to be bound to the Subcontractor by the terms of the hereinbefore described documents and to assume to the Subcontractor all the obligations and responsibilities that the Authority by the terms of the hereinbefore described documents assumes to the Contractor, except to the extent that provisions contained therein are by their terms or by law applicable only to the Authority.
2. The Contractor agrees to begin, prosecute and complete the entire work specified by the Authority in an orderly manner so that the Subcontractor will be able to begin, prosecute and complete the work described in this subcontract; and, in consideration thereof, upon notice from the Contractor, either oral or in writing, the Subcontractor agrees to begin, prosecute and complete the work described in this subcontract, in an orderly manner and with due consideration to the date or time specified by the Authority for the completion of the entire work.
3. The Subcontractor agrees to furnish to the Contractor within a reasonable time after the execution of this subcontract, evidence of workmen's compensation insurance as required by law and evidence of public liability and property damage insurance of the type and in limits required to be furnished to the Authority by the Contractor.
4. The Contractor agrees that no claim for services rendered or materials furnished by the Contractor to the Subcontractor shall be valid unless written notice thereof is given by the Contractor to the Subcontractor during the first ten (10) days of the calendar month following that in which the claim originated.
5. This Agreement is contingent upon the execution of a general contract between the Contractor and the Authority for the complete work.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first above-written.

\_\_\_\_\_  
Seal  
(Contractor)

\_\_\_\_\_  
Seal  
(Subcontractor)

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

## AGREEMENT FOR CHANGE ORDER

MPA Contract No.:	Contract Name:
Change Order No.:	Contractor Name and Address:

**1. The Massachusetts Port Authority and the undersigned Contractor agree to the following:**

- a. This agreement includes the following changes to the contract work:

See the attached Engineer's letter dated \_\_\_\_\_, which describes in more detail the changed work the Contractor will do in accordance with the terms and conditions as are herewith contained or attached and made a part hereof.

- b. There shall be (added to) (deducted from) the contract price, (the lump sum of) (a sum not to exceed) \$ \_\_\_\_ See the attached cost breakdown.
- c. The original length of the contract was \_\_\_\_\_ days. Previous time changes were (+)(-) \_\_\_\_\_ days. This change (adds) (deducts) \_\_\_\_\_ days (to) (from) the contract time. The new contract length, including all change orders, is \_\_\_\_\_ days. The new completion date is \_\_\_\_\_.
- d. This agreement shall not become effective until it is accepted, signed and approved by the Massachusetts Port Authority.

**4. The amount of this change eligible for FAA reimbursement is: \$ \_\_\_\_\_**

2. Reasons for the Change Order and respective cost(s):

	Reason for Change	Cost of Change
a.	New Scope	-
b.	Revision to Scope	
c.	Differing/Latent Site Conditions	-
d.	Design Discrepancy	-
e.	Value Engineering	-
f.	Liquidated Damages	-
g.	Safety/Code Requirements	-
h.	Regulatory Mandate	-
i.	Project Acceleration	-
j.	Stop Work	-
k.	Quantity Adjustment (Unit Price Contract)	-
l.	Other	-
		-
		-
	TOTAL	-

**3. Cost Summary of Changes to Date:**

Contract Award Amount	-
Previous Additions	-
Previous Deletions	-
Previous Net Total	-
This Change	-
New Total Contract Amount	\$ -

**5. Approval of the above agreement by Massport is recommended by:**

Architect-Engineer: \_\_\_\_\_ Date: \_\_\_\_\_

Firm Name: \_\_\_\_\_

Contractor: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

Massport: \_\_\_\_\_ Project Manager Date: \_\_\_\_\_

Massport: \_\_\_\_\_ Program Manager,  
Horizontal/Vertical or A/E Services Mgr. Date: \_\_\_\_\_

Massport: \_\_\_\_\_ Assistant Director,  
Controls Date: \_\_\_\_\_

6. Approved By: \_\_\_\_\_ Date: \_\_\_\_\_  
Massport Director of Capital Programs and Environmental Affairs