STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS

GENERAL REQUIREMENTS, GENERAL PROVISIONS, TECHNICAL PROVISIONS

FOR

TAXILANE T1 EXTENSION

AT

LIHUE AIRPORT

LIHUE, KAUAI, HAWAII

STATE PROJECT NO. CK1627-33

2026

NOTICE TO BIDDERS
Hawaii Revised Statutes (HRS),
Chapter 103D

The receiving of bids for **TAXILANE T1 EXTENSION AT LIHUE AIRPORT, LIHUE, KAUAI, HAWAII, STATE PROJECT NO. CK1627-33** will begin as of the HIePRO Release Date. Bidders shall register and submit complete bids through HIePRO only. Refer to the following HIePRO link for important information on Vendor Registration: https://hiepro.ehawaii.gov/welcome.html.

The solicitation plans, specifications, proposal, and additional documents designated or incorporated by reference shall be available in HIePRO.

HIePRO OFFER DUE DATE AND TIME is June 8, 2026, at 2:00 p.m., Hawaii Standard Time (HST). **Bidders shall submit and upload the complete proposal to HIePRO prior to the offer due date and time. Proposals received after said due date and time shall not be considered. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Bidders shall not include confidential and/or proprietary documents as part of their proposal. The record of each bidder and their respective proposal shall be open to public inspection. FAILURE TO UPLOAD THE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION.**

The scope of work consists of construction of new taxilane and apron pavements at Lihue Airport. The estimated cost of construction is between $4,000,000.00 and $5,000,000.00.

To be eligible for award, bidders shall possess a valid State of Hawaii General Engineering "A" license **at the time of bidding.**

The Hawaii Department of Transportation, Air and Water Transportation Facilities Division, 2016 GENERAL PROVISIONS FOR CONSTRUCTION PROJECTS, applicable to this project are available on the internet at: http://hidot.hawaii.gov/administration/con/.

A virtual pre-bid conference is scheduled for May 6, 2026, at 10:00 a.m., HST. Interested bidders shall contact Maybelle Lee, State Project Manager, directly at maybelle.p.lee@hawaii.gov, no later than May 5, 2026, at 12:00 p.m., HST, to receive the meeting invitation. All prospective bidders and/or their respective representatives are encouraged to attend, however, attendance is not mandatory. All information presented at the pre-bid conference shall be provided for clarification and information only. Any amendments to the solicitation shall be made by formal addendum and posted in HIePRO.

A one-time only site visit is scheduled for May 8, 2026, at 11:00 a.m., HST, at the Lihue Airport. Please contact the State Project Manager at maybelle.p.lee@hawaii.gov to confirm your attendance by close of business May 5, 2026, to receive the location to meet the Lihue Airport representative who will be escorting all attendees.

All Request for Information (RFI) questions and Substitution Requests shall be submitted in HIePRO **no later than May 19, 2026, at 2:00 p.m., HST.** RFI questions received after the stated deadline shall not be addressed. Substitution Requests received after the stated deadline shall not be considered. Verbal RFI(s) shall not receive a response. All responses to RFI questions shall be provided for clarification and information only and issued by formal addendum. Any amendments to the solicitation shall be made by formal addendum and posted in HIePRO.

If there is a conflict between the solicitation and information stated in the pre-bid conference, the meeting minutes, and/or the responses to RFI questions, the solicitation shall govern and control, unless as amended by formal addendum.

Apprenticeship Preference. A five percent bid adjustment for bidders that are party to apprenticeship agreements pursuant to HRS § 103-55.6 is applicable to this project.

Employment of State Residents on Construction Procurement Contracts. Compliance with HRS § 103B-3 is a requirement for this project whereby a minimum of 80 percent of the bidder's work force on this project shall consist of Hawaii residents.

Campaign contributions by State and County Contractors. Contractors are hereby notified of the applicability of HRS § 11-355 which states that campaign contributions are prohibited from specified State or County government contractors during the term of the contract if the contractors are paid with funds appropriated by a legislative body. For more information, contact the Campaign Spending Commission at (808) 586-0285.

Protests. Any protest of this solicitation shall be submitted in writing to the Director of Transportation, in accordance with HRS § 103D-701 and Hawaii Administrative Rules § 3-126.

The Equal Employment Opportunity Regulations of the Secretary of Labor implementing Executive Order 11246, as amended, shall be complied with on this project.

The U.S. Department of Transportation Regulation entitled "Nondiscrimination in Federally Assisted Programs of the U.S. Department of Transportation," Title 49, Code of Federal Regulations (CFR), Part 21, is applicable to this project. Bidders are hereby notified that the Department of Transportation shall affirmatively ensure that the contract entered into pursuant to this advertisement shall be awarded to the lowest responsible bidder without discrimination on the grounds of race, color, national origin, or sex (as directed by 23 CFR Part 200).

For additional information, contact Maybelle Lee, State Project Manager, by phone at (808) 838-8890, or by email at maybelle.p.lee@hawaii.gov.

The State reserves the right to reject any or all proposals and to waive any defects in said proposals in the best interest of the public.

CURT T. OTAGURO
Deputy Director of Transportation for Airports

HIePRO RELEASE DATE: May 1, 2026

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INSTRUCTIONS FOR CONTRACTOR'S LICENSING

"A" general engineering contractors and "B" general building contractors are reminded that due to the Hawaii Supreme Court's January 28, 2002 decision in Okada Trucking Co., Ltd. v. Board of Water Supply, et al., 97 Haw. 450 (2002), they are prohibited from undertaking any work, solely or as part of a larger project, which would require the general contractor to act as a specialty contractor in any area where the general contractor has no license. Although the "A" and "B" contractor may still bid on and act as the "prime" contractor on an "A" or "B" project *(See, HRS § 444-7 for the definitions of an "A" and "B" project.)*, respectively, the "A" and "B" contractor may only perform work in the areas in which they have the appropriate contractor's license *(An "A" or "B" contractor obtains "C" specialty contractor's licenses either on its own, or automatically under HAR § 16-77-32.)*. The remaining work must be performed by appropriately licensed entities. It is the sole responsibility of the contractor to review the requirements of this project and determine the appropriate licenses that are required to complete the project.

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS

SPECIAL PROVISIONS

SPECIAL PROVISIONS

The following additional amendments to the General Provisions are applicable to this project:

1.3 DEFINITIONS is amended as follows:

The definition for Subcontractor is deleted in its entirety and replaced with the following:

Subcontractor – An individual, partnership, firm, corporation, joint venture or other legal entity, as licensed or required to be licensed under Chapter 444, Hawaii Revised Statutes, as amended, which enters into an agreement with the Contractor to perform a portion of the work.

The following definitions shall be added:

AASHTO - The American Association of State Highway and Transportation Officials.

Access Road - The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.

Air Operations Area (AOA) - 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.

Apron - Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.

ASTM International (ASTM) - Formerly known as the American Society for Testing and Materials (ASTM).

Bid - The offer of a Bidder, on the prescribed HDOT form, to perform the work and to furnish the labor and materials at the prices quoted.

Building Area - 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.

Certificate of Analysis (COA) - The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.

Certificate of Compliance (COC) - 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.

Contractors Quality Control (QC) Facilities - The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).

Contractor Quality Control Program (CQCP) - 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.

Control Strip - A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.

Drainage System - The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.

Extra Work - 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.

FAA - The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.

Force Account – a) Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis. b) Owner Force Account - Work performed for the project by the Owner's employees.

HAWAII ePROCUREMENT SYSTEM (HIePRO) - The State of Hawaii eProcurement System for issuing solicitations, receiving proposals and responses, and issuing notices of award.

Intention of Terms - 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. 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.

Lighting - 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.

Major and Minor Contract Items - 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.

Owner - 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 the State of Hawaii, Department of Transportation, Airports Division.

Pavement Structure - The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.

Payment Bond - 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.

Performance Bond - 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.

Project - The agreed scope of work for accomplishing specific airport development with respect to a particular airport.

Proposal Guaranty - 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.

Quality Assurance (QA) - Owner's responsibility to assure that construction work completed complies with specifications for payment.

Quality Control - Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.

Quality Assurance (QA) Inspector - 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.

Quality Assurance (QA) Laboratory - 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.

Resident Project Representative (RPR) - 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.

Runway - The area on the airport prepared for the landing and takeoff of aircraft.

Runway Safety Area (RSA) - 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.

Subgrade - The soil that forms the pavement foundation.

Supplemental Agreement - A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%: (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item.

Taxilane - A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.

Taxiway - 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.

Taxiway/Taxilane Safety Area (TSA) - 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.

2.7 REQUEST FOR SUBSTITUTION OF SPECIFIED MATERIALS AND EQUIPMENT BEFORE BIG OPENING is amended as follows:

1. The last sentence in the first paragraph (line 147 to 152) shall be replaced with the following:

"Where a bidder intends to use a material or equipment of an unspecified brand, make, or model, the bidder must submit a request to the Department for review and approval at the earliest date possible. As specified in the Notice to Bidders, all requests shall be posted as a question in HIePRO under the "Question and Answer" tab. Supporting documents for specific request shall be emailed to the Project Manager specified in the Notice to Bidders. Request must be posted in HIePRO and supporting documents received by the Project Manager no later than twenty (20) calendar days before the bid opening date."

2. The first sentence in the second paragraph (line 154 to 156) shall be replaced with the following:

"It shall be the responsibility of the bidder to submit sufficient evidence based upon which a determination can be made by the Department that the alternate brand is a qualified equivalent."

2.8 PREPARATION AND DELIVERY OF BID is amended as follows: Last Paragraph (line 189 to 192) shall be replaced with the following:

"**Bidders shall submit and upload the complete proposal to HIePRO prior to the bid opening date and time. Proposals received after said due date and time shall not be considered. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Do not include confidential and/or proprietary documents with the proposal.** The record of each bidder and respective bid shall be open to public inspection. Original (wet ink, hard copy) proposal documents are not required to be submitted. **Contract award shall be based on evaluation of proposals submitted and uploaded to HIePRO.**

FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.

If there is a conflict between the specification document and the HIePRO solicitation, the specifications shall govern and control, unless otherwise specified."

2.11 BID SECURITY is amended by deleting (a) and replacing it with:

"(a) Unless directed otherwise in the invitation for bids, each bid shall be accompanied by bid security which is intended to protect the Department against the failure or refusal of a bidder to execute the contract for the work bid or to supply the required performance and payment bonds. Bid security shall be in an amount equal to at least five percent of the base bid and additive alternates. Bid security shall be in one of the following forms:

1. A deposit of legal tender,

2. A valid surety bid bond, underwritten by a company licensed to issue bonds in the State of Hawaii, in the form and composed, substantially with the same language as provided herewith and signed by both parties;

3. A certificate of deposit; credit union share certificate; or cashier's, treasurer's, teller's, or official check drawn by or a certified check accepted by a bank, savings institution, or credit union insured by the Federal Deposit Insurance Corporation (FDIC) or the National Credit Union Administration (NCUA) and payable at sight or unconditionally assigned to the Department. These instruments may be utilized only to a maximum of one hundred thousand dollars ($100,000.00). If the required amount totals over one hundred thousand dollars ($100,000.00), more than one instrument not exceeding one hundred thousand dollars ($100,000.00) each and issued by different financial institutions shall be accepted.

If bidder elects options (1) or (3) above for its bid security, said bid security shall be in its <u>original</u> form a<u>nd shall be submitted before the bid deadline</u> to the Contract Office, Department of Transportation, Aliiaimoku Hale, 869 Punchbowl Street, Room 103, Honolulu, Hawaii 96813. Original surety bid bonds do <u>not</u> need to be submitted to the Contracts Office. Bidders are reminded that a copy of its surety bid bond shall be <u>included with its bid</u> submitted and uploaded to HIePRO."

<u>2.12 PRE-OPENING MODIFICATION OR WITHDRAWAL OF BIDS</u> is amended by deleting 2.12 Pre-Opening Modification or Withdrawal of Bids in its entirety and replace with the following:

"2.12 PRE-OPENING MODIFICATION OR WITHDRAWAL OF BIDS. Bids may be modified or withdrawn prior to the bid opening date and time. Withdrawal or revision of proposal shall be completed, submitted and uploaded to HIePRO prior to the bid opening date and time."

<u>2.14 PUBLIC OPENING OF BIDS</u> is amended by deleting 2.14 Public Opening of bids in its entirety

<u>2.20 BID EVALUATION AND AWARD</u> is amended as follows: Paragraph (a) shall be replaced with the following:

"(a) The award shall be made to the lowest, responsive, responsible bidder within ninety (90) days after bid opening and shall be based on the criteria set forth in the invitation for bids. The Department may request the bidders to allow the Department to consider the bids for the issuance of an award beyond the 90 day period. Agreement to such an extension must be made by a bidder in writing. Only bidders who have agreed to such an extension will be eligible for the award." No response to request shall mean the bidder shall no longer be eligible for award.

<u>4.12 UTILITIES AND SERVICES</u> - is amended as follows:

<u>Add the following after the last paragraph:</u>

"(e)Repairs and Outages.

(1) The Contractor shall have available on 24-hour call sufficient specialty contractors, such as

electrical and plumbing contractors, to repair any damage to existing facilities that might occur as a result of construction operations regardless of when the damage might occur.

(2) Outage: Written requests for power outage, communication changes, and water and sewer connection outages shall be submitted to the Engineer at least seven (7) days in advance or as specified in other sections of these specifications. Outages will be restricted to non-peak operational hours between midnight and 6:00 a.m."

7.21 PUBLIC CONVENIENCE AND SAFETY - is hereby added to the General Provisions:

"It shall be especially noted by the Contractor that the area directly adjacent to the existing in use runways and taxiways, is an extremely hazardous area and that very strict controls will apply throughout the entire period required to complete all work within 500 feet from the edge of an in use runway and 180 feet from the edge of an in use taxiway.

The Contractor shall familiarize himself with the Airport Certification Manual available for review at the Airport Manager's Office and shall comply with its requirements.

The Contractor is responsible for the security of access points to the Airport Operational Area that are located within the limits of construction and will be fined $1,000 per incident for any breach of security at these locations. All gates leading into the AOA shall be kept locked and if required to be open, the Contractor shall provide professional security guards to attend gates. The guards must be approved by the Director and shall be required to attend a training session conducted by the Airport Manager prior to gate assignment."

8.8 LIQUIDATED DAMAGES FOR FAILURE TO COMPLETE THE WORK OR PORTIONS OF THE WORK ON TIME: The General Provisions is hereby amended to include the following:

Liquidated damages shall be THREE THOUSAND DOLLARS ($3,000.00) for each Working Day for failure to complete construction within the Completion Times shown in the Proposal.

8.20 LIMITATION OF OPERATIONS: is hereby added to the General Provisions:

"The following limitations shall be observed by the Contractor when operating within 75 feet from the edge of any taxiway.

General - The Contractor shall schedule his operations to minimize interference with the movement of aircraft or passengers as may be required by the Engineer. The Contractor shall be responsible to alert all of his personnel to the location of power and signal cables installed for the operation of the airport. The Contractor shall control his operations in a manner to preclude any possible damage to those cables. Utility companies shall be notified by the Contractor one week before commencement of work. The Contractor shall give notice to the Engineer in writing, at least 168 hours before operating within 75 feet from the edge of any taxiway and the Engineer will assure himself that the Airport Management personnel are notified in sufficient time to publish the warning (NOTAM). The Contractor shall immediately repair any damages to the existing perimeter fence to prevent inadvertent entry to the Airport Operation Area (AOA).

Work in Vicinity of Runways and Taxiways in Use - Under the terms of this contract, it is intended that work shall be completed without disturbing the paved surface of existing runways and taxiways, unless shown otherwise on the plans.

Aircraft traffic shall not be interrupted. The Contractor shall schedule to work within 75 feet of the taxiway as directed by the Airport Management. No ruts, holes, or open trenches of 3 inches or more in depth and no objects or material 3 inches or more in height shall be permitted within the safety area when the airfield is in operation in conformance to Federal Aviation Regulation Part 139.

The Contractor is also informed that Airport Zoning Regulations dictate that a 'clear zone' be maintained 500 feet on each side of an active runway, to be known as a hazardous area. The Contractor shall comply with all regulations governing ground operations within hazardous areas. The following FAA Advisory Circulars ·or later versions and FAA Regulations specify these requirements.

AC 150/5210-5D Painting, Marking, and Lighting Vehicles Used on an Airport, dated April 2010

AC 150/5340-lM Standards for Airport Markings, dated May 2019

AC 150/5370-2G Operational Safety on Airports During Construction, dated December 2017

FAA Regulations Objects Affecting Navigable Airspace Part 77

The Contractor shall keep all personnel and equipment off the areas not specifically designated for work under this Contract. At all times when the Contractor's equipment is not in use, the equipment shall be moved outside the hazardous areas to an area designated by the Engineer. Under no condition shall equipment be parked, or material stored within the hazardous areas.

Failure on the part of the Contractor to abide by the above will result in suspension of work.

Authority of Control Tower Personnel - With the exception of actual construction methods, the airport control tower personnel will have full authority to control the Contractor's movements within the existing taxiway. When required, the Contractor shall maintain a constant radio vigil within all work areas and in addition shall keep at least one flagman on duty with the radio man. When notified by the control tower to temporarily halt operations, it shall be the duty of the flagman, through the use of appropriate methods (lighted flares shall not be used under any circumstances), to notify all operators of equipment and other personnel to cease work and move men and equipment off of hazardous areas. Contractor shall provide, at his own expense, the necessary radio and equipment including a radio equipped mobile vehicle to maintain contact with control tower personnel at all times during job performance. A transceiver operating at a frequency designated by the Engineer to communicate with the Control Tower.

Marking of Hazardous Areas - The Engineer will designate areas that are hazardous for aircraft. The Contractor shall provide red blinker lights spaced not more than 50 feet apart around all hazardous areas and areas of work within 75 feet of any taxiway. Such systems shall be subject to approval by the Engineer. The Contractor shall have personnel on call 24 hours per day for the emergency maintenance of hazard markings.

The Contractor shall provide red flags not less than 20 inches square in addition to the red blinker lights. When danger flags are made of fabric, a wire stiffener shall be used to hold the flags in an extended position. Flags shall be so mounted that they do not produce a hazard. The red danger flags shall be spaced not more than 50 feet apart around all areas of work within 75 feet of any taxiway.

All systems proposed by the Contractor for lighting and barricading shall be submitted to the Engineer for review prior to installation. The Contractor shall install all flags, lighting and barricades as required by the Engineer. Such systems shall be subject to approval by the Engineer.

Storage of Equipment and Materials - At the end of each working shift, all of the Contractor's equipment shall be withdrawn to an area designated by the Engineer. The Contractor shall park all equipment in an orderly fashion and place a sufficient number of red flasher lights to identify these areas. Materials stored within the airport shall be so placed and the work shall, at all times, be so conducted as to cause no greater obstruction to the air and ground traffic than is considered necessary by the Engineer. No runways, taxiways or roadways shall be closed or opened, except by permission of the Engineer.

Utilities - The Contractor shall provide for the protection of all utilities from damages in areas to be traversed by his vehicles and equipment. If required, buried cables and utility lines shall be protected by mounding earth over the cables or by any other method approved by the Engineer.

The Contractor shall notify representatives of the owner, agencies, and other affected organizations at least 48 hours prior to working in any area containing the facilities of these organizations.

Failure to notify the owning organization will prevent authorization to work in a specific area.

Archaeological Features - Any archaeological features such as petroglyphs, burial sites, and artifacts discovered or unearthed during the performance of the work shall immediately be brought to the attention of the Engineer and all work that would damage or destroy these features shall be discontinued. The Engineer will decide, after proper investigation, to salvage or abandon such artifacts."

8.21 OPERATION OF CONTRACTOR'S MOTOR VEHICLE AND PERSONNEL IN RESTRICTED AIR OPERATIONS AND MOVEMENT_AREAS is hereby added to the General Provisions:

"The contractor shall conform with the all sections of the "State of Hawaii, Department of Transportation, Airports Division, Contractor's Training Guide" pertaining to access and operation in the Airport Operation Area (AOA) hereinafter described as follows:

"A. Motor Vehicles in Airport Operation Area
for safety reasons, the operation of motor vehicles in the AOA must conform with all applicable State Airport rules and regulations."

B. Motor Vehicle Access Permit

Each motor vehicle operated in the AOA is required to:

1. Meet all State licensing registration and safety requirements and be specifically licensed for operation in the AOA.
2. Meet all insurance requirements.
3. Be restricted to operation by those persons qualified to drive the vehicle and in possession of a current Ramp Driver's License and applicable Motor Vehicle Operator's License.

C. The operators of motor vehicles in the AOA shall be responsible for meeting the following insurance requirements.

1. Licensed Vehicles

As a condition for authorization to enter the AOA, the Contractor shall provide evidence of vehicle liability insurance in the form of a Certificate of Insurance issued by an authorized insurance carrier. Automobile Liability and general Liability (combined single limit, Bodily Injury and Property Damage, per occurrence) shall be required in the applicable minimum limits specified below:

a. Daniel K. Inouye International Airport

(1) Standard AOA clearance.....$5,000,000

(2) Limited AOA clearance .....$1,000,000 Limited AOA clearance is defined as operations restricted to Diamond head and Ewa Concourses second level roadways and connecting third level main terminal roadway only, with entry and exit via Security Access Point "C" (Primary) and Access Point "A" (Secondary)

b. Other Airports

Standard AOA clearance..... $1,000,000
Standard AOA clearance is defined as any portion of a public Airport from

which the public is restricted by fences or appropriate signs and no leased or demised to anyone for exclusive use and shall include runways, taxiways, all ramp and apron areas, aircraft parking and storage areas, fuel storage areas, maintenance areas, and any other area of a public Airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft or used for embarkation or debarkation of passengers.

2. Unlicensed Vehicles

Airport Liability (or General Liability) shall be required in the applicable minimum limits specified below:

a. Daniel K. Inouye International Airport, Kahului Airport and Ellison Onizuka Kona International Airport at Keahole

AOA clearance.....$5,000,000

b. All other Airports

AOA clearance.....$1,000,000

3. Specifically name the State of Hawaii as additionally insured.

4. Indicate that the Airport Engineer will be provided with a 30-day written prior notice of policy cancellation or material change in coverage or conditions.

D. Operator's Permit

1. No person shall operate a motor vehicle on the AOA unless he holds and carries on his person a current Airport Motor Vehicle operator's permit issued by the State of Hawaii, Department of Transportation, Airports Division.

2. Operator's permits will only be issued to persons who apply through the Airport District Security Office and pass a written exam covering those portions of the Airport Rules and Regulation relating to the operation of vehicles in Airport Operations Areas.

E. Authorized Vehicles

1. Only vehicles considered operationally safe and necessary for the performance of this contract may be allowed to operate in the AOA.

2. All motor vehicles must be painted in such a manner so as to be easily identifiable and must carry the Contractor’s name on each side. These signs may be of a temporary nature applied to the side windows or doors.

The lettering shall be in bold characters of a minimum of four (4) inches in height and one and one-half (1-1/2) inches in widths, the height of logos should be a minimum of six (6) inches.

3. The Contractor's operations on, over, across, and/or immediately adjacent to any runway and/or taxiway at a towered airport shall require the use of two-way radio communication. The Contractor shall obtain the necessary equipment at his own expense.

4. No person shall operate a motor vehicle on the AOA unless he holds and carries on his person a current Motor Vehicle Operator's Permit issued by the Airport Manager.

a. The Motor Vehicle Operator's Permit will be issued only to persons who

apply through the Airport Security Section and pass a written exam covering those portions of the Airport Rules and Regulations relating to the operation of vehicles in the AOA.

b. Permits issued may be suspended or revoked for cause at any time by the Airports Division.

F. Airport Operation Area Construction Pass

1. Issuance of Airport Operation Area (AOA) Construction Passes shall be limited to contractors, subcontractors, companies, organizations, individuals engaged in authorized and approved construction activity which requires a continuing need for entry into the AOA or Airfield Movement Areas Request letters for such passes must be made to the Airport District Manager's Office in accordance with the Contractors Training Guide or applicable District requirements.

2. As a condition for security area clearance, applicants must comply with Transportation Security Regulation 1542 which requires a ten-year background Criminal History Records Check for those individuals employed under this contract.

G. Access to Movement Areas

1. Movement areas shall mean all of the runways and taxiways of the Airport which are utilized for taxiing, takeoff, and landing of aircraft.

a. Any vehicle which requires access to the movement area shall be equipped with operational radio equipment capable of positive two-way contact with Tower/Ground Control.

b. Operators of vehicles in movement areas must possess knowledge and familiarity with restricted and airfield movement areas, operational rules, regulations, and procedures, or be under direct escort by individuals meeting all of the above requirements.

2. Vehicle Operations on Movement Areas

a. No vehicle shall proceed across any runway unless specifically cleared by Tower/Ground Control.

b. The operator of a vehicle in the movement area shall not leave his vehicle unless continuous radio contact is maintained with the Tower/Ground Control while he is away from his vehicle.

c. Any vehicle proceeding onto the movement area between the hours of sunset and sunrise shall be equipped with an overhead flashing light which is visible for one (1) mile, unless such vehicle is being escorted by another vehicle so equipped.

d. All vehicles operated on the movement area between sunrise and sunset except those being escorted, shall operate an overhead amber or red flashing beacon visible for at least one (1) mile; or display a flag at least three (3) feet square with orange and white checkered squares of not less than one (1) foot on each side.

H. Runway and Taxiway Closure

1. Requests for runway or taxiway closures, or for any work which affect operational conditions at the airport must be made in writing through the Airport Engineering Branch.

2. Temporarily closed runways require placement of a lighted "X" runway closure marker on top of the runway identification numerals at both ends of the closed runway.

3. Taxiway closures require placement of barricades with alternate orange and white markings at each end of the closed taxiway segment. Barricades must be supplemented with flashing red lights. The intensity of the lights and spacing for barricades, and lights must adequately define and delineate the hazardous area.

I. Gate Guards Furnished by Contractors

1. If a contractor is permitted by the airport to maintain operational control of an AOA Access Gate, entry through such gate shall be controlled by the posting of a gate guard.

   a. Written instruction will be provided, outlining the guard's duties to enforce those requirements and provisions prescribed by the airport's security program to include all personnel and vehicle entry and access requirements.

   b. Procedures will be established to identify the actions which will be undertaken by the guard in calling for assistance.

   c. An approved emergency communications procedure will be established.

J. Compliance

1. The contractor shall comply with all regulations and rules governing the Air Operations Areas during construction, as specified in the following or later versions:

   a. Hawaii Revised Statutes, Title 19, Administrative Rules for Public Airports.

   b. Federal Aviation Administration Advisory Circular AC 150/5340-l, Standards for Airport Markings; AC 150/5370-2, Operational Safety on Airports During Constructions.

K. Enforcement Authorization

Act 21, Section 1, Section 261-17(a), HRS; Federal Aviation Administration Regulations, Part 139, Part 107.

L. Right of Rejection or Revocation

The State of Hawaii, Airports Division, reserves the right to withhold, deny or revoke any airport security clearance, licenses or permits to any individual or organization who fails to meet the prescribed or required access area clearance criteria to include background investigation information, or fails to observe or comply with established rules, regulations, and directives.

It should be clearly understood that such denial or revocation is based solely on airport security or safety considerations and does not in any way constitute a determination by the State with regard to private employment by any individual or organization."

--------END OF SECTION------

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS

PART I – GENERAL PROVISIONS

(NOT PHYSICALLY INCLUDED)

The Hawaii Department of Transportation AIR and WATER Transportation Facilities Division General Provisions for Construction Projects dated 2016 is not physically included in these specifications. The General Provisions are available at http://hidot.hawaii.gov/administration/con/

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS

PART II – TECHNICAL PROVISIONS

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01005 - DESCRIPTION OF WORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

1.2 SUMMARY

The work to be performed under this Contract shall include furnishing and paying for all machinery, tools, equipment, labor, and materials necessary for Taxilane T1 Extension at Lihue Airport, including all related work as called for on the Plans and these Specifications in place, complete, and ready for use. Below is a general description of the Scope but is not limited to:

Base Bid:

a. Removal of existing pavements.

b. Excavation and stockpile excess soils at the airport, and comply with Site-specific. (Please note the Construction-Environmental Hazard Management Plan C-EHMP will be provided by HDOTA to the Contractor separately prior to issuance of the Construction NTP.)

c. Construct new storm drain system and adjust miscellaneous utilities.

d. Construct utility protection slabs for FAA and airfield lighting conduits.

e. Construct of new taxilane and apron pavements.

f. Provide new pavement markings.

Additive Alternate “A”:

a. Remove existing FAA and Airfield Lighting electrical handholes

b. Install new FAA and Airfield Lighting electrical handholes.

c. Install new electrical cables.

d. Coordinate with FAA for installation of FAA facilities.

e. Demolish and construct of new taxilane and apron pavements.

Additive Alternate “B”:

a. Transport stockpiled soils and dispose as solid waste at landfill.

Additive Alternate “C”:

a. Transport stockpiled soils and dispose as hazardous waste at an approved United States Environmental Protection Agency (EPA) regulated facility.

1.3 HOURS OF WORK

A. Work hours shall be as described on the Construction Phasing plans. The Contractor shall work continuously throughout the project duration. The Contractor shall apply and receive approval from the Engineer in writing of all work hours. The Contractor shall coordinate their schedule with the Engineer. If rescheduling of work or intermittent work is required, such work shall be performed at no extra cost to the State. Night work hours during seabird fallout season (September 15 - December 15) shall follow all Federal and State regulations and shall be subject to approval by the Engineer. If the Contractor elects to work overtime beyond the work hours indicated in the Construction Phasing plans, compensation for State employees and for construction management consultant as authorized by the State shall be the Contractor's obligation to pay in accordance with Section 7.5 - Overtime and Night Work and Section 7.6 - Overtime and Night Payment for State Inspection Service in the General Provisions.

B. Contractor shall clean work areas at the end of each working period. All rubbish, loose materials, etc., shall be disposed of daily. All materials shall be safely secured and stored in an area designated by the Airport Manager.

1.4 PROVISIONS FOR FIELD OFFICE/STORAGE SPACE

Pending the availability of space on airport property, the State will issue Revocable Permit(s) to the Contractor for the use of the space, assessed at a monthly fee of $25 for each Revocable Permit issued. The space(s) may be used for a field office, staging of materials and equipment, vehicle parking or other uses subject to the approval of the State. All spaces shall be subject to the requirements of Section 01561 - CONSTRUCTION SITE POLLUTION CONTROLS.

Since space on airport property is extremely limited, the State does not guarantee that space(s) provided to the Contractor will be in close proximity to the project site. The State will make every effort to provide the Contractor with space on airport property, however, should the State determine that no space is available for such use(s), the responsibility shall then be on the Contractor to find space outside of airport property.

1.5 REQUIREMENTS

A. The Contractor shall visit the work site and verify all conditions pertinent to the Contract he and/or she is bidding on.

B. The Contractor is hereby informed that the project is within a controlled area closed to public access, the Airports Operational Area (AOA). The Contractor shall meet

requirements of Section 01800, “Special Requirements for Contractors on the AOA”.

1.6 COORDINATION

The Contractor shall coordinate the work of different trades and shall be solely responsible for fulfillment of requirements specified herein.

1.7 SAFETY

A. The Contractor shall take all necessary precautions to protect all his and/or her workmen and all other personnel from injuries. The rules and regulations promulgated by the Occupational Safety and Health Acts are applicable and made a part of these Specifications. The Contractor shall conduct operations in a manner that maintain airport security and safe aircraft operations at all times.

B. The Contractor shall comply with the requirements of FAA AC 150/5370-2G, “Operational Safety on Airports during Construction”.

C. During the progress of the work, all debris, empty crates, waste, material drippings, etc., shall be removed by the Contractor continuously or at the end of each work shift, and the work area shall be left clean and orderly.

D. Outage: Written requests for power outage shall be submitted to the Engineer at least seven (7) days in advance or as specified in other sections of these Specifications. Outage will be restricted to non-peak operational hours.

1.8 OPERATIONS PROCEDURES DURING WORK ON THE RUNWAY OR WITHIN THE RUNWAY SAFETY AREA

A. When the runway is closed, the runway lights will be locked out to the “OFF” position. When the runway is partially closed, the runway lights in the work area will be physically blacked out in a manner acceptable to the Engineer.

B. The Contractor shall schedule his and/or her work to allow sufficient time for clean up before the runway is placed back into operation.

C. Daily excavation in the runway safety area must be restored to its original grade before placed back into operation. Stockpiles are not permitted within the runway object free area.

D. The Contractor will initiate through the Engineer and the Airports Operations Controller (AOC) the filing of a blanket airfield construction Notice to Airman (NOTAM) advising of:

1. General information of the schedule construction work, and

2. The time period (beginning and end) for the construction.

E. The Contractor will inform the Engineer when scheduled work is canceled. Generally, the Contractor will not work on the airfield when it is raining or is forecast to rain. A NOTAM should be published or cancelled when work is not scheduled.

F. The Contractor radio-equipped person shall monitor air traffic radio transmission as specified in Section 01800, "Special Requirements for Contractors on the AOA". The radio-equipped person's only duty is to monitor the radio frequency.

G. In the event of a disruption in paving operations, such as a break down in the asphalt plant or paving equipment, the Contractor must have sufficient materials available to restore the runway pavement into a safe operational runway surface by the scheduled opening time.

H. The Contractor shall keep his and/or her work force from entering the active airfield.

I. A minimum of three (3) hours prior to the beginning of each work shift, the Contractor shall coordinate with AOC to determine if work will be permitted during the upcoming shift. Due to certain weather conditions, AOC and/or ATC may cancel work shifts and require the opening of the runway for aircraft use. Therefore, the Contractor may not begin work in any area in which the asphalt pavement cannot be completed to finished grade by the end of the work shift. Weather conditions which would require cancellation of work typically occur during Kona wind conditions with certain wind velocity thresholds. Historic data from the airport shows that these conditions occur less than 10% of the time.

1.9 SPECIAL SUBMITTAL TO SUPPORT SMS REPORT

The Contractor is responsible to submit supporting documentations for Safety Management System (SMS) Report to the Engineer, when the project is located in the airside area. Supporting documentations include, but are not limited to, project schedule, project phasing plan, barricade plan, airside area project tracking plan, laydown location, and etc. Required supporting documentation shall be in accordance with FAA AC 150/5200-37 latest version, "Introduction to Safety Management System (SMS) for Airport Operators".

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.1 BASIS OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION 01005

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SECTION 01040 – SCOPE OF WORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Section 40 - Scope of Work, as included as an attachment to this Section.

1.2 SUMMARY

The work to be performed under this contract shall include all work as called for on the plans and these specifications complete and accepted by the RPR. 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.

1.3 REFERENCES

A. FAA Specification Section 40 – Scope of Work as modified herein.

B. Section 01005, Description of Work.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PART 4 MEASUREMENT AND PAYMENT

4.1 Unless otherwise noted in the section below, work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

4.2 Unforeseen Conditions approved by the State and Engineer shall be paid for under the allowance as described below. The allowance is an estimate and payment shall not exceed the maximum amount shown in the Proposal Schedule. Payment shall be full compensation for all labor, tools, equipment, and all other incidentals necessary to complete the work. Any unused amounts of the allowance will not be paid to the Contractor, and in the event that this item is not used, the Contractor is not eligible to receive any payment under the Proposal Schedule.

Payment will be made under Base Bid:

Item No.	Description	Unit
01040.1	Unforeseen Conditions	Allowance
01040.2	Utility Locating and Potholing	Allowance

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. Specification Section 40 - Scope of Work.

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 Special Provisions Section 1.3.

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 FAA AC 150/5370-10H, 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.

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

END OF SECTION 01040

SECTION 01210 - ALLOWANCES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions for Construction Projects (2016), Special Provisions and General Requirements of the Specifications, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

A. This Section includes administrative and procedural requirements governing allowances. Certain materials, equipment, and services are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials, equipment, and services to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.

B. Type of allowances include contingency allowances.

C. Related Sections include Divisions 1 through 16 Sections for items of work covered by allowances.

1.03 SUBMITTALS

Submit in accordance with SECTION 01300 - SUBMITTALS.

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders and Field Orders.

B. Submit invoices for delivery slips to show actual quantities of materials and equipment delivered to the site for use in fulfillment of each allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.04 COORDINATION

Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.05 CONTINGENCY ALLOWANCES

Contractor’s overhead, profit, and related costs for products, equipment, and services ordered by the State under the contingency allowance are included in the allowance and are not part of the Contract Lump Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs. Reference the contingency allowances respective specification sections for specific information.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 EXAMINATION

Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer or replacement.

3.02 PREPARATION

Coordinate consultants, vendors, subcontractors, materials and installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. The allowance is an estimate and the amount shall not exceed the maximum amount shown in the Proposal Schedule.

B. Payment shall be made from each allowance items respective specification section.

END OF SECTION

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions for Construction Projects (2016), Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 PROJECT DOCUMENTATION

The contract will not be considered complete until required submittals have been received and accepted by the State.

At the discretion of the Project Manager, the number of copies to be submitted may differ from that specified in this Section.

1.03 DETAILED CONSTRUCTION SCHEDULE

A. The Contractor shall submit a detailed construction schedule to the Engineer for review, no later than 30 calendar days after execution of the contract. The detailed construction schedule shall be based on a detailed critical path analysis of construction activities and sequence of operations needed for the orderly performance and completion of any separable parts of any work and all work in accordance with the contract. The schedule shall be Critical Path Method (CPM) type in the form of an arrow diagram and activity listing or comprehensive bar graph. The network diagram shall show in detail and in orderly sequence all activities on a time scale, their descriptions, durations and dependencies, necessary and required to complete all work and any separable parts thereof. The schedule shall show in detail the following information for each activity:

1. Identification by code numbers and description;

2. Duration;

3. Craft and Equipment;

4. Earliest start and finish dates;

5. Latest start and finish dates;

6. Total and free float time; and

7. Highlighted Critical Path

B. The construction schedule shall be complete in all respects, covering in addition to activities at the site of work, off-site activities such as design, fabrication, and procurement of equipment; the scheduled delivery dates of such equipment; submittal and approval of shop drawings and samples; ordering and delivery of

materials; inspections; and testing. The schedule shall also include a manpower forecast by crafts. The detailed construction schedule shall be supplemented by a three-week schedule prepared by the Contractor and submitted to the Engineer on a weekly basis. The Contractor shall promptly inform the Engineer of any proposed change in the schedule and shall furnish the Engineer with a revised schedule and cash flow diagram within 15 calendar days after approval of such change.

The schedule shall be kept up to date, taking into account the actual progress of work and shall be updated, if necessary, every 30 calendar days. The updated schedule shall, as determined by the Engineer, be sufficient to meet the requirements for the completion of the separable parts of work and the entire projects as set forth in the contract.

Upon commencing work, the Contractor shall submit at the start of each week to the Engineer for review, a detailed three (3) week construction schedule.

C. If at any time during the progress of the Work, the Contractor's actual progress appears to the Engineer to be inadequate to meet the requirements of the contract, the Engineer will notify the Contractor of such imminent or actual noncompliance with the contract. The Contractor shall thereupon take such steps as may be necessary to improve his progress and the Engineer may require an increase in the labor force, the number of shifts, and/or overtime operations, days of work and/or the amount of construction plants all without additional cost to the State. Neither such notice by the Engineer nor the Engineer's failure to issue such notice shall relieve the Contractor from his obligation to achieve the quality of work and rate of progress required by the contract. Failure of the Contractor to comply with instructions of the Engineer under these provisions may be grounds for determination by the State that the Contractor is not prosecuting work with such diligence as will assure completion within the times specified. Upon such determination, the State may employ labor and equipment and charge the Contractor for the cost thereof, including depreciation for plant and equipment or may terminate the Contractor's right to proceed with the performance of the contract, or any separable part thereof, in accordance with the applicable provisions of the contract.

D. The Contractor shall submit to the Engineer one (1) reproducible and three (3) prints of the detailed construction schedule and of each revised schedule submitted thereafter.

1.04 SCHEDULE OF VALUES

A. The Contractor shall submit the Schedule of Values to the Engineer for review, no later than 30 calendar days after execution of the Contract.

B. Format and Content: Use Proposal Schedule and/or the Project Specifications table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section. Provide a breakdown of the contract sum in sufficient detail to facilitate continued

evaluation of Applications for Payment and progress reports. Break principle work or subcontract amounts down into several smaller identifiable items of work.

C. Identification: Include the following Project identification on the schedule of values:

1. Project name and location

2. Project number

3. Contractor's name and address

4. Contract No.

5. Date of submittal

D. Arrange the Schedule of Values in tabular form with separate columns to indicate the following items listed:

1. Related Specification Section or Division

2. Description of work

3. Dollar value and percent complete

E. Correlate line items in the Schedule of Values with other required administrative schedules and forms including;

1. Construction Schedule

2. Application for Payment forms including continuation sheets

3. List of Subcontractors

4. List of principle suppliers and fabricators

5. Schedule of submittals

F. Round amount to nearest whole dollar; the total shall equal the contract sum.

G. Provide a separate line item in the Schedule of Values for each part of the work where Applications for Payment may include materials or equipment, purchased, fabricated or stored, but not yet installed.

H. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment or when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.05 OTHER SUBMITTALS REQUIRED BEFORE CONSTRUCTION

The Contractor shall submit the following items prior to or at the pre-construction meeting or unless otherwise noted:

A. Name, residence phone number, addresses and scope of authority for the following persons:

1. Superintendent

2. Contractor's authorized representative to sign documents

3. Two (2) additional persons who can be contacted during non-working hours for emergencies.

4. Field Office location and phone numbers (cellular, pager, fax, etc.)

B. Name of Safety Officer

C. Notice of Materials to be furnished

D. Three (3) copies each of Certificates of Insurance. The State of Hawaii shall be named as additionally insured. The project number and project title shall be referenced in the Description of Operations/Locations/Vehicles. If canceled, 30 days written notice to the State of Hawaii must be given. If certificates are not correct, work cannot proceed.

E. Three (3) copies each Insurance and Tax Rates.

F. List of apprentices who will be working on the project supported with the Statement of Apprenticeship or copy of the Apprenticeship Agreements registered with the State Board, for each apprentice.

G. List of equipment to be used on the job. Designate maximum working height and capacity of equipment involved and their respective rental rates.

H. Three (3) copies of an expenditure (cash flow) plan consisting of an anticipated work completion graph plotting contract time and gross payment anticipated.

1.06 SHOP DRAWINGS, SAMPLES, CATALOG CUTS, AND CERTIFICATES

A. Submittal Schedule: Prior to the submission of any shop drawings or submittals, the Contractor shall submit to the Engineer for review, a submittal schedule. The schedule shall identify the subject matter of each submittal, the corresponding specification section number and the proposed date of submission. During the progress of work, the Contractor shall revise and resubmit the submittal schedule as directed by the Engineer.

B. The Contractor shall submit for review to the Engineer, or to a representative

designated by the Engineer, six (6) copies of all shop drawings, samples, catalog cuts and certificates. Three (3) copies will be returned to the Contractor with information of review action. The Contractor shall submit additional quantities for their subcontractor's or supplier's use. Each shop drawing, certificate of compliance, sample, and equipment list shall be checked and certified correct by the Contractor and shall be identified with the applicable information specified hereinafter under "Submittal Identification."

Items are to be reviewed prior to commencing fabrication or delivery of material to the job site.

C. Each copy of the drawings, certificates, catalog cuts, and lists reviewed by the Engineer will be stamped "REVIEW ACTION" with the appropriate action noted therein. The review of the Engineer shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory. Acceptance of such drawings will not relieve the Contractor the responsibility of conforming to the contract drawings and specifications or for any error or omission which may exist as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work. Each shop drawing submitted for review shall have, in the lower right-hand corner just above title, a white space 4" x 4" in which the Engineer can place the stamp and indicate action taken. The Contractor shall also inform their subcontractors to provide this space in their preparation of shop drawings.

1.07 MAINTENANCE DATA AND OPERATING INSTRUCTIONS

Six (6) copies of maintenance data and operating instructions shall be submitted by the Contractor at the conclusion of the equipment installation. The manuals shall be assembled in one or more binders, each with a title page, typed table of contents, and heavy section dividers with numbered plastic index tabs. The binders shall be a minimum of 2 inches thick, three ring, "D slant" with hard covers. All data shall be punched for binding and composition and printing shall be arranged so that punching does not obliterate any data. The project number, project title, and Airport shall be inserted in the front and backbone binder cover.

The Contractor shall submit a draft to the Engineer for review prior to the submission of the final copies.

The manual shall include separate sections describing each equipment. Provide a general description of the equipment, instructions for operation, maintenance, recommended inspection points and periods for inspection, testing, adjustments, calibration procedures with illustrations, wiring diagrams, trouble shooting situations and solutions, and repair methods in a practical, complete, and comprehensive manner.

For each equipment, include information on detailed parts listings (part numbers and costs) with the manufacturer's name, address, contact person, e-mail address and phone/fax numbers. Provide the contact name, address, e-mail address and phone/fax numbers of the distributor in the State of Hawaii for each equipment.

Include a separate section on warranty information on all products and equipment. Provide this information in a tabular format with a listing on all products and equipments with warranty start and completion dates for each item.

Include separate sections on all approved submittals, test reports, certifications, etc.

All information shall be arranged in a logical, orderly sequence. Manuals submitted by the manufacturer will not be accepted.

1.08 TEST REPORTS

Six copies of test reports for any material used in this Contract shall be submitted when specified or required by the Engineer.

1.09 SUBMITTAL IDENTIFICATION

A. To avoid rejection and to clarify each submittal, the General Contractor shall have a rubber stamp made up in the following format:

B. _____
General Contractor's Name

PROJECT TITLE: _____
AIRPORT: _____
STATE PROJECT NO: _____
AIP PROJECT NO: _____
THIS SUBMITTAL HAS BEEN CHECKED BY THIS GENERAL CONTRACTOR AND IS CERTIFIED CORRECT AND IN COMPLIANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS.

ITEM NO. _____

SUBMITTAL NUMBER _____
DATE RECEIVED _____
SPECIFICATION SECTION # _____
SPECIFICATION PARAGRAPH # _____
DRAWING NUMBER _____
SUBCONTRACTOR NAME _____
SUPPLIER NAME _____
MANUFACTURER NAME _____

CERTIFIED BY _____ (Contractor's Signature, Date)
(Contractor's Name and Title)

C. This stamp "filled in" should appear on each reproducible shop drawing, on the cover sheet of copies of test and mill reports, certificates of compliance, catalog cuts, brochures, etc. The stamp should be placed on a heavy stock paper

merchandise (approximately 3" x 6") and one tag tied to each sample submitted for approval. The tag on the samples should state what the sample is, so that if the tag is accidentally separated from the sample, they can be matched up again. The back of this tag will be used by the Engineer for receipt, approval, and log stamp for any comments that relates to the sample.

D. Submission Number: Each submission is to be sequentially numbered in the space provided in the Contractor's stamp. Correspondence and transmittal will refer to this number.

E. The Contractor shall ensure that all submittals, including shop drawings, are complete and in conformance to the requirements of the Contract specifications prior to submission to the State for review and acceptance. Incomplete submittals will not be processed by the State and returned to the Contractor for correction. Any cost impacts and delays in the Project schedule as a result of incomplete submittals shall be the responsibility of the Contractor.

1.10 AS-BUILT DRAWINGS

As-built drawings shall conform to the requirements of Section 5.8 - "Coordination Between the Contractor and the State" of the General Provisions for Construction Projects (2016), and the following requirements:

The Contractor shall maintain on the job site a set of full-size contract drawings, marking them in red to show all variations between the construction actually provided and that indicated or specified in the contract documents, including buried or concealed construction. (Section 5.8 (a) Drawings and Special Provisions of the General Provisions for Construction Projects.).

Where a choice of material or method is permitted herein or where variations in scope of character of work from that of the original contract or authorized, the drawings shall be marked to define the construction actually provided. Where equipment installation is involved, the size, manufacturer's name, model number, power input or output characteristics as applicable shall be shown on the as-built drawings.

The representation of such changes shall conform to standard drafting practice and shall include such supplementary notes, legends, and details as necessary to clearly portray the as-built construction.

The drawings shall be maintained and updated on a daily basis. The Contractor shall stamp, sign, and date each sheet with the following stamp:

AS-BUILT DRAWINGS/SPECIFICATIONS

This certifies that the dimensions and details shown on this sheet reflect the dimensions and details, and specifications as constructed in the field.

_____

CONTRACTOR'S NAME

_____

Signature Date

Monthly and final payments to the Contractor shall be subject to prior approval of the drawings. On completion of the work, both sets of marked-up drawings shall be delivered to the Engineer and shall be subject to approval before acceptance.

1.11 GUARANTEES

Guarantee periods shall start at time of acceptance in writing by the State.

All guarantees and warranties shall be made out to the "State of Hawaii." Supplier and subcontractor guarantees shall be co-signed by the Contractor.

The Contractor is solely responsible for coincidence or non-coincidence of factory warranties or equipment guarantees, and the Contractor's own warranties and guarantees as required by the contract. The Contractor is solely responsible for scheduling and coordinating the installation of equipment and materials so as to take maximum advantage of factory warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured nor paid for separately but shall be considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION

SECTION 01400 – CONTRACTOR QUALITY CONTROL PROGRAM

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions for Construction Projects (2016), Special Provisions and General Requirements of the Specifications, apply to the work specified in this Section.

1.02 CONTRACTOR QUALITY CONTROL PROGRAM

A. GENERAL

The Contractor shall establish, provide, and maintain an effective Quality Control Program 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 herein and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The intent of this section is to enable the Contractor to establish a necessary level of control that will:

1. Adequately provide for the production of acceptable quality materials.

2. Provide sufficient information to assure both the Contractor and the Engineer that the specification requirements can be met.

3. Allow the Contractor as much latitude as possible to develop his or her own standard of control.

The Contractor shall be prepared to discuss and present, at the pre-construction conference, his/her understanding of the quality control requirements. The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the Quality Control Program has been reviewed and accepted by the Engineer and State Project Manager. No partial payment will be made for materials subject to specific quality control requirements until the Quality Control Program has been reviewed and approved by the Engineer and State Project Manager.

The quality control requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the acceptance testing requirements. Acceptance testing requirements are the responsibility of the Engineer. All inspection and test reports shall be stamped and signed by a licensed professional engineer.

B. DESCRIPTION OF PROGRAM

1. General Description. The Contractor shall establish a Quality Control Program to perform work quality inspections and control testing on all materials and items of work required by the technical specifications, including those performed by subcontractors. This program shall ensure conformance to applicable specifications and plans with respect to materials, workmanship, construction, finish, and functional performance. The program shall be effective for control of all construction work performed under this Contract, in addition to other requirements of this section, and any other activities deemed necessary by the Contractor to establish an effective level of quality control.

2. Quality Control Program. The Contractor shall describe the Quality Control Program in a written document which shall be reviewed by the Engineer and State Project Manager prior to the start of any production, construction, or off-site fabrication. The written Quality Control Program shall be submitted to the Engineer for review within thirty (30) calendar days after the date of contract execution.

3. The Quality Control Program shall be organized to address, as a minimum, the following items:

   a. Quality control organization;
   b. Submittals schedule;
   c. Inspection and Testing Requirements;
   d. Quality control testing plan;
   e. Documentation of quality control activities;
   f. Requirements for corrective action when quality control and/or acceptance criteria are not met; and
   g. A listing of the definable features of work for the project.

   The Contractor is encouraged to add any additional elements to the Quality Control Program that he/she deems necessary to adequately control all production and/or construction processes required by this contract.

C. QUALITY CONTROL ORGANIZATION

The Contractor's Quality Control Program shall be implemented by the establishment of a separate organization that is not a part of the production organization. An organizational chart shall be developed to show all quality control personnel and how these personnel integrate with other management/production and construction functions and personnel. The organizational chart shall identify all quality control staff by name and function, and shall indicate the total staff required to implement all elements of the program, including work quality inspection and control testing on materials for each item of work. At the top of the chart, an overall Contractor Quality Control

System Manager, CQCSM, shall be named and his/her subordinates shall follow thereafter.

The quality control organization shall consist of the following minimum personnel:

1. Contractor Quality Control System Manager. The CQCSM shall be a Licensed Engineer of the Contractor, or a consultant engaged by the Contractor. The CQCSM shall have a minimum of 10 years of experience in airport and/or paving and building construction and shall have had prior quality control experience on a project of comparable size and scope as the contract. The CQCSM shall be on the project full time and shall nave no production duties. The CQCSM shall NOT be the point of contact for the production organization.

   The CQCSM shall have full authority to institute any and all actions necessary for the successful implementation of the Quality Control Program to ensure compliance with the contract plans and technical specifications including authority to independently stop any work not in compliance with the contract. The CQCSM shall report directly to a responsible officer of the construction firm, such officer not being the project Superintendent or Foreman.

2. Quality Control Technicians. A sufficient number of quality control technicians necessary to adequately implement the Quality Control Program shall be provided. These personnel shall either be an engineer, engineering technicians, or experienced craftsman with qualifications in the appropriate fields and shall have a minimum of 7 years of experience in their area of expertise. The Quality Control Technician shall be on the project full time and shall have no production duties.

   The quality control technicians shall report directly to the CQCSM and shall perform the following functions:

   a. Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by paragraph 1.02E of this Section.
   b. Performance of all quality control tests as required by the technical specifications and paragraph 1.02F of this Section.

3. Staffing. The Contractor shall provide sufficient qualified quality control personnel to monitor each work activity at all times. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The Quality Control Program shall state where different technicians will be required for different work elements.

   All personnel shown on the organizational chart shall have, in resume form, all information regarding their education, any licenses, their present position, previous work experience, etc. included in the Quality Control

Program written documentation. These resumes shall be verified by the CQCSM.

D. SUBMITTALS SCHEDULE

The Contractor shall submit a detailed listing of all submittals (e.g., mix designs, material certifications, color samples) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include:

1. Specification item number:

2. Item description;

3. Description of submittal;

4. Specification paragraph requiring submittal; and

5. Scheduled date of submittal.

E. INSPECTION REQUIREMENTS

Quality control 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 in paragraph 1.02G of this Section.

Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the particular feature of work.

Before any definable feature of work is started, the CQCSM shall notify the Engineer and State Project Manager of such work at least 48 hours in advance. Upon notification, the Engineer or State Project Manager shall determine if a meeting shall be held to discuss the condition of the work area, material and equipment status, what is to be expected and any questions or possible problems. No definable feature of work shall commence without the consent of the Engineer and State Project Manager.

F. QUALITY CONTROL TESTING PLAN

As part of the overall Quality Control Program, the Contractor shall implement a quality control 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 quality control tests that the Contractor deems necessary to adequately control production and/or construction processes.

The testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

1. Specification item number;

2. Item description (e.g., plant control, concrete cylinder tests);

3. Test type (e.g., concrete compressive strength);

4. Test standard (e.g., ASTM or AASHTO test number, as applicable);

5. Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated);

6. Responsibility (e.g., plant technician, independent lab); and

7. Control Requirements (e.g., target, permissible deviations).

The testing plan shall contain a statistically based procedure of random sampling for acquiring test samples in accordance with ASTM D 3665. The Engineer and State Project Manager shall be provided the opportunity to witness the quality control sampling and testing. The CQCSM shall make every effort to inform the Engineer and State Project Manager at least 48 hours, or more if stated in the specifications, before such testing occurs.

All quality control test results shall be documented by the Contractor as required by paragraph 1.02G of this Section.

G. DOCUMENTATION

The Contractor shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that the required inspections or tests have been performed, including type and number of inspections or tests involved, results of inspections or test; 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 Engineer and State Project Manager daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCSM.

Specific Contractor quality control records required for the contract shall include, but are not necessarily limited to, the following records:

1. Daily Inspection Reports. Each Contractor quality control technician shall maintain a daily log of all inspections performed for both Contractor and Subcontractor operations on a form acceptable to the Engineer and State Project Manager. These technician's daily reports shall provide factual

evidence that continuous quality control inspections have been performed and shall, as a minimum include the following:

a. Technical specification item number and description and location of work performed;
b. A comprehensive breakdown of the work force including the number of workers and total hours for each trade;
c. Compliance with approved submittals;
d. Proper storage of materials and equipment;
e. Proper operation of all equipment;
f. Adherence to plans and technical specifications;
g. Review of quality control tests; and
h. Safety inspection.

The daily inspection reports shall identify inspections 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 stamped and signed by the licensed professional engineer CQCSM. The Engineer and State Project Manager shall be provided at least one copy of each daily inspection report on the workday following the day of record.

2. Daily Test Reports. The Contractor shall be responsible for establishing a system which will record all off-site and on-site quality control test results. Daily test reports shall document the following information:

a. Technical specification item number and description;
b. Test designation;
c. Location;
d. Date of test;
e. Control requirements;
f. Test results;
g. Causes for rejection;
h. Remedial actions; and
i. Retest results.

Test results from each day's work period shall be submitted to the Engineer and State Project Manager prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical quality control charts. The daily test reports shall be stamped and signed by the licensed professional engineer CQCSM.

H. CORRECTIVE ACTION REQUIREMENTS

The Quality Control Program 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 Quality Control Program as a whole, and for individual items of work contained in the technical specifications.

The Quality Control Program shall detail how the results of quality control inspections and tests will be used for determining the need for corrective action and shall contain clear sets of 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 utilize statistical quality control charts for individual quality control tests. The requirements for corrective action shall be linked to the control charts.

I. SURVEILLANCE BY THE ENGINEER AND STATE PROJECT MANAGER

All items of material and equipment shall be subject to surveillance by the Engineer or State Project Manager at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate quality control system in conformance with the requirements detailed herein and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to surveillance by the Engineer or State Project Manager at the site for the same purpose.

Surveillance by the Engineer or State Project Manager does not relieve the Contractor of performing quality control inspections of either the on-site or off-site Contractor's or subcontractor's work.

J. NONCOMPLIANCE

The Engineer or State Project Manager will notify the Contractor of any noncompliance with any of the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Any notice, when delivered by the Engineer or State Project Manager or his/her authorized representative to the Contractor or his/her authorized representative at the site of the work, shall be considered sufficient notice.

In cases where quality control activities do not comply with either the Contractor's Quality Control Program or the Contract provisions, or where the Contractor fails to properly operate and maintain an effective Quality Control Program, as determined by the Engineer or State Project Manager, the Engineer or State Project Manager may:

1. Order the Contractor to replace ineffective or unqualified quality control personnel or subcontractors in accordance with Section 8.4 – "Character and Proficiency of Workers" of the General Provisions for Construction Projects (2016).

2. Order the Contractor to stop operations in accordance with Section 8.10 – "Suspension of Work" of the General Provisions for Construction Projects (2016).

3. Determine work performed by the Contractor during periods of noncompliance to be unacceptable and subject to removal or non-payment in accordance with Section 5.12 – "Removal of Non-Conforming and Unauthorized Work: Performance of Corrective or Remedial Work" of the General Provisions for Construction Projects (2016).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured nor paid for separately but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

SECTION 01560 – GENERAL ENVIRONMENTAL, HEALTH, & SAFETY CONTROLS

PART I – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions for Construction Projects (2016), Special Provisions and General Requirements of the Specifications, apply to the work specified in this Section.

1.02 DESCRIPTION

This section addresses the prevention of environmental pollution as the result of construction operations under this contract. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents that adversely affect human health or welfare, unfavorably alter ecological balances of importance to human life, adversely affect other species of importance, or degrade the utilization of the environment for aesthetic and recreational purposes.

1.03 REFERENCES

All work shall conform to the most recent edition of the following Federal, State, and Local regulations, unless otherwise noted or specified on the drawings or in these specifications. Where conflicts among the requirements or with these specifications exists, the most stringent requirements shall apply.

A. DOTA Construction Site Runoff Control Program
http://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program

1. DOTA Construction Activities Best Management Practices (BMP) Field Manual.

B. Department of Health (DOH) Hazard Evaluation & Emergency Response (DOH HEER) https://health.hawaii.gov/heer/

C. State of Hawaii Administrative Rules, Title 11, Department of Health (DOH)

1. Chapter 46, Community Noise Control.

2. Chapter 59, Ambient Air Quality.

3. Chapter 60.1, Air Pollution Control.

4. Chapters 260.1, 261.1, 262.1, 263.1, 264.1, 265.1, 266.1, 268.1, 270.1, 271.1, 273.1, and 279.1, Hazardous Waste Management.

5. Chapter 451, State Contingency Plan.

6. Chapter 501, Asbestos Requirements.

D. CFR Title 40, Protection of the Environment, Chapter I, Environmental Protection Agency.

E. CFR Title 42, Public Health, Chapter I, Public Health Service, Department of Health and Human Services.

1.04 SUBMITTALS

A. The Contractor shall submit the following items as required:

1. Individual Wastewater System (IWS) Final Report: For projects involving the construction of an individual wastewater system, an IWS Final Report is required to be submitted to the DOTA Engineering Branch, Environmental Section (AIR-EE) for approval, prior to submitting to DOH Wastewater Branch and prior to project closeout.

2. Underground Injection Control (UIC) Well Final Report: For new drainage well construction and existing drainage well modification, a UIC Well Final Report is required to be submitted to AIR-EE for review and approval, prior to submitting to DOH Safe Drinking Water Branch (SDWB), and prior to project closeout. The Final Report shall also be submitted within the deadline specified on the UIC Approval to Construct. If a project involves abandoning an existing drainage well, written instructions shall be obtained from DOH SDWB and a copy provided to AIR-EE prior to backfilling the demolished well. All supporting documentation requested by DOH post demolition work shall be completed and provided to AIR-EE for review prior to submitting to DOH SDWB.

3. AST (Flammable/Combustible Liquid) Tank Installation: Provide signed record of Final Inspection issued by County Fire Department.

4. Waste Manifests: If a project will generate hazardous waste, the Contractor shall prepare waste manifests in accordance with HAR 11-262 and provide records to AIR-EE.

B. The Contractor shall comply with all applicable regulations and maintain records of permits, licenses, certificates, and other environmental regulatory requirement correspondence. Submit copies of permits, licenses, certifications, inspection reports, releases, notices, receipts for fee payments, correspondence, records, and similar documents, established for compliance with environmental regulations bearing on performance of the work.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 AIR POLLUTION CONTROL

A. Emission: The Contractor shall not be allowed to operate equipment and vehicles that show excessive emissions of exhaust gases until corrective repairs or adjustments are made, as determined by the Engineer.

B. Dust: The Contractor, for the duration of the contract, shall maintain all excavations, embankments, haul roads, permanent access roads, plant sites, waste disposal areas, borrow areas, graded areas, staging and storage areas, and all other work areas within or outside the project limits free from dust that would cause a hazard or nuisance to the work or operations of other Contractors, or to persons or property. Industry-accepted methods, that meet requirements of DOTA Construction BMP Field Manual as noted in Specification 01561 and that meet stabilization suitable for the area or materials involved.

C. Burning on Airport property shall not be permitted.

3.02 SPILL CONTROL

A. The Contractor shall follow the DOTA Construction Site Runoff Program and relevant documents, such as the Construction BMP Field Manual to implement BMPs to prevent spills and leaks and report and cleanup spills and leaks immediately, as required.

3.03 DISPOSAL

A. All unusable debris and waste material shall be hauled away to an appropriate local landfill. Contractor shall control dust during loading operations.

B. Contractor shall consult with the landfill and conduct any required waste characterization to ensure that waste meets the landfill's requirements for size, type, etc.

C. No burying of debris or waste materials, except for materials that are specifically indicated elsewhere in these specifications as suitable for backfill, shall be permitted on the project site.

D. Contractor shall manage all construction materials, debris, and waste in a manner that prevents Foreign Object Debris (FOD) from reaching the airfield, where it could be an aircraft safety hazard.

3.04 HAZARDOUS MATERIALS CONTROL

Hazardous materials shall be properly stored and handled. The use of prohibited hazardous materials, e.g., asbestos, lead paint, and polychlorinated biphenyls (PCBs), in the construction of this project shall be strictly prohibited. Any corrective action to remove and replace hazardous material and contaminated work areas shall be at the sole expense of the Contractor.

3.05 OCCUPATIONAL HEALTH AND SAFETY

The Contractor shall at all times comply with all State of Hawaii and Federal rules and regulations related to occupational health and safety and develop and follow a Health and Safety Plan describing measures the Contractor will employ to protect the health and safety of their employees. Include measures required to protect the public from dangers associated with their work.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

All work specified in this Section shall not be measured nor paid for separately but shall be considered incidental to item 01561.1, Construction Site Pollution Controls.

END OF SECTION

SECTION 01561 – CONSTRUCTION SITE POLLUTION CONTROLS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions for Construction Projects (2016), Special Provisions and General Requirements of the Specifications, apply to the work specified in this Section.

1.02 DESCRIPTION

A. This Section describes procedures for the proper application of management and engineering controls at State of Hawaii, Department of Transportation, Airports (DOTA) construction sites so that pollutants do not impact any storm drainage system, State water, soil, or groundwater.

B. The Contractor shall supply all labor, materials, and equipment necessary for the management of stormwater during construction and to carry out the work in accordance with these specifications, and all applicable Federal, State, and local regulations and latest amendments.

C. This Section also applies to construction support activities including concrete or asphalt batch plants, rock crushing plants, equipment staging yards/areas, material storage areas, excavated material disposal areas, borrow areas, waste management facilities, sanitary facilities, material storage areas, and temporary equipment fueling locations, regardless of their proximity to the Airport Property and State Right-of-Way. For areas serving multiple construction projects or operating beyond the completion of the construction project in which it supports, the Contractor shall be responsible for securing the necessary permits, clearances, and documents, and following the conditions of the permits and clearances, at no cost to the State.

D. The Contractor shall be responsible for all subcontractors, suppliers, and vendors, and shall ensure that the means and methods of construction activities of subcontractors, suppliers, and vendors are in full compliance with this Section.

E. The Contractor shall examine and be familiar with documents related to stormwater management at the airports and shall comply with related requirements for construction stormwater control. Should a requirement not be clearly described within the construction plans, specifications, permits and other applicable bid documents, notify the Engineer immediately for interpretation.

1.03 REFERENCES

All work shall conform to the most recent edition of the following, unless otherwise noted or specified on the drawings or in these specifications. Where conflicts among the requirements or with these specifications exists, the most stringent requirements shall apply.

A. DOTA Construction Site Runoff Control Program
http://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program

1. DOTA Construction Activities Best Management Practices (BMP) Field Manual.

2. DOTA Environmental Requirements for Construction Projects Standard Operating Procedures.

3. DOTA Stormwater Management Plans (SWMPs) for the Daniel K. Inouye International Airport (HNL) and Kahului Airport (OGG), as applicable.

4. DOTA Industrial Stormwater Pollution Prevention Plans (SWPPPs) for the HNL, OGG, and Lihue Airport (LIH), as applicable.

B. State of Hawaii Administrative Rules, Title 11, Department of Health (DOH)
https://health.hawaii.gov/opppd/department-of-health-administrative-rules-title-11/

1. Chapter 54, Water Quality Standards

2. Chapter 55, Water Pollution Control

3. Chapter 451, State Contingency Plan

C. United States (U.S.) Code of Federal Regulations (CFR), Title 40, Chapter I: Environmental Protection Agency.

D. Hawaii Revised Statutes (HRS), Part I, Chapter 128D, “Environmental Response Law”.

PART 2 – PRODUCTS

2.01 MATERIALS

Comply with applicable materials described in the current DOTA Construction Activities BMP Field Manual. Refer to FAA Advisory Circulars and DOTA District Office, including Wildlife Hazard Management Plan, for additional guidance and conditions. In addition, materials shall comply with the following:

A. Grass: The FAA and USDA recommend the following grass species when requiring grass: “No-Mow” bermudagrass (“Green Velvet”) (Cynodon dactylon) or Seashore paspalum (Paspalum vaginatum). These species possess higher than average drought resistance, saline soil tolerances, and most importantly, do not produce seed heads attractive to the majority of hazardous avian species. Use stolons, sprigs, or plugs to avoid providing hazardous species with a readily available food source. The use of seeds is generally not allowed.

Alternative grass species shall only be applied with the approval by the Engineer

after consultation with United States Department of Agriculture (USDA) airport representative. This includes, but is not limited to, sodding, cuttings, and planting. Grass shall be a quick-growing species. Grass shall be suitable to the area and provide a temporary cover that will not compete later with permanent cover.

B. Irrigation: Any required irrigation shall be done after dark to reduce instances of water becoming a hazardous wildlife attractant.

PART 3 – EXECUTION

3.01 PRE-CONSTRUCTION REQUIREMENTS

Do not begin construction activities until all submittals detailed in this Subsection are completed, submitted to the Engineer, and accepted in writing by AIR-EE.

A. Water Pollution, Dust, Sediment, and Erosion Control Meeting: Schedule a water pollution, dust, sediment, and erosion control meeting with the Engineer after all documents required by AIR-EE are submitted to the Engineer and accepted in writing by AIR-EE. The meeting shall be scheduled a minimum of 14 calendar days prior to the Start Work Date. At a minimum, the meeting shall be attended by the Contractor, subcontractors whose work may provide an impact to stormwater or site environmental conditions, Engineer, AIR-EE, and any authorized representatives of the designated attendees. The meeting will discuss the sequence of work and plans and proposals for water pollution, dust, sediment, and erosion controls.

B. Land Disturbance Calculations: The Contractor is responsible for calculating the total land disturbance for the life of the project and complying with all environmental requirements associated with the total land disturbance calculated. Disturbance of land is defined by Hawaii Department of Health as "the penetration, turning, or moving of soil or resurfacing of pavement with exposure of the base course or the exposure of bare soil or ground surface, including the land surface exposed by construction roads, baseyards, staging areas, demolition, headquarters, and parking areas. It does not include grass or weed cutting, bush or tree trimming or felling that leaves soil or ground intact. It includes 'grubbing' in its normal meaning of the use of equipment to knock down and push vegetation out of the way, typically uprooting vegetation and disturbing the ground surface."

Land disturbing activities that shall be included in the disturbance area calculation shall follow the guidance provided in the Environmental Requirements for Construction Projects Standard Operating Procedures.

C. Site-Specific BMP (SSBMP) Plan or SWPPP: The Contractor shall submit a SSBMP Plan (for projects disturbing less than one acre) or SWPPP (for projects disturbing one acre or more) using the latest DOTA template for acceptance by AIR-EE. If a SSBMP Plan or SWPPP was prepared by the Designer, the Contractor shall revise the plan using the latest template to include additional

information required of the Contractor and any changes the Contractor proposes. The SSBMP Plan or SWPPP shall include site-specific temporary BMPs following requirements and practices outlined in DOTA's "Construction Activities BMP Field Manual." All AIR-EE comments shall be resolved and the SSBMP Plan or SWPPP approved prior to the start of land-disturbing activities, including those activities that are needed for the implementation of the BMPs. Submission of the complete and acceptable SSBMP Plan or SWPPP is the sole responsibility of the Contractor, and additional contract time will not be issued for delays due to incompleteness.

D. SSBMP Plan/SWPPP Modifications: Modify, as necessary, and resubmit amended SSBMP Plan or SWPPP and construction schedules to the Engineer for acceptance by AIR-EE. Amendments to the SSBMP Plan or SWPPP shall be made under the following circumstances at a minimum:

1. Conditions that develop during construction that were unforeseen during the design and pre-construction stages that could impact stormwater, soil, or groundwater.

2. Changes to the Contractor's Means and Methods of Construction that could impact stormwater, soil, or groundwater.

3. Omitted conditions that should have been allowed for in the accepted documents.

4. A SSBMP Plan measure that replaces an accepted SSBMP Plan measure that was not satisfactorily performing.

5. Revised dates of installation and/or removal of SSBMP Plan measures.

SSBMP Plan/SWPPP modifications shall be submitted to the Engineer and accepted in writing by AIR-EE before implementing the revised site-specific BMPs in the field. Amendments to the SSBMP Plan or SWPPP shall be included with the original SSBMP Plan or SWPPP and documented in the Amendment Log.

E. Documentation: A copy of the accepted original or amended SSBMP Plan or SWPPP, with the signed certification by the authorized representative filed with DOH for SWPPPs, shall be kept on site or at an accessible location so that it can be made available at the time of an on-site inspection, or upon request by the Engineer, AIR-EE, DOTA's designated authorized representative, and/or DOH/EPA Representative.

F. NPDES Construction Permit: If the total land disturbance for the life of the project, including all construction support activity areas, is one acre or more, coverage under an NPDES Permit Authorizing Discharges of Storm Water Associated with Construction Activity (NPDES Construction Permit) authorizing stormwater discharges associated with construction activity is required from the Department of Health, Clean Water Branch (CWB).

1. Do not begin land-disturbing activities until the CWB has issued an Individual NPDES Permit or NGPC. Conduct land-disturbing activities in accordance with the conditions of the NPDES Permit and/or NGPC.

2. The Contractor shall submit a Notification of Start to CWB a minimum of seven calendar days before the start of construction and provide AIR-EE with a record of submittal.

3. Before construction begins, the Contractor shall assign one of their personnel as the Duly Authorized Representative, in accordance with Section 15 of Appendix A, Chapter 1155. The Duly Authorized Representative is responsible for compliance with the NPDES Construction Permit (i.e., operations of the construction project) and shall certify, sign, and date various documents, including the SWPPP and SWPPP inspection documents.

G. Solid Waste Disclosure: Submit the Solid Waste Disclosure Form for Construction Sites, if applicable, to the DOH Solid Waste Branch as specified on the form within 7 calendar days before the start of construction activities and provide a copy to the Engineer. Provide a copy of all the disposal receipts from the facility permitted by the Department of Health to receive solid waste to the Engineer. This shall also include documentation from any intermediary facility where solid waste is stored, handled or processed.

H. NPDES Hydrotesting Permit: If hydrotesting activities require effluent discharge into State waters or drainage systems, coverage under an NPDES Hydrotesting Waters Permit authorizing discharges associated with hydrotesting is required from the CWB. Do not begin hydrotesting activities until the CWB has issued an Individual NPDES Permit or NGPC for hydrotesting. Conduct Hydrotesting operations in accordance with the conditions of the NPDES Permit and/or NGPC.

I. NPDES Dewatering Permit: If dewatering activities require effluent discharge into State waters or drainage systems, coverage under an NPDES Dewatering Permit authorizing discharges associated with dewatering is required from the CWB. Do not begin dewatering activities until the CWB has issued an Individual NPDES Permit or NGPC for dewatering. Conduct dewatering operations in accordance with the conditions of the permit or NGPC.

J. Construction BMP Training: All Contractor's and subcontractor's employees on the project shall complete the DOTA Construction BMP Training prior to entering the construction site and every calendar year thereafter. All Contractor and subcontractor personnel involved with construction project responsibilities shall also be trained on the site-specific BMPs that are utilized during construction and spill response. Records of completion and/or training roster sign-in sheet shall be up to date and included in the SWPPP or SSBMP Plan. Additional training required by AIR-EE shall be at no additional time or cost to the project. There are two training options:

1. All Contractor and subcontractor employees involved with construction project responsibilities watch the DOTA Construction BMP Training Video located on the DOTA Construction Site Runoff Control Program webpage and complete the DOTA Construction BMP Training Survey with a passing score, or

2. The Contractor and subcontractor supervisors/managers watch the DOTA Construction BMP Training Video located on the DOTA Construction Site Runoff Control Program webpage, complete the DOTA Construction BMP Training Survey with a passing score, then train all employees involved with construction project responsibilities and submit a sign-in roster documenting all employees trained at the bottom of the DOTA Construction BMP Training Survey.

   DOTA Construction BMP Training Survey:
   https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-bmp-training-survey/

K. Construction Connection, Discharge, and Surface Runoff Permit: The Contractor shall complete the Contractor's section of the Construction Connection, Discharge, and Surface Runoff Permit and submit to AIR-EE for review. All AIR-EE comments shall be resolved prior to the start of land-disturbing activities.

3.02 CONSTRUCTION REQUIREMENTS

A. Construction Start: Do not expose or disturb surface area of earth material or initiate any land-disturbing activities until submittals detailed in Subsection 01561.3.01 – Pre-construction Requirements are completed, submitted to the Engineer and accepted in writing by AIR-EE. Once installation of BMPs is allowed, a Pre-construction BMP Inspection is conducted, and all deficiencies that are noted during the inspection shall be corrected prior to any other ground disturbance.

B. BMP Installation and Maintenance: Provide, install, maintain, monitor, repair and replace BMPs as needed to maintain efficacy. Address all inspection comments received from the Engineer, AIR-EE, and/or DOTA's designated authorized representative.

C. Protect temporarily or permanently disturbed soil surface from rainfall impact, runoff, and wind before the end of each work day. Coordinate and schedule the work to the maximum extent possible to minimize the amount of exposed or disturbed surface area of earth material.

D. Install and maintain stabilized construction entrances/exits, including any wheel washes, to minimize tracking of dirt and mud onto roadways, sidewalks, and other paved areas. Restrict traffic to stabilized construction entrance areas only. Clean dirt, mud, or other material tracked onto the road, sidewalk, or other paved area by the end of the same day in which the track-out occurs. If tracking is excessive or sediment is being transported farther along the pavement or

sidewalk by other vehicles traveling outside of the construction site, conduct cleaning and sweeping immediately. Modify stabilized construction entrances/exits, as needed, to prevent mud from being tracked onto road. Stabilize entire access roads if necessary.

E. Maintain all excavations, embankments, haul roads, permanent access roads, plant sites, waste disposal areas, borrow areas, and all other work areas within the project limits free from dust that would cause a hazard to the work, airport operations, operations of other contractors, or to persons or property. If chemicals are used as soil stabilizers for erosion and dust control, submit the manufacturer's product data sheets of the chemicals to the Project Manager for acceptance by AIR-EE. Oil treating shall not be used. Dust screens and fabrics are not allowed to be mounted on, or to inhibit the view of, the TSA and AOA Security Fences.

F. Cover exposed surfaces of materials completely with tarpaulin or a similar device when transporting aggregate, soil, excavated material, or other materials that may be a source of fugitive dust.

G. Protect ditches, channels, and other drainageways leading away from cuts and fills at all times by:

1. Hydromulching cuts and fills that may erode.

2. Installing check dams or other silt control devices.

3. Other methods acceptable to AIR-EE.

H. Clean up and remove any pollutant that is attributed to the Contractor. Care shall be taken to ensure that no petroleum/chemical products, bituminous materials, or other deleterious substances, including debris, are allowed to fall, flow, leach, or otherwise enter the sewage systems or storm drains. Deposition of solid waste or the discharge of liquid waste, such as fuels, lubricants, bituminous waste, untreated sewage and other pollutants that may contaminate stormwater, surface waters, soil, or groundwater shall not be permitted.

I. Disturbed Area Stabilization: Immediately initiate stabilization of exposed soil areas upon completion of land-disturbing activities for areas where disturbance has permanently or temporarily ceased on any portion of the site. Land-disturbing activities have permanently ceased when clearing and excavation within any area of the construction site that will not include permanent structures has been completed. Land-disturbing activities have temporarily ceased when clearing, grading, or excavation within any area of the site will not resume for a period of 14 or more calendar days, but such activities will resume in the future. The term "immediately" is used in this Section to define the deadline for initiating stabilization measures. "Immediately" means as soon as practicable, but no later than the end of the next work day, following the day when the land-disturbing activities have temporarily or permanently ceased.

1. After the initiation of stabilization, stabilization activities shall be completed according to the following timeline:

    a. For projects with an NPDES Construction Permit:

        - For construction areas discharging into waters not impaired for nutrients or sediments, complete installation of stabilization measures within 14 calendar days after the temporary or permanent cessation of land-disturbing activities.

        - For construction areas discharging into nutrient or sediment impaired waters, complete installation of stabilization measures within 7 calendar days after the temporary or permanent cessation of land-disturbing activities.

    b. For projects without an NPDES Construction Permit, complete stabilization within 14 calendar days after the temporary or permanent cessation of land-disturbing activities.

J. Notice of Cessation: For projects with an NPDES Construction Permit, the Contractor shall submit a Notice of Cessation to CWB within seven calendar days after the end of the month that the project was completed and provide AIR-EE with a record of submittal.

K. Changes to Land-disturbing Activities: The Contractor shall be responsible to prepare a new SWPPP or SSBMP Plans or amend existing SWPPP or SSBMP Plans if changes to the project or to the Contractor's activities result in land-disturbing activities additional to those previously approved:

1. Land-disturbing activity outside of the approved limits is NOT allowed until approval and proper permits are received. Revised documents, including an updated SWPPP or SSBMP Plan, shall be submitted to and approved by AIR-EE prior to conducting additional land-disturbing activities.

2. If coverage under an NPDES Construction Permit is needed, no activity in the additional area may occur until the additional permit coverage is granted:

    a. If the project was already granted coverage under an NPDES Construction Permit, additional coverage shall be obtained from CWB for the additional area, either by adding the area to existing project documents, and applying for NPDES Construction Permit coverage for the entire project OR by creating new documents and obtaining separate NPDES Construction Permit coverage for the additional area.

    b. If the new disturbed area will result in the total disturbed area

equaling one (1.0) acre or more for a project without existing NPDES Construction Permit coverage, NPDES Construction Permit coverage shall be obtained from CWB that will cover all land-disturbing activities anticipated for the life of the project.

3.03 INSPECTIONS

Refer to the DOTA Construction Site Runoff Program for information pertaining to AIR-EE BMP inspections (pre-construction, routine, and final). Contractor self-inspections shall occur based on the frequency outlined in the SSBMP Plan and, if applicable, NPDES Permit (HAR 11-55) and SWPPP requirements.

A. Corrective Actions: The Contractor shall be responsible for the correction of all deficiencies identified during any of the above inspections.

1. If the Contractor fails to satisfactorily address inspection deficiencies, the DOTA reserves the right to employ outside assistance or use the State's own labor forces to provide necessary corrective measures. The Contractor will be fully responsible for all related cost and time. The State will charge the Contractor such incurred costs plus any associated project engineering costs and will make appropriate deductions from the Contractor's progress payment. Additionally, DOTA can issue liquidated damages for deficiencies not resolved to DOTA's satisfaction and for illicit discharges or contaminant discharges to soil, groundwater, surface water, or State waters (see Appendix A).

2. Failure to install or maintain site-specific BMP measures may result in the assessment of liquidated damages (Appendix A). Depending on the severity of the deficiencies, additional enforcement actions, such as suspension of work and/or termination of the contract (with the Contractor's Surety being fully responsible for all additional costs incurred by the State), can be conducted and assessed against the Contractor.

3. For all citations or fines received by the DOTA for non-compliance, including non-compliance with NPDES Permit conditions, the Contractor shall reimburse the State within 30 calendar days for the full amount of outstanding cost that the State has incurred. The State may deduct incurred costs from the Contractor's progress payments; however, the Contractor shall be responsible for reimbursing the State if the costs exceed remaining payments owed to the Contractor.

4. The Contractor shall be responsible for all citations, fines and penalties levied by DOH or EPA against the State due to the Contractor's failure to satisfactorily address site-specific BMP deficiencies and/or any Contractor's illicit discharges. The State may make the appropriate deductions from the Contractor's progress payment; however, the Contractor shall be responsible for reimbursing the State if the costs of correction exceed remaining payments owed to the Contractor.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

The work specified in this Section will be paid for at the contract lump sum price. Payment shall be full compensation for work prescribed in this Section and contract documents, including but not limited to, all labor, materials, tools, equipment, and all incidentals necessary to install, maintain, monitor, repair, replace, modify, and remove site-specific BMP measures.

Item No.	Item	Unit
01561.1	Construction Site Pollution Controls	Lump Sum

Partial payments shall be paid in the Monthly Progress Payment as follows:

A. 20% of the line item price shall be paid upon the satisfactory completion of the Pre-construction BMP Inspection and associated corrective actions accepted by AIR-EE or their designated authorized representative, as described in Section 01561.3.03(A), above.

B. 70% of the line item price shall be paid in equal monthly payments over the duration of the contract. Failure to satisfactorily apply, maintain, or modify BMP measures and devices, and/or submittals shall result in the withholding of monthly progress payments for this line item.

For projects that will disturb one acre or more of land, or will be part of a larger common plan of development that will disturb one acre or more of land, payments shall be made only after Routine BMP Inspections described in Section 01561.3.03 above have been satisfactorily completed, and associated corrective actions accepted by AIR-EE or their designated authorized representative.

C. The remaining 10% of the line item price shall be paid after all temporary BMP measures have been satisfactorily removed.

Payment will be made only after the satisfactory completion of the Final BMP Inspection and associated corrective actions accepted by AIR-EE or their designated authorized representative, and acceptance of the Post-construction BMPs by AIR-EE or their designated authorized representative.

Liquidated Damages, up to $25,000 per day (Appendix A), shall be assessed for each non-compliance of the BMP requirements described in this Section. The Contractor shall not be entitled to recover any Liquidated Damages assessed, even after the deficiencies have been corrected.

The Liquidated Damages cited in Appendix A are in excess of reimbursement for any citations, fines, or penalties levied by any regulatory agency against the State due to the Contractor's violations of clean water regulations or standards.

Appendix A. Liquidated Damages Schedule for Non-Compliances

Non-Compliance	Amount
Failure to obtain coverage under an NPDES Construction Permit for construction activities associated with a project that will disturb one acre or more of land, or will be part of a larger common plan of development that will disturb one acre or more of land, as defined by DOH.	$1,000 per calendar day per violation.
Failure to obtain coverage under an NPDES Hydrotesting Permit for hydrotesting activities that will require effluent discharge into State waters or drainage systems.	$1,000 per calendar day per violation.
Failure to obtain coverage under an NPDES Dewatering Permit for dewatering activities that will require effluent discharge into State waters or drainage systems.	$1,000 per calendar day per violation.
Failure to comply with the conditions specified in an NPDES Permit, or any other applicable permit.	$1,000 per calendar day per violation.
Failure to schedule a Pre-construction BMP Inspection and receive acceptance of all associated corrective actions prior to conducting land-disturbing activities.	$1,000 per calendar day per violation.
Failure to provide corrective actions accepted by AIR-EE or their designated authorized representative by the deadlines identified in the BMP inspection report.	$1,000 per calendar day per violation.
Failure to have the accepted SSBMP Plan and amendments or the accepted SWPPP and amendments available at a project construction site.	$1,000 per calendar day per violation.
Failure to properly install or maintain a BMP specified by the SSBMP Plan, SWPPP, contract drawings and documents, or permit.	$2,000 per calendar day per violation.

Non-Compliance	Amount
Failure to have an accepted amendment to the SSBMP Plan or an accepted amendment to the SWPPP prior to implementing changes to previously accepted BMPs. Note: Advance review and acceptance can be provided to satisfy this non-compliance. However, for projects with an NGPC or NPDES permit, the written amendment shall still be formally submitted for certification and signature by the authorized representative identified in the NGPC or NDPES Permit.	$2,000 per calendar day per violation.
Failure to conduct required inspections.	$1,000 for each of the first ten violations, $2,500 for each of the next ten violations, $5,000 for each subsequent violation.
Failure to maintain required records such as BMP inspection reports, rain gauge data logs, etc.	$500 per calendar day for the first ten days of each violation, $1,000 per calendar day for the next ten days of each violation, $2,500 per calendar day for each subsequent day of violation.
Any violation resulting in a polluted discharge.	Up to $25,000 per calendar day per violation.
Note: Liquidated Damages shown in the Table shall be assessed at the discretion of the DOTA.	

Assessment of Liquidated Damages for Non-Compliance:

The Contractor may be assessed liquidated damages by issuance of an Enforcement Letter. The Enforcement Letter shall indicate the amount of liquidated damages that are assessed for the non-compliances which shall be deducted from the Contractor's next progress payment. The Enforcement Letter will be sent electronically via e-mail and a hard copy to the Contractor's designated representative(s), identified in Section 01561.3.01(2)(d), responsible for the Contractor's Construction Site Runoff Control Program. An Enforcement Letter may be issued with or without previous verbal notifications, written warnings, or official enforcement letters (i.e. Warning Letter or Notice of Violation (NOV).

Liquidated Damages may be assessed for the following:

- Non-compliances listed in the Table, herein, included in Appendix A.
- Non-compliances have not been corrected in the timeframes noted.
- Corrective actions are not completed after a verbal notification, written warning (email or formal letter), or NOV is issued.
- Contractors are non-responsive to DOTA's directives.
- Repeated non-compliance.
- A polluted discharge has occurred.

The number of days used for the liquidated damages calculations shall start on the day that the non-compliance was required to be corrected and shall end on the day that the non-compliance is corrected and accepted. If DOTA's personnel are not able to go out in the field to verify that the BMP deficiencies are corrected in the timeframe specified, the Contractor can send photographs showing the corrected deficiency via e-mail to the DOTA Engineer and AIR-EE along with documentation on how the deficiency was corrected. The DOTA Engineer and AIR-EE may visit the site to verify the corrective actions are acceptable. If the corrective actions are acceptable, then the clock stops on the day that the documentation was received.

The Contractor shall not be entitled for compensation for any liquidated damages or penalty, fine, or citations assessed and deducted from the Contractor's progress payments, even after corrective actions have been taken.

END OF SECTION

SECTION 01562 – MANAGEMENT OF CONTAMINATED MEDIA, SOIL DISPOSAL, AND SOIL REUSE

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions for Construction Projects (2016), Special Provisions and General Requirements of the Specifications, apply to the work specified in this Section.

1.02 DESCRIPTION

A. This Section describes procedures for the management of known and/or unknown contaminated media (e.g., soil, sediment, groundwater, soil vapor, and building materials) and disposal and on-site reuse of either contaminated or uncontaminated soil/sediment (referred to herein as “soil”), that may be disturbed or generated during excavation or demolition activities, or other construction activities associated with this project.

B. All soil shall be treated as potentially contaminated until it is determined otherwise.

C. The Contractor shall supply all labor, materials, and equipment necessary for the removal, temporary storage, testing, handling, backfilling and management of soil and contaminated media to carry out the work in accordance with these specifications, and all applicable Federal, State, and local regulations and latest amendments.

D. The Contractor shall follow the Site-specific Construction-Environmental Hazard Management Plan (C-EHMP). References to the State of Hawaii, Department of Transportation, Airports (DOTA) Programmatic Environmental Hazard Evaluation and Environmental Hazard Management Plan (DOTA EHE-EHMP) do not apply.

E. Qualified Environmental Professional: The Contractor shall employ a Qualified Environmental Professional (QEP) who possesses a minimum of five (5) years of experience providing environmental oversight for the management of contaminated media during construction activities, who shall assist with sampling, testing, and creating plans including the preparation and/or finalization of the Contractor’s C-EHMP. The QEP shall be identified in the applicable C-EHMP document.

F. The Contractor and their QEP shall review any available site-specific investigation reports (e.g., Phase II Environmental Site Assessment [ESA]) or construction management plans, etc.) to understand the conditions that may affect work performance.

G. Should the Contractor deviate from the DOTA EHE-EHMP or Site-Specific EHMP, the Contractor shall be responsible to prepare or modify any existing Hawaii Department of Health (DOH) required C-EHMP. Any planned deviation

from construction EHMPs will require written notification to and approval by DOH and the DOTA Engineering Branch, Environmental Section (AIR-EE) prior to implementation. The Contractor shall detail deviations from standard practices and explain how those deviations will be protective of human health and the environment.

H. The primary contaminant-related hazards addressed by the DOTA EHE-EHMP or a C-EHMP include, but are not limited to, the following Contaminants of Potential Concern (COPCs):

1. Petroleum-related Hydrocarbons, e.g., TPH-g, TPH-d, TPH-o, BTEX, and PAHs
2. Constituents of light distillate fuels and/or Chlorinated Solvents (together considered volatile organic compounds or VOCs)
3. Polychlorinated Biphenyls (PCBs)
4. Pesticides, e.g., Chlordane, Dieldrin
5. Metals, e.g., Arsenic, Barium, Cadmium, Total Chromium, Lead, Mercury, Selenium, and Silver
6. Per- and Polyfluoroalkyl Substances (PFAS)

In addition, free petroleum products (e.g., gasoline, aviation gasoline, diesel fuel, jet fuel, motor oils, lubricating oils) may be encountered in soil or groundwater in areas of previous petroleum releases.

Soil vapor may be present from volatile COPCs present in subsurface soil or groundwater.

Should changes in site conditions or additional site information identify contaminants or risks to human health and/or the environment not addressed by the DOTA EHE-EHMP or C-EHMP, the Contractor shall be responsible to revise, update, and finalize a C-EHMP to be reviewed and approved by AIR-EE and the DOH Hazard Evaluation and Emergency Response (HEER) Office.

The Contractor shall coordinate with AIR-EE, as well as have any C-EHMP approved by the HEER Office, prior to the start or continuation of any related ground disturbing activities.

1.03 REFERENCES

All work shall conform to the latest edition of the following, unless otherwise noted or specified on the drawings or in these specifications. Where conflicts among the requirements or with these specifications exists, the most stringent requirements shall apply.

A. DOTA Construction Site Runoff Control Program
https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program/

1. DOTA EHE-EHMP

2. DOTA Construction Best Management Practices (BMP) Manual

B. Department of Health (DOH) Hazard Evaluation & Emergency Response (DOH HEER) https://health.hawaii.gov/heer/

1. Technical Guidance Manual (TGM) for Implementation of the State Contingency Plan (including updates).

2. Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material.

3. HEER Office Screening for Environmental Hazards at Sites with Contaminated Soil and Groundwater.

4. HEER Office Construction EHMP Template.

C. State of Hawaii Administrative Rules, Title 11, DOH https://health.hawaii.gov/opppd/department-of-health-administrative-rules-title-11/

1. Chapter 54 Water Quality Standards

2. Chapter 58.1 Solid Waste Management Control

3. Chapter 59 Ambient Air Quality Standards

4. Chapter 11-260.1-279.1 Hazardous Waste Management: General Provisions

5. Chapter 280.1 Underground Storage Tanks

6. Chapter 451 State Contingency Plan

D. The Hawaii Environmental Response Law (Hawaii Revised Statutes [HRS] Chapter 128D) and the State Contingency Plan (Hawaii Administrative Rules [HAR] Title 11, Chapters 451-1–451-24).

E. American Petroleum Institute (API) RP 2219

F. United States Code of Federal Regulations (CFR), Title 29: Labor https://www.ecfr.gov/current/title-29

G. CFR, Title 40: Protection of the Environment https://www.ecfr.gov/current/title-40

1. Part 50, “National Primary and Secondary Ambient Air Quality Standards A”.

2. Part 122, “EPA Administered Permit Program: The National Pollutant Discharge Elimination System”.

3. Part 261, “Identification and Listing of Hazardous Waste”.

4. Part 263, “Standards Applicable to Transporters of Hazardous Waste”.

5. Part 302, “Designation, Reportable Quantities, and Notification”.

H. CFR, Title 49: Transportation
https://www.ecfr.gov/current/title-49

1. Part 171, “General Information, Regulations, and Definitions”.

2. Part 172, “Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plans”.

I. U.S. EPA Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA), Section 107(1), exemption for cleanup of legally applied pesticide products.
https://www.epa.gov/enforcement/superfund-enforcement-authorities

1.04 SUBMITTALS

A. The Contractor shall submit the following items as required:

1. Preconstruction Submittals:

Final Contractor C-EHMP reviewed and approved by AIR-EE and the HEER Office [as needed per 01 57 13.3.02.A.1]

Notification to DOH HEER Office at least 90 calendar days prior to disturbing contaminated soil at “HEER Sites” [as needed per 01 57 13.3.03.A.1]

Written request to deviate from the DOTA EHE-EHMP or Site-Specific EHMP for review and approval by DOH and AIR-EE [as needed per 01 57 13.1.02.G]

2. Construction Submittals:

Revised C-EHMP reviewed and approved by AIR-EE and the HEER Office [as needed per 01 57 13.1.02.H]

Written request to deviate from the DOTA EHE-EHMP or Site-Specific EHMP for review and approval by DOH and AIR-EE [as needed per 01 57 13.1.02.G]

Release Notification to DOTA and HEER Office [as warranted per 01 57 13.3.03.E.1]

Spills/Leaks reporting [as warranted per 01 57 13.3.03.E.2]

UST Removal Report [as warranted per 01 57 13.3.03.D.6]

3. Post-construction Submittals:

Project Close-out Report submitted within 30 calendar days after work is completed [as needed per 01 57 13.3.04.A]

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 GENERAL WORK PROCEDURES

A. Prior to beginning work, the Contractor, the Contractor's QEP, and the Engineer or their representative shall review and discuss all available information pertaining to contamination or potential contamination at the work site.

B. It should be noted that, in some cases, the contamination (e.g., soil or groundwater contaminated with metals, PCBs, pesticides, PFAS, etc.) may not be identifiable through visual and/or olfactory observation, and contaminant-specific field screening techniques may need to be implemented.

C. Potential or suspected contaminated media from separate locations or sources shall not be mixed or placed together without the approval of the QEP and AIR-EE.

D. The removal, transfer, or handling of explosive or flammable media shall be conducted using explosion-proof pumps and equipment. If a vacuum truck is used for removal of liquids or residues, the area of operation for the vacuum truck shall be vapor free. Discharge the vacuum pump exhaust gases through a hose of adequate size and length downwind of the truck and tank area. Vacuum truck operating and safety practices shall conform to API RP 2219. Collect tank residues in drums, tanks, or tank trucks labeled according to 49 CFR 171 and 49 CFR 172 and dispose of as required by regulation.

E. Contractor shall follow decontamination regulations and procedures as necessary.

F. Soil excavation, grading, and any disturbance of contaminated soil may cause a potential exposure to Contractor's employees and the public from the release of vapors or fugitive dust. The routes of exposure to dust are by inhalation, ingestion, and dermal contact. The Contractor shall use engineering controls such as a cover, water spraying, tenting, and/or wind barriers along with any

necessary worker personal protective equipment (PPE) to control fugitive dust to mitigate the release of and exposure to soil vapors.

G. The Contractor's QEP shall test excavated soil for the presence of COPCs and oversee excavated soil management in accordance with this Section and relevant guidance and regulations.

H. Contractor shall report construction activities in areas with contaminated soil or groundwater in accordance with an applicable C-EHMP or the DOTA EHE-EHMP. Contractor shall coordinate with the DOH HEER Office, the Engineer, and AIR-EE.

I. All Contractor correspondence with DOH and other regulatory agencies shall include the Engineer and AIR-EE.

3.02 PRECONSTRUCTION REQUIREMENTS

A. Submit the following a minimum of 30 calendar days prior to beginning any ground disturbing activities, for approval by AIR-EE.

1. The Contractor's revisions to the draft Site-Specific C-EHMP if prepared in the design phase, or creation of a C-EHMP if deviating from the DOTA EHE-EHMP during the course of the project, that includes, but is not limited to:

a. Procedures, engineering controls, and methods the Contractor will use during the excavation, soil stockpiling and segregation, temporary storage, testing, handling, treatment, backfilling, and disposal of contaminated media, work area isolation, construction barriers, dust control, decontamination, and emergency management.

b. Names of the Contractor's and their subcontractor's qualified personnel who will be supervising or managing contaminated materials at the site. Include the personnel's phone number and qualifications.

c. Name(s) of the Contractor's QEP , including their qualifications.

d. Proposed schedule of work.

e. Location map of temporary contaminated stockpiles and other contaminated media storage, including infrastructure such as pipes and appurtenances, if applicable.

f. All documents required as part of the appendices to the DOTA EHE-EHMP (e.g., health and safety plan and completing the management plans in the appendices) or C-EHMP applicable appendices (e.g., health and safety plan, construction material

documents, etc.).

3.03 CONSTRUCTION REQUIREMENTS

A. Soil Excavation and Stockpiling:

1. Notify the DOH HEER Office at least 90 calendar days prior to disturbing contaminated soil at "HEER Sites" utilizing the HI DOH e-Permitting System - Notification of Construction Activities (HEER Office). Version 1.7 (hawaii.gov) or most recent version available. Obtain AIR-EE's review and concurrence prior to submittal to DOH.

2. The disturbance of contaminated media shall be performed in accordance with the DOTA EHE-EHMP or the Contractor's approved C-EHMP, where applicable. The HEER Office and AIR-EE shall be immediately notified if contaminated media not previously known or anticipated is encountered. The HEER Office will determine whether additional sampling is required. The Contractor shall provide a location map with Global Positioning System (GPS) coordinates and approximate depth below ground surface at which contaminated media were encountered to the Engineer and AIR-EE.

3. Soil stockpiles shall be created and managed in accordance with project plans, the approved project-specific C-EHMP (if applicable), and the DOH Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material. If deviating from a DOH-approved C-EHMP, approval from DOTA and DOH is required. Contractor shall secure approval of new or revised stockpile characterization plans from DOTA prior to implementation. Soils placed in watertight containers shall be covered with plastic sheeting or positioned under a roof when not in active use. Soil stockpiles and containers shall be located at least 50 feet from drainage features, surface waters, and stormwater drainage paths.

4. Any liquid-phase oil or free product associated with the contaminated soil shall be drained prior to stockpiling. If feasible, the free product shall be separated from the soil, properly stored, profiled, and disposed of at an approved recycling or disposal facility.

B. Soil Testing and Disposal:

The Contractor shall test all soil generated during excavation, demolition, or other construction activities. Sampling and testing of stockpiles shall be, at a minimum, in accordance with the latest edition of the DOH's Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material. The Contractor's QEP shall direct the soil sample collection and testing methods in accordance with the most current guidelines. All soil intended for disposal or reuse shall be tested for the presence of applicable COPCs as established by the QEP and as approved by AIR-EE.

Stockpiles shall be tested using multi-increment (MI) sampling methodology in accordance with the TGM. Alternative sampling approaches, and appropriate decision unit (DU) volumes for large volume soil stockpiles, should be discussed with AIR-EE and may be utilized on a case-by-case basis when approved by the HEER Office.

No soil from airport property shall be reused at private-owner off-site properties, even if the soil appears acceptable for unrestricted use based on testing conducted. Exceptions to this policy may only occur with the written approval of the Engineer and AIR-EE. Disposal or reuse of soil at a residential property or where there are sensitive receptors (i.e. schools, recreational areas, etc.) will not be allowed under any circumstance.

For the purposes of this Section "off-site" is defined as any location outside of the established project construction boundary from which excavated soil was generated. There are two off-site soil disposal/reuse categories applicable to this Section: (1) Off-site within the Airport Boundary, and (2) Off-site and outside of the DOTA Airport Property. "On-site" refers to within the construction project boundary from which excavated soil was generated.

1. For off-site soil reuse <u>within the airport boundary</u>:

    a. The Contractor shall secure approval from the Engineer and AIR-EE for transport to the reuse location(s) prior to moving the soil.

    b. Soil shall not be categorized as or contain a regulated hazardous waste.

    c. Soil shall not exceed the DOH Tier 1 Environmental Action Levels (EALs) for unrestricted use.

2. For off-site soil disposal/reuse <u>outside the airport property boundary</u>:

    a. The Contractor shall confirm and comply with the disposal/receiving facility's testing requirements, as well as their standards for disposal/reuse.

    b. Soil that is a regulated hazardous waste shall be disposed at an approved United States Environmental Protection Agency (EPA) regulated facility.

    c. Soil that is above the DOH Tier 1 EALs for commercial/industrial use but not a regulated hazardous waste shall be disposed of at a DOH or EPA permitted disposal facility (i.e., landfill).

    d. Soil that is below the Hawaii Department of Health (DOH) Tier 1 Environmental Action Levels (EAL) for unrestricted use may be

reused at an appropriate location as approved by the Engineer and AIR-EE.

e. For any contaminated media removed from Airport property to an approved facility, the Contractor shall be responsible for its legal transport and disposal. Contractor shall provide to the Engineer copies of any soil disposal receipts.

3. For on-site soil reuse:

a. The Contractor shall representatively test all soils designated for on-site reuse. Testing can occur either *in situ* prior to excavation or after excavation. Soil that does not exceed applicable DOH Tier 1 Environmental Action Levels (EAL) for unrestricted use may be reused on-site (within construction site boundaries) with AIR-EE approval.

b. Soil with contaminants that exceed DOH Tier 1 EALs may be approved for on-site (within construction site boundaries) reuse with written approval from AIR-EE and when the following conditions are met:

i. Contaminated soil is reused within other contaminated areas in the proximity of its original location and for which a long term EHE-EHMP has been established and (if necessary) can be readily modified to accommodate that change in site conditions.

ii. Contaminated soil is reused no less than 150 meters from the nearest surface water or surface water inlet.

iii. Contaminated soil is reused at an elevation above the tidally influenced high water table, and at least one foot below the finish surface grade, with the most contaminated soil placed at the bottom of the excavation and cleanest soil toward the ground surface. A minimum of one foot of clean soil shall comprise the final, top backfill layer and, unless waived by DOTA and DOH, an impervious layer shall cap this top layer.

iv. Contaminated soil is not reused within or beneath the footprint of a permanent building structure.

v. Contaminated soil to be reused cannot contain free oil, oil sheens, oil stains, or total petroleum hydrocarbons (TPH) concentrations exceeding 5,000 milligrams per kilogram (mg/kg).

C. Groundwater Management: Groundwater may be contaminated by petroleum

hydrocarbons, dissolved metals, PFAS, VOCs, and/or pesticides, and may be encountered during soil excavation or dewatering activities.

1. If contaminated groundwater is discovered at a previously unknown source or site on the project, the Contractor shall immediately notify the Engineer, AIR-EE, and HEER Office. Provide a location map with GPS coordinates and approximate mean sea level depth of the groundwater at which the contamination was encountered.

2. The disturbance of contaminated groundwater shall be performed in accordance with the DOTA EHE-EHMP, or C-EHMP, where applicable. The HEER Office will determine whether additional sampling is required.

3. If free product is present in the extracted groundwater, it shall be separated from the groundwater, profiled, and disposed of at an DOH-approved recycling/disposal facility. Free product shall not be moved from one excavation to another. Engineering measures shall be taken to prevent the transfer of the free product during dewatering. Water contaminated with free product shall not be discharged from a dewatering pit.

4. Releases of contaminated groundwater to surface water bodies or areas beyond the work area is prohibited.

5. Groundwater shall only be re-infiltrated in the ground with the prior approval of AIR-EE and the HEER Office. Under circumstances where contaminated groundwater cannot be re-infiltrated, proper disposal at a licensed facility shall be conducted. Notification to the appropriate agencies and other pertinent information related to the discharge shall be conducted by copying the Engineer and AIR-EE on all correspondence and copies of correspondence provided upon request.

6. The Contractor is responsible for the legal disposal or discharge of groundwater that is not re-infiltrated and shall provide AIR-EE with copies of waste manifests.

7. For groundwater containerized and removed from Airport property, the Contractor shall have representative samples taken and tested in accordance with DOH guidelines, standards, and regulations. A copy of the groundwater test results shall be submitted to AIR-EE. The groundwater shall not be disposed off-site without the approval of the Engineer and a written approval from the DOH-permitted facility receiving the groundwater indicating that they acknowledge the groundwater test results and providing their approval to dispose the groundwater at their facility. Transport off-site shall occur in DOT-approved containers or mobile tanks. Documentation for the removal of containerized groundwater is required in the Close-Out Report detailed in Section 3.04.

8. With approval from AIR-EE and oversight from the QEP, small volumes of

groundwater may be disposed via evaporation from a constructed (lined) pond or basin, with solid residuals properly tested and disposed in accordance with this specification.

D. Underground Storage Tanks (USTs) and Utility Pipes:

1. For any UST or pipeline, whether unexpectedly discovered or a planned removal, the nature of the UST or pipeline and whether they are inactive shall be determined prior to removal. Immediately notify the Engineer, AIR-EE and HEER Office of any unexpected encounter with a UST or buried piping.

2. The Contractor shall record field observations of the UST and pipelines. These observations shall include, but are not limited to, the following:

   a. Location relative to fixed landmarks, including GPS coordinates. Provide a location map that shows the UST and pipelines that were encountered. The map shall include a North arrow and a scale.

   b. Depth, diameter, length, and type of piping. Describe the condition of the pipe.

   c. Volume and type of fuel or product, including analytical laboratory reports for the product recovered.

   d. Beginning and ending fluid levels, if applicable.

   e. Flow rates, if applicable.

   f. Direction of flow.

   g. Detailed photographs.

   h. Detailed description of actions taken following the discovery, such as cutting, product removal, and disposal.

3. Provide records of the field observations to the Engineer, AIR-EE, and HEER Office.

4. The removal of all USTs must comply with HAR § 11-280.1, and all correspondence related to identification, removal, and documentation shall be provided to the Engineer and AIR-EE. Only personnel knowledgeable and trained in pipeline and UST removal shall cut, drain, and remove USTs and pipelines. Hazardous conditions, particularly those created by explosive vapors and releases of product to the environment, shall be mitigated prior to removal activities. If any waste pipe or UST components are to be stored on-site prior to disposal, the

area shall be lined with polyethylene plastic sheeting, 20 mil or thicker, and bermed to contain any free product. Provisions shall be in place to contain viscous products that may liquify after exposure to atmospheric heating. The waste pipe segments shall be drained of any residual product and stored on appropriate dunnage with the ends of the pipe sealed or covered to protect the interior of the pipe from contact with rainwater and wind.

5. All removed pipelines and USTs shall be properly disposed or recycled.

6. The Contractor shall prepare and submit a UST Removal Report, including the results of all sampling activities required under HAR § 11-280.1, to the Engineer, AIR-EE, and the DOH SHWB (UST Program).

E. Reporting requirements:

1. Release Reporting: Encountering previously unknown contaminated soil or groundwater during subsurface construction activities is considered a release and shall be reported to the HEER Office. Copies of the DOH Release Report, DOH-issued Release Number, and email correspondence (if applicable), shall be furnished to the Engineer and AIR-EE. The Contractor shall be responsible for release reporting and AIR-EE shall be included on all correspondence with the HEER office.

2. Report all leaks and spills immediately to AIR-EE, DOTA personnel, and regulatory agencies in accordance with the airport-specific DOTA Spill Reporting Fact Sheet available via the DOTA Construction Site Runoff Control Program Webpage at https://hidot.hawaii.gov/airports/doing-business/engineering/environmental/construction-site-runoff-control-program/.

Releases that occur during construction activities or releases due to unforeseen events (spills) shall be reported immediately.

3.04 POST-CONSTRUCTION REQUIREMENTS

A. Submit a Project Close-out Report within 30 calendar days after work is completed. The Close-out Report shall contain the following applicable contents:

1. A signed letter certifying that the removal and disposal of all contaminated materials were completed in accordance with the DOTA EHE-EHMP or Contractor's approved C-EHMP, and all applicable Federal, State, and local rules and regulations.

2. All approved DOTA EHE-EHMP deviation request forms. (Reference DOTA EHE-EHMP.)

3. Any Site-Specific EHMP(s) or Long-term EHMP(s). For locations at an airport for which DOTA has already established a Site-Specific EHMP from previous projects, the DOTA's Site-Specific EHMP shall remain applicable. Contractor shall assist DOTA by providing requested project data and records necessary to draft any required amendments resulting from a change in site conditions due to construction.

4. All testing and laboratory results, including chain of custody, for any soil/sediment, groundwater, soil vapor, or other media sampling and analysis.

5. Any results from air monitoring.

6. Record of Field Observations, including location map with GPS coordinates, limits, and depths of any contaminated media (soil, groundwater, etc.) that were encountered at previously unknown source or sites on the project. Include a copy of the completed Hawaii Hazardous Substance Written Follow-up Notification form that was submitted to DOH and all other associated documents.

7. If contaminated soil was disposed off-site (off Airport Property), include the following:

    a. A copy of the signed agreement from the receiving facility acknowledging the sample test results and indicating acceptance of the soil.

    b. Documentation of the quantity of soil received by the facility.

    c. Copies of the test results of the soil sampling.

    d. All certifications, disposal forms, waste manifests, and summary logs.

8. If any soil was approved for reuse on-site (within the construction site boundaries) or off-site within Airport Property, at a minimum, include the following:

    a. Copies of the test results of the soil sampling.

    b. The quantity of soil that was re-used.

    c. Location map of the re-used soil. Include GPS coordinates of its emplaced limits.

    d. A brief description of the purpose of the reused soil (e.g., general fill, utility trench backfill material, etc.). Include the depth and thickness of its placement.

e. Photos of the site after placement of the re-used soil has been completed.

9. Record of Field Observation of any unanticipated UST or pipeline discovered during construction activities, including a copy of the completed DOH Notice of Intent to Close Underground Storage Tanks form, UST Closure Report, and all other associated documents.

10. The Close-out Report may be distinct to each contaminated media type/source. For sites with multiple contaminated media types/sources, Close-out Reports for each contaminated media type can be submitted separately or combined into a project-wide compilation of reports.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work specified in this Section will be paid at the unit price measurement noted below.

Item No.	Item	Unit
01562.1	Additional Management of Contaminated Media, Soil Disposal, and Soil Reuse	Allowance

Payment shall be full compensation for work prescribed in this Section and contract documents and stipulated below.

For ALLOWANCE items in the Proposal Schedule, the allowance is an estimate and the amount shall not exceed the maximum amount shown in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the DOTA Engineer. The Contractor shall be allowed to include overhead, profit, insurance and/or other mark-ups, as stipulated in Section 9.5 of the 2016 General Provisions for Construction Projects, Air and Water Transportation Facilities Divisions.

Should the DOTA receive reports of any illegal dumping of material, and if illegal dumping is confirmed to have occurred, the DOTA will assess a Liquated Damages amount of $5,000 per truck per day, until the illegally dumped material has been cleaned up or the incident has been remedied to the satisfaction of the Engineer with the DOH's concurrence. The Contractor shall not be entitled to recover any Liquidated Damages assessed, even after the non-compliance has been corrected.

The Contractor shall be responsible for reimbursing DOTA for all citations, fines, and penalties levied by DOH, EPA, Department of Labor and Industrial Relations, or any other regulatory agency against the State due to the Contractor's failure to properly manage contaminated medias, including non-compliance with the DOTA EHE-EHMP, DOTA Site-Specific EHMP, or Site-specific C-EHMP. The Contractor shall reimburse the State within 30 calendar days for the full amount of any outstanding cost that the State has incurred. The State may deduct all incurred costs from the Contractor's monthly progress payments; however, the Contractor shall be responsible for reimbursing the State if the costs of correction exceed remaining payments owed to the Contractor.

If the Contractor fails to satisfactorily address the non-compliance item, DOTA reserves the right to employ outside assistance or use the State's own labor forces to provide necessary corrective measures. The Contractor shall be fully responsible for all cost and time. The State shall charge the Contractor such incurred costs plus any associated project engineering costs and shall make appropriate deductions from the Contractor's monthly progress payment.

END OF SECTION

SECTION 01565 - SECURITY MEASURES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions for Construction Projects (2016), Special Provisions and General Requirements of the Specifications, apply to the work specified in this Section.

1.02 DESCRIPTION

The Contractor shall incorporate the State's airport security measures as part of their work. The Contractor shall adhere to established and enhanced security procedures, as mandated by the State, Federal Aviation Administration (FAA), and Transportation Security Administration (TSA), throughout the course of this Contract.

1.03 SUBMITTALS

A. Submit a security plan that addresses the conditions set forth in this Contract. Said plan shall contain, at a minimum, a plan of the project scope with locations of construction barricades with secured entry/exits, identification of locations requiring guards, Contractor measures to ensure security of worksite and personnel and procedures to ensure the containment of the worksite from unauthorized personnel. This package shall be submitted within fourteen (14) calendar days after execution of Contract.

B. For projects that involve or utilize the sterile area (passenger/aircraft boarding areas beyond the screening checkpoints), the Contractor shall submit a Tool Management Program for approval. The Contractor shall meet with the State's Airport Security Coordinator to discuss the responsibilities of all personnel who shall attend tool management training and attest in writing that they understand the security requirements. The Tool Management Program must be approved by the State's Airport Security Coordinator and implemented prior to any work.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 SECURITY

A. Obtain airport security identification badges for all employees working on this project and Air Operations Area (AOA) decals for all vehicles entering the AOA area in accordance with the requirements stated in the Special Provisions, Paragraph 8.21. All requests for badges and AOA decals shall be submitted in writing to the Airport District Manager through the Engineer within fourteen (14) calendar days after execution of Contract. Only authorized personnel working on this project shall be allowed to obtain badges. The Contractor shall be responsible to pay for all costs associated with complying with airport security requirements, including obtaining airport security identification badges.

Currently, the fee to obtain a new airport identification badge is $60.00, but due to the changing fee structure of these services, the Contractor shall verify the fees as shown on the DOTA website at: https://hidot.hawaii.gov/airports/doing-business/badging/. Any other inquiries can be made via phone or e-mail to the appropriate District's Pass & ID Office whose contact information is also listed.

If access is required to the HNL International Arrivals Building, inquiries shall be made to the U.S. Customs and Border Protection at (808) 861-8642 for additional bonding requirements.

B. The Contractor shall comply with all existing and proposed airport security initiative requirements. Contractor may be subject to civil penalties up to $35,000.00 for each security violation.

C. The Contractor shall protect work areas from theft, vandalism, and unauthorized entry. Ensure that proper methods are undertaken to secure tools, materials, and equipment from the public.

D. All vehicles entering the AOA through any of the Airport Access Check Points will be subject to search. The Contractor shall allow extra time for these inspections and be able to provide personnel, as required, to assist Airport security personnel during the inspections.

E. All personnel entering from the public area to secured areas and sterile areas in the airport terminals are subject to random, aviation worker screening for prohibited items. Exceptions are tools and materials that have a demonstrated need and are essential to perform the work being done under this project. Personnel shall expect to be randomly screened and allow extra time to complete the screening process. Refusal to comply will result in temporary or permanent airport identification badge revocation, monetary fines and/or civil penalties.

F. If required by the State, the Contractor shall be responsible for the posting of security guards, hired from the current Airport Security Contractor, at access points where the construction traffic may compromise the integrity of the airport security. Payment for posting of security guards required by the State shall be paid for as an allowance item in the Proposal Schedule. The Contractor shall inquire and coordinate with the current Airport Security Contractor.

PART 4 - MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

No measurement shall be made for the items in this Section.

4.02 BASIS OF PAYMENT

Work under this Section shall be considered incidental to, and included in the bid prices for the various items of work in this project.

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SECTION 01580 - TEMPORARY FACILITIES AND UTILITIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions for Construction Projects (2016), Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 DESCRIPTION

This item shall consist of arranging and maintaining all utilities including, but not limited to, water, electricity, sewage disposal and telephone communications in the work area which the Contractor and Engineer deems necessary to meet the requirements of the work under the contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 TEMPORARY UTILITIES DURING CONSTRUCTION

A. Water and Sanitation: The Contractor shall provide temporary drinking water and sanitary facilities for the field personnel. The facilities shall be in accordance with the applicable health regulations and shall be maintained clean and operable until the conclusion of the construction work.

B. Telephone: The Contractor shall a have a telephone available for the State's use for communications with field personnel. Cellular telephones are acceptable. The Contractor shall install the telephone immediately upon starting work and maintain service until the project is completed. All costs associated with obtaining and maintaining telephone service shall be borne by the Contractor.

C. Electricity: Contractor shall obtain or provide temporary electric power and shall pay for all connections and energy charges incurred during construction.

D. Metering: Water and electrical services shall be metered and payment for meters and services shall be borne by the Contractor. Temporary connections for water shall include installation of a meter and backflow preventer at the point of connection according to State standards at the Contractor's cost. The Contractor shall submit requests for temporary connections in writing to the Engineer 14 calendar days prior to the connection and shall include a description of work and a sketch of the proposed installation.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured nor paid for separately but shall be

considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION

SECTION 01700 - MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions for Construction Projects (2016), Special Provisions and General Requirements of the Specifications, apply to the work specified in this Section.

1.02 GENERAL REQUIREMENTS

Section 699 of "Hawaii Standard Specifications for Road and Bridge Construction, 2005", are hereby incorporated into and made a part of these specifications by reference unless otherwise modified hereinafter.

1.03 MOBILIZATION

The Contractor shall mobilize and transport his construction plant and equipment including materials and supplies for operation to the site of work, construct temporary buildings and facilities as necessary, and assemble the equipment at the site as soon as possible after receipt of Notice to Proceed, subject to the provisions of the General Provisions.

1.04 DEMOBILIZATION

The Contractor shall demobilize and transport his construction plant and equipment including materials, supplies and temporary buildings off the site as soon as possible after construction is completed. Demobilization shall include all cleanup required under this contract and as directed by the Engineer. Demobilization and final cleanup shall be completed prior to final acceptance.

1.05 PERFORMANCE BOND

The Contractor shall file and pay for the performance and payment bonds according to Section 2.24 of the General Provisions, except that the value of the bonds shall equal one hundred percent (100%) of the amount of the contract basic bid amount plus one hundred percent (100%) of the amount of the extra work.

Payment for the Contractor’s bond premium will be made as part of mobilization in accordance to the terms stated in Part 4 below.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

A. Mobilization shall not be measured for payment. The maximum bid allowed for "Mobilization" is an amount not to exceed six (6) percent of the sum of all items (excluding this item and all Allowances). If the proposal submitted by the bidder indicates an amount in excess of the allowable maximum, the indicated amount or amounts shall be reduced to the allowable maximum; the "Total Amount for Comparison of Bids" in the Proposal Schedule shall be adjusted to reflect any such reduction. For the purposes of comparing bids and determining the contract price to be inserted in the contract awarded to the bidder, if any is so awarded, the “Total Amount for Comparison of Bids” adjusted in accordance with the foregoing shall be used and the bidder’s proposal shall be deemed to have been submitted for the amounts as reduced and adjusted in accordance herewith.

B. Demobilization will not be measured for payment.

4.02 BASIS OF PAYMENT

A. Mobilization will be paid for at the contract lump sum price under Mobilization. Partial payment will be made as follows:

1. When 2 1/2 percent of the original contract amount is earned, 50 percent of the bid amount will be paid.
2. When 5 percent of the original contract amount is earned, 75 percent of the bid amount will be paid.
3. When 10 percent of the original contract amount is earned, 100 percent of the bid amount will be paid.
4. Nothing herein shall be construed to limit or preclude partial payments otherwise provided by the contract.

Item No.	Item	Unit
01700.1	Mobilization (Not to exceed 6% of the sum of all items, excluding this item and all allowances)	Lump Sum (LS)

END OF SECTION

SECTION 01800 – SPECIAL REQUIREMENTS FOR CONTRACTORS ON THE AOA

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

1.2 SUMMARY

The Contractor shall incorporate the State's airport security measures as part of his work. The Contractor shall adhere to established and enhanced security procedures, as mandated by the State and FAA, throughout the course of this Contract.

The requirements of this Section are essential for ensuring public and worker safety on this project; hence, the Contractor must comply with all requirements of this section when performing work on the AOA (Airport Operations Area). Should the Contractor fail to comply with any requirement of this section; work may be delayed or temporarily suspended without contract time extensions, or liquidated damages or fines may result. All liquidated damages or fines resulting from violations due to improper activity, inattention, or failure to comply with required airport procedures; must be borne by the Contractor.

Contractor shall provide all materials, labor, equipment, and tools necessary to complete the Special Requirements for Contractors on the AOA.

1.3 SUBMITTALS

A. Submit a security plan that addresses the conditions set forth in this Contract. Said plan shall contain, at a minimum, a plan of the project scope with locations of construction barricades with secured entry/exits, identification of locations requiring guards. Contractor measures to ensure security of worksite and personnel and procedures to ensure the containment of the worksite from unauthorized personnel. This package shall be submitted within fourteen (14) calendar days after award of the Contract.

B. Qualifications of the biological bird monitor including experience and certifications.

1.4 PROJECT LIMITATIONS

The project normal working hours shall refer to Section 01005, "Description of Work". The Contractor shall work continuously during the project duration. No work shall be performed during State holidays or when weather conditions restrict construction from occurring.

1.5 AOA SECURITY REQUIREMENTS

A. AOA Badges: AOA badges shall only be issued to people that apply through the Airport Security Office, and complete all of the fingerprinting requirements. All people accessing the AOA must possess an AOA Badge with unescorted access. AOA temporary escort badges will only be issued during State-deemed emergencies.

1. Obtain airport security identification badges for all employees working on this project and Air Operations Area (AOA) decals for all vehicles entering the AOA area in accordance to the requirements stated in Section 8.21 of the Special Provisions. All requests for badges and AOA decals shall be submitted in writing to the Airport District Manager through the Engineer within fourteen (14) calendar days after award of the Contract. Only authorized personnel working on this project shall be allowed to obtain badges. The Contractor shall be responsible to pay for all costs associated with complying with airport security requirements, including obtaining airport security identification badges.

2. The Contractor shall inquire with the Airport District Manager's Office for the cost to obtain new airport identification badges.

    a. The Contractor shall comply with all existing and proposed airport security initiative requirements. Contractor may be subject to civil penalties up to $35,000.00 for each security violation.

    b. The Contractor shall protect work areas from theft, vandalism, and unauthorized entry. Ensure that proper methods are undertaken to secure tools, materials, and equipment from the public.

B. AOA Access Points: The Contractor will be assigned only one (1) access point for each work phase, and shall ensure that all of their personnel, vehicles, and equipment enter and exit the AOA only through the assigned access point.

If the State deems an emergency situation has rendered the assigned access point unusable the Contractor will be assigned a temporary access point for the remaining workday. Should the original assigned access point remain unusable for a prolonged period, the Contractor will be assigned a new access point the following day, and shall be responsible for all requirements at the new assigned access point.

C. AOA Access Gates: Should the Contractor's assigned AOA access point be through an unguarded gate, the Contractor should be responsible for the following:

1. Obtain the AOA access gate key(s) from the Airport Security Office (a $200.00 deposit is required per key).

2. Provide all gate guards required. Each gate guard shall possess the following expertise.

    a. Familiarity with all of the AOA security access clearance requirements.

    b. Knowledge related to AOA access badge, AOA vehicle decal, and airport vehicle operator requirements.

    c. A communication device and specific instructions to call for assistance whenever problems occur.

    d. Proper control of the AOA access gate in accordance with all required airport security procedures.

    e. Close the AOA access gate during prolonged periods of inactivity; and close and lock whenever the AOA access gate is not in use, or is unattended.

    f. All vehicles entering the AOA through any of the Airport Access Check Points may be subject to search. The Contractor shall allow extra time for these inspections and be able to provide personnel, as required, to assist Airport security personnel during the inspections.

    g. If required by the State, the Contractor will be responsible for the posting of guards at access points where the construction traffic may compromise the integrity of the airport security. Payment for posting of security guards required by the State shall be paid for as an allowance under Bid Item "Unforeseen Conditions" in the Proposal Schedule. The allowance is an estimate and the amount shall not exceed the maximum amount shown in the proposal schedule, and charges by the Contractor for overhead, coordination, profit, insurances, and other incidental expenses shall not be allowed. The Contractor shall submit the name and qualifications of the security company to the Engineer for review prior to hiring the security company. The security company shall have extensive experience in working on airports and knowledgeable in airport security procedures within the State of Hawaii.

1.6 AOA OPERATIONAL SAFETY REQUIREMENTS

It is the explicit intent of this contract that the safety of aircraft, and all of the personnel and equipment under the Contractor's jurisdiction, be the highest priority; hence, the Contractor shall carefully plan the operations of all personnel and equipment under their jurisdiction to provide for the free and unobstructed movement of all aircraft on the AOA, and to provide for the uninterrupted operation of visual and electronic signals used to guide aircraft while all personnel and equipment under their jurisdiction traverses the AOA. With the exception of actual construction methods, the FAA, ATCT will have full authority to control the Contractor's movements within the existing movement area. If the FAA ATCT notifies the Contractor to temporarily halt operations, the Contractor shall effectively notify all personnel and equipment under its jurisdiction, without using lighted flares, to cease all work and move all equipment and themselves away from hazardous areas.

The Contractor is responsible for all of their movements on the AOA. Should the State deem that an escort, flagman, or driver fails to perform their duties, that escort, flagman, or driver may be terminated, or suspended and required to undergo additional training.

A. AOA Communication Devices: The Contractor shall have at least two (2) people on the AOA possessing and continuously monitoring the following fully charged communication devices:

1. A two-way radio capable of communicating on frequencies 121.9 (Ground) and 118.9 (Tower).

2. A cellular telephone, with a listing of all required emergency contact numbers.

B. AOA Travel Routes: The Contractor will be assigned only one (1) travel route per work phase, and shall ensure that all of their personnel, vehicles, and equipment traverse the AOA only along the assigned travel route. Should the State deem that an emergency situation has caused the assigned travel route to become unusable the Contractor will be assigned a temporary travel route for the duration needed and shall be responsible for all requirements associated with the new assigned travel route.

C. AOA Authorized Vehicles: Only vehicles considered safe, and required to complete the contracted work will be allowed to operate on the AOA. Each vehicle operating on the AOA shall be authorized, possessing:

1. An AOA vehicle decal obtained from the Airport Security Office and displayed on the driver's side front bumper (use of an AOA temporary vehicle permit is not allowed).

2. Insurance coverage as required by Article 7.1 of the General Provisions and further amended by the Special Provisions.

D. Vehicle and Equipment Requirements on the AOA: Each vehicle and driven piece of equipment shall possess the following when operating or staging on the AOA:

1. For operations occurring at night, or during periods of poor visibility, shall require a Flashing Amber Beacon mounted atop each vehicle/equipment's highest point.

2. For daylight operations with clear visibility, shall require a Checkered Orange and White Flag attached to a staff that is mounted to each vehicle and/or equipment in lieu of a Flashing Amber Beacon. The flag shall be at least a three foot (3') square with a checker pattern of international orange and white squares that are at least one (1) foot on each side.

3. Two (2) placards shall be on both sides of each vehicle or equipment at all times to identify the vehicle or equipment owner. Placards shall contain the company name in letters at least four inches (4") tall, or six inches (6") minimum-sized company logo.

4. All additional equipment marking, lighting, and positioning that may be required by the FAA.

E. AOA Drivers: All people operating a vehicle or any driven piece of equipment on the AOA shall possess the following license, permit, and expertise:

1. Current and valid Hawaii State Driver's License.

2. Current and valid Airport Vehicle Operator's Permit.

3. Complete Airport Familiarization.

4. An understanding and ability to identify the following:

    a. All RSA's, TSA's.

    b. All AOA Markings, Lighting, and Signing.

    c. The Need for Control of FOD.

    d. All AOA Equipment for Aircraft.

    e. All AOA Critical Areas.

    f. All AOA Travel Routes for the Various Work Phases.

F. Airport Vehicle Operator's Permit: Airport vehicle operator's permit shall only be issued to people that apply through the Airport Security Office, and pass a written

exam covering portions of the Airport Rules and Regulations related to vehicle operations on the AOA.

G. AOA Escorts: While operating on the AOA, the Contractor shall provide at least one (1) escort for every five (5) vehicles and/or equipment under their jurisdiction. The Airport Operations Manager must approve all escorts prior to any work commencing: hence, each escort shall possess:

1. All AOA Driver Requirements.

2. Both AOA Communication Devices previously specified.

3. Knowledge about the assigned access points and travel routes for the project.

4. Successful completion of all AOA driver training required by the Airport Operations Manager. Each escort shall pass an exam given by the Airports Operations Manager, which demonstrates they possess an understanding and ability to follow all ground vehicle operation and communication requirements while operating on the AOA.

H. AOA Traffic Control: Unless otherwise noted, the Contractor shall furnish and provide the following traffic control devices to block off entrances of working area:

1. Runway Lighted X's: The Contractor will be required to furnish the lighted X runway closure markers to indicate to inbound aircraft that the marked runway is closed for the project construction period. The Contractor shall transport and setup each runway closure marker at the location as shown on the Plans, and take-down and remove after each shift. The Contractor shall protect, clean and maintain the lighted X throughout the duration of the project, and shall supply fuel (diesel or gasoline as required). LIH has two (2) portable lighted X runway closure markers which may be loaned to the Contractor. However, it is the Contractor's sole responsibility to provide lighted X closure marker for the project, even if LIH is not able to loan the equipment to the Contractor.

   If the Contractor utilizes LIH's lighted X runway closure marker, it shall be returned to the LIH storage yard each night, and the Contractor is additionally responsible to perform regular maintenance and replace any fixtures for the duration of the project.

2. At the completion of the project, the Contractor shall clean each unit, replace any non-functional fixtures, provide LIH with spare fixtures and parts that were used for the duration of the project, perform a tune- up and oil change to the generator, and provide all maintenance records performed over the duration of the project.

3. Low-Profile Barricades: Low-profile barricades shall be any one (1) of the following, however, if option a or b is selected, the Contractor shall be responsible for water filling and emptying these types of barricades as part of their contracted work.

    a. Neubert Aero Corporation's Reusable Airport Low-Profile Barricade Model No. NAC-PC 2410 with at least one (1) battery-powered red barricade light, or

    b. Multi-Barrier Safety Barricade Model No. AR-10 x 96 with at least one (1) Multi-Barrier 360 degrees (360°) solar-powered light, or

    c. Constructed barricades as indicated on Plans.

    Unless otherwise noted, all Low-Profile barricades shall continuously interlocked or spaced at fifteen feet (15') on center as shown on Plans:

        (1) Interlocked barricades shall extend across the full TWY /RWY width with full width of the pavements with a single 15' wide opening for ARFF emergency vehicles

        (2) Barricades spaced at 15' on center shall extend across the full TWY/RWY width with one (1) barricade placed on the TWY/RWY centerline.

        (3) Barricades shall be placed one foot (1') clear from active RSAs/TSAs.

    d. Reflective Cones: Reflective cones shall be used to demarcate AOA travel routes, and locations where vehicles shall yield to aircraft.

I. AOA FOD Control: The Contractor shall keep all work areas, AOA Travel Routes, and all adjacent areas clean at all times. Unless otherwise stated in this contract, or otherwise directed by the Airport Manager, the Contractor shall properly haul and dispose all removed pavement materials and collected debris to a site off the Airport. The State will require remedial cleaning from the Contractor whenever their FOD Control Operations are unsatisfactory. Upon receipt of notification, the Contractor shall be ready to start remedial cleaning at the jobsite within thirty (30) minutes. Notification by telephone will be deemed as official.

J. AOA Flag Persons: Should the Plans require flag persons along the AOA Travel Route, each flag-person shall possess:

1. AOA Driver as stated in Section 1.6.E.

2. Both AOA Communication Devices previously specified in Section 1.6.A.

3. A traffic directing LED Light Baton.

4. A broom and dustpan to assist in AOA FOD Control.

K. Airport Staging Areas: The Contractor shall only stage its vehicles and equipment in approved areas. No vehicle or equipment shall park within four feet (4') of a security fence. Demarcation of the staging area as shown on Plans.

1.7 COORDINATION OF CONSTRUCTION ON THE AOA

Work on the AOA requires RWY and TWY closures that demand proper notification to numerous agencies responsible for public safety; thus, the State shall receive the following sufficiently accurate information from the Contractor.

A. Maximum Equipment Height: Equipment height shall be submitted to the State at least forty-five (45) days prior to construction. Construction shall not commence until the State receives confirmation from the FAA. All reported heights shall be the maximum heights among all vehicles or equipment used to complete the contracted work, and includes proper notification to the State whenever the reported maximum heights are exceeded.

B. Detailed Work Schedule: See Section 01300, "Submittals".

C. Cancellations: The Contractor shall only cancel work through the Project Manager, Airport Operations Control (AOC), or AOC On-Duty. Whenever a cancellation is not made and the Contractor is not at the assigned AOA Access Point within thirty (30) minutes of the start time; all Contractor closures for the remaining workweek will be cancelled. The Contractor shall reimburse the State one thousand dollars ($1,000.00) for every work cancellation the State deems unjustified. This reimbursement is to compensate the State for all unnecessary costs related to canceling existing, and coordinating new closures.

1.8 CONSTRUCTION LIGHTING REQUIREMENTS

Should any part of the work area lack sufficient sunlight; the Contractor shall provide sufficient artificial lighting to permit the work and inspection to be carried out efficiently, thoroughly, safely, and satisfactorily. Work and inspections shall not be performed with only flashlights and/or vehicle/equipment headlights. All lights shall be positioned so they do not blind aircraft pilots, or FAA-ATCT controllers. All wiring for electrical lights and power shall be properly installed, maintained, securely fastened and kept as far as possible from telephone and signal wires. The Contractor shall submit a lighting plan to the Engineer for all work phases that shall be subject to approval.

1.9 ENVIRONMENTAL AND HEALTH REQUIREMENTS

The Contractor shall perform the following in accordance with all applicable Federal, State, local, and airport rules and regulations related to environmental pollution control, abatement, and fire code.

A. Airport Water: Airport water shall not be drawn from a tap lacking a reverse pressure principle backflow prevention device. Water valves shall be opened and closed so that water hammers are not produced.

B. Waste Disposal: Waste disposal shall be performed properly. Materials shall not be burned, and construction wastes shall not be disposed into Airport storm water or sewer systems.

C. Restoration: Completely restore, to an acceptable condition; staging areas, work areas, AOA travel routes, and areas adjacent to the aforementioned.

D. When the Contractor damages an existing Airport perimeter fence, the Contractor shall perform immediate repairs on the fence to prevent inadvertent entry, and maintain Airport Security.

E. Vehicle/Equipment Leaks and Material Spills: Shall be handled by the following five-step process, and pertains to all fluids other than potable water.

1. All leaked or spilled fluids shall immediately be kept from entering the Airport storm water and sewer systems.

2. All fluid leaks or spills shall be respectively fixed or stopped, immediately after ensuring that the fluids are kept out of the Airport storm water and sewer systems.

3. All areas containing the leaks or spills shall be properly cleaned and restored.

4. Dispose all wastes per Section 1.9.B.

5. Submit proper documentation to the State showing that all leaks or spills were properly cleaned and disposed.

F. Erosion Control: The Contractor shall provide an essential temporary drainage, dikes, and similar facilities to prevent erosion damage to the site. Runoff shall be controlled to prevent damage to surrounding areas.

G. Dust Control: The Contractor shall take positive measures to ensure that dust is properly controlled without chemicals and/or oil treatments.

H. Noise Control: Noise control shall be within the levels that comply with all applicable regulations.

1.10 BIRD MONITORING

A. The Contractor shall provide a biological monitor to perform the following:

1. The biological monitor shall be present during all construction and earth moving activities to ensure Hawaiian geese, Hawaiian waterbirds, Hawaiian seabirds and their nests are not adversely affected.

2. If a Hawaiian goose, Hawaiian waterbird, Hawaiian seabird or their nest/eggs is observed within the project site, the biological monitor shall halt all construction activities within 100 feet of the bird(s) or nest. Work shall not resume until the bird(s) leave the area of its own accord.

3. Bird monitoring for all nighttime construction activities shall be performed in coordination with the State-contracted biological monitor. The person shall be formally trained and certified on the general policies, procedures and documentation of biological bird monitoring.

4. Conduct daily searches of the work areas for nests and downed seabirds. Any downed seabirds shall be turned over to USDA Wildlife Services (WS).

5. A log shall be maintained of all biological bird activities within the work area, and shall include the date, time, and other pertinent information.

6. Provide daily reports to the USDA Wildlife Service (WS) staff at Lihue Airport after each work shift.

7. Review of construction lighting plans to ensure lighting is shielded and focused to eliminate unnecessary light spillover and glare, which may impact seabirds and other sensitive wildlife. Effective light shields should be completely opaque, sufficiently large, and positioned so that the bulb is only visible from below. Lighting should be positioned low to the ground, be motion-triggered, and be shielded and/or full cutoff.

B. Observe and count the number of birds either on foot or by vehicle.

C. Review the proposed nighttime lighting type and placement prior to any nighttime construction activity.

1.11 OTHER REQUIREMENTS

The Contractor shall also comply with the following requirements should they arise.

A. Any new TSA security requirement.

B. Any additional operational safety requirements generated by the FAA.

C. Provide additional lights along AOA travel routes should the Engineer deem additional safety enhancements were needed.

D. Any new environmental and health requirements generated by the EPA or DOH.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. All work under this Section will not be measured for payment.

4.2 BASIS OF PAYMENT

A. Items covered by this section will be paid by lump sum, except for Biological Bird Monitoring. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

B. Biological Bird Monitoring as approved by the State and Engineer shall be paid for under the allowance as described below. The allowance is an estimate and payment shall not exceed the maximum amount shown in the Proposal Schedule. Payment shall be full compensation for all labor, tools, equipment, and all other incidentals necessary to complete the work. Any unused amounts of the allowance will not be paid to the Contractor, and in the event that this item is not used, the Contractor is not eligible to receive any payment under the Proposal Schedule.

Payment will be made under Base Bid:

Item No.	Description	Unit
01800.1	Special Requirements for Contractors on the AOA	Lump Sum
01800.2	Biological Bird Monitoring	Allowance

PART 5 ATTACHMENTS

None

END OF SECTION 01800

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SECTION 01900 – PROJECT SURVEY AND STAKEOUT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

1.2 SUMMARY

Project survey and stakeout shall consist of all activities necessary to control the Contractor's Work. It shall also include all additional site survey efforts as may be dictated by the Engineer during the course of the Work in order to facilitate the development of field directives, change orders or other items necessary for the successful completion of the project.

In addition, this work shall consist of furnishing and installing survey monuments at the physical ends of Runway 3-21 or directed by the Engineer, and includes the preparation and recording of the monument in accordance with the State of Hawaii requirements.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 COOPERATION BETWEEN CONTRACTORS

A. The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

B. When separate contracts are let within the limits of any one (1) project, each Contractor shall conduct his/her work so as 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.

C. Each Contractor involved shall assume all liability, financial or otherwise, in connection with his/her contract and shall protect and save harmless the Owner from any and all damages or claims that may arise because of the presence and operations of other Contractors working within the limits of the same project.

D. The Contractor shall arrange his/her work and shall place and dispose of the materials being used so as not to interfere with the operations of the other Contractors within the limits of the same project. He/she shall join his/her work

with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

3.2 CONSTRUCTION LAYOUT AND STAKES

A. The Engineer shall establish horizontal and vertical control only. The Contractor must establish all layout required for the construction of the work. Such stakes and markings as the Engineer may set for either his/her own or the Contractor's guidance shall be preserved by the Contractor. In case of negligence on the part of the Contractor, or his/her employees, resulting in the destruction of such stakes or markings, an amount equal to the cost of replacing the same may be deducted from subsequent estimates due the Contractor at the discretion of the Engineer.

B. The Contractor will be required to furnish all lines, grades, and measurements from the control points necessary for the proper prosecution and control of the work contracted for under these Specifications.

C. The Contractor must give weekly copies of the survey notes to the Engineer so that the Engineer may check them as to accuracy and method of staking. All areas that are staked by the Contractor must be checked by the Engineer prior to beginning any work in the area. The Engineer will make periodic checks of the grades and alignment set by the Contractor. In case of error on the part of the Contractor, or his/her employees, resulting in establishing grades and/or alignment that are not in accordance with the Plans or established by the Engineer, all construction not in accordance with the established grades and/or alignment shall be replaced without additional cost to the Owner.

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

E. Construction Staking and Layout includes, but is not limited to:

1. Pavement Areas:

    a. Edge of Pavement hubs and tacks (for stringline by Contractor) at 100-foot (100') stations.

    b. Between Lifts at 25-foot (25') stations for the following section locations:

        (1) Runways – each paving lane width.

        (2) Taxiways – each paving lane width.

        (3) Holding Areas – each paving lane width.

    c. After Finish Paving Operations at 50-foot (50') stations.

(1) All Paved Areas – edge of each paving lane prior to next paving lot.

d. Should and safety area blue tops at 50-foot (50') stations and at all break points with maximum of 50-foot (50') offsets.

F. Note: Controls and stakes disturbed or suspect of having been disturbed shall be checked and/or reset as directed by the Engineer without additional cost to the Owner.

3.3 AUTOMATICALLY CONTROLLED EQUIPMENT

A. Whenever batching or mixing plant equipment is required to be operated automatically under the contract and a breakdown or malfunction of the automatic controls occurs, the equipment may be operated manually or by other methods for a period 48 hours following the breakdown or malfunction, provided this method of operations will produce results which conform to all other requirements of the contract.

3.4 AUTHORITY AND DUTIES OF INSPECTION

A. Inspectors employed by the Owner shall be authorized to inspect all work done and all material furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. Inspectors are not authorized to revoke, alter, or waive any provision of the contract. Inspectors are not authorized to issue instructions contrary to the Plans and Specifications or to act as foreman for the Contractor.

B. Inspectors employed by the Owner are authorized to notify the Contractor or his/her 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 Engineer for his/her decision.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. All work under this Section will not be measured for payment.

4.2 BASIS OF PAYMENT

A. Items covered by this Section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Base Bid:

Item No.	Description	Unit
01900.1	Project Survey and Stakeout	Lump Sum

END OF SECTION 01900

DIVISION 2 – SITE WORK

SECTION 02101 - PREPARATION/REMOVAL OF EXISTING PAVEMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-101 - Preparation/Removal of Existing Pavements, as included as an attachment to this Section.

1.2 SUMMARY

This Section includes the requirements for Preparation/Removal of Existing Pavements, including but not necessarily limited to, demolition and removal of all existing improvements in the work area to prepare the area to receive the improvements described for this project, and hauling and disposing of demolition rubble and debris. This specification shall also include the delivery of such items which are identified to be salvaged and the disposal of all other items which are identified for demolition and removal.

1.3 REFERENCES

A. FAA Specification Item P-101 – Preparation/Removal of Existing Pavements as modified herein.

B. Section 01560, General Environmental, Health, & Safety Controls

C. Section 02152, Excavation, Subgrade, and Embankment

1.4 SUBMITTALS

A. Pavement Milling Plan

B. Asphalt crack sealing filler product information.

1.5 GENERAL REQUIREMENTS

The Contractor shall clear and demolish areas as shown on the Plans and as necessary to complete the Work. This demolition work shall be done at a distance that is sufficiently in advance of the following construction operations. In addition,

the Contractor shall do the following when performing any General Construction Demolition Work:

A. Survey existing conditions and correlate the conditions and boundaries with the work required so to determine the extent of selective demolition.

   1. Identify and distinguish all structures to remain and to be removed.

B. Show the demolition Work schedule on all progress schedules.

C. Notify the Engineer of the commencement of the demolition work, allowing sufficient time for the HDOTA and the HDOTA's tenants to clear the area as required.

D. Verify that benchmarks, field survey markings, and all measurements are accurate and sufficiently precise. Verify that said benchmarks and markings are not located in an area that may be impacted by the Demolition Work, and report benchmarks and markings that conflict with the Work to the Engineer.

E. Protect all survey monuments at the Site during the course of all Work.

F. Report in writing to the Engineer temporary or intermittent prevailing conditions that will adversely affect satisfactory execution of the work of this Section. Do not proceed with work until unsatisfactory conditions either are corrected or have changed to the satisfaction of the Engineer.

G. Note all subsurface existing conditions as described in the Contract Documents and referenced studies, and notify the Engineer of all changed conditions.

H. Identify all utilities to remain and verify that utilities to be removed have been disconnected and capped.

I. Continuously survey the work as it progresses to detect hazards resulting from selective demolition activities.

J. Perform demolition to permit orderly progress of work and shown on the Plans.

K. Whenever a utility is encountered and must be removed or relocated, schedule the removal and coordinate with the Engineer and utility owner sufficiently in advance of the removal so that services to existing facilities are not disrupted.

L. Conduct demolition operations and remove debris to ensure minimum interference with adjacent occupied and in-use facilities.

M. Erect temporary protection, such as, fences, where required. All such temporary protection must meet OSHA standards.

N. Comply with the Dust and Air Pollution Management Plan, Section 01560, General Environmental, Health, & Safety Controls and all other regulations and requirements.

O. Repair demolition performed in excess of that required at no cost to the HDOTA.

P. After demolition, verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive work.

Q. Immediately report to the Engineer any soil or water that is visibly stained, discolored, shiny, oily, has evidence of burn activities, has a noticeable solvent-like or hydrocarbon odor, or appears to be slag.

PART 2 PRODUCTS

Not applicable to this section.

PART 3 EXECUTION

3.1 DEMOLISH AND REMOVE MISCELLANEOUS ITEMS

As shown on the Plan, the Contractor shall:

A. Demolish and remove existing structures, pavements, utilities, abandoned foundations, bollards and associated foundations, and other materials within the limit of demolition.

B. Remove improvements, and obstructions interfering with installation of work as indicated on the Plans.

C. Mitigate the impact of the demolition operations on adjacent occupied or in-use facilities.

3.2 REMOVE AND RE-INSTALL MISCELLANEOUS EQUIPMENT

As shown on the Plans, the Contractor shall:

A. Remove, store items in Contractor's yard, and re-install items after work is completed as shown on plan including but not limited to:

1. Wildlife cages and traps

2. Stop signs

3.3 PAVEMENT REMOVAL

When removing asphalt concrete pavement as shown on the Plans, the Contractor shall:

A. Sawcut pavement sections designated for removal as shown on the Plans or as required by the HDOTA.

1. Sawcut the matching edge of all existing pavements designated to remain in a straight and true line as shown on the Plans.

2. Protect sawcut edges from damage until the finished surface has been completed.

3. Re-sawcut damaged edges the entire length of the matching joint prior to placing the finished surface, at no additional cost to the HDOTA.

4. Take care not to over-cut so that the cuts do not run past the corners.

5. Dispose of all saw cutting water in accordance with the approved SWPPP.

B. Use equipment that is capable of removing the pavement without excessively disturbing or removing underlying or adjacent materials. Breaking pavements by means of a ball breaker or gravity hammer will not be permitted.

C. Completely remove the pavement surface and all base and subbase courses to the top of the natural subgrade unless otherwise shown on the Plans or directed in the Project Manual.

D. Separate pavement, base and subbase materials and transport clean materials to the MMS.

3.4 COLDMILL AND CRACK SEALING OF PAVEMENTS

A. When coldmilling pavement, the Contractor's grinding equipment shall:

1. Have a minimum width of 10 feet.

2. Be equipped with electronic grade control devices on both sides that will cut the surface to the grade and tolerances specified.

3. Cut vertical edges.

4. Include a positive method of dust control.

5. All joints and cracks observed after the coldmilling operation shall be cleaned and filled as per FAA Specification Item P-101, Section 101-3.2.

6. Be capable of discharging the millings in a truck or leaving them in a defined windrow.

3.5 PIPES AND CONDUIT REMOVAL

When removing pipes and conduits (pipes) as part of the General Demolition Work, the Contractor shall:

A. Except for transite pipes, for pipes to partially remain in place, cut with straight and smooth edges on a plane perpendicular to the centerline of the pipe at the boundary of the removal. As shown on the Plans, provide a watertight seal appropriate for dead-ending the pipe, or abandon the remaining pipe as per Section 3.07 of this Section.

B. Handle transite and asbestos pipes in accordance with Section 01562 Management of Contaminated Medias. Remove existing transite water pipes without cutting, to the nearest joint or coupling. Plug remaining pipe as per Section 3.6 of this Section.

3.6 UNDERGROUND STRUCTURE AND OBSTRUCTION REMOVAL

When removing structures or obstructions, the Contractor shall:

A. As indicated on the Plans, remove all structures, obstructions, and miscellaneous concrete, including all or portions drainage structures and other abandoned utility structures.

B. Where new concrete is to join existing concrete, sawcut the existing concrete to a true line with straight vertical edges free from irregularities.

C. Perform underground removal without damage to any portion of any structure that is to remain in place.

D. Transport all uncontaminated concrete pipe and manhole structures from airport property, with the rubble reduced to less than 24" maximum in any dimension.

E. Coordinate with the owners of the utilities to be removed to determine the termination, plugging or capping requirements for cutting and removal of the utility. All utility piping and conduits shall be completely removed prior to the construction of the new improvements unless noted otherwise on the plans or in the specifications or unless directed otherwise by the Engineer.

F. The Contractor shall accurately locate and protect the utilities where performing the Work.

3.7 SOIL MATERIAL EXCAVATION AND REMOVAL

The Contractor shall stockpile soil on Site as allowed on the Plans and as per Section 02152, Excavation, Subgrade, and Embankment.

3.8 EXISTING UTILITIES ABANDONMENT

The Contractor shall abandon existing utilities as noted on the Plans and seal the ends of abandoned utilities as per details shown on the plans.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-101, paragraph 101-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-101, paragraph 101-5.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. P-101, Preparation/Removal of Existing Pavements

END OF SECTION 02101

ITEM P-101 PREPARATION/REMOVAL OF EXISTING PAVEMENTS

DESCRIPTION

101-1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

EQUIPMENT AND MATERIALS

101-2 All equipment and materials shall be specified here and in the following paragraphs or approved by the Resident Project Representative (RPR). The equipment shall not cause damage to the pavement to remain in place.

CONSTRUCTION

101-3.1 Removal of existing pavement.

The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.

a. Concrete pavement removal. Full depth saw cuts shall be made perpendicular to the slab surface. The Contractor shall saw through the full depth of the slab including any dowels at the joint, removing the pavement and installing new dowels as shown on the plans and per the specifications. Where the perimeter of the removal limits is not located on the joint and there are no dowels present, the perimeter shall be saw cut the full depth of the pavement. The pavement inside the saw cut shall be removed by methods which will not cause distress in the pavement which is to remain in place. The material shall be removed and disposed off airport property. Concrete slabs that are damaged by under breaking shall be repaired or removed and replaced as directed by the RPR.

The edge of existing concrete pavement against which new pavement abuts shall be protected from damage at all times. Spall and underbreak repair shall be in accordance with the plans. Any underlaying material that is to remain in place, shall be recompacted and/or replaced as shown on the plans. Adjacent areas damaged during repair shall be repaired or replaced at the Contractor's expense.

b. Asphalt pavement removal. Asphalt pavement to be removed shall be cut to the full depth of the asphalt pavement around the perimeter of the area to be removed. The material shall be removed and disposed off airport property.

c. Repair or removal of Base, Subbase, and/or Subgrade. All failed material including surface, base course, subbase course, and subgrade shall be removed and repaired as shown on the plans or as directed by the RPR. Materials and methods of construction shall comply with the applicable sections of these specifications. Any damage caused by Contractor's removal process shall be repaired at the Contractor's expense.

101-3.2 Preparation of joints and cracks prior to overlay/surface treatment. Remove all vegetation and debris from cracks to a minimum depth of 1 inch (25 mm). If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the RPR. Fill all cracks greater than 1/4 inch (6 mm) wide) with a crack sealant per ASTM D6690. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch (3 mm), not to exceed ¼ inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface.

Wider cracks (over 1-1/2 inch wide (38 mm)), along with soft or sunken spots, indicate that the pavement or the pavement base should be repaired or replaced as stated below.

Cracks and joints may be filled with a mixture of emulsified asphalt and aggregate. The aggregate shall consist of limestone, volcanic ash, sand, or other material that will cure to form a hard substance. The combined gradation shall be as shown in the following table.

Gradation

Sieve Size	Percent Passing
No. 4 (4.75 mm)	100
No. 8 (2.36 mm)	90-100
No. 16 (1.18 mm)	65-90
No. 30 (600 µm)	40-60
No. 50 (300 µm)	25-42
No. 100 (150 µm)	15-30
No. 200 (75 µm)	10-20

Up to 3% cement can be added to accelerate the set time. The mixture shall not contain more than 20% natural sand without approval in writing from the RPR.

The proportions of asphalt emulsion and aggregate shall be determined in the field and may be varied to facilitate construction requirements. Normally, these proportions will be approximately one part asphalt emulsion to five parts aggregate by volume. The material shall be poured or placed into the joints or cracks and compacted to form a voidless mass. The joint or crack shall be filled to within +0 to -1/8 inches (+0 to -3 mm) of the surface. Any material spilled outside the width of the joint shall be removed from the pavement surface prior to constructing the overlay. Where concrete overlays are to be constructed, only the excess joint material on the pavement surface and vegetation in the joints need to be removed**.**

101-3.3 Removal of Foreign Substances/contaminates prior to overlay and remarking. Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the RPR in the field during construction.

High-pressure water may be used. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the RPR that damage to the existing pavement is caused by operational error, such as permitting the application method

to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the RPR.

Removal of foreign substances shall not proceed until approved by the RPR. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed off airport property.

101-3.4 Concrete spall or failed asphaltic concrete pavement repair.

a. Repair of concrete spalls in areas to be overlaid with asphalt. The Contractor shall repair all spalled concrete as shown on the plans or as directed by the RPR. The perimeter of the repair shall be saw cut a minimum of 2 inches (50 mm) outside the affected area and 2 inches (50 mm) deep. The deteriorated material shall be removed to a depth where the existing material is firm or cannot be easily removed with a geologist pick. The removed area shall be filled with asphalt mixture with aggregate sized appropriately for the depth of the patch. The material shall be compacted with equipment approved by the RPR until the material is dense and no movement or marks are visible. The material shall not be placed in lifts over 4 inches (100 mm) in depth. This method of repair applies only to pavement to be overlaid.

b. Asphalt pavement repair. The Contractor shall repair all spalled concrete as shown on the plans or as directed by the RPR. The failed areas shall be removed as specified in paragraph 101-3.1b. All failed material including surface, base course, subbase course, and subgrade shall be removed. Materials and methods of construction shall comply with the applicable sections of these specifications.

101-3.5 Cold milling. Milling shall be performed with a power-operated milling machine or grinder, capable of producing a uniform finished surface. The milling machine or grinder shall operate without tearing or gouging the underlaying surface. The milling machine or grinder shall be equipped with grade and slope controls, and a positive means of dust control. All millings shall be removed and disposed off Airport property. If the Contractor mills or grinds deeper or wider than the plans specify, the Contractor shall replace the material removed with new material at the Contractor’s Expense.

a. Patching. The milling machine shall be capable of cutting a vertical edge without chipping or spalling the edges of the remaining pavement and it shall have a positive method of controlling the depth of cut. The RPR shall layout the area to be milled with a straightedge in increments of 1-foot (30 cm) widths. The area to be milled shall cover only the failed area. Any excessive area that is milled because the Contractor doesn’t have the appropriate milling machine, or areas that are damaged because of his negligence, shall be repaired by the Contractor at the Contractor’s Expense.

b. Profiling, grade correction, or surface correction. The milling machine shall have a minimum width of 7 feet and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch (+0 mm and -6mm) of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to remove the millings or cuttings from the pavement and load them into a truck. All millings shall be removed and disposed of off the airport.

c. Clean-up. The Contractor shall sweep the milled surface daily and immediately after the milling until all residual materials are removed from the pavement surface. Prior to paving, the Contractor shall wet down the milled pavement and thoroughly sweep and/or blow the surface to remove loose residual material. Waste materials shall be collected and removed from the

pavement surface and adjacent areas by sweeping or vacuuming. Waste materials shall be removed and disposed off Airport property.

101-3.6. Preparation of asphalt pavement surfaces prior to surface treatment. Existing asphalt pavements to be treated with a surface treatment shall be prepared as follows:

a. Patch asphalt pavement surfaces that have been softened by petroleum derivatives or have failed due to any other cause. Remove damaged pavement to the full depth of the damage and replace with new asphalt pavement similar to that of the existing pavement in accordance with paragraph 101-3.4b.

b. Repair joints and cracks in accordance with paragraph 101-3.2.

c. Remove oil or grease that has not penetrated the asphalt pavement by scrubbing with a detergent and washing thoroughly with clean water. After cleaning, treat these areas with an oil spot primer.

d. Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film.

101-3.7 Maintenance. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 Preparation of Joints in Rigid Pavement prior to resealing. Not Used.

101-3.9 Preparation of Cracks in Flexible Pavement prior to sealing. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method used cleans the cracks and does not damage the pavement.

101-3.9.1 Preparation of Crack. Widen crack with router by removing a minimum of 1/16 inch (2 mm) from each side of crack. Immediately before sealing, cracks will be blown out with a hot air lance combined with oil and water-free compressed air.

101-3.9.2 Removal of Existing Crack Sealant. Existing sealants will be removed by routing . Following routing any remaining debris will be removed by use of a hot lance combined with oil and water-free compressed air.

101-3.9.3 Crack Sealant. Crack sealant material and installation will be in accordance with Item P-605.

101-3.9.4 Removal of Pipe and other Buried Structures.

a. Removal of Existing Pipe Material. Remove the types of pipe as indicated on the plans. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment. Trenches under paved areas must be compacted to 95% of ASTM D1557**.**

b. Removal of Inlets/Manholes. Where indicated on the plans or as directed by the RPR, inlets and/or manholes shall be removed and legally disposed of off-site in a timely fashion after removal. Excavations after removal shall be backfilled with material equal or better in quality than adjacent embankment. When under paved areas must be compacted to 95% of ASTM D1557, when outside of paved areas must be compacted to 90% of ASTM D1557**.**

METHOD OF MEASUREMENT

101-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

101-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Base Bid:

Item No.	Description	Unit
02101.1	Remove Existing AC Pavement	Lump Sum
02101.2	Remove Miscellaneous Items Structures	Lump Sum
02101.3	Remove Existing Concrete Pad	Lump Sum

Payment will be made under Additive Alternate A:

Item No.	Description	Unit
02101.1	Remove Existing AC Pavement	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.

Advisory Circulars (AC)

AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements.

ASTM International (ASTM)

ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

END OF ITEM P-101

END OF SECTION 02101

SECTION 02151 - CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-151 – Clearing and Grubbing, as included as an attachment to this Section

1.2 SUMMARY

This Section includes the requirements for clearing or clearing and grubbing, including the disposal of materials, for all areas within the limits designated on the plans or as required by the Engineer.

1.3 REFERENCES

A. FAA Specifications Item 151 – Clearing and Grubbing, as included as an attachment to this Section

B. Section 02101, Preparation/Removal of Existing Pavements

1.4 SUBMITTALS

Not applicable to this section.

1.5 GENERAL REQUIREMENTS

The Contractor shall clear areas as shown on the Plans and as necessary to complete the Work. In addition, the Contractor shall do the following when performing any Excavation, Subgrade, and Embankment Work:

A. Survey existing conditions and correlate the conditions and boundaries with the work required so to determine the extent of excavation.

B. Show the earthwork schedule on all progress schedules.

C. Verify that benchmarks, field survey markings, and all measurements are accurate and sufficiently precise. Verify that said benchmarks and markings are not located in an area that may be impacted by the earthwork, and report benchmarks and markings that conflict with the Work to the Engineer.

D. Protect all survey monuments at the Site during the course of all Work.

E. Report in writing to the Engineer temporary or intermittent prevailing conditions that will adversely affect satisfactory execution of the work of this Section. Do not

proceed with work until unsatisfactory conditions either are corrected or have changed to the satisfaction of the Engineer.

F. Note all subsurface existing conditions as described in the Contract Documents and referenced studies, and notify the Engineer of all changed conditions.

G. Identify all utilities to remain and verify that utilities to be removed have been disconnected and capped.

H. Whenever a utility is encountered and must be removed or relocated, schedule the removal and coordinate with the Engineer and utility owner sufficiently in advance of the removal so that services to existing facilities are not disrupted.

I. Keep dust generation to a minimum and in compliance with Section 01560, General Environmental, Health, & Safety Controls.

J. Immediately report to the Engineer any soil or water that is visibly stained, discolored, shiny, oily, has evidence of burn activities, has a noticeable solvent-like or hydrocarbon odor, or appears to be slag.

PART 2 - PRODUCTS

Not applicable to this section.

PART 3 - EXECUTION

3.1 DEMOLISH AND REMOVE PAVEMENT AND MISCELLANEOUS ITEMS

A. Demolish and remove existing pavements, utilities, abandoned foundations, and other materials within the limit of work per Section 02101 Preparation/Removal of Existing Pavements.

3.2 SOIL MATERIAL EXCAVATION AND REMOVAL

Excavation, subgrade preparation, disposal, placement, and compaction of all soil materials shall be per Item P-152, Excavation, Subgrade, and Embankment.

3.3 EXISTING UTILITIES ABANDONMENT

The Contractor shall abandon existing utilities as noted on the Plans and seal the ends of abandoned utilities as per details shown on the plans.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-151, paragraph 151-3.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-151, paragraph 151-4.1.

PART 5 - ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. P-151, Clearing and Grubbing

END OF SECTION 02151

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ITEM P-151 CLEARING AND GRUBBING

DESCRIPTION

151-1.1 This item shall consist of clearing or clearing and grubbing, including the disposal of materials, for all areas within the limits designated on the plans or as required by the Resident Project Representative (RPR).

a. Clearing shall consist of the cutting and removal of all trees, stumps, brush, logs, hedges, the removal of fences and other loose or projecting material from the designated areas. The grubbing of stumps and roots will not be required.

b. Clearing and grubbing shall consist of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, debris, and rubbish of any nature, natural obstructions or such material which in the opinion of the RPR is unsuitable for the foundation of strips, pavements, or other required structures, including the grubbing of stumps, roots, matted roots, foundations, and the disposal from the project of all spoil materials resulting from clearing and grubbing.

c. Tree Removal. Tree Removal shall consist of the cutting and removal of isolated single trees or isolated groups of trees, and the grubbing of stumps and roots. The removal of all the trees of this classification shall be in accordance with the requirements for the particular area being cleared.

CONSTRUCTION METHODS

151-2.1 General. The areas denoted on the plans to be cleared and grubbed shall be staked on the ground by the Contractor as indicated on the plans.

The removal of existing structures and utilities required to permit orderly progress of work shall be accomplished by local agencies, unless otherwise shown on the plans. Whenever a telephone pole, pipeline, conduit, sewer, roadway, or other utility is encountered and must be removed or relocated, the Contractor shall advise the RPR who will notify the proper local authority or owner to secure prompt action.

151-2.1.1 Disposal. All materials removed by clearing or by clearing and grubbing shall be disposed of outside the Airport's limits at the Contractor's responsibility , except when otherwise directed by the RPR. As far as practicable, waste concrete and masonry shall be placed on slopes of embankments or channels. When embankments are constructed of such material, this material shall be placed in accordance with requirements for formation of embankments. Any broken concrete or masonry that cannot be used in construction and all other materials not considered suitable for use elsewhere, shall be disposed of by the Contractor. In no case, shall any discarded materials be left in windrows or piles adjacent to or within the airport limits. The manner and location of disposal of materials shall be subject to the approval of the RPR and shall not create an unsightly or objectionable view. When the Contractor is required to locate a disposal area outside the airport property limits, the Contractor shall obtain and file with the RPR permission in writing from the property owner for the use of private property for this purpose.

151-2.1.2 Blasting. Blasting shall not be allowed**.**

151-2.2 Clearing. The Contractor shall clear the staked or indicated area of all materials as indicated on the plans. Trees unavoidably falling outside the specified clearing limits must be cut up, removed, and disposed of in a satisfactory manner. To minimize damage to trees that are to be left standing, trees shall be felled toward the center of the area being cleared. The Contractor shall preserve and protect from injury all trees not to be removed. The trees, stumps, and brush shall be cut flush with the original ground surface. The grubbing of stumps and roots will not be required.

Fences shall be removed and disposed of as directed by the RPR. Fence wire shall be neatly rolled and the wire and posts stored on the airport if they are to be used again, or stored at a location designated by the RPR if the fence is to remain the property of a local owner or authority.

151-2.3 Clearing and grubbing. In areas designated to be cleared and grubbed, all stumps, roots, buried logs, brush, grass, and other unsatisfactory materials as indicated on the plans, shall be removed, except where embankments exceeding 3-1/2 feet (105 cm) in depth will be constructed outside of paved areas. For embankments constructed outside of paved areas, all unsatisfactory materials shall be removed, but sound trees, stumps, and brush can be cut off flush with the original ground and allowed to remain. Tap roots and other projections over 1-1/2 inches (38 mm) in diameter shall be grubbed out to a depth of at least 18 inches (0.5 m) below the finished subgrade or slope elevation.

Any buildings and miscellaneous structures that are shown on the plans to be removed shall be demolished or removed, and all materials shall be disposed of by removal from the site. The cost of removal is incidental to this item. The remaining or existing foundations, wells, cesspools, and like structures shall be destroyed by breaking down the materials of which the foundations, wells, cesspools, etc., are built to a depth at least 2 feet (60 cm) below the existing surrounding ground. Any broken concrete, blocks, or other objectionable material that cannot be used in backfill shall be removed and disposed of at the Contractor's expense. The holes or openings shall be backfilled with acceptable material and properly compacted.

All holes in embankment areas remaining after the grubbing operation shall have the sides of the holes flattened to facilitate filling with acceptable material and compacting as required in Item P-152. The same procedure shall be applied to all holes remaining after grubbing in areas where the depth of holes exceeds the depth of the proposed excavation.

METHOD OF MEASUREMENT

151-3.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

151-4.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Base Bid:

Item No.	Description	Unit
02151.1	Clearing and Grubbing	Lump Sum

END OF ITEM P-151

END OF SECTION 02151

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SECTION 02152 - EXCAVATION, SUBGRADE, AND EMBANKMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-152 – Excavation, Subgrade and Embankment, as included as an attachment to this Section

1.2 SUMMARY

This Section includes the requirements for Excavation, Subgrade, and Embankment, including but not necessarily limited to, excavation, placement, and compaction of all materials within the project limits, temporary stockpiling, and hauling and disposing of unused materials and debris. This specification shall also include subgrade preparation and embankment, and the disposal of all other items which are identified as unsuitable excavation material.

1.3 REFERENCES

A. FAA Specification Item P-152 – Excavation, Subgrade and Embankment as modified herein.

B. Section 02101, Preparation/Removal of Existing Pavements

C. Section 02151, Clearing and Grubbing

1.4 SUBMITTALS

Prior to commencing the Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

A. Excavation and Embankment Quality Control Plan: The contractor shall provide quality control plan to include all testing procedures and frequency in accordance with the requirements of Item P-152.

B. Soil Density Test Results: The Contractor shall submit all copies of test results to the Engineer for review. These shall include retests for items that failed initial testing.

C. Bracing / shoring: The Contractor shall submit bracing/shoring design as required for trench excavation signed / sealed by a registered engineer.

D. Contractor’s verification of accuracy or adjustment of the existing ground survey in accordance with Item P-152-2.2.

1.5 QUALITY ASSURANCE

A. The Contractor's Quality Control of excavation and backfill work shall be considered as part of the Work.

B. The HDOTA, at its discretion, will perform Quality Analysis testing for acceptance of the excavation and backfill Work.

C. Compaction testing shall be performed per FAA Specification Item P-152, Excavation and Embankment, and as modified herein.

PART 2 PRODUCTS

Not applicable to this section.

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall conform to FAA Specification Item P-152, as modified herein, for excavation, embankment, and subgrade preparation work.

3.2 EXCAVATION

Contractor have Level D personnel protection equipment (PPE’s) when performing any work associated with soils excavation, handling, and construction of the temporary stockpile

3.3 BORROW EXCAVATION.

Borrow site(s) within the airport property are indicated on the plans. Borrow excavation shall be made only at these designated locations and within the horizontal and vertical limits or as directed by the Engineer. However, it is the sole responsibility of the Contractor to locate and obtain the necessary supply of acceptable fill material for the project. Any required off-site borrow site(s) outside of the airport property are subject to the approval of the Engineer, and are the responsibility of the Contractor to manage.

All borrow pits shall be opened up to expose the vertical face of various strata of acceptable material to enable obtaining a uniform product. Borrow pits shall be excavated to regular lines to permit accurate measurements, and they shall be drained and left in a neat, presentable condition with all slopes dressed uniformly. Unless otherwise shown on Plan, after excavation of the borrow site, regrade to proposed contours as shown on Plans and ensure proper drainage at a minimum of 0.5% slope with no abrupt changes in grade. Side slopes of borrow pit shall be 5:1 or flatter. All unsuitable material shall be disposed off airport property by the Contractor.

Contractor shall provide air dust, water, and soils erosion control at all times. Dispose of materials from clearing and grubbing as required per Section 02151 Clearing and Grubbing, and strip top soil material from borrow area.

3.4 TRENCH EXCAVATION.

Unless otherwise shown on the plans, typical sections or the referenced specifications, provide vertical trench and shoring as required per geotechnical report. The soil type may require temporary shoring or sloping for excavation of greater than 3-ft depth.

The Contractor shall do all temporary 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 and their removal after completion of the work shall be included in the unit price/lump sum of the associated Bid Item. Bracing / shoring shall be designed and signed / sealed by a registered engineer.

Unless otherwise specified, excavated materials that are deemed by the Engineer to be unsuitable for use in backfill or embankments shall be removed and disposed of off-site.

3.5 STOCKPILE MANAGEMENT

The Contractor is responsible for managing on soils stockpiles of material to be temporarily stored at designated locations with advance coordination with the RPR as shown on Plan. The work included in forming stockpiles shall include the delivery, operation, and retrieval of heavy equipment necessary to perform the Work. Stockpile forming shall include installation of all required BMP's, laydown and stockpile covers and pushing up soils and rubble material to stockpiles of up to 14 feet high, shall be formed for environmental Decision Unit of a maximum of 400 cubic yards per stockpile, or as directed by the RPR. Stockpiles and the general stockpile area shall be graded to drain without ponding to prevent the accumulation of water, as directed and to the satisfaction of the Engineer.

If Additive Alternate "B" or "C" is not awarded, Contractor shall be responsible to maintain the stockpile and all required BMP's for 4 months after issuance of Substantial Completion.

3.6 TESTING AND DISPOSAL OF SOIL MATERIAL TO OFFSITE FACILITIES

HDOTA will perform the testing and provide the results in a Site-specific Construction-Environmental Hazard Management Plan (C-EHMP) prescribing the requirements for disposal of any rubble or soils to be disposed off the airport in accordance with all local, State and Federal Laws, and specification section 01562 Management of Contaminated Media, Soil Disposal, and Soil Reuse.

Based on the test results, the Contractor shall be responsible to dispose of the material at an appropriate facility including but not limited to a Hawaii DOH or EPA regulated facility as non-hazardous waste, or as hazardous waste at an approved EPA regulated

facility, or at other facility as deemed necessary. The Contractor shall be responsible for additional handling of the material, trucking, and fees associated for proper disposal to the appropriate facility.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-152, paragraph 152-3.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-152, paragraph 152-4.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. P-152, Excavation, Subgrade, and Embankment

END OF SECTION 02152

ITEM P-152 EXCAVATION, SUBGRADE, AND EMBANKMENT

DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 Classification. All material excavated shall be classified as defined below:

a. Unclassified excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature which is not otherwise classified and paid for elsewhere.

Borrow excavation. Borrow excavation shall consist of approved material required for the construction of embankments or for other portions of the work in excess of the quantity of usable material available from required excavations. Borrow material shall be obtained from areas designated by the Resident Project Representative (RPR) within the limits of the airport property but outside the normal limits of necessary grading, or from areas outside the airport boundaries.

152-1.3 Unsuitable excavation. Unsuitable material shall be disposed in designated waste areas as shown on the plans. Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used on the embankment slope when approved by the RPR.

CONSTRUCTION METHODS

152-2.1 General. Before beginning excavation, grading, and embankment operations in any area, the area shall be cleared or cleared and grubbed in accordance with Item P-151.

The suitability of material to be placed in embankments shall be subject to approval by the RPR. All unsuitable material shall be disposed of in waste areas as shown on the plans. All waste areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of waste areas shall be specified on the plans or approved by the RPR.

When the Contractor’s excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the RPR notified per Section 70, paragraph 70-20. At the direction of the RPR, 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.

Areas outside the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches (100 mm), to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches (100 mm) in their greatest dimension will not be permitted in the top 6 inches (150 mm) of the subgrade.

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 RPR, who shall arrange for their removal if

necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

a. Blasting. Blasting shall not be allowed.

152-2.2 Excavation. No excavation shall be started until the work has been staked out by the Contractor and the RPR has obtained from the Contractor, the survey notes of the elevations and measurements of the ground surface. The Contractor and RPR shall agree that the original ground lines shown on the original topographic mapping are accurate, or agree to any adjustments made to the original ground lines.

Digital terrain model (DTM) files of the existing surfaces, finished surfaces and other various surfaces were used to develop the design plans.

Volumetric quantities were calculated by comparing DTM files of the applicable design surfaces and generating Triangle Volume Reports. Electronic copies of DTM files and a paper copy of the original topographic map will be issued to the successful bidder.

Existing grades on the design cross sections or DTM's, where they do not match the locations of actual spot elevations shown on the topographic map, were developed by computer interpolation from those spot elevations. Prior to disturbing original grade, Contractor shall verify the accuracy of the existing ground surface by verifying spot elevations at the same locations where original field survey data was obtained as indicated on the topographic map. Contractor shall recognize that, due to the interpolation process, the actual ground surface at any particular location may differ somewhat from the interpolated surface shown on the design cross sections or obtained from the DTM's. Contractor's verification of original ground surface, however, shall be limited to verification of spot elevations as indicated herein, and no adjustments will be made to the original ground surface unless the Contractor demonstrates that spot elevations shown are incorrect. For this purpose, spot elevations which are within 0.1 foot (30 mm) of the stated elevations for ground surfaces, or within 0.04 foot (12 mm) for hard surfaces (pavements, buildings, foundations, structures, etc.) shall be considered "no change". Only deviations in excess of these will be considered for adjustment of the original ground surface. If Contractor's verification identifies discrepancies in the topographic map, Contractor shall notify the RPR in writing at least two weeks before disturbance of existing grade to allow sufficient time to verify the submitted information and make adjustments to the design cross sections or DTM's. Disturbance of existing grade in any area shall constitute acceptance by the Contractor of the accuracy of the original elevations shown on the topographic map for that area.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the RPR. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the RPR. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

a. Selective grading. When selective grading is indicated on the plans, the more suitable material designated by the RPR shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final

location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

b. Undercutting. Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches (300 mm) below the subgrade or to the depth specified by the RPR. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed of at locations shown on the plans or as directed by RPR. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary backfill will constitute a part of the embankment. Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans. Undercutting will be paid as unclassified excavation.

c. Over-break. Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the RPR. All over-break shall be graded or removed by the Contractor and disposed of as directed by the RPR. The RPR shall determine if the displacement of such material was unavoidable and their own decision shall be final. Payment will not be made for the removal and disposal of over-break that the RPR determines as avoidable. Unavoidable over-break will be classified as "Unclassified Excavation."

d. Removal of utilities. The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by the Contractor as indicated on the plans . All existing foundations shall be excavated at least 2 feet (60 cm) below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the RPR. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

152-2.3 Borrow excavation. Borrow areas within the airport property are indicated on the plans. Borrow excavation shall be made only at these designated locations and within the horizontal and vertical limits as staked or as directed by the RPR. All unsuitable material shall be disposed of by the Contractor as shown on the plans. All borrow pits shall be opened to expose the various strata of acceptable material to allow obtaining a uniform product. Borrow areas shall be drained and left in a neat, presentable condition with all slopes dressed uniformly. Borrow areas shall not create a hazardous wildlife attractant.

152-2.4 Drainage excavation. Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the RPR. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 Preparation of cut areas or areas where existing pavement has been removed. In those areas on which a subbase or base course is to be placed, unless otherwise noted in the project geotechnical report or on plans typical sections , the top 12 inches of subgrade shall be compacted to not less than 95% of maximum density for non-cohesive soils, and 90% of maximum density for cohesive soils as determined by ASTM D1557. As used in this

specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

152-2.6 Preparation of embankment area. 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 per paragraph 152-2.10.

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.

152-2.7 Control Strip. The first half-day of construction of subgrade and/or embankment 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.

152-2.8 Formation of embankments. The material shall be constructed in lifts as established in the control strip, but not less than 6 inches (150 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.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the RPR. 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 due to 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 lift shall be within ±2% of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

The contractor will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with D1557. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the contractor for every 3,000 square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than 95% of maximum density for non-cohesive soils, and 90% of maximum density for cohesive soils as determined by ASTM D1557. Unless otherwise noted in the project geotechnical report or on the plans typical pavement sections, under all areas to be paved, the embankments shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D1557. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches which shall be prepared for a topsoil and sprigging in accordance with FAA specification Item T-905 and T-903.

The in-place field density shall be determined in accordance with ASTM D1556 or ASTM 6938 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. The Contractor’s laboratory shall perform all density tests in the RPR’s presence and provide the test results upon completion to the RPR for acceptance. If the specified density is not attained, the area represented by the test or as designated by the RPR shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift 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 lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 12 inches (300 mm) of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the RPR and the finer material shall be used to fill the voids forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment material shall not be disposed of except at places and in the manner designated on the plans or by the RPR.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in

lifts not exceeding 2 feet (60 cm) in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift 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 lifts, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, borrow, or other items.

152-2.9 Proof rolling. The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. After compaction is completed, the subgrade area shall be proof rolled with a 20 ton Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 150 psi or a 15 ton Proof Roller with tires spaced not more than 32 inches (0.8 m) on-center with tires inflated to 125psi in the presence of the RPR. Apply a minimum of two coverage, or as specified by the RPR, under pavement 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. Removal and replacement of soft areas is incidental to this item.

152-2.10 Compaction requirements. The subgrade under areas to be paved shall be compacted to a depth and densities as shown on the plans. When no density is shown, the subgrade shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum dry density as determined by ASTM D1557, and the subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 6 inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D698.

The material to be compacted shall be within ±2% of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the ¾ inch (19.0 mm) sieve, follow the methods in ASTM D698, ASTM D1557, or procedures in AASHTO T180 Annex for correction of maximum dry density and optimum moisture for oversized particles. Tests for moisture content and compaction will be taken at a minimum of 1,000 S.Y. of subgrade. All quality assurance testing shall be done by the RPR.

The in-place field density shall be determined in accordance with ASTM D1556 or 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 within 12 months prior to its use on this contract. The gage shall be field standardized daily.

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

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 RPR and the finished subgrade shall be maintained.

152-2.11 Finishing and protection of subgrade. Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade.

Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the RPR.

152-2.12 Haul. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the lump sum 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.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

152-2.13 Surface Tolerances. 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.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to placed, grade shall not vary more than 0.10 feet (30 mm) from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.14 Topsoil. 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. 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 final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall be located as shown on the plans and the approved CSPP, and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the RPR, 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 re-handling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans and as required in Item T-905. Topsoil shall be paid for as provided in Item T-905. No direct payment will be made for topsoil under Item P-152.

METHOD OF MEASUREMENT

152-3.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

152-4.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

For ALLOWANCE items in the Proposal Schedule, the allowance is an estimate and the amount shall not exceed the maximum amount shown in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the DOTA Engineer. The Contractor shall be allowed to include overhead, profit, insurance and/or other mark-ups, as stipulated in Section 9.5 of the 2016 General Provisions for Construction Projects, Air and Water Transportation Facilities Divisions.

In the event that a Bid Item is not used during construction, the Contractor is not eligible to receive any payment under the Bid item.

Payment will be made under Base Bid:

Item No.	Description	Unit
02152.1	Unclassified Excavation and Embankment	Lump Sum
02152.2	Unclassified Excavation and Stockpile at Airport	Lump Sum
02152.3	Unclassified Over-Excavation and Stockpile at Airport	Allowance
02152.4	8” Deep Subgrade Preparation	Lump Sum

Payment will be made under Additive Alternate B:

Item No.	Description	Unit
02152.A1	Unclassified Excavation and Stockpile at Airport	Lump Sum
02152.A2	Unclassified Over-Excavation and Stockpile at Airport	Allowance
02152.A3	8” Deep Subgrade Preparation	Lump Sum

Payment will be made under Additive Alternate B:

Item No.	Description	Unit
02152.B1	Transport and Dispose Excavated Stockpiled Soils As Solid Waste at DOH or EPA Permitted Disposal Landfill	Lump Sum
02152.B2	Transport and Dispose Over-Excavated Stockpiled Soils As Solid Waste at DOH or EPA Permitted Disposal Landfill	Allowance

Payment will be made under Additive Alternate C:

Item No.	Description	Unit
02152.C1	Transport and Dispose Excavated Stockpiled Soils As Hazardous Waste at An EPA Regulated Facility	Lump Sum
02152.C2	Transport and Dispose Over-Excavated Stockpiled Soils As Hazardous Waste at An EPA Regulated Facility	Allowance

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 T-180	Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
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^3 (2700 kN-m/m^3))
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Advisory Circulars (AC)

AC 150/5370-2 Operational Safety on Airports During Construction Software

Software

FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design

U.S. Department of Transportation

FAA RD-76-66 Design and Construction of Airport Pavements on Expansive Soils

END OF ITEM P-152

END OF SECTION 02152

SECTION 02153 CONTROLLED LOW-STRENGTH MATERIAL (CLSM)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-153 – Controlled Low-Strength Material (CLSM), as included as an attachment to this Section.

1.2 SUMMARY

A. This Section includes the requirements for furnishing and installing Controlled Low Strength Material (CLSM) as backfill in confined areas around structures, pipe lines or trenches, where specified or where access for compaction equipment is limited.

B. Controlled Low Strength Material (CLSM) is a mixture of Portland cement, fly ash, aggregates and admixtures proportioned to provide a non-segregating, self-consolidating, free-flowing fill material that can be excavated by hand.

1.3 REFERENCES

A. FAA Specification Item P-153 – Controlled Low-Strength Material (CLSM) as modified herein

B. Section 02152, Excavation, Subgrade, and Embankment

1.4 SUBMITTALS

The Contractor must submit CLSM Mix Design in accordance with Section 01300, Submittals. Submit certified laboratory test results that the mix proportions and materials comply with these Specifications. Mix design proportions must be established based on experience with the plant's materials, established methods, and trial mixtures with the materials to be employed in accordance with ACI 318 Chapter 5. Submit certification on cementitious products and aggregates performed within the past 6 months, including:

A. Cementitious materials

B. Coarse and fine aggregates

C. Admixtures

D. Water

PART 2 PRODUCTS

2.1 MATERIALS

Materials must conform to the following:

A. Admixtures: Air entraining admixtures must meet ASTM C260. Air content shall be less than 15%.

2.2 MIXES

A. Performance Requirements: Proportion the CLSM to be non-segregating, free-flowing, self-consolidating, low-shrink slurry.

B. Mix Design Requirements: Determine the materials and proportions used to meet the requirements of the Specifications. The mix design must be prepared for a range of aggregate gradations that are expected to be used.

C. Density: The density must be greater than 115 pcf.

2.3 SOURCE QUALITY CONTROL

Mix, transport, and place CLSM in accordance with the methods and procedures in ACI 304 and ASTM C94.

PART 3 EXECUTION

3.1 CONSRUCTION METHODS

Controlled Low Strength Material shall be in accordance with FAA Specification Item P-153.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. P-153, Controlled Low-Strength Material (CLSM)

END OF SECTION 02153

ITEM P-153 CONTROLLED LOW-STRENGTH MATERIAL (CLSM)

DESCRIPTION

153-1.1 This item shall consist of furnishing, transporting, and placing a controlled low-strength material (CLSM) as flowable backfill in trenches or at other locations shown on the plans or as directed by the Resident Project Representative (RPR).

MATERIALS

153-2.1 Materials.

a. Cement. Cement shall conform to the requirements of ASTM C150 Type I or II.

b. Fly ash. Fly ash shall conform to ASTM C618, Class C or F.

c. Fine aggregate (sand). Fine aggregate shall conform to the requirements of ASTM C33 except for aggregate gradation. Any aggregate gradation which produces the specified performance characteristics of the CLSM and meets the following requirements, will be accepted.

Sieve Size	Percent Passing by weight
3/4 inch (19.0 mm)	100
No. 200 (75 µm)	0 - 12

d. Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

MIX DESIGN

153-3.1 Proportions. The Contractor shall submit, to the RPR, a mix design including the proportions and source of aggregate, fly ash, cement, water, and approved admixtures. No CLSM mixture shall be produced for payment until the RPR has given written approval of the proportions. The proportions shall be prepared by a laboratory and shall remain in effect for the duration of the project. The proportions shall establish a single percentage or weight for aggregate, fly ash, cement, water, and any admixtures proposed. Laboratory costs are incidental to this item.

a. Compressive strength. CLSM shall be designed to achieve a 28-day compressive strength of 100 to 200 psi (690 to 1379 kPa) when tested in accordance with ASTM D4832, with no significant strength gain after 28 days. Not less than 188 pounds of cement shall be used for each cubic yard of material produced.

b. Consistency. Design CLSM to achieve a consistency that will produce an approximate 8-inch (200 mm) diameter circular-type spread without segregation. CLSM consistency shall be determined per ASTM D6103.

CONSTRUCTION METHODS

153-4.1 Placement.

a. Placement. CLSM may be placed by any reasonable means from the mixing unit into the space to be filled. Agitation is required during transportation and waiting time. Placement shall be performed so structures or pipes are not displaced from their final position and intrusion of CLSM into unwanted areas is avoided. The material shall be brought up uniformly to the fill line shown on the plans or as directed by the RPR. Each placement of CLSM shall be as continuous an operation as possible. If CLSM is placed in more than one lift, the base lift shall be free of surface water and loose foreign material prior to placement of the next lift.

b. Contractor Quality Control. The Contractor shall collect all batch tickets to verify the CLSM delivered to the project conforms to the mix design. The Contractor shall verify daily that the CLSM is consistent with 153-3.1a and 153-3.1b. Adjustments shall be made as necessary to the proportions and materials as needed. The Contractor shall provide all batch tickets to the RPR.

c. Limitations of placement. CLSM shall not be placed on frozen ground. Mixing and placing may begin when the air or ground temperature is at least 35°F (2°C) and rising. Mixing and placement shall stop when the air temperature is 40°F (4°C) and falling or when the anticipated air or ground temperature will be 35°F (2°C) or less in the 24-hour period following proposed placement. At the time of placement, CLSM shall have a temperature of at least 40°F (4°C).

153-4.2 Curing and protection

a. Curing. The air in contact with the CLSM shall be maintained at temperatures above freezing for a minimum of 72 hours. If the CLSM is subjected to temperatures below 32°F (0°C), the material may be rejected by the RPR if damage to the material is observed.

b. Protection. The CLSM shall not be subject to loads and shall remain undisturbed by construction activities for a period of 48 hours or until a compressive strength of 15 psi (105 kPa) is obtained. The Contractor shall be responsible for providing evidence to the RPR that the material has reached the desired strength. Acceptable evidence shall be based upon compressive tests made in accordance with paragraph 153-3.1a.

153-4.3 Quality Assurance (QA) Acceptance. CLSM QA acceptance shall be based upon batch tickets provided by the Contractor to the RPR to confirm that the delivered material conforms to the mix design.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

153-5.1 Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

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 C33 Standard Specification for Concrete Aggregates

ASTM C150	Standard Specification for Portland Cement
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D4832	Standard Test Method for Preparation and Testing of Controlled Low-Strength Material (CLSM) Test Cylinders
ASTM D6103	Flow Consistency of Controlled Low Strength Material (CLSM)

END OF ITEM P-153

END OF SECTION 02153

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SECTION 02209 - CRUSHED AGGREGATE BASE COURSE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-209 – Crushed Aggregate Base Course, as included as an attachment to this Section.

1.2 SUMMARY

This Section includes the requirements for furnishing and placing Crushed Aggregate Base Course as shown on the Plans.

1.3 REFERENCES

A. FAA Specification Item P-209 – Crushed Aggregate Base Course as modified herein.

B. Section 02152, Excavation, Subgrade, and Embankment

1.4 SUBMITTALS

Prior to commencing the Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

A. Certified test reports for aggregates.

B. Samples of aggregates.

C. Quality control plan and testing procedures in accordance herein Item P-209.

PART 2 – PRODUCTS

2.1 AGGREGATES

A. Aggregates shall conform to:

FAA Specification Item P-209, Crushed Aggregate Base Course.

PART 3 – EXECUTION

A. Prior to placing crushed aggregate base, the Contractor shall compact the subgrade as required per Items P-152.

PART 1 MEASUREMENT AND PAYMENT

1.01 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-209, paragraph 209-4.1.

1.02 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-209, paragraph 209-5.1.

PART 4 – ATTACHMENTS

4.1 FAA SPECIFICATIONS

A. P-209, Crushed Aggregate Base Course

END OF SECTION 02209

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 or 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
Coarse Aggregate		
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[1]	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles [2]	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

[1] 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.

[2] 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[1] (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[2] (425 µm)	10-30		±5
No. 200[2] (75 µm)	0-10		±3

[1] 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.

[2] 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.

209-2.4 Separation Geotextile. Not used.

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 ±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 recompacted 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 1,200 square yards. Sampling locations will be determined on a random basis per ASTM D3665

a. Density. The RPR shall perform all density tests**.**

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 D1556 or 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 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.

b. Thickness. Depth tests shall be made by test holes at least 3 inches (75 mm) in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each area. 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.

In lieu of depth tests, the Contractor may elect to survey the material, before and after placement of the base, and provide CSV file for review by the RPR. In order to employ this method, contractor shall hire the services of a licensed surveyor to survey prior to placement and after placement. Survey interval shall be no greater than a 25' x 25' and shall capture all grade breaks. CSV files shall be provided for review by the RPR. At the RPR's discretion, supplemental survey and or the use of the aforementioned depth tests may be required.

The Contractor shall remove all survey and grade hubs from the base courses prior to placing any asphalt mix pavements.

METHOD OF MEASUREMENT

209-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

209-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

For ALLOWANCE items in the Proposal Schedule, the allowance is an estimate and the amount shall not exceed the maximum amount shown in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the DOTA Engineer. The Contractor shall be allowed to include overhead, profit, insurance and/or other mark-ups, as stipulated in Section 9.5 of the 2016 General Provisions for Construction Projects, Air and Water Transportation Facilities Divisions.

In the event that a Bid Item is not used during construction, the Contractor is not eligible to receive any payment under the Bid item.

Payment will be made under Base Bid:

Item No.	Description	Unit
02209.1	Crushed Aggregate Base Course, 8" Thick	Lump Sum
02209.2	Crushed Aggregate Base Course, 8" Thick For Backfill of Over-Excavation Including Geogrid	Allowance

Payment will be made under Additive Alternate A:

Item No.	Description	Unit
02209.A1	Crushed Aggregate Base Course, 8" Thick	Lump Sum
02209.A2	Crushed Aggregate Base Course, 8" Thick For Backfill of Over-Excavation Including Geogrid	Allowance

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-μm (No. 200) Sieve in 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^3 (600 kN-m/m^3))
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^3 (2700 kN-m/m^3))
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

END OF SECTION 02209

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SECTION 02403 - ASPHALT MIX PAVEMENT, SURFACE COURSE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-403 – Asphalt Mix Pavements, Base and Surface Course, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the construction of Asphalt Mix Pavement Base and Surface Course of shoulders as shown on the Plans.

1.3 REFERENCES:

A. The Asphalt Institute, Manual Series No. 2 (MS-2), Mix Design Methods for Asphalt Concrete

B. FAA Specification Item P-403 – Asphalt Mix Pavement, Surface Course as modified herein.

C. Section 02101, Preparation/Removal of Existing Pavements.

D. Section 02403, Asphalt Mix Pavement, Surface Course.

E. Section 02602, Emulsified Asphalt Prime Coat.

F. Section 02603, Emulsified Asphalt Tack Coat.

1.4 SUBMITTALS

Prior to commencing the Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

A. Job Mix Formula and Test Results: Asphalt Mix Pavement Surface job mix formula in conformance with FAA Specification Item P-403, with test reports of the parameters listed in P-403-3.3.

B. Asphalt Mix Quality Control (ACQC) Project Plan: The ACQC Project Plan shall include all testing procedures to be used for quality control and shall conform to FAA Specification Item P-403.

C. Asphalt Mix Paving Plan.

D. Asphalt Mix product information, including test reports and, if requested by the Engineer, tack coat samples of aggregates and bituminous materials.

E. Tack coat product information, including test reports and, if requested by the Engineer, tack coat samples.

F. Emulsified asphalt seal coat product information, including test reports and, if requested by the Engineer, seal coat samples.

G. During the Work of this Section, periodic Asphalt Mix field test results to the Engineer for review. These results shall include the results of retests for items that failed initial testing.

H. Quality Control Testing Laboratory Accreditation Certification, including testing personnel qualifications and lab manager certification.

I. Asphalt Crack Sealant:

1. Product information, manufacturer's specification, test reports and certificate of compliance for each type of joint sealant material and back-up material.

2. A certified copy of the manufacturer's instructions shall be furnished prior to commencement of this Work.

3. List and description of the equipment to be used and a statement from the manufacturer of the joint sealant that the proposed equipment is acceptable for installing the specified sealant. All other equipment will be approved by the Engineer prior to use on the project.

1.5 QUALITY CONTROL

The RPR will perform Quality Assurance (QA) testing for acceptance, measurement, and payment of the Work. The Contractor is responsible for hiring an approved, independent testing firm to perform standard asphalt concrete pavement testing Quality Control (QC) testing. All testing and inspection shall conform to FAA Specification Item P-403.

PART 2 – PRODUCTS

2.1 ASPHALT MIX PAVEMENT BASE AND SURFACE COURSE

Asphalt Mix Pavement Surface Course shall conform to FAA Specification Item P-403, and as modified herein.

PART 3 – EXECUTION

3.1 ASPHALT MIX PLACEMENT BASE AND SURFACE COURSE

The Contractor shall prepare, spread, and compact the surface course for asphalt mix in accordance with FAA Specification Item P-403, and as modified herein.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-403, paragraph 403-7.1.

4.02 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-403, paragraph 403-8.1.

PART 5 ATTACHMENTS

3.2 FAA SPECIFICATIONS

A. P-403, Asphalt Mix Pavement, Surface Course

END OF SECTION 02403

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ITEM P-403 ASPHALT MIX PAVEMENT, SURFACE COURSE

DESCRIPTION

403-1.1 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 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

403-2.1 Aggregate. Aggregates shall consist of crushed stone, crushed gravel, crushed slag, 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.

b. Clay ironstone, claystone, mudstone, and siltstone shall not exceed 0.2% when tested per (ASTM C 295). Clay ironstone is defined as an impure variety of iron carbonate, iron oxide, hydrous iron oxide, or combinations thereof, commonly mixed with clay, silt, or sand.

Coarse Aggregate Material Requirements

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum for surface, asphalt binder, and leveling course Loss: 50% maximum for base course	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	1.0 % 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[1]	ASTM D5821
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles with a value of 5:1 [2]	ASTM D4791

[1] 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.

[2] 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, slag, 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 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	1.0 % maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	0 to 15% maximum by weight of total aggregate	ASTM D1073

c. Sampling. ASTM D75 shall be used in sampling coarse and fine aggregate, and ASTM C183 shall be used in sampling mineral filler.

403-2.2 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

403-2.3 Asphalt binder. Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) 76-22PM.

403-2.4 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.

COMPOSITION

403-3.1 Composition of mixture. The asphalt plant mix shall be composed of a mixture of well-graded aggregate, filler and anti-strip agent if required, and asphalt binder. The several 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).

403-3.2 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 listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the RPR prior to start of construction.

403-3.3 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 403-3.2. 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 a Marshall compactor in accordance with ASTM D6926. When high absorption aggregates (more than 2%) are used in the mix, the samples must be oven conditioned to 4 hours in accordance with Asphalt Institute MS-2 Mix Design Manual Pages 37 and 38

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.

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 submitted 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 403-2.3. 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 403-2.4.
- Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 403-2.1 and 403-2.2.
- 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 course 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 mixing and compaction temperatures.
- Plot of the combined gradation on the 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).
- Type and amount of Anti-strip agent when used.
- Asphalt Pavement Analyzer (APA) results.
- Asphalt Film Thickness.

- Dust to Asphalt Ratio.
- Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.
- Percentage and properties (asphalt content, asphalt binder properties, and aggregate properties) of reclaimed asphalt pavement (RAP) in accordance with paragraph 403-3.4, Reclaimed Hot-Mix Asphalt, if RAP is used**.**
- Fine Aggregate Angularity

Table 1. Asphalt Design Criteria

Test Property	Value	Test Method
Number of blows/gyrations	75	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
TSR[1]	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA)[2,3]	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature
Asphalt Film Thickness[4]	9 microns	

[1] Test specimens for TSR shall be compacted at 7 ± 1.0 % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

[2] 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

[3] Where APA not available, use Hamburg wheel test (AASHTO T 324) 10 mm@ 20,000 passes at 50°C.

[4] The film thickness shall be calculated at each asphalt content evaluated for mix design. The value shall be derived using the asphalt content and the surface area of aggregate using computational methods described in the National Center for Asphalt Technology (NCAT) Report 98-1, "A Critical Review of VMA Requirements in Superpave", except that the effective asphalt content shall be used in the computation.

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 Sieve
1 inch (25.0 mm)	--
3/4 inch (19.0 mm)	100
1/2 inch (12.5 mm)	90-100
3/8 inch (9.5 mm)	72-88
No. 4 (4.75 mm)	53-73
No. 8 (2.36 mm)	38-60
No. 16 (1.18 mm)	26-48
No. 30 (600 µm)	18-38
No. 50 (300 µm)	11-27
No. 100 (150 µm)	6-18
No. 200 (75 µm)	3-6
Voids in Mineral Aggregate (VMA)[1]	15
Asphalt Percent:	
Stone or gravel	5.0-7.5
Recommended Minimum Construction Lift Thickness	2 inch

[1]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.

403-3.4 Reclaimed Asphalt Pavement (RAP). Reclaimed asphalt pavement shall consist of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, and asphalt. Recycled asphalt shingles (RAS) shall not be allowed. The RAP shall be of a consistent gradation and asphalt content and properties. When RAP is fed into the plant, the maximum RAP chunk size shall not exceed 1-1/2 inches (38 mm). The reclaimed asphalt mix shall be designed using procedures contained in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition. The percentage of asphalt in the RAP shall be established for the mixture design according to ASTM D2172 using the appropriate dust correction procedure. The JMF shall meet the requirements of paragraph 403-3.3. RAP should only be used for shoulder surface course mixes and for any intermediate courses. The use of RAP containing Coal Tar shall not be allowed. Coal Tar surface treatments must be removed prior to recycling underlying asphalt material. The amount of RAP shall be limited to 20 percent.

In addition to the requirements of paragraph 403-3.3, the JMF shall indicate the percent of reclaimed asphalt pavement and the percent and grade of new asphalt binder.

For the PG graded asphalt binder selected in paragraph 403-2.3, adjust as follows:

a. For 0-20% RAP, there is no change in virgin asphalt binder content.

403-3.5 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 403-5.1, has been accepted, in writing, by the RPR.

The control strip will consist of at least 250 tons (227 metric tons) or 1/2 sublot, 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 403-4.13 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 shall be evaluated for acceptance as a single lot in accordance with the acceptance criteria in paragraph 403-6.1 and 403-6.2.

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 403-5.5a; and Mat density greater than or equal to 94%, air voids 3.5% +/- 1%, joint density greater than or equal to 92%.

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 and an acceptable control strip provided at the Contractor's sole expense.

The control strip will be considered one lot for payment based upon the average of a minimum of 3 samples (no sublots required for control strip). Payment will only be made for an acceptable control strip in accordance with paragraph 403-8.1**.**

CONSTRUCTION METHODS

403-4.1 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)	
	Degrees F	Degrees 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

403-4.2 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:

a. Inspection of plant. 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.

403-4.3 Aggregate stockpile management. Aggregate stockpiles shall be constructed in such a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the concrete 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.

403-4.4 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.

403-4.4.1 Material transfer vehicle (MTV). Material transfer Vehicles shall be required due to the improvement in smoothness and decrease in both physical and thermal segregation. To transfer the material from the hauling equipment to the paver, 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**.**

403-4.5 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.

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.

The paver shall be capable of paving to a minimum width specified in paragraph 401-4.11.

The auger screw shall extend to within 10-inches of the end of the screed.

403-4.6 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, 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.

403-4.6.1 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 also supply a qualified technician during all paving operations to calibrate the density 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.

403-4.7 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 material to the mixer at a uniform temperature. The temperature of the 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.

403-4.8 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.

403-4.9 Preparation of asphalt mixture. The aggregates and the asphalt binder shall be weighed or metered and introduced into the mixer 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%.

403-4.10 Application of Prime and Tack Coat. Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

A prime coat in accordance with Item P-602 shall be applied to aggregate base prior to placing the asphalt mixture**.**

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.

403-4.11 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 401-6.2e 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 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 auger screw shall extend to within 10-inches of the end of the screed.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least 1 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.

403-4.12 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**.**

403-4.13 Joints. The formation of all joints shall be made in such a manner as 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 are 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. An asphalt tack coat or other product approved by the RPR 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.

403-4.14 Saw-cut grooving. Saw-cut grooving is not required.

403-4.15 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 minimum of 55 to 60 blades per 12 inches (300 mm) of cutting head width; 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 causes ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted.

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 FAA Item

P-608 or other surface treatment as directed by RPR to all areas that have been subject to grinding.

Grinding and surface treatment shall be at the sole expense of the Contractor.

403-4.16 Nighttime Paving Requirements. The Contractor shall provide adequate lighting during any nighttime construction. 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.

CONTRACTOR QUALITY CONTROL (CQC)

403-5.1 General. The Contractor shall develop a CQCP in accordance with FAA Item C-100. No partial payment will be made for materials that are subject to specific QC requirements without an approved CQCP.

403-5.2 Contractor quality control (QC) facilities. The Contractor shall provide or contract for testing facilities in accordance with FAA 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**.**

403-5.3 Quality Control (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 lot from mechanical analysis of extracted aggregate in accordance with ASTM D5444 and 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 lot in accordance with ASTM C566.

d. Moisture content of asphalt. The moisture content of the asphalt shall be determined once per lot in accordance with AASHTO T329 or ASTM D1461.

e. Temperatures. Temperatures shall be checked, at least four times per lot, 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 "straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot 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 the FAA profile program, ProFAA, 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 and between the start and stop of lanes place 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 will 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 will 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. When placement abuts previously placed material the first measurement shall start with one half the length of the straight edge on the previously placed material.

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 403-4.15 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 FAA Item P-608 or other surface treatment as directed by RPR . 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 the placement of the first lift and then prior to 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 403-4.15.

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 ½ inch and replacing with new material. Skin patching is not allowed.

403-5.4 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.

403-5.5 Control charts. The Contractor shall maintain linear control charts both for individual measurements and range (i.e., difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day shall 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 JMF 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%
Asphalt Content	±0.45%	±0.70%
Minimum VMA	-0.5%	-1.0%

b. Range. Control charts for range shall be established to control process variability for the test parameters and Suspension Limits listed below. The range shall be computed for each lot 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
(n = 2)

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%
Asphalt Content	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 sets of 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.

403-5.6 Quality control (QC) reports. The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with the CQCP described in FAA Item C-100.

MATERIAL ACCEPTANCE

403-6.1. Quality Assurance 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 sublot basis.

(1) Sampling. Material from each sublot 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 60 minutes nor more than 90 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 sublot in accordance with ASTM D3203 for a set of three compacted specimens prepared in accordance with ASTM D6926.

d. In-place asphalt mat and joint density. Each sublot 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 inches (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 sublot 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 sublot 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 sublot. 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 sublot sample by the TMD for that sublot.

(5) Joint density. One core centered over the longitudinal joint shall be taken for each sublot which contains 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.

403-6.2 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, and grade.

b. Air voids. Acceptance of each lot of plant produced material for air voids will be based upon the average air void from the sublots. If the average air voids of the lot are equal to or greater than 2% and equal to or less than 5%, then the lot will be acceptable. If the average is below 2% or greater than 5%, the lot shall be removed and replaced at the Contractor's expense.

c. Mat density. Acceptance of each lot of plant produced material for mat density will be based on the average of all of the densities taken from the sublots. If the average mat density of the lot so established equals or exceeds 94%, the lot will be acceptable. If the average mat density of the lot is below 94%, the lot shall be removed and replaced at the Contractor's expense.

d. Joint density. Acceptance of each lot of plant produced asphalt for joint density will be based on the average of all of the joint densities taken from the sublots. If the average joint density of the lot so established equals or exceeds 92%, the lot will be acceptable. If the average joint density of the lot is less than 92%, the Contractor shall stop production and evaluate the method of compacting joints. Production may resume once the reason for poor compaction has been determined and appropriate measures have been taken to ensure proper compaction.

e. Grade. The final finished surface of the pavement of the completed project 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 longitudinal spacing and at all longitudinal grade breaks. Minimum cross-section grade points shall include grade at centerline, ± 10 feet of centerline**]**, and edge of runway and taxiway pavements.

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 sublot shall not be more than 95%.

403-6.3 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 403-6.1. Only one resampling per lot will be permitted.

(1) A redefined mat density will be calculated for the resampled lot. The number of tests used to calculate the redefined mat density 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 mat density for a resampled lot will be used to evaluate the acceptance of that lot in accordance with paragraph 403-6.2.

c. Outliers. Check for outliers in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded and density determined using the remaining test values.

METHOD OF MEASUREMENT

403-7.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

403-8.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Base Bid:

Item No.	Description	Unit
02403.1	Asphalt Mix Pavement, Surface Course, 4” Thick	Lump Sum

Payment will be made under Additive Alternate A:

Item No.	Description	Unit
02403.A1	Asphalt Mix Pavement, Surface Course, 4” Thick	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.

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-μm (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 C183	Standard Practice for Sampling and the Amount of Testing of Hydraulic Cement
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 Bituminous Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Bituminous Paving Mixtures
ASTM D1074	Standard Test Method for Compressive Strength of Bituminous Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Bituminous Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from 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 D4125	Standard Test Methods for Asphalt Content of Bituminous mixtures by the Nuclear Method
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 D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5581	Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus (6 inch-Diameter Specimen)
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
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 Gyratory 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 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 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)

MS-2	Mix Design Manual, 7th Edition
MS-26	Asphalt Binder Handbook AI State Binder Specification Database

FAA Orders

5300.1	Modifications to Agency Airport Design, Construction, and Equipment Standards

Federal Highway Administration (FHWA)

Long Term Pavement Performance Binder program

Software

FAARFIELD

END OF ITEM P-403

END OF SECTION 02403

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SECTION 02602 - EMULSIFIED ASPHALT PRIME COAT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-602 – Emulsified Asphalt Prime Coat, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the construction of emulsified asphalt prime coat as shown on the Plans.

1.3 REFERENCES:

A. FAA Specification Item P-602 – Emulsified Asphalt Prime Coat as modified herein.

B. Section 02403, Asphalt Mix Pavement, Surface Course.

1.4 SUBMITTALS

Prior to commencing Work in this Section, the Contractor shall submit the following information according to Section 01300, Submittals.

A. Test reports and certificate of compliance for prime coat.

B. Samples of prime coat material.

C. Proposed application rate including residual rate.

PART 2 – PRODUCTS

2.1 PRIME COAT

Prime Coat shall conform to Section 02602 Emulsified Asphalt Prime Coat, FAA Item P-602.

PART 3 – EXECUTION

3.1 PRIME COAT

The Contractor shall apply prime coat in accordance with FAA Specification Item P-602, and as modified herein, to all existing aggregate base surface as shown on the plans.

Prime coat shall be applied if there is the potential for rain event in order provide a protective layer and prevent excessive absorption of moisture, or losing excess moisture before paving.

PART 4 – MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

PART 5 – ATTACHMENTS

5.1 FAA SPECIFICATONS

A. P-602, Emulsified Asphalt Prime Coat

END OF SECTION 02602

ITEM P-602 EMULSIFIED ASPHALT PRIME COAT

DESCRIPTION

602-1.1 This item shall consist of an application of emulsified asphalt material on the prepared base course in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

MATERIALS

602-2.1 Emulsified Asphalt material. The emulsified asphalt material shall be as specified in ASTM D3628 for use as a prime coat appropriate to local conditions. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt material. The COA shall be provided to and approved by the Resident Project Representative (RPR) before the emulsified asphalt material is applied. The furnishing of the COA for the emulsified 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

602-3.1 Weather limitations. The emulsified asphalt prime coat shall be applied only when the existing surface is dry; the atmospheric temperature is 50°F (10°C) or above, and 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.

602-3.2 Equipment. The equipment shall include a self-powered pressure asphalt material distributor and equipment for heating asphalt material.

Provide a distributor with pneumatic tires of such size and number that the load produced on the base surface does not exceed 65.0 psi (4.5 kg/sq cm) of tire width to prevent rutting, shoving or otherwise damaging the base, surface or other layers in the pavement structure. Design and equip the distributor to spray the asphalt material in a uniform coverage at the specified temperature, at readily determined and controlled rates from 0.05 to 1.0 gallons per square yard (0.23 to 4.5 L/square meter), with a pressure range of 25 to 75 psi (172.4 to 517.1 kPa) and with an allowable variation from the specified rate of not more than ±5%, and at variable widths. Include with the distributor equipment a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, adequate heaters for heating of materials to the proper application temperature, a thermometer for reading the temperature of tank contents, and a hand hose attachment suitable for applying asphalt material manually to areas inaccessible to the distributor. Equip the distributor to circulate and agitate the asphalt material during the heating process. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

A power broom and power blower suitable for cleaning the surfaces to which the asphalt coat is to be applied shall be provided.

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.

602-3.3 Application of emulsified asphalt material. Immediately before applying the prime coat, the full width of the surface to be primed shall be swept with a power broom to remove all loose dirt and other objectionable material.

The asphalt emulsion material shall be uniformly applied with an asphalt distributor at the rate of 0.15 to 0.30 gallons per square yard (0.68 to 1.36 liters per square meter) depending on the base course surface texture. The type of asphalt material and application rate shall be approved by the RPR prior to application.

Following application of the emulsified asphalt material and prior to application of the succeeding layer of pavement, allow the asphalt coat to cure and to obtain evaporation of any volatiles or moisture. Maintain the coated surface until the succeeding layer of pavement is placed, by protecting the surface against damage and by repairing and recoating deficient areas. Allow the prime coat to cure without being disturbed for a period of at least 48 hours or longer, as may be necessary to attain penetration into the treated course. Furnish and spread sand to effectively blot up and cure excess asphalt material. The Contractor shall remove blotting sand prior to asphalt concrete lay down operations at no additional expense to the Owner. Keep traffic off surfaces freshly treated with asphalt material. Provide sufficient warning signs and barricades so that traffic will not travel over freshly treated surfaces.

602-3.4 Trial application rates. The Contractor shall apply a minimum of three lengths of at least 100 feet (30 m) for the full width of the distributor bar to evaluate the amount of emulsified asphalt material that can be satisfactorily applied with the equipment. Apply three different application rates of emulsified asphalt materials within the application range specified in paragraph 602-3.3. Other trial applications can be made using various amounts of material as directed by the RPR. The trial application is to demonstrate the equipment can uniformly apply the emulsified asphalt material within the rates specified and determine the application rate for the project.

602-3.5 Freight and waybills. The Contractor shall submit waybills and delivery tickets during the progress of the work. Before the final estimate 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 AND BASIS OF PAYMENT

602-4.1 Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

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 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-602

END OF SECTION 02602

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SECTION 02603 – EMULSIFIED ASPHALT TACK COAT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-603 – Emulsified Asphalt Tack Coat, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the application of emulsified asphalt tack coat as shown on the Plans.

1.3 REFERENCES:

A. FAA Specification Item P-603 – Emulsified Asphalt Tack Coat as modified herein.

B. Section 02403, Asphalt Mix Pavement, Surface Course.

1.4 SUBMITTALS

Prior to commencing Work in this Section, the Contractor shall submit the following information according to Section 01300, Submittals.

A. Test reports and certificate of compliance for tack coat.

B. Samples of tack coat material.

C. Proposed application rate including residual rate.

PART 2 – PRODUCTS

2.1 TACK COAT

Tack Coat shall conform to Section 02603 Emulsified Asphalt Tack Coat, FAA Item P-603.

PART 3 – EXECUTION

3.1 TACK COAT

The Contractor shall apply tack coat in accordance with FAA Specification Item P-603, and as modified herein, to all existing pavement surfaces both horizontal and at vertical interfaces, and between lifts of asphalt pavement.

PART 4 – MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. P-603, Emulsified Asphalt Tack Coat

END OF SECTION 02603

ITEM P-603 EMULSIFIED ASPHALT TACK COAT

DESCRIPTION

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

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

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.

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 (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.

603-3.3 Application of emulsified asphalt 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.

Note that residual rates are after the evaporation of water and denote the actual amount of emulsified remaining on the surface.

Emulsified Asphalt

Surface Type	Residual Rate, gal/SY	Emulsion Application Bar Rate, gal/SY
New asphalt	0.02-0.05	0.03-0.07
Existing asphalt	0.04-0.07	0.06-0.11
Milled Surface	0.04-0.08	0.06-0.12
Concrete	0.03-0.05	0.05-0.08

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.

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 AND BASIS OF PAYMENT

603-4.1 Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

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

END OF SECTION 02603

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SECTION 02605 - JOINT SEALANT FOR PAVEMENTS

PART 1 – GENERAL

1.1 RELATED SECTIONS:

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-605 – Joint Sealant for Pavements, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the construction of asphalt pavement as shown on the Plans.

1.3 REFERENCES:

A. The FAA Specification Item P-605 – Joint Sealant for Pavements as modified herein.

B. Section 02403, Asphalt Mix Pavement, Surface Course.

1.4 SUBMITTALS

Prior to commencing Work in this Section, the Contractor shall submit the following information according to Section 01300, Submittals.

A. JOINT SEALANT MATERIAL

1. Product information, manufacturer's specification, test reports and certificate of compliance for each type of joint sealant material and back-up material.

2. A certified copy of the manufacturer's instructions shall be furnished prior to commencement of this Work.

3. List and description of the equipment to be used and a statement from the manufacturer of the joint sealant that the proposed equipment is acceptable for installing the specified sealant. All other equipment will be approved by the Engineer prior to use on the project.

PART 2 – PRODUCTS

2.1 JOINT SEALANT

A. Joint sealant and related materials shall conform to FAA Specification Item P-605, and as modified herein.

PART 3 – EXECUTION

3.1 JOINT SEALANT

A. The Contractor shall install joint sealers in accordance with FAA Specification Item P-605, and as modified herein.

PART 4 – MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-605, paragraph 605-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-605, paragraph 605-5.1.

PART 5 – ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. P-605, Joint Sealant for Pavements

END OF SECTION 02605

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; and cracks in existing pavement.

MATERIALS

605-2.1 Joint sealants. Joint sealant materials shall meet the requirements of ASTM D6690 Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

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% ± 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.

When used with Item P-606, such as light can installation, Item P-605 shall not be applied until the P-606 has fully cured.

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, **15** 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. Concrete saw. Provide a self-propelled power saw, with water-cooled diamond or abrasive saw blades, for cutting joints to the depths and widths specified.

c. Sandblasting equipment. Sandblasting is not allowed.

d. Waterblasting equipment. The Contractor must demonstrate waterblasting equipment including the pumps, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

e. 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.

f. 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.

g. Cold-applied, single-component sealing equipment. Not used

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 waterblaster 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 **1/8-inch (3 mm) ±1/16 inch (2 mm)** 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 All work under this section will not be measured for payment.

BASIS OF PAYMENT

605-5.1 Items covered by this section will be paid by an allowance.

For ALLOWANCE items in the Proposal Schedule, the allowance is an estimate and the amount shall not exceed the maximum amount shown in the Proposal Schedule. Payment shall be the actual cost as invoiced by the Contractor and approved by the DOTA Engineer. The Contractor shall be allowed to include overhead, profit, insurance and/or other mark-ups, as stipulated in Section 9.5 of the 2016 General Provisions for Construction Projects, Air and Water Transportation Facilities Divisions.

In the event that a Bid Item is not used during construction, the Contractor is not eligible to receive any payment under the Bid item.

Payment will be made under Base Bid:

Item No.	Description	Unit
02605.1	Clean and Fill Existing Cracks, 0.5” to 1.5” Wide	Allowance

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

END OF ITEM P-605

END OF SECTION 02605

SECTION 02608 – EMULSIFIED ASPHALT SEAL COAT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-608 – Emulsified Asphalt Seal Coat, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the construction of Emulsified Asphalt Seal Coat as shown on the Plans.

1.3 REFERENCES:

A. FAA Specification Item P-608 – Emulsified Asphalt Seal Coat as modified herein.

B. Section 02403, Asphalt Mix Pavement, Surface Course.

1.4 SUBMITTALS

Prior to commencing Work in this Section, the Contractor shall submit the following information according to Section 01300, Submittals.

A. Test reports and certificate of compliance for aggregate material.

B. Test reports and certificate of compliance for asphalt emulsion material.

C. Test reports and certificate of compliance for polymer material.

D. Proposed application rate including residual rate.

E. Friction test data as required by FAA Item P-608.

PART 2 – PRODUCTS

2.1 SEAL COAT

Seal Coat shall conform to Section 02608 Emulsified Asphalt Seal Coat, FAA Item P-608.

PART 3 – EXECUTION

3.1 SEAL COAT

A. The Contractor shall apply seal coat in accordance with FAA Specification Item P-608, and as modified herein, to the existing pavement surfaces shown on the plans or damaged by the Contractor or as directed by the Engineer.

PART 4 - MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-608, paragraph 608-7.1.

PART 5 - MEASUREMENT AND PAYMENT

5.1 FAA SPECIFICATIONS

A. P-608, Emulsified Asphalt Seal Coat.

END OF SECTON 02608

ITEM P-608 EMULSIFIED ASPHALT SEAL COAT

DESCRIPTION

608-1.1 This item shall consist of the application of a emulsified asphalt surface treatment composed of an emulsion of natural and refined asphalt materials, water and a polymer additive, for taxiways and runways with the application of a suitable aggregate to maintain adequate surface friction; and airfield secondary and tertiary pavements including low-speed taxiways, shoulders, overruns, roads, parking areas, and other general applications with or without aggregate applied as designated on the plans. The terms seal coat, asphalt sealer, and asphalt material are interchangeable throughout this specification. The term emulsified asphalt means an emulsion of natural and refined asphalt materials.

MATERIALS

608-2.1 Aggregate. The aggregate material shall be a dry, clean, dust and dirt free, sound, durable, angular shaped manufactured specialty sand, such as that used as an abrasive, with a Mohs hardness of 6 to 8. The Contractor shall submit the specialty sand manufacturer's technical data and a manufacturer's Certificate of Analysis (COA) indicating that the specialty sand meets the requirements of the specification to the RPR prior to start of construction. The sand must be approved for use by the RPR and shall meet the following gradation limits when tested in accordance with ASTM C136 and ASTM C117:

Aggregate Material Gradation Requirements[1]

Sieve Designation (square openings)	Individual Percentage Retained by Weight
No. 10 (2.00 mm)	0
No. 14 (1.41 mm)	0-4
No. 16 (1.18 mm)	0-8
No. 20 (850 µm)	0-35
No. 30 (600 µm)	20-50
No. 40 (425 µm)	10-45
No. 50 (300 µm)	0-20
No. 70 (212 µm)	0-5
No. 100 (150 µm)	0-2
No. 200 (75 µm)	0-2

[1] Locally available sand or abrasive material that is slightly outside of the gradation requirements may be approved by the RPR with concurrence by the seal coat manufacturer for the use of locally available sand or abrasive material. The RPR and manufacturer's field representative should verify acceptance during application of Control strips indicated under paragraph 608-3.2.

The Contractor shall provide a certification showing particle size analysis and properties of the material delivered for use on the project. The Contractor's certification may be subject to verification by testing the material delivered for use on the project.

608-2.2 Asphalt Emulsion. The asphalt emulsion shall meet the properties in the following table:

Concentrated Asphalt Emulsion Properties

Properties	Specification	Limits
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	20 – 100 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	57% minimum
Sieve Test	ASTM D6933	0.1% maximum
24-hour Stability	ASTM D6930	1% maximum
5-day Settlement Test	ASTM D6930	5.0% maximum
Particle Charge [1]	ASTM D7402	Positive 6.5 maximum pH

[1] pH may be used in lieu of the particle charge test which is sometimes inconclusive in slow setting, asphalt emulsions.

The asphalt material base residue shall contain not less than 20% gilsonite, or uintaite and shall not contain any tall oil pitch or coal tar material and shall contain no less than one percent (1%) polymer.

Tests on Residue from Distillation or Evaporation

Properties	Specification	Limits
Viscosity at 275°F (135°C)	ASTM D4402	1750 cts maximum
Solubility in 1, 1, 1 trichloroethylene	ASTM D2042	97.5% minimum
Penetration	ASTM D5	50 dmm maximum
Asphaltenes	ASTM D2007	15% minimum
Saturates	ASTM D2007	15% maximum
Polar Compounds	ASTM D2007	25% minimum
Aromatics	ASTM D2007	15% minimum

The asphalt emulsion, when diluted in the volumetric proportion of one part concentrated asphalt material to one part hot water shall have the following properties:

One-to-One Dilution Emulsion Properties

Properties	Specification	Limits
In Ready-to-Apply Form, one part concentrate to one part water, by volume		
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	5 – 50 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	28.5% minimum
Pumping Stability [1]		Pass

[1] Pumping stability is tested by pumping one pint (475 ml) of seal coat diluted one (1) part concentrate to one (1) part water, at 77°F (25°C), through a 1/4-inch (6 mm) gear pump operating 1750 rpm for 10 minutes with no significant separation or coagulation.

Two-to-One Dilution Emulsion Properties

Properties	Specification	Limits
In Ready-to-Apply Form, two parts concentrate to one part water, by volume		
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	5 – 50 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	38% minimum
Pumping Stability [1]		Pass

[1] Pumping stability is tested by pumping one pint (475 ml) of seal coat diluted one (1) part concentrate to one (1) part water, at 77°F (25°C), through a 1/4-inch (6 mm) gear pump operating 1750 rpm for 10 minutes with no significant separation or coagulation.

The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt delivered to the project. If the asphalt emulsion is diluted at other than the manufacturer's facility, the Contractor shall provide a supplemental COA from an independent laboratory verifying the asphalt emulsion properties.

The COA shall be provided to and approved by the RPR before the emulsified asphalt is applied. The furnishing of the vendor's certified test report 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.

The asphalt material storage and handling temperature shall be between 50°F - 160°F (10°C - 70°C) and the material shall be protected from freezing, or whenever outside temperature drops below 40°F (4°C) for prolonged time periods.

Contractor shall provide a list of airport pavement projects, exposed to similar climate conditions, where this product has been successfully applied within at least 5 years of the project.

608-2.3 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use. Water used in making and diluting the emulsion shall be potable, with a maximum hardness of 90ppm calcium and 15ppm magnesium; deleterious iron, sulfates, and phosphates maximum 7ppm, and less than 1ppm of organic byproducts. Water shall be a minimum of 140°F (60°C) prior to adding to emulsion.

608-2.4 Polymer. The polymer shall meet the properties in the following table:

Polymer Properties

Properties	Limits
Solids Content	47% to 65%, Percent by Weight
Weight	8.0 to 9.0 pounds/gallon (1.07 to 1.17 kg/L)
pH	3.0 to 8.0
Particle Charge	Nonionic/Cationic
Mechanical Stability	Excellent
Film Forming Temperature, °C	+5°C, minimum
Tg, °C	22°C, maximum

The manufacturer shall provide a copy of the Certificate of Analysis (COA) for the polymer used in the seal coat; and the Contractor shall include the COA with the emulsified asphalt COA when submitting to the RPR.

608-2.5 Seal Coat with Aggregate. The Contractor shall submit friction test data from no less than three of the airport projects identified under 608-2.2. The test data must be from the same project and include technical details on application rates, aggregate rates, and point of contact at the airport to confirm use and success of sealer with aggregate.

Friction test data in accordance with AC 150/5320-12, at 40 or 60 mph (65 or 95 km/h) wet, must include as a minimum; the friction value prior to sealant application; two values, between 24 and 96 hours after application, with a minimum of 24 hours between tests; and one value between 180 days and 360 days after the application. The results of the tests between 24 and 96 hours shall indicate friction is increasing at a rate to obtain similar friction value of the pavement surface prior to application, and the long-term test shall indicate no apparent adverse effect with time relative to friction values and existing pavement surface.

Seal coat material submittal without required friction performance will not be approved. Friction tests performed on this project cannot be used as a substitute of this requirement.

COMPOSITION AND APPLICATION RATE

608-3.1 Application Rate. The approximate amounts of materials per square yard (square meter) for the asphalt surface treatment shall be as provided in the table for the treatment area(s) at the specified dilution rate(s) as noted on the plans. The actual application rates will vary within the range specified to suit field conditions and will be recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation.

Application Rate

Dilution Rate	Quantity of Emulsion gal/yd^2 (l/m^2)	Quantity of Aggregate lb/yd^2 (kg/m^2)
1:1	0.10-0.17 (0.45-0.77)	0.20-0.50 (0.11-0.27)

608-3.2 Control areas and control strips. Prior to full application, the control strip must be accepted by the RPR. The surface preparation, personnel, equipment, and method of operation used on the test area(s) and control strip(s) shall be the same as used on the remainder of the work.

A qualified manufacturer's representative shall be present in the field to assist the Contractor in applying control areas and/or control strips to determine the appropriate application rate of both emulsion and aggregate to be approved by the RPR.

A test area(s) and control strip(s) shall be applied for each differing asphalt pavement surface identified in the project. The test area(s) and control strip(s) shall be used to determine the material application rate(s) of both emulsion and sand prior to full production.

a. For taxiway, taxilane and apron surfaces. Prior to full application, the Contractor shall place test areas at varying application rates as recommended by the Contractor's manufacturer's representative to determine appropriate application rate(s). The test areas will be located on representative section(s) of the pavement to receive the asphalt surface treatment designated by the RPR.

b. For runway and high-speed exit taxiway surfaces. Prior to full application, the Contractor shall place a series of control strips a minimum of 300 feet (90 m) long by 12 feet (3.6 m) wide, or width of anticipated application, whichever is greater, at varying application rates as recommended by the manufacturer's representative and acceptable to the RPR to determine appropriate application rate(s). The control strips should be separated by a minimum of 200 feet between control strips. The area to be tested will be located on a representative section of the pavement to receive the asphalt surface treatment designated by the RPR. The control strips should be placed under similar field conditions as anticipated for the actual application. The skid resistance of the existing pavement shall be determined for each control strip with a continuous friction measuring equipment (CFME). The skid resistance of existing pavement can be immediately adjacent to the control strip or at the same location as the control strip if testing prior to application. The Contractor may begin testing the skid resistance of runway and high-speed exit taxiway control strips after application of the asphalt surface treatment has fully cured, generally 8 to 36 hours after application of the control strips depending on site and environmental conditions. Aircraft shall not be permitted on the runway or high speed exit taxiway control strips until such time as the Contractor validates that its surface friction meets the maintenance planning friction levels in AC 150/5320-12, Table 3-2 when tested at speeds of 40 and 60 mph (65 and 95 km/h) wet with approved CFME.

If the control strip should prove to be unsatisfactory, necessary adjustments to the application rate, placement operations, and equipment shall be made. Additional control strips shall be placed and additional skid resistance tests performed and evaluated. Full production shall not begin without the RPR's approval of an appropriate application rate(s). Acceptable control strips shall be paid for in accordance with paragraph 608-8.1.

CONSTRUCTION METHODS

608-4.1 Worker safety. The Contractor shall obtain a Safety Data Sheet (SDS) for both the asphalt emulsion product and sand and require workmen to follow the manufacturer's recommended safety precautions.

608-4.2 Weather limitations. The asphalt emulsion shall be applied only when the existing pavement surface is dry and when the weather is not foggy, rainy, or when the wind velocity will prevent the uniform application of the material. No material shall be applied in strong winds that

interfere with the uniform application of the material(s), or when dust or sand is blowing or when rain is anticipated within eight (8) hours of application completion. The atmospheric temperature and the pavement surface temperature shall both be at, or above 60°F (16°C) and rising. Seal coat shall not be applied when pavement temperatures are expected to exceed 130ºF within the subsequent 72 hours if traffic will be opened on pavement within those 72 hours. During application, account for wind drift. Cover existing buildings, structures, runway edge lights, taxiway edge lights, informational signs, retro-reflective marking and in-pavement duct markers as necessary to protect against overspray before applying the emulsion. Should emulsion get on any light or marker fixture, promptly clean the fixture. If cleaning is not satisfactory to the RPR, the Contractor shall replace any light, sign or marker with equivalent equipment at no cost to the Owner.

608-4.3 Equipment and tools. The Contractor shall furnish all equipment, tools, and machinery necessary for the performance of the work.

a. Pressure distributor. 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. The Contractor will provide verification of truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application per nozzle manufacturer, spray-bar height and pressure and pump speed appropriate for the viscosity and temperature of sealer material, 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 12-foot (3.7-m), minimum, spray bar with individual nozzle control. The distributor truck shall be capable of specific application rates in the range of 0.05 to 0.25 gallons per square yard (0.15 to 0.80 liters per square meter). These rates shall be computer-controlled rather than mechanical. 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.

The distributor truck shall effectively heat and mix the material to the required temperature prior to application in accordance with the manufacturer’s recommendations.

The distributor shall be equipped with a hand sprayer to spray the emulsion in areas not accessible to the distributor truck.

b. Aggregate spreader. The asphalt distributor truck will be equipped with an aggregate spreader mounted to the distributor truck that can apply sand to the emulsion in a single pass operation without driving through wet emulsion. The aggregate spreader shall be equipped with a variable control system capable of uniformly distributing the sand at the specified rate at varying application widths and speeds. The aggregate spreader must be adjusted to produce an even and accurate application of specified aggregate. Prior to any seal coat application, the aggregate spreader will be calibrated onsite to ensure acceptable uniformity of spread. The RPR will observe the calibration and verify the results. The aggregate spreader will be re-calibrated each time the aggregate rate is changed either during the application of test strips or production. The Contractor may consult the seal coat manufacturer representative for procedure and guidance. The sander shall have a minimum hopper capacity of 3,000 pounds (1361 kg) of sand.

Push-type hand sanders will be allowed for use around lights, signs and other obstructions, if necessary.

c. Power broom/blower. A power broom and/or blower shall be provided for removing loose material from the surface to be treated.

d. Equipment calibration. Asphalt distributors must be calibrated within the same construction season 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.

608-4.4 Preparation of asphalt pavement surfaces. Clean pavement surface immediately prior to placing the seal coat so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease from the asphalt pavement by scrubbing with a detergent, washing thoroughly with clean water, and then treat these areas with a spot primer. Any additional surface preparation, such as crack repair, shall be in accordance with Item P-101, paragraph 101-3.6.

a. New asphalt pavement surfaces. Allow new asphalt pavement surfaces to cure so that there is no concentration of oils on the surface.

Perform a water-break-free test to confirm that the surface oils have degraded and dissipated. (Cast approximately one gallon (4 liters) of clean water out over the surface. The water should sheet out and wet the surface uniformly without crawling or showing oil rings.) If signs of crawling or oil rings are apparent on the pavement surface, additional time must be allowed for additional curing and retesting of the pavement surface prior to treatment.

608-4.5 Emulsion mixing. The application emulsion shall be obtained by blending asphalt material concentrate, water and polymer, if specified. Always add heated water to the asphalt material concentrate, never add asphalt material concentrate to heated water. Mix one part heated water to one part asphalt material concentrate, by volume.

Add 1% polymer, by volume, to the emulsion mix. If the polymer is added to the emulsion mix at the plant, submit weight scale tickets to the RPR. As an option, the polymer may be added to the emulsion mix at the job site provided the polymer is added slowly while the asphalt distributor truck circulating pump is running. The mix must be agitated for a minimum of 15 minutes or until the polymer is mixed to the satisfaction of the RPR.

608-4.6 Application of asphalt emulsion. The asphalt emulsion shall be applied using a pressure distributor upon the properly prepared, clean and dry surface at the application rate recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation for each designated treatment area. The asphalt emulsion should be applied at a temperature between 130°F (54°C) and 160°F (70°C) or in accordance with the manufacturer's recommendation.

If low spots and depressions greater than 1/2 inch (12 mm) in depth in the pavement surface cause ponding or puddling of the applied materials, the pavement surface shall be lightly broomed with a broom or brush type squeegee until the pavement surface is free of any pools of excess material.

During all applications, the surfaces of adjacent structures shall be protected to prevent their being spattered or marred.

608-4.7 Application of aggregate material. Immediately following the application of the asphalt emulsion, friction sand at the rate recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation for each designated application area,

shall be spread uniformly over the asphalt emulsion in a single-pass operation simultaneous with the sealer application. The aggregate shall be spread to the same width of application as the asphalt material and shall not be applied in such thickness as to cause blanketing.

Sprinkling of additional aggregate material, and spraying additional asphalt material over areas that show up having insufficient cover or bitumen, shall be done by hand whenever necessary. In areas where hand work is necessitated, the sand shall be applied before the sealant begins to break.

Minimize aggregate from being broadcast and accumulating on the untreated pavement adjacent to an application pass. Prior to the next application pass, the Contractor shall clean areas of excess or loose aggregate and remove from project site.

QUALITY CONTROL (QC)

608-5.1 Manufacturer's representation. The manufacturer's representative knowledgable of the material, procedures, and equipment described in the specification is responsible to assist the Contractor and RPR in determining the appropriate application rates of the emulsion and aggregate, as well as recommendations for proper preparation and start-up of seal coat application. Documentation of the manufacturer representative's experience and knowledge for applying the seal coat product shall be furnished to the RPR a minimum of 10 work days prior to placement of the control strips. The cost of the manufacturer's representative shall be included in the Contractor's bid price.

608-5.2 Contractor qualifications. The Contractor shall provide documentation to the RPR that the seal coat Contractor is qualified to apply the seal coat, including personnel, and equipment, and has made at least three (3) applications similar to this project in the past two (2) years.

MATERIAL ACCEPTANCE

608-6.1 Application rate. The rate of application of the asphalt emulsion shall be verified at least twice per day.

608-6.2 Friction tests. Friction tests in accordance with AC 150/5320-12, Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces, shall be performed on all runway and high-speed taxiways that received a seal coat. Each test includes performing friction tests at 40 mph and 60 mph (65 or 95 km/h) both wet, 15 feet (4.5 m) to each side of runway centerline with approved continuous friction measuring equipment (CFME). The Contractor shall coordinate testing with the RPR and provide the RPR a written report of friction test results. The RPR shall be present for testing.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

608-7.1 Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

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-μm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D5	Standard Test Method for Penetration of Asphalt Materials
ASTM D244	Standard Test Methods and Practices for Emulsified Asphalts
ASTM D2007	Standard Test Method for Characteristic Groups in Rubber Extender and Processing Oils and Other Petroleum-Derived Oils by the Clay-Gel Absorption Chromatographic Method
ASTM D2042	Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene
ASTM D2995	Standard Practice for Estimating Application Rate of Bituminous Distributors
ASTM D4402	Standard Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
ASTM D5340	Standard Test Method for Airport Pavement Condition Index Surveys

Advisory Circulars (AC)

AC 150/5320-12	Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces
AC 150/5320-17	Airfield Pavement Surface Evaluation and Rating (PASER) Manuals
AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements

END OF ITEM P-608

END OF SECTION 02608

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SECTION 02610 - CONCRETE FOR MISCELLANEOUS STRUCTURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-610 - Concrete For Miscellaneous Structures, as included as an attachment to this Section.

1.2 SUMMARY

A. The Work under this Section consists of plain and/or reinforced concrete for airfield signage and light can bases, NAVAID foundations, drainage structures, retaining walls, and other miscellaneous airfield concrete structures other than airfield pavements prepared and constructed as shown on the Plans and as specified herein.

B. The Work under this Section also consists of plain and/or reinforced High Early Strength (HES) cement concrete, prepared and constructed in accordance with these specifications, where the conditions required for early opening of runway, taxiway, and other construction areas for traffic movement, and of the form and dimensions shown on the plans.

1.4 REFERENCES

A. FAA Specification Item P-610 – Concrete For Miscellaneous Structures as modified herein.

B. Section 02751, Manholes, Catch Basins, Inlets and Inspection Holes.

C. Unless stated otherwise, the Work of this Section shall be in accordance with the Concrete Reinforcing Steel Institute (CRSI) “Manual of Standard Practice”.

D. For anchor bolts, reference American Institute of Steel Construction (AISC) Code of Standard Practice for Steel Buildings and Bridges.

1.5 SUBMITTALS

Prior to commencing the Work of this Section, the Contractor shall submit the following information according to Section 01300, Submittals.

A. Structural Portland Cement Concrete mix design and test results for each batch plant in conformance with FAA Specification Item P-610, with test reports. Submit alternate design mixtures when characteristics of materials, weather, test results, or

other circumstances warrant adjustments. The Contractor shall submit all copies of test results to the Engineer for review. These shall include retests for items that failed initial testing.

B. Aggregates and materials used in the mix designs, including test reports, product samples, and as required by the Engineer.

C. Steel reinforcement and dowel bars.

1.6 DEFECTIVE WORK.

A. Any work performed under this section which fails to meet the requirements stated herein will be considered defective and shall be removed and replaced at the Contractor's expense. Additional testing methods will not be allowed. Destructive testing of the field placed concrete will not be allowed.

PART 2 – PRODUCTS

2.1 STRUCTURAL CONCRETE

Concrete for Miscellaneous Structures shall conform to FAA Specification Item P-610, and as modified herein.

2.2 HIGH EARLY STRENGTH CONCRETE

Cement for High Early Strength (HES) cement concrete shall be one of the following:

A. Portland cement conforming to the requirements of ASTM C150 - Type III.

B. Use of proprietary rapid-setting cementitious grout meeting the requirements of ASTM C1107.

C. Grout shall be rapid-hardening, non-shrink grout.

D. A combination of the above.

2.3 STEEL REINFORCEMENT

Reinforcing Bars shall be ASTM A 184 or A 704 bar nuts.

2.4 REINFORCEMENT ACCESSORIES

Bar supports, including bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete shall be, as according to CRSI's Manual of Standard Practice, or greater compressive strength than concrete.

2.5 FABRICATING REINFORCEMENT

The Contractor shall ensure that steel reinforcement is fabricated as according to CRSI's Manual of Standard Practice.

PART 3 – EXECUTION

3.1 CONCRETE PLACEMENT

The Contractor shall mix and place poured concrete in accordance with FAA Specification Item P-610, as modified herein, and as shown on the Plans.

Where High Early Strength (HES) concrete is called for in the Drawings or Specifications, the minimum compressive strength shall be 3,000 psi prior to the opening of the work to traffic within the active runway and taxiway areas.

3.2 EMBEDDED ITEMS

The Contractor shall:

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions and directions furnished with items to be embedded.

B. Install anchor bolts, accurately located, to elevations required, and complying with tolerances in Section 7.5 of AISC's Code of Standard Practice for Steel Buildings and Bridges.

3.3 STEEL REINFORCEMENT

The Contractor shall comply with CRSI's Manual of Standard Practice for placing reinforcement. In particular, the Contractor shall:

A. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

B. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcement bars.

C. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

PART 4 – MEASUREMENT AND PAYMENT

5.1 METHOD OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

PART 5 – ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. P-610, Concrete for Miscellaneous Structures.

END OF SECTION 02610

ITEM P-610 CONCRETE FOR MISCELLANEOUS STRUCTURES

DESCRIPTION

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.

MATERIALS

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 Resident Project Representative (RPR) 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 aggregate and coarse aggregates to be used in all concrete shall have been tested separately within six months of the project in accordance with ASTM C1260. Test results shall be submitted to the RPR. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.08% at 14 days (16 days from casting). If the expansion either or both test specimen is greater than 0.08% at 14 days, but less than 0.20%, a minimum of 25% of Type F fly ash, or between 40% and 55% of slag cement shall be used in the concrete mix.

If the expansion is greater than 0.20%, the aggregates shall not be used, and test results for other aggregates must be submitted for evaluation; or aggregates that meet P-501 reactivity test requirements may be utilized.

610-2.2 Coarse aggregate. The coarse aggregate for concrete shall meet the requirements of ASTM C33 and the requirements of Table 4, Class Designation 5S; and the grading requirements shown below, as required for the project.

Coarse Aggregate Grading Requirements

Maximum Aggregate Size	ASTM C33, Table 3 Grading Requirements (Size No.)
1 1/2 inch (37.5 mm)	467 or 4 and 67
1 inch (25 mm)	57
¾ inch (19 mm)	67
½ inch (12.5 mm)	7

610-2.2.1 Coarse Aggregate susceptibility to durability (D) cracking.

Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted.

610-2.3 Fine aggregate. The fine aggregate for concrete shall meet all fine aggregate requirements of ASTM C33.

610-2.4 Cement. Cement shall conform to the requirements of ASTM C150 Type I or II.

610-2.5 Cementitious materials.

a. Fly ash. Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash shall have a Calcium Oxide (CaO) content of less than 15% and a total available alkali content less than 3% per ASTM C311. Fly ash produced in furnace operations using liming materials or soda ash (sodium carbonate) as an additive shall not be acceptable. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the RPR.

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.

610-2.6 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

610-2.7 Admixtures. The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the RPR 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 RPR 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.

a. Air-entraining admixtures. 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.

b. Water-reducing admixtures. 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.

c. Other chemical admixtures. The use of set retarding, and set-accelerating admixtures shall be approved by the RPR. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

610-2.8 Premolded joint material. Premolded joint material for expansion joints shall meet the requirements of ASTM D1751.

610-2.9 Joint filler. The filler for joints shall meet the requirements of Item P-605, unless otherwise specified.

610-2.10 Steel reinforcement. Reinforcing shall consist of Bar Mats conforming to the requirements of ASTM A184 or ASTM A704.

610-2.11 Materials for curing concrete. Curing materials shall conform to White-pigmented Liquid Membrane-Forming Compound, Type 2, Class B per ASTM C309.

CONSTRUCTION METHODS

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 here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the RPR.

610-3.2 Concrete Mixture. Unless otherwise notes 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 C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard (280 kg per cubic meter). The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches (100 mm) as determined by ASTM C143.

The concrete for the retaining walls shall develop a compressive strength of 5,000 psi in 28 days as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39.

610-3.3 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 C94 or ASTM C685.

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 the RPRs approval. If approval 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 expense.

After leaving the concrete plant, retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

610-3.4 Forms. Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the RPR. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as shown 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 surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes. The Contractor shall be responsible for their adequacy.

The internal form ties shall be arranged so no metal will show in the concrete surface or discolor the surface when exposed to weathering when the forms are removed. All forms shall be wetted with water or with a non-staining mineral oil, which shall be applied immediately before the concrete is placed. Forms shall be constructed so they can be removed without injuring the concrete or concrete surface.

610-3.5 Placing reinforcement. All reinforcement shall be accurately placed, as shown on the plans, and shall be firmly held in position during concrete placement. 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.

610-3.6 Embedded items. Before placing concrete, all embedded items shall be firmly and securely fastened in place as indicated. All embedded items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The concrete shall be spaded and consolidated around and against embedded items. The embedding of wood shall not be allowed.

610-3.7 Concrete Consistency. The Contractor shall monitor the consistency of the concrete delivered to the project site; collect each batch ticket; check temperature; and perform slump tests on each truck at the project site in accordance with ASTM C143.

610-3.8 Placing concrete. All concrete shall be placed during daylight hours, unless otherwise approved. The concrete shall not be placed until the depth and condition of foundations, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved by the RPR. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet (1.5 m). Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation.

610-3.9 Vibration. Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

610-3.10 Joints. Joints shall be constructed as indicated on the plans.

610-3.11 Finishing. All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

610-3.12 Curing and protection. All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance.

610-3.13 Cold weather placing. When concrete is placed at temperatures below 40°F (4°C), follow the cold weather concreting recommendations found in ACI 306R, Cold Weather Concreting.

610-3.14 Hot weather placing. When concrete is placed in hot weather greater than 85ºF (30 ºC), follow the hot weather concreting recommendations found in ACI 305R, Hot Weather Concreting.

QUALITY ASSURANCE (QA)

610-4.1 Quality Assurance sampling and testing. Concrete for each day's placement will be accepted on the basis of the compressive strength specified in paragraph 610-3.2. The RPR will sample the concrete in accordance with ASTM C172; test the slump in accordance with ASTM C143; test air content in accordance with ASTM C231 make and cure compressive strength specimens in accordance with ASTM C31; and test in accordance with ASTM C39. The QA testing agency will meet the requirements of ASTM C1077.

The Contractor shall provide adequate facilities for the initial curing of cylinders.

610-4.2 Defective work. Any defective work that cannot be satisfactorily repaired as determined by the RPR, shall be removed and replaced at the Contractor's expense. Defective work includes, but is not limited to, not achieving the minimum specified strength at 28-days using the procedures of ASTM C31 and ASTM C39, uneven dimensions, honeycombing and other voids on the surface or edges of the concrete.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

610-5.1 Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

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 A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

American Concrete Institute (ACI)

ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 308R	Guide to External Curing of Concrete
ACI 309R	Guide for Consolidation of Concrete

END OF ITEM P-610

END OF SECTION 02610

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SECTION 02620 - RUNWAY AND TAXIWAY MARKING

PART - 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-620 – Runway and Taxiway Marking, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes laying out, furnishing and installing temporary and permanent pavement striping and markings for the runways, taxiways, and other airfield pavement surfaces, including glass beads and pavement markings. In addition, pavements damaged during paint and striping removals shall be repaired with an asphalt seal coat.

1.3 REFERENCES

A. FAA Specification Item P-620 – Runway and Taxiway Marking, as modified herein.

B. Section 02403, Asphalt Mix Pavement, Base and Surface Course.

C. FAA Advisory Circular (AC) 150/5340-1M, Change 1, Standards for Airport Markings

D. Federal Specifications TT-P-1952F, and TT-B-1325D.

1.4 SUBMITTALS

Prior to commencing the Work in this Section, the Contractor shall submit the following information according to Section 01300, Submittals.

A. Pavement Paint Removal Plan including the following:

1. Descriptions of the proposed method of accomplishing the pavement paint removal.

2. Descriptions of the proposed equipment.

B. Pavement Painting Materials Product Information including the following:

1. Certificates of Compliance: Paint material information and application requirements

2. Manufacturer’s specifications and certifications of compliance for pavement paint

3. Manufacturer’s specifications and certifications of compliance for pavement beads

C. Certification of Pavement Surface Preparation

D. Elevated taxiway retro-reflector and bonding material

PART - 2 PRODUCTS

2.1 MATERIALS

A. Paint shall conform to FAA Specification Item P-620, and as modified herein.

B. Reflective media (glass beads) shall conform to FAA Specification Item P-620, and as modified herein.

C. Retro-reflective taxiway edge markings shall be in accordance with FAA L-853 Type 2, and FAA AC150/5345-39.

PART - 3 EXECUTION

3.1 APPLICATION

A. The Contractor shall apply markings and striping at locations shown on the Plans, in conformance with FAA Specification Item P-620, and as modified herein.

B. The application rates for permanent and temporary markings shall be as per Table 1, Marking Materials in Paragraph 620-2.2 of FAA Specification Item P-620.

C. All pavement markings shall include a 6” wide minimum black border on existing and new asphalt pavements.

3.2 PAINT REMOVAL

The Contractor shall remove markings and striping by water blasting or other methods approved by the Engineer.

A. Protection of Pavement: The Contractor shall take all necessary care to protect existing pavement, center line and other lights, and electrical circuits embedded in pavement (direct burial cables have been sealed in the pavement with an epoxy material). Should the Engineer determine that damage or excess site erosion results from Contractor's operations, the Engineer will direct the Contractor to perform

additional work or revised procedures as necessary for adequate protection of pavement, at no extra cost to the HDOTA.

B. Non-Propagation of Existing Defects: The Contractor shall be aware of existing minor pavement defects and patches, including cracks, slurry seal coatings and patches, etc. The Contractor is obligated to protect such areas from further damage and may be held liable for all damages caused by inappropriate operation of the water blasting equipment.

C. Removal Equipment: Removal equipment shall be an ultra-high pressure water blasting unit with an estimated maximum pressure of between 10,000 psi and 40,000 psi, with variable pressure control and vacuum recovery.

D. Clean-Up: The Contractor shall insure that any residue from the removal operation is removed in a manner acceptable to the Engineer.

3.3 EMULSIFIED ASPHALT SEALCOAT

The Contractor shall apply emulsified asphalt sealcoat in areas where markings and striping have been removed by high-pressure water, and shall comply with FAA Specification Item P-608 under Section 02608, and as modified herein.

PART - 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-620, paragraph 620-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-620, paragraph 620-5.1.

PART - 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. P-620, Runway and Taxiway Marking

END OF SECTION 02620

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ITEM P-620 RUNWAY AND TAXIWAY MARKING

DESCRIPTION

620-1.1 This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). The terms “paint” and “marking material” as well as “painting” and “application of markings” are interchangeable throughout this specification.

Two (2) coats of paint is required for pavement markings on the new asphalt pavement and seal coat. The initial coat shall be placed after the completion of paving operation or after seal coat has cured, and prior to reopening of the runway/taxiways to aircraft operations. A period of 30 days shall elapse before the application of second coat of paint. Both coats of paint shall have glass beads.

One (1) coat of paint is required for refreshing existing pavement markings or for temporary markings. Refreshing existing markings and temporary markings shall have glass beads.

MATERIALS

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 Resident Project Representative (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.

620-2.2 Marking materials.

Table 1. Marking Materials

Paint[1]				Glass Beads[2]	
Type	**Color**	**Fed Std. 595 Number**	**Application Rate Maximum**	**Type**	**Application Rate Minimum**
Permanent Airfield Waterborne Type II	White	37925	115 ft^2/gal	Type III	10 lb/gal
Permanent Airfield Waterborne Type II	Yellow	33538 or 33655	115 ft^2/gal	Type III	10 lb/gal
Permanent Airfield Waterborne Type II	Red	31136	115 ft^2/gal	Type IA	5 lb/gal
Permanent Airfield Waterborne Type II	Black	37038	115 ft^2/gal	No beads	No beads
Permanent Roadway Waterborne Type II	White	37925	115 ft^2/gal	Type IA	7 lb/gal

[1] See paragraph 620-2.2a

[2] See paragraph 620-2.2b

a. Paint. Paint shall be 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.

b. Reflective media. Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D Type I, Gradation A or Type III as shown in Table 1.

Glass beads for red and pink paint shall meet the requirements for Type I, Gradation A

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 and green paint.

Type III glass beads shall not be used in red and pink paint.

CONSTRUCTION METHODS

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.

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.

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.

For areas designated on the Plans to remove existing pavement markings, obliterate 95% of the existing paint markings, and remove foreign substances/contaminates from existing pavement that will affect the bond of the new paint including at least 90% of rubber deposits.

Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of pavement causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the RPR that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the RPR.

No material shall be deposited on the pavement shoulders or infield areas. All wastes shall be immediately collected and disposed-of off airport property.

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.

620-3.4 Layout of markings. The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the plans.

620-3.5 Application. First coat of markings shall be painted to allow reopening of the runway or taxiway. A period of 30 days shall elapse between placement of surface course or seal coat and application of the second coat of paint markings. 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.

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

Dimension and Spacing	Tolerance
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)

Pavement markings or striping with edges that undulate or wavy are not acceptable.

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.

New permanent markings are comprised of a first coat of markings at the application rate shown in Table 1 with glass beads; then a second coat of markings at the application rate shown in Table 1 with glass beads. The second paint coat is applied after the period of time as indicated under Paragraph 620-3.5. The first and second coats of paint are considered as one application of the markings for payment.

Refresh or re-painting of existing markings shall be a single coat applied with application rate shown in Table 1 with glass beads.

620-3.6 Application--preformed thermoplastic airport pavement markings.

Preformed thermoplastic pavement markings not used.

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.

620-3.8 Retro-reflectance. Reflectance shall be measured with a portable retro-reflectometer meeting ASTM E1710 (or equivalent) provided by the Contractor. A total of 6 reading shall be taken over a 6 square foot area with 3 readings taken from each direction by the Contractor in the presence of the RPR. 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^2/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[1]	100	75	10

[1] 'Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance

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.

METHOD OF MEASUREMENT

620-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

620-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Base Bid:

Item No.	Description	Unit
02620.1	Permanent Pavement Markings and Striping	Lump Sum

02620.2	Temporary Pavement Markings and Striping	Lump Sum
02620.3	Remove Pavement Markings and Striping	Lump Sum
02620.4	Elevated Edge Retro-Reflective Marker	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.

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

END OF SECTION 02620

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SECTION 02626 – EMULSIFIED ASPHALT SLURRY SEAL TREATMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item P-626 – Emulsified Asphalt Slurry Seal Treatment, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the construction of Emulsified Asphalt Slurry Seal Treatment as shown on the Plans.

1.3 REFERENCES:

A. FAA Specification Item P-626 – Emulsified Asphalt Slurry Seal Coat as modified herein.

B. Section 02403, Asphalt Mix Pavement, Surface Course.

1.4 SUBMITTALS

Prior to commencing Work in this Section, the Contractor shall submit the following information according to Section 01300, Submittals.

A. Test reports and certificate of compliance for aggregate material.

B. Test reports and certificate of compliance for asphalt emulsion material.

C. Proposed application rate.

PART 2 – PRODUCTS

2.1 SEAL COAT

Seal Coat shall conform to Section 02626 Emulsified Asphalt Slurry Seal Treatment, FAA Item P-626.

PART 3 – EXECUTION

3.1 SEAL COAT

A. The Contractor shall apply seal coat in accordance with FAA Specification Item P-626, and as modified herein, to the existing pavement surfaces shown on the plans or damaged by the Contractor or as directed by the Engineer.

PART 4 - MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-626, paragraph 626-5.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-626, paragraph 626-6.1.

PART 5 - MEASUREMENT AND PAYMENT

5.1 FAA SPECIFICATIONS

A. P-626, Emulsified Asphalt Slurry Seal Treatment.

END OF SECTON 02626

ITEM P-626 EMULSIFIED ASPHALT SLURRY SEAL TREATMENT

DESCRIPTION

626-1.1 This item shall consist of a mixture of emulsified asphalt, polymer, mineral aggregate, and water properly proportioned, mixed, and spread on an asphalt pavement surface, including airport pavements serving small airplanes 12,500 lbs or less, roads, and other general applications. The application of the surface treatment shall be in accordance with these specifications and shall conform to the dimensions shown on the plans or as directed by the Resident Project Representative (RPR).

MATERIALS

626-2.1 Aggregate. The aggregate shall consist of sound and durable manufactured sand, slag, crusher fines, crushed stone, or a combination. The aggregate shall be clean and free from vegetable matter, dirt, and other deleterious substances. The aggregate shall have a sand equivalent of not less than 45 percent when tested in accordance with ASTM D2419. The aggregate shall show a loss of not more than 35 percent when tested in accordance with ASTM C131. The sodium sulfate soundness loss shall not exceed 12 percent, or the magnesium soundness loss shall not exceed 20 percent after 5 cycles when tested in accordance with ASTM C88. Aggregate shall be 100% crushed.

The combined aggregate shall conform to the gradation shown in Table 1 when tested in accordance with ASTM C136 and ASTM C117.

Table 1. Gradation of Aggregates

Sieve Size	**Percent by Weight Passing Sieve**	
	Type II	**Type III**
3/8 inch (9.5 mm)	100	100
No. 4 (4.75 mm)	90 - 100	70 - 90
No. 8 (2.36 mm)	65 - 90	45 - 70
No. 16 (1.18 mm)	45 - 70	28 - 50
No. 30 (600 µm)	30 - 50	19 - 34
No. 50 (300 µm)	18 - 30	12 - 25
No. 100 (150 µm)	10 - 21	7 - 18
No. 200 (75 µm)	5 - 15	5 - 15
Residual asphalt content percent dry weight of aggregate	7.5% - 13.5%	6.5% - 12%

The job mix formula (mix design) shall be run using aggregate within the gradation band for the

desired type shown in Table 1. Once the mix design has been submitted and approved by the RPR, the aggregate used on the project shall not vary by more than the tolerances shown in Table 2. At no time shall the aggregate used go out of the gradation band in Table 1.

The aggregate will be accepted at the job location or stockpile based on five gradation test samples in accordance with ASTM D75. If the average of the five tests is within the gradation tolerances, then the materials will be accepted. If the tests show the material to be out of tolerance, the Contractor will be given the choice either to remove the material or blend other aggregates with the stockpile material to bring it into specification. Materials used in blending shall meet the quality tests before blending and shall be blended in a manner to produce a consistent gradation. This blending may require a new mix design.

Screening shall be required at the project stockpile site if there are oversize materials in the mix. Precautions shall be taken to prevent segregation of the aggregate in storing and handling. The stockpile shall be kept in areas that drain readily.

a. Aggregate Tolerance. Once the mix design has been accepted, the aggregate gradation used on the project may vary from the aggregate gradation used in the mix design on each sieve by the percentages shown in Table 2. If the project aggregate fails to remain within this tolerance, a new mix design will be required by the RPR at the expense of the Contractor.

Table 2. Aggregate Tolerance

Sieve Size	Tolerance, percent by weight passing sieve
3/8 inch (9.5 mm)	
No. 4 (4.75 mm)	±5%
No. 8 (2.36 mm)	±5%
No. 16 (1.18 mm)	±5%
No. (600 µm)	±5%
No. 50 (300 µm)	±4%
No. 100 (150 µm)	±3%
No. 200 (75 µm)	±2%
Residual Asphalt, percent dry weight of aggregate	±1%

626-2.2 Mineral filler. If mineral filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D242 and shall be used in the amounts required by the mix design. The mineral filler shall be considered as part of the aggregate.

626-2.3 Emulsified asphalt. The emulsified asphalt shall conform to the requirements of ASTM D3628. The cement mixing test is waived for these slurry type emulsions. The type of emulsified asphalt shall be either anionic or cationic, whichever is best suited to the aggregate and job conditions to be encountered.

The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt delivered to the project. If the asphalt emulsion is diluted at other than the manufacturer's facility, the Contractor shall provide a supplemental COA from an independent

laboratory verifying the asphalt emulsion properties.

The COA shall be provided to and approved by the RPR before the emulsified asphalt is applied. The furnishing of the vendor's certified test report 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.

626-2.4 Polymer. The Contractor shall submit manufacturer's technical data, the manufacturer's certification indicating that the polymer meets the requirements of the specification, and the asphalt material manufacturer's approval of its use to the RPR.

626-2.5 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

COMPOSITION AND APPLICATION

626-3.1 Composition. The slurry seal shall consist of a mixture of emulsified asphalt, mineral aggregate, a minimum of 1% polymer, additives as necessary, and water.

626-3.2 Job mix formula. The mix design shall be developed by a laboratory with experience in designing slurry seal mixes and a signed copy shall be submitted in writing by the Contractor to the RPR at least 10 days prior to the start of operations. No slurry seal for payment shall be placed until a mix design has been approved by the RPR.

The laboratory report (mix design) shall indicate the proportions of aggregates, mineral filler (minimum and maximum), water (minimum and maximum), polymer (%), and asphalt emulsion based on the dry aggregate weight. It shall also report the quantitative effects of moisture content on the unit weight of the aggregate (bulking effects). The mix design shall be in effect until modified in writing by the RPR. If the sources of materials change, a new mix design shall be established before the new material is used.

The Contractor shall submit to the RPR for approval a complete mix design on the materials proposed for use, prepared and certified by an approved laboratory. Compatibility of the aggregate, emulsion, mineral filler, and other additives shall be verified by the mix design. The mix design shall be made with the same aggregate and grade of emulsified asphalt that the Contractor will provide on the project. At a minimum, the required tests and values needed are as follows:

Slurry Mix Tests

ISSA Technical Bulletin No.	Description	Specification
ISSA TB-100	Wet track abrasion loss one hour soak	50 g/ft² Max (538 g/m²)
ISSA TB-115	Determination of Slurry System Compatibility	Pass

626-3.3 Application rate. Unless otherwise specified, the slurry seal shall be applied at the application rates shown in Table 3.

Table 3. Slurry Application Rates

Mix Measurement	Type II	Type III
Pounds of mixture per square yard	12 - 20	18 - 30
Kilograms of mixture per square meter	6.5 - 10.9	9.8 - 16.3

The rate of application shall not vary more than ±2 pounds per square yard (±1.1 km per square meter).

626-3.4 Control strips. Not used.

CONSTRUCTION METHODS

626-4.1 Weather limitations. The slurry seal shall not be applied if either the pavement or air temperature is below 50°F (10°C) and falling but may be applied when both pavement and air temperature are above 45°F (7°C) and rising. No slurry seal shall be applied when there the finished product will freeze before 24 hours. Do not apply slurry seal during rain or other adverse weather conditions. The mixture shall not be applied when weather conditions prolong opening to traffic beyond a reasonable time.

626-4.2 Equipment and tools. The Contractor shall furnish all equipment, tools, and machinery necessary for the performance of this work.

a. Slurry mixing equipment. The machine shall be specifically designed and manufactured to lay slurry seal. The material shall be mixed by a self-propelled slurry seal mixing machine of either truck mounted or continuous run design. Either type machine shall be able to accurately deliver and proportion the aggregate, emulsified asphalt, mineral filler, and water to a revolving mixer and discharge the mixed product on a continuous flow basis. The machine shall have sufficient storage capacity for materials to maintain an adequate supply to the proportioning controls.

If continuous run equipment is used, the machine shall be equipped to allow the operator full control of the forward and reverse speed of the machine during application of the slurry seal, with a self-loading device, with opposite side driver stations, all part of original equipment manufacturer design.

The aggregate shall be pre-wetted immediately prior to mixing with the emulsion. The mixing unit of the mixing chamber shall be capable of thoroughly blending all ingredients. No excessive mixing shall be permitted. The mixing machine shall be equipped with a fines feeder that provides an accurate metering device or method to introduce a predetermined proportion of mineral filler into the mixer at the same time and location that the aggregate is fed into the mixer.

The mixing machine shall be equipped with a water pressure system and fog-type spray bar adequate for complete fogging of the surface with an application of 0.05 to 0.10 gallon per square yard (0.23 to 0.45 liter per square meter) preceding the spreading equipment.

Sufficient machine storage capacity to mix properly and apply a minimum of 5 tons (4500 kg) of the slurry shall be provided. Proportioning devices shall be calibrated prior to placing the slurry seal.

b. Slurry spreading equipment. The mixture shall be spread uniformly by means of a conventional surfacing spreader box attached to the mixer and equipped to agitate and spread the

material evenly throughout the box. A front seal shall be provided to ensure no loss of the mixture at the surface contact point. The rear seal shall act as the final strike-off and shall be adjustable.

The spreader box and rear strike-off shall be designed and operated to produce a free flow of material of uniform consistency to the rear strike-off. The spreader box shall provide suitable means to side shift the box to compensate for variations in the pavement geometry. A burlap drag or other approved screed may be attached to the rear of the spreader box to provide a uniform mat.

c. Auxiliary equipment. Other tools or equipment such as brushes, hand squeegees, hose equipment, tank trucks, water distributors and flushers, power blowers, barricades, etc., shall be provided as required.

d. Roller. The roller, if required, shall be a self-propelled pneumatic-tired roller capable of exerting a contact pressure during rolling of 50 lb / sq inch (350 Newtons per square meter). It shall be equipped with a water spray system, to be used if the slurry is picking up on the tires during rolling.

e. Tack coat and distributor. Normally a tack coat is not required unless the surface to be covered is extremely dry and raveled or is concrete or brick. If required, the tack coat should consist of one part emulsified asphalt and three parts water. The emulsified asphalt may be the same as that used in the mix. Pressure distributors used for application of the diluted asphalt emulsion tack coat shall be self-propelled, equipped with pneumatic tires, and capable of uniformly applying 0.05 to 0.15 gallon per square yard (0.23 to 0.68 liter per square meter) of the diluted emulsion over the required width of application. Distributors shall be equipped with tachometers, pressure gauges, and volume-measuring devices. The tack coat shall be applied at least two (2) hours before the slurry seal but within the same day.

626-4.3 Equipment calibration. Each slurry mixing unit to be used on the project shall be calibrated in the presence of the RPR prior to construction. Previous calibration documentation covering the exact materials to be used may be accepted by the RPR provided they were made during the calendar year. The documentation shall include an individual calibration of each material at various settings, which can be related to the machine's metering devices. No machine will be allowed to work on the project until the calibration has been completed and/or accepted by the RPR.

626-4.4 Preparation of existing surface. Clean pavement surface immediately prior to placing the seal coat by sweeping, flushing well with water leaving no standing water, or a combination of both, so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease that has not penetrated the asphalt pavement by scraping or by scrubbing with a detergent, then wash thoroughly with clean water. After cleaning, treat these areas with the oil spot primer. Any additional surface preparation, such as crack repair, shall be in accordance with Item P-101, paragraph 101-3.6.

626-4.5 Application of slurry seal surface treatment. The surface shall be pre-wet ahead of the slurry spreader box by fogging at a rate that dampens the surface with no apparent standing water. The slurry mixture shall be at the desired consistency when exiting the mixer. Total time of mixing shall not exceed two (2) minutes. A sufficient amount of slurry shall be carried in all parts of the spreader box at all times so that complete coverage of all surface voids and cracks is obtained. Care shall be taken not to overload the spreader box which shall be towed at a slow and uniform rate not to exceed 5 miles per hour (8 km per hour). No lumping, balling, or unmixed aggregate shall be permitted. No segregation of the emulsion and fines from the coarse aggregate

will be permitted. If the coarse aggregate settles to the bottom of the mix, the slurry shall be removed from the pavement surface. A sufficient amount of slurry shall be fed into the box to keep a full supply across the full width of the spreader box. The mixture shall not be permitted to overflow the sides of the spreader box. No breaking of the emulsion will be allowed in the spreader box. The finished surface shall have no more than four (4) tear or drag marks greater than 1/2-inch (12 mm) wide and 4-inch (100 mm) long in any 12-foot (3.7-m) by 22-foot (25-sq m) section. It shall have no tear or drag marks greater than 1 inch (25 mm) wide and 3-inch (15 mm) long.

The finished surface shall have no transverse ripples of 1/4-inch (6 mm) or more in depth, as measured with a 12-foot (3.7 meter) straightedge laid upon the surface.

Adjacent lanes shall be lapped at the edges a minimum of 2 inch (50 mm) with a maximum of 4 inch (100 mm) to provide complete sealing at the overlap. Construction longitudinal and transverse joints shall be neat and uniform without buildup, uncovered areas, or unsightly appearance. All joints shall have no more than 1/4-inch (6 mm) difference in elevation when measured across with a 12-foot (3.7 meter) straightedge.

The fresh slurry seal application shall be protected by barricades and markers and permitted to dry for four (4) to 24 hours, depending on weather conditions. Any damage to uncured slurry shall be repaired at the expense of the Contractor.

In areas where the spreader box cannot be used, the slurry shall be applied by means of a hand squeegee. Upon completion of the work, the seal coat shall have no holes, bare spots, or cracks through which liquids or foreign matter could penetrate to the underlying pavement. The finished surface shall present a uniform and skid resistant texture satisfactory to the RPR. All wasted and unused material and all debris shall be removed from the site prior to final acceptance.

Upon completion of the project, the Contractor shall sweep the finished surface with a conventional power rotary broom, to remove any potential loose material from the surface. The material removed by sweeping shall be disposed of in a manner satisfactory to the RPR.

626-4.6 Emulsion material (Contractor's responsibility). Samples of the emulsion that the Contractor proposes to use, together with a statement as to its source, shall be submitted, and approval shall be obtained before using such material. The Contractor shall submit to the RPR a manufacturer's certified report for each consignment of the emulsion. The manufacturer's certified report shall not be interpreted as a basis for final acceptance. All such reports shall be subject to verification by testing samples of the emulsion received for use on the project.

METHOD OF MEASUREMENT

626-5.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

626-6.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under:

Item No.	Description	Unit
02626.1	Emulsified Asphalt Slurry Seal Treatment	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.

ASTM International (ASTM)

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-μm (No. 200) Sieve in 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 C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D977	Standard Specification for Emulsified Asphalt
ASTM D1250	Standard Guide for Use of the Petroleum Measurement Tables
ASTM D2397	Standard Specification for Cationic Emulsified Asphalt
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

International Slurry Surfacing Association (ISSA)

ISSA A-105	Recommended Performance Guidelines for Emulsified Asphalt Slurry Seal
ISSA TB-100	Laboratory Test Method for Wet Track Abrasion of Slurry Surfacing Systems
ISSA TB-106	Slurry Seal Consistency Template
ISSA TB-115	Test Method for Determination of Slurry System Compatibility

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-μm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D5	Standard Test Method for Penetration of Asphalt Materials
ASTM D244	Standard Test Methods and Practices for Emulsified Asphalts
ASTM D2007	Standard Test Method for Characteristic Groups in Rubber Extender and Processing Oils and Other Petroleum-Derived Oils by the Clay-Gel Absorption Chromatographic Method
ASTM D2042	Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene
ASTM D2995	Standard Practice for Estimating Application Rate of Bituminous Distributors
ASTM D4402	Standard Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
ASTM D5340	Standard Test Method for Airport Pavement Condition Index Surveys

Advisory Circulars (AC)

AC 150/5320-12	Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces
AC 150/5320-17	Airfield Pavement Surface Evaluation and Rating (PASER) Manuals
AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements

END OF ITEM P-626

END OF SECTION 02626

SECTION 02701 - PIPE FOR STORM DRAINS AND CULVERTS

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item D-701 – Pipe For Storm Drains and Culverts, as included as an attachment to this Section.

1.2 SUMMARY

This Section includes 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.

1.3 RELATED SECTIONS

A. FAA Specification Item D-701 – Pipe For Storm Drains and Culverts, as modified herein.

B. Section 02152, Excavation, Subgrade, and Embankment.

C. Section 02610, Concrete for Miscellaneous Structures

D. Section 02751, Manholes, Catch Basins, Inlets and Inspection Holes

E. Section 02752, Concrete Culverts, Headwalls, and Miscellaneous Drainage Structures

F. Section 02753, Storm Water Treatment Device

1.4 SUBMITTALS

Prior to commencing Work in this Section, submit information on the following items according to Section 01300, Submittals:

A. Storm Drain Pipes Product Information. Provide, at minimum -

1. Products and materials data and information, including pipe and fittings, joint materials, gaskets, couplings, and sleeves.

2. Manufacturer’s installation instructions.

B. Gradation test results of the proposed bedding and permeable materials for approval prior to use.

1.5 DEFECTIVE WORK.

A. Any work performed under this section which fails to meet the requirements stated herein will be considered defective, and shall be removed and replaced at the Contractor's expense, unless otherwise noted.

PART 2 – PRODUCTS

2.1 PIPE

Pipe and installation material shall be of the type called for on the plans and conform to the FAA Specification Item D-701

2.2 PIPE TO STRUCTURE CONNECTOR AND SEAL

A flexible pipe to manhole connector must be used for all pipe penetrations to pre-cast or cast-in-place concrete structures.

A. The seal must provide a flexible, positive, watertight connection between pipe and concrete structures. The connector must ensure that a seal is made between:

1. The connector and the structure wall

2. Between the connector and the pipe.

B. The seal between the connector and the manhole wall must be made by casting the connector integrally with the structure wall during the manufacturing process in such a manner that it will not pull out during coupling. The seal between connector and pipe will be made by way of a stainless steel take down band compressing the gasket against the outside diameter of the pipe.

C. The connector must be molded from materials whose physical and chemical properties meet or exceed the physical and chemical resistance properties described in ASTM C1478.

D. The connector must be of size specifically designed for the pipe material being used and must be installed in accordance with recommendations of the manufacturer.

2.3 PVC DRAIN PIPE

A. Unless otherwise specified on the plans and these specifications, non-perforated solid pipe must be ASTM D1785, Schedule 40 or 80 as shown on Plan. Pipe compounds must conform to ASTM D1784. Underdrain pipe and fittings must be perforated PVC (unless noted otherwise) with elastomatic joints. Plastic fittings must conform to ASTM D2729.

A. Joint material must be solvent cement conforming to ASTM D2564.

2.4 STORM DRAIN STRUCTURE BEDDING

A. Storm drain structure bedding shall be in accordance with FAA Specification Item D-701 as modified herein.

PART 3 – EXECUTION

3.1 PIPE INSTALLATION

A. Excavate and backfill trenches as per FAA Specification Item D-701 as modified herein. Storm drain construction can occur by either open cut or trenchless.

B. Verify the actual locations (horizontal and vertical) of all utilities prior to beginning trench excavation. If utilities are to remain in place, furnish protection from damage during construction operations.

C. Lay the pipe only after the Engineer observes and approves the conditions of the bottom of the trench.

D. Proceed laying pipe from the downstream to upstream, with the spigot section of the bell-and-spigot pipe pointing in the direction of the flow.

E. Lay and set each section of pipe true to line and grade and in such a manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets in the flow line.

F. Proceed with laying pipe only when the condition of the trench and the weather is suitable.

G. Install pipe and fittings in accordance with the requirements of ASTM D2321 and the manufacturer's instructions.

H. Prior to making connections, apply a manufacturer's recommended joint lubricant to the joint gasket.

I. Keep the interiors of all pipes clean of dirt and debris at all times. When work is not in progress, plug open ends of pipe and fittings.

J. Where clearing after laying pipe is difficult because of small pipe size, keep a suitable swab or squeegee in the pipe and pull forward past every joint immediately after joining has been completed.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item D-701, paragraph 701-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item D-701, paragraph 701-5.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. D-701, Pipe for Storm Drains and Culverts

END OF SECTION 02701

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 C655	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe
ASTM C1433	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
ASTM C1479	Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations
ASTM C1840	Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe
ASTM D3034	Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings

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 precoated 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. Poured filler for joints shall conform to the requirements of ASTM D6690.

701-2.7 Plastic gaskets. Plastic gaskets shall conform to the requirements of ASTM C990.

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 upgrade. 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 upgrade.

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, (3) rubber gaskets, (4) plastic gaskets, (5) coupling bands.

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. Concrete pipe joints shall be sealed with rubber gaskets meeting ASTM C443 when leak resistant joints are required.

b. Metal pipe. Metal pipe shall be firmly joined by form-fitting bands conforming to the requirements of ASTM A760 for steel pipe and AASHTO M196 for aluminum pipe.

c. PVC, Polyethylene, or Polypropylene pipe. Joints for PVC, Polyethylene, or Polypropylene pipe shall conform to the requirements of ASTM D3212 when leak resistant joints are required. Joints for PVC and Polyethylene pipe shall conform to the requirements of AASHTO M304 when soil tight joints are required. Fittings for polyethylene pipe shall conform to the requirements of AASHTO M252 or ASTM M294. Fittings for polypropylene pipe shall conform to ASTM F2881, ASTM F2736, or ASTM F2764.

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. Embedment material shall meet the requirements of ASTM D3282, A-1, A-2-4, A-2-5, or A-3. Embedment material shall be free of organic material, stones larger than 1.5 inches in the greatest dimension, or frozen lumps. Embedment material shall extend to 12 inches above the top of the pipe.

c. Metal Pipe. Embedment material shall be granular as specified in the contract document and specifications, and shall be free of organic material, rock fragments larger than 1.5 inches in the greatest dimension and frozen lumps. As a minimum, backfill materials shall meet the requirements of ASTM D3282, A-1, A-2, or A-3. Embedment material shall extend to 12 inches above the top of the pipe.

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 relaid or replaced at the Contractor's expense. Evaluation of any damage to RCP shall be evaluated based on AASHTO R73.

Overfill material shall be place 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.

Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe interior. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition. The video image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe.

For pipe sizes larger than 48 inches, a walk-through visual inspection shall be performed**.**

Reinforced concrete pipe shall be inspected, evaluated, and reported on in accordance with ASTM C1840, "Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe." Any issues reported shall include still photo and video documentation. The zoom ratio shall be provided for all still or video images that document any issues of concern by the inspection firm

Flexible pipes shall be inspected for rips, tears, joint separations, soil migration, cracks, localized buckling, settlement, alignment, and deflection.

METHOD OF MEASUREMENT

701-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

701-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Base Bid:

Item No.	Description	Unit
02701.1	Reinforced Concrete Pipe, 12" Diameter, Class III	Lump Sum
02701.2	Reinforced Concrete Pipe, 18" Diameter, Class III	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.

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 OF ITEM D-701

END OF SECTION 02701

SECTION 02751 - MANHOLES, CATCH BASINS, INLETS AND INSPECTION HOLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item D-751 - Manholes, Catch Basins, Inlets and Inspection Holes, as included as an attachment to this Section.

1.2 SUMMARY

This Section includes 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 Engineer.

1.3 REFERENCES

A. FAA Specification Item D-751 – Manholes, Catch Basins, Inlets and Inspection Holes as modified herein.

B. Section 02152, Excavation, Subgrade and Embankment.

C. Section 02610, Concrete for Miscellaneous Structures

1.4 SUBMITTALS

Prior to commencing Work in this Section, submit information on the following items according to Section 01300, Submittals:

A. Product information for manholes, catch basins, inlets and inspection holes. Provide at minimum the following:

1. Products and materials data and shop drawings, including reinforcement, steps, frame and cover.

2. Manufacturer’s calculations for precast concrete structures, signed and sealed by a licensed Engineer.

4. For cast-in-place structures – Provide a concrete mix design in accordance with Section 02610, Concrete for Miscellaneous Structures.

1.5 LOADING REQUIREMENTS

A. Unless otherwise noted, structures including frame and cover installed within the Runway/Taxiway Safety Areas shall be aircraft rated for 100,000 lbs wheel load. Structures including frame and cover outside of Runway/Taxiway Safety Areas shall be full H-20 traffic rating.

PART 2 PRODUCTS

A. Manholes, Catch Basins, Inlets and Inspection Holes and installation material shall be of the type called for on the plans and conform to the FAA Specification Item D-751.

B. Installation materials:

1. Frame and Cover: Frame and covers shall be manufactured in accordance with local regulatory specifications and shall be clearly embossed with manufacturer's product name. Frame and cover shall be aircraft or traffic load rated in accordance with Section 1.4.

2. Concrete shall conform to the Section 02610, Concrete for Miscellaneous Structures.

3. Ladders: Ladder rungs to be provided if shown on Plans.

PART 3 EXECUTION

A. Do not drop concrete freely more than six feet or where reinforcing bars will cause segregation. Use spouts, elephant trunks, or other approved means prevent segregation.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item D-751, paragraph 751-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item D-751, paragraph 751-5.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. D-751, Manholes, Catch Basins, Inlets and Inspection Holes

END OF SECTION 02751

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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.

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 be as shown on the plans and 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 as shown on the plans. 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. 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.

METHOD OF MEASUREMENT

751-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

751-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Base Bid:

Item No.	Description	Unit
02751.1	Catch Basin, 2' x 3', H-20 Traffic Rated, Type G1	Lump Sum
02751.2	Catch Basin, 2’ x 3’, H-20 Traffic Rated	Lump Sum
02751.3	Manhole, 4’ x 4’, H-20 Traffic Rated	Lump Sum
02751.4	Connect to Existing Storm Drain Structure	Lump Sum
02751.5	Adjust Water Valve to Grade and Install H-20 Traffic Rated Valve Box	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.

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

END OF ITEM D-751

END OF SECTION 02751

SECTION 02903 - SPRIGGING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item T-903 - Sprigging, as included as an attachment to this Section.

1.2 SUMMARY

A. This item shall consist of planting sprigs of living grass plants at the locations shown on the plans or as directed by the RPR in accordance with these specifications.

1.3 REFERENCES

A. FAA Specification Item T-903 – Sprigging as modified herein

B. Section 02152, Excavation, Subgrade, and Embankment.

C. Section 02905, Topsoil.

1.4 SUBMITTALS

Prior to commencing Work in this Section, submit information on the following items according to Section 01300, Submittals:

A. Plant materials sprigs

B. Fertilizer material

C. Planting Plan including the equipment for proper preparation of the ground surface, handling, and planting method for the sprigs.

D. Temporary irrigation plan.

PART 2 PRODUCTS

A. Plant material sprigs: in accordance with FAA Specification Item T-903, paragraph 2.1.

B. Fertilizer: in accordance with FAA Specification Item T-903, paragraph 2.3.

PART 3 EXECUTION

3.1 Construction methods shall be in accordance with FAA Specification Item T-903.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item T-903, paragraph 903-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item T-903, paragraph 903-5.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. Item T-903, Sprigging.

END OF SECTION 02903

ITEM T-903 SPRIGGING

DESCRIPTION

903-1.1 This item shall consist of planting sprigs of living grass plants at the locations shown on the plans or as directed by the RPR in accordance with these specifications.

MATERIALS

903-2.1 Sprigs. Sprigs shall be healthy living stems (stolons or rhizomes), of Bermuda grass or of the grass species stated in the special provisions, harvested without adhering soil and obtained from sources where the sod is heavy and thickly matted. The presence of weeds or other material that might be detrimental to the proposed planting will be cause for rejection of sprigs.

903-2.2 Lime. Not Used.

903-2.3 Fertilizer. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;

b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or

c. A granular or pellet form suitable for application by blower equipment.

First Application: Fertilizer shall be 10% nitrogen, 20% phosphate, and 20% potash commercial fertilizer and shall be spread at the rate of 500 lbs/acre about two weeks after grassing and shall be followed by watering.

Second Application: Fertilizer shall be 16% nitrogen, 16% phosphate, and 20% potash commercial fertilizer and shall be spread at the rate of 300 lbs/acre one week before the end of the maintenance period and shall be followed by watering.

903-2.4 Water. All water used shall be sufficiently free from oil, acid, alkali, salt, or other harmful materials that would inhibit the growth of grass.

903-2.5 Soil for repairs. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the RPR before being placed.

CONSTRUCTION METHODS

903-3.1 General. Areas to be sprigged and the location of sprigging material, if available on the

site, shall be shown on the plans. Areas requiring special ground surface preparation such as tilling, and those in a satisfactory condition to remain undisturbed, shall also be shown on the plans.

Suitable equipment necessary for proper preparation of the ground surface and for the handling and placing of all required materials shall be on hand, in good condition, and shall be approved by the RPR before the various operations are started. The Contractor shall demonstrate to the RPR, before starting the various operations, that the planting and application of required materials will be made at the specified rates.

When weather conditions are such that unsatisfactory results may occur, the work shall be stopped until the desired results can be obtained.

903-3.2 Advance preparation and cleanup. After grading of areas has been completed and before applying fertilizer and limestone, areas to be sprigged shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris which might interfere with sprigging, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after grading of areas and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage including filling gullies, smoothing irregularities, and repairing other incidental damage.

903-3.3 Applying fertilizer and ground limestone. Following advance preparation and cleanup, fertilizer shall be uniformly spread at a rate that will provide not less than the minimum quantity of each fertilizer ingredient as stated in the special provisions. If use of ground limestone is required, it shall then be spread at a rate that will provide not less than the minimum quantity stated in the special provisions. These materials shall be incorporated into the soil to a depth of not less than 2 inches (50 mm) by discing, raking, or other suitable methods. Any stones larger than 2 inches (50 mm) in any diameter, large clods, roots, and other litter brought to the surface by this operation shall be removed.

In steep slopes where fertilizer and ground limestone cannot be incorporated effectively by mechanical equipment, they may be applied with power sprayers, blower equipment, or other approved method, and need not be incorporated into the soil.

903-3.4 Harvesting sprigs. The sprigs obtained from sources off the site shall be from suitable areas as close as practical to the planting site. Regardless of the source, sprigging material that contains grass and weeds taller than 6 inches (150 mm) shall be mowed to a height of 3 inches (75 mm), and the clippings raked and removed before harvesting begins. Harvesting may be performed by any suitable method, including crisscross cultivation, shallow plowing, or other acceptable methods to thoroughly loosen the sprigs from the soil and to bring them to the surface. After loosening the sprigs from the soil, they shall be gathered in small piles or windrows, watered, and kept moist until planted.
Not more than 24 hours shall elapse between harvesting and planting sprigs, except that, when weather or other uncontrollable conditions interrupt the work, a time extension may be granted, provided the sprigs are still moist and viable. Sprigs that have heated in stockpiles, have become frozen, permitted to dry out, or otherwise seriously damaged during harvesting or delivery shall be rejected and shall be disposed of as directed by the RPR.

903-3.5 Planting sprigs. Sprigging shall be done only within the periods stipulated in the special provisions. Sprigging shall not be done during windy weather, or when the ground is dry,

excessively wet, frozen, or otherwise untillable. If the soil is not moist when the sprigs are being set, water shall be applied until the soil is moist and in a workable condition. One or more of the following methods shall be used, whichever is shown on the plans or stated in the special provisions:

a. Broadcast sprigging. Sprigs shall be broadcast by hand or by suitable equipment in a uniform layer over the prepared surface with spacing between sprigs not to exceed 6 inches (150 mm). The sprigs shall then be forced into the soil to a depth of 2 to 4 inches (50 to 100 mm) with a straight spade or similar tool, or with a disc harrow or other equipment set to cover the sprigs to the required depth.

b. Row sprigging. Furrows shall be opened along the approximate contour of slopes at the spacing and depth stated in the special provisions. Sprigs shall be placed without delay in a continuous row in the open furrow with successive sprigs touching, and they shall be covered immediately.

c. Spot sprigging. Spot sprigging shall be performed as specified under row sprigging, except that groups of four (4) sprigs or more shall be spaced 18 inches (0.5 m) apart in the rows.

903-3.6 Mulching and compacting. After planting of sprigs has been completed and prior to compacting, the surface shall be cleared of stones larger than 2 inches (50 mm) in any diameter, large clods, roots, and other litter brought to the surface during sprigging.

If mulching of sprigged areas is shown on the plans or stated in the special provisions, the sprigged areas shall be covered with mulch in accordance with the requirements of Item T-908 within 24 hours from the time sprigging has been completed, weather and soil conditions permitting.

If mulching is not shown on the plans nor stated in the special provisions, the sprigged area shall be compacted within 24 hours from the time sprigging has been completed, weather and soil conditions permitting, by cultipackers, rollers, or other satisfactory equipment operated at right angles to the slope. Compaction shall not be done when the soil is in such condition that it is picked up by the equipment.

903-3.7 Establishing turf. A stand of turf shall be when there is 95% ground cover of the established species. The Contractor shall be responsible for the proper care of the sprigged areas during the period when the plants are becoming established and he shall protect the sprigged areas against traffic by warning signs or barricades approved by the RPR. Surfaces gullied or otherwise damaged following sprigging shall be repaired by regrading and resprigging as directed by the RPR. The Contractor shall mow, water as directed, and otherwise maintain sprigged areas in a satisfactory condition until final inspection and acceptance of the work.

903-3.8 Temporary Irrigation. The Contractor shall develop and implement a temporary irrigation plan for review and approval. The irrigation may be a combination of water truck sprayers, sprinklers, or gravity-fed drip system designed to provide adequate pressure and coverage to irrigate the sprigging area. Any proposed sprinkler irrigation system shall allow for a manifold connection to the Contractor's water truck or temporary water line. The connection points are required to be located outside of the runway and taxiway safety areas to avoid airfield impacts. All irrigation piping shall be secured to the ground, shall be constructed of non-metallic materials, and shall not exceed 3 inches in height. Metallic irrigation fixtures will not be permitted. Temporary irrigation shall be performed for a minimum of 3 months or longer to establish a good stand of grass of uniform color and density with 95% coverage and to the

satisfaction of the Engineer. The Contractor shall be responsible to remove the temporary irrigation system.

METHOD OF MEASUREMENT

903-4.1 All work under this section will not be measured for payment..

BASIS OF PAYMENT

903-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Base Bid:

Item No.	Description	Unit
02903.1	Sprigging	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.

ASTM International (ASTM)

ASTM C602 Standard Specification for Agricultural Liming Materials

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-903

END OF SECTION 02903

SECTION 02905 - TOPSOIL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item T-905 - Topsoil, as included as an attachment to this Section.

1.2 DESCRIPTION OF WORK

A. 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.

1.3 RELATED SECTIONS

A. FAA Specification Item T-905 – Topsoil as modified herein.

B. Section 02152, Excavation, Subgrade, and Embankment.

C. Section 02903, Sprigging.

1.4 SUBMITTALS

Prior to commencing Work in this Section, submit information on the following items according to Section 01300, Submittals:

A. Source of topsoil shall be submitted in accordance with FAA Specification Item T-905, paragraph 2.2.

PART 2 PRODUCTS

2.1 Topsoil material in accordance with FAA Specification Item T-905, paragraph 2.1.

PART 3 EXECUTION

3.1 Construction methods shall be accordance with FAA Specification Item T-905.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item T-905, paragraph 905-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item T-905, paragraph 905-5.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. T-905, Topsoil.

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ITEM T-905 TOPSOIL

DESCRIPTION

905-1.1 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.

MATERIALS

905-2.1 Topsoil. Topsoil shall be the surface layer of soil 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 (50 mm) or more in diameter), and clay lumps or similar objects. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sod 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. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means, shall be removed. 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 (75 µm) sieve as determined by the wash test in accordance with ASTM C117.

Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.

905-2.2 Inspection and tests. Within 10 days following acceptance of the bid, 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 in paragraph 905-2.1.

CONSTRUCTION METHODS

905-3.1 General. Areas to be topsoiled shall be shown on the plans. If topsoil is available on the site, the location of the stockpiles or areas to be stripped of topsoil and the stripping depths shall be shown on the plans.

Suitable equipment necessary for 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.

905-3.2 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.

905-3.3 Obtaining topsoil. Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, 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.

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 topsoil 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.

905-3.4 Placing topsoil. The topsoil shall be evenly spread on the prepared areas to a uniform depth of 2 inches (50 mm) after compaction, unless otherwise shown on the plans or stated in the special provisions. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turfing 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 (50 mm) 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.

METHOD OF MEASUREMENT

905-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

905-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Base Bid:

Item No.	Description	Unit
02905.1	Topsoil	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.

ASTM International (ASTM)

ASTM C117	Materials Finer than 75 μm (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

END OF SECTION 02905

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DIVISION 16 - ELECTRICAL WORK

SECTION 16050 - ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

The requirements of this Section, unless otherwise stated, shall apply to all Division 16 Specification Sections.

1.2 SUMMARY

This Section includes the general requirements for removal and replacement or new construction of portions airfield electrical systems at the Airport. Specific requirements for each portion of the electrical Work of this Contract are including in the related sections listed in Section 1.1. This item covers both FAA and Airfield Lighting Electrical Systems.

The work to be performed includes furnishing all labor, supplies, materials, equipment, transportation, and services required to augment, move, remove, install, and complete electrical work as specified herein and as shown on the plans.

Airport lighting equipment and materials covered by FAA Specifications shall have the prior approval of the Office of Airports, Federal Aviation Administration's Advisory Circular Number 150/5345-53, (Latest Edition) “Airport Lighting Equipment Certification Program.”

All other airport equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specifications, when so requested by the Engineer.

All work shall be performed in strict accordance with these specifications, plans, and any instructions that may be furnished by the Engineer during execution of the work to aid in interpretation of said plans and specifications. Installation details, material and equipment specifications shall be in conformance with all applicable FAA Advisory Circulars.

The specifications indicate desired materials as to type and quality. Wherever proprietary names are listed in these specifications, it shall be interpreted that the words "or equal" follow. "Or equal" shall be interpreted as meaning equal in every respect as determined by the Engineer.

Nothing in these plans and specifications is to be construed as permitting work not conforming to governing codes and regulations. Where two or more codes conflict, the more stringent or strict requirement shall apply.

The work includes, but is not limited to the following:

a. Maintain, in operation, all existing electrical facilities and circuits required for active areas while this improvement work is in progress, furnish and maintain temporary circuits. This shall include the temporary relocation of existing electrical equipment and providing the temporary equipment and lighting.

b. Furnish and install underground cable of the size and type specified in accordance with specifications, at the locations shown on the plans. Test all circuit after installation of new cables.

c. Furnish and install all raceways and duct lines at the locations indicated and in accordance with specifications, ready for installation of cables.

d. Installation of concrete encased duct banks and concrete protection slabs of existing duct banks

e. Provide power and control for airfield lighting.

f. Installation of new airfield lighting cables.

g. Furnish and install AASHTO H-25 handholes

h.

j. Disposal of items identified for removal on Plans.

l. Grounding of all equipment and conduits installed under this section as shown in the plans or as called for by the authority having jurisdiction.

m. Other items required to complete foregoing. The omission of expressed reference to any parts necessary for or reasonable incidental to the complete installation shall not be construed as releasing the Contractor from furnishing such parts.

All items of general work required, such as excavation, cutting, patching, etc., shall be included. The general work requirements are as follows:

a. Deactivation of power, security and telephone circuits for extended periods shall be by schedule established by the Owner. All work shall be scheduled to minimize the impact and duration of shutdowns. The Contractor shall keep the Engineer informed of scheduled work which will affect existing equipment and operations. A minimum of ten (10) working days advance notice shall be given to the Engineer and approval received for any disconnections or shutdowns. Any interruptions of power for active systems must be scheduled with and approved by the Engineer.

b. The plans are diagrammatic. Locations of equipment to be installed are shown in the plans, but the actual installation will depend on field conditions and the nature of the equipment furnished. When conditions which will adversely affect the installation become apparent, the Engineer shall be notified in writing.

The Contractor shall at all times keep the construction areas free from accumulations of waste material and rubbish, and prior to completion of work, shall remove any rubbish from and about the project, and all tools, reels, equipment, and materials not a part of the project. Upon completion of the construction, the Contractor shall leave the work and premises in a clean, neat, and safe condition satisfactory to the Engineer. The Contractor shall be responsible for the proper performance in all respects, in whole and in part, of the electrical equipment and for the mechanical installation of electrical equipment until acceptance of the entire work by the Engineer.

The Contractor shall protect all work, materials, and equipment from damage of any cause whatever, and shall provide adequate and proper storage facilities during progress of the work. The Contractor shall provide for safety and good condition of all work until final acceptance of the work by the Engineer, and replace all damaged or defective work, materials and equipment before requesting final acceptance.

All equipment shall be thoroughly cleaned of dirt, cement, bituminous materials, etc., and all corners scraped out and free of debris prior to installation.

1.3 APPLICABLE CODES

Applicable codes are as listed in Division 16 sections. The applicable electrical code for all of the Work is the National Electrical Code as currently adopted by the County of Kauai and State of Hawaii and all Division 16 specification Sections shall be referred to as the "Electrical Code."

1.4 REFERENCES

Work shall be in accordance with Federal Aviation Administration Advisory Circular No. 150/5370-10H, "Standards for Specifying Construction of Airports," as modified herein, other FAA Advisory Circulars and Specifications referred to herein, and other requirements as specified herein. The electrical work shall comply with latest adopted editions, codes and standards applicable to this section as follows:

ANSI C2, National Electrical Safety Code
NEC, National Electrical Code (NFPA No. 70E)
FAA, Advisory Circulars
FAA, Orders
NECA, Standard for Installation
NEMA, Standard for Materials and Products
NFPA No. 101, Life Safety Code
UL, Underwriters' Laboratories
Occupational Safety and Health Act (OSHA)
Uniform Building Code (latest edition)
Local Codes, if applicable

All work shall be performed in strict accordance with these contract specifications, drawings, and any instructions that may be furnished by the Engineer during execution of the work to aid in interpretations of said drawings and specifications. The Contractor shall keep these and all applicable specifications on file at his airport construction office. Electrical work shall be performed by an Electrical Contractor licensed in the State of Hawaii with at least five (5) years' experience in airfield lighting (in-pavement as well as elevated edge lighting) and signage installation. Workmen installing electrical systems shall have a current Apprentice license. Apprentices shall have a minimum of three (3) years' experience installing electrical systems.

All material furnished for this project shall be listed by Underwriters Laboratories wherever UL has a listing standard for that material.

1.5 SUBMITTALS

The specifications indicated the desired equipment and materials as to type and quality. Wherever proprietary names are listed in these specifications, it shall be interpreted that the words "or approved equal" follow, unless otherwise specified. The words "or approved equal" shall be interpreted as meaning equal in every respect as determined by the Engineer.

Prior to the installation of any material and equipment and within 30 days of the administrative notice to proceed date, the Contractor shall electronically submit in pdf format to the Owner for approval manufacturers' brochures containing

complete dimensional and performance characteristics, wiring diagrams, installation and operation instructions, etc., for the equipment listed in the individual 16000 Series specification Sections. Shop Drawings that are submitted incorrectly and the schedule delay resulting from this incorrect submission shall be the responsibility of the Contractor and no additional time will be provided under this contract due to the Contractor's error. The contractor shall allocate 14 calendar days for the review of these submittals by the Engineer.

The submittal shall be complete and made in one submission. Partial submissions will not be reviewed or considered. The only exception is the submittal for base cans and/or extensions. Due to the time-critical factor of this item, the Contractor may choose to submit this item the day of the notice to proceed for approval.

a. The Contractor shall submit to the Engineer for approval a complete list of all equipment and materials intended to be used on the job. The list shall include the following information for each item.

(1) Name of Item
(2) FAA Specification Number (If Any)
(3) Manufacturer's Name
(4) Manufacturer's Catalog Number
(5) Size, Type and Rating

b. The Contractor shall submit a sufficient number of copies of the equipment and materials list for the Contractor's use and to allow the Owner to retain five (5) copies.

c. Before any orders are placed, and within five (5) calendar days after Engineer's approval of the equipment and materials list, the Contractor shall submit to the Engineer for written approval 5 copies of shop drawings for all electrical and lighting equipment and for all equipment and materials submittals. The shop drawings and equipment/materials submittals shall be complete showing all details.

b. The Contractor shall review, approve and sign all shop drawings prior to submitting same for Engineer's approval. All shop drawings received without the Contractor's signature will be subject to return without comment.

It shall be the responsibility of the Contractor to specifically point out any variation or discrepancy between the shop drawings or manufacturer's instructions he submits and the contract documents. Failure by the Contractor to identify in his letter of transmittal any variation, discrepancy, or conflict with the contract documents may result in the shop drawing or submittal to be returned to the Contractor for resubmittal.

e. The shop drawings shall show completely the work to be done, but approval by the Engineer shall not be construed as waiving any of the requirements of the contract and particularly shall not be construed as relieving the Contractor of full responsibility for fitting his equipment in the spaces provided; or from responsibility to fulfill the contract at no extra cost to the Owner within the completion time.

f. The Engineer will review all submittals and shop drawings and return them to the Contractor. If the Contractor's submittal or shop drawings are incomplete or the product submitted does not meet specification requirements, the Engineer will reject the submittal or shop drawing and the Contractor will be required to resubmit. Resubmittals shall address all comments from the Engineer. Partial resubmittals may be returned without action. The review of the first submittal and one resubmittal on any item will be made by the Engineer at no cost to the Contractor. The Contractor will be responsible for the Engineer's review costs for each subsequent resubmittal.

These costs will be charged to the Owner and back charged to the Contractor. Costs will be deducted from the Contractor's progress payments.

1.6 SUBMITTAL FORMAT

The submittal shall consist of manufacturer's brochures and cut sheets describing the equipment and materials the Contractor plans to incorporate in the work. These sheets shall be sequentially ordered by specification number with the reference specification number shown on the bottom right of each sheet. They shall be organized by the specification item number (L-100, L-108, etc.) with a tabbed divider sheet separating each item section. The submittal shall clearly show the equipment manufacturer's name, catalog number, size, type, and/or rating. The conformance to FAA criteria or other standards where called for shall be clearly indicated for each item. When used, cut sheets shall show all pertinent information by boldly circling all necessary data, as specified herein. Each sheet shall be dedicated to one piece of equipment, and all sheets shall be sequentially numbered (i.e., 1/50; indicating page 1 of 50 total pages). All sheets shall be 8-1/2" x 11" or 17" x 11". When these sizes are unpractical, a folded 24" x 36" drawing maybe substituted. All drawings shall be to scale. All sheets shall be bound in a 3-ring binder that is sized according to the total number of sheets. Each submittal shall show on the cover the complete job name and number, date, contractor's name, and the words: "Electrical Submittal". A checklist showing all required and proposed submittals shall be prepared by the Contractor and submitted to the Engineer within seven (7) days after the preconstruction conference.

Samples of conduit, duct, fixtures, fittings, cables, tapes, etc., may be required by the Engineer or required in these specifications. After they have been reviewed,

samples will be returned in tested condition to the Contractor. In the event any items of material or equipment contained in the list fail to comply with specification requirements, such items will be rejected. All rejected items shall be amended to meet the criteria and then resubmitted for approval by the Engineer.

Where materials or products specified herein are designated by manufacturer's name, any request to substitute materials or products other than those specified shall be accepted by the Engineer during the bidding period, as specified in the Instructions to Bidders. Burden of proof of equality of proposed substitutions will be the responsibility of the Contractor.

Substitutions of materials referenced herein is allowed provided it meets or exceeds all specification requirements and is equal to or better than specified item. Any substitution shall be included in the submittal package. Manufacturer's part numbers are provided for reference only.

Shop drawings and catalog cuts for substitute materials shall clearly specify compliance with and/or deviation from specified material. Certification shall not contain statements to imply that the item does not meet requirements specified, such as "as good as", and "achieve the same end use and results as materials formulated in accordance with the referenced publications". Certifications shall simply state that the item conforms to the requirements specified. Certificates shall be printed on the manufacturer's letterhead and shall be signed by the manufacturer's official authorized to sign certificates of compliance. Review of shop drawings and catalog cuts shall not release Contractor from complying with intent of drawings and specifications.

1.7 STANDARD INCIDENTAL WORK

The drawings, which constitute an integral part of this Contract, shall serve as the working drawings. Information was obtained using as-built information and shall be verified. They indicate the extent and general layout of the lighting and signing system, arrangement of circuits, cables through ducts, connections to existing circuit cables, and other work. Field verification of scale dimensions is required to determine actual locations, distances, and levels. The Contractor shall research in the field the exact routing and identification of all circuits which extend through, serve or are affected by the area where work is to commence.

No extra compensation will be allowed because of minor differences between work shown on the plans and field conditions. The Contractor shall check the plans and specifications and, if any portion of the work is found to be omitted, unclear, or in error, the Contractor shall immediately notify the Engineer. The directions of the Engineer shall be followed and the work completed accordingly.

a. The design drawings may be utilized in the preparation of the shop or working drawings showing the permanent construction.

b. The plans and specifications are complementary and what is called for in either one shall be as binding as if called for in both.

c. Where a disagreement exists between the plans and specifications, the item or arrangements of better quality or greater quantity shall be used.

d. Any discrepancies between the drawings and field conditions must be resolved with the Engineer before proceeding. All agreements shall be verified in writing.

e. "As-built" drawings covering equipment installed under previous contracts and which relate to this contract will be available for the Contractor. The airport cannot, however, guarantee the accuracy of these drawings. Those conditions which will affect the work under this contract should be verified prior to any design/fabrication/installation commitment.

f. Detail dimensions shown on the plans are approximate and shall be field verified before construction. All differences shall be submitted to the Engineer in writing before Construction begins.

Prospective contractors shall, as part of their proposals, enumerate, identify and list conflicts that they discover to exist within the contract documents and/or between those documents and the rules, regulations, standards and codes of local utility companies and local, county or state governing bodies.

1.8 PERMITS

Not Used.

1.9 RECORD PLANS

The Contractor shall mark up a set of prints to show the as-built conditions which differ from the plans. All changes shall be recorded by a skilled draftsman with at least three (3) years experience. The Engineer will furnish a newly printed set of drawings to be used for this purpose. As-built drawings will be checked monthly by the Engineer for accurateness and partial payments will be withheld until the record drawings are completely updated. The mark-up set shall be kept at the site, and any changes or deviations shall be recorded within one week. The Contractor shall furnish one as-built drawing set to the Engineer upon completion. This work shall be completed and accepted by the Engineer before approval of final payment.

1.10 INSPECTION

The Contractor shall allow for inspection of the Work per General Requirements, and shall repair all defective work per General Requirements.

The Contractor shall arrange for all permit inspections.

1.11 STANDARDS

As with all Work, the Contractor shall perform the electrical Work in compliance with all applicable laws, codes, regulations, and permits, and Section 01050, Control of the Work , the Contractor shall warrant that all of the Work "shall conform in all respects with all applicable requirements of Federal, State and local laws, licenses, and permits, the Contract Documents and all descriptions set forth therein, applicable construction codes and standards, and all other requirements of the Contract Documents."

As with all of the Work, the Contractor shall comply with all safety and security requirements described in the Contract Documents, specifically, but not necessarily limited to, the requirements of Section 01580, Temporary Facilities and Utilities, and Section 01800, Special Requirements for Contractors on the AOA.

Unless otherwise specified, materials and equipment used in the performance of the electrical construction shall be fully UL approved for the class of service for which they are intended.

1.12 MANUFACTURER'S DIRECTIONS

The Contractor shall provide the Owner with complete instructions in the proper care and operation of the equipment installed under this contract. As part of the final inspection and final acceptance will not be given until the Owner's representative is made knowledgeable about the system.

The Contractor shall also collect and assemble into each of six (6) hardcover books the installation details, instructions, parts list, source of local supply, schematics of actual equipment and operations, and directions supplied by the manufacturer with all equipment. A complete set of approved submittal documentation shall be included in the final Maintenance and Operating Instructions. If cut sheets are included showing various models and features of the equipment supplied, the specific model and features shall be clearly indicated to show only the options of the equipment that are actually provided and installed. Final acceptance of the work will be withheld until such data has been presented complete to the Engineer for transmission to the Owner. The submittal checklist shall serve as an index and checklist for these books. The O&M Manuals must be delivered to Owner at least two weeks before the start of training session.

1.12 ENVIRONMENTAL CONDITIONS

The equipment areas are within the airfield. Ambient temperatures generally vary from 67 to 85 degrees F with strong direct radiation from the sun. Relative humidity will vary from 65 to 100 percent with condensation occurring. All areas may have wind-blown dust, sand, and rain occurring, including subject to salt spray.

1.13 SAFETY RULES

The Electrical Safety Rules shall be observed and complied with in every detail, and any violation thereof shall be cause for immediate termination of the Contractor's authority to proceed with the work and recourse to his Surety for completion of the Project. The Electrical Safety Rules are as follows:

a. The Contractor shall be responsible for conforming to the safety requirements of the Airport.

b. Electrical circuits, operating over 300 volts, phase-to-ground, shall be de-energized before work is accomplished thereon. Work on energized systems shall be accomplished by trained personnel, properly insulated, and done with extreme caution.

c. Electrical circuits shall be considered de-energized only when one of the following conditions exists:

(1) Switches connecting subject circuit to the energy supply are observed in the OPEN position, with an air break, and safety-tagged and padlocked in the OPEN position;

(2) Electrically operated switches are visibly OPEN, blocked or racked in the OPEN position, and safety-tagged and padlocked OPEN;

(3) Whenever the supply circuit breaker is not visible and clearly identified, the circuit shall be grounded using bolted clamps and connectors capable of withstanding bolted fault conditions. The ground connection shall be safety-tagged before work thereon, when the ground connection is not within sight of the work area.

d. Use of Red Safety Tags:

Complex Lockout (Tagout). (Per. NEC, NFPA 70)

A complex lockout/tagout plan shall be required, submitted to the Airport for conformance, where one or more of the following exist:

(1) Multiple energy sources (more than one)

(2) Multiple crews

(3) Multiple crafts

(4) Multiple locations

(5) Multiple employers

(6) Unique disconnecting means

(7) Complex or particular switching sequences

(8) Lockout/tagout continues for more than one shift; that is, new shift workers

A person in charge shall be involved with a complex lockout/tagout procedure. The person in charge shall be at the procedure location.

The person in charge shall develop a written plan of execution in accordance with Airport policies and communicate that plan to all persons engaged in the job or task. The person in charge shall be held accountable for safe execution of the complex lockout/tagout plan. The complex lockout/tagout plan must address all the concerns of employees who might be exposed, and they must understand how electrical energy is controlled. The person in charge shall ensure that each person understands the hazards to which they are exposed and the safety-related work practices they are to use.

(1) Safety tags shall be filled out and connected to any switch or equipment opened for protection of personnel working upon circuits connected thereto.

(2) Safety tags shall be removed only by the employee who placed the tag, or by another employee designated in writing by the employee who placed the tag, to remove the tag. Removal of a safety tag placed by an employee not available at the time of need to remove may be authorized by the Electrical Superintendent or his designated representative, only after carefully checking that the circuit is ready to be energized.

(3) Equipment with a safety tag attached shall not be operated, and connections with a safety tag attached shall not be changed.

(4) Insulated cables, operated at over 300 volts to ground, shall be handled when energized only with rubber gloves tested to 15,000 volts.

(5) Insulated cables, which have been in operation, shall be cut only with a grounded cable shears, or shall be grounded by driving a grounded sharp tool through the shielding and the conductors before cutting.

(6) Ladders used in any electrical work shall be of wood or fiberglass construction.

1.14 LOCKOUT/TAGOUT PROCEDURES

Each complex lockout/tagout must be under the direct control of a single person in

charge who is identified in a written plan. The person in charge must be assigned and must accept the responsibility of ensuring that an electrically safe work condition is established before any work task associated with the job can begin. The person in charge also must accept the responsibility of ensuring that all people who are assigned to the job are accounted for before the electrically safe work condition is removed.

A written plan must identify each step required to install lockout and tagout devices. To clearly establish the authority of the person in charge, the plan must be reviewed with or by all affected employees. The plan must identify the following:

• The disconnecting means

• Who will install lockout/tagout devices?

• How the absence of voltage will be verified

• How employees will be accounted for before, during, and after the work is complete

The complex lockout/tagout procedure shall vest primary responsibility in an authorized employee for a set number of employees working under the protection of a group lockout or tagout device (such as an operation lock). The person in charge shall be held accountable for safe execution of the complex lockout/tagout.

The person in charge must be both a qualified person and an authorized employee. Additional employees often are assigned to an area to provide sufficient manpower to complete all necessary work tasks while a shutdown is under way. Contract employees or other temporary employees might be unfamiliar with the location of electrical circuits and disconnecting means. The person in charge is responsible for ensuring that no employee, including each temporary employee, is unnecessarily exposed to an electrical hazard.

The person in charge must understand that he or she is accountable for generating, implementing, and monitoring the implementation of the plan.

Each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

1.15 CONSTRUCTION SEQUENCING The Contractor shall notify the Engineer within 24 hours of completion of each task completed as described below:

a. The Contractor shall install all lights and fixtures, and test them in the presence of the Engineer. Any and all lights which fail to light correctly shall have new lamps installed, or work as required to correct the problem.

1.16 WARRANTIES AND GUARANTEES

The Contractor shall provide a written 1-year warranty guaranteeing all work installed under this contract. It shall cover all parts and labor against defective parts or workmanship necessary to repair or bring into proper operation any equipment including, but not limited to, fixtures, transformers, regulators, panel boards, transformers, circuit breakers, conduit system, pull boxes and base cans. The regulators shall be guaranteed under the terms of the manufacturer's and dealer's standard warranty for a period of two years and shall cover full parts and labor. The warranty shall start upon the acceptance of all work as accepted by the Engineer. Final payment will be withheld until receipt of the warranty by the Engineer.

PART 2 PRODUCTS

2.1 GENERAL

All equipment and materials covered by referenced specifications shall be subject to the acceptance through manufacturer’s certification of compliance with applicable specification when requested by the Airport.

Manufacturer’s certifications shall not relieve the Contractor of the Contractor’s responsibility to provide material in accordance with these specifications and acceptable to the Airport.

All materials and equipment used in construction shall be submitted to the Engineer for approval prior to ordering equipment.

All materials and equipment used in construction shall be sufficient, in the opinion of the Airport, to determine compliance with the plans and specifications. The Airport reserves the right to reject any and all equipment, materials, or procedures, which, in the Airport’s opinion, does not meet the system design and the standards and codes.

Materials and equipment shall be as specified herein. When materials are used that are not specifically designated herein, they shall be in accordance with the best industry standards and practices for equipment of this type. All components and parts shall be suitable for operation under the environmental conditions specified herein. Metal parts shall be either inherently corrosion-resistant or shall be suitably protected to resist corrosion or oxidation during extended service life.

The Contractor shall supply material for electrical and lighting systems such that all components of a given system are of the same manufacturer; for example, all transformers shall be from one manufacturer. All lights and series isolation transformers shall be from one manufacturer to minimize the number and types of spares.

All the equipment and materials furnished and installed under this project shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Airport. The defective materials and/or equipment shall be repaired or replaced at the Airport's discretion, at no additional cost to the Airport.

Should the Contractor find any discrepancies in or omissions from any of the documents or be in doubt as to their meaning, he shall advise the Engineer who will issue any necessary clarification within a time period which does not disrupt the progress of the work.

Should any discrepancy arise from the failure of the Contractor to notify the Engineer, the higher quality or larger quantity of item shall prevail. The Engineer shall make the final interpretation and judgement.

In the event of a discrepancy between small scale drawings and large scale details, or between drawings and specification, on which is in violation of any regulations, ordinances, laws or codes, the discrepancy, if known by the Contractor, shall be immediately brought to the attention of the State for a decision before proceeding with the particular work involved. Work carried out disregarding these instructions will be subject to removal and replacement at the Contractor's expense.

2.2 5kV CONDUCTORS

Underground 5kV airfield lighting cables shall conform to FAA Specification Item L-108, as modified in Section 16108, Underground Power Cable for Airports .

2.3 PARTS RATING

All parts shall be of adequate rating for the application and shall not be operated beyond the parts manufacturer's recommended ratings.

2.4 SALVAGE

Except as otherwise specified or indicated on the plans, all electrical materials and equipment to be salvaged or stored shall become the property of the Authority, and shall he moved by the Contractor to a site at the Airport designated by the Engineer at no additional cost to the Authority. All wastes such as removed asphalt concrete and excess dirt, shal1 be disposed of, as directed by the Engineer, including disposal on-site.

2.5 TESTING

All materials and finishes are subject to testing. Material inspection and testing and strength tests on the concrete will be performed by the Airport at no expense to the Contractor other than material used. The Contractor shall assist the Engineer in

obtaining samples during the course of construction work. The testing of electrical equipment shall conform to the description of the individual specification sections including those listed in Section 3.9 of these Specifications.

It shall be the Contractor's responsibility to demonstrate to the satisfaction of the Airport that the lighting circuits are continuous and free from short circuits and unspecified grounds, that circuits are properly connected and operable. The Contractor shall megger all existing runway and taxiway field cables and shall record and report all readings to the Engineer for cable megger readings both before modification and after. The Contractor shall provide all labor, equipment and materials.

2.6 INSPECTION

The Contractor shall provide for electrical inspections by the authority having jurisdiction No work shall be concealed or enclosed until after inspections. If work is concealed or enclosed without inspection and approval, the Contractor shall be responsible for all expense and work required to open and restore the concealed area in addition to all required modifications.

2.7 HARDWARE CORROSION PROTECTION

In order to prevent deterioration due to corrosion, all bolts, nuts, studs, washers, pins, terminals, springs, hangers, and similar fastenings and fittings shall be of an approved corrosion-resisting material and/or be treated in an approved manner to render it adequately resistant to corrosion. All hardware such as cap screws, set screws, tap bolts, nuts, washers, etc., shall be of the type recommended by the manufacturer, or if a manufacturer's recommendation is not available, shall be stainless steel type 304, SAE grade 2, if they are used outdoors unless specified otherwise on the plans. Brass, bronze, or hot-dip galvanized ferrous hardware will be considered for indoor use. All bolts, screws, nuts, etc., used on the centerline light units or any other units where vibration from aircraft operations could loosen the bolts, as directed by the Engineer, shall be coated with a layer of “Locktight #242” or approved equal. All other bolts, screws, nuts, etc., used on edge lights, signs or other units shall be coated with a layer of “Neversieze” compound or approved equal as directed by the Engineer. Locktight #242 and Neversieze can be obtained from most electrical supply houses and from many automotive shops.

PART 3 EXECUTION

3.1 GENERAL

For the requirements regarding general information, including but not limited to, utility locations and verifications, accuracy of the Plans, clean up requirements, and inspections, the Contractor shall refer to the General Requirements all other Sections of the Plans and the Specifications.

All work shall be performed in strict accordance with these contract specifications, drawings, and any instructions that may be furnished by the Engineer during execution of the work to aid in interpretations of said drawings and specifications. The Contractor shall keep these and all applicable specifications on file at his airport construction office. Electrical work shall be performed by an Electrical Contractor licensed in the State of Hawaii with at least five (5) years' experience in airfield lighting (in-pavement as well as elevated edge lighting) and signage installation. Workmen installing electrical systems shall have a current Apprentice license. Apprentices shall have a minimum of three (3) years' experience installing electrical systems.

Should the Contractor find any discrepancies in or omissions from any of the documents or be in doubt as to their meaning, he shall advise the Engineer who will issue any necessary clarification within a time period which does not disrupt the progress of the work.

Should any discrepancy arise from the failure of the Contractor to notify the Engineer, the higher quality or larger quantity of item shall prevail. The Engineer shall make the final interpretation and judgement.

In the event of a discrepancy between small scale drawings and large scale details, or between drawings and specification, on which is in violation of any regulations, ordinances, laws or codes, the discrepancy, if known by the Contractor, shall be immediately brought to the attention of the State for a decision before proceeding with the particular work involved. Work carried out disregarding these instructions will be subject to removal and replacement at the Contractor's expense.

All cable installations shall comply with FAA Specification Items L-108 as modified in Section 16108, Underground Power Cable for Airports.

3.2 INSTALLATION METHOD

The methods used for the installation of electrical system and equipment shall conform to the National Electric Contractors Association (NECA) published "Standard of Installation except where specifically specified or shown otherwise, and to the requirements of the National Electrical Code and its revisions as adopted by the local agency having jurisdiction.

All electrical materials, construction methods, and installation shall be in accordance with applicable Federal Aviation Administration's Advisory Circulars including amendments, the National Electrical Code, and the American National Standards Institute Standard C2.

Workmanship shall be consistent with the best commercial practices for

installations of this type.

The workmanship shall be first class and in accordance with the highest standards for the electrical industry. The installations and adjustments shall be by competent electricians. The responsibility for the correct and satisfactory installation and operation of all materials and equipment required herein shall rest with the Contractor. Before any equipment is ordered, a complete schedule of materials and detailed shop drawings covering all items of equipment and brochures of the materials proposed for installation shall be submitted for approval by the Engineer as described in this section.

Minor changes in the locations of fixtures and equipment shall be made prior to rough-in at the direction of the Engineer and at no additional cost to the Agency.

The equipment shall be installed with ample space allowed for removal, repair or changes to equipment. Ready accessibility to removable parts of equipment and to wiring shall be provided without moving other equipment which is to be installed or which is in place.

Contractor shall coordinate with Operations and Maintenance at the end of each daylight work shift to verify that all temporary airfield lighting circuits are operational. Contractor shall provide all labor and material for this work.

Contractor shall provide and maintain on hand sufficient equipment required to provide temporary lighting and circuit extensions. This includes, but is not limited to, light fixtures, transformers, bases, two-inch conduit, L-824 cable and L-823 connectors.

All runs shall be as continuous as possible with no splices permitted between terminations except where noted in the drawings and except where required by lengths supplied (normally 2,000 feet maximum). Locations of splices to be approved by the Owner. The Contractor, in pulling cables through ducts and/or conduits, shall not exceed the maximum allowable tension values for the cables as specified in FAA C 1391.

Any cable that is indicated on the project plans for direct earth burial shall be unreeled in place in the open trench or unreeled near the trench and carefully placed in the trench bottom. Pulling the cable into the trench by dragging over the ground will not be permitted.

A cable slack loop of 6 feet, ±6 inches shall be left on each end of cable runs and at all points where cable connections are brought above ground. The slack loop shall be installed at the same minimum depth as the cable run. Loops shall have no bends with an inner radius less than twelve times the outside diameter of the cable.

3.3 SITE CONDITIONS

At least five (5) working days prior to commencing construction operations in an area which may involve underground utility facilities, the Contractor shall notify the Engineer and the owners of each underground utility facility shown on the plans.

The existences of any known buried wires, conduits, pull boxes, ducts, or other facilities is shown in a general way only. It will be the responsibility of the Contractor, with the help of Airport personnel, to visit the site and make exact determination of the existence and location of any facilities prior to commencing any work. The Contractor will be responsible for making the exact determination of the location and condition of such facilities. A toll-free number for Hawaii One Call Center ("HOCC") is (866) 423-7287. The Contractor is required to call this number and contact the Airport's designated representative 48 hours in advance before performing excavation work within the project site. Any and all costs shall be paid for by the Contractor.

All items damaged by the Contractor's workers or equipment shall be replaced immediately at the Contractor's expense.

During the progress of work, all rubbish, waste lumber, displaced materials, etc. shall be removed as soon as possible and upon completion of the work, the Contractor shall remove from the State's property and from all public and private property, at his own expense, all temporary structures, rubbish and waste material resulting from his operations.

3.4 CABLE REMOVAL

Prior to removing stuck/jammed cable(s) the following sets of procedures shall be followed before cable(s) can be removed from existing ductbank/conduit. The following work listed below shall be incidental to the removal and installation of airfield lighting cable.

a. Using "compressed air" fill the existing conduit from both ends with cable loosening lubricant as manufactured by American Polywater Corp (CableFree Loosener Cat #CF-128) , or approved equal. The applied loosener shall remain in conduit for 24 hours minimum before prior to cable removal.

b. Minimum amount of CableFree Loosener shall be calculated by the following, all other approved equal manufacturer's shall provide similar recommendation:

$$Q = 0.2 \times L \times D$$

Q = quantity in quarts, L = length of conduit (ft.), D = inside

diameter of the conduit (in.)

c. Where initial application of cable loosener does not successfully aid in removal of cable(s), a second application shall be applied using same method as listed in 3.4 (a).

d. Use proper pulley rig setup inside junction structure for cable removal.

Roto-rooter conduit for stuck cable(s) if necessary, where second of attempt of cable loosener is not successful.

3.5 INSPECTIONS

All Electrical Work shall be subject to inspection and approval of the Federal Aviation Administration (FAA). In addition to any required inspection, the Engineer will inspect the system during the course of construction. The Contractor shall not cover up any work until inspected and approved by the Engineer, and, if required, by code enforcement inspectors.

3.6 NIGHT WORK LIGHTING

The Contractor, at its own expense, shall provide all temporary construction lighting installations as required for the performance of night work. The temporary installation shall be in accordance with all safety and electrical requirements requisite to this type of installation. Temporary lighting shall not hamper Control Tower operations.

The Contractor shall set up such installations as required to conform to runway and taxiway safety requirements.

3.7 ELECTRICAL SHUTDOWNS

For Work that will require an interruption of power or shutdown of any circuit, the Contractor shall schedule and submit a request to the Engineer at least one week before the proposed shutdown. The Contractor shall endeavor to keep such the downtime to a minimum and shall submit schedules that are mutually agreeable to all parties. The Contractor shall restore power to light circuits at the end of each construction shift in accordance with Lockout/Tagout Procedures section 1.14 of these Specifications.

3.8 IDENTIFICATION

Comply with all electrical identification as indicated in Section 16108, Underground Power Cable for Airports.

Conductors, panelboards, switches, circuit breakers and motor controllers shall be identified as per FAA-C-1217, Sections 4.6.4.2.4 and 4.16. Cable tagging and

markers shall be identified as per FAA-C-1391, Sections 3.5.1 and 2. Transformers and junction boxes shall be identified by nameplate of nonferrous metal or rigid plastic, engraved with 3/8 inch high lettering with information as per FAA-C-1217, Section 4.16.

3.9 TESTING

Submit equipment and materials list and shop drawings as per FAA-C-1217, current edition, Section 5.1. Perform testing as per FAA-C-1217, Section 5.3 and FAA-C-1391, Section 4. Pretest all cable on the reel prior to installation and provide a copy of the test results to the Port.

The Contractor shall test the installed airfield lighting and miscellaneous power cables prior to the start of and at the completion of this project. The results of the testing shall be provided to the Port for review and acceptance. The Contractor shall be responsible for repairs or replacement of any cable found defective after installation.

The Contractor is responsible for making all necessary corrections to any deficiencies made evident by the test results.

Installation tests in addition to all tests contained in other L-Series Items shall be provided as follows:

Item	**Test Required the Contractor or Independent Testing Service to Perform**	**Manufacturer's Rep. Present?**
5 kV Rated Airfield Lighting and Power Cables (Newly Installed in This Project)	Megger check at 1000 volts at the completion of installation. Test every circuit for conductor-to-ground and conductor-to-conductor (between circuits) insulation resistance. Tabulate test results and give to the Port for acceptance. The readings must be greater than 100 megohms for the Port's acceptance of the installation Work.	No
600 V Rated Power Cables (Newly Installed in This Project)	Megger check at 500 volts at the completion of installation. Test every circuit for conductor-to-ground and conductor-to-conductor (between circuits) insulation resistance. Tabulate test results and give to the Port for acceptance. The readings must be greater than 100 megohms for the Port's acceptance of the installation Work.	No
5 kV Rated Airfield Lighting and Power Cables – Existing affected by this	Megger check at 1,000 volts prior to the start of and at the completion of installation. Test every circuit for conductor-to-ground and conductor-to-conductor (between circuits) insulation resistance. Test results	No

project (All Circuits Emanating from the Lighting Vault Modified in This Project)	after completion shall match or exceed the pre-start of construction test results.	
Airfield Light Fixture	Examine each light fixture prior to installation to ensure that lenses, where required, are properly fitted, that there are no signs of physical damage to the fittings, and that the lamps are appropriately sized. Check the fixture bolts to ensure that they are properly torqued to manufacturers and FAA requirements and affirm in writing.	No

The Contractor shall furnish all necessary equipment and appliances for testing the underground cable circuits after installation. The Contractor shall test and demonstrate to the satisfaction of the Engineer the following:

a. Initial testing shall be performed prior to construction to establish the existing baseline. A final test shall be performed after the construction is completed to compare with the initial results to determine if the installation/improvements are acceptable.

b. That all lighting or power (FAA and Airfield lighting) circuits are continuous and free from short circuits. Insulation resistance of all circuits shall not be less than 100 megaohms.

c. That all circuits are free from unspecified grounds.

d. That the insulation resistance to ground of all newly installed non-grounded series 5 kV lighting circuits is not less 500 megohms.

e. That the insulation resistance to ground of all newly installed non-grounded conductors of multiple circuits is not less than 200 megohms.

f. That all circuits are properly connected in accordance with applicable wiring diagrams.

g. That insulation resistance value of reconnected circuits is not less than previously tested, prior to disconnection.

h. That all circuits 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 ½ 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 utilized, as described by ANSI/IEEE Standard 81, to verify this requirement.

j. Shall notify the Engineer of insulation resistance values less than 50 megaohms.

k. Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the Engineer for review and approval. Where connecting new cable to existing cable, ground resistance tests shall be performed on the new cable prior to connection to the existing circuit.

l. There are no approved "repair" procedures for items that have failed testing other than complete replacement.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION 16050

SECTION 16108 - UNDERGROUND POWER CABLE FOR AIRPORTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item L-108 - Underground Power Cable For Airports, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the installation of underground power cables as shown on the Plans.

1.3 REFERENCES

A. FAA Specification Item L-108 – Underground Power Cable For Airports as modified herein.

B. Section 02153, Controlled Low Strength Material.

C. Section 16110, Airport Underground Electrical Duct Banks and Conduits.

D. Section 02610, Concrete for Miscellaneous Structures.

E. American Society for Testing and Materials (ASTM), standards and tests referred to in the attached FAA Specification Items.

F. American Association of State Highway and Transportation Officials (AASHTO) standards and tests referred to in the attached FAA Specification Items.

1.4 SUBMITTALS

Prior to commencing Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

A. Equipment and materials covered by advisory circulars (ACs) shall be certified in AC 150/5345-53, Airport Lighting Equipment Certification Program (ALECP) and listed in the ALECP Addendum.

PART 2 PRODUCTS

2.1 UNDERGOUND POWER CABLES

Underground power cables shall conform to Section 16108 Underground Power Cable for Airports, FAA Item L-108.

PART 3 EXECUTION

3.1 UNDERGROUND POWER CABLES

The Contractor shall install underground power cables in accordance with FAA Specification Item L-108, modified and as shown on the plans.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item L-108, paragraph 108-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item L-108, paragraph 108-5.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. Item L-108, Underground Power Cable for Airports

END OF SECTION 16108

ITEM L-108 UNDERGROUND POWER CABLE FOR AIRPORTS

DESCRIPTION

108-1.1 This item shall consist of furnishing and installing power cables that are within conduit or duct banks per these specifications at the locations shown on the plans. 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,.

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. 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 ethylene propylene insulation, 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. 6AWG 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 or copper-clad steel sectional copper-clad steel . The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 8 feet long and 5/8 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 Section 02610, Item P-610, Concrete for Miscellaneous Structures.

108-2.7 Flowable backfill. Flowable material used to backfill trenches for power cable trenches shall conform to the requirements of Section 02153, 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 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 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 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 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 Section 16110, 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. Not Used.

108-3.4 Cable markers for direct-buried cable. Not Used.

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 used for airfield lighting cable home runs and be made by using crimp connectors for jointing conductors. Cast splices shall be made in manholes and handholes. 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 used in base cans and junction cans where connections are made to isolation transformers and at the ALV disconnect cabinet, 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 on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches 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. No heat shrink shall be applied when installed within the ALV disconnect cabinet.

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 on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches 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 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 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 contaminates 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.

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.

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 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 **500** 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 All work under this section will not be measured for payment.

BASIS OF PAYMENT

108-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Additive Alternate "A":

Item No.	Description	Unit
16108.A1	No.8 AWG, 5 kV, L-824, Type C Cable, Installed in Duct Bank or Conduit	Lump Sum
16108.A2	No. 6 AWG, Insulated, Stranded Equipment Ground, Installed in Duct Bank or Conduit	Lump Sum

16108.A3	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed Above the Duct Bank or Conduit, Including Connections/Terminations	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.

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

Federal Aviation Administration Standard

FAA STD-019E	Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment

END OF ITEM L-108

END OF SECTION 16108

SECTION 16110 - AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS

PART 1 GENERAL

1.1 RELATED SECTIONS:

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item L-110 – Airport Underground Electrical Duct Banks and Conduits, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the construction underground electrical duct banks and conduits as shown on the Plans.

1.3 REFERENCES:

A. FAA Specification Item L-110 – Airport Underground Electrical Duct Banks and Conduits as modified herein.

B. Section 02152, Excavation Subgrade and Embankment

C. Section 02153, Controlled Low Strength Material

D. American Society for Testing and Materials (ASTM), standards and tests referred to in the attached FAA Specification Items.

E. American Association of State Highway and Transportation Officials (AASHTO) standards and tests referred to in the attached FAA Specification Items.

1.4 SUBMITTALS

Prior to commencing Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

A. Equipment and materials covered by advisory circulars (ACs) shall be certified in AC 150/5345-53, Airport Lighting Equipment Certification Program (ALECP) and listed in the ALECP Addendum.

PART 2 PRODUCTS

2.1 UNDEGROUND ELECTRICAL DUCT BANKS AND CONDUITS

Equipment shall conform to Section 16110 Airport Underground Electrical Duct Banks and Conduits, FAA Item L-110.

PART 3 EXECUTION

3.1 INSTALLATION OF UNDERGROUND DUCT BANKS AND CONDUITS

The Contractor install underground duct banks and conduits in accordance with FAA Specification Item L-110, modified and as shown on the plans.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item L-110, paragraph 110-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item L-110, paragraph 110-5.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. Item L-110, Airport Underground Electrical Duct Banks and Conduits

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) 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 Item P-610, Concrete for Miscellaneous Structures.

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 Section 02153, 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 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 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 per 100 feet. 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 below the subgrade; in other locations, the top of the duct bank or underground conduit shall be be not less than 18 inches 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 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 part of a duct bank, shall be provided with a 200-pound 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.

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.

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 Section 02152, 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 Section 16110, 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 Section 02152, 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 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 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 beyond the edges of the pavement or 3 feet 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 thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches 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 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 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 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 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 wide tape, 8 inches minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch wide tape only for single conduit runs. Utilize the 6-inch wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches 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. Not Used.

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 square and 4 - 6 inches thick extending approximately one inch 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 high and 3 inches wide with width of stroke 1/2 inch and 1/4 inch 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, 3 inches of concrete shall be placed around the conduits ducts. 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 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 Section 02152, Item P-152 “Excavation and Embankment” except that the material used for backfill shall be select material not larger than 4 inches 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 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 all turfing to match existing surrounding areas as 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.

110-3.8 Ownership of removed cable. Contractor

METHOD OF MEASUREMENT

110-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

110-5.1 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

In the event that a Bid Item is not used, the Contractor is not eligible to receive any payment under this Bid item.

Payment will be made under Base Bid:

Item No.	Description	Unit
16115.1	Utility Protection Slab	Lump Sum

Payment will be made under Additive Alternate "A":

Item No.	Description	Unit
16115.A1	2-4" Electrical Ductbank, Concrete Encased	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.

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

END OF ITEM L-110

END OF SECTION 16110

SECTION 16115 - ELECTRICAL MANHOLES AND JUNCTION STRUCTURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section.

B. This Section shall be in accordance with FAA Specification Item L-115 – Electrical Manholes and Junction Structures, as included as an attachment to this Section.

1.2 SUMMARY

Work under this Section includes the requirements for the construction of electrical handholes as shown on the Plans.

1.3 REFERENCES:

A. FAA Specification Item L-115 – Electrical Manholes and Junction Structures as modified herein.

B. Section 02153, Controlled Low Strength Material (CLSM)

C. Section 02610, Concrete for Miscellaneous Structures

D. American Society for Testing and Materials (ASTM), standards and tests referred to in the attached FAA Specification Items.

E. American Association of State Highway and Transportation Officials (AASHTO) standards and tests referred to in the attached FAA Specification Items.

1.4 SUBMITTALS

Prior to commencing Work in this Section, the Contractor shall submit the following information as according to Section 01300, Submittals.

A. Product information for handholes. Provide at minimum the following:

1. For cast-in-place structures – Provide a concrete mix design in accordance with Section 02610, Concrete for Miscellaneous Structures.

2. Products and materials data and shop drawings, including reinforcement, steps, frame and cover.

3. Manufacturer’s calculations for precast concrete structures, signed and sealed by a licensed Engineer.

PART 2 PRODUCTS

2.1 MANHOLES AND JUNCTION STRUCTURES

Handholes shall conform to Section 16115 Electrical Manholes and Junction Structures, FAA Item L-115.

PART 3 EXECUTION

3.1 ADJUSTMENT OF HANDHOLES

The Contractor shall adjust to grade existing underground handholes in accordance with FAA Specification Item L-115, modified and as shown on the plans.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item L-115, paragraph 115-4.1.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item L-115, paragraph 115-5.1.

PART 5 ATTACHMENTS

5.1 FAA SPECIFICATIONS

A. Item L-115, Electrical Manholes and Junction Structures

ITEM L-115 ELECTRICAL MANHOLES AND JUNCTION STRUCTURES

DESCRIPTION

115-1.1 This item shall consist of electrical manholes and junction structures (handholes, pull boxes, junction cans, etc.) installed 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 sections with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel,, appurtenances, grounding, testing, dewatering and restoration of surfaces to the satisfaction of the RPR including removal of existing manholes and junction structures as shown on the plans.

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 Section 02610, Item P-610, Concrete for Miscellaneous Structures.

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 32,000 lbs truck wheel load, unless otherwise 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. Not Used.

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 Item P-610, Concrete for Miscellaneous Structures.

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 the traffic loading as indicated on Plan.

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. Not Used.

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. Not Used.

115-2.13 Plastic conduit. Plastic conduit shall comply with Section 16110, Item L-110, Airport Underground Electrical Duct Banks and Conduits.

115-2.14 Conduit terminators. Not Used.

115-2.15 Pulling-in irons. Not Used

115-2.16 Ground rods. Ground rods shall be one piece, copper or **[** 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 long nor less than 5/8 inch 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 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 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. 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 manholes, handhole and pull boxes. 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.

115-3.5 Installation of ladders. Not Used.

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 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 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.

Existing ground bus shall be bonded to all 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. Not Used.

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 Junction structure elevation adjustments. The Contractor shall adjust the tops of existing junction structures 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 and cover on the junction structure or access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the junction structure 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 replace the top section 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. Not Used

METHOD OF MEASUREMENT

115-4.1 All work under this section will not be measured for payment.

BASIS OF PAYMENT

115-5.2 Items covered by this section will be paid by lump sum. The contract price paid shall be for full compensation for furnishing and placing all materials and all labor, equipment, tools, and incidentals necessary for each of the construction phases.

Payment will be made under Additive Alternate "A":

Item No.	Description	Unit
16115.A1	Remove Existing Electrical Handhole and Conduit, and Pull Back Cables	Lump Sum
16115.A2	Electrical Handhole, H-20 Traffic Rated	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.

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

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)

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

END OF SECTION 16115

Requirements of Chapter 104, HRS
Wages and Hours of Employees on Public Works Law

Chapter 104, HRS, applies to every public works construction project over $2,000, regardless of the method of procurement or financing (purchase order, voucher, bid, contract, lease arrangement, warranty, SPRB).

Rate of Wages for Laborers and Mechanics

- Minimum prevailing wages (basic hourly rate plus fringe benefits), as determined by the Director of Labor and Industrial Relations and published in wage rate schedules, shall be paid to the various classes of laborers and mechanics working on the job site. [§104-2(a), (b), Hawaii Revised Statutes (HRS)]

- If the Director of Labor determines that prevailing wages have increased during the performance of a public works contract, the rate of pay of laborers and mechanics shall be raised accordingly. [§104-2(a) and (b), HRS; §12-22-3(d) Hawaii Administrative Rules (HAR)]

Overtime

- Laborers and mechanics working on a Saturday, Sunday, or a legal holiday of the State or more than eight hours a day on any other day shall be paid overtime compensation at not less than one and one-half times the basic hourly rate plus the cost of fringe benefits for all hours worked. If the Director of Labor determines that a prevailing wage is defined by a collective bargaining agreement, the overtime compensation shall be at the rates set by the applicable collective bargaining agreement [§§104-1, 104-2(c), HRS; §12-22-4.1, HAR]

Weekly Pay

- Laborers and mechanics employed on the job site shall be paid their full wages at least once a week, without deduction or rebate, except for legal deductions, within five working days after the cutoff date. [§104-2(d), HRS]

Posting of Wage Rate Schedules

- Wage rate schedules with the notes for prevailing wages and special overtime rates, shall be posted by the contractor in a prominent and easily accessible place at the job site. A copy of the entire wage rate schedule shall be given to each laborer and mechanic employed under the contract, except when the employee is covered by a collective bargaining agreement. [§104-2(d), HRS]

Withholding of Accrued Payments

- If necessary, the contracting agency may withhold accrued payments to the contractor to pay to laborers and mechanics employed by the contractor or subcontractor on the job site any difference between the wages required by the public works contract or specifications and the wages received. [§104-2(e), HRS]

Certified Weekly Payrolls and Payroll Records

- A certified copy of all payrolls shall be submitted weekly to the contracting agency. [§104-3(a), HRS; §12-22-10, HAR]

- The contractor is responsible for the submission of certified copies of the payrolls of all subcontractors. The certification shall affirm that the payrolls are correct and complete, that the wage rates listed are not less than the applicable rates contained in the applicable wage rate schedule, and that the classifications for each laborer or mechanic conform with the work the laborer or mechanic performed. [§104-3(a), HRS; §12-22-10, HAR]

- Payroll records shall be maintained by the contractor and subcontractors for three years after completion of construction. The records shall contain: [§104-3(b), HRS; §12-22-10, HAR]
  - the name and home address of each employee
  - the last four digits of social security number
  - a copy of the apprentice's registration with DLIR
  - the employee's correct classification
  - rate of pay (basic hourly rate + fringe benefits)
  - itemized list of fringe benefits paid
  - daily and weekly hours worked
  - weekly straight time and overtime earnings
  - amount and type of deductions
  - total net wages paid
  - date of payment

- Records shall be made available for examination by the contracting agency, the Department of Labor and Industrial Relations (DLIR), or any of its authorized representatives, who may also interview employees during working hours on the job. [§§104-3(c), 104-22(a), HRS; §12-22-10, HAR]

Termination of Work on Failure to Pay Wages

- If the contracting agency finds that any laborer or mechanic employed on the job site by the contractor or any subcontractor has not been paid prevailing wages or overtime, the contracting agency may, by written notice to the contractor, terminate the contractor's or subcontractor's right to proceed with the work or with the part of the work in which the required wages or overtime compensation have not been paid. The contracting agency may complete this work by contract or otherwise, and the contractor or contractor's sureties shall be liable to the contracting agency for any excess costs incurred. [§104-4, HRS]

Apprentices

- Apprentice wage rates apply to contractors who are a party to a bona fide apprenticeship program which has been registered with the DLIR. In order to be paid apprentice rates, apprentices must be parties to an agreement either registered with or recognized as a USDOL nationally approved apprenticeship program by the DLIR, Workforce Development Division, (808) 586-8877, and the apprentice must be individually registered by name with the DLIR. [§12-22-6(1) and (2), HAR]

- The number of apprentices on any public work in relation to the number of journeyworkers in the same craft classification as the apprentices employed by the same employer on the same public work may not exceed the ratio allowed under the apprenticeship standards registered with or recognized by the DLIR. A registered or recognized apprentice receiving the journeyworker rate will not be considered a journeyworker for the purpose of meeting the ratio requirement. [§12-22-6(3), HAR]

Enforcement

- To ensure compliance with the law, DLIR and the contracting agency will conduct investigations of contractors and subcontractors. If a contractor or subcontractor violates the law, the penalties are: [§104-24, HRS]

  - First Violation — Equal to 25% of back wages found due or $250 per offense up to $2,500, whichever is greater.
  - Second Violation — Equal to amount of back wages found due or $500 for each offense up to $5,000, whichever is greater.
  - Third Violation — Equal to two times the amount of back wages found due or $1,000 for each offense up to $10,000, whichever is greater; and **Suspension** from doing any new work on any public work of a governmental contracting agency for three years.

  ▪ A violation would be deemed a second violation if it occurs within two years of the **first notification of violation**, and a third violation if it occurs within three years of **the second notification of violation**. [§104-24, HRS; §12-22-25(b), HAR]

  ▪ **Suspension**: For a first or second violation, the department shall immediately suspend a contractor who fails to pay wages or penalties until all wages and penalties are paid in full. For a third violation, the department shall penalize and suspend the contractor as described above, **except that if the contractor continues to violate the law, then the department shall immediately suspend the contractor for a mandatory three years. The contractor shall remain suspended until all wages and penalties are paid in full.** [§§104-24, 104-25, HRS]

- **Suspension**: Any contractor who fails to make payroll records accessible or provide requested information within 10 days, or fails to keep or falsifies any required record, shall be assessed a penalty including suspension as provided in Section 104-22(b) and 104-25(a)(3), HRS. [§104-3(c), HRS; §12-22-26, HAR]

- If any contractor interferes with or delays any investigation, the contracting agency shall withhold further payments until the delay has ceased. Interference or delay includes failure to provide requested records or information within ten days, failure to allow employees to be interviewed during working hours on the job, and falsification of payroll records. The department shall assess a penalty of $10,000 per project, and $1,000 per day thereafter, for interference or delay. [§104-22(b), HRS; §12-22-26, HAR]

- Failure by the contracting agency to include in the provisions of the contract or specifications the requirements of Chapter 104, HRS, relating to coverage and the payment of prevailing wages and overtime, is not a defense of the contractor or subcontractor for noncompliance with the requirements of this chapter. [§104-2(f), HRS]

For additional information, visit the department's website at *http://labor.hawaii.gov/wsd*
or contact any of the following DLIR offices:

Oahu (Wage Standards Division) ..... (808) 586-8777
Hawaii Island ..... (808) 974-6464
Maui and Kauai ..... (808) 243-5322

PROPOSAL TO THE

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

PROJECT:	**TAXILANE T1 EXTENSION** **LIHUE AIRPORT** **LIHUE, KAUAI, HAWAII**
STATE PROJECT NO.:	**CK1627-33**
COMPLETION TIME:	All work under this Contract shall be completed within three hundred and sixty-five (365) CALENDAR DAYS from the date indicated in the Notice to Proceed from the State.
LIQUIDATED DAMAGES:	THREE THOUSAND DOLLARS ($3,000) for each and every Working Day which the Contractor has delayed the completion of this project.
STATE PROJECT MANAGER:	Maybelle Lee Department of Transportation, Airports 400 Rodgers Boulevard, Suite 700 Honolulu, HI 96819 Email: Maybelle.p.lee@hawaii.gov phone: 808-838-8890
ELECTRONIC SUBMITTAL:	Bidders shall submit and upload the complete Proposal to HIePRO prior to the bid opening date and time. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Bidders shall refer to SPECIAL PROVISIONS 2.8 PREPARATION AND DELIVERY OF BID for complete details. FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.

Director of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Sir:

The undersigned Bidder declares the following:

1. It has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal.

2. It has not been assisted or represented on this matter by any individual who has, in a State capacity, been involved in the subject matter of this contract within the past two years.

3. It has not and will not, either directly or indirectly offered or given a gratuity (i.e. an entertainment or gift) to any State or County employee to obtain a contract or favorable treatment under a contract.

The undersigned Bidder further agrees to the following:

1. If this proposal is accepted, it shall execute a contract with the Department to provide all necessary labor, machinery, tools, equipment, apparatus and any other means of construction, to do all the work and to furnish all the materials specified in the contract in the manner and within the time therein prescribed in the contract, and that it shall accept in full payment therefore the sum of the unit and/or lump sum prices as set forth in the attached proposal schedule for the actual quantities of work performed and materials furnished and furnish satisfactory security in accordance with Section 103D-324, Hawaii Revised Statutes, within 10 days after the award of the contract or within such time as the Director of Transportation may allow after the undersigned has received the contract documents for execution, and is fully aware that non-compliance with the aforementioned terms will result in the forfeiture of the full amount of the bid guarantee required under Section 103D-323, Hawaii Revised Statutes.

2. That the quantities given in the attached proposal schedule are approximate only and are intended principally to serve as a guide in determining and comparing the bids.

3. That the Department does not either expressly or by implication, agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work, as may be deemed necessary or advisable by the Director of Transportation, and that all increased or decreased quantities of work shall be performed at the unit prices set forth in the attached proposal schedule except as provided for in the specifications.

4. In case of a discrepancy between unit prices and the totals in said Proposal Schedule, the unit prices shall prevail.

5. Agrees to begin work within 10 working days after the date of notification to commence with the work, which date is in the notice to proceed, and shall finish the entire project within the time prescribed.

6. The Director of Transportation reserves the right to reject any or all bids and to waive any defects when in the Director's opinion such rejections or waiver will be for the best interest of the public.

The Bidder acknowledges receipt of and certifies that it has completely examined the following listed items: the Hawaii Department of Transportation, Air and Water Transportation Facilities Division General Provisions for Construction Projects dated 2016, the Notice to Bidders, the Special Provisions, if any, the Technical Provisions, the Proposal, the Contract and Bond Forms, and the Project Plans.

In accordance with Section 103D-323, Hawaii Revised Statutes, this proposal is accompanied with a bid security in the amount of 5% of the total amount bid, in the form checked below. (Check applicable bid security submitted with bid.)

_____ Surety Bid Bond (Use standard form),

_____ Cash,

_____ Cashier's Check,

_____ Certified Check, or

_____ _____.
(Fill in other acceptable security.)

The undersigned Bidder acknowledges receipt of any addendum issued by the Department by recording in the space below the date of receipt.

Addendum No. 1 _____ Addendum No. 3 _____

Addendum No. 2 _____ Addendum No. 4 _____

In accordance with Section 103D-302, Hawaii Revised Statutes, the undersigned as Bidder, has listed the name of each person or firm, who will be engaged by the Bidder on the project as a Subcontractor or Joint Contractor and the nature of work to be done by each. **The Bidder must adequately and unambiguously disclose the unique nature and scope of the work to be performed by each Subcontractor or Joint Contractor.** For each listed firm, the Bidder declares the respective firm is a Subcontractor or Joint Contractor and is subject to evaluation as a Subcontractor or Joint Contractor. It is understood that failure to comply with the aforementioned requirements may be cause for rejection of the bid submitted.

Name of Subcontractor	Nature and Scope of Work
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

Name of Joint Contractor	Nature and Scope of Work
1.	
2.	
3.	

NOTES:

"None" or if left blank indicates no Subcontractor or Joint Contractor.

If more space is needed, attach additional sheets.

The undersigned hereby certifies that the bid prices contained in the attached proposal schedule have been carefully checked and are submitted as correct and final.

This declaration is made with the understanding that the undersigned is subject to the penalty of perjury under the laws of the United States and is in violation of the Hawaii Penal Code, Section 710-1063, unsworn falsification to authorities, of the Hawaii Revised Statutes, for knowingly rendering a false declaration.

_____
Bidder (Company Name)

By_____
Authorized Signature

_____
Print Name and Title

_____

_____
Business Address

_____
Business Telephone

_____
Date

_____
Contact Person (If different from above)

Phone:_____ Email:_____

NOTE:

If Bidder is a CORPORATION, the legal name of the corporation shall be set forth above, the corporate seal affixed, together with the signature(s) of the officer(s) authorized to sign contracts for the corporation. Please attach to this page current (not more than six months old) evidence of the authority of the officer(s) to sign for the corporation.

If Bidder is a PARTNERSHIP, the true name of the partnership shall be set forth above, with the signature(s) of the general partner(s). Please attach to this page current (not more than six months old) evidence of the authority of the partner authorized to sign for the partnership.

If Bidder is an INDIVIDUAL, the bidder's signature shall be placed above.

If signature is by an agent, other than an officer of a corporation or a partner of a partnership, a POWER OF ATTORNEY must be on file with the Department before opening bids or submitted with the bid. Otherwise, the Department may reject the bid as irregular and unauthorized.

PREFERENCES

Bidders agree that preferences shall be taken into consideration to determine the low bidder in accordance with said Sections and the rules promulgated, however, the award of contract will be in the amount of the bid offered exclusive of any preferences.

A. HAWAII PRODUCTS PREFERENCE

In accordance with ACT 174, SLH 2022, effective June 27, 2022, Hawaii Products Preference shall not apply to solicitations for public works construction. Therefore, the Hawaii Products Preference shall not apply to this project.

B. APPRENTICESHIP PROGRAMS PREFERENCE

In accordance with ACT 17, SLH 2009 – Apprenticeship Program, a 5% bid adjustment for bidders that are parties to apprenticeship agreements pursuant to Hawaii Revised Statutes (HRS) Section 103-55.6 may be applied to the bidder's price for evaluation purposes.

Any bidder seeking this preference must be a party to an apprenticeship agreement registered with the Department of Labor and Industrial Relations at the time the offer is made for each apprenticeable trade the bidder will employ to construct the public works projects for which the offer is being made.

The bidder is responsible for complying with all submission requirements for registration of its apprenticeship program before requesting the preference.

( ) Yes, I wish to be considered for the Apprenticeship Programs Preference. I have included Certification Form(s) 1 with my bid.

C. RECYCLED PRODUCT PREFERENCE

Recycled product preference shall not apply to this proposal.

TAXILANE T1 EXTENSION
LIHUE AIRPORT
KAUAI, HAWAII
STATE PROJECT NO. CK1627-33

PROPOSAL SCHEDULE – BASE BID

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total
01040.1	Unforeseen Conditions	Allowance		Allowance	$ 200,000.00
01040.2	Utility Locating and Potholing	Allowance		Allowance	$ 150,000.00
01561.1	Construction Site Pollution Controls	LS	LS	LS	$
01562.1	Additional Management of Contaminated Medias, Soils Disposal, and Soils Reuse	Allowance		Allowance	$ 200,000.00
01700.1	Mobilization (not to exceed 6% of sum of all items, excluding this item and all allowances)	LS	LS	LS	$
01800.1	Special Requirements for Contractors on the AOA	LS	LS	LS	$
01800.2	Biological Bird Monitoring	Allowance		Allowance	$ 150,000.00
01900.1	Project Survey and Stakeout	LS	LS	LS	$
02101.1	Remove Existing AC Pavements	LS	LS	LS	$
02101.2	Remove Miscellaneous Structures	LS	LS	LS	$
02101.3	Remove Existing Concrete Pad	LS	LS	LS	$
02151.1	Clearing and Grubbing	LS	LS	LS	$
02152.1	Unclassified Excavation and Embankment	LS	LS	LS	$
02152.2	Unclassified Excavation and Stockpile at Airport	LS	LS	LS	$
02152.3	Unclassified Over-Excavation and Stockpile at Airport	Allowance		Allowance	$ 130,000.00
02152.4	8” Deep Subgrade Preparation	LS	LS	LS	$
02209.1	Crushed Aggregate Base Course, 8” Thick	LS	LS	LS	$
02209.2	Crushed Aggregate Base Course, 8” Thick For Backfill of Over-Excavation Including Geogrid	Allowance		Allowance	$ 70,000.00
02403.1	Asphalt Mix Pavement, 4” Thick, Surface Course	LS	LS	LS	$
02605.1	Clean and Fill Existing Cracks, 0.5” to 1.5” Wide	Allowance		Allowance	$ 30,000.00
02620.1	Permanent Pavement Markings and Striping	LS	LS	LS	$
02620.2	Temporary Pavement Markings and Striping	LS	LS	LS	$
02620.3	Remove Pavement Markings and Striping	LS	LS	LS	$
02620.4	Elevated Edge Retro-Reflective Marker	LS	LS	LS	$
02626.1	Emulsified Asphalt Slurry Seal Treatment	LS	LS	LS	$
02701.1	Reinforced Concrete Pipe, 12" Diameter, Class III	LS	LS	LS	$

02701.2	Reinforced Concrete Pipe, 18" Diameter, Class III	LS	LS	LS	$ _____
02751.1	Catch Basin, 2' x 3', H-20 Traffic Rated, Type G1	LS	LS	LS	$ _____
02751.2	Catch Basin, 2' x 3', H-20 Traffic Rated	LS	LS	LS	$ _____
02751.3	Manhole, 4' x 4', H-20 Traffic Rated	LS	LS	LS	$ _____
02751.4	Connect to Existing Storm Drain Structure	LS	LS	LS	$ _____
02751.5	Adjust Water Valve to Grade and Install H-20 Traffic Rated Valve Box	LS	LS	LS	$ _____
02903.1	Sprigging	LS	LS	LS	$ _____
02905.1	Topsoil	LS	LS	LS	$ _____
16110.1	Utility Protection Slab	LS	LS	LS	$ _____

TOTAL AMOUNT (BASE BID) $ _____

PROPOSAL SCHEDULE – ADDITIVE ALTERNATE "A"

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total
02152.B1	Transport and Dispose Excavated Stockpiled Soils As Solid Waste at DOH or EPA Permitted Disposal Landfill	LS	LS	LS	$ _____
02152.B2	Transport and Dispose Over-Excavated Stockpiled Soils As Solid Waste at DOH or EPA Permitted Disposal Landfill	Allowance		Allowance	$ 200,000.00

TOTAL AMOUNT (ADDITIVE ALTERNATE "A") $ _____

PROPOSAL SCHEDULE – ADDITIVE ALTERNATE "B"

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total
02152.C1	Transport and Dispose Excavated Stockpiled Soils As Hazardous Waste at An EPA Regulated Facility	LS	LS	LS	$ _____
02152.C2	Transport and Dispose Over-Excavated Stockpiled Soils As Hazardous Waste at An EPA Regulated Facility	Allowance		Allowance	$ 400,000.00

TOTAL AMOUNT (ADDITIVE ALTERNATE "B") $ _____

PROPOSAL SCHEDULE – ADDITIVE ALTERNATE "C"

Item No.	Description	Approx. Quantity	Unit	Unit Price	Total
02101.A1	Remove Existing AC Pavements	LS	LS	LS	$ _____
02152.A1	Unclassified Excavation and Stockpile at Airport	LS	LS	LS	$ _____
02152.A2	Unclassified Over-Excavation and Stockpile at Airport	Allowance		Allowance	$ 3,000.00
02152.A3	8" Deep Subgrade Preparation	LS	LS	LS	$ _____
02209.A1	Crushed Aggregate Base Course, 8" Thick	LS	LS	LS	$ _____
02209.A2	Crushed Aggregate Base Course, 8" Thick For Backfill of Over-Excavation Including Geogrid	Allowance		Allowance	$ 2,000.00
02403.A1	Asphalt Mix Pavement, 4" Thick, Surface Course	LS	LS	LS	$ _____
16108.A1	No.8 AWG, 5 kV, L-824, Type C Cable, Installed in Duct Bank or Conduit	LS	LS	LS	$ _____
16108.A2	No. 6 AWG, Insulated, Stranded Equipment Ground, Installed in Duct Bank or Conduit	LS	LS	LS	$ _____
16108.A3	No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed Above the Duct Bank or Conduit, Including Connections/Terminations	LS	LS	LS	$ _____
16110.A1	2-4" Electrical Ductbank, Concrete Encased	LS	LS	LS	$ _____
16115.A1	Remove Existing Electrical Handhole and Conduit, and Pull Back Cables	LS	LS	LS	$ _____
16115.A2	Electrical Handhole, H-20 Traffic Rated	LS	LS	LS	$ _____

TOTAL AMOUNT (ADDITIVE ALTERNATE "C") $_____

BID SUMMARY PROPOSAL SCHEDULE

TOTAL AMOUNT (BASE BID)	$ _____
TOTAL AMOUNT (ADDITIVE ALTERNATE "A")	$ _____
TOTAL AMOUNT (ADDITIVE ALTERNATE "B")	$ _____
TOTAL AMOUNT (ADDITIVE ALTERNATE "C")	$ _____
TOTAL AMOUNT FOR COMPARSION OF BIDS	$ _____

Notes:
The bid prices herein shall include all labor, materials, equipment, and incidentals necessary to construct all items in place, including installation and testing of equipment, complete and ready for operation, all in accordance with the specifications.

Note 1: Bid shall include all Federal, State, County and other applicable taxes and fees.

Note 2: Bidders shall complete all unit prices and amounts. Failure to do so shall be grounds for rejection of bid.

Note 3: Bidders are required to bid on all items in the BASE BID and all items of the ADDITIVE ALTERNATE "A", ADDITIVE ALTERNATE "B", and ADDITIVE ALTERNATE "C" to be considered responsive.

Note 4: State reserves the right to reject any or all Bids and to waive any defects in said Bids in the best interest of the State.

Note 5: Submission of a Bid is a warranty that the bidder has made an examination of the project site and is fully aware of all conditions to be encountered in performing the work and the requirements of the plans and specifications.

Note 6: The bidder's attention is directed to Section 2.11 – BID SECURITY of the "General Provisions", as amended by the Special Provisions.

Note 7: Bidders shall be paid for actual work performed as directed by the Engineer for allowance items. Bidders will not be paid overhead and profit for unused allowance funds.

Note 8: Evaluating Bids with Additive Alternates:

Bids will be evaluated based on the total price of the BASE BID plus Additive Alternates, in the priority order listed, up to the point that the total bid does not exceed the Project Control Budget.

Priority Order:

1. Base Bid
2. Additive Alternate “A”
3. Additive Alternate “B”
4. Additive Alternate “C”

The evaluation process will proceed as follows:

a. Prior to opening bids, the State will announce the project control budget on HIePRO.

b. Each bidder’s BASE BID will be considered first.

c. Additive Alternates will be added in priority order to the BASE BID, as long as the total bid amount remains within the established Project Control Budget.

d. The bidder with the lowest aggregate amount, within the project control budget, for the BASE BID plus ADDITIVE ALTERNATE(S) in their precedence order, is the lowest responsible bidder.

Note 9: If the TOTAL AMOUNT (BASE BID) exceeds the funds available for the project, then the State reserves the right to negotiate with the lowest, responsive, responsible bidder as permitted under Section 103D-302, Hawaii Revised Statutes (HRS), to further reduce the scope of work and award a contract thereafter.

Note 10: **Bidders shall submit and upload the complete proposal in HIePRO pior to the bid opening date and time. Proposals received after said due date and time shall not be considered. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Bidders shall not include confidential and/or proprietary documents with the proposal. The record of each bidder and respective bid shall be open to public inspection.** Original (wet ink) proposal documents are not required to be submitted. **Contract award shall be based on evaluation of proposals submitted and uploaded to HIePRO.**

FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.

If there is a conflict between this specification document and the HIePRO solicitation, the specifications shall govern and control, unless otherwise specified.

SUPPLEMENT TO PROPOSAL SCHEDULE

The Department recognizes that certain items of material to be incorporated into the project and/or consumed in the prosecution of the project are temporarily in short supply and beyond the control and without the fault of the Contractor. The effect of such shortages has, among other things, resulted in periodic fluctuations in the posted prices of such short supply materials, thereby making the proposal difficult for the Contractor to bid with confidence.

The only materials considered to be in short supply are asphalt cement, portland cement, reinforcing steel, structural steel and galvanized steel.

Each bidder shall submit with the proposal a written statement from the supplier of each short supply material indicating the supplier's current posted price, effective date of that price and the location of the material at that posted price (by island).

If the price of such short supply material is increased or decreased by more than 5% by the supplier prior to the completion of that contract item requiring the short supply material, the Contractor shall submit to the Department a written statement from the supplier indicating the effective date and changed price the Contractor will thereafter be charged for such short supply material. The Contractor shall also obtain whenever possible, quotations for furnishing the material from other available local suppliers. The quotations shall be obtained sufficiently in advance of the need for the material to allow review by the Department so as not to delay the work. The Contractor's request to the Department for adjusted compensation due to such changed prices will be computed only with prices in effect at the time of delivery. Only the lowest quotation obtained will be accepted by the Department. Transportation, handling, loading, processing and other similar costs will not be subject to adjusted compensation.

No adjustment to the unit bid prices will be made when the increase or decrease in the price of the short material is less than 5% of the original posted price.

If the adjustment to the unit bid price is decreased in the price of the short supply material by more than 5% of the original posted price, the State will be credited. The Contractor shall notify the State within five (5) working days in the event of such an occurrence.

When an adjustment in price is made in accordance with this section, the adjustment will be allowed only so long as the purchase price remains more or less than 5% of the original posted price.

If an increase in the price of any short supply material exceeds or is scheduled to exceed 5% of the original posted price, the Contractor must notify the State within five (5) working days before using the short supply material. Upon receipt of such notification from the Contractor, the State will direct the Contractor to either (1) authorize work to proceed as usual with the assurance that the indicated incremental price increase above the 5% will be compensable, (2) issue such change orders as the State may deem necessary to reduce further requirements of the short supply material which is to be paid at the increase price, or (3) if the material is considered to have priced itself beyond reason or beyond what the State can pay, the State may order cessation

of further use of such short supply material on the project. Such notification by the Contractor will be required at each instance of incremental price increase above the 5% limit. If the Contractor fails to notify the State of any such incremental price increase within five (5) working days before using the short supply material and continues to utilize the short supply material on the project, the State will not be responsible for payment for the incremental cost increase of which the State was not forewarned.

Computation for the adjusted compensation will be as follows:

(A) Portland Cement

If, X = Adjustment per cubic yard of concrete,

P = Portland cement content of the approved mix design expressed in hundredweight per cubic yard of concrete,

Q = Increase or decrease in the price of portland cement in dollars per hundredweight,

Then, $X = QP$

Example: Posted price of Portland cement increases from \$1.40 to \$1.70 per cwt. and the hundredweight (cwt) of concrete is 5.6 cwt per c.y., then the adjustment will be:

\$1.70 - \$1.40	=	\$0.30
(\$1.40) × (5%)	=	\$0.07
\$0.30 - \$0.07	=	\$0.23
X	=	(\$0.23) × (5.6)
	=	\$1.29 per c.y. of concrete

(B) Asphalt Cement

If, X = Adjustment per ton of mix,

P = Asphalt cement content, expressed in percentage of dry weight of the aggregates, as determined and accepted by the Department for each of the design plant mixes,

Q = Increase or decrease in the price of asphalt cement, in dollars per ton,

Then, $X = Q \times (P) \div (100 + P)$

Example: Posted price of asphalt concrete increases from \$70 to \$80 per ton and the asphalt content of the A.C. mix was accepted at 6.0%, then the adjustment shall be:

$80.00 - $70.00	=	$10.00
($70.00) × (5%)	=	$3.50
$10.00 - $3.50	=	$6.50
X	=	$6.50 × 6 / (100 + 6)
	=	$0.37 per ton A.C. mix

(C) Reinforcing Steel

If, X = Adjustment for reinforcing steel,

P = Weight of reinforcing steel, expressed in hundredweight,

Q = Increase or decrease in the price of reinforcing steel in dollars per hundredweight,

Then, X = QP

Example: Posted price of grade 40 reinforcing steel increases from $14.00 to $15.00 per cwt and the weight of the grade 40 reinforcing steel is 80,000 pounds, then the adjustment shall be:

$15.00 - $14.00	=	$1.00
($14.00) × (5%)	=	$0.70
$1.00 - $0.70	=	$0.30
X	=	($0.30) × (800)
	=	$240 for grade 40 reinforcing steel

The contractor shall submit to the Department original receipted bills covering the short supply material used on the project as soon as practicable after shipments are completed. The bills shall be accompanied by a tabulation on which the bills are listed in chronological order showing for each bill the quantity, the date shipped from the supplier's terminal and the price per unit at the place indicated in the posted price (reflecting any deductions for quantity shipments). These bills shall be subject to audit verification.

The Department reserves the right to alter the quantities of material to be furnished in accordance with the provisions of General Provisions, Article IV, Section 4.2 – CHANGES.

The Department also reserves the right, during construction, to decrease or increase the scope of work, because of limitations of funds, with no adjustment in unit prices other than that specified hereinabove.

Price increases as specified hereinabove shall not exceed the remaining unpaid balance in the contract at any point in time without prior review and approval from the State Project Manager or designated representative.

SURETY BID BOND

Bond No. _____

KNOW TO ALL BY THESE PRESENTS:

That we, _____
(Full name or legal title of offeror)

as Offeror, hereinafter called the Principal, and

_____
(name of bonding company)

as Surety, hereinafter called Surety, a corporation authorized to transact business as a Surety in the State of Hawaii, are held and firmly bound unto _____
(State/county entity)

as Owner, hereinafter called Owner, in the penal sum of

_____
(required amount of bid security)

Dollars ($_____), lawful money of the United States of America, for the payment of which sum well and truly to be made, the said Principal and the said Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS:

The Principal has submitted an offer for _____

_____
(project by number and brief description)

NOW, THEREFORE:

The condition of this obligation is such that if the Owner shall reject said offer, or in the alternate, accept the offer of the Principal and the Principal shall enter into a contract with the Owner in accordance with the terms of such offer, and give such bond or bonds as may be specified in the solicitation or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof as specified in the solicitation then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed this _____ day of _____, _____

(Seal) _____
Name of Principal (Offeror)

_____
Signature

_____
Title

(Seal) _____
Name of Surety

_____
Signature

_____
Title

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

FORMS

Contents:

CONTRACT

THIS AGREEMENT, made this day of _____, by and between the STATE OF HAWAII, by its Director of Transportation, hereinafter referred to as "STATE", and «CONTRACTOR», «STATE_OF_INCORPORATON», whose business/post office address is «ADDRESS», hereinafter referred to as CONTRACTOR";

WITNESSETH: That for and in consideration of the payments hereinafter mentioned, the CONTRACTOR hereby covenants and agrees with the STATE to complete in place, furnish and pay for all labor and materials necessary for "«PROJECT_NAME_AND_NO»", or such a part thereof as shall be required by the STATE, the total amount of which labor, material and construction shall be computed at the unit and/or lump sum prices set forth in the attached proposal schedule and shall be the sum of «BASIC»----DOLLARS ($«BASIC_NUMERIC») as follows:

TOTAL AMOUNT FOR COMPARISON OF BIDS……$«BASIC_NUMERIC»

which sum shall be provided from State funds, all in accordance with the specifications, the special provisions, if any, the notice to bidders, the instructions to bidders, the proposal and plans for «PROJECT_NO_ONLY», and any supplements thereto, on file in the office of the Director of Transportation. These documents, together with all alterations, amendments, and additions thereto and deductions therefrom, are attached hereto or incorporated herein by reference and made a part of this contract.

The CONTRACTOR hereby covenants and agrees to complete such construction within «WORKING_DAYS» from the date indicated in the Notice to Proceed from the State subject, however, to such extensions as may be provided for in writing under the specifications.

For and in consideration of the covenants, undertakings and agreements of the CONTRACTOR herein set forth and upon the full and faithful performance thereof by the CONTRACTOR, the STATE hereby agrees to pay the CONTRACTOR the sum of «BASIC»---DOLLARS ($«BASIC_NUMERIC») in lawful money, but not more than such part of the same as is actually earned according to the STATE's determination of the actual quantities of work performed and materials furnished by the CONTRACTOR at the unit or lump sum prices set forth in the attached proposal schedule. Such payment, including any extras, shall be made, subject to such additions or deductions hereto or hereafter made in the manner and at the time prescribed in the specifications and this contract.

An additional sum of «EXTRAS»-----DOLLARS ($«EXTRA_NUMERIC») is hereby provided for extra work.

All words used herein in the singular shall extend to and include the plural. All words used in the plural shall extend to and include the singular. The use of any gender shall extend to and include all genders.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be duly executed the day and year first above written.

STATE OF HAWAII

_____
Director of Transportation

«CONTRACTOR» (Seal)

_____
Signature

_____
Print name

_____
Print Title

_____
Date

PERFORMANCE BOND

KNOW TO ALL BY THESE PRESENTS:

That we, _____
(full legal name and street address of Contractor)

as Contractor, hereinafter called Contractor, is held and firmly bound unto the

_____
(State/County entity)

its successors and assigns, as Obligee, hereinafter called Obligee, in the amount

_____DOLLARS $_____),
(Dollar amount of Contract)

lawful money of the United States of America, for the payment of which to the said Obligee, well and truly to be made, Contractor binds itself, its heir, executors, administrators, successors and assigns, firmly by these presents. Said amount is evidenced by:

☐ **Legal Tender;**

☐ **Share Certificate** unconditionally assigned to or made payable at sight to _____
Description:_____;

☐ **Certificate of Deposit**, No. _____, dated _____ issued by _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Cashier's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Teller's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Treasurer's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Official Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Certified Check** No. _____, dated _____ accepted by a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

WHEREAS:

The Contractor has by written agreement dated _____ entered into a contract with Obligee for the following Project:_____

_____

hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE,

The Condition of this obligation is such that, if Contractor shall promptly and faithfully perform the Contract in accordance with, in all respects, the stipulations, agreements, covenants and conditions of the Contract as it now exists or may be modified according to its terms, and shall deliver the Project to the Obligee, or to its successors or assigns, fully completed as in the Contract specified and free from all liens and claims and without further cost, expense or charge to the Obligee, its officers, agents, successors or assigns, free and harmless from all suits or actions of every nature and kind which may be brought for or on account of any injury or damage, direct or indirect, arising or growing out of the doing of said work or the repair or maintenance thereof or the manner of doing the same or the neglect of the Contractor or its agents or servants or the improper performance of the Contract by the Contractor or its agents or servants or from any other cause, then this obligation shall be void; otherwise it shall be and remain in full force and effect.

AND IT IS HEREBY STIPULATED AND AGREED that suit on this bond may be brought before a court of competent jurisdiction without a jury, and that the sum or sums specified in the said Contract as liquidated damages, if any, shall be forfeited to the Obligee, its successors or assigns, in the event of a breach of any, or all, or any part of, covenants, agreements, conditions, or stipulations contained in the Contract or in this bond in accordance with the terms thereof.

The amount of this bond may be reduced by and to the extent of any payment or payments made in good faith hereunder.

Signed and sealed this _____ day of _____, _____.

(Seal)_____
Name of Contractor

_____
Signature*

_____
Title

*ALL SIGNATURES MUST BE ACKNOWLEDGED
BY A NOTARY PUBLIC

PERFORMANCE BOND (SURETY)
(6/21/07)

KNOW TO ALL BY THESE PRESENTS:

That _____,
(Full Legal Name and Street Address of Contractor)

as Contractor, hereinafter called Principal, and _____

_____
(Name and Street Address of Bonding Company)

as Surety, hereinafter called Surety, a corporation(s) authorized to transact business as a surety in the State of Hawaii, are held and firmly bound unto the _____,
(State/County Entity)

its successors and assigns, hereinafter called Obligee, in the amount of _____

_____
DOLLARS ($_____), to which payment Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above-bound Principal has signed a Contract with Obligee on _____, for the following project:_____
_____
_____
_____
_____
_____
hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE, the condition of this obligation is such that:

If the Principal shall promptly and faithfully perform, and fully complete the Contract in strict accordance with the terms of the Contract as said Contract may be modified or amended from time to time; then this obligation shall be void; otherwise to remain in full force and effect.

Surety to this Bond hereby stipulates and agrees that no changes, extensions of time, alterations, or additions to the terms of the Contract, including the work to be performed thereunder, and the specifications or drawings accompanying same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, extensions of time, alterations, or additions, and agrees that they shall become part of the Contract.

In the event of Default by the Principal, of the obligations under the Contract, then after written Notice of Default from the Obligee to the Surety and the Principal and subject to the limitation of the penal sum of this bond, Surety shall remedy the Default, or take over the work to be performed under the Contract and complete such work, or pay moneys to the Obligee in satisfaction of the surety's performance obligation on this bond.

Signed this _____ day of _____, _____.

(Seal) _____
Name of Principal (Contractor)

* _____
Signature

_____
Title

(Seal) _____
Name of Surety

* _____
Signature

_____
Title

*ALL SIGNATURES MUST BE ACKNOWLEDGED
BY A NOTARY PUBLIC

LABOR AND MATERIAL PAYMENT BOND

KNOW TO ALL BY THESE PRESENTS:

That we, _____
(full legal name and street address of Contractor)

as Contractor, hereinafter called Contractor, is held and firmly bound unto _____
(State/County entity)

its successors and assigns, as Obligee, hereinafter called Obligee, in the amount

_____DOLLARS ($_____)
(Dollar amount of Contract)

lawful money of the United States of America, for the payment of which to the said Obligee, well and truly to be made, Contractor binds itself, its heir, executors, administrators, successors and assigns, firmly by these presents. Said amount is evidenced by:

☐ **Legal Tender;**

☐ **Share Certificate** unconditionally assigned to or made payable at sight to_____
Description:_____

☐ **Certificate of Deposit**, No. _____, dated _____ issued by _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Cashier's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Teller's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Treasurer's Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Official Check** No. _____, dated _____ drawn on _____ a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

☐ **Certified Check** No. _____, dated _____ accepted by a bank, savings institution or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, payable at sight or unconditionally assigned to _____;

WHEREAS:

The Contractor has by written agreement dated _____ entered into a contract with Obligee for the following Project:_____

_____

hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE,

The condition of this obligation is such that, if Contractor shall promptly and faithfully perform the Contract in accordance with, in all respects, the stipulations, agreements, covenants and conditions of the Contract as it now exists or may be modified according to its terms, free from all liens and claims and without further cost, expense or charge to the Obligee, its officers, agents, successors or assigns, free and harmless from all suits or actions of every nature and kind which may be brought for or on account of any injury or damage, direct or indirect, arising or growing out of the doing of said work or the repair or maintenance thereof or the manner of doing the same or the neglect of the Contractor or its agents or servants or the improper performance of the Contract by the Contractor or its agents or servants or from any other cause, then this obligation shall be void; otherwise it shall be and remain in full force and effect.

AND IT IS HEREBY STIPULATED AND AGREED that suit on this bond may be brought before a court of competent jurisdiction without a jury, and that the sum or sums specified in the said Contract as liquidated damages, if any, shall be forfeited to the Obligee, its successors or assigns, in the event of a breach of any, or all, or any part of, covenants, agreements, conditions, or stipulations contained in the Contract or in this bond in accordance with the terms thereof.

AND IT IS HEREBY STIPULATED AND AGREED that this bond shall inure to the benefit of any and all persons entitled to file claims for labor performed or materials furnished in said work so as to give any and all such persons a right of action as contemplated by Sections 103D-324(d) and 103D-324(e), Hawaii Revised Statutes.

The amount of this bond may be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payments of mechanics' liens which may be filed of record against the Project, whether or not claim for the amount of such lien be presented under and against this bond..

Signed this _____ day of _____, _____.

(Seal)_____
Name of Contractor

_____
Signature*

_____
Title

ALL SIGNATURES MUST BE ACKNOWLEDGED BY A NOTARY PUBLIC

LABOR AND MATERIAL PAYMENT BOND (SURETY)
(6/21/07)

KNOW TO ALL BY THESE PRESENTS:

That _____,
(Full Legal Name and Street Address of Contractor)

as Contractor, hereinafter called Principal, and _____

_____,
(Name and Street Address of Bonding Company)
as Surety, hereinafter called Surety, a corporation(s) authorized to transact business as a surety in the State of Hawaii, are held and firmly bound unto the _____,
(State/County Entity)

its successors and assigns, hereinafter called Obligee, in the amount of _____

_____
_____ Dollars ($_____), to which payment Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above-bound Principal has signed Contract with the Obligee on _____ for the following project:_____
_____
_____
_____
_____
hereinafter called Contract, which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall promptly make payment to any Claimant, as hereinafter defined, for all labor and materials supplied to the Principal for use in the performance of the Contract, then this obligation shall be void; otherwise to remain in full force and effect.

1. Surety to this Bond hereby stipulates and agrees that no changes, extensions of time, alterations, or additions to the terms of the Contract, including the work to be performed thereunder, and the specifications or drawings accompanying same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, extensions of time, alterations, or additions, and agrees that they shall become part of the Contract.

2. A "Claimant" shall be defined herein as any person who has furnished labor or materials to the Principal for the work provided in the Contract.

Every Claimant who has not been paid amounts due for labor and materials furnished for work provided in the Contract may institute an action against the Principal and its Surety on this bond at the time and in the manner prescribed in Section 103D-324, Hawaii Revised Statutes, and have the rights and claims adjudicated in the action, and judgment rendered thereon; subject to the Obligee's priority on this bond. If the full amount of the liability of the Surety on this bond is insufficient to pay the full amount of the claims, then after paying the full amount due the Obligee, the remainder shall be distributed pro rata among the claimants.

Signed this _____ day of _____, _____.

(Seal) _____
Name of Principal (Contractor)

* _____
Signature

_____
Title

(Seal) _____
Name of Surety

* _____
Signature

_____
Title

*ALL SIGNATURES MUST BE ACKNOWLEDGED
BY A NOTARY PUBLIC

CHAPTER 104, HRS COMPLIANCE CERTIFICATE

The undersigned bidder does hereby certify to the following:

1. Individuals engaged in the performance of the contract on the job site shall be paid:

A. Not less than the wages that the director of labor and industrial relations shall have determined to be prevailing for corresponding classes of laborers and mechanics employed on public works projects; and

B. Overtime compensation at one and one-half times the basic hourly rate plus fringe benefits for hours worked on Saturday, Sunday, or a legal holiday of the State or in excess of eight hours on any other day.

2. All applicable laws of the federal and state governments relating to workers' compensation, unemployment compensation, payment of wages, and safety shall be fully complied with.

DATED at Honolulu, Hawaii, this _____ day of _____, 20___.

«CONTRACTOR»
Name of Corporation, Partnership, or Individual

Signature and Title of Signer

Notary Seal
NOTARY ACKNOWLEDGEMENT

Subscribed and sworn before me this
_____day of_____
Notary signature_____
Notary public, State of _____
My Commission Expires:_____

Notary Seal
NOTARY CERTIFICATION

Doc. Date: _____ #Pages: ____
Notary Name: _____ _____Circuit
Doc. Description: _____
_____
Notary signature_____
Date _____

PROVISIONS TO BE INCLUDED IN CONSTRUCTION PROCUREMENT SOLICITATIONS

1. Definitions for terms used in HRS Chapter 103B as amended by Act 192, SLH 2011:

   a. "Contract" means contracts for construction under 103D, HRS.

   b. "Contractor" has the same meaning as in Section 103D-104, HRS, provided that "contractor" includes a subcontractor where applicable.

   c. "Construction" has the same meaning as in Section 103D-104, HRS.

   d. "General Contractor" means any person having a construction contract with a governmental body.

   e. "Procurement Officer" has the same meaning as in Section 103D-104, HRS.

   f. "Resident" means a person who is physically present in the State of Hawai'i at the time the person claims to have established the person's domicile in the State of Hawai'i and shows the person's intent is to make Hawai'i the person's primary residence.

   g. "Shortage trade" means a construction trade in which there is a shortage of Hawai'i residents qualified to work in the trade as determined by the Department of Labor and Industrial Relations.

2. HRS Chapter 103B as amended by Act 192, SLH 2011–Employment of State Residents Requirements:

   a. A Contractor awarded a contract shall ensure that Hawai'i residents comprise not less than 80% of the workforce employed to perform the contract work on the project. The 80% requirement shall be determined by dividing the total number of hours worked on the contract by Hawai'i residents, by the total number of hours worked on the contract by all employees of the Contractor in the performance of the contract. The hours worked by any Subcontractor of the Contractor shall count towards the calculation for this section. The hours worked by employees within shortage trades, as determined by the Department of Labor and Industrial Relations (DLIR), shall not be included in the calculation for this section.

EXHIBIT 1

b. Prior to award of a contract, an Offeror/Bidder may withdraw an offer/bid without penalty if the Offeror/Bidder finds that it is unable to comply with HRS Chapter 103B as amended by Act 192, SLH 2011.

c. Prior to starting any construction work, the Contractor shall submit the subcontract dollar amount for each of its Subcontractors.

d. The requirements of this section shall apply to any subcontract of $50,000 or more in connection with the Contractor; that is, such Subcontractors must also ensure that Hawai'i residents comprise not less than 80% of the Subcontractor's workforce used to perform the subcontract.

e. The Contractor and any Subcontractor whose subcontract is $50,000 or more shall comply with the requirements of HRS Chapter 103B as amended by Act 192, SLH 2011.

1) Certification of compliance shall be made in writing under oath by an officer of the General Contractor and applicable Subcontractors and submitted with the final payment request.

2) The certification of compliance shall be made under oath by an officer of the company by completing a "Certification of Compliance for Employment of State Residents" form and executing the Certificate before a licensed notary public.

3) In addition to the certification of compliance as indicated above, the Contractor and Subcontractors shall maintain records such as certified payrolls for laborers and mechanics who performed work at the site and time sheets for all other employees who performed work on the project. These records shall include the names, addresses and number of hours worked on the project by all employees of the Contractor and Subcontractor who performed work on the project to validate compliance with HRS Chapter 103B as amended by Act 192, SLH 2011. The Contractor and Subcontractors shall retain these records and provide access to the State for a minimum period of four (4) years after the final payment, except that if any litigation, claim, negotiation, investigation, audit or other action involving the records has been started before the expiration of the four-year period, the Contractor and Subcontractors shall retain the records until completion of the action and resolution of all issues that arise from it, or until the end of the four-year period, whichever occurs later. Furthermore, it shall be the Contractor's responsibility to enforce compliance with this provision by any Subcontractor.

f. A General Contractor or applicable Subcontractor who fails to comply with this section shall be subject to any of the following sanctions:

1) With respect to the General Contractor, withholding of payment on the contract until the Contractor or its Subcontractor complies with HRS Chapter 103B as amended by Act 192, SLH 2011.

2) Proceedings for debarment or suspension of the Contractor or Subcontractor under Hawai'i Revised Statues §103D-702.

3. Conflict with Federal Law: This section shall not apply if the application of this section is in conflict with any federal law, or if the application of this section will disqualify the State from receiving Federal funds or aid.

EXHIBIT 1

CERTIFICATION OF COMPLIANCE
FOR
EMPLOYMENT OF STATE RESIDENTS
HRS CHAPTER 103B, AS AMENDED BY ACT 192, SLH 2011

Project Title: _____

Agency Project No: _____

Contract No.: _____

As required by Hawai'i Revised Statutes Chapter103B, as amended by Act 192, Session Laws of Hawaii 2011–Employment of State Residents on Construction Procurement Contracts, I hereby certify under oath, that I am an officer of _____ and
(Name of Contractor or Subcontractor Company)
for the Project Contract indicated above, _____ was in
(Name of Contractor or Subcontractor Company)
compliance with HRS Chapter 103B, as amended by Act 192, SLH 2011, by employing a workforce of which not less than eighty percent are Hawai'i residents, as calculated according to the formula in the solicitation, to perform this Contract.

☐ I am an officer of the **Contractor** for this contract.

☐ I am an officer of a **Subcontractor** for this contract.

CORPORATE SEAL

_____
(Name of Company)

_____
(Signature)

_____
(Print Name)

_____
(Print Title)

Subscribed and sworn to me before this
_____ day of _____, 2011.

_____
Notary Public, 1st Circuit, State of Hawai'i
My commission expires: _____

Doc. Date: _____ # of Pages_____ 1st Circuit
Notary Name: _____
Doc. Description: _____
_____
_____

_____
Notary Signature Date
NOTARY CERTIFICATION

EXHIBIT 2