



PURCHASING

June 26, 2026

MEMO TO: Prospective Bidders

FROM: Kimberly Toon, Purchasing Manager

SUBJECT: **Addendum #2:** Rehabilitation of Taxiway Foxtrot and Golf Project

DUE DATE AND TIME: **JULY 09, 2026; 2:00 p.m.**

1. The Bid Documents are hereby modified by this Addendum #2 dated June 26, 2026. To include the following changes:

SPECIFICATIONS:

- a. **L-108 Underground Power Cable for Airports**
 - i. **Revised to include item *L-108-3 3/4" x 10' Copper Clad Ground Rod - Supplemental.***
- b. **L-125 - Installation of Airport Lighting Systems**
 - i. **Revised Section 125-5.1 to clarify that item L-125-7 is the contractor's cost associated with coordinating the recalibration of the existing Constant Current Regulator.**
 - ii. **Revised to include item *L-125-8 CCR Re-calibration Coordination with ADB-Safegate – Manufacturer.***
- c. **Invitation to Bid**
 - i. **Revised list of pay items.**

PLANS:

- d. **Sheet C001 – Index of Sheets and Summary of Quantities**
 - i. **Added pay item *L-108-3 3/4" x 10' Copper Clad Ground Rod – Supplemental.***
 - ii. **Revised pay item *L-125-7 CCR Re-Calibration Coordination with ADB-Safegate – Contractor.***
 - iii. **Added pay item *L-125-8 CCR Re-calibration Coordination with ADB-Safegate – Manufacturer.***

2. The foregoing changes shall be incorporated in the Bid Documents, and a copy of the Addendum #2, signed by the Bidder, must accompany the Bid to indicate the Bidder's familiarity with the changes.

BIDDER'S QUESTIONS:

1. *Sign 5 is illustrated as a 4-module sign but the sign legend on side A will fit 3 modules. Since there is no bid item for a 4-module sign making it 3-modules allows the sign to be priced under bid item L-125-6.*
 - a. **Engineer takes no exceptions for Sign 5 to be a 3 module sign rather than a 4 module sign, provided the manufacturer can fit the sign legend on 3 modules.**
2. *Will you please confirm that the airport wants mode 3 signs?*
 - a. **Provide mode 3 signs per plans.**
3. *What are the badging requirements? Is there training required to obtain a badge? And will there be necessary SIDA access for the project?*
 - a. **There is an airport provided training course to obtain a badge. The badge will grant SIDA access but will not grant movement access. Access to the electrical vault must be coordinated with the airport.**
4. *After night closure within the Runway 4-22 RSA, will a post-shift FOD inspection have to be conducted?*
 - a. **Yes. Airport Operations Personnel will inspect the construction site prior to the reopening of any closed active taxiway, runway, and apron.**
5. *Will a trailer be necessary for the RPR?*
 - a. **No trailer will be necessary for the RPR.**
6. *Is P-501 included in the project?*
 - a. **P-501 is not included in the project.**
7. *Are all millings to be placed on Radar Road?*
 - a. **All millings are to be placed at designated locations on Radar Road based on the Millings Placement Plan (Sheet C111 in the Bidding Documents).**
8. *In regard to this project, L-125-7 CCR RE-CALIBRATION COORDINATION WITH ADB-SAFEGATE indicates "include all work associated with coordinating and supporting the CCR manufacturer to complete all re-calibration of the CCR, including, but not limited to, fees, site visit expenses, manufacturer escort access to AOA, hardware modifications if directed by the manufacturer, and all other incidentals required in the field necessary to complete this item." As this is proprietary/sole source to one manufacturer, it will need to be procured outside of this Federally Funded project per AIP Guidelines, Handbook 5100-38D Change 1, 3-36 Limited Noncompetitive Proposal Situations (Sole Source...).*
 - a. **Item L-125-7 revised per this addendum. See attached specification.**
9. *Sheet E306 Note 3 calls out a supplemental ground rod line item. Can this line item be provided?*
 - a. **Engineer will provide a line item and estimate for Supplemental Ground Rods per this addendum.**

10. *Would it be possible to conduct the 2W2" directional drill under Runway 4-22 during a daytime runway closure? This would significantly help reduce the cost of directional drilling.*
- a. **No daytime runway closures of Runway 4-22 are permitted. All work on Runway 4-22 must be completed during night time hours from 12:00 AM to 5:30 AM.**
11. *Can more information be provided regarding the current condition of the CCR's slated to be recalibrated by ADB Safegate? Can the recalibration of the CCR's be performed by the contractor through coordination with ADB Safegate, or must ADB Safegate be on-site to perform the recalibration of the CCR's?*
- a. **One CCR is to be re-calibrated. The CCR is a ferroresonant type CCR and is part of a Switchgear Regulator System and is in working condition. ADB Safegate must be on-site to perform the recalibration of the CCR. See attached specification for more information.**

Attachments: List of Pay Items, L-108, L-125, C001

Bidder Acknowledgement:

Bidder Name (Print):_____

Bidder Signature:_____

Date of Signature:_____

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
C-100-1	CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)	1	LS	\$ _____	\$ _____
C-105-1	MOBILIZATION	1	LS	\$ _____	\$ _____
GP-102-1	SAFETY AND SECURITY	1	LS	\$ _____	\$ _____
GP-103-1	TEMPORARY CONSTRUCTION ITEMS	1	LS	\$ _____	\$ _____
P-101-1	ASPHALT SHOULDER FULL DEPTH PAVEMENT REMOVAL (1.5-INCH DEPTH)	1,100	SY	\$ _____	\$ _____
P-101-2	VEHICLE SERVICE ROAD FULL DEPTH PAVEMENT REMOVAL (UP TO 9-INCH DEPTH)	430	SY	\$ _____	\$ _____
P-101-3	ASPHALT TAXIWAY FULL DEPTH PAVEMENT REMOVAL (UP TO 9-INCH DEPTH)	625	SY	\$ _____	\$ _____
P-101-4	COLD MILLING	24,770	SY	\$ _____	\$ _____
P-101-5	MILLINGS PLACEMENT FOR RADAR ROAD (COMPACTED IN PLACE)	14,040	SY	\$ _____	\$ _____
P-101-6	CONCRETE FLUME REMOVAL	140	SY	\$ _____	\$ _____
C-102-1	TEMPORARY SEEDING AND MULCHING	2,915	SY	\$ _____	\$ _____

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
C-102-2	INSTALLATION AND REMOVAL OF COMPOST SOCK	700	LF	\$ _____	\$ _____
C-102-3	INSTALLATION AND REMOVAL OF ROCK PIPE INLET PROTECTION	1	EA	\$ _____	\$ _____
C-102-4	INSTALLATION AND REMOVAL OF DROP INLET PROTECTION	2	EA	\$ _____	\$ _____
D-701-1	18-INCH CORRUGATED METAL PIPE	35	LF	\$ _____	\$ _____
P-152-1	UNCLASSIFIED EXCAVATION	125	CY	\$ _____	\$ _____
P-152-2	UNSUITABLE EXCAVATION	25	CY	\$ _____	\$ _____
P-152-3	SUBGRADE PREPARATION	890	SY	\$ _____	\$ _____
P-209-1	CRUSHED AGGREGATE BASE COURSE (5-INCH DEPTH)	890	SY	\$ _____	\$ _____
P-401-1	ASPHALT SURFACE COURSE (GRADATION 2)	8,470	TN	\$ _____	\$ _____
P-401-2	ASPHALT LEVELING COURSE (GRADATION 3)	25	TN	\$ _____	\$ _____
P-602-1	EMULSIFIED ASPHALT PRIME COAT	12,840	GA	\$ _____	\$ _____

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
P-603-1	EMULSIFIED ASPHALT TACK COAT	2,140	GA	\$ _____	\$ _____
P-620-1	SURFACE PREPARATION	3,694	SF	\$ _____	\$ _____
P-620-2	WHITE REFLECTIVE MARKING (TYPE I WATERBORNE PAINT)	300	SF	\$ _____	\$ _____
P-620-3	WHITE REFLECTIVE MARKING (TYPE III WATERBORNE PAINT)	3,820	SF	\$ _____	\$ _____
P-620-4	YELLOW REFLECTIVE MARKING (TYPE I WATERBORNE PAINT)	3,230	SF	\$ _____	\$ _____
P-620-5	RED REFLECTIVE MARKING (TYPE I WATERBORNE PAINT)	1,140	SF	\$ _____	\$ _____
P-620-6	BLACK NON-REFLECTIVE MARKING (TYPE I WATERBORNE PAINT, NO GLASS BEADS)	14,120	SF	\$ _____	\$ _____
P-620-7	TYPE I GLASS BEADS, GRADATION A, REFLECTIVE MEDIA	70	LB	\$ _____	\$ _____
P-620-8	TYPE III GLASS BEADS, REFLECTIVE MEDIA	620	LB	\$ _____	\$ _____
T-901-1	SEEDING	0.4	AC	\$ _____	\$ _____
T-905-1	TOPSOIL OBTAINED ON SITE	139	CY	\$ _____	\$ _____

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
T-904-1	SODDING	795	SY	\$ _____	\$ _____
T-908-1	MULCHING	1,709	SY	\$ _____	\$ _____
L-105-1	REMOVE EXISTING STAKE MOUNTED LIGHT FIXTURE	69	EA	\$ _____	\$ _____
L-105-2	REMOVE EXISTING BASE MOUNTED LIGHT FIXTURE AND BASE CAN	12	EA	\$ _____	\$ _____
L-105-3	REMOVE EXISTING IN-PAVEMENT LIGHT FIXTURE AND BASE CAN IN MILL/OVERLAY PAVEMENT	2	EA	\$ _____	\$ _____
L-105-4	REMOVE EXISTING SIGN AND FOUNDATION	8	EA	\$ _____	\$ _____
L-105-5	MISCELLANEOUS ELECTRICAL DEMOLITION	1	LS	\$ _____	\$ _____
L-108-1	NO. 6 AWG, SOLID, BARE COUNTERPOISE WIRE, INSTALLED IN TRENCH, ABOVE THE DUCT BANK OR CONDUIT, INCLUDING GROUND RODS (INITIAL AND SUPPLEMENTAL) AND GROUND CONNECTORS	10,255	LF	\$ _____	\$ _____
L-108-2	NO. 8 AWG, 5 KV, L-824, TYPE C CABLE	14,600	LF	\$ _____	\$ _____
L-108-3	3/4" x 10' COPPER CLAD GROUND ROD - SUPPLEMENTAL	140	EA	\$ _____	\$ _____

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
L-110-1	1 WAY 2-INCH SCHEDULE 40 PVC CONDUIT – DIRECT EARTH BURIED IN TURF	9,400	LF	\$ _____	\$ _____
L-110-2	1 WAY 2-INCH SCHEDULE 40 PVC CONDUIT – DIRECT EARTH BURIED UNDER MILL/OVERLAY PAVEMENT	30	LF	\$ _____	\$ _____
L-110-3	1 WAY 2-INCH SCHEDULE 40 PVC CONDUIT – CONCRETE ENCASED UNDER MILL/OVERLAY PAVEMENT	175	LF	\$ _____	\$ _____
L-110-4	2 WAY 2-INCH SCHEDULE 40 PVC CONDUIT - DIRECT EARTH BURIED	650	LF	\$ _____	\$ _____
L-110-5	2 WAY 2-INCH SCHEDULE 80 HDPE DIRECTIONAL DRILL	400	LF	\$ _____	\$ _____
L-115-1	JUNCTION CAN PLAZA - 2 L-867D BASE CANS	6	EA	\$ _____	\$ _____
L-125-1	L-861T(L) LED TAXIWAY EDGE LIGHT – BASE MOUNTED IN TURF	89	EA	\$ _____	\$ _____
L-125-2	L-861T(L) LED TAXIWAY EDGE LIGHT – BASE MOUNTED IN MILL/OVERLAY PAVEMENT	2	EA	\$ _____	\$ _____
L-125-3	REINSTALL EXISTING IN-PAVEMENT LIGHT FIXTURE ON NEW BASE CAN IN MILL/OVERLAY PAVEMENT	2	EA	\$ _____	\$ _____
L-125-4	L-858(L) LED SIGN, 1-MODULE ON A NEW CONCRETE SIGN BASE	3	EA	\$ _____	\$ _____

Item No.	Item Description	Estimated Quantity		Unit Price in Numbers	Total Amount per Item
L-125-5	L-858(L) LED SIGN, 2-MODULE ON A NEW CONCRETE SIGN BASE	2	EA	\$ _____	\$ _____
L-125-6	L-858(L) LED SIGN, 3-MODULE ON A NEW CONCRETE SIGN BASE	3	EA	\$ _____	\$ _____
L-125-7	CCR RE-CALIBRATION COORDINATION WITH ADB-SAFEGATE - CONTRACTOR	1	LS	\$ _____	\$ _____
L-125-8	CCR RE-CALIBRATION COORDINATION WITH ADB-SAFEGATE - MANUFACTURER	1	AL	\$ _____	\$ _____

This Bid Package is executed by:

ITEM	DETAILS
Name / Title:	
Company Name:	
Mailing Address:	
Email:	
Signature:	
Phone Number:	
NC Contractor License No.:	
License Classification / Limitation:	
Total Bid Amount (figures):	\$
Total Bid Amount (written):	

ACKNOWLEDGEMENT OF ADDENDA

The bidder has received, acknowledged, and incorporated the following addenda in completing this Bid.
(Written Initials and date as appropriate.)

ITEM	DETAILS
Addendum No. 1:	Dated: _____
Addendum No. 2:	Dated: _____
Addendum No. 3:	Dated: _____
Addendum No. 4:	Dated: _____

Item L-108 Underground Power Cable for Airports

The following items in **red** are changes associated with Addendum 2

DESCRIPTION

108-1.1 This item shall consist of furnishing and installing power cables that are direct buried and furnishing and/or installing power cables within conduit or duct banks per these specifications at the locations shown on the plans. It includes excavation and backfill of trench for direct-buried cables only. Also included are the installation of counterpoise wires, ground wires, ground rods and connections, cable splicing, cable marking, cable testing, and all incidentals necessary to place the cable in operating condition as a completed unit to the satisfaction of the RPR. This item shall not include the installation of duct banks or conduit, trenching and backfilling for duct banks or conduit, or furnishing or installation of cable for FAA owned/operated facilities.

EQUIPMENT AND MATERIALS

108-2.1 General.

a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program per AC 150/5345-53, current version.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

d. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format. The RPR reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall maintain a minimum insulation resistance in accordance with paragraph 108-3.10e with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract warranty period when tested in accordance with AC 150/5340-26, Maintenance Airport Visual Aid Facilities, paragraph 5.1.3.1, Insulation Resistance Test.

108-2.2 Cable. Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits latest edition. Conductors for use on 6.6 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #8 American wire gauge (AWG), L-824 Type C , 5,000 volts, non-shielded, with cross-linked polyethylene insulation. Conductors for use on 20 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #6 AWG, L-824 Type C , 5,000 volts, non-shielded, with cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type XHHW, 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, XHHW, 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 XHHW 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-clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 10 feet long and 3/4 inch in diameter.

108-2.4 Cable connections. In-line connections or splices of underground primary cables shall be of the type called for on the plans, and shall be one of the types listed below. No separate payment will be made for cable connections.

a. The cast splice. A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3MTM 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 Item P-610, Concrete for Miscellaneous Structures.

108-2.7 Flowable backfill. Not used.

108-2.8 Cable identification tags. Cable identification tags shall be made from a non-corrosive material with the circuit identification stamped onto the tag. The tags shall be of the type as detailed on the plans.

108-2.9 Tape. Electrical tapes shall be Scotch™ Electrical Tapes –Scotch™ 88 (1-1/2 inch (38 mm) wide) and Scotch™ 130C® linerless rubber splicing tape (2-inch (50 mm) wide), as manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equivalent.

108-2.10 Electrical coating. Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equivalent.

108-2.11 Existing circuits. Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the RPR. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall record the results on forms acceptable to the RPR. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the existing circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

108-2.12 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend tape shall be polyethylene film with a metalized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item. Detectable warning tape for communication cables shall be orange. Detectable warning tape color code shall comply with the APWA Uniform Color Code.

CONSTRUCTION METHODS

108-3.1 General. The Contractor shall install the specified cable at the approximate locations indicated on the plans. Unless otherwise shown on the plans, all cable required to cross under pavements expected to carry aircraft loads shall be installed in concrete encased duct banks. Cable shall be run without splices, from fixture to fixture.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable

runs without connections unless otherwise authorized in writing by the RPR or shown on the plans.

In addition to connectors being installed at individual isolation transformers, L-823 cable connectors for maintenance and test points shall be installed at locations shown on the plans. Cable circuit identification markers shall be installed on both sides of the L-823 connectors installed and on both sides of slack loops where a future connector would be installed.

Provide not less than 3 feet (1 m) of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. Where provisions must be made for testing or for future above grade connections, provide enough slack to allow the cable to be extended at least one foot (30 cm) vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the RPR.

Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch (6 mm) in size. The cable circuit identification shall match the circuits noted on the construction plans.

108-3.2 Installation in duct banks or conduits. This item includes the installation of the cable in duct banks or conduit per the following paragraphs. The maximum number and voltage ratings of cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be per the latest version of the National Electric Code, or the code of the local agency or authority having jurisdiction.

The Contractor shall make no connections or splices of any kind in cables installed in conduits or duct banks.

Unless otherwise designated in the plans, where ducts are in tiers, use the lowest ducts to receive the cable first, with spare ducts left in the upper levels. Check duct routes prior to construction to obtain assurance that the shortest routes are selected and that any potential interference is avoided.

Duct banks or conduits shall be installed as a separate item per Item L-110, Airport Underground Electrical Duct Banks and Conduit. The Contractor shall run a mandrel through duct banks or conduit prior to installation of cable to ensure that the duct bank or conduit is open, continuous and clear of debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

The cable shall be installed in a manner that prevents harmful stretching of the conductor, damage to the insulation, or damage to the outer protective covering. The ends of all cables shall

be sealed with moisture-seal tape providing moisture-tight mechanical protection with minimum bulk, or alternately, heat shrinkable tubing before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a conduit, all cable shall be pulled in the conduit at the same time. The pulling of a cable through duct banks or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's recommendations. A non-hardening cable-pulling lubricant recommended for the type of cable being installed shall be used where required.

The Contractor shall submit the recommended pulling tension values to the RPR prior to any cable installation. If required by the RPR, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the RPR. Cable pull tensions shall be recorded by the Contractor and reviewed by the RPR. Cables exceeding the maximum allowable pulling tension values shall be removed and replaced by the Contractor at the Contractor's expense.

The manufacturer's minimum bend radius or NEC requirements (whichever is more restrictive) shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the Contractor may submit a plan, for review by the RPR, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. When cable must be coiled, lay cable out on a canvas tarp or use other appropriate means to prevent abrasion to the cable jacket.

108-3.3 Installation of direct-buried cable in trenches. Unless otherwise specified, the Contractor shall not use a cable plow for installing the cable. Cable shall be unreeled uniformly in place alongside or in the trench and shall be carefully placed along the bottom of the trench. The cable shall not be unreeled and pulled into the trench from one end. Slack cable sufficient to provide strain relief shall be placed in the trench in a series of S curves. Sharp bends or kinks in the cable shall not be permitted.

Where cables must cross over each other, a minimum of 3 inches (75 mm) vertical displacement shall be provided with the topmost cable depth at or below the minimum required depth below finished grade.

~~**a. Trenching.** Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of surface is disturbed. Graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable trenches shall be excavated to a minimum depth of 18 inches (0.5 m) below finished grade per NEC Table 300.5, except as follows:~~

~~When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches (91 cm) unless otherwise specified.~~

~~Minimum cable depth when crossing under a railroad track, shall be 42 inches (1 m) unless otherwise specified.~~

~~The Contractor shall excavate all cable trenches to a width not less than 6 inches (150 mm). Unless otherwise specified on the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.~~

~~When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4 inch (6.3 mm) sieve. Flowable backfill material may alternatively be used.~~

~~Duct bank or conduit markers temporarily removed for trench excavations shall be replaced as required.~~

~~It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:~~

~~(1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.~~

~~(2) Trenching, etc., in cable areas shall then proceed, with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.~~

~~In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair or replacement.~~

~~**b. Backfilling.** After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall encompass all cables; be 3 inches (75 mm) deep, loose measurement; and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4 inch (6.3 mm) sieve. This layer shall not be compacted. The second layer shall be 5 inches (125 mm) deep, loose measurement, and shall contain no particles that would be retained on a one inch (25.0 mm) sieve. The remaining third and subsequent layers of backfill shall not exceed 8 inches (20 cm) of loose measurement and be excavated or imported material and shall not contain stone or aggregate larger than 4 inches (100 mm) maximum diameter.~~

~~The second and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent material. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be to a minimum of 100 percent of ASTM D1557.~~

~~Trenches shall not contain pools of water during backfilling operations. The trench shall be completely backfilled and tamped level with the adjacent surface, except that when turf is to be established over the trench, the backfilling shall be stopped at an appropriate depth consistent with the type of turbing operation to be accommodated. A proper allowance for settlement shall also be provided. Any excess excavated material shall be removed and disposed of per the plans and specifications.~~

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the RPR. If not shown on the plans, the warning tape shall be located 6 inches (150 mm) above the direct-buried cable or the counterpoise wire if present. A 3-6 inch (75 - 150 mm) wide polyethylene film detectable tape, with a metalized foil core, shall be installed above all direct buried cable or counterpoise. The tape shall be of the color and have a continuous legend as indicated on the plans. The tape shall be installed 8 inches (200 mm) minimum below finished grade.

c. Restoration. Following restoration of all trenching near airport movement surfaces, the Contractor shall visually inspect the area for foreign object debris (FOD) and remove any that is found. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the **sodding** and seeding as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be to a minimum of 100 percent of ASTM D1557. Restoration shall be considered incidental to the pay item of which it is a component part.

108-3.4 Cable markers for direct-buried cable. The location of direct buried circuits shall be marked by a concrete slab marker, 2 feet (60 cm) square and 4-6 inch (10 - 15 cm) thick, extending approximately one inch (25 mm) above the surface. Each cable run from a line of lights and signs to the equipment vault shall be marked at approximately every 200 feet (61 m) along the cable run, with an additional marker at each change of direction of cable run. All other direct-buried cable shall be marked in the same manner. Cable markers shall be installed directly above the cable. The Contractor shall impress the word "CABLE" and directional arrows on each cable marking slab. The letters shall be approximately 4 inches (100 mm) high and 3 inches (75 mm) wide, with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep. Stencils shall be used for cable marker lettering; no hand lettering shall be permitted.

At the location of each underground cable connection/splice, except at lighting units, or isolation transformers, a concrete marker slab shall be installed to mark the location of the connection/splice. The Contractor shall impress the word "SPLICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the RPR. All cable markers and splice markers shall be painted international orange. Paint shall be specifically manufactured for uncured exterior concrete. After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint as approved by the RPR. Furnishing and installation of cable markers is incidental to the respective cable pay item.

108-3.5 Splicing. Connections of the type shown on the plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

a. Cast splices. These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the RPR.

b. Field-attached plug-in splices. These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint

where the connectors come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint or (3) On connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

c. Factory-molded plug-in splices. These shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) Wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint. or (3) On connector kits so equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

d. Taped or heat-shrink splices. A taped splice shall be made in the following manner:

Bring the cables to their final position and cut so that the conductors will butt. Remove insulation and jacket allowing for bare conductor of proper length to fit compression sleeve connector with 1/4 inch (6 mm) of bare conductor on each side of the connector. Prior to splicing, the two ends of the cable insulation shall be penciled using a tool designed specifically for this purpose and for cable size and type. Do not use emery paper on splicing operation since it contains metallic particles. The copper conductors shall be thoroughly cleaned. Join the conductors by inserting them equidistant into the compression connection sleeve. Crimp conductors firmly in place with crimping tool that requires a complete crimp before tool can be removed. Test the crimped connection by pulling on the cable. Scrape the insulation to assure that the entire surface over which the tape will be applied (plus 3 inches (75 mm) on each end) is clean. After scraping, wipe the entire area with a clean lint-free cloth. Do not use solvents.

Apply high-voltage rubber tape one-half lapped over bare conductor. This tape should be tensioned as recommended by the manufacturer. Voids in the connector area may be eliminated by highly elongating the tape, stretching it just short of its breaking point. The manufacturer's recommendation for stretching tape during splicing shall be followed. Always attempt to exactly half-lap to produce a uniform buildup. Continue buildup to 1-1/2 times cable diameter over the body of the splice with ends tapered a distance of approximately one inch (25 mm) over the original jacket. Cover rubber tape with two layers of vinyl pressure-sensitive tape one-half lapped. Do not use glyptol or lacquer over vinyl tape as they react as solvents to the tape. No further cable covering or splice boxes are required.

Heat shrinkable tubing shall be installed following manufacturer's instructions. Direct flame heating shall not be permitted unless recommended by the manufacturer. Cable surfaces within the limits of the heat-shrink application shall be clean and free of contaminants prior to application.

e. Assembly. Surfaces of equipment or conductors being terminated or connected shall be prepared in accordance with industry standard practice and manufacturer's recommendations. All surfaces to be connected shall be thoroughly cleaned to remove all dirt, grease, oxides, nonconductive films, or other foreign material. Paints and other nonconductive coatings shall be removed to expose base metal. Clean all surfaces at least 1/4 inch (6.4 mm) beyond all sides of the larger bonded area on all mating surfaces. Use a joint compound suitable for the materials

used in the connection. Repair painted/coated surface to original condition after completing the connection.

108-3.6 Bare counterpoise wire installation for lightning protection and grounding. If shown on the plans or included in the job specifications, bare solid #6 AWG copper counterpoise wire shall be installed for lightning protection of the underground cables. The RPR shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.

a. Equipotential. [Not used]

b. Isolation. Counterpoise size is as shown on the plans. The isolation method is an alternate method for use only with edge lights installed in turf and stabilized soils and raceways installed parallel to and adjacent to the edge of the pavement. NFPA 780 uses 15 feet to define “adjacent to”.

The counterpoise conductor shall be installed halfway between the pavement edge and the light base, mounting stake, raceway, or cable being protected.

The counterpoise conductor shall be installed 8 inches (203 mm) minimum below grade. The counterpoise is not connected to the light base or mounting stake. An additional grounding electrode is required at each light base or mounting stake. The grounding electrode is bonded to the light base or mounting stake with a 6 AWG solid copper conductor.

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 Isolation Method of lightning protection.

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.

Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the NFPA 70 (NEC) or NFPA 780.

Where raceway is installed by the directional bore, jack and bore, or other drilling method, the counterpoise conductor shall be permitted to be installed concurrently with the directional bore, jack and bore, or other drilling method raceway, external to the raceway or sleeve.

The counterpoise wire shall also be exothermically welded to ground rods installed as shown on the plans but not more than 500 feet (150 m) apart around the entire circuit. The counterpoise system shall be continuous and terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment external ground ring or other made electrode-grounding system. The connections shall be made as shown on the plans and in the specifications.

Where an existing airfield lighting system is being extended or modified, the new counterpoise conductors shall be interconnected to existing counterpoise conductors at each intersection of the new and existing airfield lighting counterpoise systems.

d. Parallel Voltage Systems. Provide grounding and bonding in accordance with NFPA 70, National Electrical Code.

108-3.7 Counterpoise installation above multiple conduits and duct banks. Counterpoise wires shall be installed above multiple conduits/duct banks for airfield lighting cables, with the intent being to provide a complete area of protection over the airfield lighting cables. When multiple conduits and/or duct banks for airfield cable are installed in the same trench, the number and location of counterpoise wires above the conduits shall be adequate to provide a complete area of protection measured 45 degrees each side of vertical.

Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed above the duct bank. Reference details on the construction plans.

108-3.8 Counterpoise installation at existing duct banks. When airfield lighting cables are indicated on the plans to be routed through existing duct banks, the new counterpoise wiring shall be terminated at ground rods at each end of the existing duct bank where the cables being protected enter and exit the duct bank. The new counterpoise conductor shall be bonded to the existing counterpoise system.

108-3.9 Exothermic bonding. Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the RPR. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the RPR, the welding kits, materials and procedures to be used for welded connections prior to any installations in the field. The installations shall comply with the manufacturer's recommendations and the following:

- a. All slag shall be removed from welds.
- b. Using an exothermic weld to bond the counterpoise to a lug on a galvanized light base is not recommended unless the base has been specially modified. Consult the manufacturer's installation directions for proper methods of bonding copper wire to the light base. See AC 150/5340-30 for galvanized light base exception.
- c. If called for in the plans, all buried copper and weld material at weld connections shall be thoroughly coated with 6 mm of 3M™ Scotchkote™, or approved equivalent, or coated with coal tar Bitumastic® material to prevent surface exposure to corrosive soil or moisture.

108-3.10 Testing. The Contractor shall furnish all necessary equipment and appliances for testing the airport electrical systems and underground cable circuits before and after installation. The Contractor shall perform all tests in the presence of the RPR. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the RPR. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase. The Contractor must maintain the test results throughout the entire project as well as during the warranty period that meet the following:

- a. Earth resistance testing methods shall be submitted to the RPR for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the RPR. All such testing shall be at the sole expense of the Contractor.
- b. Should the counterpoise or ground grid conductors be damaged or suspected of being damaged by construction activities the Contractor shall test the conductors for continuity with a low resistance ohmmeter. The conductors shall be isolated such that no parallel path exists and tested for continuity. The RPR shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

After installation, the Contractor shall test and demonstrate to the satisfaction of the RPR the following:

c. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.

d. That all affected circuits (existing and new) are free from unspecified grounds.

e. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than **100** megohms. Verify continuity of all series airfield lighting circuits prior to energization.

f. That the insulation resistance to ground of all new non-grounded conductors of new multiple circuits or circuit segments is not less than 100 megohms.

g. That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.

h. That all affected circuits (existing and new) are operable. Tests shall be conducted that include operating each control not less than 10 times and the continuous operation of each lighting and power circuit for not less than 1/2 hour.

i. That the impedance to ground of each ground rod does not exceed 25 ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be used, as described by American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81, to verify this requirement. As an alternate, clamp-on style ground impedance test meters may be used to satisfy the impedance testing requirement. Test equipment and its calibration sheets shall be submitted for review and approval by the RPR prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the RPR. Where connecting new cable to existing cable, insulation resistance tests shall be performed on the new cable prior to connection to the existing circuit.

There are no approved “repair” procedures for items that have failed testing other than complete replacement.

METHOD OF MEASUREMENT

108-4.1 Cable or counterpoise wire installed in duct bank or conduit shall be measured by the number of linear feet of cable or counterpoise wire installed in trenches, duct bank, or conduit, including ground rods and grounding connectors, and trench marking tape ready for operation, and accepted as satisfactory. Separate measurement shall be made for each cable or counterpoise wire installed in trench, duct bank or conduit. The measurement for this item shall not include additional quantities required for slack. This measurement shall include an additional supplemental ground rod required if the first ground rod does not reach ground resistance requirements. Cable and counterpoise slack is considered incidental to this item and is included in the Contractor’s unit price. No separate measurement or payment will be made for cable or counterpoise slack.

BASIS OF PAYMENT

108-5.1 Payment will be made at the contract unit price for cable, bare counterpoise, and equipment ground installed in duct bank or conduit, and any required additional supplemental ground rods installed, in place by the Contractor and accepted by the RPR. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item.

Payment will be made under:

L-108-1	No. 6 AWG, Solid, Bare Counterpoise Wire, Installed in Trench, Above the Duct Bank or Conduit, Including Ground Rods (Initial and Supplemental) and Ground Connectors	per linear foot
L-108-2	No. 8 AWG, 5 kV, L-824, Type C Cable	per linear foot
L-108-3	3/4" x 10' Copper Clad Ground Rod - Supplemental	per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

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

Item L-125 Installation of Airport Lighting Systems

The following items in red are changes associated with Addendum 2

DESCRIPTION

125-1.1 This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

125-2.1 General.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not perform as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

b. Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in an electronic PDF format, tabbed by specification section. The RPR reserves the right to reject any or all

equipment, materials or procedures, which, in the RPR's opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

125-2.2 Conduit/Duct. Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

125-2.3 Cable and Counterpoise. Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

125-2.4 Tape. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

125-2.5 Concrete. All concrete used in structures must conform to the requirements of Item P-610, Concrete for Miscellaneous Structures.

125-2.5 Cable Connections. Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

125-2.6 Retroreflective Markers. Retroreflective markers shall be type L-853 and shall conform to

the requirements of AC 150/5345-39.

125-2.7 Taxiway Edge Lights. Taxiway edge lights shall conform to the requirements of FAA AC 150/5345-46, latest edition TYPE L-861T. Taxiway edge fixture lamps shall be LED type with properly sized transformer at the locations indicated on the plans. Taxiway edge lights shall be installed at the locations indicated in the plans in accordance with the details.

125-2.8 Guidance Signs. Guidance Signs shall conform to the requirements of FAA AC 150/5345-44 latest edition TYPE L-858 Y, R, L, and B. Guidance signs shall be of size and type as indicated on the details in the plans with LED type engines. The signs shall be installed at the locations indicated in the plans in accordance with the details with the messages as shown on the sign schedule.

125-2.9 Light Base and Transformer Housings. Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be Type L-867, Class 1A, Size shall be as shown on plans. Base cans shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.

125-2.10 Isolation Transformers. Isolation Transformers shall be Type L-830 , size as required for each installation. Transformer shall conform to AC 150/5345-47.

125-2.11 Constant Current Regulators. Not used.

125-2.17 Basis Of Design. The airfield lighting systems are designed using the below listed maximum fixture wattages. Approved airfield lighting fixtures with higher wattages are permissible provided the Contractor assumes all costs for the redesign of the airfield lighting and necessary power distribution systems and all costs incurred furnishing and installing any additional

equipment. In no case shall the Contractor be allowed to reduce the size of the constant current regulators or the power distribution systems.

L-861T Taxiway Edge Light - LED (Elevated)

21 W

L-861T Taxiway Edge Light - Incandescent (Elevated)

42 VA

L-858Y,R,L - LED

Location, Information,	1 Module	100
VA		
Boundary, Destination		
Mandatory Sign		
	2 Module	100 VA
	3 Module	110 VA
	4 Module	110 VA

INSTALLATION

125-3.1 Installation. The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

125-3.2 Testing. All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

Require the Contractor to furnish all necessary equipment and appliances for testing the underground cables, counterpoise, and safety ground in accordance with Item L-108, Underground Power Cable for Airports and L-131.

125-3.3 Shipping and Storage. Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

125-3.4 Elevated and In-pavement Lights. Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

125-3.5 Maintenance Of Airport Lighting Systems. The Contractor shall maintain the airport lighting systems during the various phases of the work as shown on the phasing plan(s) or as directed by the Engineer. The Contractor shall be responsible for all temporary connections in the field or at the regulator necessary for operation of the circuits during construction.

125-3.6 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. The restoration shall include top soiling, seeding, and mulching. The Contractor shall grade around structures as required to provide positive drainage away from the structure. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacement until final acceptance. All restoration shall be considered incidental to the item for which it applies.

125-3.7 Inspection. Inspect each light fixture, marker, and sign to determine that it is installed correctly, at the proper height, in line with the other fixtures, level, and properly oriented.

Check all fixture, marker, and sign securing screws or bolts to ensure that they have been tightened per manufacturer's recommendations. Use an anti-seize compound on bolts made of stainless steel.

Check each fixture, marker, and sign to determine that the lenses and panels are clean and unscratched.

Check identification numbers for each light fixture and sign to determine that the number at the installation is assigned in the plans or by the Owner's direction.

Check equipment covered by FAA specifications to determine if the manufacturers have supplied certified equipment. Also check equipment for general conformance with the specification requirements.

Check base plates for damage during installation and refinish according to manufacturer's instructions.

METHOD OF MEASUREMENT

125-4.1 Taxiway lights and guidance signs will be measured by the number of each type installed as completed units in place, ready for operation, and accepted by the RPR. In-Pavement Light Fixtures reinstalled on existing base cans will be measured by the number installed as completed units in place, ready for operation, and accepted by the RPR.

125-4.2 Measurement for the coordination of re-calibrating the existing Constant Current Regulator will be per lump sum. This will include all work associated with coordinating and supporting the CCR manufacturer to complete all re-calibration of the CCR, including, but not limited to, fees, site visit expenses, manufacturer escort access to AOA, hardware modifications if directed by the manufacturer, and all other incidentals required in the field necessary to complete this item in accordance with these specifications, installation details shown on the plan drawings, and as directed by the RPR.

BASIS OF PAYMENT

125-5.1 Payment will be made at the Contract unit price for each complete light fixture, guidance sign, installed by the Contractor and accepted by the RPR. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

Taxiway edge light units include fixtures, stems, frangible couplings, base cans, base plates, gaskets, isolation transformers, grounding connections, ground rods, excavation, backfill, restoration, testing, and incidental items required to provide a functioning unit in accordance with the Contract Documents.

Item L-125-7: Payment will be made at the contract lump sum unit price for **the contractor's cost associated with** coordinating the re-calibration of the existing Constant Current Regulator with the manufacturer ADB Safegate. This price will be full compensation for furnishing all **necessary materials by the contractor** and for **any and all** preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals **by the contractor** necessary to complete the item, including all coordination, fees, and site visit expenses required by the CCR manufacturer.

Item L-125-8: Payment will be made under the ALCMS vendor allowance pay item. This shall include work necessary to complete a complete re-calibration of the existing CCR including, but not limited to, fees, site visit expenses, manufacturer escort access to AOA, hardware modifications if directed by the manufacturer, and all other incidentals required in the field necessary to complete this item in accordance with these specifications, installation details shown on the plan drawings, and as directed by the RPR.

Payment will be made under:

L-125-1	L-861T(L) LED Taxiway Edge Light – Base Mounted in Turf	per each
L-125-2	L-861T(L) LED Taxiway Edge Light – Base Mounted in Mill/Overlay Pavement	per each
L-125-3	Reinstall Existing In-Pavement Light Fixture On New Base Can In Mill/Overlay Pavement	per each
L-125-4	L-858(L) LED Sign, 1-Module on a New Concrete Sign Base	per each
L-125-5	L-858(L) LED Sign, 2-Module on a New Concrete Sign Base	per each
L-125-6	L-858(L) LED Sign, 3-Module on a New Concrete Sign Base	per each

L-125-7	CCR Re-calibration Coordination with ADB-Safegate - Contractor	per lump sum
L-125-8	CCR Re-calibration Coordination with ADB-Safegate - Manufacturer	per 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.

Advisory Circulars (AC)

AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program

Engineering Brief (EB)

EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures
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END OF ITEM L-125

CIVIL DRAWINGS	
SHEET #	SHEET TITLE
C000	COVER SHEET
C001	INDEX OF DRAWINGS AND SUMMARY OF QUANTITIES
C011	SAFETY AND SECURITY NOTES AND DETAILS
C012	CONTRACTOR ACCESS PLAN
C013	PART 77 AIRSPACE PLAN
C014	CONTRACTOR PHASING PLAN
C015	TEMPORARY RUNWAY CLOSURE PLAN
C020	HORIZONTAL AND VERTICAL CONTROL PLAN
C100	DEMOLITION KEY MAP
C101	DEMOLITION PLAN (1 OF 5)
C102	DEMOLITION PLAN (2 OF 5)
C103	DEMOLITION PLAN (3 OF 5)
C104	DEMOLITION PLAN (4 OF 5)
C105	DEMOLITION PLAN (5 OF 5)
C111	MILLINGS PLACEMENT PLAN
C200	PAVING KEY MAP
C201	PAVING PLAN (1 OF 5)
C202	PAVING PLAN (2 OF 5)
C203	PAVING PLAN (3 OF 5)
C204	PAVING PLAN (4 OF 5)
C205	PAVING PLAN (5 OF 5)
C210	TAXIWAY F & G PLAN AND PROFILE KEY MAP
C211	TAXIWAY F PLAN AND PROFILE (1 OF 7)
C212	TAXIWAY F PLAN AND PROFILE (2 OF 7)
C213	TAXIWAY F PLAN AND PROFILE (3 OF 7)
C214	TAXIWAY F PLAN AND PROFILE (4 OF 7)
C215	TAXIWAY F PLAN AND PROFILE (5 OF 7)
C216	TAXIWAY F PLAN AND PROFILE (6 OF 7)
C217	TAXIWAY F PLAN AND PROFILE (7 OF 7)
C218	TAXIWAY G PLAN AND PROFILE
C231	TYPICAL SECTIONS (1 OF 2)
C232	TYPICAL SECTIONS (2 OF 2)
C300	GRADING KEY MAP
C301	GRADING PLAN (1 OF 5)
C302	GRADING PLAN (2 OF 5)
C303	GRADING PLAN (3 OF 5)
C304	GRADING PLAN (4 OF 5)
C305	GRADING PLAN (5 OF 5)
C311	INTERMEDIATE ELEVATION PLAN - TIE-INS
C320	FINAL ELEVATION KEY MAP
C321	FINAL ELEVATION PLAN (1 OF 5)
C322	FINAL ELEVATION PLAN (2 OF 5)
C323	FINAL ELEVATION PLAN (3 OF 5)
C324	FINAL ELEVATION PLAN (4 OF 5)
C325	FINAL ELEVATION PLAN (5 OF 5)
C400	PAVEMENT MARKING KEY MAP
C401	PAVEMENT MARKING PLAN (1 OF 5)
C402	PAVEMENT MARKING PLAN (2 OF 5)
C403	PAVEMENT MARKING PLAN (3 OF 5)
C404	PAVEMENT MARKING PLAN (4 OF 5)
C405	PAVEMENT MARKING PLAN (5 OF 5)
C431	PAVEMENT MARKING DETAILS
C531	EROSION CONTROL NOTES
C532	EROSION CONTROL DETAILS (1 OF 3)
C533	EROSION CONTROL DETAILS (2 OF 3)
C534	EROSION CONTROL DETAILS (3 OF 3)

ELECTRICAL DRAWINGS	
SHEET #	SHEET TITLE
E001	ELECTRICAL GENERAL NOTES
E101	ELECTRICAL DEMOLITION PLAN
E102	ELECTRICAL DEMOLITION PLAN
E103	ELECTRICAL DEMOLITION PLAN
E104	ELECTRICAL DEMOLITION PLAN
E105	ELECTRICAL DEMOLITION PLAN
E106	ELECTRICAL DEMOLITION PLAN
E201	ELECTRICAL LAYOUT AND CIRCUITING PLAN
E202	ELECTRICAL LAYOUT AND CIRCUITING PLAN
E203	ELECTRICAL LAYOUT AND CIRCUITING PLAN
E204	ELECTRICAL LAYOUT AND CIRCUITING PLAN
E205	ELECTRICAL LAYOUT AND CIRCUITING PLAN
E206	ELECTRICAL LAYOUT AND CIRCUITING PLAN
E301	ELECTRICAL DETAILS
E302	ELECTRICAL DETAILS
E303	ELECTRICAL DETAILS
E304	ELECTRICAL DETAILS
E305	ELECTRICAL DETAILS
E306	ELECTRICAL DETAILS
E307	ELECTRICAL DETAILS
E308	ELECTRICAL DETAILS

SUMMARY OF QUANTITIES					
ITEM NO.	ITEM DESCRIPTION	AIP ELIGIBLE	NON-AIP ELIGIBLE	TOTAL QUANTITY	UNIT
CIVIL QUANTITIES					
C-100-1	CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)	0.5	0.5	1	LS
C-105-1	MOBILIZATION	0.5	0.5	1	LS
GP-102-1	SAFETY AND SECURITY	0.5	0.5	1	LS
GP-103-1	TEMPORARY CONSTRUCTION ITEMS	0.5	0.5	1	LS
P-101-1	ASPHALT SHOULDER FULL DEPTH PAVEMENT REMOVAL (1.5-INCH DEPTH)	0	1400	1400	SY
P-101-2	VEHICLE SERVICE ROAD FULL DEPTH PAVEMENT REMOVAL (UP TO 9-INCH DEPTH)	430	0	430	SY
P-101-3	ASPHALT TAXIWAY FULL DEPTH PAVEMENT REMOVAL (UP TO 9-INCH DEPTH)	0	625	625	SY
P-101-4	COLD MILLING	10270	14500	24770	SY
P-101-5	MILLINGS PLACEMENT FOR RADAR ROAD (COMPACTED IN PLACE)	14040	0	14040	SY
P-101-6	CONCRETE FLUME REMOVAL	0	140	140	SY
C-102-1	TEMPORARY SEEDING AND MULCHING	425	2490	2915	SY
C-102-2	INSTALLATION AND REMOVAL OF COMPOST SOCK	0	700	700	LF
C-102-3	INSTALLATION AND REMOVAL OF ROCK PIPE INLET PROTECTION	0	1	1	EA
C-102-4	INSTALLATION AND REMOVAL OF DROP INLET PROTECTION	1	1	2	EA
D-701-1	18-INCH CORRUGATED METAL PIPE	35	0	35	LF
P-152-1	UNCLASSIFIED EXCAVATION	0	125	125	CY
P-152-2	UNSUITABLE EXCAVATION	0	25	25	CY
P-152-3	SUBGRADE PREPARATION	0	890	890	SY
P-209-1	CRUSHED AGGREGATE BASE COURSE (5-INCH DEPTH)	0	890	890	SY
P-401-1	ASPHALT SURFACE COURSE (GRADATION 2)	3390	5080	8470	TN
P-401-2	ASPHALT LEVELING COURSE (GRADATION 3)	20	5	25	TN
P-602-1	EMULSIFIED ASPHALT PRIME COAT	5140	7700	12840	GA
P-603-1	EMULSIFIED ASPHALT TACK COAT	890	1250	2140	GA
P-620-1	SURFACE PREPARATION	3372	322	3694	SF
P-620-2	WHITE REFLECTIVE MARKING (TYPE I WATERBORNE PAINT)	200	100	300	SF
P-620-3	WHITE REFLECTIVE MARKING (TYPE III WATERBORNE PAINT)	1190	2630	3820	SF
P-620-4	YELLOW REFLECTIVE MARKING (TYPE I WATERBORNE PAINT)	1650	1580	3230	SF
P-620-5	RED REFLECTIVE MARKING (TYPE I WATERBORNE PAINT)	830	310	1140	SF
P-620-6	BLACK NON-REFLECTIVE MARKING (TYPE I WATERBORNE PAINT, NO GLASS BEADS)	6360	7760	14120	SF
P-620-7	TYPE I GLASS BEADS, GRADATION A, REFLECTIVE MEDIA	51	19	70	LB
P-620-8	TYPE III GLASS BEADS, REFLECTIVE MEDIA	274	346	620	LB
T-901-1	SEEDING	0.1	0.3	0.4	AC
T-905-1	TOPSOIL OBTAINED ON SITE	24	115	139	CY
T-904-1	SODDING	35	760	795	SY
T-908-1	MULCHING	395	1314	1709	SY
ELECTRICAL QUANTITIES					
L-105-1	REMOVE EXISTING STAKE MOUNTED LIGHT FIXTURE	35	34	69	EA
L-105-2	REMOVE EXISTING BASE MOUNTED LIGHT FIXTURE AND BASE CAN	2	10	12	EA
L-105-3	REMOVE EXISTING IN-PAVEMENT LIGHT FIXTURE AND BASE CAN IN MILL/OVERLAY PAVEMENT	1	1	2	EA
L-105-4	REMOVE EXISTING SIGN AND FOUNDATION	4	4	8	EA
L-105-5	MISCELLANEOUS ELECTRICAL DEMOLITION	0.5	0.5	1	LS
L-108-1	NO. 6 AWG, SOLID, BARE COUNTERPOISE WIRE, INSTALLED IN TRENCH, ABOVE THE DUCT BANK OR CONDUIT, INCLUDING GROUND RODS (INITIAL AND SUPPLEMENTAL) AND GROUND CONNECTORS	4155	6100	10255	LF
L-108-2	NO. 8 AWG, 5 KV, T-824, TYPE C CABLE	7800	6800	14600	LF
L-108-3	3/4" x 10' COPPER CLAD GROUND ROD - SUPPLEMENTAL	70	70	140	EA
L-110-1	1 WAY 2-INCH SCHEDULE 40 PVC CONDUIT - DIRECT EARTH BURIED IN-TURE	3500	5900	9400	LF
L-110-2	1 WAY 2-INCH SCHEDULE 40 PVC CONDUIT - DIRECT EARTH BURIED UNDER MILL/OVERLAY PAVEMENT	30	0	30	LF
L-110-3	1 WAY 2-INCH SCHEDULE 40 PVC CONDUIT - CONCRETE ENCASED UNDER MILL/OVERLAY PAVEMENT	75	100	175	LF
L-110-4	2 WAY 2-INCH SCHEDULE 40 PVC CONDUIT - DIRECT EARTH BURIED	550	100	650	LF
L-110-5	2 WAY 2-INCH SCHEDULE 80 HDPE DIRECTIONAL DRILL	400	0	400	LF
L-115-1	JUNCTION CAN PLAZA - 2 L-867D BASE CANS	4	2	6	EA
L-125-1	L-861T(L) LED TAXIWAY EDGE LIGHT - BASE MOUNTED IN TURF	40	49	89	EA
L-125-2	L-861T(L) LED TAXIWAY EDGE LIGHT - BASE MOUNTED IN MILL/OVERLAY PAVEMENT	2	0	2	EA
L-125-3	REINSTALL EXISTING IN-PAVEMENT LIGHT FIXTURE ON NEW BASE CAN IN MILL/OVERLAY PAVEMENT	1	1	2	EA
L-125-4	L-858(L) LED SIGN, 1-MODULE ON A NEW CONCRETE SIGN BASE	1	2	3	EA
L-125-5	L-858(L) LED SIGN, 2-MODULE ON A NEW CONCRETE SIGN BASE	2	0	2	EA
L-125-6	L-858(L) LED SIGN, 3-MODULE ON A NEW CONCRETE SIGN BASE	1	2	3	EA
L-125-7	CCR RE-CALIBRATION COORDINATION WITH ADB-SAFEGATE - CONTRACTOR	0.5	0.5	1	LS
L-125-8	CCR RE-CALIBRATION COORDINATION WITH ADB-SAFEGATE - MANUFACTURER	0	1	1	AL

ABBREVIATIONS							
ABC - AGGREGATE BASE COURSE	CONT - CONTINUOUS	FOD - FOREIGN OBJECT DEBRIS	MECH - MECHANICAL	PSF - POUNDS PER SQUARE FOOT	SD - STORM DRAIN	TRANSPORTATION SECURITY ADMINISTRATION	
ADG - AIRPLANE DESIGN GROUP	CSSO - CONTRACTOR SAFETY AND SECURITY OFFICER	FAR - FEDERAL AVIATION REGULATIONS	MH - MANHOLE	PSI - POUNDS PER SQUARE INCH	SDMH - STORM DRAIN MANHOLE	TW - TAXIWAY	
AOA - AIRCRAFT OPERATIONS AREA	CY - CUBIC YARD	GL - GUTTER LINE	MIN - MINIMUM	PT - POINT OF TANGENCY	SHT - SHEET	TYP - TYPICAL	
APPROX. - APPROXIMATE	DBL - DOUBLE	GND. - GROUND	N - NOTHING	PVI - POINT OF VERTICAL INTERSECTION	SIDA - SECURITY IDENTIFICATION DISPLAY AREA	UD - UNDERDRAIN	
ARFF - AIRCRAFT RESCUE AND FIREFIGHTING	DET - DETAIL	GSE - GROUND SERVICE EQUIPMENT	NAD - NORTH AMERICAN DATUM	RCP - REINFORCED CONCRETE PIPE	SF - SQUARE FOOT	UG - UNDERGROUND	
ASTM - AMERICAN SOCIETY FOR TESTING AND MATERIALS	DIA - DIAMETER	GWL - GROUND WATER LEVEL	NAVAIDS - NAVIGATIONAL AIDS	REF - REFERENCE	STA - STATION	VA - VOLT-AMPS	
ATCT - AIR TRAFFIC CONTROL TOWER	DIAG. - DIAGONAL	HORT - HORIZONTAL	NLVR - NON-LICENSED VEHICLE ROAD	REINF - REINFORCED	SW - SINGLE WALL	VERT - VERTICAL	
BOP - BOTTOM OF PIPE	DWG - DRAWING	I/C - NUMBER OF CONDUCTORS/CONDUCTOR	NO - NUMBER	REQ/REQ'D - REQUIRED	SY - SQUARE YARD	VSR - VEHICLE SERVICE ROAD	
BOD - BOTTOM OF DUCT	E - EASTING	ID - IDENTIFICATION	NTP - NOTICE TO PROCEED	RGL - RUNWAY GUARD LIGHTS	TBR - TO BE REMOVED	W - WATER	
BOTT. - BOTTOM	EA - EACH	I.D. - INNER DIAMETER	NTS - NOT TO SCALE	RIM - RIM ELEVATION	TDG - TAXIWAY DESIGN GROUP	W/- WITH	
CL/C- CENTERLINE	EG - EXISTING GROUND	IE/INV - INVERT ELEVATION / INVERT	OC - ON CENTER	RON - REMAIN OVERNIGHT	TEL - TELEPHONE	W/O - WITHOUT	
C - CONDUIT	ELB - ELECTRIC SERVICE BOX/METER	KIP - 1,000 LBS	OD - OUTER DIAMETER	RPZ - RUNWAY PROTECTION ZONE	TEMP - TEMPORARY	YI - YARD INLET	
CF - CUBIC FOOT	EL/ELEV - ELEVATION	KV - KILOVOLT	OFA - OBJECT FREE AREA	RSA - RUNWAY SAFETY AREA	THK - THICK	YL - YARD LIGHT	
CKT - CIRCUIT	ELEC - ELECTRICAL	L - LIGHTING	PAVT - PAVEMENT	RT - RIGHT	T/L - TAXILANE		
CLR - CLEARANCE	EMH - ELECTRIC MANHOLE	LB - POUND	PC - POINT OF CURVATURE	RW - RUNWAY	T.O. - TOP OF		
COM - COMMUNICATION	EOP - EDGE OF PAVEMENT	LED - LIGHT-EMITTING DIODE	PCG - PORTLAND CEMENT CONCRETE	S/SAN - SANITARY	TOC - TOP OF CONCRETE		
CONC - CONCRETE	EX/EXST/EXIST - EXISTING	LF - LINEAR FEET	PERF - PERFORATED	SA - SAFETY AREA	TOD - TOP OF DUCT		
CONN - CONNECTION	FAA - FEDERAL AVIATION ADMINISTRATION	LT - LEFT	PG - PROPOSED GRADE	SC - SECONDARY CONTAINMENT	TOFA - TAXIWAY OBJECT FREE AREA		
		MAX - MAXIMUM	PL - PLATE	SCH/SCHED - SCHEDULE	TSA - TAXIWAY SAFETY AREA OR		



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DRAWN BY:	ERG
REVIEWED BY:	AEB

SHEET TITLE

INDEX OF
DRAWINGS AND
SUMMARY OF
QUANTITIES

SHEET NUMBER

C001

BIDDING
DOCUMENTS