Contractor for the Reconstruction of Taxiway NA
at George Bush Intercontinental Airport Houston (IAH)
CSP No.: H37-RTWYNA-2019-002 PN No.: 9007

LOC #4 Attachments for Clarifications No.'s II through VIII

(revised 11-22-2019)

I. **To EXTEND the DUE DATE** from Thursday, December 5, 2019 @ 2:00 P.M., CST to **Thursday, December 12, 2019 @ 2:00 P.M., CST.**

II. **To CHANGE and REPLACE the list of FORMS TO BE SUBMITTED WITH PROPOSALS (Section 7.1),** with the attached Section 7.1. See Attached LOC #4 Attachments for Clarifications Nos. II through VIII (revised 11-22-2019)

III. **Replace Specifications Section 00410, "BID FORM PART A"**, with the attached Section 00410, "BID FORM PART A". Contract Time has been changed.

IV. **Replace Specifications Section 00520, "AGREEMENT"**, page 00520-1, with the attached Section 00520, "AGREEMENT", page 00520-1. Contract Time has been changed.

V. **Replace Specification 265590 "INSTALLATION OF AIRPORT LIGHTING SYSTEMS"**, Pages 4 and 20 with attached Section 265590 "INSTALLATION OF AIRPORT LIGHTING SYSTEMS" Pages 4 and 20 for use of coated bolts.

VI. **Replace plan drawing E08-05 "AIRFIELD LIGHTING LIGHT FIXTURE SCHEDULE TAXIWAY 'NA' CENTERLINE (WEST)** with new drawing E08-05 "AIRFIELD LIGHTING LIGHT FIXTURE SCHEDULE TAXIWAY 'NA' CENTERLINE (WEST)" showing modification of L-852C fixtures with L-852D fixtures following revised FAA design requirements.

VII. **Replace plan drawing E10-03 "ELECTRICAL DETAILS AIRFIELD LIGHTING"** with new drawing E10-03 "ELECTRICAL DETAILS AIRFIELD LIGHTING" showing modification to detail 3 modifying bolting hardware to Grade 5 coated bolts.

VIII. **Replace plan drawing E10-04 "ELECTRICAL DETAILS AIRFIELD LIGHTING"** with new drawing E10-04 "ELECTRICAL DETAILS AIRFIELD LIGHTING" showing modification to details 1 and 3 and new detail 6 clarifying label requirements and splice details.

7.1 FORMS TO BE SUBMITTED WITH PROPOSALS (rev. 11/22/19)

00410 Bid Form (Parts A and B)

00430 Bidder's Bond

00450 Bidder's Statement of DBE Status

00452 Form A: Contractor Submission List - City Of Houston Campaign Finance Ordinance

00454 Affidavit of Non-interest

00455 Affidavit of Ownership Information Form

00456 Bidder's Certificate of Compliance with Buy American Program

00457 Conflict of Interest Questionnaire

00458 Bidder's Certificate Regarding Foreign Trade Restriction

00459 Previous Contract Subject to EEO Statement

00460 Pay or Play Program Acknowledgement Form

00470-D Bidder's DBE Participation Plan

00480 Reference Verification Form

00481 Anti-Collusion Statement

00842 Letter of Intent

Section 00410A

BID FORM – PART A

To: **The Honorable Mayor and City Council of the City of Houston**
City Hall Annex
900 Bagby Street
Houston, Texas 77002

Project: Reconstruction of Taxiway NA
Project No.: Project No. 907 CIP No. A-000570 AIP No. 3-48-0111-107-16
Bidder: _____
(Print or type full name of business entity, such as corporation, LLC, etc.)

1.0 OFFER

A. **Total Bid Price**: Having examined the Project location and all matters referred to in Bid Documents for the Project, we, the undersigned, offer to enter into a Contract to perform the Work for the Total Bid Price shown on the signature page of this Document

B. **Security Deposit**: Included with the Bid is a Security Deposit in the amount of 10 percent of the Total Bid Price subject to terms described in Section 00200 – Instructions to Bidders.

C. **Period for Bid Acceptance**: This offer is open to acceptance and is irrevocable for 120 days from Bid Date. That period may be extended by mutual written agreement of the City and Bidder.

D. **Addenda**: All Addenda have been received. Modifications to Bid Documents have been considered and all related costs are included in the Total Bid Price.

E. **Bid Supplements (to be submitted with the bid)**: The following documents are attached:

[X] Security Deposit *(as defined in Section 00200 – Instructions to Bidders)*
[X] Section 00450 – Bidder's Statement of MWSBE Status
[X] Section 00452 – Contractor's Submission List - Fair Campaign Ordinance Form A
[X] Section 00454 – Affidavit of Non-interest
[X] Section 00455 – Ownership Information Form
[X] Section 00456 – Bidder's Certificate of Compliance with Buy American Program
[X] Section 00457 – Conflicts of Interest Questionnaire (CIQ)
[X] Section 00458 – Bidder's Certificate Regarding Foreign Trade Restriction
[X] Section 00459 – Contractor's Statement Regarding Previous Contracts Subject to EEO
[X] Section 00460 – Pay or Play Acknowledgement Form (POP 1-A)
[X] Section 00480 – Form SCM-1 Reference Verification
[X] Section 00481 – Anti-Collusion Statement

[X] Others as listed: EXHIBIT A – City of Houston Disadvantage Business Enterprise Requirements
EXHIBIT B – City of Houston Equal Employment Opportunity

2.0 CONTRACT TIME

A. If offer is accepted, Contractor shall achieve Date of Substantial Completion within 600 calendar days after Date of Commencement of the Work, subject to adjustments of Contract Time as provided in the Contract.

Document 00520

AGREEMENT

Project: Reconstruction of Taxiway NA

Project Location: George Bush Intercontinental Airport

Project No: Project Number 907, CIP Number A-000570, AIP Number 3-48-0111-107-16

The City: THE CITY OF HOUSTON, 900 Bagby Street, Houston, Texas 77002 (the "City")

and

Contractor: _____

(Address for Written Notice) _____

_____

Phone Number: _____

E-mail Address: _____

City Engineer, with respect to Section 4.1.9 and 4.3 thru 4.5 of the General Conditions, is:

Devon Tiner, P.E. – Design Division, Department of Aviation, City Of Houston (or successor)

Address for Written Notice: P. O. Box 60106, Houston, Texas 77205-0106

Phone Number: 281-233-1942

Email Address: Devon.Tiner@houstontx.gov

THE CITY AND CONTRACTOR AGREE AS FOLLOWS:

ARTICLE 1

THE WORK OF THE CONTRACT

1.1 Contractor shall perform the Work in accordance with the Contract.

ARTICLE 2

CONTRACT TIME

2.1 Contractor shall achieve Date of Substantial Completion within 600 calendar days after Date of Commencement of the Work, subject to adjustments of Contract Time as provided in the Contract.

2.2 The Parties recognize that time is of the essence for this Agreement and that the City will suffer financial loss if the Work is not completed within the Contract Time. Parties also recognize delays, expense, and difficulties involved in proving in a legal or arbitration proceeding actual loss suffered by the City if the Work is not completed on time. Accordingly, instead of requiring any such

Section 26 55 90

INSTALLATION OF AIRPORT LIGHTING SYSTEMS

PART 1 DESCRIPTION

1.01 SECTION INCLUDES. This section shall consist of all lighting systems furnished and installed following the project plans and specifications and the applicable advisory circulars.

A. The systems shall be installed at the locations and following the dimensions, design and details shown on plans. It is the intent and meaning of the plans and specifications that the Contractor shall provide an electrical installation that is complete, including all items and appurtenances necessary, reasonably incidental or customarily included, even though each and every item is not specifically called out or shown.

B. Installations and construction under these provisions shall be coordinated with the Airport Construction Manager, hereby referred to as the CM. Specification requirements for approvals, reviews or other involvement of the City Engineer shall be transmitted by the Contractor through the CM to the City Engineer.

C. This item shall include the furnishing of all products, labor and incidentals necessary to place the systems in operation as completed units to the satisfaction of the CM. Refer to provisions of Section 26 05 00 – Common Work Results for Electrical.

D. Airport lighting and products covered by Federal Aviation Administration (FAA) specifications shall have the prior approval of the FAA and shall be listed in latest edition of Advisory Circular (AC) 150/5345-1, Airport Lighting Equipment.

E. All Advisory Circulars referenced in this specification shall be the edition indicated or the latest edition.

1.02 RELATED SECTIONS

A. Section 26 08 10 - Recommended Lockout Procedure for Airfield Lighting Circuit

B. Section 26 08 20 - Airfield Electrical Installation Testing

C. Section 26 05 53 - Electrical Identification

D. Section 26 05 40 - Installation of Underground Cable for Airports

E. Section 26 05 43 – Installation of Airport Underground Electrical Duct Banks and Conduits

F. Section 26 35 53 – Installation of Vault Equipment

G. Section 26 55 95 - Airfield Lighting Remote Control System

1.03 RELATED DOCUMENTS

A. AC 150/5340-18 Standards for Airport Sign Systems

B. AC 150/5340-30 Design and Installation Details for Airport Visual Aids

C. EB-67 Light Sources Other Than Incandescent and Xenon For Airport and Obstruction Lighting Fixtures.

PART 2 PRODUCTS

2.01 GENERAL

A. All commercial items of electrical products not covered by Federal Aviation Administration specifications shall conform to the applicable rulings and standards of the National Electrical Code.

B. Some products shall be City Furnished for installation by the Contractor, as indicated in these specifications and/or on the construction plans and details.

2.02 APPROVAL PROCESS REQUIREMENTS

A. As part of the approval procedure, a sample of all proposed models and/or types of the following products, shall be submitted and become the property of the Airport.

1. Taxiway Centerline Light (LED)
2. Connector splice kit.

B. Submittal information shall include, but shall not be limited to, the following, where applicable.

1. Bolt pattern information for fixture bases.
2. Insulating transformer ratings
3. Sign legend, module information, and technical information.

C. Submittals shall comply with Section 26 05 00 – Common Work Results for Electrical on submittals.

2.03 LIGHT FIXTURES.

A. Light fixtures and lamps specified shall be low wattage and energy efficient, unless noted otherwise.

B. The fixtures shall meet the latest edition of FAA Specifications in the applicable Advisory Circulars listed and shall be approved under the Airport Lighting Equipment Certification Program described in AC150/5345-53.

C. The lighting fixtures shall be ADB, Crouse-Hinds, or approved equivalent.

D. All new guidance signs shall be LED, and match existing signs, or approved equivalent.

E. The guidance sign replacement panels shall be supplied by the manufacturer of the sign, to ensure continued photometric performance.

2.04 PRODUCTS COMMON TO ALL SYSTEMS

A. Primary Cable. Primary L-824 cable shall as specified in Section 26 05 40 – Installation of Underground Cable for Airports.

B. Counterpoise Wire. Counterpoise wire shall as specified in Section 26 05 40 – Installation of Underground Cable for Airports.

C. Isolation Transformers. Isolation transformers shall be of rating compatible with associated light fixture and conforming to requirements of AC 150/5345-47.

D. Fixture Bases. Provide L-868 and L-867, Class I bases that conform to the requirements of AC 150/5345-42 for all fixtures.

1. Certain applications shall require additional entrance hubs, as shown on the plans.
2. Provide drain coupling in base cans where noted on the contract documents.
3. All fixture mounting holes in base top shall be drilled completely through and then tapped.
4. Provide L-868, Class I, two-piece bases with factory installed anti-rotation tabs.
5. Coordinate bolt hole patterns for bases with fixtures to be installed. Stainless Steel Hardware to include nylon insert locking nuts. Reference bolt circle dimensions on fixture schedule noted on plans. In general, to match fixtures, bolt hole pattern for bases off concrete pavement shall be

10-1/4 inch diameter and bolt hole pattern for bases in concrete pavement, other than bases for runway edge lights, shall be 11-1/4 inch diameter.

6. All bases to include internal and external ground lug.

E. Connectors. L-823 connectors used to splice the L-824 primary cables shall be as specified in Section 26 05 40 - Installation of Underground Cable for Airports. Fixtures shall be provided with a single connecting lead plug for connection to L-830 transformers.

F. Ducts and Conduits. Ducts and conduits shall be as specified in Section 26 0543 – Installation of Airport Underground Duct Banks and Conduits.

G. Tape and Heat Shrinkable Splices. Tapes and splices to be used on primary L-824 cable shall be as specified in Section 26 05 40 - Installation of Underground Cable for Airports.

H. Concrete. Concrete shall adhere to requirements of Structural Portland Cement Concrete Item P-610. Reinforcing steel shall conform to provisions of Item P-610.

I. Sealer Products. Products used shall conform to applicable requirements of Joint Sealing Filler Item P-605. Submit materials with satisfactory adhesive and waterproofing qualities for approval of the CM.

J. Joints. Use joint sealing material conforming to Section Item P-605 across concrete pavement joints. Where conduit is being installed in saw cut trench in existing pavement, OZ Gedney Type DX Expansion Fitting shall be installed at intersection of conduit installation and existing concrete pavement expansion joints.

K. Fixture Hold Down Bolts. Fixture hold down bolts and installations shall adhere to the following requirements.

1. ***Bolts shall be all-thread 18-8 Grade 5 Carbon Steel with Fluoropolymer coating. Bolts shall be colored orange or pink.*** ~~Bolts shall be all-thread, 18-8, Type 304 stainless steel~~.
2. Bolts information shall be submitted for approval of the CM. Submittal shall be specifically identify, as a minimum, the bolt material, dimensions and threading.
3. Bolt material shall be readily identifiable in the field by appropriate ASTM markings on the bolts or by having material identified on bolt packaging, as approved by the City Engineer.
4. Normally, bolts are supplied with the bases, not the fixtures. However, the usual bolts supplied with the bases are too short to extend into base can. The Contractor shall install bolts long enough to extend 1 inch inside the

rim of the can after proper installation to hold down fixtures. Bolts of appropriate length shall be ordered accordingly.

5. ***Do not install anti-sieze compound on grade 5 coated bolts.*** ~~Bolts shall receive anti-seize compound prior to the final turn~~.
6. Lock washers shall be installed on each bolt as per fixture base manufacturer's recommendations. Appropriate lock washers are usually provided with bases.

L. Spacer Rings. Light fixture spacer rings shall be used where shown and required for fixture adjustments. Only 1 spacer ring will be allowed per fixture base. City to retain additional spacers as spare parts.

2.05 PRODUCTS FOR TAXIWAY CENTERLINE LIGHTING

A. Light Fixtures. Fixtures shall be furnished complete, ready for installation on a base and shall comply with requirements of AC 150/5345-46. All fixtures shall be style 3. Drawings will indicate use of LED or Quartz Fixtures.

1. Taxiway centerline light fixtures shall be L-852C for straight sections and L-852K for curved sections and L852F for omnidirectional installations, as noted on the contract drawings. Fixtures shall be bi-directional with green/green or green/amber color lenses or uni-directional with green or amber lens, as indicated on construction plans and light fixture schedule. Fixture lamps shall be as shown on plans, or as manufacturer provides.
2. Taxiway centerline clearance bar fixtures shall be L-852C and shall have uni-directional yellow color lenses, unless indicated otherwise on construction plans and/or light fixture schedule. Fixture lamps shall be as shown on plans.
3. Fixtures shall be provided with connecting leads for power connections, optical system, lamp and mounting assembly.

B. Isolation Transformer. Transformers shall be L-830, isolation transformers complying with requirements of AC 150/5345-47 for 6.6 ampere series circuits. Transformer wattage rating shall be as shown on plans.

C. Light Base and Transformer Housing. Fixtures shall be installed on L-868 base complying with requirements of AC-150/5345-42.

1. Bases shall house isolation transformer and shall be 12” diameter, two - piece cylindrical body with a top flange having an 11-1/14 inch bolt circle.
2. Empty bases installed for future use shall be as specified above.

2.06 PRODUCTS FOR TAXIWAY EDGE LIGHTING SYSTEM

A. Light Fixtures. Fixtures shall be furnished complete, ready for installation on a base and shall comply with requirements of AC 150/5345-46.

1. Taxiway elevated edge light fixtures shall be L-861T(L). Fixtures shall be furnished with blue color omni-directional lens as indicated on construction plans and light fixture schedule. Fixture lamps shall be series lamp, LED, 6.6 ampere.
2. Taxiway semi-flush edge light fixtures shall be L-852T(L). LED. Fixtures shall be omni-directional with blue color lens, as indicated on construction plans and light fixture schedule. Fixtures shall be as shown on plans.
3. Fixtures shall be provided with connecting leads for power connections, optical system, lamp and mounting assembly.

B. Isolation Transformer. Transformers shall be L-830, isolation transformers complying with requirements of AC 150/5345-47A for 6.6 ampere series circuits.

C. Light Base and Transformer Housing. Fixtures shall be installed on new or existing L-867 base (except L-852T, is on an L-868 2 piece base) complying with requirements of AC 150/5345-42. Furnish all elevated edge lights in new base cans installed in shoulder pavement with telescoping base cans. Furnish all elevated edge lights in new base cans installed in earth with one-piece base cans.

1. Bases shall house isolation transformer and are 12 inch diameter, cylindrical body with a top flange having an10-1/4 inch bolt circle. Base shall be provided with 1, 2 or more factory installed cable entrance hubs. Contractor to field verify entrances.

2.07 LED RUNWAY GUARD LIGHTS

A. Light Fixtures.

1. Fixtures shall be furnished complete, ready for installation on a new or existing base and shall comply with requirements of AC 150/5345-46, AC150/5340-30 and EB-67. See Section 26 55 92 for additional runway guard light requirements. The flashing of the in pavement RGLs and the monitoring of the light and flashing functionality shall be integrated in the fixture.
2. In-pavement runway light fixtures shall be LED L-852G (L). Fixtures shall be unidirectional yellow, as indicated on construction plans and light fixture schedule. Light fixture shall consist of an optical system as shown on plans, mounted in a suitable housing and mounting assembly.
3. Fixtures shall be provided with connecting leads for power connections.

B. Isolation Transformer. To facilitate RGL communication, transformers shall be low inductance L-830 isolation transformers complying with requirements of AC 150/5345-47 for 6.6 ampere series circuits. Leakage inductance shall

not exceed 40 microhenries. Transformer wattage rating for runway guard light fixture, as shown on plans.

C. Light Base and Transformer Housing. Fixture light bases for the in-pavement guard lights shall be type L-868 base complying with requirements of AC 150/5345-42.

1. Bases shall house isolation transformer and and shall consist of a two-piece cylindrical body with a top flange having a bolt circle as indicated below. Base shall be provided with one, two or more factory installed cable entrance hubs, as indicated on the plans.
2. L-852G (L) Semi-flush guard light fixtures shall be mounted on an L-868 base with an 11-1/4 inch bolt circle.

2.08 ADDITIONAL REQUIREMENTS FOR LED FIXTURES OR SIGNS

A. LED fixtures shall comply to the FAA EB-67, Light Sources Other Than Incandescent and Xenon For Airport and Obstruction Lighting Fixtures latest version, and support the dimming curve as stated in EB-67.

B. Out of tolerance circuit current behavior. The fixture shall not fail or enter the failed or open circuit state automatically, when the input current is applied starting from zero amps RMS, and increasing linearly, to the maximum allowed by the constant current regulator. This shall include current levels that not at the correct nominal steps defined in AC 150/5345-10 for CCRs.

C. LED fixtures and signs shall limit their start up voltage requirement so the circuit shown on the drawings power on properly and operates with stability. LED fixtures and signs shall not cause an open circuit faults on startup on the circuits.

D. Light Output Dependency on Current waveform. The light output level of the fixture shall not depend on the duty cycle or crest factor of the input current. Light output shall operate at the nominal steps with full conduction sinusoidal current with a crest factor of 1.414 and partial conduction waveform up to and including a maximum crest factor as specified in AC 150/5345-10 for CCRs. If the RMS current is set for a given step, the fixture shall not change the light output anywhere within the full range of current crest factors.

E. Transient current behavior LED fixtures operating at a selected step, with the associated brightness output, and it encounters a transient in the circuit current, followed by a return to the same RMS current, it shall return to the correct selected step with the associated brightness output for the RMS current as was present before the transient event.

F. LED Fixture Dimming. LED Fixtures shall provide linear dimming as described in EB-67. The fixtures shall average the RMS input current to determine the brightness of the fixture, and not reflect momentary or transient current dips or surges in the light output. Discrete step fixtures are not acceptable.

G. Conducted emissions. The LED fixture and all LED fixtures on the circuits in the contract drawings shall not cause emissive currents in excess of minus 6dBmA at frequencies from 1 to 150 KHz, measured into a 50 ohm load

H. Fixture Step Support. The LED fixture shall support both 3 and 5 step brightness levels as specified in AC 150/5345-10.

2.09 PRODUCTS FOR AIRFIELD GUIDANCE SIGNS SYSTEM

A. General. Signs shall be internally lighted by LED light sources and shall comply with requirements of AC 150/5345-44.

1. Signs shall be provided with the required transformers and regulators.
2. The signs shall be style 5 installed on a fixed 5.5 Ampere circuit and shall be considered a part of the dedicated sign circuit system for electrical power supply.
3. All guidance signs shall be Size 3.

B. Isolation Transformers. Isolation transformers for signs shall be of wattage recommended by sign manufacturer for particular sign installation and shall comply with requirements of AC 150/5345-47.

C. Bases. Install one L-867, 16 inch base in sign support pads complying with requirements of AC 150/5345-42. Base cover shall be as indicated on plans. Furnish all bases with minimum 2~~1~~” drain coupling.

D. Concrete Pads. Install reinforced concrete pad for signs and indicated on the plans and in accordance with sign manufacturer's recommendations. Pad construction shall conform to requirements of Item P-610.

PART 3 CONSTRUCTION METHODS

3.01 GENERAL

A. Install conduit, cables, counterpoise and supports necessary to insure a complete and operable electrical installation for lighting systems as specified and shown on the plans.

B. Install and mount the products to comply with the requirements of the National Electric Code, Section 26 08 20 – Airfield Electrical Installation

Testing, and Section 26 05 40 – Installation of Airport Underground Cable for Airports.

C. General Light Fixture Base Installation Requirements.

1. Caution shall be exercised during light base installation to prevent the collection of foreign matter in products and on operating components. All installation residue shall be collected as installation progresses. As directed by CM, a cover shield shall be used to protect components from foreign matter during installation.
2. Fixture base shall be installed in existing reinforced concrete or asphalt pavements with connecting conduit as shown on the plans.
3. Light bases shall be set level. Leveling jig shall be required as specified and as directed by the CM.
4. Flexible, seal tight steel conduit shall not be used unless specifically approved by the CM. If approved for use, a maximum length of two (2) feet of flexible, sealtight steel conduit can be installed at the connection point to fixture base cans, only where rigid conduit connections cannot be made. Any flexible, sealtight steel conduit bend radius shall meet the cable manufacturer's minimum bend radius requirements or shall meet bend radius requirements for rigid conduit. The more stringent requirement shall govern, as determined by the CM.
5. Light or bases shall have 1, 2 or more 2-inch threaded metallic hubs for all required conduit entrances, or as indicated on the plans. Grommeted conduit entrances are strictly prohibited. The cable entrance hubs shall be oriented in the proper direction so as to align with the connecting conduit.
6. Stub-in conduit connections into existing light bases shall be Meyers Hub installation, where required on the plans and as noted on plan details.
7. When existing light fixtures are removed for the purpose of installing new conductors, or cover plates are installed, new SS CEC lockwashers shall be installed using new 18-8, Type 304 stainless steel hold down bolts and bolts shall extend 1 inch below flange into base can. Submit bolts information for approval.
8. Breakage of fixture hold down bolts normally and regularly occurs in the field during fixture removal or fixture installation. When breakage occurs, the Contractor shall adhere to the following requirements:
   a. The Contractor shall submit a broken bolt removal process for approval of the CM.
   b. Submittal shall include information about the planned broken bolt removal process and jig required to effectively drill and tap broken bolts, when necessary.
   c. Whenever encountered, broken bolts shall be removed.
   d. Where drilling and tapping is required, a jig approved for use by the CM shall be used. Use Jaquith Industries L867B/L868B drill repair fixture or equivalent.

e. All broken bolts shall be replaced with 3/8”-16 stainless steel bolts. In the event that light fixture bases are permanently damaged in the course of removing broken bolts, the Contractor shall be held responsible for the immediate repair/replacement of the lighting base. Permanent damage includes drilling of holes which exceed the required 3/8” bolt diameter and/or any “off centered” impressions that penetrate the inner lip of the existing bolt holes.
f. Use of "helicoils" shall be strictly prohibited as a method of dealing with stripped bolt holes, unless specifically approved in extreme emergency conditions by the CM.
g. Light fixture bases to be used as junction boxes shall be installed at the approximate locations indicated in the plans, or as directed by the CM.

D. General Cable Installation Requirements

1. The primary cable shall enter the light base and transformer housing as shown on the plans.
2. Primary cable slack shall be provided inside the light fixture base following Section 26 05 40 – Installation of Underground Cable for Airports. In general, enough slack shall be left in the cable to permit installation aboveground of the connections between the primary cable and the isolation transformer primary leads. A similar length of primary cable slack shall be provided for any unconnected cable installed in a fixture base can.
3. The transformer secondary leads shall be connected to the lamp leads with a disconnecting plug and receptacle. The secondary connection shall not be taped; the cable connections to the insulating transformer's leads shall be made following Item Section 26 05 40 – Installation of Underground Cable for Airports.
4. The connector joints in the primary circuit shall be wrapped with at least 1 layer of synthetic rubber tape and 2 layers of plastic tape, one-half lapped, extending at least 1-1/2 inches on each side of the joint.
5. Ends of cables shall be sealed with heat shrinkable tubing until the splice is made to prevent the entrance of moisture.

E. General Duct and Conduit Installation Requirements. Trenching, installation of ducts and conduits, concrete backfilling, trench backfilling, installation of duct markers and the type of material used shall conform to Section 26 05 43 – Installation of Airport Underground Electrical Duct Banks and Conduits.

F. Installing Light Fixtures at Existing Bases

1. At locations indicated on the plans, the Contractor shall install light fixtures at existing fixture bases. This shall include providing the following items, as required and directed by the CM.

a. Remove and salvage existing base cover plates.
b. Refurbish and prepare the base flange with flange rings or spacer rings, as required and directed by the CM, in order to properly install the specified light fixture.
c. If no ground lug exists on the interior, provide new ground lug with ground strap following base manufacturer's recommendations. Do not weld to galvanized base can.
d. Clean out and refurbish the interior of the bases, including conduits.
e. Install primary airfield lighting circuit cable.
f. Provide new 304 stainless steel bolts and CEC stainless lock washers
g. Install fixture isolation transformers of proper specified rating and wattage.
h. Install specified fixtures.

G. Demolition and Salvage. At locations noted on plans, the following shall be required.

1. Existing light fixtures, bases, cables and other materials identified as salvageable by the CM shall be removed. Salvageable materials shall be delivered to City salvage area or disposed of as directed by the CM.

3.02 LIGHT FIXTURE INSTALLATIONS IN RIGID PAVEMENT AREAS

A. Toe-In Requirements. Taxiway centerline light fixture installations require that the base shall be angled from a straight set to provide toe-in.

1. Taxiway toe-in for curved taxiway centerline light fixture installations require that the base shall be angled from a straight set to provide toe-in. Taxiway centerline light toe-in shall be left or right, as required, 4 degrees from a line parallel to the centerline of the runway. The Contractor shall submit his written installation method to the CM for approval prior to installation, to provide the proper toe-in as the bases are being set.

B. Light Base Installation Requirements for Class I Bases. Install light fixture bases as per general requirements as noted below.

1. Conduit trench shall be filled with a concrete slurry of well graded aggregate mix with a top size aggregate of 3/8 inches. This concrete shall have a minimum cement content of six (6) sacks per cubic yard and a slump of 5 to 6 inches. The aggregate and other material shall meet the requirements of Item P-610. The level of the slurry fill shall remain 1 (1) inch below the bottom of the pavement slab as shown on the plans.
2. Concrete anchor block around the light base shall be constructed in accordance with Plan details.

3. Light base setting and leveling jig shall not be removed until concrete has set and sufficiently cured to allow stable installation for remainder of system.
4. Before the paving operation, the 1/8 inch mud plate shall be installed over the 5/8 inch construction ring and 3/4 inch plywood cover.
5. After placement of the overlay, the center of the light base is to be located. A properly sized core is to be centered over the base and the asphalt is to be cored and removed. Obtain measurement from the top of the L-868 bottom section to the top of the pavement and custom fabricate the L-868 top section, allow for installation of 1/8” spacer ring between top section and multi-hole adapter ring. Remove construction ring and cover plate and replace with custom made L-868 top section, spacer ring and fixture as shown in plan details.
6. After installation of the light fixture, the azimuth of the light beam shall not vary more than +1/2 degree from the required direction. The elevation of the light fixture outside edge shall be flush with the surrounding surface elevation such that the elevation of the fixture is not more than +0 inches higher than or -1/16 inch lower than the elevation of the pavement. If this tolerance is not met, the Contractor shall, at his expense, remove and replace the fixture to the satisfaction of the City.
7. In-concrete light bases shall have 1, 2 or more 2-inch threaded metallic hubs for all required conduit entrances, as indicated on the plans. Grommeted conduit entrances are strictly prohibited.

C. Light Fixtures. Assemble the light fixture following the manufacturer's instructions. Connect the secondary leads of the transformer to the fixture leads with a disconnecting plug and receptacle conforming to AC 150/5345-26A without taping the joint. Install a lamp of the proper rating in the fixture. Level each fixture as recommended by the manufacturer.

3.03 LIGHT FIXTURE INSTALLATION IN SHOULDER AREAS

A. Light Base Installation Requirements. Install light fixture bases as per general requirements noted in as noted below.

1. Approximately 4 inches of concrete shall be placed under and around the outside of the base. Reference detail drawings for fixture base installation requirements.
2. The top of the concrete shall be sloped away from the flange portion of the base so that a minimum amount of concrete is exposed above the shoulder. The bituminous surface shall not extend over the concrete surface.
3. Provide each fixture with an identification number following the plans by impressing numbers of a 1/4-inch minimum height on a 3 inch brass concrete marker disk imbedded in the concrete encasement.

4. For installation in surface shoulder areas the Contractor shall utilize the following method of installation:
   a. Prior to the bituminous base and surface courses, but after the construction of the lime treated subgrade simultaneously install the edge light base and conduit. Set adjustable L-867 base in place using jig to keep alignment and elevation. Run conduit between bases, completing conduit installation. The conduit alignment shall be straight between bases.
   b. Install counterpoise and make all connections.
   c. Backfill the trench with 4000 PSI concrete and encase L-867 base up to top of lime stabilization. The steel shall extend 2 inch +1/4 inch above top of lime treated subgrade. The concrete and reinforcing steel shall not be separate bid items and will be considered subsidiary to the conduit, or of the L-867 base, as applicable.
   d. Place a protective cover on the adjustable L-867 base, bond breaker on top of concrete, which will also prevent asphalt from getting on concrete, and a protective cover on the reinforcing steel.
   e. After placement of bituminous base and surface course, drill 4 inch core to locate center of base. After determining center of base, core a 24 inch diameter hole down to top of L-867 base.
   f. Remove bituminous plug, extend adjustable base up to 1/2 inch above finish surface of shoulder.
   g. Clean off concrete and steel, place remainder of reinforcing steel, then apply a 2 component epoxy. Place 3000 PSI concrete into void, tapering off concrete back to shoulder surface as required.
   h. Install the concrete marker disk.
5. The Contractor may use alternate methods of installations, only if approved in writing by the City Engineer. The placement of conduit prior to liming operations and setting of bases after place of bituminous courses will not be allowed.
6. Submit planned installation process for approval of the CM.

B. Light Fixtures. Assemble the light fixture following the manufacturer's instructions.

1. Connect the secondary leads of the transformer to the fixture leads with a disconnecting plug and receptacle conforming to AC 150/5345-26 without taping the joint. Install a lamp of the proper rating in the fixture.
2. Do not extend the shearing groove of the breakable coupling more than 3-1/2 inches above finished grade. Level each fixture as recommended by the manufacturer to within 1 degree.

C. Cable, Duct and Conduit. Install as per general requirements noted in Section 26 05 40 – Installation of Underground Cable for Airports and Section

26 05 43 – Installation of Airport Underground Electrical Duct Banks and Conduits.

3.04 TAXIWAY CENTERLINE AND FLUSH MOUNTED EDGE LIGHTING SYSTEMS

A. Description. The taxiway centerline lighting system shall consist of single semiflush lights installed on a line parallel to the geometrical center of the taxiway.

1. Longitudinal Spacing. Light fixtures shall be spaced longitudinally as shown on the plans. A tolerance of plus or minus 10 percent of the longitudinal spacing specified to eliminate interferences shall be allowed and subject to the approval of the CM. Taxiway lights shall be displaced a maximum of 2 feet from the geometrical centerline of the taxiway. This lateral tolerance shall be applied consistently to avoid abrupt and noticeable changes in alignment, i.e., "zigzagging" from 1 side to the other side of the centerline.
2. Long Radius Taxi Exits Greater Than 1,200 Feet. The configuration shown on the plans shall be used to establish the starting point on the runway, spacing, and other details necessary to provide guidance to aircraft from the runway centerline into the "throat" of a long radius taxi exit.
3. Taxiway Crossing or Intersecting Another Taxiway. Taxiway centerline lighting shall continue across the intersection when a taxiway intersects or crosses another taxiway. An omni-directional, L-852F fixture shall be installed at the point of intersection of the 2 centerline light systems as shown in the details in the plans.
4. Taxiways Crossing a Runway. Taxiway centerline lighting shall normally stop where taxiways intersect or cross a runway. Lights shall not encroach within the confines of an intersecting runway except where shown on the plans.
5. Orientation of light beams shall adhere to the following requirements.
   a. On Straight Portions. On all straight portions of taxiway centerlines, the axis of the light beam shall be parallel to the centerline of the taxiing path.
   b. On Curved Portions. The axis of the 2 beams of bi-directional lights shall be oriented parallel to the tangent of the nearest point of the curve designated as the true centerline of the taxiway path. The axis of a unidirectional light beam shall be oriented so that it is "toed-in" to intersect the centerline of the light fixture path radius at a point approximately equivalent to 4 times the spacing of lights on the curved portion. This spacing shall be measured along the chord of the curve.
6. Flush mounted edge lights shall be located as indicated on the drawings and shall be a part of the taxiway edge lighting system.

B. Installation. Taxiway centerline and flush mounted edge lights shall be installed following details shown on the plans.

C. Testing and Inspection

1. General. Because certain components may be inaccessible after final installation, lighting shall be tested concurrently with installation.
2. Elevation and Alignment. Light unit installation procedures shall be checked during construction and after the system has been completed to determine that the recommended fixture elevation and alignment is following design and manufacturer's installation requirements.
3. Securing Screws or Bolts. All fixture securing screws or bolts shall be tightened following the manufacturer's recommendations.
4. Light Channels and Lenses. Each light fixture shall be checked to determine that the lenses and the channels in front of the lenses are clean.
5. Cables, Wiring and Splices. All cables, wiring, and splices shall be tested following Item Section 26 05 40 – Installation of Underground Cable for Airports.
6. The airfield electrical installations shall be tested following the requirements of Section 26 08 20 – Airfield Electrical Installation Testing.
7. Systems Tests shall also be conducted following Item Section 26 08 20 – Airfield Electrical Installation Testing.
8. Any system installation errors or unacceptable discrepancies of installation shall be corrected, as directed by CM and to the satisfaction of the CM.

D. Phasing

1. Phase the centerline light installation separately from the paving schedule so that once the entire centerline circuit is completed and installed for the respective taxiway, the lights can be activated. IE: the centerline lights for the connector taxiways will be activated before the centerline lights on Taxiway NB. For all R/W 8R-26L centerline lead-on/lead-off lights, keep circuits active during construction using temporary cabling for as much of the circuit as possible and at a minimum the segment from the runway thru to the runway safety area hold bar.

3.05 TAXIWAY EDGE LIGHTING SYSTEM

A. Description. All taxiway edge lighting fixtures shall emit blue light. Light fixtures shall be located not more than 10 feet from the edge of the full strength pavement on each side of the taxiway and shall be spaced as indicated on the plans to define the lateral limits of the taxiing paths.

1. On a straight section, the lights on opposite sides of the taxiways are located on a line perpendicular to the taxiway centerline. Closer spacing

of the lights at entrance to taxiways from runways or aprons may be required.

2. Taxiway edge lights are installed at runway/taxiway intersections to define the throat or entrance into the intersecting taxiing route. The taxiway edge lighting system shall be installed following the plans and these specifications.

B. Installation. Taxiway edge lights shall be installed following details shown on the plans and following the requirements AC 150/5340-30.

C. Testing and Inspection

1. General. The installation and alignment of all lighting fixtures of the completed system shall be checked to determine if the products has been installed as designed.
2. Each light fixture shall be checked to determine that a lamp has been installed and that each light fixture using masked lamps is properly oriented following specifications.
3. Products covered by FAA specifications shall be checked to determine if the manufacturers are approved suppliers. The products shall be checked for conformance with specification requirements.
4. The airfield electrical installations shall be tested following the requirements of Section 26 08 20 – Airfield Electrical Installation Testing.
5. Systems Tests shall also be conducted following Item Section 26 08 20 – Airfield Electrical Installation Testing.
6. Any system installation errors or unacceptable discrepancies of installation shall be corrected, as directed by CM and to the satisfaction of the CM.

3.06 AIRFIELD GUIDANCE SIGNS SYSTEM

A. Description. The signs shall be located as indicated on the plans. The side of the sign closest to the taxiway or apron edge shall be 50 feet from the edge of full strength pavement, as shown on plans. Other locations will be as directed by the Construction Manager.

B. All signs shall be oriented so that the face of the sign is approximately 90 degrees to the direction of the taxiing paths from which it is viewed, unless otherwise shown on the plans or directed by the Construction Manager.

C. Installation. Installation shall be in accordance with AC 150/5340-18 and the plans.

1. Airfield guidance signs shall be furnished and installed, or relocated, as noted in these specifications. Signs shall also be installed in conformity with the details and locations shown on the plans.

2. Sign installations or relocations shall include signs, bases, transformers, mounting assemblies and concrete foundations (pads). Installation and relocation shall also include all cable connections, all lamps, regulators, all internal or external conduit and wiring and all incidentals necessary to place the signs in operation as completed units.

D. Sign Modifications. General sign modifications include the removal of existing signs and the installation of new signs on existing bases, modified as required for installation of the new signs.

1. All panels that are removed shall be returned to the City at a location on the airport property directed by the Construction Manager. The contractor shall furnish all required or necessary materials.

E. Inspections and Tests. Each sign shall be inspected to insure that it is installed erect, level at the proper height, and at the location shown on the plans. Each sign identification number shall correspond to the number on the plans.

F. All cables, splices, and wiring shall be inspected to ensure that the installation is in accordance with the plans and specifications. All wiring shall be continuous and free of shorts. All circuits shall be wired in accordance with the manufacturer's instructions. Insulation resistance to ground of all underground conductors shall meet the requirements of Section 26 08 20 – Airfield Electrical Installation Testing. All signs shall be tested by operating the complete system continuously for a minimum of one hour and operating each control ten times. Test signs in accordance with AC 150/5345-44. The airfield electrical installations shall be tested in accordance with the requirements of Section 26 08 20 – Airfield Electrical Installation Testing. Systems Tests shall also be conducted as specified in Section 26 08 20 – Airfield Electrical Installation Testing. Any system installation errors or unacceptable discrepancies of installation shall be corrected, as directed by Construction Manager and to the satisfaction of the City.

G. Concrete Pad. A concrete pad for sign installation shall be constructed at the approximate location shown on the plans. The exact location and orientation shall be as shown on the coordinate schedule of the plans unless otherwise directed by the Construction Manager. The concrete pad shall be sized as shown on plans and shall be poured in place in undisturbed soil. Pad shall be reinforced as shown on the plans.

H. The surface of the concrete shall slope at 1/2 inch per foot, or 5% maximum. The exposed surface of the concrete shall be finished to a smooth finish with a steel trowel or by rubbing. Where required, place anchor bolts for additional flange supports in the concrete pad in accordance with the manufacturer's

instructions. Anchors shall be drop in anchors manufactured by Hilti, or approved equivalent.

I. Leveling. The transformer base housing shall be firmly held in place during the construction of the concrete pad so that the machined upper surface of the base flange will be level within +2 degrees and not more than 1/4 inch above the surface of the pad. All other bearing areas for the additional flange supports shall be in the same horizontal plane as the transformer base flange, which shall be at the same elevation as the nearest edge of the taxiway shoulder. Provide grading of adjacent area, as directed by the Construction Manager.

J. Cable Connections. Primary cable slack shall be left inside the base as required in Section 26 05 40 – Installation of Underground Cable for Airports to permit all cable connections to the taxiway sign to be made above the ground. A similar length primary cable slack shall be provided for any unconnected cable in sign base.

K. Type of Supply Circuit Connection. Sign transformer primary leads shall be connected to the primary cable using L-823 connectors specified in section 26 05 40 – Installation of Underground Cable for Airports.

L. Identification Numbers. An identification number shall be assigned to each sign in accordance with the plans and as directed by the Construction Manager.

M. Assembling Airfield Guidance Sign. The taxiway sign shall be assembled in accordance with the manufacturer's instructions. The sign shall be installed so that the distance from finished grade to the top of the sign is as indicated on the plans and in AC 150/5345-44. The secondary leads of the transformer shall connect to the sign leads with a disconnecting plug and a receptacle, conforming to AC 150/5345-26.

N. Location of Airfield Guidance Signs. Signs shall be installed in the locations as shown on the plans. Deviations/changes shall only be made with prior written approval by the Construction Manager.

O. Existing signs and bases to be removed shall have the removed sign salvaged to HAS. Base shall be disposed of according to specifications.

P. Existing signs and bases to be modified to accept larger signs shall have the removed sign salvaged to HAS. Install new Unistrut or extend existing Unistrut in concrete base as required for larger sign. Finished sign base shall follow detail sheet.

3.07 FIELD PHOTOMETRIC TESTING OF THE NEW LIGHTING SYSTEM

A. Field photometric testing of all new runway and taxiway lights shall be performed as part of the final acceptance testing. Testing shall be performed by a firm with a demonstrated capability for the field measurement of the photometric performance of airfield lighting fixtures. The firm shall have experience in evaluating the test results against FAA standards (FAA AC 150/5345-46) for each type of light fixture. The main beam axis readings for each light fixture evaluated shall be displayed simultaneously on a computer screen for operator and Airport representative review and evaluation, and shall be recorded automatically by the computer. Testing will be performed using a photometric measurement arrangement that is driven by the fixtures installed in place. The measurement must measure intensity and light beam orientation consistent with 150/5345-46 and for LED fixtures, EB 67. Any fixture not meeting the photometric requirements must be aligned, repaired or replaced at contractors expense and retested. A test report summarizing the photometric performance of each of the tested light fixtures, including conclusions and any recommendations for corrective actions shall be submitted. The testing firm shall re-test any fixtures that have deficient test results and require correction or replacement.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

A. The number of light fixtures with new base can installed to be paid for shall be measured per each per location, installed and accepted by the Engineer. This item will include the light unit, lenses, isolation transformer, L-868 Spacers, splice kits, heat shrinks, base can, drain line, base plate, multihole adapter ring, tag, concrete encasement collar, ground rods, ground rod terminations and all items necessary to complete installation and accepted by the Engineer. Separate measurement will be made for each fixture type.

B. The number of light fixtures installed on existing base can to be paid for shall be measured per each per location, installed and accepted by the Engineer. This item will include the light unit, base plate, multihole adapter ring, can modifications for internal ground lug with safety ground, lenses, isolation transformer, splice kits, heat shrinks, tag, connector kit, terminations, new stainless steel hardware and CEC Lock washers, and all items necessary to complete installation and accepted by the Engineer. Separate measurement will be made for each fixture type.

C. The re-installation of an existing fixture on a new base can shall be measured per each fixture reinstalled. This item will include the fixture installation including new isolation transformer, connectors, base can, ground rod, splice kits, heat shrinks, base plate, multihole adapter ring, tag, concrete encasement, terminations, new stainless steel hardware and CEC Lock washers, and all

items necessary to re-install the existing fixture and accepted by the engineer. There will be no separate measurement for fixture or base can type.

D. The number of new airfield signs shall be measured per each per location, installed and accepted by the Engineer. This item will include the sign structure, panels, lamps, replacement lamps, concrete foundation with L-867D, 24" deep base can with galvanized steel cover plate with hub, gasket, L-830 isolation transformer, L-823 connector, stainless-steel bolting hardware, ground rod with test report, identification tag, tether and all incidentals required to provide a complete and operational system. Separate measurement will be made for the various sign module quantities and for single or double sided signs.

E. The number of salvaged airfield signs installed on new sign foundations shall be measured per each per location, installed and accepted by the Engineer. This item will include installation of the salvaged sign structure with associated panels, new lamps, new concrete foundation with L-867D, 24" deep base can with galvanized steel cover plate with hub, gasket, L-830 isolation transformer, L-823 connector, stainless-steel bolting hardware, ground rod with test report, identification tag, tether and all incidentals required to provide a complete and operational system. Incidental to this item is the re-installation of salvaged sign panels from one sign frame to a separate sign frame. There is no separate measurement for sign module quantities, sign size or for single or double sided signs.

F. The number of airfield sign ***panels*** ~~modules~~ shall be measured per each per location, installed and accepted by the Engineer. This item will include removing the existing sign ***panel*** ~~module~~ and installation of a new ***panel*** ~~module~~. Also included with this item is removal and replacement of the isolation transformer and connector kit.

G. The quantity of bolts and threads repaired or replaced on existing base can to be paid for under this item shall be the number of base cans repaired, complete and in place, ready for operation, and accepted by the Engineer. This item includes the labor and materials required for the bolt removal and repair to thread repair including multi-hole adapter plate, threaded inserts, stainless steel bolting hardware and all incidentals required to provide a complete and operational system. There is no separate measurement for can type.

H. The isolation transformers shall be measured complete in place. This item will include installation of new splice kit, connector kit and isolation transformer. For guidance signs, this item includes replacement lamps. There will be separate measurement for major equipment types only (guidance signs vs. light fixtures), not for different varieties or sizes of similar equipment.

I. The photometric testing of the airfield lighting shall be measured per lump sum and shall include all labor, equipment, and materials necessary to perform photometric testing as specified, including retesting of the fixtures deficient in the initial testing and corrected by the contractor, and the furnishing of the report to the construction manager.

J. For in pavement Runway Guard Lights, separate payment under section 26 55 92 will be made for system calibration, setup and provision for the modifications to the existing Runway Guard Light Control and Monitoring System.

4.02 METHOD OF PAYMENT

A. The light fixture or lighting base installation will be paid for at the contract unit price for each item completed in accordance with the plans and specifications that is installed by the contractor and accepted by the Engineer. This price shall be full compensation for furnishing all materials, labor, tools and incidentals necessary to install the light, complete in place in accordance with the plans and specifications.

B. The signage installation will be paid for at the contract unit price for each item completed in accordance with the plans and specifications that is installed by the contractor and accepted by the Engineer. This price shall be full compensation for furnishing all materials, labor, tools and incidentals necessary to install the light, complete in place in accordance with the plans and specifications.

C. Payment for Photometric testing will be paid per lump upon completion of the testing and the receipt of the report, in accordance with specifications. This price shall be full compensation for furnishing all materials, labor, tools and incidentals necessary to complete the testing and report.

Payment will be made under:

26 55 90 - 1	L-861T(L) LED MITL with L-867B base can in new shoulder pavement – Per Each
26 55 90 - 2	L-861T(L) LED MITL on existing L-867B base can – Per Each
26 55 90 - 3	L-852C(L) LED Bi-Directional Taxiway Centerline light on new L-868B base can in new full strength pavement – Per Each
26 55 90 - 4	L-852K(L) LED Bi-Directional Taxiway Centerline Light on new L-868B Base Can in New Full Strength Pavement – Per Each

26 55 90 - 5 L-852C(L) LED Uni-Directional Taxiway Centerline Light on new L-868B Base Can in New Full Strength Pavement – Per Each

26 55 90 - 6 L-852K(L) LED Uni-Directional Taxiway Centerline Light on new L-868B Base Can in New Full Strength Pavement – Per Each

26 55 90 - 7 L-852C(L) LED Bi-Directional Taxiway Centerline Light on existing L-868B Base Can – Per Each

26 55 90 - 8 L-852K(L) LED Bi-Directional Taxiway Centerline Light on existing L-868B Base Can – Per Each

26 55 90 - 9 L-852C(L) LED Uni-Directional Taxiway Centerline Light on existing L-868B Base Can – Per Each

26 55 90 - 10 L-852F Omni-Directional Taxiway Centerline Light on existing L-868B Base Can – Per Each

26 55 90 - 11 L-852G(L) LED Runway Guard Light with integral flashing and monitoring, mounted on a new L-868B two-piece base in New Full Strength pavement - Per Each

26 55 90 - 12 L-852G(L) LED Runway Guard Light with integral flashing and monitoring, mounted on an existing L-868B base can - Per Each

26 55 90 - 13 New L-868B Base Can with Blank Cover in New Full Strength pavement - Per Each

26 55 90 - 14 Install Salvaged Fixture in new base can in new pavement - Per each

26 55 90 - 15 New LED guidance sign including foundation, 3-module, single face – Per Each

26 55 90 - 16 New LED guidance sign including foundation, 4-module, double face – Per Each

26 55 90 - 17 Install Salvaged Sign on new Foundation – Per Each

26 55 90 - 18 Remove and replace Size 3 sign panel – Per Each

26 55 90 - 19 Remove and repair bolts/threads on existing base can – Per Each

26 55 90 - 20 Install new isolation transformer, splice kit and fixture tag – Per Each

26 55 90 - 21 Install new isolation transformer, splice kit, lamps and sign tag – Per Each

26 55 90 - 22 Photometric testing of airfield lighting – Per Lump Sum

26 55 90 - 23 Pavement Block-Out for L-868B Base Can - Per Each

END OF SECTION

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TAXIWAY NA CENTERLINE LIGHT FIXTURES

FIXTURE NUMBER	FAA TYPE	FAA BASE	LENS COLOR 180° CLEAR	180° RED	180° YEL	180° GRE	180° OBS	360° YEL	360° GRE	360° BLU	360° RED	LAMP TYPE QUANT.	LAMP TYPE LED VA	NORTHING COORD.	EASTING COORD.	REGULATOR CIRCUIT NAME	KEY NOTES
1NAC1	L-852D	L-868B							●			2	20	13927420.1181	3122454.4654	NA CL1	(1)
2NAC1	L-852D	L-868B			●	●						2	20	13927466.2105	3122452.9853	NA CL1	(1)
3NAC1	L-852D	L-868B							●			2	20	13927517.4332	3122451.3147	NA CL1	(1)
4NAC1	L-852D	L-868B						●				2	20	13927566.0908	3122449.7394	NA CL1	(1)
5NAC1	L-852D	L-868B							●			2	20	13927614.7484	3122448.1641	NA CL1	(1)
6NAC1	L-852D	L-868B						●				2	20	13927663.4059	3122446.5887	NA CL1	(1)
7NAC1	L-852D	L-868B							●			2	20	13927712.0635	3122445.0134	NA CL1	(1)
8NAC1	L-852D	L-868B						●				2	20	EXISTING	EXISTING	NA CL1	(2)
9NAC1	L-852D	L-868B							●			2	20	EXISTING	EXISTING	NA CL1	(2)
10NAC1	L-852D	L-868B						●				2	20	EXISTING	EXISTING	NA CL1	(2)
11NAC1	L-852D	L-868B							●			2	20	EXISTING	EXISTING	NA CL1	(2)
12NAC1	L-852K	L-868B						●				2	30	13927635.8295	3122449.3177	NA CL1	(1)
13NAC1	L-852K	L-868B							●			2	30	13927656.5122	3122453.6963	NA CL1	(1)
14NAC1	L-852K	L-868B						●				2	30	13927676.6295	3122460.1956	NA CL1	(1)
15NAC1	L-852K	L-868B							●			2	30	13927695.9646	3122468.7456	NA CL1	(1)
16NAC1	L-852K	L-868B						●				2	30	13927714.3090	3122479.2541	NA CL1	(1)
17NAC1	L-852K	L-868B							●			2	30	13927730.8502	3122491.6160	NA CL1	(1)
18NAC1	L-852K	L-868B						●				2	30	EXISTING	EXISTING	NA CL1	(2)
19NAC1	L-852K	L-868B							●			2	30	EXISTING	EXISTING	NA CL1	(2)
20NAC1	L-852K	L-868B						●				2	30	EXISTING	EXISTING	NA CL1	(2)
21NAC1	L-852K	L-868B							●			2	30	EXISTING	EXISTING	NA CL1	(2)
22NAC1	L-852K	L-868B						●				2	30	EXISTING	EXISTING	NA CL1	(2)
23NAC1	L-852K	L-868B							●			2	30	EXISTING	EXISTING	NA CL1	(2)
24NAC1	L-852K	L-868B							●			2	30	EXISTING	EXISTING	NA CL1	(2)
25NAC1	L-852C	L-868B			●							1	15	13927402.5784	3122450.0273	NA CL1	(3)
26NAC1	L-852C	L-868B			●							1	15	13927402.7392	3122455.0281	NA CL1	(3)
27NAC1	L-852C	L-868B			●							1	15	13927402.9005	3122460.0221	NA CL1	(3)
28NAC1	L-852D	L-868B							●			2	20	13927371.4605	3122456.0408	NA CL1	(1)
29NAC1	L-852C	L-868B							●			2	20	13927322.8029	3122457.6161	NA CL1	(1)
30NAC1	L-852C	L-868B							●			2	20	13927234.5184	3122460.4744	NA CL1	(1)
30aNAC1	L-852K	L-868B							●			2	30	13927210.4285	3122453.7580	NA CL1	(1)
30bNAC1	L-852K	L-868B							●			2	30	13927187.3632	3122447.2704	NA CL1	(1)
30cNAC1	L-852K	L-868B							●			2	30	13927169.0710	3122437.9255	NA CL1	(1)
30dNAC1	L-852K	L-868B							●			2	30	13927148.9777	3122421.7198	NA CL1	(1)
30eNAC1	L-852K	L-868B							●			2	30	13927134.5128	3122403.6078	NA CL1	(1)
30fNAC1	L-852K	L-868B							●			2	30	13927124.0670	3122382.9158	NA CL1	(1)
30gNAC1	L-852K	L-868B							●			2	30	13927118.0834	3122360.5223	NA CL1	(1)
31NAC1	L-852C	L-868B							●			2	20	13927112.4886	3122323.4059	NA CL1	(1)
32aNAC1	L-852K	L-868B							●			2	30	13927109.5618	3122346.3370	NA CL1	(1)
32bNAC1	L-852K	L-868B							●			2	30	13927103.0880	3122368.5291	NA CL1	(1)
32cNAC1	L-852K	L-868B							●			2	30	13927093.2264	3122389.4373	NA CL1	(1)
32dNAC1	L-852K	L-868B							●			2	30	13927080.9549	3122407.6230	NA CL1	(1)
32eNAC1	L-852K	L-868B							●			2	30	13927064.3857	3122425.3913	NA CL1	(1)
32fNAC1	L-852K	L-868B							●			2	30	13927048.7793	3122437.7631	NA CL1	(1)
32gNAC1	L-852K	L-868B							●			2	30	13927028.8717	3122449.2855	NA CL1	(1)
33NAC1	L-852K	L-868B							●			2	30	EXISTING	EXISTING	NA CL1	(2)
34NAC1	L-852C	L-868B							●			2	20	13927057.9492	3122466.1910	NA CL1	(1)
35aNAC1	L-852C	L-868B			●							1	15	13927062.7132	3122461.0308	NA CL1	(3)
35bNAC1	L-852C	L-868B			●							1	15	13927062.8741	3122466.0315	NA CL1	(3)
35cNAC1	L-852C	L-868B			●							1	15	13927063.0353	3122471.0256	NA CL1	(3)
36NAC1	L-852C	L-868B							●			2	20	13927144.3717	3122463.3926	NA CL1	(1)
37NAC1	L-852K	L-868B							●			2	30	13927081.0558	3122466.9393	NA CL1	(1)
38NAC1	L-852K	L-868B							●			2	30	13927103.7197	3122471.6200	NA CL1	(1)
39NAC1	L-852K	L-868B							●			2	30	13927124.7895	3122479.5156	NA CL1	(1)
40NAC1	L-852K	L-868B							●			2	30	13927144.4131	3122490.5240	NA CL1	(1)
41NAC1	L-852K	L-868B							●			2	30	13927163.5510	3122505.7007	NA CL1	(1)
42NAC1	L-852K	L-868B							●			2	30	13927179.1368	3122522.8076	NA CL1	(1)
43NAC1	L-852K	L-868B							●			2	30	13927192.4709	3122543.2720	NA CL1	(1)
44NAC1	L-852K	L-868B							●			2	30	13927201.3925	3122563.2273	NA CL1	(1)
45NAC1	L-852K	L-868B							●			2	30	13927207.2670	3122584.2819	NA CL1	(1)
46NAC1	L-852C	L-868B							●			2	20	13927121.2594	3122389.3976	NA CL1	(1)
46aNAC1	L-852C	L-868B							●			2	20	13927141.0722	3122432.0363	NA CL1	(1)
47NAC1	L-852C	L-868B							●			2	20	13927159.5154	3122471.7276	NA CL1	(1)
48NAC1	L-852C	L-868B							●			2	20	13927177.9586	3122511.4189	NA CL1	(1)
49NAC1	L-852K	L-868B							●			2	30	13927300.9255	3122460.2646	NA CL1	(1)
50NAC1	L-852K	L-868B							●			2	30	13927280.0338	3122467.3387	NA CL1	(1)
51NAC1	L-852K	L-868B							●			2	30	13927259.3839	3122479.4749	NA CL1	(1)
52NAC1	L-852K	L-868B							●			2	30	13927244.3304	3122492.8847	NA CL1	(1)
53NAC1	L-852K	L-868B							●			2	30	13927230.8911	3122510.3745	NA CL1	(1)
54NAC1	L-852K	L-868B							●			2	30	13927221.1227	3122530.1504	NA CL1	(1)
55NAC1	L-852K	L-868B							●			2	30	13927215.4007	3122551.4522	NA CL1	(1)
56NAC1	L-852C	L-868B							●			2	20	13927213.9450	3122573.4611	NA CL1	(1)
57NAC1	L-852C	L-868B							●			2	20	13927210.0895	3122609.1322	NA CL1	(1)
58NAC1	L-852C	L-868B							●			2	20	13927211.2090	3122644.1844	NA CL1	(1)
59NAC1	L-852C	L-868B			●							1	15	13927206.5229	3122653.7157	NA CL1	(3)
60NAC1	L-852C	L-868B			●							1	15	13927211.5203	3122653.5546	NA CL1	(3)
61NAC1	L-852C	L-868B			●							1	15	13927216.5177	3122653.3935	NA CL1	(3)
62NAC1	L-852C	L-868B							●			2	20	13927212.9409	3122697.8086	NA CL1	(1)
63NAC1	L-852C	L-868B							●			2	20	13927214.3760	3122742.4400	NA CL1	(1)
64NAC1	L-852C	L-868B							●			2	20	13927215.8766	3122789.1092	NA CL1	(1)
65NAC1	L-852C	L-868B							●			2	20	13927217.2462	3122831.7030	NA CL1	(1)
66NAC1	L-852C	L-868B							●			2	20	13927218.6814	3122876.3345	NA CL1	(1)
67NAC1	L-852C	L-868B			●							1	15	13927215.1080	3122920.7794	NA CL1	(3)
68NAC1	L-852C	L-868B			●							1	15	13927220.1054	3122920.6184	NA CL1	(3)
69NAC1	L-852C	L-868B			●							1	15	13927225.1028	3122920.4573	NA CL1	(3)
70NAC1	L-852C	L-868B							●			2	20	13927220.3838	3122929.0367	NA CL1	(1)
71NAC1	L-852C	L-868B							●			2	20	13927221.6615	3122969.0163	NA CL1	(1)
72NAC1	L-852K	L-868B							●			2	30	13927220.4131	3122989.2285	NA CL1	(1)
73NAC1	L-852K	L-868B							●			2	30	13927215.8012	3123011.3854	NA CL1	(1)
74NAC1	L-852K	L-868B							●			2	30	13927208.1779	3123031.8750	NA CL1	(1)
75NAC1	L-852K	L-868B							●			2	30	13927196.1830	3123053.1555	NA CL1	(1)
76NAC1	L-852K	L-868B							●			2	30	13927181.7249	3123071.2294	NA CL1	(1)
77NAC1	L-852K	L-868B							●			2	30	13927164.1084	3123087.2127	NA CL1	(1)
78NAC1	L-852K	L-868B							●			2	30	13927145.2819	3123099.5405	NA CL1	(1)
79NAC1	L-852K	L-868B							●			2	30	13927124.1944	3123109.0807	NA CL1	(1)
80NAC1	L-852K	L-868B							●			2	30	13927101.8740	3123115.2046	NA CL1	(1)
81NAC1	L-852C	L-868B							●			2	20	13927078.8705	3123117.7615	NA CL1	(1)
82NAC1	L-852C	L-868B			●							1	15	13927097.1014	3123117.2516	NA CL1	(3)
83NAC1	L-852C	L-868B			●							1	15	13927097.2440	3123122.2276	NA CL1	(3)
84NAC1	L-852C	L-868B			●							1	15	13927097.4179	3123127.2414	NA CL1	(3)

TAXIWAY NA CENTERLINE LIGHT FIXTURES

FIXTURE NUMBER	FAA TYPE	FAA BASE	LENS COLOR 180° CLEAR	180° RED	180° YEL	180° GRE	180° OBS	360° YEL	360° GRE	360° BLU	360° RED	LAMP TYPE QUANT.	LAMP TYPE WATT	NORTHING COORD.	EASTING COORD.	REGULATOR CIRCUIT NAME	KEY NOTES
85NAC1	L-852C	L-868B							●			2	20	13927123.1711	3123121.3390	NA CL1	(1)
86NAC1	L-852C	L-868B							●			2	20	13927165.5937	3123119.9742	NA CL1	(1)
87NAC1	L-852C	L-868B							●			2	20	13927211.4601	3123118.4987	NA CL1	(1)
88NAC1	L-852C	L-868B							●			2	20	13927255.6047	3123117.0785	NA CL1	(1)
89NAC1	L-852C	L-868B							●			2	20	13927299.7492	3123115.6584	NA CL1	(1)
90NAC1	L-852C	L-868B							●			2	20	13927343.8937	3123114.2382	NA CL1	(1)
91NAC1	L-852D	L-868B							●			2	20	13927392.3665	3123112.6687	NA CL1	(1)
91aNAC1	L-852C	L-868B			●							1	15	13927423.6925	3123106.6663	NA CL1	(3)
91bNAC1	L-852C	L-868B			●							1	15	13927423.8534	3123111.6671	NA CL1	(3)
91cNAC1	L-852C	L-868B			●							1	15	13927424.0147	3123116.6611	NA CL1	(3)
92NAC1	L-852D	L-868B							●			2	20	13927440.2096	3123111.1195	NA CL1	(1)
93NAC1	L-852D	L-868B			●	●						2	20	13927487.3167	3123109.5939	NA CL1	(1)
94NAC1	L-852D	L-868B							●			2	20	13927536.5255	3123108.0007	NA CL1	(1)
95NAC1	L-852D	L-868B						●				2	20	13927584.6835	3123106.4413	NA CL1	(1)
96NAC1	L-852D	L-868B							●			2	20	13927632.8414	3123104.8820	NA CL1	(1)
97NAC1	L-852D	L-868B						●				2	20	13927680.9994	3123103.3226	NA CL1	(1)
98NAC1	L-852D	L-868B							●			2	20	13927731.7483	3123101.7667	NA CL1	(1)
99NAC1	L-852D	L-868B						●				2	20	EXISTING	EXISTING	NA CL1	(2)
100NAC1	L-852D	L-868B							●			2	20	EXISTING	EXISTING	NA CL1	(2)
101NAC1	L-852D	L-868B						●				2	20	EXISTING	EXISTING	NA CL1	(2)
102NAC1	L-852D	L-868B							●			2	20	EXISTING	EXISTING	NA CL1	(2)
103NAC1	L-852K	L-868B							●			2	30	13927705.3572	3123104.6663	NA CL1	(1)
104NAC1	L-852K	L-868B						●				2	30	13927729.1117	3123110.2192	NA CL1	(1)
105NAC1	L-852K	L-868B							●			2	30	13927750.4617	3123119.2412	NA CL1	(1)
106NAC1	L-852K	L-868B						●				2	30	EXISTING	EXISTING	NA CL1	(2)
107NAC1	L-852K	L-868B							●			2	30	EXISTING	EXISTING	NA CL1	(2)
108NAC1	L-852K	L-868B						●				2	30	EXISTING	EXISTING	NA CL1	(2)
109NAC1	L-852K	L-868B							●			2	30	EXISTING	EXISTING	NA CL1	(2)
110NAC1	L-852K	L-868B						●				2	30	EXISTING	EXISTING	NA CL1	(2)
111NAC1	L-852D	L-868B							●			2	20	EXISTING	EXISTING	NA CL1	(2)
112NAC1	L-852C	L-868B							●			2	20	13927079.0266	3123122.7591	NA CL1	(1)
113NAC1	L-852K	L-868B							●			2	30	13927102.1474	3123123.8323	NA CL1	(1)
114NAC1	L-852K	L-868B							●			2	30	13927124.8156	3123128.5091	NA CL1	(1)
115NAC1	L-852K	L-868B							●			2	30	13927146.4731	3123136.6745	NA CL1	(1)
116NAC1	L-852K	L-868B							●			2	30	13927166.1601	3123147.8390	NA CL1	(1)
117NAC1	L-852K	L-868B							●			2	30	13927184.6608	3123162.5857	NA CL1	(1)
118NAC1	L-852K	L-868B							●			2	30	13927200.2507	3123179.6935	NA CL1	(1)
119NAC1	L-852K	L-868B							●			2	30	13927213.8927	3123200.7268	NA CL1	(1)
120NAC1	L-852K	L-868B							●			2	30	13927222.5126	3123220.1176	NA CL1	(1)
121NAC1	L-852K	L-868B							●			2	30	13927228.6365	3123242.4384	NA CL1	(1)
122NAC1	L-852K	L-868B							●			2	30	13927236.4415	3123208.7746	NA CL1	(1)
123NAC1	L-852K	L-868B							●			2	30	13927241.5643	3123188.8345	NA CL1	(1)
124NAC1	L-852K	L-868B							●			2	30	13927252.0064	3123167.2176	NA CL1	(1)
125NAC1	L-852K	L-868B							●			2	30	13927265.4418	3123149.7290	NA CL1	(1)
126NAC1	L-852K	L-868B							●			2	30	13927280.4443	3123136.3541	NA CL1	(1)
127NAC1	L-852K	L-868B							●			2	30	13927301.1362	3123124.1815	NA CL1	(1)
128NAC1	L-852K	L-868B							●			2	30	13927322.0235	3123117.1045	NA CL1	(1)
129NAC1	L-852K	L-868B							●			2	30	13927321.7269	3123107.7859	NA CL1	(1)
130NAC1	L-852K	L-868B							●			2	30	13927300.4275	3123102.0658	NA CL1	(1)
131NAC1	L-852K	L-868B							●			2	30	13927278.9957	3123091.2479	NA CL1	(1)
132NAC1	L-852K	L-868B							●			2	30	13927263.1644	3123078.8646	NA CL1	(1)
133NAC1	L-852K	L-868B							●			2	30	13927248.6327	3123062.2751	NA CL1	(1)
134NAC1	L-852K	L-868B							●			2	30	13927237.6167	3123043.1693	NA CL1	(1)
135NAC1	L-852K	L-868B							●			2	30	13927230.5397	3123022.2816	NA CL1	(1)
136NAC1	L-852C	L-868B							●			2	20	13927223.1585	3123015.5716	NA CL1	(1)
137NAC1	L-852C	L-868B							●			2	20	13927224.7147	3123063.9672	NA CL1	(1)
138NAC1	L-852C	L-868B							●			2	20	13927226.3723	3123115.5199	NA CL1	(1)
139NAC1	L-852C	L-868B							●			2	20	13927227.9285	3123163.9156	NA CL1	(1)
140NAC1	L-852C	L-868B							●			2	20	13927229.5862	3123215.4683	NA CL1	(1)
141NAC1	L-852C	L-868B							●			2	20	13927231.1423	3123263.8639	NA CL1	(1)
142NAC1	L-852C	L-868B			●							1	15	13927227.6452	3123310.5781	NA CL1	(3)
143NAC1	L-852C	L-868B			●							1	15	13927232.6392	3123310.4169	NA CL1	(3)
144NAC1	L-852C	L-868B			●							1	15	13927237.6400	3123310.2560	NA CL1	(3)
145NAC1	L-852C	L-868B							●			2	20	13927232.7977	3123315.3454	NA CL1	(1)
146NAC1	L-852C	L-868B							●			2	20	13927234.3562	3123363.8122	NA CL1	(4)
147NAC1	L-852C	L-868B							●			2	20	13927236.0070	3123415.1514	NA CL1	(4)
148NAC1	L-852C	L-868B							●			2	20	13927237.5700	3123463.7606	NA CL1	(4)
149NAC1	L-852C	L-868B							●			2	20	13927239.2162	3123514.9573	NA CL1	(4)
150NAC1	L-852C	L-868B							●			2	20	13927240.7838	3123563.7089	NA CL1	(4)
151NAC1	L-852C	L-868B							●			2	20	13927242.4255	3123614.7633	NA CL1	(4)
152NAC1	L-852C	L-868B							●			2	20	13927243.9977	3123663.6573	NA CL1	(4)
153NAC1	L-852C	L-868B			●							1	15	13927240.4443	3123708.7251	NA CL1	(4)
154NAC1	L-852C	L-868B			●							1	15	13927245.4417	3123708.5640	NA CL1	(4)
155NAC1	L-852C	L-868B			●							1	15	13927250.4391	3123708.4030	NA CL1	(4)
156NAC1	L-852C	L-868B							●			2	30	13927245.6348	3123714.5693	NA CL1	(4)
157NAC1	L-852K	L-868B							●			2	30	13927244.3479	3123739.3157	NA CL1	(4)
158NAC1	L-852K	L-868B							●			2	30	13927238.9365	3123763.4975	NA CL1	(4)
159NAC1	L-852K	L-868B							●			2	30	13927229.5534	3123786.4321	NA CL1	(4)
160NAC1	L-852K	L-868B							●			2	30	13927216.4632	3123807.4723	NA CL1	(4)
161NAC1	L-852K	L-868B							●			2	30	13927200.0356	3123826.0242	NA CL1	(4)
162NAC1	L-852K	L-868B							●			2	30	13927180.7341	3123841.5643	NA CL1	(4)
163NAC1	L-852K	L-868B							●			2	30	13927157.9288	3123854.1800	NA CL1	(4)
164NAC1	L-852K	L-868B							●			2	30	13927135.7542	3123861.9517	NA CL1	(4)
164aNAC1	L-852C	L-868B			●							1	15	13927122.0244	3123859.7270	NA CL1	(4)
164bNAC1	L-852C	L-868B			●							1	15	13927123.1468	3123864.5994	NA CL1	(4)
164cNAC1	L-852C	L-868B			●							1	15	13927124.2691	3123869.4718	NA CL1	(4)
165NAC1	L-852K	L-868B							●			2	30	13927111.3454	3123866.2237	NA CL1	(4)
166NAC1	L-852K	L-868B							●			2	30	EXISTING	EXISTING	NA CL1	(4)
167NAC1	L-852K	L-868B							●			2	30	EXISTING	EXISTING	NA CL1	(4)
168NAC1	L-852K	L-868B							●			2	30	EXISTING	EXISTING	NA CL1	(4)
169NAC1	L-852C	L-868B							●			2	20	13927247.1082	3123760.3914	NA CL1	(4)
170NAC1	L-852C	L-868B							●			2	20	13927248.4971	3123803.5850	NA CL1	(4)
171NAC1	L-852C	L-868B							●			2	20	13927250.0550	3123852.0356	NA CL1	(4)
172NAC1	L-852C	L-868B							●			2	20	13927251.5284	3123897.8577	NA CL1	(4)
173NAC1	L-852C	L-868B							●			2	20	13927252.9964	3123943.5126	NA CL1	(4)
174NAC1	L-852C	L-868B							●			2	20	13927254.4752	3123989.5020	NA CL1	(4)
175NAC1	L-852C	L-868B							●			2	20	13927255.9486	3124035.3241	NA CL1	(4)
176NAC1	L-852C	L-868B							●			2	20	13927257.4220	3124081.1462	NA CL1	(4)
177NAC1	L-852K	L-868B							●			2	30	13927209.5539	3123977.0523	NA CL1	(4)
178NAC1	L-852K	L-868B							●			2	30	13927225.5804	3123994.2514	NA CL1	(4)

TAXIWAY NA CENTERLINE LIGHT FIXTURES

FIXTURE NUMBER	FAA TYPE	FAA BASE	LENS COLOR 180° CLEAR	180° RED	180° YEL	180° GRE	180° OBS	360° YEL	360° GRE	360° BLU	360° RED	LAMP TYPE QUANT.	LAMP TYPE WATT	NORTHING COORD.	EASTING COORD.	REGULATOR CIRCUIT NAME	KEY NOTES
179NAC1	L-852K	L-868B							●			2	30	13927239.8487	3124015.9215	NA CL1	(4)
180NAC1	L-852K	L-868B							●			2	30	13927248.4927	3124035.1369	NA CL1	(4)
181NAC1	L-852K	L-868B							●			2	30	13927254.7964	3124057.7846	NA CL1	(4)
182NAC1	L-852C	L-868B							●			2	20	13927258.9879	3124129.8448	NA CL1	(4)
183NAC1	L-852C	L-868B							●			2	20	13927260.5538	3124178.5434	NA CL1	(4)
184NAC1	L-852C	L-868B							●			2	20	13927262.1558	3124228.3654	NA CL1	(4)
185NAC1	L-852C	L-868B							●			2	20	13927263.6856	3124275.9405	NA CL1	(4)
186NAC1	L-852C	L-868B							●			2	20	13927265.2090	3124323.3163	NA CL1	(4)
187NAC1	L-852C	L-868B							●			2	20	13927266.8174	3124373.3377	NA CL1	(4)
188NAC1	L-852C	L-868B							●			2	20	13927268.3833	3124422.0363	NA CL1	(4)
189NAC1	L-852C	L-868B							●			2	20	13927269.9492	3124470.7348	NA CL1	(4)
190NAC1	L-852C	L-868B							●			2	20	13927271.5151	3124519.4334	NA CL1	(4)
191NAC1	L-852C	L-868B							●			2	20	13927273.0829	3124568.1898	NA CL1	(4)
192NAC1	L-852C	L-868B			●							1	15	13927269.3772	3124608.5231	NA CL1	(4)
193NAC1	L-852C	L-868B			●							1	15	13927274.3746	3124608.3620	NA CL1	(4)
194NAC1	L-852C	L-868B			●							1	15	13927279.3720	3124608.2010	NA CL1	(4)
195NAC1	L-852C	L-868B							●			2	20	13927274.6469	3124616.8306	NA CL1	(4)
196NAC1	L-852C	L-868B							●			2	20	13927276.2967	3124668.1381	NA CL1	(4)
197NAC1	L-852C	L-868B							●			2	20	13927277.7787	3124714.2277	NA CL1	(4)
198NAC1	L-852C	L-868B							●			2	20	13927279.3446	3124762.9263	NA CL1	(4)
199NAC1	L-852C	L-868B							●			2	20	13927280.9105	3124811.6249	NA CL1	(4)
200NAC1	L-852C	L-868B							●			2	20	13927282.4764	3124860.3235	NA CL1	(4)
201NAC1	L-852C	L-868B							●			2	20	13927284.0423	3124909.0221	NA CL1	(4)
202NAC1	L-852C	L-868B							●			2	20	13927285.6082	3124957.7206	NA CL1	(4)
203NAC1	L-852C	L-868B							●			2	20	13927287.2237	3125007.9625	NA CL1	(4)
204NAC1	L-852C	L-868B							●			2	20	13927288.7400	3125055.1178	NA CL1	(4)
205NAC1	L-852C	L-868B							●			2	20	13927290.2793	3125103.0351	NA CL1	(4)
206NAC1	L-852C	L-868B							●			2	20	13927291.8718	3125152.5150	NA CL1	(4)
207NAC1	L-852C	L-868B							●			2	20	13927293.4377	3125201.2135	NA CL1	(4)
208NAC1	L-852C	L-868B							●			2	20	13927295.0036	3125249.9121	NA CL1	(4)
209NAC1	L-852C	L-868B							●			2	20	13927296.5695	3125298.6107	NA CL1	(4)
210NAC1	L-852C	L-868B							●			2	20	13927298.1507	3125347.7868	NA CL1	(4)
211NAC1	L-852C	L-868B							●			2	20	13927299.7013	3125396.0079	NA CL1	(4)
212NAC1	L-852C	L-868B							●			2	20	13927301.2039	3125442.7378	NA CL1	(4)
213NAC1	L-852C	L-868B							●			2	20	13927302.8331	3125493.4050	NA CL1	(4)
214NAC1	L-852C	L-868B							●			2	20	13927304.3990	3125542.1036	NA CL1	(4)
215NAC1	L-852C	L-868B							●			2	20	13927305.9649	3125590.8022	NA CL1	(4)
216NAC1	L-852C	L-868B							●			2	20	13927307.5308	3125639.5008	NA CL1	(4)
217NAC1	L-852C	L-868B			●							1	15	13927303.8841	3125681.9804	NA CL1	(4)
218NAC1	L-852C	L-868B			●							1	15	13927308.8916	3125681.8190	NA CL1	(4)
219NAC1	L-852C	L-868B			●							1	15	13927313.8789	3125681.6582	NA CL1	(4)
220NAC1	L-852C	L-868B							●			2	20	13927309.0967	3125688.1993	NA CL1	(4)
221NAC1	L-852C	L-868B							●			2	20	13927310.6626	3125736.8979	NA CL1	(4)
222NAC1	L-852D	L-868B							●			2	20	13927312.2916	3125787.5595	NA CL1	(1)
223NAC1	L-852D	L-868B							●			2	20	13927313.7944	3125834.2951	NA CL1	(1)
224NAC1	L-852D	L-868B							●			2	20	13927315.3447	3125882.5105	NA CL1	(1)
225NAC1	L-852D	L-868B							●			2	20	13927316.9262	3125931.6922	NA CL1	(1)
226NAC1	L-852D	L-868B							●			2	20	13927318.5331	3125981.6664	NA CL1	(1)
227NAC1	L-852D	L-868B							●			2	20	13927320.1400	3126031.6406	NA CL1	(1)
228NAC1	L-852D	L-868B							●			2	20	13927321.7469	3126081.6148	NA CL1	(1)
229NAC1	L-852D	L-868B							●			2	20	13927323.3538	3126131.5889	NA CL1	(1)
230NAC1	L-852D	L-868B							●			2	20	13927324.9608	3126181.5631	NA CL1	(1)
231NAC1	L-852D	L-868B							●			2	20	13927326.5677	3126231.5373	NA CL1	(1)
232NAC1	L-852K	L-868B							●			2	30	13927324.0118	3126208.5371	NA CL1	(1)
233NAC1	L-852K	L-868B							●			2	30	13927318.4064	3126187.6754	NA CL1	(1)
234NAC1	L-852K	L-868B							●			2	30	13927308.3526	3126165.1346	NA CL1	(1)
235NAC1	L-852K	L-868B							●			2	30	13927295.6349	3126145.8006	NA CL1	(1)
236NAC1	L-852K	L-868B							●			2	30	13927280.0496	3126128.6938	NA CL1	(1)
237NAC1	L-852K	L-868B							●			2	30	13927260.9123	3126113.5171	NA CL1	(1)
238NAC1	L-852K	L-868B							●			2	30	13927241.8723	3126102.7809	NA CL1	(1)
239NAC1	L-852K	L-868B							●			2	30	13927220.2201	3126094.6126	NA CL1	(1)
240NAC1	L-852K	L-868B							●			2	30	13927199.8531	3126090.2387	NA CL1	(1)
241NAC1	L-852D	L-868B							●			2	20	13927174.4400	3126088.8527	NA CL1	(1)
242aNAC1	L-852C	L-868B			●							1	15	13927195.1151	3126083.3625	NA CL1	(3)
242bNAC1	L-852C	L-868B			●							1	15	13927195.2577	3126088.3386	NA CL1	(3)
242cNAC1	L-852C	L-868B			●							1	15	13927195.4316	3126093.3523	NA CL1	(3)
243NAC1	L-852K	L-868B							●			2	30	13927199.4864	3126080.8529	NA CL1	(1)
244NAC1	L-852K	L-868B							●			2	30	13927219.5397	3126075.1861	NA CL1	(1)
245NAC1	L-852K	L-868B							●			2	30	13927240.6327	3126065.6485	NA CL1	(1)
246NAC1	L-852K	L-868B							●			2	30	13927259.9736	3126052.9281	NA CL1	(1)
247NAC1	L-852K	L-868B							●			2	30	13927277.0862	3126037.3384	NA CL1	(1)
248NAC1	L-852K	L-868B							●			2	30	13927291.5488	3126019.2632	NA CL1	(1)
249NAC1	L-852K	L-868B							●			2	30	13927303.6548	3125997.7464	NA CL1	(1)
250NAC1	L-852K	L-868B							●			2	30	13927311.1736	3125977.4877	NA CL1	(1)
251NAC1	L-852K	L-868B							●			2	30	13927315.8522	3125954.8164	NA CL1	(1)

KEYED NOTES:

1. FURNISH AND INSTALL NEW BI-DIRECTIONAL INPAVEMENT LIGHT (TYPE AS NOTED) MOUNTED ON A NEW L-868B BASE CAN IN NEW PAVEMENT FOLLOWING LINE ITEM, SPECIFICATIONS AND DETAILS.
2. FURNISH AND INSTALL NEW BI-DIRECTIONAL INPAVEMENT LIGHT (TYPE AS NOTED) MOUNTED IN AN EXISTING BASE CAN FOLLOWING LINE ITEM, SPECIFICATIONS AND DETAILS.
3. FURNISH AND INSTALL NEW UNI-DIRECTIONAL INPAVEMENT LIGHT (L-852C) MOUNTED ON A NEW L-868B BASE CAN IN NEW PAVEMENT FOLLOWING LINE ITEM, SPECIFICATIONS AND DETAILS.
4. EXISTING FIXTURE SHOWN FOR REFERENCE ONLY. FIXTURE IS NOT IN SCOPE OF WORK.

GENERAL NOTES:

REFER TO E08-06 FOR GENERAL NOTES

LIGHT FIXTURES ELECTRICAL INFORMATION:

FIXTURE TYPE	FAA TYPE	LAMP WATTAGE	ISOLATION TRANSFORMER
TAXIWAY FLUSH LED CENTERLINE LIGHT	L-852C	20VA	20/25W (6.6A)
TAXIWAY FLUSH LED CENTERLINE LIGHT	L-852D	30VA	30/45W (6.6A)
TAXIWAY FLUSH LED CLEARANCE LIGHT	L-852C	15VA	10/15W (6.6A)
TAXIWAY FLUSH LED CENTERLINE LIGHT	L-852K	30VA	30/45W (6.6A)

HOUSTON AIRPORT SYSTEM
GEORGE BUSH INTERCONTINENTAL AIRPORT — HOUSTON, TEXAS

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THE WOODLANDS, TEXAS 77380
(281) 252-9232 FIRM No. F-6864

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	LOC #4	11/18/19	

REHABILITATION OF TAXIWAY NA
AT GEORGE BUSH INTERCONTINENTAL AIRPORT

AIRFIELD LIGHTING
LIGHT FIXTURE SCHEDULE
TAXIWAY 'NA' CENTERLINE (WEST)

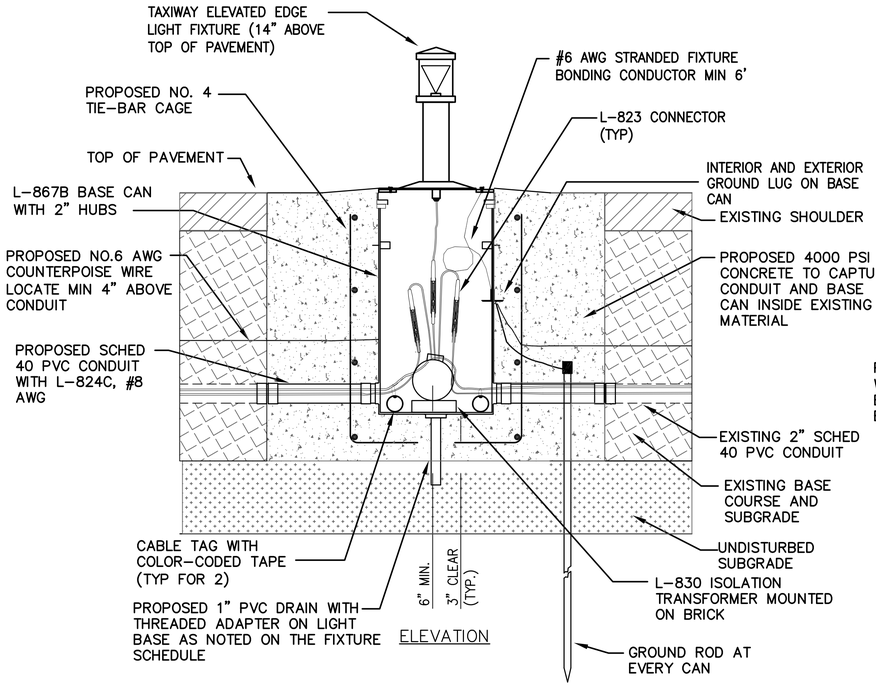
ISSUED FOR BID

PROJECT MGR: CLF
DESIGNER: RSF
DRAWN BY: RSF
CHECKED BY: CLF
SCALE: N.T.S.
DATE: 07/27/2018

STATE OF TEXAS — C. LECETTE FERGUSON — 81460 — REGISTERED PROFESSIONAL ENGINEER — 11/18/19

DEPARTMENT OF AVIATION
APPROVED BY: DP 7/26/18
HOUSTON AIRPORT SYSTEMS AUTHORIZED REPRESENTATIVE

PROJECT NO. 0907
C.I.P. NO. A-000570
H.A.S. NO.
SHEET NO. E08-05

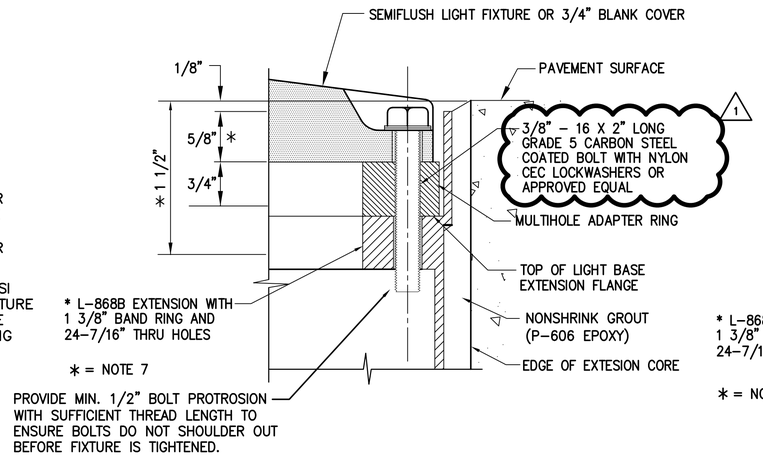


1 E10-03 LIGHT FIXTURE INSTALLATION AT EXISTING SHOULDER

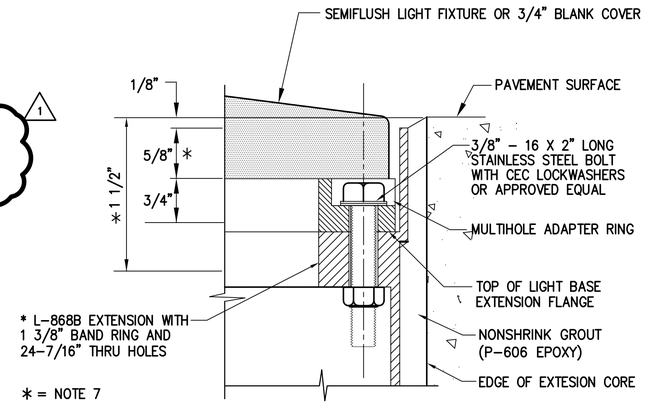
SCALE: 1" = 1'-0"

TYPICAL ELEVATED TAXIWAY EDGE LIGHT INSTALLATION IN EXISTING SHOULDER:

1. DISCONNECT EXISTING L-824C, #8 5KV CABLES FROM EXISTING CONDUIT PATHWAY.
2. CORE DRILL A MINIMUM 36" DIAMETER TO A MINIMUM DEPTH OF 32" BELOW EXISTING FINISHED GRADE FOR INSTALLATION OF NEW BASE CAN. CONTRACTOR HAS THE OPTION TO CORE UP TO 42" DIA CORE IF NEEDED TO CAPTURE EXISTING CONDUIT. NO ADDITIONAL PAYMENT WILL BE MADE.
3. SET ONE-PIECE L-867 BASE INTO CAPTURE SECTION USING ALIGNMENT JIG TO KEEP ALIGNMENT AND ELEVATION PER FAA A/C. TOP OF BASE CAN SHOULD BE 3/4" ABOVE EXISTING FINISHED SURFACE OF SHOULDER. PROVIDE #4 TIE-BAR CAGE AS DETAILED ON CAPTURE SECTION DETAIL ON E503.
3. EXPOSE EXISTING CONDUIT END. INSTALL NEW 2" SCHED 40 PVC CONDUIT FROM NEW BASE CAN TO EXISTING CONDUIT. INSTALL CONDUIT FITTINGS TO CONNECT NEW CONDUIT TO EXISTING. PROVIDE CONDUIT SLEEPERS SO CONDUIT CONCRETE AGGREGATES WILL FLOW UNDER CONDUIT.
4. INSTALL SEPARATE GROUND ROD FOR EVERY BASE CAN AND EXOTHERMIC WELD TO COUNTERPOISE WHICH IS TERMINATED AT CUSTOM FACTORY MANUFACTURED MECHANICAL TERMINATION POINT, WHICH HAS BEEN BONDED TO BASE CAN PRIOR TO GALVANIZATION PROCESS. BOND NEW COUNTERPOISE CABLE TO EXISTING COUNTERPOISE CABLE FOR CONTINUITY.
5. PLACE 4000 PSI CONCRETE INTO CAPTURE SECTION OF L-867B BASE CAN FILLING ANNULAR SPACE OF CONDUIT AND BASE CAN LEVELING UP TO TOP OF CAN AND TAPERING OFF CONCRETE BACK TO EXISTING SHOULDER SURFACE AS REQUIRED.



A – FIXTURE MOUNTING BOLT



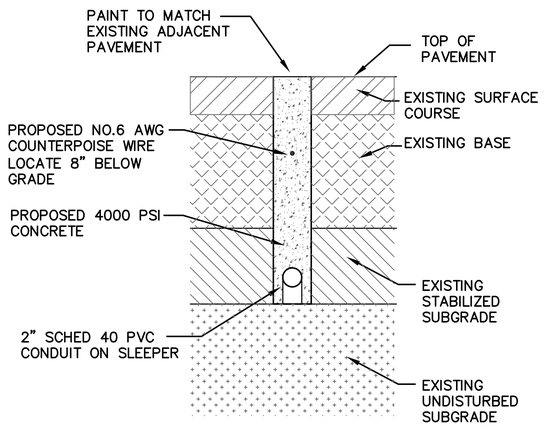
B – MULTIHOLE ADAPTER RING MOUNTING BOLT

NOTES:

1. BOLTS SHALL BE LENGTH SPECIFIED ABOVE UNLESS OTHERWISE APPROVED BY DESIGN ENGINEER.
2. STANDARD BAND RING EXTENDS 1-3/8" ABOVE TOP OF UPPER BASE SECTION TO ALLOW 3/4" FIXTURE RECESS AND 3/4" MULTIHOLE ADAPTER RING. TOP OF FLANGE RING BAND IS 1/8" BELOW PAVEMENT SURFACE. SEE NOTE 7.
3. TORQUE BOLTS HOLDING FIXTURE TO 180 INCH-POUNDS. TORQUE REMAINING BOLTS TO MANUFACTURER'S RECOMMENDATIONS.
4. BLANK LIDS FOR L-868 BASES IN RIGID PAVEMENT SHALL BE 3/4" THICK
5. ALL LIGHT BASE BOLTS SHALL BE PROVIDED WITH TWO-PIECE CEC LOCK WASHERS
6. FOR L-850 HIRL FIXTURES THE BAND RING EXTENDS 1-7/8" FOR A TOTAL RECESS OF 2" FROM THE PAVEMENT SURFACE TO THE TOP OF THE LIGHT BASE EXTENSION FLANGE.
7. BOLTS FOR L-850 HIRL FIXTURES SHALL BE APPROPRIATELY SIZED TO EXTEND ~3/4" BELOW MULTIHOLE ADAPTER RING AS SHOWN.

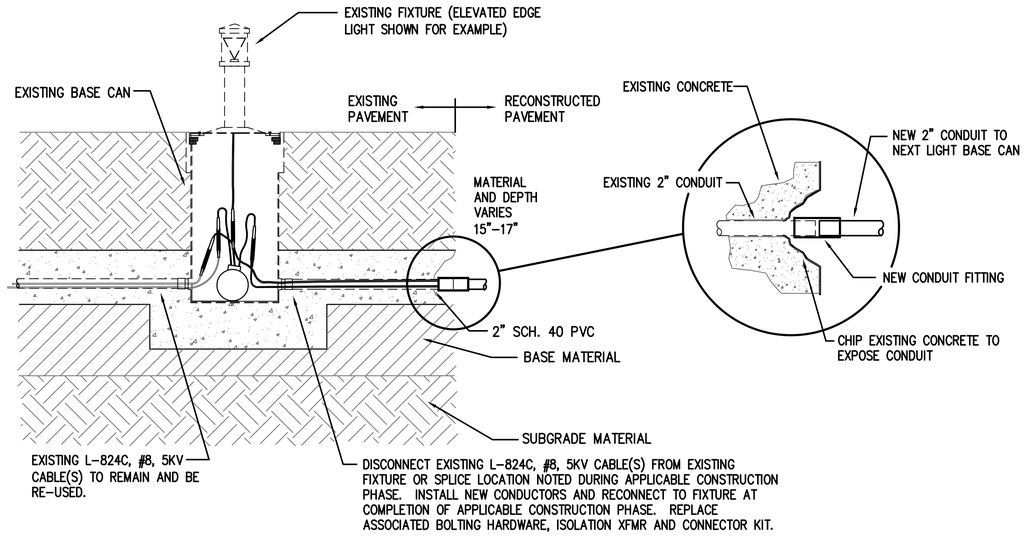
4 E10-03 DETAILS FOR SEMIFLUSH FIXTURE MOUNTING BOLT AND MULTIHOLE ADAPTOR RING IN FULL STRENGTH PAVEMENT

SCALE: NTS



2 E10-03 TYPICAL OPEN-CUT CONDUIT SECTION AT EXISTING SHOULDER CONSTRUCTION

SCALE: 1" = 1'-0"



3 E10-03 CONDUIT SECTION AT NEW SHOULDER CONSTRUCTION

SCALE: 1" = 1'-0"

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GEORGE BUSH INTERCONTINENTAL AIRPORT HOUSTON, TEXAS

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THE WOODLANDS, TEXAS 77380
(281) 252-9232 FIRM No. F-8864

REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	LOC #4	11/18/19	

REHABILITATION OF TAXIWAY NA
AT GEORGE BUSH INTERCONTINENTAL AIRPORT

ELECTRICAL DETAILS
AIRFIELD LIGHTING

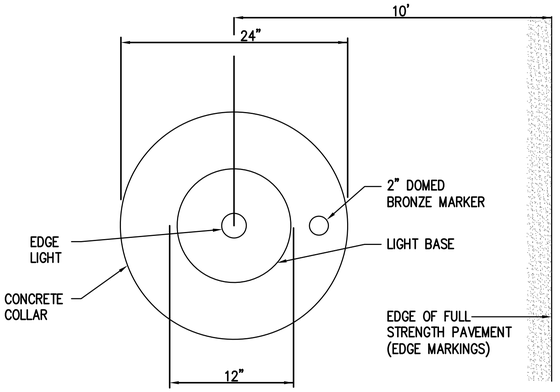
ISSUED FOR BID

PROJECT MGR:	CLF
DESIGNER:	RSF
DRAWN BY:	RSF
CHECKED BY:	CLF
SCALE:	NONE
DATE:	07/27/2018

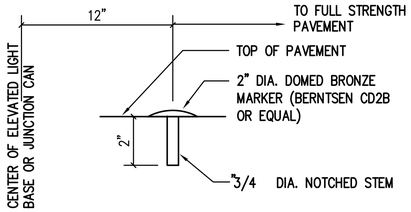
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
11/18/19

DEPARTMENT OF AVIATION
APPROVED BY: DP 7/26/18
HOUSTON AIRPORT SYSTEMS AUTHORIZED REPRESENTATIVE

PROJECT NO. 0907
C.I.P. NO. A-000570
H.A.S. NO.
SHEET NO. E10-03



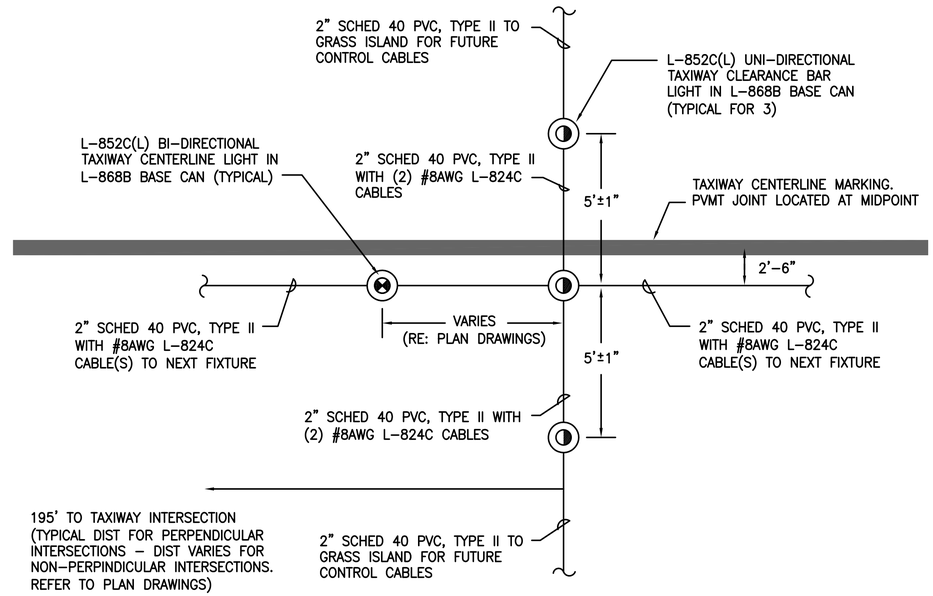
6 PLAN VIEW DETAIL
E10-04 SCALE: NTS



NOTES:

1. IDENTIFICATION SHALL BE STAMPED 3" LETTERS AND NUMBERS UNIFORMLY SPACED ON THE BRONZE MARKER.
2. IDENTIFICATION MARKERS SHALL BE UNIFORMLY INSTALLED ADJACENT TO JUNCTION CANS AND ELEVATED EDGE LIGHTS LOCATED PERPINDICULAR TO PAVEMENT CENTERLINE INBOARD OF THE BASE CAN.

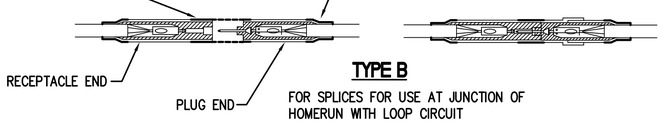
4 BRASS ID TAG DETAIL
E10-04 SCALE: NTS



5 TAXIWAY CLEARANCE BAR INSTALLATION DETAIL
E10-04 SCALE: 1" = 5'-0"

PROVIDE ONE LAYER OF 1.5"W SCOTCH #88 HIGH VOLTAGE RUBBER TAPE HALF LAPPED PLUS ONE LAYER OF 2"W SCOTCH #130C LINERLESS RUBBER TAPE HALF LAPPED, FOR 4 TOTAL THICKNESS AT ANY GIVEN POINT, ACROSS CONNECTOR JOINT. EXTEND A MINIMUM OF 1.5" EITHER SIDE OF CONNECTOR JOINT.

USE ONLY CONNECTOR KIT WITH ROLL-OVER WATER SEAL FLAP TO SEAL POSITION ON MATING CONNECTOR

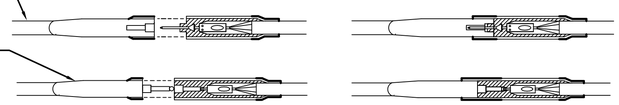


TYPE B

FOR SPLICES FOR USE AT JUNCTION OF HOMERUN WITH LOOP CIRCUIT

UNDERGROUND CABLE
SPEC L-824, TYPICAL

FACTORY MOLDED
TRANSFORMER LEADS



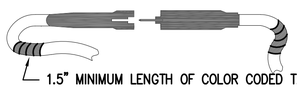
TYPE C

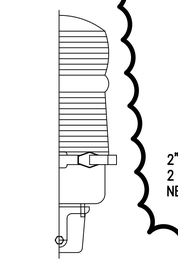
FOR SPLICES AT LIGHTS OR SIGNS

NOTES:

1. PROVIDE STANDARD L-823 KIT FOR SPLICES.
2. PROVIDE COLOR CODED CABLE ID AT EVERY SPLICE IN CANS, PULL BOX, HANDHOLE, AND MANHOLE

3 SPLICE DETAILS
E10-04 SCALE: NTS



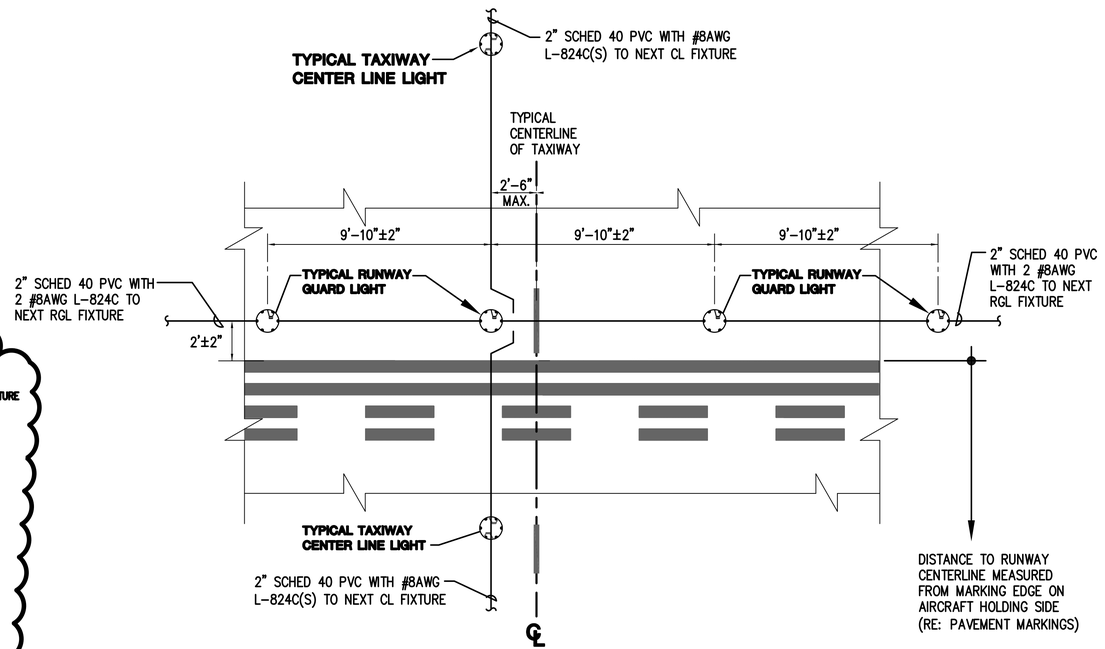


NOTE:

PROVIDE MATCHING LABEL TAGS (WATERPROOF VINYL LABELS 2"Hx3.5"L, YELLOW, SELF-LAMINATING AND RIGID (PANDUIT #PST-FOBLNK OR EQUAL) FOR EACH CONNECTOR PAIR FOR ALL CIRCUITS ON THIS PROJECT IN HANDHOLES, MANHOLES AND PULL BOXES. PROVIDE SEPARATE LABEL WITH UNIQUE IDENTIFICATION FOR EACH ADDITIONAL CONNECTOR PAIR. EXAMPLE: TAG 'AA' MATCHES 'AA', 'BB' MATCHES 'BB' AND ....ETC. LABELS SHALL BE FASTENED TO CABLE USING TY-WRAPS, MINIMUM 2 PER LABEL. LABEL LOCATIONS SHALL BE THE SAME AS FOR SS TAGS DESCRIBED ABOVE.

IN ADDITION TO CABLE TAG, INSTALL COLOR CODED TAPE AT END OF ALL "BLACK" JACKETED CONDUCTORS. LOCATE TAPE AT ALL CONDUCTOR ENDS AND IN ALL HANDHOLES, MANHOLES AND PULLBOXES. EACH CONDUCTOR MUST BE TAPED WITH A UNIQUE COLOR FOR IDENTIFICATION. CONTRACTOR TO PROVIDE A COLOR-CODE CIRCUIT SCHEDULE FOR ELECTRICIANS AT PROJECT COMPLETION. SUBMIT SCHEDULE WITH AS-BUILT DOCUMENTS FOR REVIEW. ALL COLOR CODED TAPE LABELS SHALL MATCH EXISTING COLOR CODED TAPE LABEL COLORS FOR EACH RESPECTIVE CIRCUIT.

1 STAINLESS STEEL TAG + TAPE DETAIL
E10-04 SCALE: NTS



2 IN-PAVEMENT RW GUARD LIGHT INSTALLATION DETAIL
E10-04 SCALE: NTS

HOUSTON AIRPORT SYSTEM
GEORGE BUSH INTERCONTINENTAL AIRPORT HOUSTON, TEXAS

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(281) 252-9232 FIRM No. F-8864

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	LOC #4	11/18/19	

REHABILITATION OF TAXIWAY NA
AT GEORGE BUSH INTERCONTINENTAL AIRPORT

ELECTRICAL DETAILS
AIRFIELD LIGHTING

ISSUED FOR BID

PROJECT MGR:	CLF
DESIGNER:	RSF
DRAWN BY:	RSF
CHECKED BY:	CLF
SCALE:	NONE
DATE:	07/27/2018

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
11/18/19

DEPARTMENT OF AVIATION
APPROVED BY: DP 7/26/18
HOUSTON AIRPORT SYSTEMS
AUTHORIZED REPRESENTATIVE

PROJECT NO.
0907
C.I.P. NO.
A-000570
H.A.S. NO.

SHEET NO.
E10-04