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Letting January 19, 2024

Notice to Bidders, Specifications and Proposal

Illinois Department of Transportation

Springfield, Illinois 62764

Contract No. EF010
Effingham County Memorial Airport
Effingham, Illinois
Effingham County
Illinois Project No. 1H2-4982
SBG Project No. N/A

(Printed by authority of the State of Illinois)

Illinois Department of Transportation

NOTICE TO BIDDERS

1. **TIME AND PLACE OF OPENING BIDS.** Electronic bids are to be submitted to the electronic bidding system (iCX-Integrated Contractors Exchange). All bids must be submitted to the iCX system prior to 12:00 p.m. on January 19, 2024, at which time the bids will be publicly opened from the iCX SecureVault.

2. **DESCRIPTION OF WORK**. The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

   Contract No. EF010
   Effingham County Memorial Airport
   Effingham, Illinois
   Effingham County
   Illinois Project No. 1H2-4982
   SBG Project No. N/A

   Extend Runway 11-29 and Extend Taxiway A to Runway 29

   For engineering information, please contact Michael Dudas. P.E. of Hanson Professional Services, Inc. at 217.747.9297.

3. **INSTRUCTIONS TO BIDDERS**.

   (a) This Notice, the invitation for bids, proposal and letter of award shall, together with all other documents in accordance with Article 10-18 of the Illinois Standard Specifications for Construction of Airports (Adopted April 1, 2012), become part of the contract. Bidders are cautioned to read and examine carefully all documents, to make all required inspections, and to inquire or seek explanation of the same prior to submission of a bid.

   (b) State law, and, if the work is to be paid wholly or in part with Federal-aid funds, Federal law requires the bidder to make various certifications as a part of the proposal and contract. By execution and submission of the proposal, the bidder makes the certification contained therein. A false or fraudulent certification shall, in addition to all other remedies provided by law, be a breach of contract and may result in termination of the contract.

4. **AWARD CRITERIA AND REJECTION OF BIDS**. This contract will be awarded within 90 calendar days to the lowest responsive and responsible bidder considering conformity with the terms and conditions established by the Department in the rules, Invitation for Bids and contract documents. The issuance of plans and proposal forms for bidding based upon a prequalification rating shall not be the sole determinant of responsibility. The Department reserves the right to determine responsibility at the time of award, to reject any or all proposals, to readvertise the proposed improvement, and to waive technicalities.

5. **PRE-BID CONFERENCE.** N/A

6. **DISADVANTAGED BUSINESS POLICY.** The DBE goal for this contract is 10.0%.

7. **SPECIFICATIONS AND DRAWINGS.** The work shall be done in accordance with the Illinois Standard Specifications for Construction of Airports (Adopted April 1, 2012), the Special Provisions dated November 17, 2023, and the Construction Plans dated November 17, 2023 as approved by the Illinois Department of Transportation, Division of Aeronautics.

8. **BIDDING REQUIREMENTS AND BASIS OF AWARD.** When alternates are included in the proposal, the following shall apply:

   a. Additive Alternates

      (1) Bidders must submit a bid for the Base Bid and for all Additive Alternates.

      (2) Award of this contract will be made to the lowest responsible qualified bidder computed as follows:

      The lowest aggregate amount of (i) the Base Bid plus (ii) any Additive Alternate(s) which the Department elects to award.

      The Department may elect not to award any Additive Alternates. In that case, award will be to the lowest responsible qualified bidder of the Base Bid.

   b. Optional Alternates

      (1) Bidders must submit a bid for the Base Bid and for either Alternate A or Alternate B or for both Alternate A and Alternate B.

      (2) Award of this contract will be made to the lowest responsible qualified bidder computed as follows:

      The lower of the aggregate of either (i) the Base Bid plus Alternate A or (ii) the Base Bid plus Alternate B.

9. **CONTRACT TIME.** The Contractor shall complete all work within the specified contract time. Any calendar day extension beyond the specified contract time must be fully justified, requested by the Contractor in writing, and approved by the Engineer, or be subject to liquidated damages.

   The contract time for this contract is Base Bid: 120 calendar days; Additive Alternate #1: 95 additional calendar days; Additive Alternate #2: 25 additional calendar days; Additive Alternate #3: 23 additional calendar days.

10. **INDEPENDENT WEIGHT CHECKS.** The Department reserves the right to conduct random unannounced independent weight checks on any delivery for bituminous, aggregate or other pay item for which the method of measurement for payment is based on weight. The weight checks will be accomplished by selecting, at random, a loaded truck and obtaining a loaded and empty weight on an independent scale. In addition, the department may perform random weight checks by obtaining loaded and empty truck weights on portable scales operated by department personnel.

11. **MATERIAL COST ADJUSTMENTS.** The Illinois Department of Transportation, Division of Aeronautics does not offer any material cost adjustment provisions.

12. **GOOD FAITH COMPLIANCE.** The Illinois Department of Transportation has made a good faith effort to include all statements, requirements, and other language required by federal and state law and by various offices within federal and state governments whether that language is required by law or not. If anything of this nature has been left out or if additional language etc. is later required, the bidder/contractor shall cooperate fully with the Department to modify the contract or bid documents to correct the deficiency. If the change results in increased operational costs, the Department shall reimburse the contractor for such costs as it may find to be reasonable.

By Order of the
Illinois Department of Transportation

Omer Osman,
Secretary

State of Illinois
Department of Transportation

SPECIAL PROVISION
FOR
EEO

Effective: July 21, 1978
Revised: November 18, 1980

The requirements of the following provisions written for federally-assisted construction contracts, including all goals and timetables and affirmative action steps, shall also apply to all State-funded construction contracts awarded by the Illinois Department of Transportation.

Notice of Requirement for Affirmative Action to Ensure
Equal Employment Opportunity (Executive Order 11246)

1. The offeror's or bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

APPENDIX A

The following goal for female utilization in each construction craft and trade shall apply to all Contractors holding Federal and federally assisted construction contracts and subcontracts in excess of $10,000. The goal is applicable to the Contractor's total on-site construction workforce, regardless of whether or not part of that workforce is performing work on a federal, federally assisted or nonfederally related construction contact or subcontract.

Area Covered (Statewide)

Goals for Women apply nationwide.

GOAL	Goal (percent)
Female Utilization	6.9

APPENDIX B

Until further notice, the following goals for minority utilization in each construction craft and trade shall apply to all Contractors holding federal and federally-assisted construction contracts and subcontracts in excess of $10,000 to be performed in the respective geographical areas. The goals are applicable to the Contractor's total on-site construction workforce, regardless of whether or not part of that workforce is performing work on a federal, federally-assisted or nonfederally related construction contract or subcontract.

Economic Area	Goal (percent)
056 Paducah, KY: Non-SMSA Counties - IL - Hardin, Massac, Pope KY - Ballard, Caldwell, Calloway, Carlisle, Crittenden, Fulton, Graves, Hickman, Livingston, Lyon, McCracken, Marshall	5.2
080 Evansville, IN: Non-SMSA Counties - IL - Edwards, Gallatin, Hamilton, Lawrence, Saline, Wabash, White IN - Dubois, Knox, Perry, Pike, Spencer KY - Hancock, Hopkins, McLean, Mublenberg, Ohio, Union, Webster	3.5
081 Terre Haute, IN: Non-SMSA Counties - IL - Clark, Crawford IN - Parke	2.5

083 Chicago, IL:
SMSA Counties:
1600 Chicago, IL - 19.6
IL - Cook, DuPage, Kane,
Lake, McHenry, Will
3740 Kankakee, IL - 9.1
IL - Kankakee
Non-SMSA Counties 18.4
IL - Bureau, DeKalb, Grundy, Iroquois,
Kendall, LaSalle, Livingston, Putnam
IN - Jasper, Laporte, Newton,
Pulaski, Starke

084 Champaign - Urbana, IL:
SMSA Counties:
1400 Champaign - Urbana - Rantoul, IL - 7.8
IL - Champaign
Non-SMSA Counties - 4.8
IL - Coles, Cumberland, Douglas,
Edgar, Ford, Piatt, Vermilion

085 Springfield - Decatur, IL:
SMSA Counties:
2040 Decatur, IL - 7.6
IL - Macon
7880 Springfield, IL - 4.5
IL - Menard, Sangamon
Non-SMSA Counties 4.0
IL - Cass, Christian, Dewitt, Logan,
Morgan, Moultrie, Scott, Shelby

086 Quincy, IL:
Non-SMSA Counties 3.1
IL - Adams, Brown, Pike
MO - Lewis, Marion, Pike, Ralls

087 Peoria, IL:
SMSA Counties:
1040 Bloomington - Normal, IL - 2.5
IL - McLean
6120 Peoria, IL - 4.4
IL - Peoria, Tazewell, Woodford
Non-SMSA Counties - 3.3
IL - Fulton, Knox, McDonough, Marshall,
Mason, Schuyler, Stark, Warren

088 Rockford, IL:
SMSA Counties:
6880 Rockford, IL - 6.3
IL - Boone, Winnebago
Non-SMSA Counties - 4.6
IL - Lee, Ogle, Stephenson

098 Dubuque, IA:
Non-SMSA Counties - 0.5
IL - JoDaviess
IA - Atlamakee, Clayton, Delaware,
Jackson, Winnesheik
WI - Crawford, Grant, Lafayette

099 Davenport, Rock Island, Moline, IA - IL:
SMSA Counties:
1960 Davenport, Rock Island, Moline, IA - IL - 4.6
IL - Henry, Rock Island
IA - Scott
Non-SMSA Counties - 3.4
IL - Carroll, Hancock, Henderson, Mercer, Whiteside
IA - Clinton, DesMoines, Henry, Lee, Louisa, Muscatine
MO - Clark

107	St. Louis, MO:	
	SMSA Counties:	
	7040 St. Louis, MO - IL -	14.7
	IL - Clinton, Madison, Monroe, St. Clair	
	MO - Franklin, Jefferson, St. Charles,	
	St. Louis, St. Louis City	
	Non-SMSA Counties -	11.4
	IL - Alexander, Bond, Calhoun, Clay,	
	Effingham, Fayette, Franklin, Greene,	
	Jackson, Jasper, Jefferson, Jersey,	
	Johnson, Macoupin, Marion, Montgomery,	
	Perry, Pulaski, Randolph, Richland,	
	Union, Washington, Wayne, Williamson	
	MO - Bollinger, Butler, Cape Girardeau,	
	Carter, Crawford, Dent, Gasconade,	
	Iron, Lincoln, Madison, Maries,	
	Mississippi, Montgomery, Perry,	
	Phelps, Reynolds, Ripley, St. Francois,	
	St. Genevieve, Scott, Stoddard, Warren,	
	Washington, Wayne	

These goals are applicable to all the Contractor's construction work (whether or not it is federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with Executive Order 11246 and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the provisions and specifications set forth in its federally assisted contracts, and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order 11246 and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Illinois Department of Transportation will provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten working days of award of any construction contract and/or subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. This notification will list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is the entire State of Illinois for the goal set forth in APPENDIX A and the county or counties in which the work is located for the goals set forth in APPENDIX B.

STANDARD FEDERAL EQUAL EMPLOYMENT
OPPORTUNITY CONSTRUCTION CONTRACT
SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:

   (a) "Covered area" means the geographical area described in the solicitation from which this contract resulted;
   (b) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
   (c) "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;
   (d) "Minority" includes:
      (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
      (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
      (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000. the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction Contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

   (a) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working as such sites or in such facilities.

   (b) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

   (c) Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractors may have taken.

   (d) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

   (e) Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

   (f) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreements; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

   (g) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

   (h) Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

   (i) Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship of other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

   (j) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

   (k) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

(l) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

(m) Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

(n) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

(o) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction Contractors and suppliers, including circulation of solicitations to minority and female Contractor associations and other business associations.

(p) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a Contractor association, joint Contractor-union, Contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specified minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy his requirement, Contractors shall not be required to maintain separate records.

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

State of Illinois
Department of Transportation

SPECIAL PROVISION
FOR
SPECIFIC EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES
NONFEDERAL-AID CONTRACTS

Effective: March 20, 1969
Revised: January 1, 1994

1. General

   a. The requirements set forth herein shall constitute the specific affirmative action requirements under this contract and supplement the non- discrimination requirements contained elsewhere in this proposal.

   b. The Contractor shall work with the Illinois Department of Transportation (IDOT) in carrying out Equal Employment Opportunity (EEO) obligations and in reviews of activities under the contract.

   c. The Contractor, and all subcontractors holding subcontracts (not including material suppliers) of $10,000 or more, shall comply with the following minimum specific requirement activities of EEO. The Contractor shall include these requirements in every subcontract of $10,000 or more with such modification of language as is necessary to make them binding on the subcontractor.

2. Equal Employment Opportunity Policy

   The Contractor shall accept as operating policy the following statement which is designed to further the provision of EEO to all persons, and to promote the full realization of equal employment opportunity through a positive continuing program: "It is the policy of this Company to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age, or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

3. Equal Employment Opportunity Officer

   The Contractor shall designate and make known to IDOT contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active Contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

4. Dissemination of Policy

   a. All members of the Contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the Contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

      (1) Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the Contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

      (2) All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the Contractor's EEO obligations within thirty days following their reporting for duty with the Contractor.

      (3) All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the Contractor's procedures for locating and hiring minority and female employees.

   b. In order to make the Contractor's EEO policy known to all employees, prospective employees, and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., the Contractor shall take the following actions:

      (1) Notices and posters setting forth the Contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

      (2) The Contractor's EEO policy and the procedures to implement such policy shall be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

5. Recruitment

   a. When advertising for employees, the Contractor shall include in all advertisements for employees the notation: "An Equal Opportunity Employer". All such advertisements shall be published in newspapers, or other publications, having a large circulation among minority groups in the area from which the project work force would normally be derived.

   b. The Contractor shall, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority and female applicants, including, but not limited to, State employment

agencies, schools, colleges and minority and female organizations. To meet this requirement, the Contractor shall, identify sources of potential minority and female employees, and establish with such identified sources procedures whereby minority and female applicants may be referred to the Contractor for employment consideration. In the event the Contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he/she is expected to observe the provisions of that agreement to the extent that the system permits the Contractor's compliance with EEO contract provisions.

c. The Contractor shall encourage present employees to refer minority and female applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, information and procedures with regard to referring minority and female applicants shall be discussed with employees.

6. Personnel Actions

Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, will be taken without regard to race, color, religion, sex, national origin, age, or disability. The following procedures shall be followed:

a. The Contractor shall conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The Contractor shall periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The Contractor shall periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the Contractor shall promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The Contractor shall promptly investigate all complaints of alleged discrimination made to the Contractor in connection with the obligations under this contract, shall attempt to resolve such complaints, and shall take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the Contractor shall inform every complainant of all of the avenues of appeal.

7. Training and Promotion

a. The Contractor shall assist in locating, qualifying and increasing the skills of minority and female employees and applicants for employment.

b. Consistent with the Contractor's work force requirements and as permissible under Federal and State regulations, the Contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance.

c. The Contractor shall advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The Contractor shall periodically review the training and promotion potential of minority and female employees and shall encourage eligible employees to apply for such training and promotion.

8. Unions

If the Contractor relies in whole or in part upon unions as a source of employees, the Contractor shall use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minorities and females within the unions, and to effect referrals by such unions of minority and female employees. Actions by the Contractor, either directly or through a Contractor's association acting as agent, shall include the procedures set forth below:

a. The Contractor shall use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority and female employees for membership in the unions and increasing the skills of minority and female and employees so that they may qualify for higher paying employment.

b. The Contractor shall use best efforts to incorporate an EEO clause into each union agreement to the end that such union shall be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age, or disability.

c. The Contractor is to obtain information as to the referral practices and policies of the labor union, except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the Contractor, the Contractor shall so certify to IDOT and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the Contractor with a reasonable flow of minority and female referrals within the time limit set forth in the collective bargaining agreement, the Contractor shall, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and females. (The U.S. Department of Labor has held that it shall be no excuse that the union with which the Contractor has a collective bargaining agreement providing for exclusive referral failed to refer minorities or female employees). In the event the union referral practice prevents the Contractor from meeting the obligations pursuant to these Special Provisions, such Contractor shall immediately notify IDOT.

9. Selection of Subcontractors, Procurement of Materials, and Leasing of Equipment

The Contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The Contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR Part 23, shall have equal opportunity to compete for and perform subcontracts which the Contractor enters into pursuant to this contract. The Contractor shall use best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority and female representation among their employees. Contractors shall obtain lists of DBE construction firms from IDOT personnel.

c. The Contractor shall use his/her best efforts to ensure subcontractor compliance with their EEO obligations.

10. Records and Reports

The Contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of IDOT.

a. The records kept by the Contractor shall document the following:

(1) the number of minorities, non-minorities and females employed in each work classification on the project;

(2) the progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and females;

(3) the progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) the progress and efforts being made in securing the services of DBE subcontractors, or subcontractors with meaningful minority and female representation among their employees.

b. The Contractor shall submit to IDOT a monthly report every month for the duration of the project, indicating the number of minority, non-minority and female employees currently engaged in each work classification required by contract work and the number of hours worked. This information is to be reported on Form SBE-956. If on-the-job training is being required by special provision, the Contractor will be required to collect and report training data.

State of Illinois
Department of Transportation

SPECIAL PROVISION
FOR
REQUIRED PROVISIONS – STATE CONTRACTS

Effective: April 1 1965
Revised: January 1, 2017

I. SELECTION OF LABOR

The Contractor shall comply with all Illinois statutes pertaining to the selection of labor.

EMPLOYMENT OF ILLINOIS WORKERS DURING PERIODS OF
EXCESSIVE UNEMPLOYMENT

Whenever there is a period of excessive unemployment in Illinois, which is defined herein as any month immediately following two consecutive calendar months during which the level of unemployment in the State of Illinois has exceeded five percent as measured by the United States Bureau of Labor Statistics in its monthly publication of employment and unemployment figures, the Contractor shall employ at least 90 percent Illinois laborers. "Illinois laborer" means any person who has resided in Illinois for at least 30 days and intends to become or remain an Illinois resident.

Other laborers may be used when Illinois laborers as defined herein are not available, or are incapable of performing the particular type of work involved, if so certified by the Contractor and approved by the Engineer. The Contractor may place no more than three of his/her regularly employed non-resident executive and technical experts, who do not qualify as Illinois laborers, to do work encompassed by this Contract during period of excessive unemployment.

This provision applies to all labor, whether skilled, semi-skilled, or unskilled, whether manual or non-manual.

II. EQUAL EMPLOYMENT OPPORTUNITY

In the event of the Contractor's noncompliance with the provisions of this Equal Employment Opportunity Clause, the Illinois Human Rights Act or the Illinois Department of Human Rights Rules and Regulations, the Contractor may be declared ineligible for future contracts or subcontracts with the State of Illinois or any of its political sub-divisions or municipal corporations, and the contract may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation.

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

1. That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, marital status, order of protection status, national origin or ancestry, citizenship status, age, physical or mental disability unrelated to ability, military status, or an unfavorable discharge from military service; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.

2. That, if it hires additional employees in order to perform this contract or any portion hereof, it will determine the availability (in accordance with the Illinois Department of Human Rights Rules and Regulations) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.

3. That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, sexual orientation, marital status, order of protection status, national origin or ancestry, citizenship status, age, physical or mental disability unrelated to ability, military status, or an unfavorable discharge from military service.

4. That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the Contractor's obligations under the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations. If any labor organization or representative fails or refuses to cooperate with the Contractor in its efforts to comply with such Act and Rules and Regulations, the Contractor will promptly so notify the Illinois Department of Human Rights and IDOT and will recruit employees from other sources when necessary to fulfill its obligations thereunder.

5. That it will submit reports as required by the Illinois Department of Human Rights Rules and Regulations, furnish all relevant information as may from time to time be requested by the Illinois Department of Human Rights or IDOT, and in all respects comply with the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations.

6. That it will permit access to all relevant books, records, accounts and work sites by personnel of IDOT and the Illinois Department of Human Rights for purposes of investigation to ascertain compliance with the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations.

7. That it will include verbatim or by reference the provisions of this clause in every subcontract it awards under which any portion of the contract obligations are undertaken or assumed, so that the provisions will be binding upon the subcontractor. In the same manner as with other provisions of this contract, the Contractor will be liable for compliance with applicable provisions of this clause by subcontractors; and further it will promptly notify IDOT and the Illinois Department of Human Rights in the event any subcontractor fails or refuses to comply with these provisions. In addition, the Contractor will not utilize any subcontractor declared by the Illinois Human Rights Commission to be ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.

III. SUBLETTING OR ASSIGNING THE CONTRACT

1. The Contractor shall perform with his/her own organization contract work amounting to not less than 51 percent of the original total contract price, except that any items designated by the State as "Specialty Items" may be performed by subcontract and the amount of any such "Specialty Items" so performed may be deducted from the original total contract price before computing the amount of work required to be performed by the Contractor with his/her own organization.

   a. "His/her own organization" shall be construed to include only worker employed and paid directly by the Contractor and equipment owned or rented by him/her, with or without operators.

   b. "Specialty Items" shall be construed to be limited to work that requires specialized knowledge, craftsmanship or equipment not ordinarily available in contracting organizations qualified to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. In addition to the 51 percent requirement set forth in paragraph 1 above, the Contractor shall furnish (a) a competent superintendent or foreman who is employed by him/her, who has full authority to direct performance of the work in accordance with the contract requirements, and who is in charge of all construction operations (regardless of who performs the work), and (b) such other of his/her own organizational capability and responsibility (supervision, management, and engineering services) as the State highway department contracting officer determines is necessary to assure the performance of the contract.

3. The Contractor shall not sublet, sell, transfer, assign or otherwise dispose of the contract or contracts or any portion thereof, or of his/her right, title or interest therein, without written consent of the Engineer. In case such consent is given, the Contractor will be permitted to sublet a portion thereof, but shall perform with the Contractor's own organization, work amounting to not less than 51 percent of the total contract cost, except that any items designated in the contract as "specialty items" may be performed by subcontract and the cost of any such specialty items so performed by subcontract may be deducted from the total cost before computing the amount of work required to be performed by the Contractor with his/her own organization. Materials purchased or produced by the Contractor must be incorporated into the project by the Contractor's own organization if their cost is to be applied to the 50 percent requirement.

   No subcontracts, or transfer of contract, shall in any case release the Contractor of his/her liability under the contract and bonds. All transactions of the Engineer shall be with the Contractor. The Contractor shall have representative on the job at all times when either contract or subcontract work is being performed.

   All requests to subcontract shall contain a certification that the subcontract agreement exists in writing and physically contains the required Federal and State Equal Employment Opportunity provisions and Labor compliance provisions, including the contract minimum wage requirements. The Contractor shall permit Department or Federal representatives to examine the subcontract agreements upon notice.

4. Any items that have been selected as "Specialty Items" for the contract are listed as such in the Special Provisions, bid schedule, or elsewhere in the contract documents.

5. No portion of the contract shall be sublet, assigned or otherwise disposed of, except with the written consent of the State highway department contracting officer, or his/her authorized representative, and such consent when given shall not be construed to relieve the Contractor of any responsibility for the fulfillment of the contract. Request for permission to sublet, assign or otherwise dispose of any portion of the contract shall be in writing and accompanied by (a) a showing that the organization which will perform the work is particularly experienced and equipped for such work, and (b) an assurance by the Contractor that the labor standards provisions set forth in this contract shall apply to labor performed on all work encompassed by the request.

IV. COMPLIANCE WITH THE PREVAILING WAGE ACT

1. Prevailing Wages. All wages paid by the Contractor and each subcontractor shall be in compliance with The Prevailing Wage Act (820 ILCS 130), as amended, except where a prevailing wage violates a federal law, order, or ruling, the rate conforming to the federal law, order, or ruling shall govern. The Contractor shall be responsible to notify each subcontractor of the wage rates set forth in this contract and any revisions thereto. If the Department of Labor revises the wage rates, the Contractor will not be allowed additional compensation on account of said revisions. Current wage rate information shall be obtained by visiting the Department of Labor website at http://www.illinois.gov/idol/Pages/default.aspx. It is the responsibility of the Contractor to review the rates applicable to the work of this contract at regular intervals in order to insure the timely payment of current rates. Provision of this information to the Contractor by means of the Department of Labor website satisfies the notification of revisions by the Department to the Contractor pursuant to the Act, and the Contractor agrees that no additional notice is required.

2. Payroll Records. The Contractor and each subcontractor shall make and keep, for a period of three years from the later of the date of final payment under the contract or completion of the contract, records of the wages paid to his/her workers. The payroll records shall include each worker's name, address, telephone number, social security number, classification, rate of pay, number of hours worked each day, starting and ending times of work each day, total hours worked each week, itemized deductions made, and actual wages paid. Upon seven business days' notice, these records shall be available at a location within the State, during reasonable hours, for inspection by the Department or the Department of Labor; and Federal, State, or local law enforcement agencies and prosecutors.

3. **SUBMISSION OF PAYROLL RECORDS (BDE)**

   Effective: April 1, 2021
   Revised: November 2, 2023

   Submission of Payroll Records. The Contractor and each subcontractor shall, no later than the 15th day of each calendar month, file a certified payroll for the immediately preceding month to the Illinois Department of Labor (IDOL) through the Illinois Prevailing Wage Portal in compliance with the State Prevailing Wage Act (820 ILCS 130). The portal can be found on the IDOL website at https://www2.illinois.gov/idol/Laws-Rules/CONMED/Pages/Prevailing-Wage-Portal.aspx. Payrolls shall be submitted in the format prescribed by the IDOL.

In addition to filing certified payroll(s) with the IDOL, the Contractor and each subcontractor shall certify and submit payroll records to the Department each week from the start to the completion of their respective work, except that full social security numbers shall not be included on weekly submittals. Instead, the payrolls shall include an identification number for each employee (e.g., the last four digits of the employee's social security number). In addition, starting and ending times of work each day may be omitted from the payroll records submitted. The submittals shall be made using LCPtracker Pro software. The software is web-based and can be accessed at https://lcptracker.com/. When there has been no activity during a work week, a payroll record shall still be submitted with the appropriate option ("No Work", "Suspended", or "Complete") selected."

4. Employee Interviews. The Contractor and each subcontractor shall permit his/her employees to be interviewed on the job, during working hours, by compliance investigators of the Department or the Department of Labor.

V. NONSEGREGATED FACILITIES

(Applicable to State Financed Construction Contracts and related subcontracts exceeding $10,000 which are not exempt from the Equal Opportunity clause).

By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement, as appropriate, the bidder, construction Contractor, subcontractor, or material supplier, as appropriate, certifies that (s)he does not maintain or provide for his/her employees any segregated facilities at any of his/her establishments, and that (s)he does not permit his/her employees to perform their services at any location, under his/her control, where segregated facilities are maintained. (S)He certifies further that (s)he will not maintain or provide for his/her employees any segregated facilities at any of his/her establishments, and that (s)he will not permit his/her employees to perform their services at any location, under his/her control, where segregated facilities are maintained. (S)He agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. (S)He agrees that (except where he/she has obtained identical certifications from proposed subcontractors and material suppliers for specific time periods), he/she will obtain identical certifications from proposed subcontractors or material suppliers prior to the award of subcontracts or the consummation of material supply agreements, exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause, and that (s)he will retain such certifications in his/her files.

State of Illinois
Department of Transportation

SPECIAL PROVISION
FOR
SECTION 80 PROSECUTION AND PROGRESS

This Special Provision amends the provisions of the Standard Specifications for Construction of Airports, adopted April 1, 2012 and shall be construed to be a part thereof, superseding any conflicting provisions thereof applicable to the work under the contract.

80-09 FAILURE TO COMPLETE ON TIME.

DELETE: “See contract documents for current schedule of deductions.”

ADD:

Schedule of Deductions for Each Day of Overrun in Contract Time			
Original Contract Amount		Daily Charges	
From More Than	To and Including	Calendar Day	Work Day
$ 0	$ 100,000	$ 475	$ 675
100,000	500,000	750	1,050
500,000	1,000,000	1,025	1,425
1,000,000	3,000,000	1,275	1,725
3,000,000	6,000,000	1,425	2,000
6,000,000	12,000,000	2,300	3,450
12,000,000	And over	6,775	9,525

State of Illinois
Department of Transportation

SPECIAL PROVISION
FOR
SECTION 90 MEASUREMENT AND PAYMENT

This Special Provision amends the provisions of the Standard Specifications for Construction of Airports, adopted April 1, 2012 and shall be construed to be a part thereof, superseding any conflicting provisions thereof applicable to the work under the contract.

90-07 PARTIAL PAYMENTS.

DELETE: The entire section.

ADD: Partial payments will be made to the Contractor at least once each month as the work progresses. The payments will be based upon estimates, prepared by the Resident Engineer, of the value of the work performed and materials complete and in place in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with the Section 90-08 PAYMENT FOR MATERIALS ON HAND. From the amount of partial payment so determined on Federal-Aid projects, there shall be deducted an amount up to ten percent of the cost of the completed work which shall be retained until all conditions necessary for financial closeout of the project are satisfied. The amount of the estimate approved as due for payment will be vouchered by the Department and presented to the State Comptroller for payment. No amount less than $1,000.00 will be approved for payment other than the final payment. A final voucher for under $5.00 shall not be paid except through electronic funds transfer. (15 ILCS 405/9(b-1))

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

No partial payment shall bind the Department to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in Section 90-09 ACCEPTANCE AND FINAL PAYMENT.

Progress payments may be reduced by liens filed pursuant to Section 23(c) of the Mechanics Lien Act, 770 ILCS 60/23(c).

If a Contractor or subcontractor has defaulted on a loan issued under the Department's Disadvantaged Business Revolving Loan Program (20 ILCS 2705/2705-610) progress payments may be reduced pursuant to the terms of that loan agreement. In such cases, the amount of the estimate related to the work performed by the Contractor or subcontractor, in default of the loan agreement, will be offset, in whole or in part, and vouchered by the Department to the Working Capital Revolving Fund or designated escrow account. Payment for the work shall be considered as issued and received by the Contractor or subcontractor on the date of the offset voucher. Further, the amount of the offset voucher shall be a credit against the Department's obligation to pay the Contractor, the Contractor's obligation to pay the subcontractor, and the Contractor's or subcontractor's total loan indebtedness to the Department. The offset shall continue until such time as the entire loan indebtedness is satisfied. The Department will notify the Contractor and Fund Control Agent in a timely manner of such offset. The Contractor or subcontractor shall not be entitled to additional payment in consideration of the offset.

In accordance with 49 USC § 47111, the Department will not make payments totaling more than 90 percent of the contract until all conditions necessary for financial closeout of the project are satisfied.

The failure to perform any requirement, obligation, or term of the contract by the Contractor shall be reason for withholding any progress payments until the Department determines that compliance has been achieved.

90-10 TRUST AGREEMENT OPTION.

DELETE: The entire section.

STATE OF ILLINOIS

SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for Construction of Airports," adopted April 1, 2012, and the Special Provisions included herein which apply to and govern the airport improvement of: Extend Runway 11-29 and Extend Taxiway A to Runway 29 at Effingham County Memorial, Contract EF010, and in case of conflict with any part or parts of said Specifications, the said Special Provisions shall take precedence and shall govern.

SPECIAL PROVISION FOR COMPLETION TIME VIA CALENDAR DAYS

It being understood and agreed that the completion within the time limit is an essential part of the contract, the bidder agrees to complete the work within **Base Bid: 120 calendar days; Additive Alternate #1: 95 additional calendar days; Additive Alternate #2: 25 additional calendar days; Additive Alternate #3: 23 additional calendar days**, unless additional time is granted by the Engineer in accordance with the provisions of the specifications. In case of failure to complete the work on or before the time named herein, or within such extra time as may have been allowed by extensions, the bidder agrees that the Department of Transportation shall withhold from such sum as may be due him/her under the terms of this contract, the costs, as set forth in Section 80-09 Failure to Complete on Time of the Standard Specifications, which costs shall be considered and treated not as a penalty but as damages due to the State from the bidder by reason of the failure of the bidder to complete the work within the time specified in the contract.

CONSTRUCTION AIR QUALITY – DIESEL VEHICLE EMISSIONS CONTROL (BDE)
Effective: April 1, 2009
Revised: January 2, 2012

Diesel Vehicle Emissions Control. The reduction of construction air emissions shall be accomplished by using cleaner burning diesel fuel. The term "equipment" refers to any and all diesel fuel powered devices rated at 50 hp and above, to be used on the project site in excess of seven calendar days over the course of the construction period on the project site (including any "rental" equipment).

All equipment on the jobsite, with engine ratings of 50 hp and above, shall be required to: use Ultra Low Sulfur Diesel fuel (ULSD) exclusively (15 ppm sulfur content or less).

Diesel powered equipment in non-compliance will not be allowed to be used on the project site, and is also subject to a notice of non-compliance as outlined below.

The Contractor shall certify that only ULSD will be used in all jobsite equipment. The certification shall be presented to the Department prior to the commencement of the work.

If any diesel powered equipment is found to be in non-compliance with any portion of this specification, the Engineer will issue the Contractor a notice of non-compliance and identify an appropriate period of time, as outlined below under environmental deficiency deduction, in which to bring the equipment into compliance or remove it from the project site.

Any costs associated with bringing any diesel powered equipment into compliance with these diesel vehicle emissions controls shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed. The Contractor's compliance with this notice and any associated regulations shall also not be grounds for a claim.

Environmental Deficiency Deduction. When the Engineer is notified, or determines that an environmental control deficiency exists, he/she will notify the Contractor in writing, and direct the Contractor to correct the deficiency within a specified time period. The specified time-period, which begins upon Contractor notification, will be from 1/2 hour to 24 hours long, based on the urgency of the situation and the nature of the deficiency. The Engineer shall be the sole judge regarding the time period.

The deficiency will be based on lack of repair, maintenance and diesel vehicle emissions control.

If the Contractor fails to correct the deficiency within the specified time frame, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency continues to exist. The calendar day(s) will begin when the time period for correction is exceeded and end with the Engineer's written acceptance of the correction. The daily monetary deduction will be $1,000.00 for each deficiency identified.

If a Contractor or subcontractor accumulates three environmental deficiency deductions in a contract period, the Contractor will be shutdown until the deficiency is corrected. Such a shutdown will not be grounds for any extension of contract time, waiver of penalties, or be grounds for any claim.

CONSTRUCTION AIR QUALITY – IDLING RESTRICTION (BDE)
Effective: April 1, 2009

Idling Restrictions. The Contractor shall establish truck-staging areas for all diesel powered vehicles that are waiting to load or unload material at the jobsite. Staging areas shall be located where the diesel emissions from the equipment will have a minimum impact on adjacent sensitive receptors. The

Department will review the selection of staging areas, whether within or outside the existing highway right-of-way, to avoid locations near sensitive areas or populations to the extent possible. Sensitive receptors include, but are not limited to, hospitals, schools, residences, motels, hotels, daycare facilities, elderly housing and convalescent facilities. Diesel powered engines shall also be located as far away as possible from fresh air intakes, air conditioners, and windows. The Engineer will approve staging areas before implementation.

Diesel powered vehicle operators may not cause or allow the motor vehicle, when it is not in motion, to idle for more than a total of 10 minutes within any 60 minute period, except under any of the following circumstances:

1) The motor vehicle has a gross vehicle weight rating of less than 8000 lb (3630 kg).
2) The motor vehicle idles while forced to remain motionless because of on-highway traffic, an official traffic control device or signal, or at the direction of a law enforcement official.
3) The motor vehicle idles when operating defrosters, heaters, air conditioners, or other equipment solely to prevent a safety or health emergency.
4) A police, fire, ambulance, public safety, other emergency or law enforcement motor vehicle, or any motor vehicle used in an emergency capacity, idles while in an emergency or training mode and not for the convenience of the vehicle operator.
5) The primary propulsion engine idles for maintenance, servicing, repairing, or diagnostic purposes if idling is necessary for such activity.
6) A motor vehicle idles as part of a government inspection to verify that all equipment is in good working order, provided idling is required as part of the inspection.
7) When idling of the motor vehicle is required to operate auxiliary equipment to accomplish the intended use of the vehicle (such as loading, unloading, mixing, or processing cargo; controlling cargo temperature; construction operations, lumbering operations; oil or gas well servicing; or farming operations), provided that this exemption does not apply when the vehicle is idling solely for cabin comfort or to operate non-essential equipment such as air conditioning, heating, microwave ovens, or televisions.
8) When the motor vehicle idles due to mechanical difficulties over which the operator has no control.
9) The outdoor temperature is less than 32 °F (0 °C) or greater than 80 °F (26 °C).

When the outdoor temperature is greater than or equal to 32 °F (0 °C) or less than or equal to 80 °F (26 °C), a person who operates a motor vehicle operating on diesel fuel shall not cause or allow the motor vehicle to idle for a period greater than 30 minutes in any 60 minute period while waiting to weigh, load, or unload cargo or freight, unless the vehicle is in a line of vehicles that regularly and periodically moves forward.

The above requirements do not prohibit the operation of an auxiliary power unit or generator set as an alternative to idling the main engine of a motor vehicle operating on diesel fuel.

Environmental Deficiency Deduction. When the Engineer is notified, or determines that an environmental control deficiency exists based on non-compliance with the idling restrictions, he/she will notify the Contractor, and direct the Contractor to correct the deficiency.

If the Contractor fails to correct the deficiency a monetary deduction will be imposed. The monetary deduction will be $1,000.00 for each deficiency identified.

SPECIAL PROVISION FOR DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION
Effective: September 1, 2000
Revised: March 2, 2019

FEDERAL OBLIGATION. The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR Part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified by the Department in accordance with the requirements of 49 CFR Part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory.

STATE OBLIGATION. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. When this Special Provision is used to satisfy state law requirements on 100 percent state-funded contracts, the federal government has no involvement in such contracts (not a federal-aid contract) and no responsibility to oversee the implementation of this Special Provision by the Department on those contracts. DBE participation on 100 percent state-funded contracts will not be credited toward fulfilling the Department's annual overall DBE goal required by the US Department of Transportation to comply with the federal DBE program requirements.

CONTRACTOR ASSURANCE. The Contractor makes the following assurance and agrees to include the assurance in each subcontract the Contractor signs with a subcontractor.

The Contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of contracts funded in whole or in part with federal or state funds. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

(a) Withholding progress payments;

(b) Assessing sanctions;

(c) Liquidated damages; and/or

(d) Disqualifying the Contractor from future bidding as non-responsible.

OVERALL GOAL SET FOR THE DEPARTMENT. As a requirement of compliance with 49 CFR Part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal applies to all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a good faith effort to achieve the overall goal. The dollar amount paid to all approved DBE companies performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. The determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates, in the absence of unlawful discrimination and in an arena of fair and open competition, DBE companies can be expected to perform 10.0% of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set for in this Special Provision:

(a) The bidder documents enough DBE participation has been obtained to meet the goal or,

(b) The bidder documents a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

DBE LOCATOR REFERENCES. Bidders shall consult the IL UCP DBE Directory as a reference source for DBE-certified companies. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217) 785-4611, or by visiting the Department's website at: http://www.idot.illinois.gov/doing-business/certifications/disadvantaged-business-enterprise-certification/il-ucp-directory/index.

BIDDING PROCEDURES. Compliance with this Special Provision is a material bidding requirement and failure of the bidder to comply will render the bid not responsive.

The bidder shall submit a DBE Utilization Plan (form SBE 2026), and a DBE Participation Statement (form SBE 2025) for each DBE company proposed for the performance of work to achieve the contract goal, with the bid. If the Utilization Plan indicates the contract goal will not be met, documentation of good faith efforts shall also be submitted. The documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor is selected over a DBE for work on the contract. The required forms and documentation must be submitted as a single .pdf file using the "Integrated Contractor Exchange (iCX)" application within the Department's "EBids System".

The Department will not accept a Utilization Plan if it does not meet the bidding procedures set forth herein and the bid will be declared not responsive. In the event the bid is declared not responsive, the Department may elect to cause the forfeiture of the penal sum of the bidder's proposal guaranty and may deny authorization to bid the project if re-advertised for bids.

GOOD FAITH EFFORT PROCEDURES. The contract will not be awarded until the Utilization Plan is approved. All information submitted by the bidder must be complete, accurate and adequately document enough DBE participation has been obtained or document the good faith efforts of the bidder, in the event enough DBE participation has not been obtained, before the Department will commit to the performance of the contract by the bidder. The Utilization Plan will be approved by the Department if the Utilization Plan documents sufficient commercially useful DBE work to meet the contract goal or the bidder submits sufficient documentation of a good faith effort to meet the contract goal pursuant to 49 CFR Part 26, Appendix A. This means the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which, by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not successful. The Department will consider the quality, quantity, and intensity of the kinds of efforts the bidder has made. Mere *pro forma* efforts, in other words efforts done as a matter of form, are not good faith efforts; rather, the bidder is expected to have taken genuine efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

(a) The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases and will be considered by the Department.

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

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

(3) Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

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

b. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable. In accordance with the above Bidding Procedures, the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.

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

(6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.

(7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.

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

(b) If the Department determines the bidder has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided it is otherwise eligible for award. If the Department determines the bidder has failed to meet the requirements of this Special Provision or that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan that the bid is not responsive. The notification will also include a statement of reasons for the adverse determination. If the Utilization Plan is not approved because it is deficient as a technical matter, unless waived by the Department, the bidder will be notified and will be allowed no more than a five calendar day period to cure the deficiency.

(c) The bidder may request administrative reconsideration of an adverse determination by emailing the Department at "DOT.DBE.UP@illinois.gov" within the five calendar days after the receipt of the notification of the determination. The determination shall become final if a request is not made on or before the fifth calendar day. A request may provide additional written documentation or argument concerning the issues raised in the determination statement of reasons, provided the documentation and arguments address efforts made prior to submitting the bid. The request will be reviewed by the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person to consider all issues of documentation and whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. A final decision by the Reconsideration Officer that a good faith effort was made shall approve the Utilization Plan submitted by the bidder and shall clear the contract for award. A final decision that a good faith effort was not made shall render the bid not responsive.

CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work anticipated to be performed and paid for upon satisfactory completion. The Department is only able to count toward the achievement of the overall goal and the contract goal the value of payments made for the work actually performed by DBE companies. In addition, a DBE must perform a commercially useful function on the contract to be counted. A commercially useful function is generally performed when the DBE is responsible for the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The Department and Contractor are governed by the provisions of 49 CFR Part 26.55(c) on questions of commercially useful functions as it affects the work. Specific counting guidelines are provided in 49 CFR Part 26.55, the provisions of which govern over the summary contained herein.

(a) DBE as the Contractor: 100 percent goal credit for that portion of the work performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontracts to a non-DBE does not count toward the DBE goals.

(b) DBE as a joint venture Contractor: 100 percent goal credit for that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work performed by the DBE's own forces.

(c) DBE as a subcontractor: 100 percent goal credit for the work of the subcontract performed by the DBE's own forces, including the cost of materials and supplies, excluding the purchase of materials and supplies or the lease of equipment by the DBE subcontractor from the Contractor or its affiliates. Work that a DBE subcontractor in turn subcontracts to a non-DBE does not count toward the DBE goal.

(d) DBE as a trucker: 100 percent goal credit for trucking participation provided the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible. At least one truck owned, operated, licensed, and insured by the DBE must be used on the contract. Credit will be given for the following:

(1) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.

(2) The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission is receives as a result of the lease arrangement.

(e) DBE as a material supplier:

(1) 60 percent goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.

(2) 100 percent goal credit for the cost of materials of supplies obtained from a DBE manufacturer.

(3) 100 percent credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a DBE regular dealer or DBE manufacturer.

CONTRACT COMPLIANCE. Compliance with this Special Provision is an essential part of the contract. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Utilization Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract. If the Contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal. All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the DBE Participation Commitment Statement.

(a) NO AMENDMENT. No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be emailed to the Department at DOT.DBE.UP@illinois.gov.

(b) CHANGES TO WORK. Any deviation from the DBE condition-of-award or contract plans, specifications, or special provisions must be approved, in writing, by the Department as provided elsewhere in the Contract. The Contractor shall notify affected DBEs in writing of any changes in the scope of work which result in a reduction in the dollar amount condition-of-award to the contract. Where the revision includes work committed to a new DBE subcontractor, not previously involved in the project, then a Request for Approval of Subcontractor, Department form BC 260A or AER 260A, must be signed and submitted. If the commitment of work is in the form of additional tasks assigned to an existing subcontract, a new Request for Approval of Subcontractor will not be required. However, the Contractor must document efforts to assure the existing DBE subcontractor is capable of performing the additional work and has agreed in writing to the change.

(c) SUBCONTRACT. The Contractor must provide copies of DBE subcontracts to the Department upon request. Subcontractors shall ensure that all lower tier subcontracts or agreements with DBEs to supply labor or materials be performed in accordance with this Special Provision.

(d) ALTERNATIVE WORK METHODS. In addition to the above requirements for reductions in the condition of award, additional requirements apply to the two cases of Contractor-initiated work substitution proposals. Where the contract allows alternate work methods which serve to delete or create underruns in condition of award DBE work, and the Contractor selects that alternate method or, where the Contractor proposes a substitute work method or material that serves to diminish or delete work committed to a DBE and replace it with other work, then the Contractor must demonstrate one of the following:

(1) The replacement work will be performed by the same DBE (as long as the DBE is certified in the respective item of work) in a modification of the condition of award; or

(2) The DBE is aware its work will be deleted or will experience underruns and has agreed in writing to the change. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so; or

(3) The DBE is not capable of performing the replacement work or has declined to perform the work at a reasonable competitive price. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so.

(e) TERMINATION AND REPLACEMENT PROCEDURES. The Contractor shall not terminate or replace a DBE listed on the approved Utilization Plan, or perform with other forces work designated for a listed DBE except as provided in this Special Provision. The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the Contractor obtains the Department's written consent as provided in subsection (a) of this part. Unless Department consent is provided for termination of a DBE subcontractor, the Contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the DBE in the Utilization Plan.

As stated above, the Contractor shall not terminate or replace a DBE subcontractor listed in the approved Utilization Plan without prior written consent. This includes, but is not limited to, instances in which the Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Written consent will be granted only if the Bureau of Small Business Enterprises agrees, for reasons stated in its concurrence document, that the Contractor has good cause to terminate or replace the DBE firm. Before transmitting to the Bureau of Small Business Enterprises any request to terminate and/or substitute a DBE subcontractor, the Contractor shall give notice in writing to the DBE subcontractor, with a copy to the Bureau, of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor shall give the DBE five days to respond to the Contractor's notice. The DBE so notified shall advise the Bureau and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Bureau should not approve the Contractor's action. If required in a particular case as a matter of public necessity, the Bureau may provide a response period shorter than five days.

For purposes of this paragraph, good cause includes the following circumstances:

(1) The listed DBE subcontractor fails or refuses to execute a written contract;

(2) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the Contractor;

(3) The listed DBE subcontractor fails or refuses to meet the Contractor's reasonable, nondiscriminatory bond requirements;

(4) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;

(5) The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1200 or applicable state law.

(6) The Contractor has determined the listed DBE subcontractor is not a responsible contractor;

(7) The listed DBE subcontractor voluntarily withdraws from the projects and provides written notice to the Contractor of its withdrawal;

(8) The listed DBE is ineligible to receive DBE credit for the type of work required;

(9) A DBE owner dies or becomes disabled with the result that the listed DBE subcontractor is unable to complete its work on the contract;

(10) Other documented good cause that compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the Contractor can self-perform the work for which the DBE contractor was engaged or so that the Contractor can substitute another DBE or non-DBE contractor after contract award.

When a DBE is terminated or fails to complete its work on the Contract for any reason, the Contractor shall make a good faith effort to find another DBE to substitute for the original DBE to perform at least the same amount of work under the contract as the terminated DBE to the extent needed to meet the established Contract goal. The good faith efforts shall be documented by the Contractor. If the Department requests documentation under this provision, the Contractor shall submit the documentation within seven days, which may be extended for an additional seven days if necessary at the request of the Contractor. The Department will provide a written determination to the Contractor stating whether or not good faith efforts have been demonstrated.

(f) FINAL PAYMENT. After the performance of the final item of work or delivery of material by a DBE and final payment therefore to the DBE by the Contractor, but not later than 30 calendar days after payment has been made by the Department to the Contractor for such work or material, the Contractor shall submit a DBE Payment Agreement on Department form SBE 2115 to the Resident Engineer. If full and final payment has not been made to the DBE, the DBE Payment Agreement shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes the work has not been satisfactorily completed. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Utilization Plan and after good faith efforts are reviewed, the Department may deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages. The Contractor may request an administrative reconsideration of any amount deducted as damages pursuant to subsection (h) of this part.

(g) ENFORCEMENT. The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.

(h) RECONSIDERATION. Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of "Good Faith Effort Procedures" of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department. The result of the reconsideration process is not administratively appealable to the U.S. Department of Transportation.

SPECIAL PROVISION FOR WEEKLY DBE TRUCKING REPORTS (BDE)
Effective: June 2, 2012
Revised: November 1, 2021

The Contractor shall submit a weekly report of Disadvantaged Business Enterprise (DBE) trucks hired by the Contractor or subcontractors (i.e. not owned by the Contractor or subcontractors) that are used for DBE goal credit.

The report shall be submitted to the Resident Engineer on Division of Aeronautics Form "AER 723" within ten business days following the reporting period. The reporting period shall be Sunday through Saturday for each week reportable trucking activities occur.

Any costs associated with providing weekly DBE trucking reports shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.

SPECIAL PROVISION FOR SUBCONTRACTOR MOBILIZATION PAYMENTS
Effective: November 2, 2017
Revised: April 1, 2019

To account for the preparatory work and the operations necessary for the movement of subcontractor personnel, equipment, supplies, and incidentals to the project site and for all other work or operations that must be performed or costs incurred when beginning work approved for subcontracting according to Section 80-01 of the Standard Specifications, the Contractor shall make a mobilization payment to each subcontractor.

This mobilization payment shall be made at least seven days prior to the subcontractor starting work. The amount paid shall be at the following percentage of the amount of the subcontract reported on form AER 260A submitted for the approval of the subcontractor's work.

Value of Subcontract Reported on Form AER 260A	Mobilization Percentage
Less than $10,000	25%
$10,000 to less than $20,000	20%
$20,000 to less than $40,000	18%
$40,000 to less than $60,000	16%
$60,000 to less than $80,000	14%
$80,000 to less than $100,000	12%
$100,000 to less than $250,000	10%
$250,000 to less than $500,000	9%
$500,000 to $750,000	8%
Over $750,000	7%

The mobilization payment to the subcontractor is an advance payment of the reported amount of the subcontract and is not a payment in addition to the amount of the subcontract; therefore, the amount of the advance payment will be deducted from future progress payments.

This provision shall be incorporated directly or by reference into each subcontract approved by the Department.

SPECIAL PROVISION FOR PAYMENTS TO SUBCONTRACTORS
Effective: November 2, 2017

Federal regulations found at 49 CFR §26.29 mandate the Department to establish a contract clause to require Contractors to pay subcontractors for satisfactory performance of their subcontracts and to set the time for such payments.

State law also addresses the timing of payments to be made to subcontractors and material suppliers. Section 7 of the Prompt Payment Act, 30 ILCS 540/7, requires that when a Contractor receives any payment from the Department, the Contractor shall make corresponding, proportional payments to each subcontractor and material supplier performing work or supplying material within 15 calendar days after receipt of the Department payment. Section 7 of the Act further provides that interest in the amount of two percent per month, in addition to the payment due, shall be paid to any subcontractor or material supplier by the Contractor if the payment required by the Act is withheld or delayed without reasonable cause. The Act also

provides that the time for payment required and the calculation of any interest due applies to transactions between subcontractors and lower-tier subcontractors and material suppliers throughout the contracting chain.

This Special Provision establishes the required federal contract clause, and adopts the 15 calendar day requirement of the State Prompt Payment Act for purposes of compliance with the federal regulation regarding payments to subcontractors. This contract is subject to the following payment obligations.

When progress payments are made to the Contractor according to Article 90-07 of the Standard Specifications, the Contractor shall make a corresponding payment to each subcontractor and material supplier in proportion to the work satisfactorily completed by each subcontractor and for the material supplied to perform any work of the contract. The proportionate amount of partial payment due to each subcontractor and material supplier throughout the contracting chain shall be determined by the quantities measured or otherwise determined as eligible for payment by the Department and included in the progress payment to the Contractor. Subcontractors and material suppliers shall be paid by the Contractor within 15 calendar days after the receipt of payment from the Department. The Contractor shall not hold retainage from the subcontractors. These obligations shall also apply to any payments made by subcontractors and material suppliers to their subcontractors and material suppliers; and to all payments made to lower tier subcontractors and material suppliers throughout the contracting chain. Any payment or portion of a payment subject to this provision may only be withheld from the subcontractor or material supplier to whom it is due for reasonable cause. If reasonable cause is asserted, written notice shall be provided to the applicable subcontractor and/or material supplier and the Engineer within five days of the Contractor receiving payment. The written notice shall identify the contract number, the subcontract or material purchase agreement, a detailed reason for refusal, the value of payment being withheld, and the specific remedial actions required of the subcontractor and/or material supplier so that payment can be made.

This Special Provision does not create any rights in favor of any subcontractor or material supplier against the State or authorize any cause of action against the State on account of any payment, nonpayment, delayed payment, or interest claimed by application of the State Prompt Payment Act. The Department will not approve any delay or postponement of the 15 day requirement except for reasonable cause shown after notice and hearing pursuant to Section 7(b) of the State Prompt Payment Act. State law creates other and additional remedies available to any subcontractor or material supplier, regardless of tier, who has not been paid for work properly performed or material furnished. These remedies are a lien against public funds set forth in Section 23(c) of the Mechanics Lien Act, 770 ILCS 60/23(c), and a recovery on the Contractor's payment bond according to the Public Construction Bond Act, 30 ILCS 550.

SPECIAL PROVISION FOR SUBCONTRACTOR AND DBE PAYMENT REPORTING (BDE)
Effective: April 2, 2018

Subcontractor and Disadvantaged Business Enterprise Payment Reporting

The Contractor shall report all payments made to the following parties:

(a) first tier subcontractors;

(b) lower tier subcontractors affecting disadvantaged business enterprise (DBE) goal credit;

(c) material suppliers or trucking firms that are part of the Contractor's submitted DBE utilization plan.

The report shall be made through the Department's on-line subcontractor payment reporting system within 21 days of making the payment.

SPECIAL PROVISION FOR NPDES CERTIFICATION

In accordance with the provisions of the Illinois Environmental Protection Act, the Illinois Pollution Control Board Rules and Regulations (35 Ill. Adm. Code, Subtitle C, Chapter I), and the Clean Water Act, and the regulations thereunder, this certification is required for all construction contracts that will result in the disturbance of one or more acres total land area.

The bidder certifies under penalty of law that he/she understands the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit (ILR100000) that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

The Airport Owner or its Agent will:

1) prepare, sign and submit the Notice of Intent (NOI)

2) conduct site inspections and complete and file the inspection reports

3) submit Incidence of Non-Compliance (ION) forms

4) submit Notice of Termination (NOT) form

Prior to the issuance of the Notice-to-Proceed, for each erosion control measure identified in the Storm Water Pollution Prevention Plan, the contractor or subcontractor responsible for the control measure(s) must sign the above certification (forms to be provided by the Department).

ILLINOIS WORKS APPRENTICESHIP INITIATIVE – STATE FUNDED CONTRACTS (BDE)
Effective: June 2, 2021
Revised: September 2, 2021

Illinois Works Jobs Program Act (30 ILCS 559/20-1 et seq.). For contracts having an awarded contract value of $500,000 or more, the Contractor shall comply with the Illinois Works Apprenticeship Initiative (30 ILCS 559/20-20 to 20-25) and all applicable administrative rules. The goal of the Illinois Apprenticeship Works Initiative is that apprentices will perform either 10% of the total labor hours actually worked in each prevailing wage classification or 10% of the estimated labor hours in each prevailing wage classification, whichever is less. The Contractor may seek from the Department of

Commerce and Economic Opportunity (DCEO) a waiver or reduction of this goal in certain circumstances pursuant to 30 ILCS 559/20-20(b). The Contractor shall ensure compliance during the term of the contract and will be required to report on and certify its compliance. An apprentice use plan, apprentice hours, and a compliance certification shall be submitted to the Engineer on forms provided by the Department and/or DCEO.

REVISIONS TO THE ILLINOIS PREVAILING WAGE RATES

The Prevailing rates of wages are included in this Contract proposal. The rates have been ascertained and certified by the Illinois Department of Labor for the locality in which the work is to be performed and for each craft or type of work or mechanic needed to execute the work of the Contract. As required by Prevailing Wage Act (820 ILCS 130/0.01, et seq.) and this Proposal, not less than the rates of wages ascertained by the Illinois Department of Labor and as revised during the performance of a Contract shall be paid to all laborers, workers and mechanics performing work under the Contract. Post the scale of wages in a prominent and easily accessible place at the site of work.

If the Illinois Department of Labor revises the prevailing rates of wages to be paid as listed in the specification of rates, the contractor shall post the revised rates of wages and shall pay not less than the revised rates of wages. Current wage rate information shall be obtained by visiting the Illinois Department of Labor web site at https://www2.illinois.gov/idol/Laws-Rules/CONMED/Pages/Rates.aspx or by calling 312-793-2814. It is the responsibility of the contractor to review the rates applicable to the work of the contract at regular intervals in order to insure the timely payment of current rates. Provision of this information to the contractor by means of the Illinois Department of Labor web site satisfies the notification of revisions by the Department to the contractor pursuant to the Act, and the contractor agrees that no additional notice is required. The contractor shall notify each of its subcontractors of the revised rates of wages.

ITEM 06A **EF010**

SECTION III
SPECIAL PROVISIONS

EXTEND RUNWAY 11-29 AND EXTEND TAXIWAY A TO RUNWAY 29

EFFINGHAM COUNTY AIRPORT

EFFINGHAM, ILLINOIS

IL PROJECT NO: 1H2-4982

PREPARED BY

HANSON
Engineering | Planning | Allied Services
HANSON PROFESSIONAL SERVICES INC.
1525 SOUTH SIXTH STREET
SPRINGFIELD, ILLINOIS 62703-2886

11/15/2023
EXPIRES: 11/30/2025
COVERING
ELECTRICAL DESIGN

FOR BID

NOVEMBER 17, 2023

EXPIRES 11/30/2025
COVERING CIVIL DESIGN

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FORWARD

These special provisions, together with applicable standard specifications, manuals, policies, memorandums, worksheets, rules and regulations, contract requirements for airport improvement projects (AIP), payroll requirements, and minimum wage rates, which are hereto attached or which by reference are herein incorporated, cover the requirements of the State of Illinois, Department of Transportation (IDOT), Division of Aeronautics (Division) for the following improvement project at Effingham County Memorial Airport, Effingham, Illinois: **Extend Runway 11-29 and Extend Taxiway A to Runway 29**. This project includes constructing an 898' Portland Cement Concrete (PCC) runway extension, and includes an additive alternative to extend the existing partial parallel taxiway, designated as "Taxiway A," to the end of Runway 9. The work includes the following items and two additional additive alternates:

Base Bid

- Moving the existing threshold to maintain airfield operations on Runway 11-29,
- Removal of the existing PCC turnaround,
- Grading the proposed runway safety areas,
- Improving the existing subgrade through lime stabilization,
- Installing stabilization fabric,
- Constructing an 898-foot 10-inch PCC runway on crushed aggregate,
- Installing underdrains,
- Installing culverts,
- Installing proposed runway lighting,
- Installing a supplemental windcone,
- Removal of existing runway markings,
- Placing new runway markings,
- Installing erosion control,
- Seeding, and Mulching.

Additive Alternative 1

- Improving the existing subgrade through lime stabilization,
- Installing stabilization fabric,
- Constructing approximately 2,200-foot asphalt taxiway extension on crushed aggregate,
- Installing underdrains,
- Installing new lighting and signage,
- Installing a new constant current regulator, and
- Installing new taxiway markings.

Additive Alternative 2

- Removing existing 6-inch PCC pavement, and
- Constructing new 10-inch PCC pavement.

Additive Alternative 3

- Installing a 4-Box Precision Approach Path Indicators (PAPIs)
- Installing cable, 2-inch PVC duct bank, splice cans, and
- Directional boring.

END OF FORWARD

GOVERNING SPECIFICATIONS AND RULES AND REGULATIONS

The Illinois Standard Specifications for Construction of Airports, State of Illinois Department of Transportation, Division of Aeronautics, adopted **April 1, 2012,** shall govern the project except as otherwise revised or noted in these Special Provisions. All references to IDOT Specifications refer to Standard Specifications for Road and Bridge Construction, Illinois Department of Transportation, adopted January 1, 2022, as revised. Resolution of conflicts with any part or parts of said Specifications shall be in accordance with Section 50-03 of the Standard Specifications.

The following Federal Aviation Administration Advisory Circulars are referenced on the Plans and/or Special Provision Specifications in regard to safety on airports. These Advisory Circulars are available on the FAA web site at http://www.faa.gov/regulations_policies/advisory_circulars

END OF GOVERNING SPECIFICATIONS AND RULES AND REGULATIONS

MANUALS, POLICY MEMORANDUMS, AND GUIDES

The Illinois Department of Transportation, Division of Aeronautics, Manuals, Policies, Memorandums and Guides that are incorporated into this Project by reference are listed below. Also provided is a notation as to whether all or a portion of each applicable Manual, Policy Memorandum, and Guide has been modified by these Special Provisions.

MANUALS	
Title	Modified By Special Provisions
Airport Construction Documentation Manual (Updated 6/2014)	NO
Manual for Documentation of Airport Materials (Updated 4/01/2010)	NO

MANUALS		
No.	Title	Modified By Special Provisions
87-2	Density Acceptance of Bituminous Pavements	NO
87-3	Mix Design, Test Batch, Quality Control, and Acceptance Testing of PCC Pavement Mixture	NO
87-4	Determination of Bulk Specific Gravity (d) of Compacted Bituminous Mixes	NO
90-1	Resampling and Retesting of PCC Pavement	NO
95-1	Field Test Procedures for Mixer Performance And Concrete Uniformity Tests	NO
96-1	Item 610, Structural Portland Cement Concrete: Job Mix Formula Approval & Production Testing	NO
96-3	Requirements for Quality Assurance on Projects with Bituminous Concrete Paving	NO
97-2	Pavement Marking Paint Acceptance	NO
2001-1	Requirements for Cold Weather Concreting (2020)	NO
2003-1	Requirements for Laboratory, Testing, Quality Control, and Paving of Superpave Bituminous Concrete Mixtures for Airports (2020)	NO
07-21	Acceptance Procedure for Finely Divided Minerals Used in Portland Cement Concrete and Other Applications	NO
22-1	Accepted Cement Types	NO
	HMA Comparison Samples	NO

FORMS		
No.	Title	Modified By Special Provisions
AER 26	Concrete Quality Control Plan	NO
AER 27	Hot Mix Asphalt (HMA) Quality Control Plan	NO

It is the Bidder's and Contractor's responsibility to review and incorporate into their bid, and work, the requirements contained in these Manuals, Policy Memorandums, and Guides. Copies

of each applicable manual, policy memorandum, and guide can be found on the Illinois Department of Transportation, Division of Aeronautics webpage at:

https://idot.illinois.gov/doing-business/procurements/construction-services/contractor-resources/aeronautics/construction-and-materials.html.

Forms are located at: https://idot.illinois.gov/resources/forms.html.

END OF MANUALS, POLICY MEMORANDUMS, AND GUIDES

DIVISION I – GENERAL PROVISIONS

SECTION 40 - SCOPE OF WORK

Revise Section 40 of the Standard Specifications as follows:

40-05 MAINTENANCE OF TRAFFIC.

Add the following Paragraphs:

Prior to the issuance of a construction Notice-to-Proceed (NTP) by the Illinois Division of Aeronautics, the Contractor shall prepare and submit a Safety Plan Compliance Document (SPCD) in accordance with FAA Advisory Circular 150/5370-2 (current issue), paragraph 2.4.2, or equivalent section in subsequent/current issues. The SPCD shall be reviewed and approved by the Airport Manager, who will then submit the document to the Illinois Division of Aeronautics for their approval.

Construction of the project shall be performed by the Contractor in accordance with the guidelines specified in FAA advisory circular 150/5370-2 (current issue) and the airport rules and regulations. Any Contractor activities required for project safety shall be provided by the Contractor and be incidental to the contract.

To minimize disruptions of airport operations, construction operations must be controlled throughout the project's duration, and work must be completed expeditiously. A construction phasing plan detailing the sequencing of the Contractor's work throughout the project is included in the plans. The Contractor shall provide his written acceptance of the project construction phasing plan at the pre-construction conference. All changes to the construction phasing plan that may be requested by the Contractor must be approved by the FAA, the project engineer and the Airport Owner. It shall be the Contractor's responsibility to provide sufficient advance notice of any proposed phasing change to permit consideration and approval by the project engineer and the Airport Owner. The Contractor shall not be entitled to any extra compensation, nor extension to the contract time, because of a phasing change request or for any time necessary in receiving the required approvals. The Contractor shall expedite work at those stages where active taxiways, hangar access, aprons, roadways, or parking lots must be closed to minimize the length of time that Airport operations are restricted.

At the pre-construction conference, the Contractor shall provide a Contractor coordination plan that coordinates his work with the work of his subcontractors and the work of other contractors of other on-going Airport projects.

Runway and taxiway pavements will require closure. Airfield closures shall only be permitted by prior authorization of the resident engineer and the Airport Owner.

The Contractor shall furnish barricades for any airfield or roadway pavement to be closed by his work. It will be the Contractor's responsibility to furnish, place and maintain barricades as shown in the Construction Plans, and as directed by the Resident Engineer and Airport Owner. The cost of these items, and their maintenance will be

considered incidental to the contract. Any work that requires portions of an active runway, taxiway, or apron to be closed must be completed expeditiously to minimize disruption to aircraft operations.

The Contractor shall erect and maintain, at no cost to the contract, directional and informational signs for the Contractor's access routes at the existing construction entrances and for the Contractor's route within the Airport Operations Area, as noted on the plans or as directed by the Resident Engineer. Where Contractor equipment is operating within active Aircraft Operations Areas, radio-equipped flaggers shall be furnished by the Contractor. Continuous pavement sweeping shall be furnished to remove debris from active aircraft movement paths. The cost of traffic control/flaggers will be considered incidental to the contract.

The Contractor shall not have access to any part of the active airfield (runways, taxiways, or aprons) for any equipment or personnel without the approval of the Resident Engineer and the Airport Owner. Activities within the Airport Operations Area (AOA) are subject to federal access control. Because of the high requirements for Airport security and safety, the following requirements must be adhered to:

- All employees of the Contractor shall park their personal vehicles in the designated equipment parking and storage area. Each person or vehicle entering the Contractor area shall do so in accordance with the policies and procedures of the Airport Owner. The Contractor will transport the workers from the parking areas to the work area. Only Contractor vehicles will be allowed outside of the proposed equipment storage and parking areas.

- Should any Contractor personnel be identified as noncompliant with any vehicle driving safety requirements in this project safety plan or in the Airport vehicle operations regulations, such drivers shall be penalized by rescission of their on-Airport driving privileges, and their access to the construction limit area when operating vehicles shall be revoked.

- The Contractor will be required to be in contact with Airport operations. This will keep the Contractor in contact with Airport personnel and enable the Airport personnel to immediately contact the Contractor in case of an aeronautical emergency that would require action by the Contractor and/or his personnel.

The Contractor shall remain within the construction limits line shown in the plans. When outside these limits, all Contractor activities shall adhere to the following:

- **Runway 11/29 (5,103' x 100' Paved)**

  Remain more than 250 feet from the centerline and 600 feet from the end of the runway.

- **Runway 1/19 (3400' x 60' Paved)**

  Remain more than 125 feet from the centerline and 240' from the end of the runway.

- **Taxiways**

  Remain more than 62.5 feet from any active centerline.

- **Taxilane**

  Remain more than 62.5 feet from any active centerline.

- **Apron**

  Remain 10 feet from any active apron edge.

When construction operations must be conducted within these separations, the pavement must be closed to aircraft activity by the Contractor by providing temporary barricades as shown in the plans, and in the case of runway pavements, closed runway markers. When haul vehicles are permitted to cross active airfield pavements, the Contractor will provide positive control of construction vehicles using radio-equipped flaggers. Contractor shall establish and maintain radio contact with:

- **CTAF/UNICOM (122.725 MHz).**

All Contractor's equipment used in active Airport Operations Areas shall be equipped with a FAA-standard flag, as referenced in FAA AC 150/5370-2, current issue. Aircraft shall have the right-of-way. The Contractor shall keep all equipment and personnel at least 15 feet from the edge of any active roadway or auto parking pavement. When his activities require working within 15 feet of the road/pavement edge, the Contractor shall provide for traffic control in accordance with IDOT Specifications (Highway Standards). Open trenches, excavations and stockpiled material at the construction site shall be delineated with the use of barricades during hours of restricted visibility and/or darkness. No open trenches shall be allowed within the Runway Safety Area (RSA) or the Taxiway Safety Area (TSA) when the runway or taxiway is open to air traffic (including overnight). The following limits shall govern:

- **The RSA is defined as 75 feet from the centerline and 300 feet from the end of Runway 11/29.**

- **The RSA is defined as 60 feet from the centerline and 240 feet from the end of Runway 15/33.**

- **The TSA is measured as 39.5 feet from the centerline.**

No vertical drop of greater than 3-inches in height from pavement edge to earth grade or earth grade to earth grade within the RSA or TSA will be permitted when the runway or taxiway is open to air traffic. The Contractor will have steel plates on-site to allow for the rapid covering of trenches or earth drops in the event of unexpected work stoppages for weather or Airport emergencies.

When not in use and during nonworking hours, Contractor's equipment shall be parked within the Contractor's equipment storage and parking areas. The equipment storage and parking areas are to be located as shown on the phasing plan. The Contractor will be responsible for maintaining the construction entrances in good condition. The cost of maintaining the construction entrance and Contractor areas is to be incidental to the contract. The Contractor shall protect all existing pavement edges from damage from construction equipment and haul vehicles.

At no time shall the Contractor conduct any activities or operate or park equipment to obstruct active part 77 Airport imaginary surfaces or the runway protection zones (RPZ) as delineated in the plans. The contractor’s equipment shall extend no higher than 25 feet. Cranes shall not be used during instrument weather conditions or at night. Cranes shall be lowered when not in use.

Before reopening temporarily closed pavements, the Contractor shall inspect and clean, as necessary, the pavement to assure that no materials or objects that may damage aircraft or vehicles remain. Any required cleaning shall be to the satisfaction of the Resident Engineer and Airport Owner and is incidental to the contract.

All work shall be completed in accordance with the approved project safety plan, issued by the Illinois Division of Aeronautics.

Failure to use these prescribed procedures or adhere to the safety requirements will result in the suspension of work.

The Contractor must notify the Resident Engineer and the Airport Owner 3 days in advance of any required partial or complete closing of any runway, taxiway, or apron. The date, time and scheduled duration of the closing must be approved by the Resident Engineer and the Airport Owner. The Contractor shall notify the Resident Engineer and Airport Owner 3 days in advance of the Contractor's closing of other active roadways, airfield or roadway lighting circuits, or other Airport facilities.

Contractor's access to the project when on Airport property is shown in the plans. Contractor's access to the Airport itself is to be provided by public rights-of-way. The Contractor is to secure all necessary permits for the use of any public rights-of-way and shall maintain traffic on public roads, with the costs of permitting, cleaning, and repairing of pavement damaged by Contractor's activities incidental to the contract. Use of and repairs to any public facilities are to be completed to the satisfaction of the facility's Owner.

The Contractor is to provide temporary construction roads within the construction limit lines as may be required by his activities. Heavy vehicles shall not cross existing pavement surfaces except as approved by the Airport Owner and the Resident Engineer. Any damage to pavements that may occur by the Contractor's activities shall be repaired at the Contractor's expense and to the satisfaction of the Airport Owner and the Resident Engineer. For haul routes made by Contractor through grassed areas, Contractor shall grade, level, topsoil, seed, and mulch at the end of the project, cost incidental to the contract.

The Contractor is to provide an equipment storage and parking area at the locations shown in the plans. It is the Contractor's responsibility to maintain the access roads and the storage area during construction and to restore the areas at project completion to conditions suitable to the Airport Owner and the Resident Engineer. At the Airport Owner's discretion, the temporary facilities may remain, but they must be left in conditions suitable to the Airport Owner. The cost of providing, maintaining, and restoring the temporary facilities is incidental to the contract.

The Contractor shall provide 3 days prior notice of any outages or shutdowns of utilities to the Owner and the agency owning the affected utility. The Contractor shall provide any temporary connections or other measures as may be required to maintain service as may be required by the owning agency at no cost to the Owner.

END OF SECTION 40

SECTION 50 - CONTROL OF WORK

Revise Section 50 of the Standard Specifications as follows:

50-06 CONSTRUCTION LAYOUT STAKES. Revise the first paragraph to read:

The Contractor shall be responsible for all construction layout and any extension of the control network provided in the plans necessary to properly complete the work.

Remove the following:

Delete paragraphs A, B, and C (under the heading RESPONSIBILITY OF THE RESIDENT ENGINEER).

Add the following:

Grades shall be furnished by the Contractor to the Project Engineer and shall include:

1. Subgrade surface,
2. Crushed aggregate surfaces,
3. Each lift of asphalt,
4. Final surface for PCC pavements, and
5. Inverts for all pipe culverts installed under the contract.

Surveying shall also be furnished by the Contractor after any constructed surface requested by the Resident Engineer for which deviations from Plan grade elevations and/or slopes that are greater than those allowed in the Standard Specifications, or these Special Provisions, as identified by the Resident Engineer.

50-12 LOAD RESTRICTIONS. Add the following:

By submitting a bid, the Contractor acknowledges that the existing Airport pavements are of the "light-duty" type, requiring their consideration of construction vehicle weights. Any damage to existing Airport pavements shall be repaired by the Contractor at their own expense and to the satisfaction of the Airport Owner and the Resident Engineer.

The Contractor shall erect and maintain directional and informational signs for the Contractor’s access routes at the existing construction entrance and for the Contractor’s routes within the Airport, as noted on the Plans, or as directed by the Resident Engineer/Technician. This work will be considered incidental to the contract.

50-16 FINAL ACCEPTANCE. Revise the first sentence of the first paragraph to read:

Upon due notice to the Resident Engineer/Technician by the Contractor of presumptive completion of the entire project, the charging of Contract Time shall be suspended, and the Engineer and Owner will make an inspection.

Add after the first sentence of the second paragraph:

The charging of Contract Time shall resume upon receipt of the punchlist from the Engineer and continue until the remaining work, including work as required in Section 40–08 Final Clean Up, is completed to the satisfaction of the Engineer.

END OF SECTION 50

SECTION 70 - LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

Add the following sections:

70-27 MAINTAINING OPERATION OF AIRFIELD LIGHTING AND NAVAIDS.

Shutdown of airfield lighting and/or NAVAIDs shall only be permitted during daylight hours and must be coordinated with and approved by the Airport Manager. All airfield lighting and navaid circuits shall be operational at night fall. The Contractor shall not leave the runway lighting, taxiway lighting, or any other airfield lighting circuit inoperable overnight. The Contractor shall provide temporary cable connections (in unit duct) and any manual operations of airfield lighting to keep them in operation overnight. The Contractor shall secure, identify, and place temporary exposed wiring in conduit, duct, or unit duct to prevent electrocution and fire ignition sources in conformance with the requirements of FAA AC 150/5370-2G “OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

70-28 SITE INSPECTION.

The Contractor shall be responsible for an on-site inspection prior to submitting a bid on this project. Upon receipt of a bid, it shall be assumed that the Contractor is fully familiar with the construction site.

70-29 TRAFFIC MAINTENANCE.

The Contractor shall also meet the requirements of the Standard Specifications and these Special Provisions contained in Paragraph 40-5, Maintenance of Traffic, and Item AR150530 Traffic Maintenance.

END OF SECTION 70

SECTION 80 - PROSECUTION AND PROGRESS

80-13 CONTRACTOR'S ACCESS TO AIRFIELD. Add the following to this section:

The Contractor's personnel and equipment shall not traverse outside the designated work areas to other locations on the Airport. The designated haul route will be the only vehicular access to the construction site. It will be the responsibility of the Contractor to maintain the proposed haul route and equipment parking area for the duration of the project.

The Contractor will be responsible for obtaining any permits necessary to use the State/County/Township/City roads. All work required in complying with the above requirement will be considered incidental to the Contract, and no additional compensation will be allowed.

Failure to use the prescribed haul routes and equipment parking area or adhere to the safety requirements will result in the suspension of work.

Add the following sections:

80-14 EMPLOYEE PARKING.

The Contractor's employees shall park their personal vehicles in the designated Equipment Parking Area as shown on the Proposed Safety and Phasing Plan Sheets. The Contractor will transport the workers from the parking area to the work area. Only Contractor vehicles needed for construction will be allowed outside of the proposed equipment parking area. No employee vehicle will be allowed onto the proposed construction site.

80-15 EQUIPMENT PARKING AND MATERIAL STORAGE.

The Contractor will be allowed to park equipment and store material in the Proposed Equipment Parking Area shown on the Safety and Phasing Plan Sheets. The Contractor will maintain this area throughout the duration of the project and restore it to its original condition upon completion of the project. This work will be considered incidental to the Contract and no additional compensation will be allowed.

END OF SECTION 80

DIVISION II – PAVING CONSTRUCTION DETAILS

ITEM 150510 – ENGINEER'S FIELD OFFICE

CONSTRUCTION METHODS

150-2.1 Revise the following in the list of equipment and furniture required in the office:

B. Delete this item.

C. One two-drawer legal letter size filing cabinet with lock and an Underwriter's Laboratories insulated file device 350 degrees one hour rating.

H. A functional internet Wi-Fi device such as a mobile hot spot providing hi-speed broadband internet access to the field office. Dial up, or equivalent, internet service will not be acceptable.

J. Delete this item.

Add the following to the list of equipment to be furnished by the Contractor:

N. One lockable cabinet or closet that is large enough in which a nuclear density machine may be stored.

BASIS OF PAYMENT

150-4.1 Add the following to this section:

The mobile hot spot, wireless Aircard, internet access and associated charges will be included in the contract unit price per lump sum for Engineer's Field Office. This price shall include all utility costs and shall reflect the salvage value of the building or buildings, equipment, and furniture which remain the property of the Contractor after release by the Engineer.

Payment will be made under:

Item AR150510 Engineer's Field Office – per lump sum.

END OF ITEM 150510

ITEM 105520 – MOBILIZATION

BASIS OF PAYMENT

105-3.1 Revise as follows:

Mobilization shall be limited to 10% of the original contract amount. Should the bid for mobilization exceed 10%, the amount over 10% will not be paid until the final acceptance of the project by the engineer.

Based upon the contract lump sum price for “Mobilization” partial payments will be allowed as follows:

a. With the first pay request, 25%.

b. When 25% or more of the original contract is earned, an additional 25%.

c. When 50% or more of the original contract is earned, an additional 40%.

d. The remaining 10% of the pay item will be paid along with any amount bid in excess of 10% of the original contract amount upon final acceptance of the project by the Engineer.

Payment will be made under:

Item AR150520 Mobilization – per lump sum.

END OF ITEM 150520

ITEM 105530 – TRAFFIC MAINTENANCE

DESCRIPTION

150530-1.1 This work shall consist of the furnishing, installation, maintenance, relocation, and removal of work zone traffic control and protection, and will be in accordance with the Plans, Plan details, and the guidelines specified in FAA Advisory Circular 150/5370-2 (current issue). The item shall also include the provision for pavement sweepers, cleaning, flaggers, radio equipment for traffic control, set-up, operation, maintenance, and removal of taxiway closure markers, as shown in the Site and Safety Plan and as specified in these Special Provisions.

The Contractor shall be responsible for the proper location, installation, and arrangement of all traffic control devices as shown in the Plans.

All traffic control devices used for the maintenance of traffic, as detailed on the Plans, shall be reflectorized prior to installation, and cleaned as specified by the Resident Engineer. When directed by the Resident Engineer, the Contractor shall remove all traffic control devices which were furnished, installed, or maintained by the Contractor under this contract. All traffic control devices shall remain in place until specific authorization for relocation or removal is received from the Resident Engineer. The Contractor shall be responsible for replacement of any devices that are supplied by others and damaged by the Contractor's and/or Subcontractor's workforce during relocation or construction operation.

The Contractor will notify the Resident Engineer in writing three (3) calendar days prior to any activities that will disrupt runway, taxiway and/or apron traffic; a three-day notice will be required for road closures and lane closures.

MATERIALS

150530-2.1 Materials shall be according to the following:

- Manual of Uniform Traffic Control Devices for Streets and Highways, including the Illinois Supplement, latest edition.
- FAA Advisory Circular 150/5370-2 (current issue), Operational Safety on Airports During Construction.
- Illinois Department of Transportation Standard Specifications for Road and Bridge Construction adopted January 1, 2022.
- Illinois Department of Transportation Supplemental Specifications and Recurring Special Provisions adopted January 1, 2024.

CONSTRUCTION METHODS

150530-3.1 All work zone traffic control and protection shall be according to stages and phases detailed in the Plans, Notes, and Details. In addition, work shall be completed following guidelines described in FAA Advisory Circular 150/5370-2 (current issue), Operational Safety on

Airports During Construction, and Highway Standards (latest issue), as published by the Illinois Department of Transportation.

The traffic control shown on the Plans represents the minimum required combination of traffic control devices needed for a particular construction operation. Conditions created by the Contractor's operation which are not covered by the Plans shall be delineated by devices as directed by the Engineer at no additional cost to the Project.

The Traffic Control and Construction Phasing represents one suggested alternative for the construction sequencing and method of handling traffic. Revisions or modifications of the traffic control shall have the Engineer's written approval. Any deviation from the proposed plan shall be approved in writing by the Engineer before implementation. The traffic control should remain in place only as long as needed and must be removed when directed by the Resident Engineer.

At the pre-construction conference, the Contractor shall furnish the name and telephone number of the individual in the Contractor's employ who is to be responsible, 24 hours a day, for the installation and maintenance of traffic control for the Project. When the actual installation and maintenance are to be accomplished by a subcontractor, consent shall be requested of the Resident Engineer at the time of the preconstruction conference. This shall not relieve the Contractor of furnishing a responsible individual in the Contractor's direct employ. The Resident Engineer will provide the Contractor with the name of its representative who will be responsible for administration of the traffic control.

Removal, relocation, maintenance, and inspection of traffic control devices, as required by the Contractor's activities, shall be included in the item and not measured separately for payment.

BASIS OF PAYMENT

150530-4.1 Payment will be made at the contract unit price per lump sum for traffic maintenance as specified above and on the construction plans. This price shall be full compensation for furnishing, installing, maintaining and removal of all materials, for all labor, equipment, and incidentals necessary to complete this item of work.

Payment will be made under:

Item AR150530 Traffic Maintenance – per lump sum.

END OF ITEM 150530

ITEM 105540 – HAUL ROUTE

DESCRIPTION

150540-1.1 This item of work shall consist of the construction/utilization, maintenance, and restoration of the proposed haul route and equipment parking area that are needed to provide access to the proposed construction area as shown on the Construction Plans. The Contractor will utilize an existing access gate in the existing fence line and a portion of existing haul roads to access the site as shown on the Proposed Safety Plan sheet of the Construction Plan Set. The Contractor will construct an all-weather staging area (equipment parking and material storage) and an all-weather haul route inside the existing perimeter fence to the construction site.

The proposed equipment parking area will also be utilized as shown on the Plans. The Contractor's personnel will park their personal vehicles in the area shown and be transported to the construction site by a contractor vehicle.

CONSTRUCTION METHODS

150540-2.1 In accordance with section 50-04 of the Standard Specifications, it is the Contractor's responsibility to obtain permission and any applicable permits to use the roads (federal, state, county, city, township) leading to the airport construction site.

The Contractor shall utilize the haul route and equipment parking and material storage areas to provide all weather access to the construction site. The haul route and equipment parking and material storage areas will be maintained so as not to cause delays to the proposed construction. Any temporary additions to the haul route outside of the existing pavements will be made of any suitable aggregate material to provide an all-weather haul route, and temporary drainage pipes shall be installed as necessary to maintain existing drainage patterns. Upon completion of the project, the aggregate material and any temporary drainage pipes will be removed.

Restoration: The haul route, parking, and material storage area shall be restored to their original condition and configuration. The access gate shall be restored to its original condition and configuration, if necessary. The disturbed turf areas that are outside of the proposed seeding and mulching limits will be graded to drain, seeded, and mulched in accordance with Item 901 - Seeding and Item 908 - Mulching. The restoration of these areas will be considered as part of this item.

Safety: All traffic control, safety, and permitting requirements associated with the use of the haul routes are the responsibility of the Contractor.

BASIS OF PAYMENT

150540-3.1 Payment will be made at the contract unit price per lump sum for using, maintaining, and restoring the haul route and equipment parking area as specified. This price shall include full compensation for furnishing, installing, maintaining, and restoring all disturbed areas, and for all labor, equipment, culverts, and incidentals necessary to complete this item of work.

Payment will be made under:

Item AR150540 Haul Route – per lump sum.

END OF ITEM 150540

ITEM 152 – EXCAVATION AND EMBANKMENT

DESCRIPTION

152-1.2 CLASSIFICATION Delete the second, third, and fourth paragraphs and add the following:

Earthwork cut as required in the Plans may result in unsuitable/unstable material that cannot be incorporated into the work as fill material when constructing the lines and grades shown in the Plan. All such unsuitable/unstable material, that cannot be used in the Work, as determined by the Resident Engineer, shall be loaded, and hauled to an off-site disposal site authorized to accept the debris. Excess but suitable material shall be used elsewhere in the Work to the extent possible. Any excess suitable material that cannot be incorporated into the Work shall be lawfully disposed of off-site. The loading, hauling and disposal off-site, including any regulatory testing/documentation, shall not be paid for separately, but shall be included in the Contract unit price for Unclassified Excavation.

CONSTRUCTION METHOD

152-2.1 GENERAL Add the following:

The Contractor will proof-roll the subgrade when required by the Resident Engineer, as directed by the Resident Engineer. The cost for this proofing will not be paid separately but shall be included in the cost for Unclassified Excavation or Subgrade Repair as appropriate.

152-2.2 EXCAVATION Add the following to the fifth paragraph:

Unsuitable/unstable material, as determined by the Resident Engineer, and any excess suitable material not used in the Work shall be loaded, hauled, tested/documented as may be required by state law, and disposed of at an off-site disposal site authorized to accept the debris. Only material identified by the Resident Engineer for haul and disposal shall be hauled from the Work and disposed of at the off-site location.

Contractor shall provide for all materials testing and suitability documentation as required by State law for the disposal of suitable material or unsuitable construction debris. Loading, haul, testing and disposal of the excess material to the off-site disposal site shall not be paid for separately, but shall be included in the Contract unit price for Unclassified Excavation or Subgrade Repair as appropriate.

Revise paragraph 8 as follows:

Excavation and embankment shall be compacted to a density of not less than the percentage of the maximum density, at optimum moisture, shown in TABLE 1 as determined by the compaction control tests cited in Division VII for ASTM D 698 (Standard Proctor) for **Aircraft weights of less than 60,000 pounds.**

Add the following:

Excess but suitable material shall be used elsewhere in the Work to the extent possible; any excess material that cannot be incorporated into the Work shall be lawfully disposed of off-site. The loading, hauling and disposal off-site, including any regulatory testing/documentation, shall not be paid for separately, but shall be included in the Contract unit price for Unclassified Excavation.

Topsoil to be used elsewhere under this project shall be stockpiled within the construction limits but located so as not to violate any runway or any taxiway safety or object area criteria, or obstruct any FAR Part 77 imaginary surfaces, or be located within 15 feet of the pavement edge, or the roadway clear area, whichever is greater, until separately placed. The location shall be approved by the Resident Engineer. Placement and storage of the topsoil shall not be paid for separately **but shall be included in the Contract unit price for Unclassified Excavation.**

152-2.9 TOLERANCES Add the following:

For purposes of verifying these tolerances, the Contractor shall furnish to the Project Engineer for review, survey elevations for the prepared subgrade under pavements, and outside pavements, the final prepared grade prior to topsoil spread, as specified under Section 50-06 (Responsibility of the Contractor Paragraph G).

152.210 TOPSOIL Add the following:

Topsoil shall be stripped from cut areas and below proposed pavements and stockpiled outside of the grading limits. Topsoil shall be utilized in shoulders adjacent to the proposed pavements. In addition, the surface of all disturbed areas shall be covered with a layer of topsoil, as needed, to facilitate drainage and the growth of turf. No separate payment shall be made for stockpiling or excavation from the stockpile. Costs associated with stockpiling and/or excavation from the stockpile shall be considered incidental to Item 152.

BASIS OF PAYMENT

152-5.1 Add the following:

Payment will be made under:

Item AR152410 Unclassified Excavation – per square yard.
Item AS152540 Unclassified Excavation – per square yard.
Item AT152410 Unclassified Excavation – per square yard.

END OF ITEM 152

ITEM 152540 – SOIL STABILIZATION FABRIC

Revise Item 152540 of the Standard Specifications as follows:

MATERIALS

152-2.1 GEOTEXTILE FABRIC FOR SOIL STABILIZATION

Fabric for soil stabilization shall consist of woven yarns of polyolefins or polyesters. Woven fabrics shall be Class 2 according to AASHTO M 288. The physical properties for soil stabilization fabrics shall be according to the following:

PHYSICAL PROPERTIES	
	Ground Stabilization Woven[1]
Grab Strength, lb ASTM D 46322	247 min.[3]
Elongation/Grab Strain, % ASTM D 4632[3]	49 max.
Trapezoidal Tear Strength, lb – ASTM D 4533[3]	90 min.
Puncture Strength, lb ASTM D 6241[3]	494 min.
Apparent Opening Size, Sieve No. ASTM D 4751[4]	40 max.
Permittivity, sec^{-1} ASTM D 4491	0.05 min.
Ultraviolet Stability, % retained strength after 500 hours of exposure ASTM D 4355	50 min.

1. NTPEP results (manufacturer's QC test values) to meet test requirements. The manufacturer shall have public release status and current reports on laboratory results in Test Data of NTPEP's DataMine.
2. MD = Machine direction. XD = Cross-machine direction.
3. Values represent the minimum average roll value (MARV) in the weaker
4. principle direction, MD or XD.
5. Values represent the maximum average roll value.

BASIS OF PAYMENT

152-5.1

Payment will be made under:

Item AR152540 Soil Stabilization Fabric – per square yard.
Item AS152540 Soil Stabilization Fabric – per square yard.

END OF ITEM 152540

ITEM 154604 – GRANULAR DRAINAGE SUBBASE-4”

GENERAL

154604-1.1 This item shall consist of furnishing, placing, shaping, and compacting crushed stone for use as a granular subbase course and drainage layer. The material is to be placed to the lines and grades as shown on the Plans and as directed by the Resident Engineer.

MATERIALS

154604-2.1 The crushed coarse aggregate shall conform with the requirements of Article 1004.01 of IDOT Standard Specifications for Road and Bridge Construction, adopted January 1, 2022, and the following specific requirements.

Description: The coarse aggregate shall be crushed gravel, novaculite, crushed stone, or crushed sandstone. Pit run gravel and gravel shall not be used for the granular subbase material.

The granular material, if approved by the Engineer, may be produced by blending aggregates from more than one source, provided the method of blending results in a uniform product. The components of a blend may not be of the same kind of material. The source of material shall not be changed during the progress of the Work without written permission of the Engineer. Where a natural aggregate is deficient in fines, the material added to make up deficiencies shall be a material approved by the Engineer.

Quality: The coarse aggregate shall be Class D Quality or better.

Gradation: The coarse aggregate base gradation shall be CA-7.

CONSTRUCTION METHODS

154604-3.1 GENERAL All work involved in clearing and stripping of quarries and pits, including the handling of unsuitable material, shall be performed by the Contractor at his own expense. The subbase material shall be obtained from approved sources. The material shall be handled in a manner that shall secure a uniform and satisfactory product.

154604-3.2 EQUIPMENT All equipment necessary for the proper construction of this Work shall be on the Project, in first class working condition, and approved by the Resident Engineer before construction is permitted to start. Equipment available shall meet the requirements of IDOT Standard Specifications for Road and Bridge Construction, adopted January 1, 2022, Article 311.03, of Section 311, Granular Subbase.

154604-3.3 PREPARING UNDERLYING COURSE The underlying subgrade shall be checked and accepted by the Resident Engineer before placing and spreading operations are started. The subgrade shall be free of ruts, objects and debris, but shall not be proof rolled unless directed by the Resident Engineer.

The crushed aggregate is to be placed over soil stabilization fabric specified in Item 152540. The furnishing and placement of the fabrics will be paid for under Item AR152540. The aggregate will be spread over the fabric in a manner that is not injurious to the fabric. To protect

the underlying course and to ensure proper drainage, the spreading of the aggregate shall begin along the centerline of the area for a crowned section or on the high side of the pavement with a one-way slope.

Grade control shall be provided by the Contractor using string lines, checkboards, forms or other suitable methods that will assure that the soil stabilization fabric or separation fabric beneath is not damaged.

154604-3.4 PLACING AND SPREADING The depositing and spreading of the material shall commence where designated and shall progress without breaks. The drainage layer shall be constructed in a layer of not less than 3-inches nor more than 6-inches of compacted thickness. The material shall be deposited and spread on the underlying subgrade and separation fabric in lanes of a uniform thickness and gradation, without segregation by size or pockets of fine or coarse materials, and to such loose depth that, when compacted, the layer shall have the required thickness. The aggregate shall be spread by spreader boxes or other approved devices or methods that shall spread the aggregate in the required amount to avoid or minimize the need for re-handling the material and to prevent the rutting of the underlying subgrade. Hauling over the un-compacted material shall not be permitted.

No material shall be placed in snow or on a soft, muddy, or frozen underlying course, unless directed by the Resident Engineer.

When more than one layer is required, the construction procedure described herein shall apply similarly to each layer.

During the placing and spreading, sufficient caution shall be exercised to prevent the incorporation of subgrade or shoulder material in the base mixture.

154604-3.5 ROLLING AND COMPACTING After spreading, the crushed aggregate shall be thoroughly compacted by rolling. The rolling shall progress gradually from the sides to the center of the lane under construction, or from one side toward previously placed material by lapping uniformly each preceding rear wheel track by one-half the width of such track. Rolling shall continue until the stone is thoroughly set, the interstices of the material reduced to a minimum, and creeping of the stone ahead of the roller is no longer visible. The base shall be compacted to the satisfaction of the Resident Engineer.

The course shall not be rolled when the underlying course is soft or yielding or when the rolling causes undulation in the subbase course. In areas inaccessible to rollers, the crushed aggregate material shall be tamped thoroughly with mechanical tampers.

The sprinkling during rolling, if necessary, shall be in the amount and by equipment approved by the Resident Engineer.

154604-3.6 FINISHING OF SUBBASE Prior to final shaping, the subbase shall be brought to true shape. After the subbase has been brought to its true shape and correct elevation, the surface shall be wetted and rolled as directed by the Resident Engineer with a three-wheel or tandem roller weighing between 6 and 10 tons and weighing not less than 200 pounds/inch nor more than 325 pounds/inch of width of the roller.

After the subbase has been compacted and shaped, the surface of the subbase shall be tested for crown and elevation. The Contractor shall furnish all equipment necessary for these checks. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified, reshaped, re-compacted, and otherwise manipulated as the Resident Engineer may direct until the required smoothness and accuracy are obtained. The finished surface shall not vary more than 1/2-inch from a 16-foot straightedge when applied to the surface parallel with, and at right angles to, the centerline, or shall not be more than 0.05 foot from the true grade as established by grade hubs or pins.

The Contractor shall have a minimum of one (1) day's production of subbase ahead of any crushed aggregate base course to be placed.

The subbase shall be moist at the time of placing subsequent base materials. If the subbase subsequently becomes too dry, it shall be sprinkled again, in such a manner as not to form puddles of water. The Contractor shall provide water and all equipment necessary to meet this requirement. The cost of watering shall be incidental to the Contract.

154604-3.7 TOLERANCE IN THICKNESS The subbase shall be constructed to the thickness shown on the Plans. Thickness determinations shall be made by depth tests or cores taken at intervals in such a manner that each test shall represent no more than 400 square yards. When the base deficiency is more than 1/2-inch, the Contractor shall correct such areas by scarifying, adding satisfactory base mixture, rolling, sprinkling, reshaping, and finishing in accordance with these Specifications.

The Contractor shall replace, at his expense, the subbase material where borings have been taken for test purposes.

For purposes of determining suitability for placement of Item 209 or 501, the Contractor shall furnish grade elevations for the granular drainage subbase to the Project Engineer for review, as specified under Section 50-06 (Responsibility of the Contractor Paragraph G).

154604-3.8 PROTECTION Work on the subbase shall not be accomplished during freezing temperatures nor when the subgrade is wet. When the aggregates contain frozen materials or when the underlying course is frozen, the construction shall be stopped.

Hauling equipment may be routed over completed portions of the subbase, provided no damage results and provided that such equipment is routed over the full width of the course to avoid rutting or uneven compaction. However, the Resident Engineer shall have the full and specific authority to stop all hauling over completed or partially completed subbase when, in his opinion, such hauling is causing damage. Any damage resulting from routing equipment over the course shall be repaired by the Contractor at his own expense.

154604-3.9 MAINTENANCE Following the completion of the subbase, the Contractor shall perform all maintenance work necessary to keep the subbase in good condition. If cleaning is necessary, any work or restitution necessary shall be at the expense of the Contractor.

METHOD OF MEASURMENT

154604-4.1 The Granular Drainage Subbase to be paid for shall be the measured area in square yards for each thickness of subbase course placed, bonded, and accepted by the Resident Engineer.

BASIS OF PAYMENT

154604-5.1 Payment will be made at the Contract unit price per square yard, per thickness indicated on the Plans, for Granular Drainage Subbase. This price shall be full compensation for furnishing all materials and for the preparation, hauling, and placing of these materials, for furnishing certified scales, and for all labor, equipment, tools and incidentals necessary to complete the item to the satisfaction of the Engineer.

Payment will be made under:

Item AS154604 Granular Drainage Subbase-4” – per square yard.

END OF ITEM 154604

ITEM 155 – LIME TREATED SUBGRADE

DESCRIPTION

155-1.1 Add the following:

The optimum moisture content and maximum dry density of the lime-modified soil shall be determined in accordance with ASTM D 698 for aircraft weighing less than 60,000 lbs.

COMPOSITION

155-3.1 Add the following:

Assumed soil type was “Brown and Gray Silty Clay (CL)” with a maximum dry density (pcF) of 109.8 at an optimum moisture content of 17.5% for quantity purposes. The assumed rate is 49 lb/sq yd of lime.

BASIS OF PAYMENT

155-8.1 Add the following:

Payment will be made under:

Item AR155530 Hydrated Lime – per ton.
Item AR155712 Lime-Modified Subgrade-12” – per square yard.
Item AS155530 Hydrated Lime – per ton.
Item AS155712 Lime-Modified Subgrade-12” – per square yard.
Item AT155530 Hydrated Lime – per ton.
Item AT155712 Lime-Modified Subgrade-12” – per square yard.

END OF ITEM 155

ITEM 156000 – EROSION CONTROL

Revise Item 156000 of the Standard Specifications as follows:

MATERIALS

156-2.1 SILT FENCE Add the following:

Delete the first paragraph and replace with:

> Silt fence shall be of either a prefabricated type or shall be constructed in the field, and regardless of the fabrication method, shall be of materials meeting the dimensions and material requirements shown in the Plans.

156-2.5 TEMPORARY SEED Replace with the following:

> Temporary Seed shall be annual ryegrass at a rate of 100 lb/acre.

CONSTRUCTION METHODS

156-3.2 TEMPORARY EROSION CONTROL Add the following:

Replace paragraph C. with the following:

> Temporary Erosion Control Seeding shall consist of seeding all erodible/bare areas to minimize the amount of exposed surface area. Seed bed preparation will not be required if the surface of the soil is uniformly smooth and in a loose condition. Light disking shall be done if the soil is hard packed or caked. Erosion rills greater than 1 in. in depth shall be filled and area blended with the surrounding soil. Fertilizer nutrients will not be required. The original seed bags shall be opened in the presence of the Resident Engineer/Technician. The seed shall be applied by hand broadcasting to achieve a reasonably uniform coverage at a rate of 100 lb/acre (110 kg/ha). Seed shall be applied to all bare areas every seven days, regardless of weather conditions or progress of the work. The Resident Engineer/Technician may require that critical locations be seeded immediately, and the Contractor shall seed these areas within 48 hours of such a directive.
>
> After application, the Contractor shall furnish a watering of the seed bed to encourage germination of the seeds. After planting, the Contractor shall be required to mow the area covered with temporary seeding before the seed heads mature (the seeds could become a strong wildlife attractant if allowed to mature).

BASIS OF PAYMENT

156-5.1 Add the following:

Payment will be made under:

Item AR156510 Silt Fence – per foot.
Item AR156511 Ditch Check – per each.
Item AR156533 Temporary Seed and Mulch – per acre.

END OF ITEM 156000

ITEM 209 – CRUSHED AGGREGATE BASE COURSE

Revise Item 209 of the Standard Specifications as follows:

DESCRIPTION

209-1.1 Add the following:

The Crushed Aggregate Base Course shall be placed upon a prepared subgrade in lifts of limited thickness as required in the Standard Specifications and to the total uniform compacted thicknesses shown in the Plans. In accordance with Section 209-3.2, the material used in this item shall be pugmilled with water at a central mixing plant or traveling plant and placed at the material's optimum moisture content.

MATERIALS

Revise with the following:

209-2.1 CRUSHED AGGREGATE BASE Crushed aggregate shall consist of clean, sound, durable particles of crushed stone, crushed gravel, crushed slag, or crushed concrete from approved sources and shall be free from coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials or coatings. The method used to produce the crushed gravel shall result in the fractured particles in the finished product as consistent and uniform as practicable. Fine aggregate portion, defined as the portion passing the No. 4 sieve shall consist of fines from the coarse aggregate crushing operation. The fine aggregate shall be produced by crushing stone, gravel, or slag that meet the coarse aggregate requirements for wear and soundness. The natural and manufactured materials used as coarse aggregate are defined as follows:

a. **Crushed stone**. Crushed stone shall be the angular fragments resulting from crushing undisturbed, consolidated deposits of rock by mechanical means. Crushed stone shall be divided into the following, when specified.

    1) **Carbonate crushed stone**. Carbonate crushed stone shall be either dolomite or limestone. Dolomite shall contain 11.0% or more magnesium oxide (MgO). Limestone shall contain less than 11.0% magnesium oxide (MgO).

    2) **Crystalline crushed stone**. Crystalline crushed stone shall be either metamorphic or igneous stone, including but is not limited to, quartzite, granite, rhyolite and diabase.

b. **Crushed gravel**. Crushed gravel shall be the product resulting from crushing, by mechanical means, and shall consist entirely of particles obtained by crushing gravel. The acceptance and use of crushed gravel shall be according to the current Illinois Department of Transportation, Bureau of Materials Policy Memorandum (PM) 12-08 Crushed Gravel Producer Self-Testing Program.

c. **Crushed slag**. Crushed slag shall be the graded product resulting from the processing of air-cooled blast furnace slag. Air-cooled blast furnace slag shall be the nonmetallic product, consisting essentially of silicates and alumino-silicates of lime and other bases, which is developed in a molten condition simultaneously with iron in a blast furnace. It shall be aircooled and shall have a compact weight (ITP 19) of not less than 70 pounds per cubic foot. The acceptance and use of air-cooled blast furnace slag shall be according to the current Illinois Department of Transportation, Bureau of Materials Policy Memorandum (PM) 13-08, Slag Producer Self-Testing Program.

d. **Crushed concrete**. Crushed concrete shall be the angular fragments resulting from crushing Portland cement concrete by mechanical means. The acceptance and use of crushed concrete shall be according to Item 219 titled RECYCLED CONCRETE AGGREGATE BASE COURSE.

209-2.2 QUALITY The coarse aggregate shall be Class B Quality or better according to the quality standards listed in the following table.

Coarse Aggregate Quality

Quality Test	Class B
Na_2SO_4 Soundness 5 Cycle, Illinois Modified AASHTO T 104[1], % Loss max	15
Los Angeles Abrasion, Illinois Modified AASHTO T 96, % Loss max.	40[2]
Deleterious Materials[3]	
Shale, % max.	2.0
Clay Lumps, % max.	0.5
Coal & Lignite, % max.	---
Soft & Unsound Fragments, % max.	6.0
Other Deleterious, % max.	2.0
Total Deleterious, % max.	6.0

1. Does not apply to crushed concrete.
2. Does not apply to crushed slag or crushed steel slag.
3. Test shall be run according to ITP 203.

209-2.3 GRADATION REQUIREMENTS The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per the current Illinois Department of Transportation, Bureau of Materials Policy Memorandum (PM) 11-08, Aggregate Gradation Control System (AGCS).

Gradation of Crushed Aggregate Base

Sieve Size	Gradation Percent Passing
	CA 6
1-1/2 inch	100
1 inch	95±5
1/2 inch	75±15
No. 4	43±13
No. 16	16 25±15
No. 200[1]	0-5

1. Modified for FAA requirement associated with non-frost susceptible material. Maximum allowable material passing No. 200 sieve shall be 5%.

The gradations represent the limits which shall determine suitability of aggregate for use from the sources of supply. The final gradation shall be well graded from coarse to fine within the limits designated in the table and shall not vary from the lower limit on one (1) sieve to the high limit on an adjacent sieve or vice versa.

209-2.4 PLASTICITY All material shall comply with the plasticity index requirements listed below. The plasticity index requirement for crushed gravel, crushed stone, and crushed slag may be waived if the ratio of the percent passing the No. 200 sieve to that passing the No. 40 sieve is 0.60 or less.

Use	Plasticity Index – Percent	
	Gravel	Crushed Gravel, Stone, & Slag
Aggregate Base Course	0 to 6	---

Plasticity Index shall be determined by the method given in AASHTO T 90. Where shale in any form exists in the producing ledges, crushed stone samples shall be soaked a minimum of 18 hours before processing for plasticity index or minus No. 40 material. When clay material is added to adjust the plasticity index, the clay material shall be in a minus No. 4 sieve size.

209-2.5 SAMPLING AND TESTING All material shall comply with the plasticity index requirements listed below. The plasticity index requirement for crushed gravel, crushed stone, and crushed slag may be waived if the ratio of the percent passing the No. 200 sieve to that passing the No. 40 sieve is 0.60 or less.

a. **Aggregate base materials**. The Contractor shall take samples of the aggregate base in accordance with the current Illinois Department of Transportation, Bureau of Materials Policy Memorandum (PM) 11-08, Aggregate Gradation Control System (AGCS), to verify initial aggregate base requirements and gradation.

Material shall meet the requirements in paragraphs 209-2.1 through 209-2.4. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

b. **Gradation requirements**. The Contractor shall take at least two (2) aggregate base samples per day in the presence of the Resident Engineer to check the final gradation. Sampling shall be per the current Illinois Department of Transportation, Bureau of Materials Policy Memorandum (PM) 11-08, Aggregate Gradation Control System (AGCS). Material shall meet the requirements in paragraph 209-2.3 titled GRADATION REQUIREMENTS. The samples shall be taken from the in-place, un-compacted material at random sampling locations determined by the Resident Engineer. Results shall be furnished to the Resident Engineer by the Contractor each day during construction.

CONSTRUCTION METHODS

209-3.4 FINISHING AND COMPACTING Add the following:

Add the following after the first Paragraph:

For compaction control testing, this item is to be constructed for aircraft weighing Less than 60,000 pounds (Standard Proctor).

Add the following after the third Paragraph:

The Contractor shall furnish the Resident Engineer with the size and type of straightedge required to check the pavement components as directed in the various sections of the Specifications.

209-3.7 SURFACE GRADE ACCURACY Add the following to this Section:

For purposes of this grade check, the Contractor shall furnish grade elevations for the crushed aggregate base course to the Project Engineer for review, as specified under Section 50-06 (Responsibility of the Contractor Paragraph G).

METHOD OF MEASUREMENT

209-4.1 Delete. Section 209-4.2 of the Standard Specifications shall be used.

209-4.3 Delete.

BASIS OF PAYMENT

156-5.1 Add the following:

Payment will be made under:

Item AR209606 Crushed Agg. Base Course-6” – per square yard.
Item AS209606 Crushed Agg. Base Course-6” – per square yard.
Item AT209606 Crushed Agg. Base Course-6” – per square yard.

END OF ITEM 209

ITEM 401 – BITUMINOUS SURFACE COURSE-SUPERPAVE

Revise Item 401 of the Standard Specifications as follows:

DESCRIPTION

401-1.1 Note the following:

Method I paving shall be used, and proportioning shall be for aircraft weighing less than 60,000 pounds for runway or taxiway pavements.

COMPOSITION

401-3.2 JOB MIX FORMULA Note the following:

This item is to be designed for Aircraft under 60,000 lbs., Runway or Taxiway.

CONSTRUCTION METHODS

401-4.4 HMA PAVERS Add the following:

Should Plan grade elevations and slopes for the Bituminous Base Course have been achieved, subject to the tolerances permitted for Item AR403613, the Contractor may use a ski-type device of not less than 30 feet in length, or as directed by the Engineer, in conjunction with the HMA paver controls. Should Plan grade elevations and/or slopes have not been achieved for the Bituminous Base Course, taut stringline (wire) shall be used for grade control.

401-4.15 ACCEPTANCE TESTING OF HMA MIXES FOR DENSITY Add the following:

Acceptance of the surface mix shall be performed in accordance with requirements for Method I: Less than 2,500 tons/pay item.

401-4.16 SURFACE TESTS Add the following:

To verify conformance with Plan final grades, the Contractor shall furnish grade elevations for the final surface lift to the Project Engineer for review, as specified under Section 50-06 (Responsibility of the Contractor Paragraph G).

BASIS OF PAYMENT

401-6.1 Add the following:

Payment will be made under:

Item AS401613 Bit. Surf. Cse. -Method I, Superpave – per ton.

END OF ITEM 401

ITEM 401900 – REMOVE BITUMINOUS PAVEMENT

DESCRIPTION

401-1.1 Replace with the following:

This item of work shall consist of removing bituminous pavement structure defined as:

- 1.5-inch HMA Surface Course
- 4-inch Bituminous Base Course
- 8- inch Crushed Aggregate Base Course
- 12-inch Lime Modified Subgrade

The Contractor shall remove bituminous pavement structure of the thickness shown in the plans.

Typical construction details are shown in the plans. Exact locations of bituminous pavement removal. shall be determined by the Resident Engineer.

CONSTRUCTION METHODS

401-2.1 Replace with the following:

The Contractor shall sawcut the existing pavement structure full depth as shown in the plans at locations determined by the Resident Engineer. Saw cutting shall provide a vertical surface.

After completion of saw cutting, the Contractor shall remove the pavement structure using methods which will allow a vertical surface along all sides of the removal area.

Material obtained from removal operations shall be hauled to a disposal site off of airport property by the Contractor. No additional compensation will be made for hauling and disposal of the removed material.

Any damage to the existing pavement made by the Contractor beyond the limits shown on the plans shall be removed and replaced by the Contractor at his/her own expense, when identified by the Resident Engineer. These areas shall be saw cut as directed by the Resident Engineer.

BASIS OF PAYMENT

401-4.1 Add the following:

Payment will be made under:

Item AS401900 Remove Bituminous Pavement– per square yard.

END OF ITEM 401900

ITEM 403 – BITUMINOUS BASE COURSE - SUPERPAVE

Revise Item 401 of the Standard Specifications as follows:

DESCRIPTION

403-1.1 Note the following:

Method I paving shall be used, and proportioning shall be for aircraft weighing less than 60,000 pounds for runway or taxiway pavements.

COMPOSITION

403-3.2 JOB MIX FORMULA Add the following:

This item is to be designed for Aircraft under 60,000 lbs., Runway or Taxiway.

CONSTRUCTION METHODS

403-4.13 ACCEPTANCE TESTING OF HMA MIXES FOR DENSITY Add the following:

Acceptance of the surface mix shall be performed in accordance with requirements for Method I: Less than 2,500 tons/pay item.

403-4.14 SURFACE TESTS Add the following:

To verify conformance with Plan final grades, the Contractor shall furnish grade elevations for the final surface lift to the Project Engineer for review, as specified under Section 50-06 (Responsibility of the Contractor Paragraph G).

BASIS OF PAYMENT

403-6.1 Add the following:

Payment will be made under:

Item AS403613 Bit. Base Course -Method I, Superpave – per ton.

END OF ITEM 403

ITEM 501 – PORTLAND CEMENT CONCRETE PAVEMENT

DESCRIPTION

501-1.1 Note the following:

The project will be completed as Method II paving.

MATERIALS

501-2.3 CEMENTITIOUS MATERIAL Replace paragraph one with the following:

Cement shall conform to the requirements of ASTM C150 Type I or ASTM C595 Type IL.

501-2.6 STEEL REINFORCEMENT Replace with the following:

Reinforcement of panels as shown in the Plans shall be welded wire steel fabric of the size and dimensions shown in the Plans conforming to ASTM A185.

501-2.9 COVER MATERIAL FOR CURING Revise with the following:

Curing materials shall conform to the following specification:

A. Liquid membrane-forming compounds for curing concrete shall conform to the requirements of ASTM C 309, Type 2.

501-2.10 ADMIXTURES Add the following Item E:

Set-accelerating admixtures shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

CONSTRUCTION METHODS

501-3.6(B) PROPORTIONS Delete this Section in its entirety.

501-3.16 SURFACE TEST Add the following:

To verify conformance with Plan final grades, the Contractor shall furnish grade elevations for the final surface lift to the Project Engineer for review, as specified under Section 50-06 (Responsibility of the Contractor Paragraph G).

501-3.21 OPENING TO TRAFFIC Add the following:

Prior to opening, the pavement shall be cleaned of all deleterious material. Sweeping shall be conducted in such a manner that dust will not affect operations at the Airport.

BASIS OF PAYMENT

501-5.1 Add the following:

Payment will be made under:

Item AR501510 10" PCC Pavement – per square yard.
Item AR501530 PCC Test Batch – per each.
Item AT501510 10" PCC Pavement – per square yard.

END OF ITEM 501

ITEM 501900 – REMOVE PCC PAVEMENT

DESCRIPTION

501-1.1 Add the following to this section:

Within the limits shown in the Plans or as directed by the Resident Engineer, the Contractor shall remove all the existing Portland cement concrete pavement. No separate measurements will be made for various thicknesses that may be encountered. Existing Crushed Aggregate Base Course removal that may be required to furnish Plan elevations shall be incidental under unclassified excavation.

Pavement removal includes the following pavement structure:

1. Center 75 Feet
    a. 6-inch PCC Pavement on
    b. 12” Lime Modified Subgrade

2. Outer 12.5 Feet (each side)
    a. 6-inch PCC Pavement on
    b. 4-inch 209 Crushed Aggregate Base Course (CA 6) on
    c. Separation Fabric on
    d. 12” Lime Modified Subgrade.

BASIS OF PAYMENT

501-5.1 Add the following:

Payment will be made under:

Item AR501900 Remove PCC Pavement – square yard.
Item AT501900 Remove PCC Pavement – square yard.

END OF ITEM 501900

ITEM 602 – BITUMINOUS PRIME COAT

MATERIALS

602-2.1 Revise as follows:

The bituminous material used for the prime coat shall be either MC-30 or PEP.

CONSTRUCTION METHOD

602-2.1 APPLICATION OF BITUMINOUS MATERIAL: Revise as follows:

The prime coat shall be permitted to cure until the penetration has been approved by the Engineer, but at no time shall the curing period be less than 24 hours for MC-30 or 4 hours for PEP. Pools of bituminous material occurring in the depressions shall be squeegeed over the surrounding surface the same day the prime coat is applied. At no time during curing shall traffic be allowed upon the primed surface.

BASIS OF PAYMENT

602-5.1 Add the following:

Payment will be made under:

Item AS602510 Bituminous Prime Coat – per gallon.

END OF ITEM 602

ITEM 603 – BITUMINOUS TACK COAT

BASIS OF PAYMENT

603-5.1 Add the following:

Payment will be made under:

Item AS603510 Bituminous Tack Coat – per gallon.

END OF ITEM 603

ITEM 610 – STRUCTURAL PORTLAND CEMENT CONCRETE

MATERIALS

610-2.4 CEMENT Add the following:

Cement shall conform to the requirements of ASTM C150 Type I or ASTM C595 Type IL. Other cement types may be allowed by Special Provision.

610-2.11 CALCIUM CHLORIDE Delete Section.

END OF ITEM 610

ITEM 620 – PAVEMENT MARKING

MATERIALS

620-2.2 PAINT Add the following as the first paragraph:

The paint used to mark the proposed pavements shall be Waterborne paint.

White paint color shall match color 37925 of Federal Standard No. 595.
Yellow paint color shall match color 33538 or 33655 of Federal Standard No. 595.
Black paint color shall match color 37038 of Federal Standard No. 595.

CONSTRUCTION METHODS

620-3.5 APPLICATION

Replace paragraph two with the following:

For **bituminous pavement**, the paint shall be mixed in accordance with the manufacturer's instructions and, except for black paint, applied to the pavement with a marking machine in two applications as shown in TABLE 1. The first application shall be 50% of the specified application rate and applied as a temporary marking (no glass beads). The final marking application must be at a rate equal to 100% of the full application rate with glass beads. The addition of thinner will not be permitted.

For **Portland cement concrete (PCC) pavement,** marking paint shall be applied to the pavement in two applications, each at the rate shown in TABLE 1. (Note, glass beads are applied to second coat only.)

Black paint shall be applied in one application at a rate equal to 100% of the full specified rate.

Replace paragraph three with the following:

Bituminous Pavement

A period of 30 days shall elapse between placement of surface course and application of the permanent (final) paint markings. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the RPR.

For proposed (new) Portland cement concrete (PCC) pavement, the material shall attain an age of 28 days before the curing compound is removed and the paint is applied.

620-3.7 PAVEMENT MARKING REMOVAL Revise with the following:

The Contractor shall remove existing and temporary markings as shown in the plans or as directed by the Engineer using water blasting. Sandblasting and/or shot blasting will not be allowed.

620-3.8 TEMPORARY PAVEMENT MARKING Revise with the following:

Temporary pavement marking shall be applied at 30% - 50% of the application rate shown in Table 1. No glass beads will be required.

BASIS OF PAYMENT

620–5.1 Add the following to this section:

Payment will be made under:

Item AR620520 Pavement Marking–Waterborne – per square foot.
Item AR620525 Pavement Marking–Black Border – per square foot.
Item AR620900 Pavement Marking Removal – per square foot.
Item AS620520 Pavement Marking–Waterborne – per square foot.
Item AS620525 Pavement Marking–Black Border – per square foot.

END OF ITEM 620

ITEM 620912 – TEMPORARY MARK & LIGHT

DESCRIPTION

620912-1.1 This item of work shall consist of temporarily displacing the threshold for Runway End 29 in accordance with the layouts and details as shown on the Construction Plans. This item of work shall include installing cable as jumpers for airfield lighting series circuits to temporarily activate runway lighting circuits during this project. The displacement will remain in place until the project is completed.

620912-1.2 REFERENCES Note: where FAA Advisory Circulars are referenced, they shall be the current issue or issues in effect.

A. FAA AC 150/5340-30, “DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS”.

B. FAA AC 150/5345-7, "SPECIFICATIONS FOR L-824 UNDERGROUND ELECTRICAL CABLE FOR AIRPORT LIGHTING CIRCUITS”.

C. FAA AC 150/5345-26, “FAA SPECIFCATIONS FOR L-823 PLUG AND RECEPTACLE CABLE CONNECTORS”.

D. FAA AC 150/5345-53 “AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM” and FAA AC 150/5345-53D, “AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum”.

E. FAA AC 150/5370-2, “OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION”.

F. NFPA 70 – National Electrical Code (most current issue in force).

G. NFPA 70E – Standard for Electrical Safety in the Workplace

H. OSHA 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures.

MATERIALS

620912-2.1 Jumpers shall be constructed using the following material:

A. 1/C #8 5KV UG Cable shall be one conductor No. 8, 5000-Volt, FAA L-824, Type C, stranded. L-824 cable shall be FAA approved and listed in the current AC150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum.

B. Splices shall be as detailed on the Plans and in accordance with Item 108.

C. Ducts used for temporary lighting circuits shall be in accordance with Items 108 and 110.

620912-2.2 GROUND RODS Furnish and install a 3/4-inch diameter by 10-foot long (minimum), UL-listed, copper-clad, ground rod at each temporary relocated airfield light fixture (base mounted light fixture and/or stake-mounted light fixture)**. Ground rods shall be 3/4-inch diameter by 10-foot long UL listed copper clad with 10 mil. (minimum) copper coating,** Ground rods shall be manufactured in the United States of America. Steel used to manufacture ground rods shall be 100 percent domestic steel. Ground rods used for temporary relocated light fixtures may be removed when the displaced threshold is removed and may be reused with the installation of other airfield lighting.

620912.2.3 TEMPORARY MARKING Temporary marking shall comply with Item 620 in these Special Provisions.

CONSTRUCTION METHODS

620912-3.1 RUNWAY MARKING REMOVAL The existing marking that is designated to be removed will be removed by using water blasting. After the marking has been removed, the pavement will be cleaned of all other foreign material.

620912-3.2 TEMPORARY MARKING Temporary marking on the existing pavement will be accomplished using waterborne paint in accordance with Standard Specification 620 and these Special Provisions. Where designated, temporary marking on the proposed pavement will be accomplished using reflective traffic tape and shall be properly maintained or replaced throughout the project at no additional cost.

620912-3.3 TEMPORARY LIGHTING The Contractor shall relocate the existing threshold lights from the threshold of Runway End 29 to the proposed temporary threshold. The Contractor shall erect the temporary threshold lights in accordance with the details as shown on the Construction Plans. Cable shall be installed in unit duct below grade or as shown on the plans. Transformers shall be buried in earth. New No. 8, 5,000-volt cable in unit duct or conduit will be used to connect the temporary threshold lights into the existing runway circuit as shown on the Construction Plans. The proposed unit duct will be sealed to prevent accidental shock and will be either orange in color or painted orange to help reduce accidental tripping where located above grade. Existing lights located within the displaced area will be temporarily disconnected from the series circuit. Upon completion of the project and removal of the displaced threshold, the existing light fixtures, mounting stakes, and isolation transformers shall be turned over to the airport personnel. Concrete foundations shall be removed and disposed of, off the Airport site in a legal manner. All cable used as part of the temporary lighting will be disposed of off the Airport site.

A. The Contractor shall furnish and install all materials necessary for complete and operational installation of the temporary lighting, as specified herein and as shown on the Plans. The complete installation and wiring shall be done in a neat, workmanlike manner. All electrical work shall comply with the requirements of the NFPA 70 – National Electrical Code (NEC) most current issue in force, and all other applicable local codes, laws, ordinances, and requirements in force. Electrical equipment shall be installed in conformance with the respective manufacturer's directions and recommendations for the respective application. Any installations which void the UL listing, ETL/Intertek Testing Services verification/listing (or other third-party listing), and/or the manufacturer's warranty of a device will not be permitted. All temporary installations shall comply with National Electrical Code Article 590 –

"Temporary Installations". Secure, identify and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources in conformance with the requirements of FAA AC 150/5370-2G, Part 2.18.3 "Lighting and Visual NAVAIDs". All temporary installations shall comply with National Electrical Code Article 590 – "Temporary Installations."

B. The Contractor will be required to provide temporary wiring to maintain operation of runway and taxiway lighting circuits as detailed on the Plans and as specified herein. All of the runway and taxiway lighting circuits shall be identified and labeled by the Contractor. Airfield lighting circuits may only be disabled during day light hours unless the respective runway or taxiway is scheduled to be closed. All runways and taxiways that are not closed shall have their respective airfield lighting circuits operational by nightfall.

C. The respective personnel performing airfield lighting work, vault work, and/or tests shall be familiar with, and qualified to work on 5000 Volt airfield lighting series circuits, constant current regulators and associated airport electrical vault equipment. Every airfield lighting cable splicer shall be qualified in making cable splices and terminations on cables rated at and/or above 5000 Volts AC. The Contractor shall submit to the Project Engineer proof of the qualifications of each proposed cable splicer for the 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.

D. All temporary wiring shall be installed in conduit, duct, or unit duct and shall be protected and guarded by suitable fencing, barriers, or other effective means to limit access only to authorized and qualified personnel to comply with NEC 590.7. Any damage shall be immediately repaired at the Contractor's own expense. Contractor shall provide lighted barricades for all taxiway and runway pavement closures. All taxiway, runway, and other pavement closures shall be coordinated with the Airport Manager and the Resident Engineer/Resident Project Representative. Lighted barricades shall comply with the requirements of the Airport Safety Plan. Contractor shall provide temporary fencing and/or barricades for areas of excavation, open manholes, etc. and to protect the temporary cable installation, and to keep unauthorized personnel from entering the construction area.

E. Contractor shall coordinate work and any power outages with the Airport Manager and the Resident Engineer/Resident Project Representative. Any shutdown of existing systems shall be scheduled with and approved by the Airport Manager prior to shutdown. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow U.S. Department of Labor Occupational Safety & Health Administration (OSHA) 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures including, but not limited to, 29 CFR section 1910.147 The Control of Hazardous Energy (lockout/tagout).

F. Contractor shall comply with the requirements of FAA AC No. 150/5370-2G (most current issue in effect) "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION".

G. Contractor shall comply with the applicable requirements of NFPA 70E – Standard for Electrical Safety in the Workplace.

H. At the end of the construction day, prior to leaving the construction site, the Contractor shall

activate the respective runway and taxiway lighting circuits to insure they are functioning properly. If a jumper cable has been damaged, it will be replaced at no additional cost to the project. The Contractor shall repair any lighting circuit that is not functioning. The maintenance of these lighting circuits, and jumper cables will be considered as part of this item of work, and no additional compensation will be allowed. The Contractor will furnish a contact person who will be responsible to provide 24-hour repair service in the case a circuit should deactivate after the Contractor has left the job site for the day.

I. Temporary jumpers shall be removed when the respective replacement circuit installations are complete and operational.

J. Cable used for Item AR620912 will not be permitted for reuse for Item AR108108; 1/C #8 5 KV UG Cable nor Item AR108158; 1/C #8 5 KV UG Cable in UD.

620912-3.4 GROUNDING FOR AIRFIELD LIGHTS. Grounding for airfield lights shall be as detailed on the Plans and as specified herein. Furnish and install a ground rod at each L-867 transformer base/light can and at each stake-mounted light fixture. A ground rod must be installed at each light fixture and taxi guidance sign. The purpose of the light base ground is to provide a degree of protection for maintenance personnel from possible contact with an energized light base or mounting stake that may result from a shorted power cable or isolation transformer. A light base ground shall be installed at each transformer base/light can associated with runway lights, taxiway lights, and lighted taxi guidance signs. A light base ground shall also be installed at each stake-mounted light fixture. A light base ground shall be installed and connected to the metal frame of each taxi guidance sign as detailed on the Plans and in accordance with the respective taxi guidance sign manufacturer recommendations. The light base ground shall be a #6 AWG bare copper conductor bonded to the ground lug on the respective L-867 transformer base/light can or mounting stake and a 3/4-inch diameter by 10-feet long (minimum), UL-listed, copper-clad ground rod. Connections to ground lugs on the L-867 transformer base/light can or mounting stake shall be with a UL-listed grounding connector. Connections to ground rods shall be made with exothermic-weld type connectors, Cadweld by nVent Erico Products, Inc., Thermoweld by Continental Industries, Inc., Ultraweld by Harger, or approved equal. Exothermic-weld connections shall be installed in conformance with the respective manufacturer's directions using molds, as required for each respective application. Bolted connections will not be permitted at ground rods. Top of ground rods shall be buried 12 in. minimum below grade, unless noted deeper on the Plans. For each airfield light fixture and taxi guidance sign the Contractor shall test the made electrode ground system with an instrument specifically designed for testing ground systems. Test results shall be recorded for each airfield light fixture, each taxi guidance sign installation, and each splice can. If ground resistance exceeds 25 Ohms, contact the Project Engineer of Record for further directions. Also refer to EOR-47643 for additional information on grounding requirements where applicable. Copies of ground system test results shall be furnished to the Resident Engineer and the Project Engineer of Record.

For base mounted light fixtures the light fixtures must be bonded to the light base internal ground lug via a #6 AWG stranded copper wire rated for 600 Volts with Green XHHW insulation or a braided ground strap of equivalent current rating. The ground wire length must be sufficient to allow the removal of the light fixture from the light base for routine maintenance. See the light fixture manufacturer's instructions for proper methods of a attaching a bonding wire.

METHOD OF MEASUREMENT

620912-4.1. The installation and removal of the temporary threshold lighting and marking shall be measured as a lump sum item completed and accepted by the Resident Engineer.

The proposed marking removal will be paid for under item: AR620900 “Pavement Marking Removal” - per square foot.

All lockout/tagout procedures to ensure and maintain safety of personnel will be considered incidental to the respective item of work for which it applies, and no additional compensation will be allowed.

All cable and constant current regulator testing will be considered incidental to the respective item for which it is required.”

BASIS OF PAYMENT

620912-5.1. This work will be paid for at the contract unit bid price per lump sum for temporary marking and lighting, which price and payment will constitute full compensation for furnishing all materials; for all preparation, assembly, installation, and removal of these materials; and for all labor, tools, equipment, and incidentals necessary to complete this item of work.

Payment will be made under:

Item AR620912 Temporary Mark and Light – per lump sum.

END OF ITEM AR620912

DIVISION III – FENCING

ITEM 161 – WIRE FENCE WITH STEEL POSTS

DESCRIPTION

161-1.1 Revise with the following:

This work shall include removing metal t-posts with steel wire field fence and two strands of barbwire.

CONSTRUCTION METHODS

161-3.10 FENCE AND GATE REMOVAL Revise with the following:

This work shall consist of the removal and disposal of the existing. The fence shall be removed completely.

The removed material shall be disposed of off airport property unless requested by the airport to be stockpiled on-site.

METHOD OF MEASUREMENT

161-4.3 Revise with the following:

Class C Fence Removal to be paid for shall be the actual length of fence (including post widths) removed.

BASIS OF PAYMENT

161-5.3 Add the following to this section:

Payment will be made under:

Item AR161900 Remove Class C Fence – per foot.

END OF ITEM 161

DIVISION IV – DRAINAGE

ITEM 701 – PIPE FOR STORM SEWERS AND CULVERTS

BASIS OF PAYMENT

701–5.1 Add the following:

Payment will be made under:

Item AR701512 12” RCP, Class IV – per foot.
Item AR701536 36” RCP, Class IV – per foot.

END OF ITEM 701

ITEM 705 – PIPE UNDERDRAINS FOR AIRPORTS

DESCRIPTION

705-1.1 Add the following:

The underdrain pipe shall be wrapped with a filter fabric casing.

This item shall include the installation of underdrain inspection holes, cleanouts, and headwalls as shown in the Plans, and as directed by the Resident Engineer.

This item shall include the removal of the existing underdrain pipe wherever it interferes with the installation of the proposed underdrain pipe, and where it is detailed in the Plans.

This item shall include the removal of existing inspection holes, cleanouts, or structures in conflict with the installation of the proposed underdrain pipe, and where it is detailed in the plans. Items associated with structure removal shall be disposed off-site.

MATERIALS

705-2.12 CORRUGATED POLYETHYLENE (PE) TUBING AND IGS FITTINGS. Delete this section and replace with the following:

All underdrains shall be **4-inch** perforated corrugated polyethylene (PE) pipe, **double wall** with a smooth inner surface, conforming to the requirements of AASHTO M 252, Type SP, Class 2. The underdrain shall be wrapped with a filter fabric casing, as noted in Section 705-2.13.

705-3.9 HEADWALLS, END SECTIONS, INSPECTION HOLES, COLLECTION STRUCTURES AND CLEANOUTS FOR UNDERDRAINS Add the following:

Cleanouts for underdrains shall be constructed in accordance with the applicable sections of Item 752. Castings shall be R-6461 by Neenah Foundry, V2610-1 by EJ Group. The frame and lid shall not extend above any adjacent pavement.

CONSTRUCTION

705-3.7 CONNECTIONS Add the following:

Underdrain pipe connections to the storm sewer system are to be made at manholes or concrete culvert pipe, unless otherwise shown on the Plans. These connections shall be made through smooth, cored holes made at the proper invert elevation. Holes remaining from existing underdrain pipe connections removed in this work shall be patched to the satisfaction of the Resident Engineer. Concrete conforming with Item 610 shall be used. Connections to structures or pipe and patching of existing connections removed shall not be paid for separately but shall be included in the Contract price for underdrain.

Add the following sections:

705-3.10 REMOVAL OF EXISTING INSPECTION HOLES AND CLEANOUT STRUCTURES

Existing inspection hole and cleanout structures shall be removed as shown in the Plans and as directed by the Resident Engineer. The concrete structure shall be disposed of at an off-site location, with the disposal cost incidental to Remove Underdrain Inspection Hole or Remove Underdrain Cleanout. The pipe tubing shall be carefully cut to the indicated location and the pipe removed for the distance shown on the Plans or as directed by the Resident Engineer. New couplings shall be furnished for all pipes to be extended or rerouted. All pipe ends to remain that are not to be extended shall be provided with end caps installed in accordance with the manufacturer's recommendations. End caps and couplings used in this Work shall not be paid for separately but shall be included in the Contract unit price for Remove Underdrain Inspection Hole or Remove Underdrain Cleanout.

705-3.11 REMOVAL OF UNDERDRAINS

Existing underdrain pipe, granular material and fabric envelop shall be removed at the locations shown on the Plans and as directed by the Resident Engineer. Removed materials shall be disposed of off-site, with any haul and disposal costs incidental to the Contract unit price for Remove Underdrain.

METHOD OF MEASUREMENT

705-4.1 Add the following:

The number of existing underdrain inspection holes and cleanouts removed shall be the number of units removed and disposed of as specified or as accepted by the Resident Engineer. The quantity of underdrain removed shall be the linear feet of underdrain pipe, and surrounding aggregate and fabric envelop, removed, and accepted by the Resident Engineer, measured in place prior to removal.

BASIS OF PAYMENT

705–5.1 Add the following to this section:

Revise paragraph 4 with the following:

Payment for underdrain removal and underdrain structure removal shall be paid for separately.

Add the following:

Payment will be made under:

Item AR705524 4” Perforated Underdrain w/Sock – per foot.
Item AR705630 Underdrain Inspection Hole – per each.

Item AR705640 Underdrain Cleanout – per each.
Item AR705900 Remove Underdrain – per foot.
Item AR705903 Remove Insp. Hole – per each.
Item AS705524 4” Perforated Underdrain w/Sock – per foot.
Item AS705630 Underdrain Inspection Hole – per each.
Item AS705640 Underdrain Cleanout – per each.
Item AS705900 Remove Underdrain – per foot.
Item AS705903 Remove Insp. Hole – per each.

END OF ITEM 705

ITEM 751 – MANHOLES, CATCH BASINS, INLETS AND INSPECTION HOLES

BASIS OF PAYMENT

751–5.1 Add the following to this section:

Payment will be made under:

Item AR752412 Precast Reinforced Conc. FES 12” – per each.
Item AR752436 Precast Reinforced Conc. FES 36” – per each.

END OF ITEM 751

DIVISION V – TURFING

ITEM 901 – SEEDING

MATERIALS

901-2.1 SEED Revise the seed mixture table as follows:

Seed	Minimum Seed Purity	Minimum Germination	Application Rate (lb/acre)
* Tall Fescue	98%	90%	60
Annual Rye	98%	90%	20
* Red Fescue	98%	85%	30
* Hard Fescue	96%	85%	30

* Seed shall be of a variety bred to contain high levels of endophyte.

Revise the third paragraph:

Seeding shall be performed during the period between April 1 and June 1 or September 1 and November 1 provided that the ground is not frozen or in any way detrimental to the seed.

BASIS OF PAYMENT

901-5.1 Add the following:

Payment will be made under:

Item AR901510 Seeding – per acre.

END OF ITEM 901

ITEM 908 – MULCHING

BASIS OF PAYMENT

905-5.1 Add the following:

Payment will be made under:

Item AR908510 Mulching – per acre.

END OF ITEM 908

DIVISION VI – LIGHTING INSTALLATION

ITEM 107 – INSTALLATION OF AIRPORT 8-FOOT AND 12-FOOT WIND CONES

DESCRIPTION

107-1.1. Revise this section to read as follows:

"Item AR107508; L-806 WC-8' Internally Lit shall consist of furnishing and installing an 8-ft lighted wind cone at the location shown on the Plans, and in accordance with the details and notes on the Plans and these Special Provisions. The work shall include the furnishing and installation of a support for mounting the wind cone and a concrete foundation. This item shall include wind cone manufacturer's cable, connections, feeder cable, splice cans, conduit and conduit fittings, lamps, ground rod and ground connection, and all associated equipment, materials, labor, tools, testing, and all incidentals necessary to place each wind cone in operation as a completed unit to the satisfaction of the Resident Engineer/Resident Technician.

Airport Certification Information Bulletin Number 08-10 and FAA AC 150/5370-10G Standards for Specifying Construction of Airports both state the following:

"*The illuminated wind cone must present a constant brightness to the pilot. As a result, the source of power for the wind cone circuit must be identified. Where a constant voltage is available, the wind cone may be connected directly to the constant voltage circuit. Where the series lighting circuit is used as a power source to the wind cone, a power adapter that converts current to constant voltage must be specified. An additional requirement for the power adapter is the output voltage must remain constant regardless of the input current. The manufacturer of the power adapter must be consulted to verify the additional load imposed on the series circuit by the power adapter.*

The engineer should specify the wind cone and power adapter combination recommended by the manufacturer when the power source for the wind cone circuit will be the constant current series lighting circuit.""

Add the following:

107-1.2 REFERENCES. Note: where FAA Advisory Circulars are referenced, they shall be the current issue or issues in effect.

A. ANSI C80.1 – Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.4 – Fittings Rigid Metal Conduit and EMT.

C. FAA Advisory Circular 150/5340-30J (current issue in effect) DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS

D. FAA AC No. 150/5345-27 (current issue in effect) “SPECIFICATION FOR WIND CONE ASSEMBLIES”.

E. FAA AC No. 150/5345-53 “AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM” (current issue in effect) and AC 150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum (current issue in effect).

F. FAA AC No. 150/5370-2 (current issue in effect) “OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

G. NFPA 70 – National Electrical Code (most current issue in force).

H. NFPA 70E – Standard for Electrical Safety in the Workplace

I. NFPA 2638645-1 = National Fire Protection Association IDN

J. OSHA 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures

K. UL Standard 6 – Rigid Metal Conduit.

L. UL Standard 514B – Conduit, Tubing and Cable Fittings.

107-1.3 SHOP DRAWINGS. The Contractor shall furnish shop drawings for approval before ordering equipment and/or materials. Shop drawings are required for wind cones and materials to be used on the project. **Shop drawings shall be clear and legible. Copies that are illegible will be rejected.** The preferred shop drawing submittal format shall be electronic (PDF) copies. Shop drawings shall include the following information:

A. In order to expedite the shop drawing review, inspection and/or testing of materials and equipment, the Contractor shall furnish complete statements to the Project Engineer as to the origin and manufacturer of all materials and equipment to be used in the work. Such statements shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials and equipment.

B. Provide certification that steel products are manufactured in the USA from domestic steel to comply with the Steel Products Procurement Act (30 ILCS 565/)

C. Cut sheets with part number and specifications for each wind cone.

D. Concrete mix design.

E. Provide cut sheets with manufacturer’s name, catalog number, dimensions, material and UL listing for each type and size ground rod. Include certification of 100% domestic steel for ground rods.

F. Provide cut sheets for all types of conduit used with the wind cones (for example galvanized rigid steel conduit). Include certification that steel conduits are made with 100 percent domestic steel.

EQUIPMENT AND MATERIALS

107-2.2 WIND CONES. Revise this section to read as follows:

"L-806(L) wind cones shall be manufactured to Federal Aviation Administration (FAA) Specification AC 150/5345-27 (most current issue in effect) and shall be FAA approved and/or listed in the current AC150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum. The wind cone shall be a Type L-806(L), Style I-B (internally lighted) with lighting emitting diode illumination, Size 1 (18 inches diameter by 8 feet long) orange nylon windsock, 6.6 Amp series circuit power, mounted on a frangible base pole. The pole and support structure shall be factory-painted "Aviation Orange". Wind cone shall be equipped with an L-810(L) obstruction light mounted on the top of the mast. Overall height of wind cone and support assembly shall not exceed 10 feet. Wind cone lighting shall provide constant-brightness series circuit power adapter suitable for operation on a five step (2.8 Amp. 3.4 Amp, 4.1 Amp, 5.2 Amp, and 6.6 Amp) series circuit or a three step (4.8 Amp, 5.5 Amp, and 6.6 Amp) series circuit. Include a series circuit isolation transformer rated for the respective wind cone and compatible with the respective series circuit power. Contractor shall confirm part number and special options with the respective manufacturer for compliance with these Special Provisions. Include sufficient slack cable with the wind cone to allow connection to the respective series transformer in an adjacent splice can. Include manufacturer's specified anchor bolts."

107-2.3 WIRE. Revise this section to read as follows:

"Cable and wiring associated with the wind cone installations shall be as detailed on the Plans, as specified herein, and shall also comply with Item 108.

Cable in duct or unit duct from the point of connection to the respective power source to the point of connection to the respective wind cone installation is not included with this item, and shall be paid for separately under Items 108 and 110."

107-2.4 CONDUIT. Revise this section at follows:

"Rigid Steel Conduit and fittings shall be hot-dipped, galvanized, UL-listed, and produced in accordance with UL Standard 6 – Rigid Metal Conduit and ANSI C80.1 – Rigid Steel Conduit, Zinc Coated. Couplings, connectors, and fittings for rigid steel conduit shall be threaded, galvanized steel or galvanized, malleable iron, specifically designed and manufactured for the purpose. Fittings shall conform to ANSI C80.4 – Fittings Rigid Metal Conduit and EMT and UL 514B – Conduit, Tubing, and Cable Fittings. Set screw type fittings are not acceptable. The steel used to manufacture conduits shall be 100 percent domestic steel. Contractor shall provide certification that the respective steel conduits used on this project are manufactured from 100 percent domestic steel.

Conduit for grounding electrode conductors shall be Schedule 80 PVC conduit and shall comply with Item 110 and the following: Conduit shall be Schedule 80 PVC, 90°C, UL-rated, or approved equal. Material shall comply with NEMA Specification TC-2 (Conduit), (Fittings UL-514), and UL-651 (Standard for rigid, non-metallic conduit)."

107-2.6 CONCRETE. Add the following:

> "Foundation for the L-806 wind cone shall be 24 inches diameter by 60 inches deep (minimum). Coordinate the installation of a 2-inch, galvanized, rigid steel conduit (GRSC)/elbow into the foundation for the power wiring. Coordinate the installation of a 1-inch Schedule 80 PVC conduit/elbow into the foundation for the grounding electrode conductor. Include reinforcing steel, as detailed on the Plans. Steel used to manufacture rebar shall be 100 percent domestic steel."

Add the following:

107-2.7 SPLICE/TRANSFORMER CANS. Splice/transformer cans shall conform to the requirements of FAA AC 150/5345-42 (current issue in effect) for Type L-867, Class IA, Size B (12-inches nominal diameter), 24 inches deep and shall be FAA approved and/or listed in the current AC150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum. Splice/transformer cans shall have galvanized steel covers, 3/8-in. minimum thick, with stainless steel bolts. Splice/transformer cans shall include internal and external ground lugs. A splice can shall be provided to house the series circuit isolation transformer and cable connections and shall be located adjacent to the wind cone foundation. Larger size splice cans shall be provided, where necessary, to accommodate the respective series circuit isolation transformer(s) and cable connections. This splice can shall be bonded to the respective ground rod located at the wind cone foundation with a #4 AWG bare copper conductor. Splice cans shall not be used as a base for the wind cone.

107-2.8 SERIES CIRCUIT TRANSFORMER. Series circuit isolation transformers for the wind cones shall be manufactured to FAA Specification AC 150/5345-47 (current edition in effect) and shall be FAA approved and/or listed in the current AC150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum. Series circuit transformers shall be properly sized for the respective wind cone lighting loads and shall be as recommended by the respective wind cone manufacturer. Confirm proper transformer selection and sizing with the respective wind cone manufacturer.

107-2.9 GROUND RODS. **Ground rods shall be 3/4-inch diameter by 10-feet long UL listed copper clad with 10 mils (minimum) copper coating.** Two 3/4-inch diameter by 10-feet long ground rods spaced a minimum of one rod length apart (10 feet for a ground rod that is 10 feet in length) shall be furnished and installed for the wind cone. Ground rods shall be manufactured in the United States of America. The steel used to manufacture ground rods shall be 100 percent domestic steel to comply with the Steel Products Procurement Act (30 ILCS 565/).

107-2.10 SPARE PARTS. Spare parts for airport visual aids are allowable in accordance with the requirements of FAA Order 5100.38D "Airport Improvement Program Handbook" and the guidelines in FAA AC No. 150/5340-26C "Maintenance of Airport Visual Aid Facilities". Provide the following spare parts for the airport visual aid/airfield lighting system:

- Spare lighting assembly for the L-806(L) Wind Cone

Spare parts for the airport visual aid/airfield lighting system will be considered incidental to the respective airfield lighting system pay items and no additional compensation will be allowed.

CONSTRUCTION METHODS

107-3.1 INSTALLATION. Add the following:

"The support pole shall be installed on a concrete foundation, as detailed on the Plans. The Contractor shall furnish and install all electrical materials necessary for complete and operational installation of each wind cone, as detailed herein and in accordance with the manufacturer's instructions. The complete installation and wiring shall be done in a neat, workmanlike manner. All electrical work shall comply with the requirements of NFPA 70 - National Electrical Code (NEC), most current issue in force. Wind cones shall be installed in conformance with the respective manufacturer's directions and recommendations for the respective application. Any installations which void the UL listing, ETL/Intertek Testing Services verification/listing (or other third-party listing), and/or the manufacturer's warranty of a device will not be permitted.

The Contractor shall always keep a copy of the latest NEC in force on site during construction for use as a reference.

The Contractor should examine the proposed site to evaluate the complexity of the work.

Contractor shall coordinate work and any power outages to airfield lighting systems, buildings or facilities located at the Airport with the Airport Manager. Where FAA facilities are affected, the Contractor shall coordinate work and any power outages with the Airport Manager and the respective FAA personnel. Any shutdown of existing systems shall be scheduled with and approved by the Airport Manager prior to shutdown. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow OSHA 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures, including, but not limited to, 29 CFR Section 1910.147 The Control of Hazardous Energy (lockout/tagout). Safety of personnel is the priority.

Contractor shall comply with the requirements of FAA AC No. 150/5370-2 (current issue in effect) "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION".

Contractor shall comply with the applicable requirements of NFPA 70E – Standard for Electrical Safety in the Workplace.

The Contractor shall be responsible for furnishing and setting all anchor bolts required to install his equipment.

Where concrete mounting pads, foundations, or piers are required for equipment mounting, the Contractor shall furnish all concrete and form work necessary to complete the installation. Concrete shall conform to Item 610 Structural Portland Cement Concrete of the Standard Specifications."

107-3.2. COUNTERWEIGHT. Delete this section.

107-3.3 ELECTRICAL CONNECTION. Add the following:

"Splices in conductors will be allowed only within the specified junction boxes, splice cans, or electrical handholes. Circuit conductors for power wiring shall be continuous from source of power to connected device, unless otherwise approved by the Resident Engineer/Resident Technician. Spliced connections of the wind cone conductors to the transformer secondary conductors shall be installed in an L-867 transformer/splice can located at the wind cone.

A slack of three (3') feet, minimum, plus depth of base can (if applicable), shall be provided in the primary cable at each transformer/connector termination. There shall be no additional payment for cable slack and therefore the quantity of proposed cable slack has not been included in the respective cable pay items."

107-3.5 GROUND CONNECTION AND GROUND ROD. Revise this section as follows:

"The Contractor shall furnish and install two ground rods, grounding electrode conductor cable, ground clamps/connectors, and exothermic weld connections for grounding the wind cone pole support near the base. Each ground rod shall be 3/4 - inch diameter by 10 feet long, UL-listed, copper-clad with 10-mil minimum copper coating. One ground rod shall be driven into the ground adjacent to the concrete foundation so that the top of the rod is at least 12 inches below grade. The second ground rod shall be located a minimum of one rod length away (10 feet for a ground rod that is 10 feet in length) and bonded to the first ground rod with a #4 AWG copper grounding electrical conductor. Buried or concealed ground systems shall be observed by the Resident Engineer/Resident Technician before backfilling or covering. The grounding electrode conductor shall consist of No. 4 AWG bare-stranded Copper wire or larger. All connections to ground rods and/or buried grounding electrode conductors shall be made with exothermic weld-type connectors, Cadweld by Pentair Erico Products, Inc., Thermoweld by Continental Industries, Inc., Ultraweld by Harger, or approved equal. Exothermic weld connections shall be installed in conformance with the respective manufacturer's directions using molds as required for each respective application. Bolted connections will not be permitted at ground rods. The other end of the grounding electrode conductor shall be securely attached to the base of the wind cone pipe support with a UL-listed grounding connector or pipe clamp suitable for the respective application. Metallic surfaces to be joined shall be prepared by the removal of all non-conductive material (including paint) per 2017 NEC, Article 250-12. All bolted or mechanical connections shall be coated with a corrosion preventative compound before joining, Sanchem Inc. "NO-OX-ID "A-Special" compound, Burndy Penetrox E, or approved equal. Coordinate the installation of a 1-inch Schedule 80 PVC conduit into the wind cone foundation to accommodate the grounding electrode conductor. The resistance to ground shall not exceed 25 Ohms. Contractor shall test the made electrode ground rod installation with an instrument specifically designed for testing ground field systems. If ground resistance exceeds 25 Ohms, contact the Project Engineer of Record for further directions. Copies of ground rod test results shall be furnished to the Project Engineer of Record and the Resident Engineer/Resident Technician."

107-3.6 PAINTING. Add the following:

"The pole, and any support structure and the exposed, non-stainless components of the wind cone shall be **factory painted – aviation orange**."

107-3.7 LAMPS. Revise this section as follows:

"The Contractor shall furnish and install all lamps/light emitting diode assemblies required as per manufacturer's recommendation."

107-3.8 CHAIN AND PADLOCK. Delete this section.

Add the following:

107-3.9 RESTORATION. All turf areas disturbed by the installation of the wind cone and associated work shall be restored, graded, and seeded in accordance with Item 901 Seeding and Item 908 Mulching to the satisfaction of the Resident Engineer/Resident Technician and will be considered as incidental to the installation of each wind cone.

107-3.10 INSTRUCTION OF AIRPORT STAFF. Contractor shall provide instruction to airport staff in regard to the operation and maintenance of the wind cones and associated equipment. Contractor shall demonstrate operating procedures, lamp changing procedures, and items requiring maintenance. Contractor shall furnish operation and maintenance manuals for wind cones and associated equipment.

107-3.12 LOCATING EXISTING UNDERGROUND UTILITIES AND CABLES. The location, size, and type of material of existing underground and/or aboveground utilities indicated on the Plans are not represented as being accurate, sufficient, or complete. Neither the Owner nor the Engineer assumes any responsibility whatever in respect to the accuracy, completeness, or sufficiency of the information. There is no guarantee, either expressed or implied, that the locations, size, and type of material of existing underground utilities indicated are representative of those to be encountered in the construction. It shall be the Contractor's responsibility to determine the actual location of all such facilities, including service connections to underground utilities. Prior to construction, the Contractor shall notify the utility companies of his operational plans and shall obtain from the respective utility companies detailed information and assistance relative to the location of their facilities and the working schedule of the companies for removal or adjustment, where required. In the event an unexpected utility interference is encountered during construction, the Contractor shall immediately notify the utility company of jurisdiction. The Owner's Representative and/or the Resident Engineer shall also be immediately notified. Any damage to such mains and services shall be restored to service at once and paid for by the Contractor at no additional cost to the Contract.

All utility cables and lines shall be located by the respective utility. Contact JULIE (Joint Utility Location Information for Excavators) for utility information, phone: 1-800-892-0123. Contact the FAA (Federal Aviation Administration) for assistance in locating FAA cables and utilities. Location of FAA power, control, and communication cables shall be coordinated with and/or located by the FAA. Also contact Airport Director/Manager and Airport Personnel for assistance in locating underground Airport cables and/or utilities. Also coordinate work with all aboveground utilities.

Contractor shall locate and mark all existing cables within 10 ft of proposed excavating/trenching area. Any cables found interfering with proposed excavation or cable/trenching shall be hand dug and exposed. Any damaged cables shall be immediately repaired to the satisfaction of the Resident Engineer at the Contractor's expense. The Resident Engineer and Owner shall be notified immediately if any cables are damaged.

Payment for locating and marking underground utilities and cables will not be paid for separately but shall be considered incidental to the respective wind cone, cable, and/or duct installation.

METHOD OF MEASUREMENT

107-4.1. Add the following:

"Ground resistance tests for the made electrode ground system at each wind cone will be considered incidental to the respective wind cone pay item and no additional compensation will be allowed.

Testing the airfield lighting systems and the associated constant current regulator tests and cable tests will be considered incidental to the Contract and no additional compensation will be allowed.

Spare parts for the airport visual aid/wind cone will be considered incidental to the respective wind cone pay item and no additional compensation will be allowed.

Conduits, conduit nipples, conduit couplings, and other conduit fittings included with splice cans, transformer cans, junction structures, wind cones and/or other Navaid installations, will be considered incidental to the respective item for which they are installed and no additional compensation will be made.

Ground rods, grounding electrode conductors, connections, and associated grounding work included with airfield lights, taxi guidance signs, and/or splice cans will be considered incidental to the respective item for which they are installed, and no additional compensation will be made.

L-867 splice/transformer cans associated with the wind cone installations shall be incidental to the respective wind cone pay item and no additional compensation will be made.

The concrete pad around the wind cone foundation will be considered incidental to this item and no additional compensation will be made.

All lockout/tagout procedures to ensure and maintain safety of personnel will be considered incidental to the respective item of work for which it applies, and no additional compensation will be allowed."

BASIS OF PAYMENT

107-5.1. Revise this section to read as follows:

"Payment will be made at the contract unit price per each unit installed and accepted by the Resident Engineer/Resident Technician. This price shall be full compensation for furnishing all materials, preparation, assembly, and installation of these materials; and for all labor, equipment, tools, and incidentals necessary to complete this Item.

Payment will be made under:

Item AR107508 L-806 WC 8' Internally Lit - per EACH"

END OF ITEM 107

ITEM 108 – UNDERGROUND POWER CABLE FOR AIRPORTS

DESCRIPTION

108-1.1. Add the following to this section:

"This Item of work shall consist of the installation (plowing, trenching, directional-boring, or installing in ducts or raceways) of cable for airfield lighting circuits and/or Navaid circuits on the runways, taxiways, aprons, and the associated homeruns at the locations shown on the Plans and in accordance with these Specifications.

In areas where there is congestion of buried cable or where the proposed cable crosses an existing cable, the Contractor will be required to trench the proposed cable into place. In all other areas, the Contractor has the option to either trench or plow the proposed cable in unit duct into place.

When crossing existing circuits, the Contractor will be required to hand dig the trenches for the proposed cable."

Add the following:

108-1.2 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. Note: where FAA Advisory Circulars are referenced, they shall be the current issue or issues in effect.

A. ASTM Specification B3 – Standard Specification for Soft or Annealed Copper Wire.

B. ASTM Specification B8 – Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

C. FAA AC 150/5340-30, "DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS".

D. FAA AC 150/5345-7, "SPECIFICATIONS FOR L-824 UNDERGROUND ELECTRICAL CABLE FOR AIRPORT LIGHTING CIRCUITS".

E. FAA AC 150/5345-26, "FAA SPECIFCATIONS FOR L-823 PLUG AND RECEPTACLE CABLE CONNECTORS".

F. FAA AC 150/5345-53 "AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM" and FAA AC 150/5345-53D, "AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum".

G. FAA AC 150/5370-2, "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION".

H. FAA Standard-019f; Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment.

I. Federal Specification A-A-59544 Cable and Wire, Electrical (Power, Fixed Installation).

J. Federal Specification A-A-55809 Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic.

K. NFPA 70 – National Electrical Code (most current issue in force).

L. NFPA 70E – Standard for Electrical Safety in the Workplace.

M. NFPA 2638645-1 = National Fire Protection Association IDN.

N. OSHA 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures.

O. UL Standard 44 – Thermoset-Insulated Wires and Cables.

P. UL Standard 83 – Thermoplastic-Insulated Wires and Cables.

Q. UL Standard 854 – Service Entrance Cables.

108-1.3 SHOP DRAWINGS. The Contractor shall furnish shop drawings for approval before ordering equipment and/or materials. Shop drawings are required for each wire, conductor, and/or cable type to be used on the project. **Shop drawings shall be clear and legible. Copies that are illegible will be rejected.** Shop drawings shall include the following information:

A. In order to expedite the shop drawing review, inspection and/or testing of materials, the Contractor shall furnish complete statements to the Project Engineer as to the origin, composition, and manufacturer of all material to be used in the work. Such statements shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

B. Provide certification that steel products are manufactured in the USA from domestic steel to comply with the Steel Products Procurement Act (30 ILCS 565/).

C. Indicate the pay item number for each respective cable and/or cable in unit duct.

D. Shop drawings shall include wire/conductor/cable cut sheets with type, size, specifications, Intertek Testing Services verification/ETL listing or UL listing, manufacturer, and catalog or part number.

E. Where cable is required to have colored coded insulation, provide information on the color coding for the respective conductors.

EQUIPMENT AND MATERIALS

108-2.1 GENERAL. Add the following:

"All cable shall be FAA approved or UL-listed as suitable for installed application. All conductors shall be Copper."

108-2.2 CABLE. Revise this section to read as follows:

"L-824 Cable – L-824 cable shall be FAA L-824, Type C and shall conform to the requirements of FAA Advisory Circular 150/5345-7 (current edition in effect) "SPECIFICATIONS FOR L-824 UNDERGROUND ELECTRICAL CABLE FOR AIRPORT LIGHTING CIRCUITS". L-824 cable shall be FAA approved and listed in the current AC 150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum. Circuits for use with constant current regulator outputs (runway or taxiway lighting circuits) shall use 5000-Volt rated cable. Circuits for use with low voltage applications (600 Volts or below) shall use either 5000-Volt rated cable or 600-Volt rated cable and shall have colored insulation corresponding to the respective voltage system.

Cable for use with airfield lighting series circuits (including runway lighting, taxiway lighting and taxi guidance signs) shall be one conductor No. 8, 5,000-Volt, FAA L-824, Type C, stranded.

XLP-USE Wire. Cable shall comply with UL Standard 44, UL Standard 854, and Federal Specification A-A-59544. The conductor shall be concentric-strand, soft Copper, conforming to ASTM B8 and Underwriters' Laboratories Standard UL44 for Rubber Insulated Wires. Insulation shall be rated for 600-Volt. Insulation shall be cross-linked polyethylene conforming to Underwriters Laboratories Requirements for Type USE-2 insulation. Cable shall be UL-listed and marked USE-2.

Color-coding: Color-code phase and neutral conductor insulation for No. 6 AWG or smaller. Provide colored marking tape or colored insulation for phase and neutral conductors for No. 4 AWG and larger. Insulated ground conductors shall have green colored insulation for all conductor sizes (AWG and/or KCMIL) to comply with NEC 250.119. Neutral conductors shall have white colored insulation for No. 6 AWG and smaller to meet the requirements of NEC 200.6. Standard colors for power wiring and branch circuits for 120/240 VAC, 1-Phase, 3-Wire system shall be Phase A – Black, Phase B – Red, Neutral – White, and Ground – Green.

Item AR108108, 1/C #8 5KV UG Cable shall be one conductor No. 8 AWG, 5,000-Volt, FAA L-824, Type C, stranded copper cable.

Item AR108158, 1/C #8 5KV UG Cable in UD shall be one conductor No. 8, 5,000-Volt, FAA L-824, Type C, stranded, in unit duct (3/4-inch) or 3/4-inch Schedule 40 or SDR 13.5 HDPE (High Density Polyethylene) duct. HDPE duct shall be Schedule 40 (minimum wall thickness), conforming to NEMA Standard TC-7 and UL 651B, or HDPE SDR 13.5 (minimum wall thickness) manufactured in accordance with ASTM D-3350 (Specification of Polyethylene Plastics Pipe and Fittings Materials) and ASTM F2160

(Standard Specification for Solid Wall, High-Density Polyethylene Conduit Based on Controlled Outside Diameter). Conduits shall be suitable for direct burial in earth and/or concrete encasement.

Item AU108088, 1C #8 XLP-USE shall consist of #8 AWG, XLP-USE, 600 Volt cable or #8 AWG, FAA L-824, Type C, 5,000 Volt or 600 Volt cables. Conductor insulation for 240 VAC, 1 phase, 2-wire with ground circuits shall be color-coded: Phase A – Black, Phase B – Red, and Ground – Green.

108-2.4 CABLE CONNECTIONS. Add the following to this section:

"The Contractor will use a cable stripper/penciller whenever cable connections are made.

All below grade splices shall be installed in splice cans, handholes, or manholes. Splice cans shall be L-867, Class IA, Size B (12 in. diameter), 24 in. deep, with ½ in. thick, galvanized steel cover and stainless-steel bolts. Larger-sized splice cans shall be provided, as applicable, for specific equipment applications or manufacturer's recommendations, and/or where detailed on the Plans. Splice cans located in areas subject to heavy aircraft or vehicle loading shall be L-868 type. The Engineer shall approve all splice locations before work commences. The furnishing and installing of splice cans for new homerun cables shall be incidental to the respective cable pay item, and no additional compensation will be allowed."

108-2.5 RESERVED. Revise 108-2.5 as follows to comply with the requirements of FAA Advisory Circular Number 150/5370-10H Standards for Specifying Construction of Airports, Item L-108 Underground Power Cable for Airports:

"108-2.5 SPLICER QUALIFICATIONS. Every airfield lighting cable splicer shall be qualified in making cable splices and terminations on cables rated at and/or above 5000 Volts AC. The Contractor shall submit to the Project Engineer proof of the qualifications of each proposed cable splicer for the 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."

108-2.13 UNIT DUCT. Add the following:

"Unit duct shall be HDPE (High Density Polyethylene) duct. HDPE duct shall be Schedule 40 (minimum wall thickness), conforming to NEMA Standard TC-7 and UL 651B, or HDPE SDR 13.5 (minimum wall thickness) manufactured in accordance with ASTM D-3350 (Specification of Polyethylene Plastics Pipe and Fittings Materials) and ASTM F2160 (Standard Specification for Solid Wall, High-Density Polyethylene Conduit Based on Controlled Outside Diameter). Conduits shall be suitable for direct burial in earth and/or concrete encasement."

CONSTRUCTION METHODS

108-3.1 GENERAL. Add the following to this section:

"Keep all work, power outages, and/or shut down of existing systems coordinated with the Airport Director/Manager and the Resident Engineer. Any shutdown of existing systems shall be scheduled with and approved by the Airport Director/Manager prior to shutdown. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow U.S. Department of Labor Occupational Safety & Health Administration (OSHA) 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures including, but not limited to, 29 CFR section 1910.147 The Control of Hazardous Energy (lockout/tagout).

Examine the site to determine the extent of the work. Contractor shall field verify existing site conditions.

Verify respective circuits and power sources prior to removing, disconnecting, relocating, installing, connecting, or working on the respective airfield lighting, taxi sign, NAVAID, or other device. Identify each respective circuit prior to performing work on that circuit.

If the Contractor wishes to lay cable on a line other than that shown on the Plans, he shall obtain approval of the Project Engineer of record before doing so and coordinate with the Resident Engineer. Any additional cable needed because of such a change will be at the Contractor's expense.

New airfield lighting series circuit cables shall be installed a minimum of 18 inches below grade to comply with NEC 300.5 Underground Installations. Deeper depths might be required to avoid obstructions, or where detailed herein.

Locate and identify all existing underground utilities located within the area where the proposed cables are being installed and take all precautions to protect these utilities from damage. Care shall be taken so as not to damage any existing circuits. Any existing circuits damaged shall be immediately repaired to the satisfaction of the Engineer and/or the respective utility or owner where applicable. Any underground utility damaged will be repaired or replaced at the Contractor's own expense. Any repairs of existing cables will be considered incidental to the contract, and no additional compensation will be allowed.

In areas where there is a congestion of buried cables or where the proposed cable crosses an existing cable, the Contractor will be required to hand dig and/or carefully excavate the trench necessary for the proposed cable. At other locations, the proposed cable in unit duct, or conduit may be trenched or plowed into place. Hand digging, trenching, and/or plowing will be considered incidental to the proposed cables and no additional compensation will be allowed.

Grounding work and modifications shall not be performed during a thunderstorm or when a thunderstorm is predicted in the area. Grounding for airfield lights and taxi signs shall be as detailed on the Plans and as specified herein.

Homerun cables for a respective circuit that are installed in conduit or duct shall be run together in the same raceway or duct.

The respective personnel performing airfield lighting work, vault work, and/or test shall be familiar with, and qualified to work on 5000 Volt airfield lighting series circuits, constant current regulators and associated airport electrical vault equipment.

FAA requires that every airfield lighting cable splicer shall be qualified in making cable splices and terminations on cables rated at and/or above 5000 Volts AC and shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

Only cable in unit duct may be plowed or directional-bored.

Obey and comply with the applicable requirements of NFPA 70E – Standard for Electrical Safety in the Workplace.

The Contractor shall comply with the requirements of FAA AC No. 150/5370-2 (current issue in effect) “OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION”.

In the event a conflict is determined with respect to manufacturer installation instructions, National Electrical Code, and/or the Contract Documents, contact the Project Engineer for further direction.

Secure, identify and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources in conformance with the requirements of FAA AC 150/5370-2G, Part 2.18.3 “Lighting and Visual NAVAIDs”. All temporary installations shall comply with National Electrical Code Article 590 – “Temporary Installations.”

Existing ducts and cables associated with removal work shall be abandoned in place unless it conflicts with the installation of the airfield light, sign, duct, cable, handhole, manhole, site work, pavement, or other work, then it shall be disconnected, removed, and disposed of off the site at no additional cost to the Contract. Contractor may remove abandoned cables at no additional cost to the Contract and shall have the salvage rights to abandoned cables.

Other construction projects might be in progress on the Airport at the same time as this project. The Contractor will be required to cooperate with all other contractors and the Airport Director/Manager in the coordination of the work.

Relocation of existing cables and/or cable in unit duct will require careful excavation of the cables to prevent damage to them. The cables and/or cable in unit duct shall be excavated and exposed and then relocated to a different depth and/or route to accommodate the respective site work.

The cable quantities as shown on the Construction plans are based on straight-line measurement. All other cable lengths, such as slack or waste, will not be measured for payment.

All cables installed by the Contractor shall be properly labeled and tagged at all points of access (handholes, manholes, terminal panels, control panels, and the respective wireway in the vault).

All changes to the airfield lighting system shall be documented by the Contractor and provided to the Resident Engineer."

108 3.2 INSTALLATION IN DUCT OR CONDUIT. Add the following to this section:

"The unit duct will be run continuous through ducts and conduits that do not terminate in junction structures, handholes, or manholes.

Where cable in unit duct enters a handhole or manhole with a continuous duct bank system to the termination point (such as from a handhole to the vault or between junction cans, handholes and/or manholes) the unit duct will not be required for the respective cable."

108-3.3 TRENCHING. Add the following to this section:

"F. Cable installed in cultivated fields shall be installed at a minimum of 42 in. below grade.

G. Any and all trenches will be backfilled to a smooth grade to the satisfaction of the Engineer. All trench settlements shall be corrected for a period of one year. Restoration, grading, and seeding of areas disturbed during the installation of the proposed cable will be incidental to the respective 108 Pay Item."

108-3.5 SPLICING. Add the following:

"In-line connections for existing 600 Volt cables cut during construction shall be repaired with a cast splice kit. cast splice kit. The Contractor shall have a minimum of ten splice kits for each type of splice, on the job site always for emergency repairs. Cast splice kits shall be as specified in paragraph (a) of Item 108-2.4.

In-line connections for existing 5,000 Volt series circuit cables cut during construction shall be repaired with an FAA approved L-823 connector kit properly sized for the respective cables. The Contractor shall have a minimum of ten splice kits for each type of splice, on the job site at all times for emergency repairs. FAA approved L-823 connector kits shall be as specified in paragraph (b) of Item 108-2.4. **Note the Effingham County Airport has 6.6 Amp series circuits with #8 AWG FAA L-824, 5000 Volt cable.**

Splice cans shall be provided for existing cables cut and repaired for each splice in cables not to be abandoned. Where a splice can is not readily available at the time of the cable damage, splice markers shall be temporarily installed over each splice in cables not to be abandoned, then these splices shall later be replaced with new splices in an L-867 splice can. Costs associated with splice cans for accidental cable cuts caused by the Contractor, repairs and/or shortages of cables will be the responsibility of the Contractor and no additional compensation will be allowed.

There shall be no splices between series lighting circuit isolation transformers. In the event that a series lighting circuit cable is cut between isolation transformers, the entire length of cable between these isolation transformers shall be replaced, at the Contractor's own expense.

The Contractor shall use a cable stripper/penciller whenever cable connections are made.

All splices and connections will be considered incidental to the respective cable."

108-3.8 TESTING. Add the following.

K. Prior to beginning airfield lighting modifications, cable installation, and/or any other work that might possibly affect airfield lighting circuits, all existing series circuit cables shall be Megger tested and recorded at the vault. All existing series circuit cable loops shall have the resistance tested and recorded for each circuit at the vault. Each constant current regulator shall be tested with results recorded. Copies of test results shall be provided to the Resident Engineer and the respective Project Engineer within 5 business days of conducting the respective set of tests. See the testing forms in Appendix A. **These tests are required to protect the Owner and the Contractor and to identify existing conditions and any defective cables, circuits, and/or constant current regulators. Failure to comply with this requirement might result in the Contractor being responsible for defective cable and circuit conditions (where previously not identified) and the associated corrective work at no additional cost to the Contract. The Contractor is responsible to perform the tests, record the test results and submit the test results to the Engineer of Record.**

L. After airfield lighting modifications, additions, and/or upgrades have been completed, series circuit cables shall be Megger tested and recorded at the vault. All series circuit cable loops shall have the resistance tested and recorded for each circuit at the vault. Each constant current regulator shall be tested with results recorded. Copies of test results shall be provided to the Resident Engineer and the respective Project Engineer within 5 business days of conducting the respective set of tests. See the testing forms in Appendix A. **The Contractor is responsible to perform the tests, record the test results and submit the test results to the Engineer of Record.**

M. Insulation resistance testing equipment for use with 5,000 Volt series circuit cables shall use an insulation resistance tester capable of testing the cables at 5,000 Volts. Older series circuit cables and/or cables in poor condition may require the test voltage to be performed at a voltage lower than 5,000 Volts (Example 1,000 Volts, 500 Volts, or less than 500 Volts). The respective test voltage shall be recorded for each cable insulation resistance test result.

N. Insulation resistance testing equipment for use with 600 Volt rated cables shall use a 500 Volt insulation resistance tester. The respective test voltage shall be recorded for each cable insulation resistance test result.

O. It is recommended to use the same insulation resistance test equipment throughout the project to ensure reliable comparative readings at the beginning of the project and at the completion of the project.

P. Disconnect the airfield lighting series circuit cables from the constant current regulator when performing cable insulation resistance tests (Megger Tests). Test the cables that go to the airfield for the respective airfield lighting series circuit. Connect the cable insulation resistance tester to one of the airfield lighting series circuit cables and to a good ground in the airport electrical vault such as the airport vault ground bus. Conduct the cable insulation resistance test on each respective cable for not less than 90 seconds. Record the test results at the end of the time duration for the test.

Q. FAA Advisory Circular 150/5340-26C Maintenance of Airport Visual Aid Facilities provides guidance on Insulation Resistance Tests. Also refer to the user manual for the respective cable insulation resistance tester. Reasonably new series circuit cables and transformers with good connections should read 500 Mega-Ohms to 1,000 Mega-Ohms or higher. The readings should decrease with age. The resistance value declines over the service life of the circuit; a 10-20 percent decline per year may be considered normal. A yearly decline of 50 percent (4 percent monthly) or greater indicates the existence of a problem, such as a high resistance ground, serious deterioration of the circuit insulation, lightning damage, bad connections, bad splices, cable insulation damage, or other failure. FAA Advisory Circular 150/5340-26C notes *"Generally speaking, any circuit that measures less than 1 megohm is certainly destined for rapid failure."* Airfield lighting series circuits with cable insulation readings of less than 1 megohm are not uncommon for older circuits that are 20 years or more of age.

R. Based on information in FAA AC No. 150/5340-26C Maintenance of Airport Visual Aid Facilities, the cable insulation resistance value inevitably declines of the service life of the circuit; a 10-20 percent decline per year may be considered normal. In the event that the cable insulation resistance readings have declined more than 2 percent per month it might indicate cable damage due to lightning or damage as a result of Contractor operations. Where the cable insulation resistance readings have declined more than 2 percent per month over the project construction duration as a result of Contractor operations, Contractor will need to investigate, address, and repair the respective cable circuits.

S. All existing series circuit cable loops shall also have the resistance measured with an Ohmmeter and recorded for each circuit at the vault. The resistance of the series circuit loop with connections using #8 AWG copper conductor should be approximately 0.8 to 1 Ohm per thousand feet of cable length. The resistance of the series circuit loop with connections using #6 AWG copper conductor should be approximately 0.5 to 0.7 Ohm per thousand feet of cable length. The number of series circuit transformers and connections will affect the overall resistance of the series circuit loop and therefore the measurements might be slightly higher than the calculated resistance for the respective length of cable.

T. The Contractor is responsible to employ qualified personnel that are capable of properly conducting the required tests to the satisfaction of the Project Engineer. Tests that provide unsatisfactory results shall be reviewed to determine the possible cause of

unsatisfactory results, corrections shall be made, and the tests shall be conducted again."

Add the following:

108-3.12 LOCATING OF EXISTING UNDERGROUND UTILITIES AND CABLES. The location, size, and type of material of existing underground and/or aboveground utilities indicated on the Plans are not represented as being accurate, sufficient, or complete. Neither the Owner nor the Engineer assumes any responsibility whatsoever in respect to the accuracy, completeness, or sufficiency of the information. There is no guarantee, either expressed or implied, that the locations, size, and type of material of existing underground utilities indicated are representative of those to be encountered in the construction. It shall be the Contractor's responsibility to determine the actual location of all such facilities, including service connections to underground utilities. Prior to construction, the Contractor shall notify the utility companies of his operational plans, and shall obtain, from the respective utility companies, detailed information and assistance relative to the location of their facilities and the working schedule of the companies for removal or adjustment, where required. In the event an unexpected utility interference is encountered during construction, the Contractor shall immediately notify the utility company of jurisdiction. The Owner's Representative and/or the Resident Engineer/Technician shall also be immediately notified. Any damage to such mains and services shall be restored to service at once and paid for by the Contractor at no additional cost to the Contract.

All utility cables and lines shall be located by the respective utility. **Contact JULIE (Joint Utility Location Information for Excavators) for utility information, phone: 1-800-892-0123.** Contact the FAA (Federal Aviation Administration) for assistance in locating FAA cables and utilities. Location of FAA power, control, and communication cables shall be coordinated with and/or located by the FAA. Also contact Airport Director/Manager and Airport Personnel for assistance in locating underground Airport cables and/or utilities. Also coordinate work with all aboveground utilities.

Payment for locating and marking underground utilities and cables will not be paid for separately, but shall be considered incidental to the plowing/trenching/boring of cable and cable in unit duct.

108-3.13 SEPARATION OF HIGH-VOLTAGE AND LOW-VOLTAGE WIRING. High-voltage circuit wiring (airfield lighting 5000 Volt series circuits and/or other circuits rated above 600 Volts) and low-voltage circuit wiring (rated 600 Volts and below) shall maintain separation from each other. High-voltage wiring and low-voltage wiring shall not be installed in the same wireway, conduit, duct, raceway, handhole, or junction box. Where necessary provide split flexible duct around low voltage cables located in a handhole with high voltage cables, to isolate the cables from possible contact with each other.

108-3.14 IDENTIFICATION OF CABLES. At electrical handholes and manholes, identify and label each cable originating in the vault with respect to the system or device served. Provide identification tags rated suitable for the respective locations with permanent markings.

METHOD OF MEASUREMENT

108-4.1. Add the following:

"The footage of cable and/or cable in unit duct installed in duct, conduit, or raceway to be paid for shall be the number of linear feet of cable installed in duct, conduit, or raceway measured in place by direct measurement, completed, ready for operation and accepted as satisfactory with no allowance being made for overrun due to slack, turns, splices, etc. Slack cable required to perform cable splices outside of the respective splice cans, handholes, or manholes, shall be incidental to the respective cable pay item and no additional measurement for payment will be made. Coring and interface to handholes, manholes, or junction structures shall be incidental to the respective cable pay item and no additional measurement for payment will be made. The relocation, interface, and/or adjustment of existing cable and/or cable in unit duct will be considered incidental to the work for which it is required, and no additional compensation will be allowed. Cable will be measured for payment from the respective termination or splice point in the field up to the vault or respective termination point.

Trenching including the excavation, backfill, dewatering and restoration shall not be measured for payment, but shall be considered incidental to the respective cable pay item for which it is required.

All lockout/tagout procedures to ensure and maintain safety of personnel will be considered incidental to the respective item of work for which it applies, and no additional compensation will be allowed.

All cable and constant current regulator testing will be considered incidental to the respective item for which it is required."

BASIS OF PAYMENT

108-5.1. Add the following:

"Payment will be made at the contract unit price per lin. ft. of cable completed and accepted by the Resident Engineer. This price shall be full compensation for furnishing all materials, and for all preparation, assembly, and installation of these materials; for all plowing, trenching, directional-boring, coring and/or interface of manholes, handholes or junction boxes, installation in ducts, raceways, conduits, splice cans, handholes, or manholes, and for all excavation and backfilling; for all site restoration (topsoiling, grading, seeding, mulching) and pavement restoration; and for all labor, equipment, tools, testing, and incidentals necessary to complete this Item.

Payment will be made under:

Item AR108108	1/C #8 5KV UG Cable - per FOOT
Item AS108108	1/C #8 5KV UG Cable - per FOOT
Item AS108158	1/C #8 5KV UG Cable in UD - per FOOT
Item AU108088	1/C #8 XLP-USE – per FOOT."

END OF ITEM 108

ITEM 109 – AIRPORT TRANSFORMER VAULT AND VAULT EQUIPMENT

DESCRIPTION

109-1.1. Add the following:

"Installation of Equipment within existing vault in Place" shall consist of furnishing and installing electrical equipment and materials inside the vault as detailed on the Plans and specified herein. This item shall include all labor, materials, transportation, equipment, wiring, raceways, grounding, warranties, tools, coordination, removals, relocations, operational instructions, labeling, testing, and all incidentals required to place the vault and associated equipment into proper working order as a completed unit to the satisfaction of the Owner and Resident Engineer.

Included under this item shall be the following:

A. Field verification of existing site conditions to determine the complexity of the proposed work.

B. Coordinating all work with the Airport Director/Manager and/or designated Airport Maintenance Staff, the respective FAA personnel, and the Resident Engineer.

C. Furnishing and installing all associated electrical equipment, materials, and support hardware in the vault as detailed on the Plans and specified herein.

D. Furnishing and installing all raceways, conduits, pull boxes, and ducts in, beneath, and adjacent to the vault. Conduits and ducts from the vault to handholes or junction structures near the vault will be included with this item.

E. Furnishing and installing all necessary cables and wiring at the vault as detailed on the Plans and specified herein.

F. Furnishing and installing all grounding and surge protection as detailed on the Plans and specified herein.

G. Locating, identifying, relocating, and/or replacing existing airfield lighting cables, power cables, and/or control wiring, as necessary to disconnect these respective cables and wiring from the existing equipment and reconnect, replace and/or interface these respective cables to the new or relocated equipment. All work shall be coordinated with the Airport Director/Manager and shall be coordinated to minimize down time to the respective airfield systems.

H. Removal and/or relocation of existing equipment and/or materials.

I. Furnishing and installing lockout/tagout kits and following lockout/tagout procedures for safety of personnel.

J. Furnishing and installing new series circuit cutouts for the respective airfield lighting circuits.

K. Furnishing and installing UL listed fire stop material at each series plug cutout enclosure conduit entry and exit.

L. Furnishing shop drawings for new equipment and materials.

M. Testing, adjusting, and retesting, where applicable, all new equipment and modifications to existing systems for proper operation.

N. Labeling all electrical equipment and incidentals necessary to place all of the equipment in operation as a complete unit acceptable to the Owner and Resident Engineer.

O. Furnishing operation, maintenance, and installation manuals for all new equipment.

Add the following:

109-1.2. Item AR800564 “Cable and CCR (Constant Current Regulator) Testing and Calibration” shall consist of testing the airfield lighting systems and the associated cable tests, constant current regulator tests and calibration.

Included under this item shall be the following:

A. Field verification of existing site conditions to determine the complexity of the proposed work.

B. Coordinating all work with the Airport Director and/or designated Airport Maintenance Staff, the respective FAA personnel and the Resident Engineer.

C. Furnishing and installing lockout/tagout kits and following lockout/tagout procedures for safety of personnel.

D. Furnishing and installing UL listed fire stop material at each series plug cutout enclosure conduit entry and exit.

E. Testing, adjusting, and retesting, where applicable, respective equipment and modifications to existing systems for proper operation.

F. Submitting test reports to the Resident Engineer and the Project Engineer of Record.

109-1.3 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. Note: where FAA Advisory Circulars are referenced, they shall be the current issue or issues in effect.

A. ASTM A706, Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.

B. ANSI/ICEA S-85-625, Standard for Telecommunications Cable Aircore, Polyolefin Insulated, Copper Conductor Technical Requirements.

C. FAA AC 150/5340-26, “MAINTENANCE OF AIRPORT VISUAL AID FACILITIES”.

D. FAA AC 150/5340-30, “DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS”.

E. FAA AC 150/5345-7, “SPECIFICATION FOR L-824 UNDERGROUND ELECTRICAL CABLE FOR AIRPORT LIGHTING CIRCUITS”.

F. FAA AC No. 150/5345-10 (current issues in effect) “SPECIFICATION FOR CONSTANT CURRENT REGULATORS AND REGULATOR MONITORS”.

G. FAA AC No. 150/5345-49 (current issue in effect) “SPECIFICATION L-854 RADIO CONTROL EQUIPMENT”.

H. FAA AC 150/5345-53, “AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM”.

I. FAA AC 150/5370-2, “OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION”.

J. FAA STD-019f, Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment.

K. Federal Specification A-A-59544, Cable and Wire, Electrical (Power, Fixed Installation).

L. Federal Specification A-A-55809, Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic.

M. IEEE 1584, Guide for Performing Arc-Flash Hazard Calculations.

N. NFPA 70 – National Electrical Code (most current issue in force).

O. NFPA 70E – Standard for Electrical Safety in the Workplace.

P. NFPA 780 – Standard for the Installation of Lightning Protection Systems.

Q. NFPA 2638645-1 = National Fire Protection Association IDN.

R. OSHA 29 CFR Part 1910, Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures.

S. UL Standard 6, Electrical Rigid Metal Conduit – Steel.

T. UL Standard 514B, Conduit, Tubing, and Cable Fittings.

U. UL Standard 44, Thermoset-Insulated Wires and Cables.

V. UL Standard 83, Thermoplastic-Insulated Wires and Cables.

W. UL Standard 467, Grounding and Bonding Equipment.

X. UL Standard 486A-486B, Wire Connectors.

Y. UL Standard 514C, Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers.

Z. UL Standard 651, Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings.

AA.UL Standard 651A, Type EB and A Rigid PVC Conduit and HDPE Conduit.

BB.UL Standard 854, Service Entrance Cables.

EQUIPMENT AND MATERIALS

VAULT OR PREFABRICATED METAL HOUSING

109-2.18 FAA-APPROVED EQUIPMENT. Add the following:

"Proposed FAA approved equipment shall be as follows:

A. Constant Current Regulator for Taxiway "A". Constant Current Regulator for Taxiway "A" shall be a Type L-828 constant current regulator, Class 1 - 6.6 Amps output current, Style 1 - three brightness steps (4.8, 5.5, and 6.6-Amps), **7.5 KW**, **240 VAC,** single-phase, 60 Hertz input. Constant current regulator shall comply with FAA AC 150/5345-10G for Type L-828 regulator and shall be FAA Approved. Constant current regulator shall properly operate the respective airfield lighting system it is powering. Constant current regulator shall be suitable for use and capable of properly operating pulsing load such as two pair of L-849I(L) LED REILS. Constant current regulator must cause the minimum possible radiated or conducted electromagnetic interference (EMI) to airport and FAA Equipment (example; computers, radars, instrument landing systems, radio receivers, VHF Omni-directional Range, etc.) that may be located on or near an airport. Constant current regulator shall include open circuit protection, over current protection, output current ammeter, output voltmeter, and arresters of the proper rating to protect the CCR from lightning induced voltage and current surges installed at both the input and output terminals of the CCR. Constant current regulators shall also include a remote/local control feature with selections for "Remote, Off, 10% Brightness, 30% Brightness, and 100% Brightness". Control voltage shall be 120 VAC (internal/external). Constant current regulators shall be ADB Airfield Solution dry-type ferro-resonant regulator, Manairco, Inc. dry-type ferromagnetic reactor regulator, or approved equal. Include the following spare components:

    1. One spare control circuit board for each type in the constant current regulator
    2. Primary switch contactor
    3. Lightning arresters (input and two output)
    4. Control circuit fuses or breaker

Note the requirement for spare parts is based on FAA AC 150/5340-26C Maintenance of Airport Visual Aid Facilities, Part 5.2 Constant Current Regulators (CCRs) which notes the following in regard to a backup regulator and/or spare parts: "*Most constant current regulators manufactured today are reliable and reasonably trouble-free. However, do not be lulled into complacency when considering preventative maintenance of the vital components in the airport lighting electrical system. A regulator failure without a spare backup regulator or spare parts on hand can shut down a vital runway or taxiway indefinitely. Many times otherwise conscientious electricians have been surprised by a sudden failure or lack of spare parts for a piece of equipment. Unlike other elements of*

the electrical system that use commonly available parts, when a failure in a CCR, it is most likely that a printed circuit (PC) board will need to be replaced. The CCR manufacturer may not have replacement parts readily available."

109-2.19 OTHER ELECTRICAL EQUIPMENT. Add the following:

"Proposed electrical equipment and materials for the vault shall be as follows:

A. Type S-1 Series Plug Cutouts. Provide series plug cutouts for each constant current regulator as detailed on the Plans. Series plug cutouts shall be Type S-1, rated 5KV, 20-Amps, and shall comply with FAA AC 150/5340-30J. Cutouts shall be certified in writing by the manufacturer as suitable for the respective application. Cutouts shall disconnect the input from the output, short the input terminals, and short the output terminals when the handle/plug is removed. Series plug cutouts shall be Crouse-Hinds, Type S-1, Model 2, Catalog Number 30775, Manairco Catalog Number MRS1, or an approved equal. Series cutouts where the manufacturer has noted their cutouts are not recommended to operate with the handle pulled/removed are not acceptable. Other cutouts, that do not function as detailed on the Plans or that are not suitable for the respective application, are not acceptable. Install the series plug cutouts in a NEMA 1 or NEMA 12 painted steel enclosure adequately sized to house the cutout(s), with a hinged cover and back panel to mount the cutouts. All enclosures shall be pad lockable. Where existing cutout enclosures are used provide pad lock kits for each existing enclosure.

B. Circuit Breakers. Circuit breakers, to be installed in the existing vault panelboards, shall be compatible with the existing panelboard. Circuit breakers shall be bolt-on type with an amp interrupting capacity of 22,000 Amps minimum at 120/240 VAC, unless noted otherwise on the Plans. Circuit breaker amperage trip settings and number of poles shall be as detailed on the Plans.

C. Liquid-Tight Flexible Metal Conduit. Liquid-tight, flexible metal conduit shall consist of polyvinyl jacket over flexible hot dip galvanized steel tubing. The flexible conduit shall be completely sealed from liquids, dust, dirt, and fumes and be resistant to oil, gasoline, grease, and abrasion. Jacket shall also be sunlight resistant. Liquid-tight flexible metal conduit shall be UL-listed, suitable for use as a grounding conductor, and comply with Article 350 of the NEC. Liquid-tight flexible metal conduit and associated fittings shall be UL-listed to meet the requirements of NEC 350.6. Liquid-tight flexible metal conduit shall be Anaconda Sealtite Type UA as manufactured by Anamet Electrical Inc., Liquatite Type LA as manufactured by Electri-Flex Company, Liquid-Tuff Type LFMC as manufactured by Atkore International AFC Cable Systems or approved equal. Do not install liquid-tight, flexible metal conduit that is not UL listed. Confirm liquid-tight, flexible metal conduit bears the UL label prior to installation.

D. Lockout/Tagout Kit. Provide a Lockout Station suitable for wall mounting, with 10 lockout padlocks each with a different key, 5 lockout hasps to accommodate multiple padlocks, and 100 lockout tags. Lockout station and components shall comply with OSHA Standard 1910.147. Include hardware to mount on the vault interior wall.

E. Fire Barrier Moldable Material. Provide UL listed fire barrier moldable putty suitable for use with electrical box protection at electrical conduit penetrations. The fire stop material shall be designed to prevent the spread of fire, smoke and noxious gases. The fire stop material shall be pliable, conformable, and shapeable to accommodate the respective coverage and application. Fire stop material shall be manufactured by 3M, Hilti, or approved equal.

F. Pull Boxes. Junction and pull boxes shall be sized, as required for conductors and splices and per 2020 NEC Article 314. Boxes shall be UL-listed. Pull boxes shall be as detailed on the Plans. Exterior pull boxes (located in non-hazardous areas) shall be NEMA 4X stainless steel enclosures with hinger cover and pad lock feature, sized as detailed on the Plans and manufactured by Hoffman, E-Box, Saginaw Control & Engineering, or approved equal."

109-2.20 WIRE. Add the following to Section A. Control Circuits:

"THWN Wire. Cable shall comply with Underwriters' Laboratories Standard UL-83 and Federal Specification A-A-59544. The conductor shall be soft-annealed, uncoated Copper and shall comply with ASTM B3 and B8. Insulation shall be rated for 600-Volt. The insulation shall be polyvinyl-chloride conforming to Underwriters' Laboratories requirements for Type THW. The outer covering shall be nylon-conforming to Underwriters' Laboratories for type THHN or THWN. Cable shall be UL-listed and marked THWN."

Delete paragraphs 1, 2, and 3 under Section B. Power Circuits.

Add the following:

"Power Cable (600-Volt and Below). All power wiring, 600-Volt and below, shall be the type, size, and number of conductors as noted on the Plans.

THWN Wire. Cable shall comply with Underwriters' Laboratories Standard UL-83 and Federal Specification A-A-59544. The conductor shall be soft-annealed, uncoated Copper and shall comply with ASTM B3 and B8. Insulation shall be rated for 600-Volt. The insulation shall be polyvinyl-chloride conforming to Underwriters' Laboratories requirements for Type THW. The outer covering shall be nylon-conforming to Underwriters' Laboratories for type THHN or THWN. Cable shall be UL-listed and marked THWN-2. Power and control wiring shall be Type THWN-2 or approved equal. **Note where THWN wiring is referenced on the Plans, it shall be THWN-2.**

XHHW Wire. Cable shall be UL-listed as Type XHHW-2 per UL Standard 44. Cable shall also conform to ICEA S-95-658/NEMA WC70 and Federal Specification A-A-59544. Conductors shall be Class B stranded, annealed, uncoated Copper per UL Standard 44. Insulation shall be rated for 600-Volt. Insulation shall be cross-linked polyethylene complying with the physical and electrical requirements of UL Standard 44 for Type XHHW-2. XHHW wire may be used in place of THWN wire for all applications.

XLP-USE Wire. Cable shall comply with UL Standard 44, UL Standard 854, and Federal Specification A-A-59544. Conductor shall be concentric-strand, soft Copper, conforming to ASTM B8 and Underwriters' Laboratories Standard UL44 for Rubber-Insulated Wires. Insulation shall be rated for 600-Volts. Insulation shall be cross-linked polyethylene conforming to Underwriter's Laboratories Requirements for Type USE-2 insulation. Cable shall be UL-listed and marked USE-2.

Series Circuit 5000-Volt Cable. Cable for use with series circuit airfield lighting shall be FAA-L-824, Type C cable complying with Item 108. L-824 cable shall be FAA approved and listed in the current AC150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum. Cable furnished on this project shall comply with the requirements of the Airport Improvement Program Buy American Requirement and the "Buy American Act". Circuits for use with constant current regulator outputs (runway or taxiway lighting circuits) shall use 5000-Volt rated cable.

Grounding electrode conductors and/or bonding jumpers shall be the size and type, as detailed on the Plans. Ground wire for bonding constant current regulator housings, cutout enclosures, and other vault equipment frames to the vault ground bus shall be #6 AWG stranded Copper."

CONSTRUCTION METHODS

INSTALLATION OF EQUIPMENT IN VAULT OR PREFABRICATED METAL HOUSING

109-3.10 GENERAL. Add the following:

"The Contractor shall furnish and install all equipment and materials necessary for complete and operational installation of all vault equipment, as specified herein and as shown on the Plans. The complete installation and wiring shall be done in a neat, workmanlike manner. All electrical work shall comply with the requirements of NFPA 70 - National Electrical Code (NEC) most current issue in force, and all other applicable local codes, laws, ordinances, and requirements in force. Electrical equipment shall be installed in conformance with the respective manufacturer's directions and recommendations for the respective application. Any installations, which void the UL listing, Intertek Testing Services verification/ETL listing, (or other third-party listing) and/or the manufacturer's warranty of a device, will not be permitted.

A. Keep a copy of the latest NEC in force on site, always during construction for use as a reference. Contractor shall keep a copy of the Plans, Special Provision Specifications including any addenda, and copies of any change orders on site at all times during construction.

B. Examine the site to determine the extent of the work. Contractor shall field verify existing site conditions.

C. Verify respective circuits and power sources prior to removing, disconnecting, relocating, installing, connecting, or working on the respective service, feeder, branch circuit, airfield lighting system, Navaid, or other device.

D. Identify each respective circuit prior to performing work on that circuit.

E. New work shall be coordinated with the Airport Director/Manager and to minimize downtime to existing systems. Contractor shall coordinate work and any power outages with the Airport Director/Manager and the Resident Engineer. Any shutdown of existing systems shall be scheduled with and approved by the Airport Director/Manager prior to shutdown. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow U.S. Department of Labor Occupational Safety & Health Administration (OSHA) 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures including, but not limited to, 29 CFR section 1910.147 The Control of Hazardous Energy (lockout/tagout).

F. Locate Existing Underground Utilities and Cables. The location, size, and type of material of existing underground and/or aboveground utilities indicated on the Plans are not represented as being accurate, sufficient, or complete. Neither the Owner nor the Engineer assumes any responsibility whatsoever in respect to the accuracy, completeness, or sufficiency of the information. There is no guarantee, either expressed or implied, that the locations, size, and type of material of existing underground utilities indicated are representative of those to be encountered in the construction. It shall be the Contractor's responsibility to determine the actual location of all such facilities, including service connections to underground utilities. Prior to construction, the Contractor shall notify the utility companies of his operational plans, and shall obtain, from the respective utility companies, detailed information and assistance relative to the location of their facilities and the working schedule of the companies for removal or adjustment, where required. In the event an unexpected utility interference is encountered during construction, the Contractor shall immediately notify the utility company of jurisdiction. The Owner's Representative and/or the Resident Engineer shall also be immediately notified. Any damage to such mains and services shall be restored to service at once and paid for by the Contractor at no additional cost to the Contract. All utility cables and lines shall be located by the respective utility. **Contact JULIE (Joint Utility Location Information for Excavators) for utility information, phone: 1-800-892-0123.** Contact the FAA (Federal Aviation Administration) for assistance in locating FAA cables and utilities. Location of FAA power, control, and communication cables shall be coordinated with and/or located by the FAA. Also contact Airport Director/Manager and Airport Personnel for assistance in locating underground Airport cables and/or utilities. Also coordinate work with all aboveground utilities.

G. In areas where there is a congestion of buried cables or where the proposed duct, cable, or work crosses an existing cable, the Contractor will be required to hand dig and/or carefully excavate the trench necessary for the proposed duct, cable, or other work.

H. Grounding work and modifications shall not be performed during a thunderstorm or when a thunderstorm is predicted in the area.

I. Homerun cables for a respective circuit that are installed in conduit, duct, or raceway shall be run together in the same conduit, duct or raceway.

J. The respective personnel performing airfield lighting work, vault work, and/or tests shall be familiar with and qualified to work on 5000 Volt airfield lighting series circuits, constant current regulators, and associated airport electrical vault equipment.

K. Feeder circuit conductors, branch circuit conductors, power wiring, control wiring, airfield lighting series circuit conductors, and other wiring at the Vault shall be installed in conduit, duct, wireways, pull boxes, junction boxes, or raceways. No exposed power or control wiring will be permitted.

L. Obey and comply with the applicable requirements of NFPA 70E – Standard for Electrical Safety in the Workplace.

M. Other construction projects might be in progress on the Airport at the same time as this project. The Contractor will be required to cooperate with all other contractors and the Airport Director/Manager in the coordination of the work.

N. The Contractor shall comply with the requirements of FAA AC No. 150/5370-2G (or most current issue) “OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION”.

O. In the event a conflict is determined with respect to manufacturer installation instructions, National Electrical Code, and/or the Contract Documents, contact the Project Engineer for further direction.

P. Secure, identify, and place temporary exposed wiring in conduit, duct, or unit duct to prevent electrocution and fire ignition sources in conformance with the requirements of FAA AC 150/5370-2G, Part 2.18.3 “Lighting and Visual NAVAIDs”. All temporary installations shall comply with National Electrical Code Article 590 – “Temporary Installations”.

Q. Equipment installed by the Contractor shall be properly labeled, and all cables must be tagged.

R. Obtain approval from the Airport Director/Manager prior to shutting down a runway or taxiway. When a respective Runway is closed the respective runway lighting and NAVAIDS for the runway shall be shut off. Keep respective Navaids active during times when the runway is open. Navaids receiving maintenance shall be shut off until operating properly. When a respective taxiway is closed the respective taxiway lighting for that taxiway shall be shut off.

S. Record and document all changes to the airfield lighting system and provide this information to the Resident Engineer.”

109-3.11 POWER SUPPLY EQUIPMENT. Add the following to this section:

"Constant Current Regulators. Install constant current regulators in conformance with the manufacturer's recommendations, as detailed on the Plans and as specified herein. Maintain working clearances in front of constant current regulators per the requirements of NEC 110.26 and 110.34. Maintain clearance around constant current regulators for air flow and cooling per the respective manufacturer's recommendations. Confirm circuit breaker sizes for constant current regulators are sized in conformance with the respective manufacturer's recommendations and/or requirements and NEC. Where necessary to accommodate the respective constant current regulator input amperage requirements, circuit breakers, conductors, and conduits shall be adjusted (increased in size) to meet the manufacturer's recommendations and/or requirements and the NEC. Conduit connections to constant current regulators shall be with UL-listed, liquid-tight, flexible metal conduit. Include an external bonding jumper or internal equipment ground wire with each piece of liquid-tight, flexible metal conduit that is connected to a constant current regulator to comply with NEC 350.60. Maintain separation of high-voltage airfield lighting 5000 Volt series circuits from low-voltage circuit wiring (120 VAC, 208 VAC, 240 VAC, 480 VAC or other wiring rated 600 Volts and below). High-voltage wiring shall enter each respective regulator at the high-voltage/series circuit output section of the regulator. 208 VAC, 240 VAC, or 480 VAC input power wiring shall enter each respective regulator at the low-voltage/input power section of the regulator. Furnish and install control wiring, as detailed on the Plans. Control wiring shall enter each respective regulator at the control section of the regulator. Bond each constant current regulator enclosure frame, to the vault ground bus with a #6 AWG (minimum), bare-stranded, Copper-bonding jumper."

109-3.12 SWITCHGEAR AND PANELS. Add the following to this section:

A. Installation of Control Panels. Install control panels, as detailed on the Plans and in conformance with the respective panel manufacturer's requirements and/or recommendations.

B. Installation of S-1-Type Cutouts. Install plug cutouts in conformance with the manufacturer's recommendations, as detailed on the Plans and as specified herein. Provide NEMA 1 or NEMA 12 painted steel enclosures adequately sized for the cutouts and cables with hinged cover and back panel to mount the plug cutouts.

C. Installation of Circuit Breakers in Panelboards. Install circuit breakers in panelboards in conformance with the respective manufacturer's directions. Connect only one wire/cable to each breaker terminal. Update circuit directory to identify the respective device fed by each new circuit breaker.

D. Installation of Safety Switches. Safety switches shall be provided with appropriate mounting hardware and strut support. Strut support shall be hot-dipped, galvanized steel strut support, manufactured by Unistrut, B-Line, or approved equal. Provide zinc rich paint applied to field cuts of strut support to minimize the potential for corrosion per the respective strut support manufacturer's recommendation. All

hardware shall be corrosion resistant. Mount safety switches securely in accordance with the manufacturer's recommendations/instructions and as required for the respective application. Inspect all safety switches for proper operation, tight and secure connections, and correctness. All safety switch enclosures shall be bonded to ground with a ground lug or bar and ground wire. Field cut holes in safety switch enclosures to accommodate conduit entrances. Where safety switch enclosures are provided with concentric knockouts, and the respective conduit does not use the largest knockout, install a grounding bushing with ground wire connections between the bushing and the ground bus. Where safety switches enclosures are used for service entrance applications provide a grounding bushing with ground wire connections between the bushing and the ground bus at each metal conduit entry. Do not use safety switch enclosures for a splice box or for a pull box. Do not route control wires or other circuit wiring through a safety switch enclosure. Where splices are required or other control circuit wires are installed in the respective conduit to a safety switch, provide a separate junction box to accommodate the splices and/or other circuit conductors. Provide weatherproof, abrasion-resistant, engraved legend plates for each safety switch noting the device served, the power source, and the voltage system."

109-3.13 DUCT AND CONDUIT. Add the following to this section:

"A. Conduit shall be installed in accordance with the following:

1. All service, feeder, branch circuit, and control circuit conduits associated with the vault shall be galvanized rigid steel conduit as detailed on the Plans.

2. Schedule 40 PVC conduits shall be used for individual grounding electrode conductors and/or bonding jumpers.

3. Liquid-tight, flexible metal conduit shall be used as specified herein.

B. Conduit Runs:

1. All conduits shall be sized, as indicated on the Drawings, or if conduit sizes are not shown shall be in accordance with the NEC. All conduit systems shall be mechanically and electrically continuous from source of current to all outlets and grounded in accordance with the NEC.

2. Run all exposed conduit parallel to building walls using right angle bends. Exposed diagonal runs of conduit will not be permitted. Do not install conduit on roof surfaces unless specifically indicated on the Drawings.

3. Ream conduits after threads are cut. Cut ends square and butt solidly into couplings.

4. Prevent the accumulation of water, foreign matter, or concrete in the conduits during the execution of the work. Temporarily plug conduit, blowout, and swab before wires are pulled.

5. Fasten conduits to all sheet metal boxes and cabinets with two locknuts in accord with the NEC where insulated bushings are used and where bushings cannot be brought into firm contact with the metal enclosures; otherwise, use at least a single locknut and bushing.

6. Seal each underground joint and make water-tight.

7. Where building construction or other conditions make it impossible to use standard threaded couplings, install water-tight, threaded unions.

8. Make changes in direction of runs with symmetrical bends or cast-metal fittings. Make field-made bends and offsets with conduit bending machine to avoid changing the internal diameter of the conduit and not damage its protective coating either inside or outside. Individual bends shall not exceed 90 degrees, and not more than 270 degrees total bends will be allowed in any one conduit run. Where more bends are necessary, and conduit runs exceed 150 lin. ft., install a suitable pull box or junction box.

9. Provide empty conduits installed with a pull wire. Pull wire shall be No. 14 AWG, zinc-coated steel or of plastic having not less than 200 lb. tensile strength. Leave not less than 12 in. of slack at each end of the pull wire.

10. Use liquid-tight, flexible metal conduit for final connection to motors, constant current regulators, transformers, portable equipment, and for equipment subject to vibration and noise transmission. For each conduit size up to 1-in. trade size, flexible conduit shall be minimum length of 12 in. and a maximum length of 36 in. and for conduit sizes above 1-in. trade size, flexible conduit shall be minimum length of 20 in. and maximum length of 48 in. Liquid-tight flexible metal conduit and associated fitting shall be UL listed to meet the requirements of NEC 350.6. Liquid-tight flexible metal conduit that is used for flexibility (including connections to motors, constant current regulators, and transformers) shall require an external bonding jumper or internal equipment grounding conductor per NEC 350.60. Do not install liquid-tight flexible metal conduit that is not UL listed. Confirm liquid-tight flexible metal conduit bears the UL label prior to installation.

11. Provide duct seal at conduit terminations inside enclosures where the respective conduit is from below grade.

12. All enclosures rated NEMA 4, 4X shall have watertight hubs at conduit entrances UL listed NEMA 4, 4X for the respective enclosure to maintain the NEMA 4, 4X rating. Provide NEMA 4 hubs at conduit entrances for equipment rated NEMA 3R to maintain a watertight seal.

C. Raceway Support and Hangers:

1. Securely fasten raceways in-place and support from ceiling or walls at spacing not exceeding:

Material	Maximum Spacing of Supports
a. ½-in. through 1-in. trade size conduit	6 ft.
b. 1¼-in. through 1½-in. trade size conduit	8 ft.
c. 2-in. to 4-in. trade size conduit	10 ft.
d. Liquid-tight, flexible metal conduit	4½ ft.
e. Metal wireway	10 ft.

2. Support rigid conduits within 3 ft. of every outlet box, junction box, pull box, cabinet, or termination. Support flexible conduit within 12 in. on each side of every outlet box or fitting.

3. Support conduits by pipe straps, wall brackets, hangers, or ceiling trapeze. The use of perforated iron or wire for supporting conduits is prohibited. Fasten with wood screws or screw nails to wood; by toggle bolts on hollow masonry units, by concrete inserts, or expansion bolts on concrete or spring-tension or threaded C-clamps for rigid steel conduits on steel. Do not weld conduits or pipe straps to steel structures unless specifically indicated.

4. The load applied to fasteners shall not exceed one-third the proof test load of the fasteners.

5. Fasteners attached to concrete shall be vibration and shock-resistant.

6. All screws, bolts, washers, and miscellaneous hardware used for conduit supports shall be fabricated from rust-resisting metal. Trapeze hangers shall have hanger assemblies protected with galvanized finish."

109-3.15 WIRING AND CONNECTIONS. Add the following to this section.

"High-voltage circuit wiring (airfield lighting 5000 Volt series circuits and/or other circuits rated above 600 Volts) and low-voltage circuit wiring (rated 600 Volts and below) shall maintain separation from each other. High-voltage wiring and low-voltage wiring shall not be installed in the same wireway, conduit, duct, raceway, junction box, handhole, or manhole. Where necessary provide split flexible duct around low voltage cables located in a handhole with high voltage cables, to isolate the cables from possible contact with each other."

109-3.16 MARKING AND LABELING. Add the following to this section:

"C. Legend plates shall be provided for all equipment. Legend plates shall be provided to identify the equipment controlled, the power source, and the function of each device. Legend plates shall be weatherproof and abrasion-resistant

phenolic/plastic engraved material and fastened with contact type permanent adhesive, screws, or rivets. Installation shall not break, crack, or deform the legend plate. Lettering shall be ¼ in. high, black on a white background, unless noted otherwise.

D. Identify control wiring at each termination point and in junction/terminal boxes with wire number corresponding to the respective control wiring diagram or respective terminal numbering arrangement. Each individual control wire shall have unique identification and shall maintain that same identification from its point of origin to its final termination point. Wire markers shall be permanent pressure sensitive labels with suitable numbers or letters for easy recognition. Where new control wiring is interfaced to existing control wiring it shall also match the color coding of the existing control wiring."

E. Each constant current regulator shall be furnished with a phenolic-engraved legend plate that identifies the regulator number designation, the runway or taxiway served, and the power source and circuit number.

F. Each plug cutout cabinet shall be furnished with a phenolic-engraved legend plate that identifies the respective circuit or regulator and the voltage system (5000-Volts).

G. Each individual circuit breaker, control panel, terminal panel, safety switch, etc. shall be furnished with a phenolic-engraved legend plate that identifies the respective device, the power source, and the respective voltage, phase, and wire. Furnish additional phenolic-engraved legend plates as detailed on the Plans and/or where required by code.

H. At electrical handholes, identify each cable originating in the vault with respect to the system or device served.

I. Color-code phase and neutral conductor insulation for No. 6 AWG or smaller. Provide colored marking tape for phase and neutral conductors for No. 4 AWG and larger. **Insulated ground conductors shall have green colored insulation for all conductor sizes (AWG and/or KCMIL) to comply with NEC 250.119. Neutral conductors shall have white colored insulation for No. 6 AWG and smaller to meet the requirements of NEC 200.6.** Standard colors for power wiring and branch circuits shall be as follows:

120/240 VAC, 1-Phase, 3-Wire System	
Phase A	Black
Phase B	Red
Neutral	White
Ground	Green

J. Furnish and install weatherproof warning label for each meter socket, enclosed circuit breaker, disconnect switch, switchboard, cutout, panelboard, load center, motor control center, and control panel to warn persons of potential electric arc

flash hazards, per the requirements of NEC 110.16 “Flash Protection”. Labels shall also conform to ANSI Z535.4-2002 “American National Standard for Product Safety Signs and Labels”. NEC 110.16 requires that switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential arc flash hazards. The markings shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment. This new requirement is intended to help reduce the occurrence of serious injury or death due to arcing faults to those working on or near energized electrical equipment. The warning labels are to indicate to a qualified worker who intends to open the equipment for analysis of work that a serious hazard exists, and that the worker should follow appropriate work practices and wear appropriate personal protective equipment (PPE) for the specific hazard. Labels shall be as detailed on the Plans or shall include at least the following information: “Warning - Potential Arc-Flash Hazards exist while working on this energized equipment. Appropriate PPE Required.

K. Furnish and install “DANGER – HIGH VOLTAGE” signs or labels on all fixed electrical equipment where potentials of 500 Volts or more terminal-to-ground are exposed (including, but not limited to, constant current regulators, series circuit cutout enclosures, high voltage junction boxes, and high voltage wireways) in accordance with FAA AC No. 150/5340-26C “Maintenance of Airport Visual Aid Facilities” and National Electrical Code Article 300.45 “Warning Signs”. Place signs in a conspicuous location, usually on the outside of equipment.”

109-3.18 TESTING. Add the following:

“The installation shall be tested in operation and as a completed unit prior to acceptance. Contractor shall furnish all equipment, meters, instruments, cable connections, tools, manpower, and labor to perform the respective tests. Test all new equipment and all existing equipment where modifications take place and confirm proper operation. Coordinate tests with the respective airport personnel and the Resident Engineer/Resident Technician. Tests shall include resistance, voltage, and current reading, as applicable for the respective equipment. When tests disclose any unsatisfactory workmanship or equipment furnished under this contract, correct defects and retest. Repeat tests until satisfactory results are obtained. When any wiring or equipment is damaged by tests, the wiring or equipment shall be repaired or replaced at no additional cost to the contract. Test repaired or replaced items to ensure satisfactory operation. Submit three copies of all test reports to the Project Engineer. All test reports shall be assembled and bound in a folder or binder. Each test report shall include the following information:

- Project number,
- Project title and location,
- Device or system tested,
- Test performed,
- Date performed,

- Test equipment used,
- Respective Contractor's name, address, and telephone number,
- Testing firm's name, address, and telephone number if other than the Contractor,
- Names of individuals performing tests,
- Names of individuals observing tests,
- Statement verifying each test,
- Nameplate data from respective equipment tested,
- Test results, and
- Retest results after correction of defective components or systems (where applicable).

Add the following:

109-3.19 TESTING AIRFIELD LIGHTING SYSTEMS. Cable and constant current regulator testing and calibration shall include the following:

A. Follow safety procedures for all tests. Make sure each constant current regulator has a good and secured frame ground connection from the regulator housing to the respective vault ground bus and grounding electrode system, prior to operation and testing of each regulator.

B. Prior to beginning excavations, airfield lighting modifications, cable installation, and/or any other work that might possibly affect airfield lighting circuits, all existing series circuit cables shall be Megger tested with an insulation resistance tester and recorded at the respective vault. All existing series circuit cable loops shall have the resistance measured with an Ohmmeter and recorded for each circuit at the vault. Each constant current regulator shall be tested with results recorded. Contractor shall provide a True RMS Ammeter for current measurements. Copies of test results shall be provided to the Resident Engineer and the respective Project Engineer within five business days of conducting the respective set of tests. See the testing forms included in the Appendix. **These tests are required to protect the Owner and the Contractor and to identify existing conditions and any defective cables, circuits, and/or constant current regulators. Failure to comply with this requirement might result in the Contractor being responsible for defective cable and circuit conditions (where previously not identified) and the associated corrective work at no additional cost to the Contract. The Contractor is responsible to perform the tests, record the test results and submit the test results to the Engineer of Record.**

C. After airfield lighting modifications, additions, and/or upgrades have been completed, series circuit cables shall be Megger tested with an insulation resistance tester and recorded at the respective vault. All series circuit cable loops shall have the resistance measured with an Ohmmeter and recorded for each circuit at the respective vault. Each constant current regulator shall be tested with results recorded. Contractor shall provide a True RMS Ammeter for current measurements. Copies of test results shall be provided to the Resident Engineer and the respective Project Engineer within five business days of conducting the respective set of tests. See the testing forms included in the Appendix. **The Contractor is responsible to**

perform the tests, record the test results and submit the test results to the Engineer of Record.

D. Insulation resistance testing equipment for use with 5,000 Volt series circuit cables shall use an insulation resistance tester capable of testing the cables at 5,000 Volts. Older series circuit cables and/or cables in poor condition may require the test voltage to be performed at a voltage lower than 5,000 Volts (Example 1,000 Volts, 500 Volts, or less than 500 Volts). The respective test voltage shall be recorded for each cable insulation resistance test result.

E. Insulation resistance testing equipment for use with 600 Volt rated cables shall use a 500 Volt insulation resistance tester. The respective test voltage shall be recorded for each cable insulation resistance test result.

F. It is recommended to use the same insulation resistance test equipment throughout the project to ensure reliable comparative readings at the beginning of the project and at the completion of the project.

G. Disconnect the airfield lighting series circuit cables from the constant current regulator when performing cable insulation resistance tests (Megger Tests). Test the cables that go to the airfield for the respective airfield lighting series circuit. Connect the cable insulation resistance tester to one of the airfield lighting series circuit cables and to a good ground in the airport electrical vault such as the airport vault ground bus. Conduct the cable insulation resistance test on each respective cable for not less than 90 seconds. Record the test results at the end of the time duration for the test.

H. FAA Advisory Circular 150/5340-26C Maintenance of Airport Visual Aid Facilities provides guidance on Insulation Resistance Tests. Also refer to the user manual for the respective cable insulation resistance tester. Reasonably new series circuit cables and transformers with good connections should read 500 Mega-Ohms to 1,000 Mega-Ohms or higher. The readings should decrease with age. The resistance value declines over the service life of the circuit; a 10-20 percent decline per year may be considered normal. A yearly decline of 50 percent (4 percent monthly) or greater indicates the existence of a problem, such as a high resistance ground, serious deterioration of the circuit insulation, lightning damage, bad connections, bad splices, cable insulation damage, or other failure. FAA Advisory Circular 150/5340-26C notes "*Generally speaking, any circuit that measures less than 1 megohm is certainly destined for rapid failure."* Airfield lighting series circuits with cable insulation readings of less than 1 megohm are not uncommon for older circuits that are 20 years or more of age.

I. Based on information in FAA AC No. 150/5340-26C MAINTENANCE OF AIRPORT VISUAL AID FACILITIES, the cable insulation resistance value inevitably declines over the service life of the circuit; a 10-20 percent decline per year may be considered normal. In the event that the cable insulation resistance readings have declined more than 2 percent per month it might indicate cable damage due to lightning or damage as a result of Contractor operations. Where the cable insulation resistance readings have declined more than 2 percent per month over the project

construction duration as a result of Contractor operations, Contractor will need to investigate, address, and repair the respective cable circuits.

J. All existing series circuit cable loops shall also have the resistance measured with an Ohmmeter and recorded for each circuit at the vault. The resistance of the series circuit loop with connections using #8 AWG copper conductor should be approximately 0.8 to 1 Ohm per thousand feet of cable length. The resistance of the series circuit loop with connections using #6 AWG copper conductor should be approximately 0.5 to 0.7 Ohm per thousand feet of cable length. The number of series circuit transformers and connections will affect the overall resistance of the series circuit loop and therefore the measurements might be slightly higher than the calculated resistance for the respective length of cable.

K. When test results for constant current regulators indicate readings that are outside the acceptable tolerances calibrate and adjust the regulator to be within acceptable output current levels. Adjustments and calibrations shall be in accordance with the respective regulator manufacturer recommendations and instructions. Provide a true RMS Ammeter for measuring input and output currents on constant current regulators.

L. The respective personnel performing tests shall be familiar with the respective test equipment and the use and operation of the test equipment. The Contractor is responsible to employ the services of personnel qualified to perform the respective tests and qualified to work on 5000 Volt airfield lighting series circuits, constant current regulators, and associated airport electrical vault equipment. The Contractor is required to employ qualified personnel that are familiar with and capable of properly conducting the required tests and calibrations for the respective cables and equipment.

M. See Appendix A – “Cable and Constant Current Regulator Testing Forms” for additional information on testing requirements for airfield lighting systems. All testing will be considered incidental to the respective work items and no additional compensation will be allowed.

<u>109-3.20 LOCKOUT/TAGOUT PROCEDURES.</u> Lockout/Tagout Procedures shall include the following:

A. The Contractor shall provide a copy of their electrical energy source Lockout/Tagout Procedures document to the Airport Director/Manager, Resident Engineer and the Project Engineer. The Lockout/Tagout Procedures document shall include the contact information with 24-hour phone numbers for the Contractor and the Electrical Contractor Superintendent and/or the respective licensed Journeyman Electricians on the project site.

B. Contractor shall coordinate work and any power outages with the Airport Director/Manager and the Resident Engineer. Any shutdown of existing systems shall be scheduled with and approved by the Airport Director/Manager prior to shutdown. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow U.S.

Department of Labor Occupational Safety & Health Administration (OSHA) 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures including, but not limited to, 29 CFR section 1910.147 The Control of Hazardous Energy (lockout/tagout).

C. Where existing electrical equipment does not have features for lockout/tagout the Contractor will be responsible to provide the appropriate lockout/tagout equipment and measures to ensure the safety of personnel.

D. Contractor shall provide a Lockout Stations suitable for wall mounting, each with 10 lockout padlocks each with a different key, 5 lockout hasps to accommodate multiple padlocks, and 100 lockout tags. Lockout station and components shall comply with OSHA Standard 1910.147. Include hardware to mount on each vault interior wall.

E. Contractor shall comply with the applicable requirements of NFPA 70E – Standard for Electrical Safety in the Workplace.

F. Compliance with Lockout/Tagout Procedures and all other safety procedures and requirements are the responsibility of the Contractor.

109-3.21 GROUNDING REQUIREMENTS. Grounding shall conform to the following as applicable: The Contractor shall furnish and install all grounding shown on the Plans and/or as may be necessary or required to make a complete grounding system, as required by the latest NFPA 70 – National Electrical Code (NEC) in force. The reliability of the grounding system is dependent on careful, proper installation, and choice of materials. Improper preparation of surfaces to be joined to make an electrical path, loose joints, or corrosion can introduce impedance that will seriously impair the ability of the ground path to protect personnel and equipment and to absorb transients that can cause noise in communications circuits. The following functions are particularly important to ensure a reliable ground system:

A. All products associated with the grounding system shall be UL-listed and labeled.

B. All bolted or mechanical connections shall be coated with a corrosion preventative compound before joining Sanchem Inc. “NO-OX-ID “A-Special” compound, Burndy Penetrox E, or equal.

C. Metallic surfaces to be joined shall be prepared by the removal of all non-conductive material, per 2020 NEC Article 250-12. All copper bus bars must be cleaned prior to making connections to remove surface oxidation.

D. Metallic raceway fittings shall be made up tight to provide a permanent low impedance path for all circuits. Metal conduit terminations in enclosures shall be bonded to the enclosure with UL-listed fittings suitable for grounding. Provide grounding bushings with bonding jumpers for all metal conduits entering service equipment (meter base, CT cabinet, main service breaker enclosure, etc.), generator breaker enclosures, and automatic transfer switch enclosures. Provide grounding bushings with bonding jumpers for all metal conduits entering an enclosure through concentric or eccentric knockouts that are punched or otherwise formed so as to impair the electrical connection to ground. Standard locknuts or bushings shall not

be the sole means for bonding where a conduit enters an enclosure through a concentric or eccentric knockout.

E. Furnish and install ground rods and ground rings at all locations where shown on the Plans or specified herein. Ground rods shall be 3/4-in. diameter, 10 ft. long, UL-listed, stainless steel, unless detailed otherwise on the Plans. Longer ground rods shall be required where detailed on the Plans and/or as specified herein to accommodate respective soil conditions or respective applications. Ground rods shall have 10 mil minimum copper coating. The top of ground rods shall be a minimum of 12 inches below finish grade unless otherwise noted on the Plans. Ground rods shall be spaced, as detailed on the Plans, and in no case spaced less than one-rod length apart. All connections to ground rods and/or ground rings shall be made with exothermic weld type connectors, Cadweld by Erico Products, Inc., Thermoweld by Continental Industries, Inc., Ultraweld by Harger, or approved equal. Exothermic weld connections shall be installed in conformance with the respective manufacturer's directions using molds as required for each respective application. Bolted connections will not be permitted at ground rods or at buried grounding electrode conductors. Grounding electrode conductors shall be bare copper (stranded or solid) sized, as detailed on the Plans. In addition to the grounding work described herein and shown on the Plans, the Contractor shall test the made electrode ground system with an instrument specifically designed for testing ground systems. If ground resistance exceeds **25 Ohms**, contact the Project Engineer of Record for further direction. Copies of the ground system test results shall be furnished to the Resident Engineer and the Project Engineer of Record.

F. All connections located above grade, between the different types of grounding conductors shall be made using UL-listed, double-compression, crimp-type connectors or UL-listed, bolted ground connectors. For ground connections to enclosures, cases, and frames of electrical equipment not supplied with ground lugs, the Contractor shall drill required holes for mounting a bolted, ground connector. All bolted, ground connectors shall be Burndy, Dossert Corporation, ILSCO Corporation, Penn-Union Corporation, Thomas and Betts, or approved equal. Tighten connections to comply with tightening torques in UL Standard 486A to assure permanent and effective grounding.

G. All metal equipment enclosures, conduits, cabinets, boxes, receptacles, etc. shall be bonded to the respective grounding system. Provide grounding bushings at all conduits entering service entrance equipment (meter bases, service disconnects, service panelboards, etc.) and distribution panels or load centers and ground wire from bushing to ground bus in the respective service entrance equipment or distribution panel.

H. Each feeder circuit and/or branch circuit shall include an equipment ground wire. Metal raceways or conduit shall not meet this requirement. The equipment ground wire from equipment shall not be smaller than allowed by 2020 NEC Table 250-122 "Minimum Size Conductors or Grounding Raceway and Equipment." When conductors are adjusted in size to compensate for voltage drop, equipment-grounding conductors shall be adjusted proportionately according to circular mil area. All equipment ground wires shall be copper, either bare or insulated green in color.

Where the equipment grounding conductors are insulated, they shall be identified by the color green, and shall be the same insulation type as the phase conductors.

I. All utility transformer bank grounds shall be installed in accordance with the serving utility company's recommendation and in accordance with the NEC.

J. Bond the main electrical service neutral to ground at the main service disconnect. Bond the service neutral to ground at one location only per the NEC. A grounding connection shall not be made to any neutral circuit conductor on the load side of the service disconnecting means, except as permitted by 2020 NEC 250-24.

K. The secondary neutral of all transformers (separately derived system transformers) shall be grounded in accordance with the NEC. The respective grounding electrode conductor shall be connected to the neutral point of the transformer between the transformer and the output disconnecting means. Size of the grounding electrode conductor shall be in accordance with 2020 NEC Article 250-66 and Table 250-66 unless shown larger on the Drawings. A bond shall be provided between the neutral and transformer case, or other metal that is part of the AC equipment grounding system, so as to complete a circuit for fault current to the transformer winding from the AC equipment grounding system. The size of the neutral bonding conductor shall be in accordance with 2020 NEC Article 250-102.

L. All exterior metal conduit, where not electrically continuous because of manholes, handholes, non-metallic junction boxes, etc., shall be bonded to all other metal conduit in the respective duct run, and at each end, with a copper-bonding jumper sized in conformance with 2020 NEC 250-102. Where metal conduits terminate in an enclosure (such as a motor control center, switchboard, etc.) where there is not electrical continuity with the conduit and the respective enclosure, provide a bonding jumper from the respective enclosure ground bus to the conduit sized per 2020 NEC 250-102.

M. Where acceptable to the Authority of Jurisdiction, install grounding electrode conductors and/or individual ground conductors in Schedule 80 PVC conduit. Where grounding electrode conductors or individual ground conductors are run in PVC conduit, do not completely encircle conduit with ferrous and/or magnetic materials. Use non-metallic, reinforced fiberglass strut support, nylon bolts, and other nonferrous support hardware. Where metal conduit clamps are installed, use nylon bolts, nuts, washers, and spacers to interrupt a complete metallic path from encircling the conduit.

N. If local codes dictate that individual grounding conductors must be run in metal conduit or raceway, then the conduit or raceway must be bonded at each end of the run with a bonding jumper sized equal to the individual grounding conductor or as required by 2020 NEC 250-102 and/or 2020 NEC 250.64(E). Note: this does not apply to AC equipment ground conductors run with AC circuits. Confirm requirements with the Authority of Jurisdiction.

O. Grounding work affecting operations at a facility shall be coordinated with the Owner's Representative and to minimize downtime to existing systems. Contractor

shall coordinate work and any power outages with the Owner's Representative. Any shutdown of existing systems shall be scheduled with and approved by the Owner's Representative prior to shutdown. All power systems (AC or DC) shall have provisions to lockout and tagout any circuit to help ensure the circuit is safe to work on for protection of personnel. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow U.S. Department of Labor Occupational Safety & Health Administration (OSHA) 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures including, but not limited to, 29 CFR section 1910.147 The Control of Hazardous Energy (lockout/tagout). Where a facility does not have lockout/tagout kits the Contractor shall provide adequate quantities of lockout/tagout kits suitable for use with the respective equipment. Where existing electrical equipment does not have features for lockout/tagout the Contractor will be responsible for providing the appropriate lockout/tagout equipment and measures to ensure the safety of personnel. All padlocks for use with lockout/tagout procedures shall have a different key. Provide lockout hasps to accommodate multiple padlocks where multiple people are working on the same system. Include lockout tags for each piece of equipment requiring servicing and shutdown. Compliance with Lockout/Tagout Procedures and all other safety procedures and requirements are the responsibility of the respective personnel working at the facility.

P. Never remove, alter, or attempt to repair conductors or conduit systems providing grounding or electrical bonding for any electrical equipment until all power is removed from the equipment. Warn all personnel of the ungrounded condition of the equipment. Display appropriate warning signs, such as danger tags, to warn personnel of the possible hazards.

Q. Grounding work and modifications shall not be performed during a thunderstorm or when a thunderstorm is predicted in the area.

R. Per NFPA 70E Standard for Electrical Safety in the Workplace it defines Electrically Safe Work Condition as "A state in which an electrical conductor or circuit part has been disconnected from energized parts, locked/tagged in accordance with established standards, tested to verify the absence of voltage, and, if necessary, temporarily grounded for personnel protection." Prior to conducting tests or working on equipment, verify equipment enclosures and frames have a good and secure ground connection for the safety of personnel.

S. Where a conflict is determined with respect to grounding requirements per manufacturer installation instructions, National Electrical Code, and/or the Contract Documents, or there are other questions or concerns about the grounding requirements contact the Project Engineer of Record: Kevin Lightfoot for further directions. Safety of personnel is the top priority.

109-3.20 RESTORATION. All trenches and disturbed areas will be backfilled and restored to a smooth grade and seeded to the satisfaction of the Resident Engineer. All trench settlement or disturbed areas shall be corrected for a period of one year. Restoration, grading, and seeding of areas disturbed during the installation of the proposed vault work and/or vault removal work

will be incidental to the respective 109 Pay Item. The vault interior shall be cleaned to remove dust, dirt, debris, metal shavings, scrap materials, and waste materials. The Vault floor shall be swept and/or vacuumed to clean. The vault interior shall be cleaned and disinfected.

METHOD OF MEASUREMENT

109-4.3 Add the following:

"The quantity of vault equipment to be paid for under Item AR109200 "Install Electrical Equipment" shall be made on a lump sum basis wherein no measurement will be made and shall consist of furnishing and installing all electrical equipment and materials at the vault, as detailed on the Plans and specified herein. This item shall include all labor, materials, transportation, equipment, wiring, raceways, grounding, warranties, tools, coordination, relocations, lockout/tagout procedures, operational instructions, labeling, testing, cleaning, and all incidentals required to place the vault and associated equipment into proper working order.

All lockout/tagout procedures to ensure and maintain safety of personnel will be considered incidental to the respective item of work for which it applies, and no additional compensation will be allowed.

Removals, relocations, rewiring, and/or adjustments to existing equipment in the vault will be considered incidental to this item, and no additional compensation will be allowed.

Cables inside or at the Airport Electrical Vault Building will be considered incidental to this item, and no additional compensation will be allowed. Conduits inside, adjacent to, interfacing to, or at the Airport Electrical Vault Building will be considered incidental to this item, and no additional compensation will be allowed. Disconnecting and removing existing designated equipment and materials will be considered incidental to this item, and no additional compensation will be allowed. Relocation of existing equipment to storage will be considered incidental to this item, and no additional compensation will be allowed.

All cleaning of the vault interior will be considered incidental to this item, and no additional compensation will be allowed.

Add the following:

109-4.4. The quantity of 7.5 KW, Style 1 Constant Current Regulators to be paid for under Item AS109311; 7.5 KW Regulator, Style 1 shall be made on a per each basis shall consist of furnishing and installing the respective constant current regulator and all associated wiring, conduits, grounding, interface, and materials at the vault, as detailed on the Plans and specified herein. This item shall include all labor, materials, transportation, equipment, wiring, raceways, grounding, warranties, tools, coordination, relocations, removals, lockout/tagout procedures, operational instructions, labeling, testing, calibration, cleaning, and all incidentals required to place the constant current regulator into proper working order as necessary to complete this item.

Removals, relocations, rewiring, and/or adjustments to existing equipment in the vault will be considered incidental to this item, and no additional compensation will be allowed.

Cables inside or at the Airport Electrical Vault Building will be considered incidental to this item, and no additional compensation will be allowed. Conduits inside, adjacent to, interfacing to, or at the Airport Electrical Vault Building will be considered incidental to this item, and no additional compensation will be allowed.

Disconnecting and removing existing designated equipment and materials will be considered incidental to this item, and no additional compensation will be allowed. Relocation of existing equipment to storage will be considered incidental to this item, and no additional compensation will be allowed.

109-4.5. Testing the airfield lighting systems and the associated cable tests, constant current regulator tests and calibration will be paid for on a per lump sum basis and shall include all testing prior to beginning excavations, airfield lighting modifications, cable installation, and/or any other work that might possibly affect airfield lighting circuits and all testing after airfield lighting modifications, additions, and/or upgrades have been completed. Testing of the airfield lighting systems and the associated cable tests and constant current regulator tests and calibration shall include all labor, transportation, equipment, tools, and measuring devices; all coordination with the Airport Director/Manager, Airport Staff, FAA personnel, Contractor staff, and the Resident Engineer; all recording of the test results and submission of the test results to the Resident Engineer and the Project Engineer; all calibration and adjusting of constant current regulators where test results indicate regulator output currents that are not within accepted tolerances; all retesting where test results indicate unsatisfactory conditions or incorrect testing procedures; and all other incidentals necessary to complete this item. Based on the contract lump sum price for Cable and Constant Current Regulator Testing, partial payments will be allowed as follows:

A. Upon completion of all testing prior to beginning excavations, airfield lighting modifications, cable installation, and/or any other work that might possibly affect airfield lighting circuits, submission of testing results to the Resident Engineer and the Project Engineer, and acceptance of the testing results by the Project Engineer, 50 percent of the lump sum payment will be allowed.

B. Upon completion of all testing after airfield lighting modifications, additions, and/or upgrades have been completed, submission of testing results to the Resident Engineer and the Project Engineer, and acceptance of the testing results by the Project Engineer, the remaining 50 percent of the lump sum payment will be allowed.

BASIS OF PAYMENT

109-5.1 Add the following:

Payment will be made under:

Item AR109200	Install Electrical Equipment per L. SUM.
Item AS109311	7.5 KW Regulator, Style 1 per EACH.

Add the following:

109-5.2. "Payment for Cable and Constant Current Regulator Testing and Calibration will be made at the contract unit price per lump sum and shall include all labor, transportation, equipment, tools, and measuring devices; all coordination with the Airport Director/Manager, Airport Staff, FAA personnel, Contractor staff, and the Resident Engineer; calibration and adjusting constant current regulators; all recording of the test results and submission of the test results to the Resident Engineer and the Project Engineer; all retesting where test results indicate unsatisfactory conditions or incorrect testing procedures; and all other incidentals necessary to complete this item. Furnishing and installing lockout/tagout kits and the associated lockout/tagout procedures will be considered incidental to this item and no additional compensation will be made. Furnishing and installing UL listed fire stop material at each series plug cutout enclosure conduit entry and exit will be considered incidental to this item and no additional compensation will be made. Cleaning the vault interior will be considered incidental to this item and no additional compensation will be made.

Payment will be made under:

Item AR800564 Cable and CCR Testing and Calibration - per L. SUM."

END OF ITEM 109

ITEM 110 – AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS

DESCRIPTION

110-1.1 Add the following:

"This item of work shall consist of the installation of all proposed conduits and ducts as shown on the Construction Plans."

110-1.2 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. Note: where FAA Advisory Circulars are referenced, they shall be the current issue or issues in effect.

A. ANSI C80.1 – Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.4 – Fittings Rigid Metal Conduit and EMT.

C. ASTM A706 – Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement

D. ASTM D3350 – Specification of Polyethylene Plastics Pipe and Fittings Materials.

E. ASTM F2160 – Standard Specification for Solid Wall, High-Density Polyethylene Conduit Based on Controlled Outside Diameter.

F. FAA AC 150/5340-30, "DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS".

G. FAA AC 150/5345-53, "AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM".

H. FAA STD-019f, Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment.

I. NEMA TC-2 – Electrical Plastic Tubing and Conduit.

J. NEMA TC-3 – Fittings Rigid PVC Conduit and Tubing.

K. NEMA TC-7 – Smooth-Wall Coilable Polyethylene Electrical Plastic Conduit.

L. NFPA 70 – National Electrical Code (NEC), most current issue in force.

M. NFPA 70E – Standard for Electrical Safety in the Workplace.

N. NFPA 2638645-1 = National Fire Protection Association IDN.

O. OSHA 29 CFR Part 1910, Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures.

P. UL Standard 6 – Electrical Rigid Metal Conduit – Steel.

Q. UL Standard 514B – Conduit, Tubing and Cable Fittings.

R. UL Standard 514C – Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers.

S. UL Standard 1242 – Electrical Intermediate Metal Conduit Steel.

T. UL Standard 651 – Schedule 40 and 80 Rigid PVC Conduit.

U. UL Standard 651A – Type EB and A Rigid PVC Conduit and HDPE Conduit.

V. UL Standard 651B – Standard for Continuous Length High-Density Polyethylene (HDPE) Conduit.

110-1.3 SHOP DRAWINGS. The Contractor shall furnish shop drawings for approval before ordering equipment and/or materials. Shop drawings are required for each type of conduit or duct to be used on the project. **Shop drawings shall be clear and legible. Copies that are illegible will be rejected.** Shop drawings shall include the following information:

A. In order to expedite the shop drawing review, inspection and/or testing of materials and equipment, the Contractor shall furnish complete statements to the Project Engineer as to the origin and manufacturer of all materials and equipment to be used in the work. Such statements shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials and equipment.

B. Provide certification that steel products are manufactured in the USA from domestic steel to comply with the Steel Products Procurement Act (30 ILCS 565/)

C. Indicate the pay item number for each respective conduit or duct.

D. Shop drawings shall include conduit and/or duct cut sheets with type, size, specifications, UL listing, manufacturer, and catalog or part number.

E. Provide manufacturer's literature confirming the respective duct to be bored is suitable for directional boring with the respective Shop Drawing submittal.

F. Provide certification that the respective steel conduits used on this project are manufactured from 100 percent domestic steel.

EQUIPMENT AND MATERIALS

110-2.1 GENERAL. Add the following:

"All materials for these items shall be in accordance with the FAA Standard Specification 110 Equipment and Materials, as detailed on the Plans, and as specified herein.

A. Conduit for concrete encased duct shall be Schedule 40 (minimum) Polyvinyl Chloride (PVC) or Schedule 40 (minimum) High-Density Polyethylene (HDPE), sized as detailed on the Plans, and suitable for concrete encasement.

B. The duct to be directional-bored shall be, Schedule 40 PVC Conduit, Schedule 80 PVC Conduit or High-Density Polyethylene (HDPE) duct, (Schedule 40, Schedule 80, SDR 9, SDR 11, or SDR 13.5), and suitable for directional boring installation."

110-2.2 STEEL CONDUIT. Replace this section with the following:

"Rigid Steel Conduit and fittings shall be hot-dipped, galvanized, UL-listed, and produced in accordance with UL Standard 6 – Rigid Metal Conduit and ANSI C80.1 – Rigid Steel Conduit, Zinc Coated. Couplings, connectors, and fittings for rigid steel conduit shall be threaded, galvanized steel or galvanized, malleable iron, specifically designed and manufactured for the purpose. Fittings shall conform to ANSI C80.4 – Fittings Rigid Metal Conduit and EMT and UL 514B – Conduit, Tubing, and Cable Fittings. Set screw type fittings are not acceptable. Steel used to manufacture conduits shall be 100 percent domestic steel to comply with the Steel Products Procurement (30 ILCS 565/). Contractor shall provide certification that the respective steel conduits used on this project are manufactured from 100 percent domestic steel.

Miscellaneous Fittings. Fittings shall be suitable for use with conduits and ducts supplied. All fittings for use with rigid metal conduit shall be threaded. Set screw-type fittings are not acceptable. All conduit bodies, fittings, and boxes installed in classified hazardous locations (Class I, Division 1 or 2, Group D) shall be suitable for use in Class I, Division 1, and Group D locations. Fittings shall be manufactured by Appleton, Crouse-Hinds, Hubbell-Killark, O-Z/Gedney, or approved equal.

Provide NEMA 4, 4X hubs for all conduit entries into NEMA 4, 4X equipment enclosures to maintain the NEMA 4, 4X rating of the respective enclosure. Hubs for use with NEMA 4X stainless steel enclosures shall be NEMA 4X stainless steel hubs."

110-2.3 PLASTIC CONDUIT. Add the following to the end of this section:

"Conduits shall be suitable for underground applications encased in concrete or direct burial, and suitable for exposed applications aboveground.

C. Conduits for concrete encasement shall be Schedule 40 PVC, UL-listed, rated for 90°C cable, conforming to NEMA Standard TC-2 and UL 651, listed suitable for concrete encasement or Schedule 40 (minimum) HDPE conduit, UL-listed or ETL listed, conforming to NEMA Standard TC-7 and UL 651B and listed suitable for concrete encasement. Conduits shall be suitable for underground applications encased in concrete or direct burial, and suitable for exposed applications aboveground.

D. Conduits for directional boring shall be Schedule 40 PVC or Schedule 80 PVC conduit, UL-listed or ETL listed, rated for 90°C cable-conforming to NEMA Standard TC-2 and UL 651 and suitable for directional boring installation, Schedule 40 HDPE or Schedule 80 HDPE conduit, UL-listed, conforming to NEMA Standard TC-7 and UL 651B and suitable for directional boring installation, or Wall Type SDR 11 (minimum) HDPE conduit

manufactured in accordance with ASTM D-3350 (Specification of Polyethylene Plastics Pipe and Fittings Materials) and ASTM F2160 (Standard Specification for Solid Wall, High-Density Polyethylene Conduit Based on Controlled Outside Diameter), and suitable for directional boring installation. **Per NEC 300.5 (K), raceways installed using directional boring equipment shall be approved for the purpose. Provide manufacturer's literature confirming the respective duct is suitable for directional boring with the respective Shop Drawing submittal.**

E. Conduits for direct burial in earth shall be PVC Schedule 40 (minimum wall thickness), UL-listed, rated for 90°C cable-conforming to NEMA Standard TC-2 and UL 651, listed suitable for direct burial in earth, or HDPE Schedule 40 (minimum wall thickness), conforming to NEMA Standard TC-7 and UL 651B, or HDPE SDR 13.5 (minimum wall thickness) manufactured in accordance with ASTM D-3350 (Specification of Polyethylene Plastics Pipe and Fittings Materials) and ASTM F2160 (Standard Specification for Solid Wall, High-Density Polyethylene Conduit Based on Controlled Outside Diameter). Conduits shall be suitable for direct burial in earth and/or concrete encasement.

F. Conduit for Item AR110202 and Item AU110202; 2" PVC Conduit, Direct Bury shall be Schedule 40 PVC (minimum), UL-listed or ETL listed, rated for 90°C cable, conforming to NEMA Standard TC-2 and UL 651 or Schedule 40 (minimum) HDPE, UL-listed, conforming to NEMA Standard TC-7 and UL 651B. Conduits shall be suitable for underground applications direct burial in earth or concrete."

110-2.4 SPLIT CONDUIT. Add the following to this section:

"NON-METALLIC SPLIT DUCT. Non-metallic spilt duct shall be used to extend existing duct that contains cables and/or for protection of existing cables as detailed on the Plans. Non-metallic split duct shall be Schedule 40 PVC designed for use with power and control cable applications. Non-metallic split duct shall be suitable for direct burial in earth and concrete encasement and exhibit superior impact strength. Joints shall be sealed with corrosion-resistant tape and heavy-duty plastic straps as recommended by the split duct manufacturer for the application. Split duct sleeve couplings, duct sweeps, fittings, and accessories shall be by the same manufacturer to assure system integrity. Non-metallic split duct shall be manufactured by Prime Conduit, Inc., Carlon Electrical Products, Cantex Inc., or approved equal. 4-in. Schedule 40 split ducts shall be Carlon Part Number 49015SD, Cantex Part Number A52EAZS, or approved equal. Install split duct as detailed on the Plans and in conformance with manufacturer's recommendations for the respective application. Provide adapters, couplings, and fittings to accommodate interface to existing duct or conduit. Where split duct is to be concrete-encased, confirm it is suitable for the respective application with the manufacturer."

Add the following:

110-2.9 DUCT SPACERS. Provide duct spacers to provide proper separation of conduits installed in concrete encased duct. Duct spacers shall be designed to provide 3" separation of conduits. Duct spacers shall be suitable for the respective size and quantity of ducts; Underground Devices Incorporated Wunpeece Series, Carlon Snap-N-Stac Combo Spacers,

Cantex Spacers for Duct, or approved equal. Confirm catalog numbers with the manufacturer for the respective application.

CONSTRUCTION METHODS

110-3.1 GENERAL. Add to this section:

"The proposed conduits and ducts shall be constructed at the locations and in accordance with the details shown on the Construction Plans. Ducts shall be installed 18 in. minimum below grade. Ducts located in area subject to farming shall be 42 in minimum below grade. Where detailed on the Plans or where required to avoid obstructions, ducts shall be buried deeper. Where concrete-encased duct interfaces to directional-bored duct at a pavement crossing, the concrete encasement shall be installed up to the respective pavement edge. Where concrete-encased duct interfaces to an electrical handhole or manhole, the concrete encasement shall be installed up to the respective handhole or manhole. Provide bushings or bells at conduit terminations in electrical handholes or manholes.

Underground ducts installed by directional-boring method shall be installed in a manner that will not damage any existing underground utilities and shall not disturb or damage the respective pavement or roadway surface. Ducts shall be directional bored at the locations shown on the Construction Plans. The ducts will be bored at a minimum depth of 24 inches below the bottom of the pavement it is being bored under. Ducts installed under paved areas and roadways shall extend a minimum of 10 feet beyond the respective pavement or roadway surface, unless detailed otherwise on the Plans. A pull wire will be left in the conduit if it is to be left vacant. The ends of the conduit will be sealed with approved plugs.

The Contractor will determine if there is a conflict between the installation of the proposed electrical ducts and any existing/proposed utilities. He will make all necessary adjustments in the depth of installation to avoid all existing/proposed underground improvements.

Provide conduit bushings or bells at duct terminations in handholes and manholes.

All electrical work shall comply with the requirements of the NFPA 70 - National Electrical Code (NEC) most current issue in force and the applicable Federal Aviation Administration standards, orders, and advisory circulars. Equipment and materials shall be installed in conformance with the respective manufacturer's directions and recommendations for the respective application. Any installations which void the UL listing, Intertek Testing Services verification/ETL listing, (or other third-party listing), and/or the manufacturer's warranty of a device will not be permitted.

Contractor shall coordinate work and any power outages with the Airport Manager and the Resident Engineer/Resident Technician. Any shutdown of existing systems shall be scheduled with and approved by the Airport Manager prior to shutdown. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow U.S. Department of Labor Occupational Safety & Health Administration (OSHA) 29 CFR Part 1910 Occupational Safety and

Health Standards for electrical safety and lockout/tagout procedures including, but not limited to, 29 CFR section 1910.147 The Control of Hazardous Energy (lockout/tagout).

Contractor shall comply with the applicable requirements of NFPA 70E – Standard for Electrical Safety in the Workplace.

Contractor shall comply with the requirements of FAA AC No. 150/5370-2 (current issue in effect) "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION".

All temporary installations shall comply with National Electrical Code Article 590 – "Temporary Installations." The Contractor shall secure, identify, and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources in conformance with the requirements of FAA AC 150/5370-2G, Part 218.3 "Lighting and Visual NAVAIDs"."

110-3.7 RESTORATION. Add to this section:

"Any and all trenches and disturbed areas will be backfilled and restored to a smooth grade and seeded to the satisfaction of the Resident Engineer/Resident Technician. All trench settlements shall be corrected for a period of one year. Restoration, grading, and seeding of areas disturbed during the installation of the proposed ducts will be incidental to the respective pay item for which the duct is installed and shall be in accordance with Item 901 Seeding and Item 908 Mulching.

Any and all disturbed pavement areas will be restored to their original or better condition. Restoration of pavement areas disturbed during the installation of the proposed ducts will be incidental to the respective pay item for which the duct is installed. The restoration of concrete pavement will be completed in accordance with Item 610 for sidewalks and concrete pavement but will be incidental to the respective pay item for which the duct is installed."

Add the following:

110-3.8 LOCATING OF EXISTING UNDERGROUND UTILITIES AND CABLES. The location, size, and type of material of existing underground and/or aboveground utilities indicated on the Plans are not represented as being accurate, sufficient, or complete. Neither the Owner nor the Engineer assumes any responsibility whatsoever in respect to the accuracy, completeness, or sufficiency of the information. There is no guarantee, either expressed or implied, that the locations, size, and type of material of existing underground utilities indicated are representative of those to be encountered in the construction. It shall be the Contractor's responsibility to determine the actual location of all such facilities, including service connections to underground utilities. Prior to construction, the Contractor shall notify the utility companies of his operational plans, and shall obtain from the respective utility companies detailed information and assistance relative to the location of their facilities and the working schedule of the companies for removal or adjustment, where required. In the event an unexpected utility interference is encountered during construction, the Contractor shall immediately notify the utility company of jurisdiction. The Owner's Representative and/or the Resident Engineer shall also be immediately notified. Any damage to such mains and services shall be restored to service at once and paid for by the Contractor at no additional cost to the Contract.

All utility cables and lines shall be located by the respective utility. **Contact JULIE (Joint Utility Location Information for Excavators) for utility information, phone: 1-800-892-0123.** Contact the FAA (Federal Aviation Administration) for assistance in locating FAA cables and utilities. Location of FAA power, control, and communication cables shall be coordinated with and/or located by the FAA. Also contact Airport Director/Manager and Airport Personnel for assistance in locating underground Airport cables and/or utilities. Also coordinate work with all aboveground utilities.

Contractor shall locate and mark all existing cables within ten (10) feet of proposed excavating/trenching area. Any cables found interfering with proposed excavation or cable/trenching shall be hand dug and exposed. Any damaged cables shall be immediately repaired to the satisfaction of the Resident Engineer at the Contractor's expense. The Resident Engineer and Owner shall be notified immediately if any cables are damaged.

Due to the quantities of existing utilities and lines in the proposed areas of work, the Contractor will need to carefully excavate to expose and protect these utilities and lines prior to installing manholes, handholes, and/or junction structures and the associated trenches for the proposed conduits, ducts, and raceway system.

Payment for locating and marking underground utilities and cables will not be paid for separately but shall be considered incidental to the respective duct installation.

110-3.9 SEPARATION OF HIGH-VOLTAGE AND LOW-VOLTAGE WIRING. High-voltage circuit wiring (airfield lighting 5000 Volt series circuits and/or other circuits rated above 600 Volts) and low-voltage circuit wiring (rated 600 Volts and below) shall maintain separation from each other. High-voltage wiring and low-voltage wiring shall not be installed in the same wireway, conduit, duct, raceway, handhole, or junction box.

METHOD OF MEASUREMENT

110-4.1 Add the following:

> "All restoration work associated with installation of ducts and conduits will be considered incidental to the respective item for which they are installed, and no additional measurement will be made. Removal and replacement of bituminous pavement or concrete pavement will be considered incidental to the respective pay item for which the duct is installed. All duct and conduit interface to manholes, handholes, junction structures, or pull boxes including coring of manholes, handholes, junction structures, or pull boxes will be considered incidental to the respective item for which they are installed, and no additional measurement will be made. Conduits, conduit nipples, conduit couplings, and other conduit fittings included with splice cans, junction structures, Navaid installations, base mounted airfield light fixtures, airfield signs, and/or taxi signs, will be considered incidental to the respective item for which they are installed, and no additional measurement will be made.
>
> All lockout/tagout procedures to ensure and maintain safety of personnel will be considered incidental to the respective item of work for which it applies, and no additional compensation will be allowed."

110-4.2 Delete this section.

BASIS OF PAYMENT

110-5.1. Add the following:

"Payment will be made at the contract unit price per each type and size of conduit, completed and accepted. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials; for all sawing and pavement removal; for all duct interface work to handholes/manholes including coring of handholes/manholes; for all excavation and backfilling with aggregate backfill, earth backfill, and concrete; and for all labor, coordination, equipment, tools, and incidentals necessary to complete this Item. Removal and replacement of bituminous pavement or concrete pavement will be considered incidental to the respective pay item for which the duct is installed.

Payment will be made under:

Item AR110202	2" PVC Conduit, Direct Bury – per FOOT
Item AS110202	2" PVC Conduit, Direct Bury – per FOOT
Item AS110503	3-Way Concrete Encased Duct – per FOOT
Item AU110012	2" Directional Bore - per FOOT
Item AU110202	2" PVC Conduit, Direct Bury – per FOOT."

END OF ITEM 110

ITEM 115 – ELECTRICAL MANHOLES AND JUNCTION STRUCTURES

DESCRIPTION

115-1.1. This item of work shall consist of electrical manholes and junction structures (handholes and splice cans) in accordance with this Specification and as detailed on the Construction Plans. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the Resident Engineer/Resident Technician.

115-1.2 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. Note: where FAA Advisory Circulars are referenced, they shall be the current issue or issues in effect.

A. ASTM A123, Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.

B. ASTM A283, Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

C. ASTM A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

D. AASHTO M 85, Standard Specification for Portland Cement.

E. ANSI/IEEE STD 81, IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.

F. Federal Specification A-A 59544, Cable and Wire, Electrical (Power, Fixed Installation).

G. FAA AC 150/5345-7, “SPECIFICATION FOR L-824 UNDERGROUND ELECTRICAL CABLE FOR AIRPORT LIGHTING CIRCUITS”.

H. FAA AC 150/5345-26, “SPECIFICATION FOR L-823 PLUG AND RECEPTACLE, CABLE CONNECTORS”.

I. FAA AC 150/5345-42, “SPECIFICATION FOR AIRPORT LIGHT BASES, TRANSFORMER HOUSINGS, JUNCTION BOXES, AND ACCESSORIES”.

J. FAA AC 150/5340-30, “DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS”.

K. FAA AC 150/5345-53, “AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM”.

L. MIL-P-21035, Paint High Zinc Dust Content, Galvanizing Repair.

M. NFPA-70, National Electrical Code (NEC), most current issue in force.

N. NFPA 70E – Standard for Electrical Safety in the Workplace.

O. NFPA 2638645-1 = National Fire Protection Association IDN.

115-1.3 SHOP DRAWINGS. The Contractor shall furnish shop drawings for approval before ordering equipment and/or materials. Shop drawings are required for each type of electrical handhole/manhole and junction structure to be used on the project. **Shop drawings shall be clear and legible. Copies that are illegible will be rejected.** The preferred shop drawing submittal format shall be electronic (PDF) copies. Shop drawings shall include the following information:

A. In order to expedite the shop drawing review, inspection and/or testing of materials and equipment, the Contractor shall furnish complete statements to the Project Engineer as to the origin and manufacturer of all materials and equipment to be used in the work. Such statements shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials and equipment.

B. Provide certification that steel products are manufactured in the USA from domestic steel to comply with the Steel Products Procurement Act (30 ILCS 565/)

C. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the plans and specifications. The Engineer 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.

D. Precast concrete handholes and manholes must be on IDOT (Illinois Department of Transportation) List of Certified Precast Concrete Producers. Provide information on respective precast concrete producer for precast manholes and drawings for respective handholes.

E. Provide cut sheets with part number and specifications for each FAA L-867 junction structure/splice can.

F. Provide certification that the respective pre-cast handholes and manholes are manufactured in the United States of America.

MATERIALS

115-2.1. GENERAL

A. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the Engineer.

B. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer.

Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

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

115-2.2 CONCRETE STRUCTURES. Provide precast concrete structures where shown on the Plans. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. Openings or knockouts shall be provided in the structure as detailed on the Plans and as applicable to interface to the respective duct system. Threaded inserts and pulling eyes shall be cast in as shown.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the Engineer shall be submitted by the Contractor to allow for a full evaluation by the Engineer.

A. Electrical Handholes. Each electrical handhole shall be constructed in accordance with the details as shown on the Construction Plans. The handholes shall be provided with heavy duty frame and lid suitable for 40,000 pounds loading. Lids for the handholes containing high voltage airfield lighting cables shall include lettering labeled "**DANGER HIGH VOLTAGE KEEP OUT 5000 VOLTS"** to comply with NEC Article 300.45 "Warning Signs" and NEC Article 314.30(D) "Covers". Lids for the handholes containing low voltage cables (600 Volts and below) shall include lettering labeled "**LOW-VOLTAGE**". Coordinate lettering with manufacturer. Precast electrical handholes shall be manufactured by a concrete electrical handhole producer on the Illinois Department of Transportation approved list of certified precast concrete producers. Electrical handholes will be paid for under Item AR115610 (or AS115610) Electrical Handhole per each.

115-2.3 JUNCTION BOXES**.** Junction structures for Item AR125565 Splice Can shall be FAA Type L-867 (non-load bearing) Class IA, Size D; 16-inch diameter, 24 inches deep, with minimum 3/8-inch thick galvanized steel cover and stainless steel bolts. Refer to the Plans for the number, size, and quantity of conduit hubs for each respective splice/junction can. Covers for splice cans containing high voltage airfield lighting cables shall include minimum 1/2-inch high lettering labeled "DANGER HIGH VOLTAGE KEEP OUT" to comply with National Electrical Code Article 300.45 "Warning Signs" and National Electrical Code Article 314.71(E) "Suitable Covers". This will need to be coordinated with the splice can manufacturer. Lids for splice cans containing low voltage cables (rated 600 Volts and below) will be acceptable to use blank covers.

115-2.4 GROUND RODS. Ground rods for use with junction structures/splice cans shall be minimum 3/4-inch diameter by 10 feet long UL listed copper-clad steel. Ground rod for junction structures/splice cans shall be tested. Where ground resistance exceeds 25 Ohms furnish and install and second ground rod not less than one rod length apart and connect to the first ground rods at the junction structure/splice can.

CONSTRUCTION METHODS

115-3.1. Electrical handholes and manholes shall be constructed in accordance with the details as shown on the Construction Plans. At electrical handholes and manholes, identify and label each cable with respective to its origin and the system or device served. Coordinate conduit and duct interface with the handhole and/or manhole installation. Field cut openings for conduits and ducts according to the respective handhole and/or manhole manufacturer's recommendations. Core drill and/or cut wall of handhole and/or manhole with a tool designed for the material to be cut and suitable for the respective application. Size holes for termination fittings to be used and seal around penetrations after fittings are installed.

115-3.2 UNCLASSIFIED EXCAVATION. It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the Resident Engineer/Resident Technician without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to the respective handhole and/or manhole structure pay item of which it is a component part. Dewatering necessary for manhole structure installation, erosion and turbidity control, in accordance with Federal, State, and Local requirements is incidental to its respective pay item. The cost of all excavation regardless of type of material encountered, shall be included in the unit price bid for the respective manhole structure pay item.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the Resident Engineer/Resident Technician. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be affected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the Resident Engineer/Resident Technician. Structures shall be placed after the Resident Engineer/Resident Technician has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 in of sand or a material approved by the Resident Engineer/Resident Technician as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the Plans.

115-3.2 CONCRETE STRUCTURES. Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item 610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the Engineer before the concrete is placed.

115-3.3 PRECAST UNIT INSTALLATIONS. Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

115-3.4 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES AND FITTINGS. All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the Resident Engineer/Resident Technician and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has been set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written permission is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the Resident Engineer/Resident Technician and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor’s expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

115-3.5 INSTALLATION OF LADDERS. [Not used]

115-3.6 REMOVAL OF SHEETING AND BRACING. In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The Resident Engineer/Resident Technician may order the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

115-3.7 BACKFILLING. After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches (150 mm) in thickness. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the Resident Engineer/Resident Technician.

Backfill shall not be placed against any structure until permission is given by the Resident Engineer/Resident Technician. In the case of concrete, such permission shall not be given until tests made by the laboratory under supervision of the Engineer establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the Resident Engineer/Resident Technician may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

115-3.8 CONNECTION OF DUCT BANKS. To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

115-3.9 RESTORATION. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, seeding, mulching grading and restoration shall be considered incidental to the respective pay item and shall be in accordance with Item 901 Seeding and Item 908 Mulching. The Contractor shall grade around structures as required to provide positive drainage away from the structure. Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials. After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

115-3.10 LOCATING EXISTING UNDERGROUND UTILITIES AND CABLES. The location, size, and type of material of existing underground and/or aboveground utilities indicated on the Plans are not represented as being accurate, sufficient, or complete. Neither the Owner nor the Engineer assumes any responsibility whatsoever in respect to the accuracy, completeness, or sufficiency of the information. There is no guarantee, either expressed or implied, that the locations, size, and type of material of existing underground utilities indicated are representative of those to be encountered in the construction. It shall be the Contractor's responsibility to determine the actual location of all such facilities, including service connections to underground utilities. Prior to construction, the Contractor shall notify the utility companies of his operational plans and shall obtain from the respective utility companies detailed information and assistance relative to the location of their facilities and the working schedule of the companies for removal or adjustment, where required. In the event an unexpected utility interference is encountered

during construction, the Contractor shall immediately notify the utility company of jurisdiction. The Owner's Representative and/or the Resident Engineer shall also be immediately notified. Any damage to such mains and services shall be restored to service at once and paid for by the Contractor at no additional cost to the Contract.

All utility cables and lines shall be located by the respective utility. **Contact JULIE (Joint Utility Location Information for Excavators) for utility information, phone: 1-800-892-0123.** Contact the FAA (Federal Aviation Administration) for assistance in locating FAA cables and utilities. Location of FAA power, control, and communication cables shall be coordinated with and/or located by the FAA. Also contact Airport Director/Manager and Airport Personnel for assistance in locating underground Airport cables and/or utilities. Also coordinate work with all aboveground utilities.

Contractor shall locate and mark all existing cables within ten (10) feet of proposed excavating/trenching area. Any cables found interfering with proposed excavation or cable/trenching shall be hand dug and exposed. Any damaged cables shall be immediately repaired to the satisfaction of the Resident Engineer at the Contractor's expense. The Resident Engineer and Owner shall be notified immediately if any cables are damaged.

Due to the quantities of existing utilities and lines in the proposed areas of work, the Contractor will need to carefully excavate to expose and protect these utilities and lines prior to installing manholes, handholes, and/or junction structures and the associated trenches for the proposed conduits, ducts, and raceway system.

Contractor is responsible for the repairs of any utilities, lines, and/or cables damaged as a result of his operations.

Payment for locating and marking underground utilities and cables will not be paid for separately but shall be considered incidental to the respective duct installation.

115-3.11 SEPARATION OF HIGH-VOLTAGE AND LOW-VOLTAGE WIRING. High-voltage circuit wiring (airfield lighting 5000 Volt series circuits and/or other circuits rated above 600 Volts) and low-voltage circuit wiring (rated 600 Volts and below) shall maintain separation from each other. High-voltage wiring and low-voltage wiring shall not be installed in the same wireway, conduit, duct, raceway, handhole, or junction box.

METHOD OF MEASUREMENT

115-4.1. Electrical manholes, handholes and junction structures shall be measured by each unit completed in place and accepted by the Resident Engineer/Technician. The following additional items are specifically included in each unit.

- All required excavation,
- Sheeting and bracing
- All required backfilling with on-site materials
- Restoration of all surfaces and finished grading, sodding
- All required connections
- Conduits, conduit nipples, conduit couplings, and other conduit fittings included with junction structures, and/or splice cans.

- Slack cable required to perform cable splices outside of the respective junction structures, handholes, or manholes.
- Dewatering if required
- Temporary cables and connections
- Ground rods, grounding electrode conductors, connections, and associated grounding work included with junction structures, and/or splice cans.
- Ground rod testing
- All coring and labor associated with conduit, duct, cable in unit duct, and/or cable entries
- Locating existing utilities, lines, and cables in the respective areas of work
- All coordination with the respective Airport staff, site personnel, and/or FAA personnel
- All lockout/tagout procedures to ensure and maintain safety of personnel.

BASIS OF PAYMENT

115-5.1. Payment will be made at the contract unit price bid for each electrical manhole, handhole, and/or junction structure completed and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling, and placing of the materials; for locating existing utilities, lines, and cables in the respective areas of work; for all coring and labor associated with conduit, duct, cable in unit duct, and/or cable entries; for all coordination with the respective Airport and/or FAA personnel; for furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

Item AS115610	Electrical Handhole – per EACH
Item AR125565	Splice Can - per EACH
Item AU125565	Splice Can - per EACH”

END OF ITEM 115

ITEM 125 – INSTALLATION OF AIRPORT LIGHTING SYSTEMS

DESCRIPTION

125-1.1. Revise this paragraph to read as follows:

> "This Item of work shall consist of furnishing and installing base- and stake-mounted airfield lights, taxiway lights, taxi guidance signs, and splice cans at the locations shown on the Construction Plans and in accordance with the details shown on the Plans. This Item of work shall also include the removal of base- and stake-mounted runway lights, taxiway lights and/or taxi guidance signs. Also included in this Item will be the testing of the installation and all incidentals necessary to place the lighting systems into operation, completed, and to the satisfaction of the Resident Engineer/Technician."

125-1.6 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. Note: where FAA Advisory Circulars are referenced, they shall be the current issue or issues in effect.

A. ANSI C80.1 – Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.4 – Fittings Rigid Metal Conduit and EMT.

C. FAA AC 150/5340-18, "STANDARDS FOR AIRPORT SIGN SYSTEMS".

D. FAA AC 150/5340-26, "MAINTENANCE OF AIRPORT VISUAL AID FACILITIES".

E. FAA AC 150/5340-30, "DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS".

F. FAA AC 150/5345-7, "SPECIFICATION FOR L-824 UNDERGROUND ELECTRICAL CABLE FOR AIRPORT LIGHTING CIRCUITS".

G. FAA AC 150/5345-26, "SPECIFICATION FOR L-823 PLUG AND RECEPTACLE, CABLE CONNECTORS".

H. FAA AC 150/5345-42, "SPECIFICATION FOR AIRPORT LIGHT BASES, TRANSFORMER HOUSINGS, JUNCTION BOXES, AND ACCESSORIES".

I. FAA AC 150/5345-44, "SPECIFICATION FOR RUNWAY AND TAXIWAY SIGNS".

J. FAA AC 150/5345-46, "SPECIFICATION FOR RUNWAY AND TAXIWAY LIGHT FIXTURES".

K. FAA AC 150/5345-47, "SPECIFICATION FOR SERIES TO SERIES ISOLATION TRANSFORMERS FOR AIRPORT LIGHTING SYSTEMS".

L. FAA AC 150/5345-53, “AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM” and FAA AC 150/5345-53D, “AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum”.

M. FAA AC 150/5370-2, “OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

N. FAA STD-019f, Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment.

O. NFPA 70 – National Electrical Code (most current issue in force).

P. NFPA 70E – Standard for Electrical Safety in the Workplace.

Q. NFPA 2638645-1 = National Fire Protection Association IDN.

R. OSHA 29 CFR Part 1910, Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures.

S. UL Standard 6 – Electrical Rigid Metal Conduit – Steel.

T. UL Standard 514B – Conduit, Tubing and Cable Fittings.

EQUIPMENT AND MATERIALS

125-1.7 SHOP DRAWINGS. The Contractor shall furnish shop drawings for approval before ordering equipment and/or materials. Shop drawings are required for each type of electrical handhole/manhole and junction structure to be used on the project. **Shop drawings shall be clear and legible. Copies that are illegible will be rejected.** The preferred shop drawing submittal format shall be electronic (PDF) copies. Shop drawings shall include the following information:

A. In order to expedite the shop drawing review, inspection and/or testing of materials and equipment, the Contractor shall furnish complete statements to the Project Engineer as to the origin and manufacturer of all materials and equipment to be used in the work. Such statements shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials and equipment.

B. Cut sheets with part number and specifications each airfield light fixture. Include cut sheets with part numbers and dimensions for base cans, base plates, transformers, and associated components for each airfield light fixture.

C. Cut sheets with part number and specifications for each runway or taxi guidance sign. Include cut sheets with part numbers and dimensions for base cans, transformer cans, cover plates, transformers, and associated components for each runway or taxi guidance sign.

D. Concrete mix design.

E. Provide cut sheets with manufacturer's name, catalog number, dimensions, material and UL listing for each type and size ground rod. Include certification of 100% domestic steel for ground rods. Include cut sheets for exothermic weld connections, ground lugs, and ground wire.

F. Provide cut sheets for all types of conduits used with the airfield light fixtures and/or taxi guidance signs (for example galvanized rigid steel conduit). Include certification that steel conduits are made with 100 percent domestic steel.

EQUIPMENT AND MATERIALS

125-2.1 GENERAL. Add the following to this section:

"D. **The proposed medium intensity runway edge lights shall be Type L-861 Medium Intensity Runway Edge Light with incandescent or quartz lamps to match the existing elevated runway edge lights.** All lights shall have an overall height of 24 in. The above lights shall be manufactured in accordance with FAA Specification AC No. 150/5345-46E, (or respective edition in force as identified in AC 150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum), and shall be FAA approved. Light direction and colors shall be as detailed on the Plans.

E. **The proposed medium intensity threshold lights shall be Type L-861E Medium Intensity Threshold Light with incandescent or quartz lamps to match the existing elevated threshold edge lights.** All lights shall have an overall height of 24 in. All of the above lights shall be manufactured in accordance with FAA Specification AC No. 150/5345-46E, (or respective edition in force as identified in AC 150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum), and shall be FAA approved, and in compliance with the Airport Improvement Program Buy American Preference Requirements. Light direction and colors shall be as detailed on the Plans.

F. **The proposed taxiway edge lights shall be Type L-861T(L) Taxiway Edge Light with LED (Light Emitting Diode) illumination.** All lights shall have an overall height of 24 in. All of the above lights shall be manufactured in accordance with FAA Specification AC No. 150/5345-46E, (or respective edition in force as identified in AC 150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum), and shall be FAA approved. Taxiway Edge lights shall be blue in color. Medium Intensity Taxiway Edge Lights with LED (Light Emitting Diode) illumination shall conform to the applicable requirements of FAA Engineering Brief No. 67D Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures. **See 125-2.20 Spare Parts for spare part requirements.**

G. Item AR125931 Replace Light Lense shall apply to existing Runway edge lights on Runway 11-29. To accommodate the Runway extension some of the existing lights with White/Yellow bi-directional lenses will need to be replaced with white

omni-directional lenses. The existing Runway 11-29 edge lights are L-861 with quartz or incandescent lamps.

H. Where non-metallic light fixtures or plastic couplings are proposed the Contractor will be responsible to furnish all grounding connectors, bonding jumpers, pipe grounding clamps, and accessories to maintain continuity of the ground path for the required light base ground in accordance with FAA AC 150/5340-30J DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS, Chapter 12, Parts 12.6 and 12.7.

I. The concrete used in the construction of these Items shall be in accordance with Item 610."

125-2.4 CONDUIT. Add the following to this section:

"Rigid Steel Conduit and fittings shall be hot-dipped, galvanized, UL-listed, produced in accordance with UL Standard 6 – Rigid Metal Conduit and ANSI C80.1 – Rigid Steel Conduit, Zinc Coated. Couplings, connectors, and fittings for rigid steel conduit shall be threaded galvanized steel or galvanized malleable iron specifically designed and manufactured for the purpose. Fittings shall conform to ANSI C80.4 – Fittings Rigid Metal Conduit and EMT. Set screw type fittings are not acceptable. Galvanized rigid steel conduit shall be manufactured in the United States of America produced from 100 percent domestic steel."

125-2.7 ISOLATION TRANSFORMERS. Add the following to this section:

"Series circuit isolation transformers for the runway or taxiway edge lights, airfield guidance signs, and/or other airfield Navaids or lighting devices shall be manufactured to FAA Specification AC 150/5345-47 (current edition in effect) and shall be FAA-approved (ETL-Certified). Series circuit transformer shall be properly sized for the respective runway or taxiway edge lights, airfield guidance signs and/or other airfield Navaids or lighting devices and shall be as recommended by the respective runway or taxiway edge lights manufacturer, respective airfield guidance sign manufacturer, respective Navaid manufacturer, and/or respective airfield lighting device manufacturer. Confirm proper transformer selection and sizing with the respective equipment manufacturer.

125-2.8 LIGHT CANS. Add the following to this section:

"Each light base can and/or splice can shall include internal and external ground lugs. Cans shall be the size and depth as detailed on the Plans. L-867 splice cans shall have galvanized steel covers, 3/8 in. thick, with stainless steel bolts. Lids for splice cans containing high voltage airfield lighting cables shall include minimum 1/2-inch high lettering labeled "DANGER HIGH VOLTAGE KEEP OUT" to comply with National Electrical Code Article 300.45 "Warning Signs" and National Electrical Code Article 314.71(E) "Suitable Covers". This will need to be coordinated with the splice can manufacturer. Lids for splice cans containing low voltage cables (rated 600 Volts and below) will be acceptable to use blank covers."

125-2.11 AIRFIELD SIGNS. Add the following to this section:

"The proposed taxi guidance signs shall conform to Advisory Circular 150/5345-44 (current issue in effect) and be FAA-approved for Type L-858(L) Taxiway and Runway Signs. The signs shall be LED Size 1, 18-in. legend panel (sign face) with a 12-in. legend; Style 2, powered from a 4.8 to 6.6-amp series lighting circuit; Class 2, for operation from -40°F to 131°F; Mode 2, to withstand wind loads of 200 M.P.H., base-mounted, double-sided, as specified on the Plans.

The signs shall read as described on the Construction Plans. The proposed taxi guidance signs shall have LED (Light Emitting Diode) type illumination. The proposed taxi guidance signs shall be Type L-858-Y(L) direction, destination, and boundary signs (black legend on yellow background); Type L-858-R(L) mandatory instruction sign (black outline on outside edge of white legend on red background); and Type L-858-L(L) location sign (yellow legend and border on black background).

Taxi Guidance Signs with LED (Light Emitting Diode) illumination shall conform to the applicable requirements of FAA Engineering Brief No. 67D Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures.

The proposed taxi guidance sign replacement sign panels shall conform to 150/5345-44 (respective issue in force as identified in AC 150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum) and be FAA-approved. Existing lighted taxi guidance signs in the respective work areas on the Airport are noted on the Plans. To maintain the ETL-Intertek FAA approval rating of these respective signs, the replacement panels shall be furnished by the Original Equipment Manufacturer. Sign panels that void the ETL-Intertek FAA approval rating of these respective signs will not be acceptable. Contractor shall field verify existing signs to determine size and legends for replacement panels. Contractor shall confirm the replacement panels are correct in color, description, and not damaged. Any unacceptable sign panel shall be returned to the manufacturer to be replaced.

The concrete used in the construction of these Items shall be in accordance with Item 610."

Add the following:

125-2.14 IDENTIFICATION TAGS. Identification tags shall be attached to each airfield light fixture. Where shown on the Plans provide new identification tags for existing fixtures. The tag shall be of the type and with the lettering shown on the Plans. The cost of furnishing and installing these tags shall be included in the unit price for the fixtures and no additional compensation will be allowed.

125-2.15 ANTI-SEIZE COMPOUND. Prior to installing the proposed airfield lights, the Contractor will apply an oxide-inhibiting, anti-seizing compound to all screws, nuts, breakable coupling, and all places where metal comes into contact with metal.

125-2.16 STAINLESS STEEL BOLTS. All base plate-mounting bolts and stake-mounting bolts shall be stainless steel.

125-2.17 GROUND RODS. **Ground rods shall be 3/4-inch diameter by 10-feet long UL listed Copper clad with 10 mils (minimum) Copper coating.** Ground rods shall be manufactured in the United States of America from 100 percent domestic steel to comply with the requirements of the Steel Products Procurement Act (30 ILCS 565/).

125-2.18 SPARE PARTS. Spare parts for airport visual aids are allowable in accordance with the requirements of FAA Order 5100.38D "Airport Improvement Program Handbook" and the guidelines in FAA AC No. 150/5340-26C "Maintenance of Airport Visual Aid Facilities". Provide the following spare parts for the airport visual aid/airfield lighting system:

a. 10 (ten) spare L861T(L) taxiway edge lights, blue color corresponding to the respective fixtures furnished. Include mounting hardware and transformers for each spare light fixture.

Spare parts for the airport visual aid/airfield lighting system will be considered incidental to the respective airfield lighting system pay items and no additional compensation will be allowed.

CONSTRUCTION METHODS

125-3.1 GENERAL. Add the following to this section:

"The Contractor shall furnish and install all equipment and electrical materials necessary for complete and operational installation of the airfield lighting systems as shown on the Plans and detailed herein. The complete installation and wiring shall be done in a neat, workmanlike manner. All electrical work shall comply with the requirements of the NFPA 70 - National Electrical Code (NEC) most current issue in force and the applicable Federal Aviation Administration standards, orders, and advisory circulars. Equipment and materials shall be installed in conformance with the respective manufacturer's directions and recommendations for the respective application. Any installations which void the UL listing, Intertek Testing Services verification/ETL listing, (or other third-party listing), and/or the manufacturer's warranty of a device will not be permitted.

A. Keep all work, power outages, and/or shutdown of existing systems coordinated with the Airport Director/Manager and the Resident Engineer. Any shutdown of existing systems shall be scheduled with and approved by the Airport Director/Manager prior to shutdown. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow U.S. Department of Labor Occupational Safety & Health Administration (OSHA) 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures including, but not limited to, 29 CFR section 1910.147 The Control of Hazardous Energy (lockout/tagout).

B. Examine the site to determine the extent of the work. Contractor shall field verify existing site conditions.

C. Verify respective circuits and power sources prior to removing, disconnecting, relocating, installing, connecting, or working on the respective airfield lighting, taxi

sign, NAVAID, or other device. Identify each respective circuit prior to performing work on that circuit.

D. Install airfield guidance signs and other airfield lighting devices in accordance with the details shown on the Construction Plans.

E. New 1/C #8 AWG FAA L-824 5,000 Volt cable shall be furnished and installed in duct or unit duct from each respective light on either side of the proposed guidance sign in order to place the new sign into the lighting circuit. The cable will be paid for under Item 108. Provide sufficient slack cable at each splice/transformer can to perform cable splices outside of the can.

F. Locate existing underground utilities, cables and lines. The location, size, and type of material of existing underground and/or aboveground utilities indicated on the Plans are not represented as being accurate, sufficient, or complete. Neither the Owner nor the Engineer assumes any responsibility whatsoever in respect to the accuracy, completeness, or sufficiency of the information. There is no guarantee, either expressed or implied, that the locations, size, and type of material of existing underground utilities indicated are representative of those to be encountered in the construction. It shall be the Contractor's responsibility to determine the actual location of all such facilities, including service connections to underground utilities. Prior to construction, the Contractor shall notify the utility companies of his operational plans, and shall obtain, from the respective utility companies, detailed information and assistance relative to the location of their facilities and the working schedule of the companies for removal or adjustment, where required. In the event an unexpected utility interference is encountered during construction, the Contractor shall immediately notify the utility company of jurisdiction. The Owner's Representative and/or the Resident Engineer shall also be immediately notified. Any damage to such mains and services shall be restored to service at once and paid for by the Contractor at no additional cost to the Contract. All utility cables and lines shall be located by the respective utility. Also coordinate work with all aboveground utilities.

G. Identify, secure, and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources in conformance with the requirements of FAA AC 150/5370-2G, Part 2.18.3 "Lighting and Visual NAVAIDs". All temporary installations shall comply with National Electrical Code Article 590 – "Temporary Installations."

H. Grounding work and modifications shall not be performed during a thunderstorm or when a thunderstorm is predicted in the area. Grounding for airfield lights and taxi signs shall be as detailed on the Plans and as specified herein.

I. Homerun cables for a respective circuit that are installed in conduit or duct shall be run together in the same raceway or duct.

J. The respective personnel performing airfield lighting work, vault work, and/or test shall be familiar with, and qualified to work on 5000-Volt airfield lighting series circuits, constant current regulators and associated airport electrical vault equipment.

K. FAA requires that every airfield lighting cable splicer shall be qualified in making cable splices and terminations on cables rated at and/or above 5000 Volts AC and shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

L. Obey and comply with the applicable requirements of NFPA 70E – Standard for Electrical Safety in the Workplace.

M. Other construction projects might be in progress on the Airport at the same time as this project. The Contractor will be required to cooperate with all other contractors and the Airport Director/Manager in the coordination of the work.

N. The Contractor shall comply with the requirements of FAA AC No. 150/5370-2 (current issue in effect) "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION".

O. In the event a conflict is determined with respect to manufacturer installation instructions, National Electrical Code, and/or the Contract Documents, contact the Project Engineer for further direction.

P. Sign replacement panels (for existing taxi guidance signs) shall be installed in accordance with the respective sign manufacturer's instructions and as detailed on the Plans.

Q. Existing ducts and cables associated with airfield lighting removals shall be removed where accessible and abandoned in place elsewhere unless it conflicts with the installation of the airfield light, sign, duct, cable, handhole, manhole, site work, pavement or other work, then it shall be disconnected, removed, and disposed of off the site at no additional cost to the Contract. Contractor may remove abandoned cables at no additional cost to the Contract and shall have the salvage rights to abandoned cables.

R. Obtaining the required borrow material from an offsite borrow, placing the borrow material, grading, seeding, and mulching the disturbed areas will be considered as an Incidental Item to the proposed/relocated lights, splice cans, and/or removal/relocation work and no additional compensation will be allowed.

S. Requirements of FAA AC 150/5340-30J, Paragraph 1.6 it notes "*Do not use the high voltage series lighting circuit to power devices that are not certified per AC 150/5345-53, Airport Lighting Equipment Certification Program, listed in Appendix 3, Addendum. Using non-certified devices can result in a poor system power factor resulting in unexpected constant current regulator (CCR) shutdowns and lighting circuit start-up problems."*

T. When a respective runway is closed the runway lighting and Navaids for that runway shall be shut off. Keep respective Navaids active during times when respective runway is open. Navaids receiving maintenance shall be shut off until operating

properly. Coordinate with the Airport Director/Manager to issue NOTAMS when airfield lighting and/or Navaids are out of service.

U. Per the requirements of FAA AC 150/5340-26C, Chapter 3, Section 3.6.6 Use of Original Equipment Manufacturer (OEM) Part, it notes the following: *"The use of non-OEM parts or lamps in FAA approved equipment is strongly discouraged. The FAA has strict specifications for approval of all airport lighting equipment and use of non-OEM parts or lamps in such equipment or systems can render the equipment to be functionally non-FAA approved. This could possibly lead to serious liability consequences in case of an aircraft incident at an airport following these practices. In the case of runway and taxiway lighting fixtures, the use of a generic, non-approved lamp can render the photometric output of the fixture out of specification and adversely affect the safety of low visibility operations."*

V. A slack of three (3') feet, minimum, plus depth of base can (if applicable), shall be provided in the primary cable at each transformer/connector termination. At stake-mounted lights, the slack shall be loosely coiled immediately below the isolation transformer. There shall be no additional payment for cable slack and therefore the quantity of proposed cable slack has not been included in the respective cable pay items.

W. Provisions shall be made for the temporary wiring of the affected circuits to ensure that the Airport will maintain all runway and taxiway lighting capabilities for active runways and taxiways. All temporary wiring will be considered incidental to the associated work for which it is necessary, and no additional compensation will be allowed."

Add the following:

125-3.4 INSTALLATION OF AIRPORT LIGHTING SYSTEMS AND SIGNS.

A. Airfield light fixtures, light bases, guidance signs, isolation transformers, and accessories shall be installed as shown on the Plans or approved shop drawings and in accordance with the applicable FAA advisory circulars. Tolerances given in the FAA advisory circulars and on the Plans shall not be exceeded. Where no tolerance is given, no deviation is permitted. Items not installed in accordance with the FAA advisory circulars, and the plans shall be replaced by and at the cost of the Contractor.

B. The airfield light fixtures and guidance signs shall be installed at the locations indicated on the Plans. The Contractor shall exercise caution in the installation of all light units. Any units damaged by the Contractor's operations shall be repaired or replaced to the satisfaction of the Resident Engineer at no additional cost to the Contract.

C. The Contractor shall assemble units and connect them to the system in accordance with the manufacturer's recommendation and instructions.

D. Personnel installing airfield lighting systems shall be experienced and qualified to perform the respective work. Personnel performing cable connections shall be qualified in making cable splices and terminations on 5,000 Volt rated cable for use on runway and taxiway series circuits in accordance with the requirements of Item L-108.

125-3.5 IDENTIFICATION TAGS. The Contractor will place updated light identification number tags on all of the proposed and/or relocated airfield lights as detailed on the Plans. Existing light identification number tags may be reused and/or relocated for relocated and existing airfield light fixtures. The correct light identification numbers are shown on the Construction Plans. The cost to provide and install the identification number tags will be considered as an incidental item to the new and/or relocated airfield lights and no additional compensation will be allowed.

125-3.6 GROUNDING FOR AIRFIELD LIGHTS AND TAXI GUIDANCE SIGNS. Furnish and install a ground rod at each L-867 transformer base/light can and at each stake-mounted light fixture**.** Grounding for Runway Lights, Taxiway Lights, and Lighted Taxi Guidance Signs shall be as detailed on the Plans and as specified herein. A ground rod must be installed at each light fixture and taxi guidance sign. The purpose of the light base ground is to provide a degree of protection for maintenance personnel from possible contact with an energized light base or mounting stake that may result from a shorted power cable or isolation transformer. A light base ground shall be installed at each transformer base/light can associated with runway lights, taxiway lights, and lighted taxi guidance signs. A light base ground shall also be installed at each stake-mounted light fixture. A light base ground shall be installed and connected to the metal frame of each taxi guidance sign as detailed on the Plans and in accordance with the respective taxi guidance sign manufacturer recommendations. The light base ground shall be a #6 AWG bare copper conductor bonded to the ground lug on the respective L-867 transformer base/light can or mounting stake and a **3/4-inch diameter by 10-feet long (minimum),** UL-listed, copper-clad ground rod. Connections to ground lugs on the L-867 transformer base/light can or mounting stake shall be with a UL-listed grounding connector. Connections to ground rods shall be made with exothermic-weld type connectors, Cadweld by nVent Erico Products, Inc., Thermoweld by Continental Industries, Inc., Ultraweld by Harger, or approved equal. Exothermic-weld connections shall be installed in conformance with the respective manufacturer's directions using molds, as required for each respective application. Bolted connections will not be permitted at ground rods. Top of ground rods shall be buried 12 in. minimum below grade, unless noted deeper on the Plans. **For each airfield light fixture and taxi guidance sign the Contractor shall test the made electrode ground system with an instrument specifically designed for testing ground systems. Test results shall be recorded for each airfield light fixture, each taxi guidance sign installation, and each splice can. If ground resistance exceeds 25 Ohms, contact the Project Engineer for further direction.** Also refer to EOR-47643 for additional information on grounding requirements where applicable. Copies of ground system test results shall be furnished to the Resident Engineer and the Project Engineer**.**

For base mounted light fixtures the light fixtures must be bonded to the light base internal ground lug via a #6 AWG stranded copper wire rated for 600 Volts with Green XHHW insulation or a braided ground strap of equivalent current rating. The ground wire length must be sufficient to allow the removal of the light fixture from the light base for routine maintenance. See the light fixture manufacturer's instructions for proper methods of a attaching a bonding wire.

125-3.7 TESTING AIRFIELD LIGHTING SYSTEMS. Each airfield lighting system shall be tested to determine proper installation and operation. Contractor shall coordinate testing with the Resident Engineer. All equipment, tools, and labor required for testing and demonstrations shall be furnished by the Contractor.

A. Prior to beginning excavations, airfield lighting modifications, cable installation, and/or any other work that might possibly affect airfield lighting circuits, all existing series circuit cables shall be Megger tested with an insulation resistance tester and recorded at the respective vault. All existing series circuit cable loops shall have the resistance measured with an Ohmmeter and recorded for each circuit at the vault. Each constant current regulator shall be tested with results recorded. Contractor shall provide a True RMS Ammeter for current measurements. Copies of test results shall be provided to the Resident Engineer and the respective Project Engineer within five business days of conducting the respective set of tests. See the testing forms included in Appendix A. **These tests are required to protect the Owner and the Contractor and to identify existing conditions and any defective cables, circuits, and/or constant current regulators. Failure to comply with this requirement might result in the Contractor being responsible for defective cable and circuit conditions (where previously not identified) and the associated corrective work at no additional cost to the Contract. The Contractor is responsible to perform the tests, record the test results and submit the test results to the Engineer of Record.**

B. After airfield lighting modifications, additions, and/or upgrades have been completed, series circuit cables shall be Megger tested with an insulation resistance tester and recorded at the vault. All series circuit cable loops shall have the resistance measured with an Ohmmeter and recorded for each circuit at the vault. Each constant current regulator shall be tested with results recorded. Provide a True RMS Ammeter for current measurements. Copies of test results shall be provided to the Resident Engineer and the respective Project Engineer within 5 business days of conducting the tests. See the testing forms in Appendix A. **The Contractor is responsible to perform the tests, record the test results and submit the test results to the Engineer of Record.**

C. Insulation resistance testing equipment for use with 5,000 Volt series circuit cables shall use an insulation resistance tester capable of testing the cables at 5,000 Volts. Older series circuit cables and/or cables in poor condition may require the test voltage to be performed at a voltage lower than 5,000 Volts (Example 1,000 Volts, 500 Volts, or less than 500 Volts). The respective test voltage shall be recorded for each cable insulation resistance test result.

D. Insulation resistance testing equipment for use with 600 Volt rated cables shall use a 500 Volt insulation resistance tester. The respective test voltage shall be recorded for each cable insulation resistance test result.

E. It is recommended to use the same insulation resistance test equipment throughout the project to ensure reliable comparative readings at the beginning of the project and at the completion of the project.

F. Demonstrate all features and functions of all systems and instruct the Owner's personnel in the proper and safe operation of the systems.

G. The Contractor is responsible to employ qualified personnel that are capable of properly conducting the required tests to the satisfaction of the Project Engineer. Tests that provide unsatisfactory results shall be reviewed to determine the possible cause of unsatisfactory results, corrections shall be made, and the tests shall be conducted again.

H. See Appendix A – "Cable and Constant Current Regulator Testing Forms" for additional information on testing requirements for airfield lighting systems. All testing will be considered incidental to the respective work items and no additional compensation will be allowed.

125-3.8 SAFETY PRACTICES WITH AIRFIELD LIGHTING SERIES CIRCUITS. Please understand that airfield lighting series circuits are dangerous and only qualified personnel should be permitted to work on them and safety procedures need to be followed. Safety of personnel is the top priority. Follow safety procedures for all work. Only qualified and experienced personnel should be permitted to work on airfield lighting series circuits. The following safety procedures shall be followed for the safety of personnel.

A. Contractor shall coordinate work and any power outages with the Airport Manager and the Resident Engineer/Resident Technician. Any shutdown of existing systems shall be scheduled with and approved by the Airport Manager prior to shutdown. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow U.S. Department of Labor Occupational Safety & Health Administration (OSHA) 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures including, but not limited to, 29 CFR section 1910.147 The Control of Hazardous Energy (lockout/tagout). Where the facility is not equipped with lockout/tagout equipment the Contractor will be responsible to provide the appropriate lockout/tagout equipment for safety of personnel.

B. The Contractor shall provide a copy of their electrical energy source Lockout/Tagout Procedures document to the Airport Director/Manager, Resident Engineer and the Project Engineer. The Lockout/Tagout Procedures document shall include the contact information with 24-hour phone numbers for the Contractor and the Electrical Contractor Superintendent and/or the respective licensed Journeyman Electricians on the project site.

C. Where existing electrical equipment does not have features for lockout/tagout the Contractor will be responsible for providing the appropriate lockout/tagout equipment and measures to ensure the safety of personnel.

D. Compliance with Lockout/Tagout Procedures and all other safety procedures and requirements are the responsibility of the Contractor, the respective maintenance personnel, and any other personnel working on the equipment or electrical system.

E. All electrical work shall comply with the requirements of NFPA 70 - National Electrical Code (NEC) most current issue in force, and all other applicable local codes, laws, ordinances, and requirements in force. Electrical equipment shall be installed in conformance with the respective manufacturer's directions and recommendations for the respective application. Any installations which void the UL listing, Intertek Testing

Services verification/ETL listing, (or other third-party listing) and/or the manufacturer's warranty of a device, will not be permitted.

F. Provide personnel protective equipment for all personnel working on or testing electrical systems suitable for the respective application. Provide protective equipment for personnel to keep them safe in the event of an arc flash or other electrical accident.

G. The respective personnel performing airfield lighting work, vault work, and/or tests shall be familiar with, and qualified to work on 5000 Volt airfield lighting series circuits, constant current regulators and associated airport electrical vault equipment. Every airfield lighting cable splicer shall be qualified in making cable splices and terminations on cables rated at and/or above 5000 Volts AC. The Contractor shall submit to the Project Engineer proof of the qualifications of each proposed cable splicer for the 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.

H. Contractor shall comply with the applicable requirements of NFPA 70E – Standard for Electrical Safety in the Workplace.

I. Per NFPA 70E Standard for Electrical Safety in the Workplace it defines Electrically Safe Work Condition as "A state in which an electrical conductor or circuit part has been disconnected from energized parts, locked/tagged in accordance with established standards, tested to verify the absence of voltage, and, if necessary, temporarily grounded for personnel protection." Prior to conducting tests or working on equipment, verify equipment enclosures and frames have a good and secure ground connection for the safety of personnel.

J. Personnel shall comply with the applicable requirements of FAA Advisory Circular Number 150/5340-26C "Maintenance of Airport Visual Aid Facilities". Obtain and review this document for your safety.

K. FAA Advisory Circular Number 150/5340-26C notes that there are three basic rules to remember when working on and around airport lighting circuits. These are noted as follows:

1. *ALWAYS assume that the circuit is energized until you have proven otherwise. ALWAYS check for current before disconnecting the series circuit connector, removing the S1 cutout, or opening the primary series circuit by any other means. Make it a required practice to check the circuit with an ammeter prior to breaking the connection – NO EXCEPTIONS. Never attempt to measure voltage in a series lighting circuit using ordinary volt meters. An inductive voltage measuring device (sometimes referred to as a "ticker") such as is described in Chapter 4 may be used to detect the presence of induced voltage on a series lighting cable after checking for the presence of current. Always use a true RMS clamp-on type ammeter to verify if the circuit is energized. ALWAYS check the operation of the test equipment on a known live circuit before and after measurements are taken.*

2. ***NEVER*** *under any circumstances open or break a live airfield series circuit. The voltage generated in the circuit can reach levels many times normal before the regulator's open circuit protection can shut it down. As long as a current flow can be maintained, even if it is through you, the regulator will continue to operate. This is one of the reasons that series circuits can be so hazardous to work around – there is no personnel protection provided such as might be found on parallel interior wiring.*

3. *NEVER enter a manhole with energized conductors and never handle cables or transformers in light bases while there is current present. Cables or connectors can have cracked insulation where it is not visible or may be deteriorated and fall apart, exposing you to live circuit conductors.*

L. Verify respective circuits and power sources prior to removing, disconnecting, relocating, installing, connecting, or working on the respective airfield lighting, taxi sign, NAVAID, or other device. Identify each respective circuit prior to performing work on that circuit. Disconnect the airfield lighting series circuit cables from the constant current regulator when performing work or tests on the respective circuit. Disconnect the power source for the respective lighting system, sign, Navaid or other device when performing work or tests on the respective circuit. Shut down and lockout the circuit for safety of personnel.

M. When performing work on an airfield lighting circuit the respective circuit shall be shut down and locked off for the safety of personnel. This includes, but is not limited to, light fixture, sign and/or Navaid removals, repairs, replacements, relocations, lamp replacements, transformer replacements, component replacements, and/or installations; cable work, removals, repairs, replacements, relocations, rerouting, splicing, connecting, testing, and/or installations; grounding work, repairs, replacements, corrections, testing, and/or installations; Airport Electrical Vault work, constant current regulator work, and/or other electrical work.

N. Make sure each constant current regulator has a good and secured frame ground connection from the regulator housing to the respective vault ground bus and grounding electrode system, prior to operation and testing of each regulator.

O. Avoid placing materials on top of constant current regulators. Maintain clearance about constant current regulators for air flow and cooling.

P. Make sure each airfield light fixture, sign, and Navaid has a good and secured frame ground connection from the respective device to the respective grounding electrode system, prior to operation, working on, and/or and testing of the device.

Q. Never come in contact with water surrounding an active airfield lighting series circuit. Do not put your hand in a junction structure, splice can, handhole, manhole or other raceway system containing live airfield lighting circuits with water. The water may conduct electricity and cause harm, electric shock, injury or death.

R. Series circuit disconnects are required for each constant current regulator in accordance with FAA AC 150/5340-30J “Design and Installation Details for Airport Visual Aids”. The following practices are recommended and/or required for series circuit cutouts/disconnects and the associated airfield lighting series circuit wiring.

1. The Type S-1 Series Plug Cutout is a series circuit disconnecting device installed at the output side of a constant current regulator (CCR). With the handle plug assembly removed, the cutout isolates the CCR output from airfield lighting series circuit loop for maintenance and personnel safety. The S-1 cutout also shorts the series loop and shorts the regulator secondary for helping with servicing, maintenance, and troubleshooting.

2. Provide series plug cutouts for each constant current regulator as detailed on the Plans. Series plug cutouts shall be Type S-1, rated 5KV, 20-Amps, and shall comply with FAA AC 150/5340-30J. Cutouts shall be certified in writing by the manufacturer as suitable for the respective application. Cutouts shall disconnect the input from the output, short the input terminals, and short the output terminals when the handle/plug is removed. Series plug cutouts shall be Crouse-Hinds, Type S-1, Model 2, Catalog Number 30775, Manairco Catalog Number MRS1, or an approved equal. Series cutouts where the manufacturer has noted their cutouts are not recommended to operate with the handle pulled/removed are not acceptable. Other cutouts, that do not function as detailed on the Plans or that are not suitable for the respective application, are not acceptable.

3. Install the series plug cutouts in a NEMA 1 or NEMA 12 painted steel enclosure adequately sized to house the cutout(s), with a hinged cover and back panel to mount the cutouts. All enclosures shall be pad lockable. Where existing cutout enclosures are used provide pad lock kits for each existing enclosure. The installation of series circuit cutouts shall accommodate lockout/tagout for safety of personnel.

4. Never remove or insert a series circuit plug cutout/disconnect with the circuit energized. Removal of a series circuit plug cutout/disconnect on an energized circuit can result in an arc flash that may cause injury, burns, and harm to personnel. Always shutoff and lockout input power to the respective constant current regulator prior to pulling or inserting a series plug cutout.

5. Series circuit plug cutouts/disconnects shall only be used on airfield lighting series circuits in accordance with the respective manufacturer’s instructions. Verify ratings and applications with each respective series plug cutout manufacturer. Note, observe, and verify the differences in applications for the different manufacturer series plug cutouts. Confirm ratings and suitability for the respective application with each respective cutout manufacturer. Some manufacturer’s Type S-1 series circuit cutouts might not be suitable for applications that other manufacturer’s Type S-1 series circuit cutouts are rated for.

6. Know the difference between Type S-1 series circuit plug cutouts and Type SCO series circuit plug cutouts. Type SCO cutouts do not operate the same as Type S-1 cutouts. Examples of Type S-1 cutouts include Crouse-Hinds, Type S-1, Model 2, Catalog Number 30775, and Manairco Catalog Number MRS1. Example of Type SCO cutout is ADB Safegate Part Number 1475.92.030 and Part Number 1475.92.030-1. Refer to the respective installation instructions for each type of cutout. This is important for the safety of personnel.

7. Series circuit wiring shall be installed in enclosed raceways. No exposed airfield lighting series circuit cables (L-824) will be permitted in the Airport Electrical Vault. In accordance with National Electrical Code Article 300, Part II Requirements for over 1000 Volts, Nominal, Part 300.37 Aboveground Wiring Methods, Exception, it notes: "*Airfield lighting cable used in series circuits that are powered by regulators and installed in restricted airport lighting vault shall be permitted as exposed cable installations."* An Airport Electrical Vault is a restricted access facility limited to access by qualified persons only. Often airport electrical vault buildings do not have provisions to limit access to only qualified personnel. Therefore, no exposed airfield lighting series circuit cables will be permitted in the Airport Electrical Vault.

8. Maintain separation of high-voltage airfield lighting 5000 Volt series circuits from low-voltage circuit wiring (120 VAC, 208 VAC, 240 VAC, 480 VAC or other wiring rated 600 Volts and below). High-voltage wiring and low-voltage wiring shall not be installed in the same wireway, conduit, duct, raceway, junction box, handhole, or manhole. High-voltage airfield lighting 5000 Volt series circuits wiring shall enter each respective regulator at the high-voltage/series circuit output section of the regulator. 208 VAC, 240 VAC, or 480 VAC input power wiring shall enter each respective regulator at the low-voltage/input power section of the regulator. Control wiring shall enter each respective regulator at the control section of the regulator.

S. The following are a list of incidents that have taken place on airfields that resulted in dangerous conditions, injuries, electric shock, and/or death. These are provided for informational purposes to help keep personnel safe.

1. Situation 1; In 2023 a taxiway circuit was tested to be in very poor and dangerous condition. The circuit was energized and the Airport staff drove around to see if any lights were on. They observed one of the airfield lighting series circuit transformers was above grade and was on fire on a wet day. The Airport Maintenance Person got out of the truck to go look at the transformer that was on fire. The Hanson employee on site told the Airport Maintenance Personnel to get back in the truck immediately and explained that a 5,000 Volt series circuit on fire in wet conditions can cause electrocution to someone getting into the nearby wet grass and/or standing water. Injury was avoided on this day.

2. Situation 2; The taxiway circuit identified in Situation 1 was troubleshooted by qualified personnel. The circuit was energized, and the Electrical Contractor drove around to see if any lights were on. They observed one of the taxiway lights having steam coming out of the light base due to boiling water caused by a bad transformer and/or ground fault condition. The Contactor recorded this with a video and shortly after the taxiway light fixture blew up and caused an arc flash.

3. Situation 3; The Electrical Contractor was changing light bulbs on a live airfield lighting series circuit. The Contractor did not have the circuit shut off nor was it locked off and tagged off per OSHA requirements. The Contractor was wearing gloves to protect his hands from possible broken lamps. The Contractor had one hand on a lamp and grabbed the stem of the light fixture with his other hand and it blew off the thumb on his hand. The light fixture stem was shorted to the series circuit.

4. Situation 4; The Electrical Contractor was changing light bulbs on a live airfield lighting series circuit. The Contractor did not have the circuit shut off nor was it locked off and tagged off per OSHA requirements. The Contractor had one hand on a lamp and grabbed the stem of the light fixture with his other hand and it blew off the index finger on his hand. The light fixture stem was shorted to the series circuit.

5. Situation 5; An Electrical Contractor was working on a base mounted airfield light fixture on a live airfield lighting series circuit. The Contractor did not have the circuit shut off nor was it locked off and tagged off per OSHA requirements. The contractor was removing the bolts for the light base cover. He had 5 of the six bolts removed. When he removed the sixth bolt the cover blew off and hit him in the face due to a ground fault condition and losing the ground path when the last bolt was removed. It is important to have light base covers connected to ground with a bonding jumper or ground strap to maintain safety of personnel. FAA AC 150/5340-30j requires the following light fixture bonding for safety of personnel: *Bond the light fixture to the light base internal ground lug via a No. 6 AWG stranded copper wire rated for 600 volts with green XHHW, THWN-2, or other suitable insulation, bare stranded conductor or a braided ground strap of equivalent current rating. The bonding conductor length must be sufficient to allow the removal of the light fixture from the light base for routine maintenance.*

6. Situation 6; During an electrical survey at an Airport it was observed that the electric utility transformer for the Airport Electrical Vault Building had been changed from a 25 KVA unit to a 100 KVA unit to accommodate additional temporary electric services for the annual festival that took place at the Airport. The electric service to the Airport Electrical Vault is 120/240 VAC, single phase, 3 wire. The previous 25 KVA utility transformer had a maximum calculated fault current that was less than 10,000 Amps, and the service disconnect and distribution panelboard were adequately rated for fault current not exceeding 10,000 Amps at 120/240 VAC. The replacement 100 KVA transformer had an impedance of 1.73 percent and a maximum calculated fault current of 17,705 Amps. The existing Service Disconnect had 200 Amp, Bussmann NON-200

One-Time General Purpose Fuses that had 10,000 Amp Interrupting Rating which were no longer suitable for the available fault current. The Distribution panelboard had a 200 Amp, 2 pole main breaker with 22,000 AIC at 240 VAC and branch breakers that were rated 10,000 AIC at 120/240 VAC. To address the higher available fault current of 17,705 Amps the following corrective action was taken. The existing 200 Amp, Bussmann NON-200 One-Time General Purpose Fuses in the service disconnect were replaced with 200 Amp, Type RK5 fuses that had 100,000 Amp Interrupting Rating. To make the distribution panel fully rated for 22,000 AIC at 120/240 all of the branch and feeder circuit breakers were replaced with new breakers that were rated 22,000 AIC at 120/240 VAC. The point to this is that situations can change that affect existing electrical equipment ratings. When the vault service and distribution equipment was originally installed it was properly rated and suitable for the application where served by a 25 KVA transformer that had a fault current of less than 10,000 Amps. The change to the larger 100 KVA transformer was not coordinated with the vault electric service and distribution equipment. This was discovered after the transformer had been replaced with a larger unit. Upon its discovery, corrective action was taken to address this unsafe situation. Please be aware when doing work on electric service and distribution systems it is important to verify the maximum available fault current at the equipment and verify that the respective equipment is properly rated for the fault current. Sometimes changes will be necessary to ensure the equipment is properly rated to safely trip the circuit breakers or blow the fuse in the event of a fault. Where equipment is not adequately rated for the fault current it might be subject to damage and unsafe conditions for personnel in the event of a fault. Such conditions need to be addressed and corrective action needs to be taken.

7. Situation 7; Several years ago a client contacted us and noted they had lightning damage on their runway lighting circuit. Approximately 16 runway light fixtures and transformers were damaged and in some cases the transformers were blown out of the circuit (and disconnected). The client explained that the constant current regulator for the runway lighting system would operate providing 6.6 Amps but 0 (zero) volts output indicating a shorted output. They noted when they switched over to the backup regulator it would not run and provided an open circuit loop alarm. It was explained the client to be very cautious about the regulator that was providing 6.6 Amps output at zero volts output. It sounded like the output lightning arrestors on the regulator had blown and shorted to ground (the frame of the regulator). This condition had the output current running through the metal frame/housing of the regulator and is a concern of electric shock or electrocution. A qualified electrician investigated and determined that both output lightning arrestors had blown and shorted to the frame of the regulator. The regulator was shut down and repairs were made. Based on the above please note the following safety concerns.

    - It is required and important that each constant current regulator always has a good and secure ground connection from its frame to a good grounding electrode system. When operating a constant current regulator confirm it has a good and secure ground connection to its frame prior to operation. This is important for the protection of personnel. In the above

situation, if the regulator did not have a good ground to its frame, a condition would have existed that could have caused electric shock or electrocution.

- It is recommended to include an output voltage meter on constant current regulators for testing, maintenance, and troubleshooting purposes. This is an optional feature, not a standard feature, and therefore needs to be included with the specification for the respective regulator. Having an output voltage meter on the regulator identified above helped us to determine the failure and unsafe condition.

- An airport electrical vault is a restricted access electrical facility for qualified and authorized personnel only. Anytime you enter an airport electrical vault you need to be accompanied by someone that is authorized and qualified to ensure your safety. Also note that just because someone is “authorized and qualified”, does not mean that they will also take responsibility for your safety. If you are not comfortable entering an airport electrical vault, please stay out. Your safety is always important and needs to be the priority.

8. Situation 8; In July 2009 we were working at an airport and observing the installation of a new airport electrical vault building and airfield lighting equipment. An airport vault is a building that contains electrical power and airfield lighting equipment and controls. The electrical contractor staff performing the installation had left the site to go work at another location and brought in a different two-man crew (journeyman and apprentice) that was not completely familiar with the status of the work completed to date. We had worked for several days addressing problems and were at the point of testing the new vault equipment. Tests were conducted in the morning and the airfield lighting was observed to be in working order. In the afternoon the apprentice began demolition of the old vault. The electric service had been disconnected and removed from the old vault a number of days earlier. Tests were conducted again in the afternoon for demonstration to the Airport Manager and it was discovered that one of the runway circuits no longer worked. Investigation found that there was an old homerun circuit to the old vault that had not been disconnected from the airfield lighting. The apprentice had removed the old series circuit disconnecting means (cutout) and it resulted in an open circuit condition for the runway lighting series circuit, which caused the lights to no longer work. Remember this old vault had no electric service power, but it still had a live circuit running to it that originated from the new vault. This was an extremely dangerous condition. The issue was corrected, and no one was hurt. The point of this is to be aware of the possible dangers that might occur when a different crew is brought in to complete the work of others. And never assume a circuit is dead unless it has been checked and verified as disconnected at the power source AND disconnected at the respective system it is powering (disconnected at both locations). Please always take measures to ensure your safety and the safety of those you are working with.

9. Situation 9; In April 2011 we were testing a new taxiway lighting system on an old constant current regulator. The cover of the constant current regulator was off for testing and startup purposes. The Resident Technician was looking at the regulator and was told not to look at the regulator during a startup. The Resident Technician was not a qualified electrical person and left the site for safety purposes. The regulator was turned on and tested with no load. The regulator was observed to operate properly. The regulator was shut off and the taxiway lighting circuit was connected to it. The regulator was again turned on and one of the capacitors exploded and caught fire. This is an example of why you should not look at electrical equipment during start up until considered safe and you have appropriate personal protection equipment. It is also an example of the need for personnel protective equipment, clothing, face protection and other protection during start up, testing and operation of electrical equipment.

10. Situation 10; A laborer was performing an airfield lighting series circuit splice connection. He had not practiced lockout/tagout for the respective circuit. An Airport maintenance person decided to check the respective airfield lighting for burnt out lamps and turned on the circuit while the laborer was performing a splice. The laborer received electric shock and had to be taken to a hospital for medical attention. The laborer was reported to have spent two days in the hospital and did recover. The point to this is that only qualified and experienced cable splicers are permitted to perform airfield lighting series circuit connections and lockout/tagout procedures must be followed for safety of personnel.

11. Situation 11; An electrical contractor crew was working on an airfield lighting system. The electrical contractor pulled the airfield lighting series circuit cutouts/disconnects in the Airport Electrical Vault. The Electrical contractor thought they had all airfield lighting series circuits disconnected but actually had one circuit that was not disconnected and was a live circuit. An apprentice electrician went to work on the one circuit that was not disconnected and was electrocuted and died on the site. This is an example of why it is important to verify all power sources, shut off and disconnect power to each respective constant current regulator AND disconnect each respective airfield lighting series circuit/cutout and lockout/tagout the respective circuits.

12. Situation 12; An airport maintenance electrician was working on a taxi guidance sign during daylight hours. The maintenance electrician did not verify the respective series lighting circuit and did not practice lockout/tagout. The maintenance staff thought the respective circuit was off but mistakenly identified the wrong circuit. The maintenance electrician went to work on the taxi sign and received electric shock and required medical attention. The maintenance electrician did survive this incident. This is another example of why it is important to verify all power sources, shut off and disconnect power to each respective constant current regulator AND disconnect each respective airfield lighting series circuit/cutout and lockout/tagout the respective circuits. During the daylight all of the series circuits could have been shut down and not affected airfield operations. The safety of personnel is the most important issue.

13. Situation 13; An airfield maintenance staff person was troubleshooting an airfield lighting series circuit. They were in communication with the Air Traff Control Tower (ATCT) staff and having them turn the circuit off. They were not practicing lockout/tagout of the circuit and were relying on the Air Traffic Control Tower staff to tell them when the circuit was off. They requested the ATCT to turn off the circuit and the ATCT person reported back the circuit was off. The circuit had not been turned off as reported and the maintenance person died due to electrocution while working of the circuit. The point to this is, never trust someone else to shut off and lockout a circuit. You need to shut off and lockout circuits for your protection and safety.

14. Situation 14; In May 2019, it was observed during a vault survey that all of the Type SCO series circuit cutouts were wired incorrectly. This was reported to the head maintenance electrician at the Airport. The head maintenance electrician took a serious interest in this situation and requested directions for correction. The head maintenance electrician informed us that the reason he became the head maintenance electrician was because his previous supervisor had been electrocuted and died while working on an airfield lighting series circuit.

15. Situation 15; it was a very hot day in July 2011. The heat index was reported to be 122 degrees F. The actual temperature was observed on a local thermometer as 113 degrees F. An electrical contractor was working on an airfield lighting series circuit. People on site including engineering staff and contractor staff were getting overheated and it was affecting their judgement. One of the electricians received a phone call about a friend of his that was also an electrician and that was working on another nearby job site. This electrician had been electrocuted and died on the job site. The point is that weather conditions can create unsafe working conditions, and this always needs to be considered for the safety of personnel.

16. Situation 16; Please note when electrical/mechanical equipment and/or materials are energized after installation, repairs, relocation, maintenance, servicing, or other applications there is a danger of arc flash, fire, or other unsafe conditions that might take place. When in the field observing work, stand clear of and do not look at electrical/mechanical equipment/materials when being turned on until it is confirmed to be safe and operating properly. Often during startups equipment can cause an arc flash, fire, or come apart due to defective components, incorrect wiring, failing or weakened components, incorrect application, or other factors that might affect the installation. This is a dangerous situation that can cause injury, fire, or death. Please make sure to always consider your safety and the safety of others. Many of these installations are restricted to qualified and authorized personnel only. Regardless of your qualifications you need to make sure your safety is always addressed.

17. Situation 17; When using a voltmeter to check if a circuit is live always check the meter first on a known live source to confirm the voltage meter is working properly. Many years ago, we (my supervisor at the time and myself) were working at a project site and were checking an electric service for the voltage and got no voltage reading on the voltmeter. We were pretty sure the service was

active so we checked again with a second voltmeter and got no voltage reading on the meter. We were not convinced this service was off and therefore checked it again with a third voltmeter and got no voltage reading on the meter. An electrician was on site and we asked him about the service and he used his voltmeter and confirmed the service was active. We had three different voltage meters that all had bad batteries and were giving false readings. Never assume an electrical system is off unless you have confirmation the system is shut off and have checked it with a known working voltage meter. Additionally if you are not comfortable or qualified to use a voltage meter, leave that task to those that are qualified. Regardless of your qualifications you need to make sure your safety is always addressed.

18. Situation 18; During an airport electrical vault survey, we observed a Type S-1 series circuit plug cutout wired to a 120 VAC Circuit for use as a primary disconnect to a 120 VAC to 480 VAC step-up transformer. This is an unacceptable and dangerous practice. The Airport maintenance staff noted that each time they try to shut off the transformer it blows up. When the cutout plug is removed it causes a line to neutral fault (short circuit between phase conductor and neutral) and an arc flash. This puts the personnel at risk of injury, burns, and harm. The series circuit cutout in this application needs to be disconnected, removed, and replaced with a heavy duty 30 Amp, 240 VAC, 2 pole, safety switch suitable for the 120 VAC power application. Series circuit plug cutouts shall only be used on airfield lighting series circuits in accordance with the respective manufacturer's instructions.

19. Situation 19; An Airport Manager contacted us and noted the circuit breaker had tripped for their main runway lighting constant current regulator. This was during the summer on a day when the ambient temperature was 103 degrees Fahrenheit. It was suggested that they check the Airport Vault building fan to make sure it was operating properly. The Airport Manager confirmed the fan was operating. A few minutes later the Airport Manager called and noted that he discovered they had a filter on the intake air louver, and it was completely clogged with dirt. The Airport Manager noted they were not aware that this intake air louver included a filter and that it might not have been changed since the original installation of the Airport Vault building. Note it is important that constant current regulators have adequate air flow and cooling to accommodate proper operation. Confirm ventilation and cooling systems are in proper working order.

20. Situation 20; Two electricians were troubleshooting an airfield lighting series circuit. Both were experienced electricians with more than 30 years of experience each but had little knowledge and experience with constant current regulators. They put a 600 Volt rated voltmeter across the output terminals of the constant current regulator and blew up the meter. The electricians were not aware that the maximum output voltage for the 7.5 KW constant current regulator was over 1100 Volts. Neither electrician was harmed, but the voltage meter was destroyed. It is recommended to include an output voltage meter on constant

current regulators for testing, maintenance, and troubleshooting purposes. This is an optional feature, not a standard feature, and therefore needs to be included with the specification for the respective regulator. Having an output voltage meter on the regulator identified would have helped avoid the unsafe condition that occurred.

SAFETY OF PERSONNEL IS THE PRIORITY ON THE JOB. PLEASE ALWAYS PRACTICE SAFETY PROCEDURES FOR THE PROTECTION OF PERSONNEL.

METHOD OF MEASUREMENT

125-4.1 Add the following:

"All lockout/tagout procedures to ensure and maintain safety of personnel will be considered incidental to the respective item of work for which it applies, and no additional compensation will be allowed.

The transformer base can and series isolation transformer, associated with the light fixture or other airfield lighting device, and slack cable to perform cable connections outside of the base can, will be considered incidental to the respective light and no additional compensation will be allowed.

The series isolation transformer associated with the light fixture, taxi guidance sign, wind cone, REIL, Navaid, or other airfield lighting device, will be considered incidental to the respective device and no additional compensation will be allowed.

Ground resistance tests for the made electrode ground system at each airfield light fixture and/or airfield sign will be considered incidental to the respective airfield light fixture and/or airfield sign and no additional compensation will be allowed.

Testing the airfield lighting systems and the associated constant current regulator tests and cable tests will be considered incidental to the respective work item for which they are installed, and no additional compensation will be allowed.

Spare parts for the airport visual aid/airfield lighting system will be considered incidental to the respective airfield lighting system pay items and no additional compensation will be allowed.

Conduits, conduit nipples, conduit couplings, and other conduit fittings included with splice cans, junction structures, Navaid installations, base mounted airfield light fixtures, airfield signs, and/or other airfield fixtures, will be considered incidental to the respective item for which they are installed, and no additional compensation will be made.

Ground rods, grounding electrode conductors, connections, and associated grounding work included with airfield lights and/or airfield guidance signs will be considered incidental to the respective item for which they are installed, and no additional compensation will be made.

All temporary wiring will be considered incidental to the associated work for which it is necessary, and no additional compensation will be allowed.

All cable and duct removals associated with airfield lighting removals, relocations, and /or cable or duct replacements will be considered incidental to the associated work and no additional compensation will be allowed.

The quantity of airfield guidance signs to be paid for under this item shall be the number of each type installed as completed units in place, ready for operation, and accepted by the Resident Engineer. The transformer can, associated with the airfield guidance sign, and slack cable to perform cable connections outside of the transformer can, will be considered incidental to the respective airfield guidance sign and no additional compensation will be allowed. Ground resistance tests for the made electrode ground system at each taxi guidance sign will be considered incidental to the respective airfield guidance sign and no additional compensation will be allowed.

The quantity of taxi sign panel replacements to be paid for shall be the number of each size panel that is removed and replaced with new sign panel as detailed on the Plans, installed as completed units in place, ready for operation, and accepted by the Engineer.

All cable and constant current regulator testing will be considered incidental to the respective item for which it is required.

The quantity of taxiway edge light replacements to be paid for under Item AR125921 Replace Stake Mounted Light shall be the number of existing incandescent taxiway edge lights that are removed and replaced with new L-861(T) LED taxiway light fixtures, new properly sized series isolation transformers, mounting hardware, grounding, and secondary connectors installed as completed units in place, ready for operation, and accepted by the Engineer.

The quantity of taxiway edge light replacements to be paid for under Item AR125922 Replace Base Mounted Light shall be the number of existing incandescent taxiway edge lights that are removed and replaced with new L-861(T) LED taxiway light fixtures, new properly sized series isolation transformers, mounting hardware, grounding and secondary connectors installed as completed units in place, ready for operation, and accepted by the Engineer."

BASIS OF PAYMENT

125-5.1 Add the following:

"Payment will be made at the contract price for each completed airfield light fixture, each completed taxi guidance sign, each replacement taxiway edge light, and each replacement sign panel installed in place by the Contractor and accepted by the Resident Engineer/Resident Technician. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials; and for all excavation, backfilling, and restoration; and for all labor, testing, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item AR125510	MIRL, Base Mounted – per EACH
Item AR125545	MI Threshold Light Base Mtd – per EACH
Item AR125931	Replace Light Lense – per EACH
Item AS125411	MITL-Stake Mounted-LED – per EACH
Item AS125416	MITL-Base Mounted-LED – per EACH
Item AS125444	Taxi Guidance Sign, 4 Character – per EACH
Item AS125470	Modify Existing Sign Panel – per EACH
Item AS125921	Replace Stake Mounted Light – per EACH
Item AS125922	Replace Base Mounted Light – per EACH

END OF ITEM 125

ITEM – AU125615 PAPI (L-880 SYSTEM)

DESCRIPTION

125615-1.1 This item of work shall consist of furnishing and installing an L-880(L) Light Emitting Diode) Precision Approach Path Indicators (PAPI's) and the associated foundations, concrete, conduits, ducts, wiring, splice cans and grounding at the locations shown on the Construction Plans. Each installation will be in accordance with the details on the Plans and these Special Provisions. This item shall include the circuit breakers, wire, labeling, legend plates, and associated electrical materials and labor in the Airport Electrical Vault, necessary to power the PAPI systems. Also included in this item will be the testing of the installation and all incidentals necessary to place each respective PAPI system into proper operation and to the satisfaction of the Engineer.

125615-1.2 REFERENCES. Note: where FAA Advisory Circulars are referenced, they shall be the current issue or issues in effect.

A. ANSI C80.1 – Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.3 – Steel Electrical metallic Tubing (EMT).

C. ANSI C80.4 – Fittings Rigid Metal Conduit and EMT.

D. FAA AC No. 150/5340-30 (current issue in effect) "DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS."

E. FAA AC No. 150/5345-28 (current issue in effect) "PRECISION APPROACH PATH INDICATOR (PAPI) SYSTEMS"

F. FAA AC 150/5345-42 (current issues in effect) "Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories"

G. FAA AC No. 150/5345-53 "AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM" (current issue in effect) and AC 150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum (current issue in effect).

H. FAA AC No. 150/5370-2 (current issue in effect) "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

I. NEMA TC-2 – Electrical Plastic Tubing and Conduit.

J. NEMA TC-3 – Fittings Rigid PVC Conduit and Tubing.

K. NFPA 70 – National Electrical Code (most current issue in force).

L. NFPA 70E – Standard for Electrical Safety in the Workplace

M. NFPA 2638645-1 = National Fire Protection Association IDN.

N. OSHA 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures

O. UL Standard 6 – Rigid Metal Conduit.

P. UL Standard 467 – Grounding and Bonding Equipment.

Q. UL Standard 486A-486B Wire Connectors.

R. UL Standard 514B – Conduit, Tubing and Cable Fittings.

S. UL Standard 651 – Schedule 40 and 80 Rigid PVC Conduit.

125615-1.3 SHOP DRAWINGS. The Contractor shall furnish shop drawings for approval before ordering equipment and/or materials. Shop drawings are required for PAPI units and materials to be used on the project. **Shop drawings shall be clear and legible. Copies that are illegible will be rejected.** The preferred shop drawing submittal format shall be electronic (PDF) copies. Shop drawings shall include the following information:

A. In order to expedite the shop drawing review, inspection and/or testing of materials and equipment, the Contractor shall furnish complete statements to the Project Engineer as to the origin and manufacturer of all materials and equipment to be used in the work. Such statements shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials and equipment.

B. Provide certification of compliance with the Steel Products Procurement Act.

C. Provide cut sheets and specifications for the PAPI's.

D. Concrete mix design.

E. Provide cut sheets for L-867 light bases.

F. Provide cut sheets with manufacturer's name, catalog number, dimensions, material and UL listing for each type and size ground rod. Include certification of 100% domestic steel for ground rods. Include cut sheets for exothermic weld connections, ground lugs, and ground wire.

G. Provide cut sheets for all types of conduits used with the PAPI installation (for example galvanized rigid steel conduit, EMT, and liquid-tight flexible metal conduit). Include certification that steel conduits are made with 100 percent domestic steel.

H. Provide cut sheets for reinforcing steel. Include certification that reinforcing steel is made with 100 percent domestic steel.

EQUIPMENT AND MATERIALS

125615-2.1 PAPI UNITS. The light units and power and control unit for the PAPI shall meet the requirements of FAA AC 150/5345-28 (current issue if effect) FAA approved, Type L-880(L) (System consisting of 4 light units with Light Emitting Diode type illumination), Style A (Voltage powered system suitable for operation on a nominal 240 VAC, 60 Hertz, single phase, 2-wire system), Class I (Systems that operate from -31 degrees Fahrenheit (F) (-35 degrees Celsius [C]) to 131 degrees F (55 degrees C)). Baffles shall be provided to potentially set the limits of the horizontal light distribution, in accordance with FAA AC 150/5340-30J, Figure A-81 PAPI Obstacle Clearance Surface, FAA Order JO 6850.2C, Visual Guidance Lighting Systems, and in accordance with the notes on the PAPI Siting Details and Notes plan sheet(s) within the contract documents."

125615-2.3 POWER AND CONTROL CABLE. Power cables from the respective power source to the respective PAPI installation shall be sized as detailed on the Plans and in conformance with Item 108. The power and control cable between the PAPI light units shall be as recommended by the respective PAPI manufacturer.

125615-2.4 CONDUIT AND DUCTS. Conduit and ducts for the PAPI systems shall conform to Item 110, per manufacturer's recommendations, as detailed on the Plans, and as specified herein.

A. Conduit for power and control cables between the PAPI units shall be 2-inch Galvanized Rigid Steel Conduit with threaded fittings, or larger where required by NEC and/or manufacturer's recommendations for the respective cables. GRSC shall be heavy wall, hot-dipped, galvanized steel pipe bearing the UL label and conforming to UL-6 and ANSI Specification C80.1. Couplings, connectors, and fittings for rigid steel conduit shall be threaded galvanized steel or galvanized malleable iron specifically designed and manufactured for the purpose. Fittings shall conform to ANSI C80.4 and UL-514B. Galvanized rigid steel conduit shall be produced from 100 percent domestic steel. Contractor shall provide certification that the respective steel conduits used on this project are manufactured from 100 percent domestic steel.

B. Electrical Metallic Tubing (EMT) shall be used for the PAPI mounting legs. EMT shall be galvanized steel tubing conforming to ANSI C80.3 and U.L. 797. All EMT and mounting hardware shall be constructed of corrosion resistant materials and be listed for use in wet locations. EMT fittings, couplings and connectors shall be steel compression type. Set screw fittings will not be allowed. The steel used to manufacture conduits shall be 100 percent domestic steel. Contractor shall provide certification that the respective steel conduits used on this project are manufactured from 100 percent domestic steel.

C. Liquid-Tight Flexible Metal Conduit. Liquid-tight, flexible metal conduit shall consist of polyvinyl jacket over flexible hot dip galvanized steel tubing. The flexible conduit shall be completely sealed from liquids, dust, dirt, and fumes and be resistant to oil, gasoline, grease, and abrasion. The jacket shall also be sunlight-resistant. Liquid-tight flexible metal conduit shall be UL-listed, suitable for use as a grounding conductor, and comply with Article 350 of the NEC. Liquid-tight flexible metal conduit and associated fittings shall be UL-listed to meet the requirements of NEC 350.6. Liquid-tight flexible metal

conduit shall be Anaconda Sealtite Type UA as manufactured by Anamet Electrical Inc., Liquatite Type LA as manufactured by Electri-Flex Company, Liquid-Tuff Type LFMC as manufactured by Atkore International AFC Cable Systems or approved equal. Do not install liquid-tight, flexible metal conduit that is not UL listed. Confirm liquid-tight, flexible metal conduit bears the UL label prior to installation. Steel used to manufacture conduits shall be 100 percent domestic steel. Contractor shall provide certification that the respective steel conduits used on this project are manufactured from 100 percent domestic steel.

D. Conduits for grounding electrode conductors shall be Schedule 80 (minimum) PVC, UL-listed, rated for 90°C cable-conforming to NEMA Standard TC-2 and UL 651, listed suitable for concrete encasement and direct burial in earth.

125615-2.5 SPLICE CANS. Splice cans shall conform to the requirements of FAA AC 150/5345-42 (current issues in effect) for Type L-867, Class IA, Size B (12-inch nominal diameter), 24-inch deep. Splice/transformer cans shall have 2" hubs at 0 degrees and at 180 degrees. Splice cans shall have galvanized steel or aviation yellow powder coat painted steel covers, 3/8 inch thick, or as recommended by the respective PAPI manufacturer where the splice can is installed at the PAPI installation. Coordinate selection of L-867 covers and hub/hole openings with the respective PAPI manufacturer to ensure compatibility with each respective PAPI unit. Include internal and external ground lugs on each L-867 splice can.

125615-2.6 ANTI-SEIZE COMPOUND. The Contractor shall apply an oxide-inhibiting, anti-seizing compound to all screws, nuts, breakable coupling, and all places where metal comes into contact with metal.

125615-2.7 STAINLESS STEEL BOLTS. All base plate-mounting bolts shall be stainless steel.

125615-2.8 GROUND RODS. Ground rods shall be 3/4-inch diameter by 10-feet long UL listed copper clad, with 10-mil minimum copper coating. Steel used to manufacture ground rods shall be 100 percent domestic steel.

125615-2.9 CONCRETE. Concrete associated with the each PAPI foundation piers/pad and/or splice can shall conform to Item 610 Portland Cement Concrete of the Standard Specifications for Construction of Airports and as detailed on the Plans.

125615-2.10 CIRCUIT BREAKERS. Circuit breakers, to be installed in the existing vault panelboard, shall be compatible with the existing panelboard. Circuit breakers shall be bolt-on type with an amp interrupting capacity of 10,000 Amps minimum at 120/240 VAC. Circuit breaker amperage trip settings and number of poles shall be as detailed on the Plans. Existing spare breakers in the Vault may be used where available and where they are the proper size for the application.

125615-2.11 THWN WIRE. Cable shall comply with Underwriters' Laboratories Standard UL-83 and Federal Specification A-A-59544. Conductor shall be soft-annealed, uncoated Copper and shall comply with ASTM B3 and B8. Insulation shall be rated for 600-Volt. The insulation shall be polyvinyl-chloride conforming to Underwriters' Laboratories requirements for Type THW. The outer covering shall be nylon-conforming to Underwriters' Laboratories for type THHN or THWN. Cable shall be UL-listed and marked THWN.

CONSTRUCTION METHODS

125615-3.1 INSTALLATION OF PAPI SYSTEMS. Installation of PAPI systems shall conform to FAA AC No. 150/5345-28 (current issue in effect) titled "PRECISION APPROACH PATH INDICATOR (PAPI) SYSTEMS" and the respective manufacturer's instructions, as detailed on the Plans, and as specified herein. The Contractor shall construct concrete bases for the PAPI system units per manufacturer's instructions and recommendations and/or as shown on the Construction Plans. All bolt placements will be as per the manufacturer's recommendations. The structural legs shall have breakable couplings not more than 2 in. from the top of the respective base/foundation. Coordinate conduit installations into the bases as applicable for power, control, and/or grounding cable conduits. Conduits between the PAPI light units and between the PAPI Power and Control Unit and PAPI light units shall be 2-inch galvanized rigid steel conduit for lightning protection and equipment protection. The power control unit shall be installed in the location shown on the Plans. The poles/support posts installed to support the unit will be anchored in concrete typical to the PAPI base, and each pole/support post shall have a breakable coupling not more than 2 in. from the top of the concrete base/foundation.

The PAPI units shall be installed and aimed in accordance with manufacturer's specifications and instructions. The aiming angles shall comply with those shown on the Plans.

The Contractor will install all the required electrical equipment and materials in the electrical vault to place the proposed PAPI units into operation. The furnishing and installing of electrical equipment and materials in the vault will be incidental to the respective PAPI pay item and no additional compensation will be allowed.

125615-3.2 ELECTRICAL. The Contractor shall furnish and install all electrical materials necessary for the complete and operational installation of the PAPI systems as shown on the plans and detailed herein. The complete installation and wiring shall be done in a neat, workmanlike manner. All electrical work shall comply with the requirements of the NFPA 70 - National Electrical Code (NEC) most current issue in force. Electrical equipment and materials shall be installed in conformance with the respective manufacturer's directions and recommendations for the respective application. Any installations which void the UL listing, Intertek Testing Services verification/ETL listing, (or other third-party listing), and/or the manufacturer's warranty of a device will not be permitted.

A. Keep a copy of the latest NEC in force on site at all times during construction for use as a reference. Contractor shall keep a copy of the Plans, Special Provision Specifications including any addenda, and copies of any change orders on site at all times during construction.

B. Examine the site to determine the extent of the work. Contractor shall field verify existing site conditions and follow safety procedures for protection of personnel. All work, power outages, and/or shutdown of existing systems shall be coordinated with the Airport Manager and the Resident Engineer/Resident Technician. Any shutdown of existing systems shall be scheduled with and approved by the Airport Manager prior to shutdown. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow U.S. Department of Labor Occupational Safety & Health Administration (OSHA) 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and

lockout/tagout procedures including, but not limited to, 29 CFR section 1910.147 The Control of Hazardous Energy (lockout/tagout).

C. Verify respective circuits and power sources prior to removing, disconnecting, relocating, installing, connecting, or working on the respective airfield lighting, taxi sign, NAVAID, or other device. Identify each respective circuit prior to performing work on that circuit.

D. Install PAPI's and other airfield lighting devices in accordance with the details shown on the Construction Plans.

E. New cable shall be furnished from the Vault to each respective PAPI system as detailed on the Plans and Specified herein. The cable will be paid for under Item 108.

F. Locate existing underground utilities, cables and lines. The location, size, and type of material of existing underground and/or aboveground utilities indicated on the Plans are not represented as being accurate, sufficient, or complete. Neither the Owner nor the Engineer assumes any responsibility whatsoever in respect to the accuracy, completeness, or sufficiency of the information. There is no guarantee, either expressed or implied, that the locations, size, and type of material of existing underground utilities indicated are representative of those to be encountered in the construction. It shall be the Contractor's responsibility to determine the actual location of all such facilities, including service connections to underground utilities. Prior to construction, the Contractor shall notify the utility companies of his operational plans, and shall obtain, from the respective utility companies, detailed information and assistance relative to the location of their facilities and the working schedule of the companies for removal or adjustment, where required. In the event an unexpected utility interference is encountered during construction, the Contractor shall immediately notify the utility company of jurisdiction. The Owner's Representative and/or the Resident Engineer/Technician shall also be immediately notified. Any damage to such mains and services shall be restored to service at once and paid for by the Contractor at no additional cost to the Contract. All utility cables and lines shall be located by the respective utility. Also coordinate work with all aboveground utilities.

G. Identify, secure, and place any above ground temporary wiring in conduit to prevent electrocution and fire ignition sources in conformance with the requirements of FAA AC 150/5370-2G, Part 2.18.3 "Lighting and Visual NAVAIDs". All temporary installations shall comply with National Electrical Code Article 590 – "Temporary Installations."

H. Grounding work and modifications shall not be performed during a thunderstorm or when a thunderstorm is predicted in the area.

I. Homerun cables for a respective circuit that are installed in conduit or duct shall be run together in the same raceway or duct.

J. The respective personnel performing airfield lighting work, vault work, and/or test shall be familiar with, and qualified to work on 5000 Volt airfield lighting series circuits, constant current regulators and associated airport electrical vault equipment.

K. FAA requires that every airfield lighting cable splicer shall be qualified in making cable splices and terminations on cables rated at and/or above 5000 Volts AC and shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

L. Obey and comply with the applicable requirements of NFPA 70E – Standard for Electrical Safety in the Workplace.

M. Other construction projects might be in progress on the Airport at the same time as this project. The Contractor will be required to cooperate with all other contractors and the Airport Manager in the coordination of the work.

N. The Contractor shall comply with the requirements of FAA AC No. 150/5370-2 (current issue in effect) “OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION”.

O. In the event a conflict is determined with respect to manufacturer installation instructions, National Electrical Code, and/or the Contract Documents, contact the Project Engineer for further direction.

P. See Safety Plan and Notes for safety and construction coordination requirements.

Q. Existing ducts and cables associated with PLASI removals or other removal work shall be removed where accessible and abandoned in place elsewhere unless it conflicts with the installation of the Navaid, airfield light, sign, duct, cable, handhole, manhole, site work, pavement or other work, then it shall be disconnected, removed, and disposed of off the site at no additional cost to the Contract. Contractor may remove abandoned cables at no additional cost to the Contract and shall have the salvage rights to abandoned cables.

R. Obtaining the required borrow material from an offsite borrow, placing the borrow material, grading, seeding, and mulching the disturbed areas will be considered as an Incidental Item to the proposed work items and/or removal work and no additional compensation will be allowed.

S. Route new cables and ducts to avoid interferences with other lines, utilities, cables, ducts, and structures.

T. When a respective runway is closed the runway lighting and Navaids for that runway shall be shut off. Keep respective Navaids active during times when respective runway is open. Navaids receiving maintenance shall be shut off until operating properly.

U. All changes to the airfield lighting system control wiring will be documented by the Contractor and provided to the Resident Engineer/Resident Technician.

125615-3.3 CABLE INSTALLATION FOR PAPI'S. Installation of cables shall conform to Item 108, the applicable sections of FAA AC 150/5345-28 (current issue in effect), per the respective equipment manufacturer's recommendations, and as detailed on the Plans. Power and control cables from the PAPI Power and Control Unit, or PAPI Primary Unit (Light Unit with Integral Power and Control Unit), to the PAPI light units and between the PAPI light units shall be installed in 2-inch galvanized rigid steel conduit, or larger where required by NEC and/or manufacturer's recommendations for the respective cables.

125615-3.4 CONDUIT INSTALLATION FOR PAPI'S. Installation of conduit shall conform to Item 110, the respective PAPI manufacturer's installation instructions and/or recommendations, as detailed on the Plans and as specified herein. Coordinate conduit installations into the PAPI foundations and/or L-867 splice cans. Conduits between the PAPI light units and between the PAPI Power and Control Unit and PAPI light units shall be 2-inch galvanized rigid steel conduit for lightning protection and equipment protection. Liquid-tight flexible metal conduit from light base cans to PAPI light units shall be UL listed and sunlight resistant.

125615-3.5 GROUNDING FOR PAPI'S. Grounding for PAPI's shall conform to the respective PAPI manufacturer's installation instructions, as detailed on the Plans, and as specified herein. The power circuit to each PAPI unit shall include an equipment ground wire of the same size and type as the phase conductors. Furnish and install two 3/4-inch diameter by 10-feet long copper clad ground rods at each PAPI lighting unit spaced not less than one rod length (10 feet) apart. Bond each PAPI unit and the respective L-867 splice can to the respective ground rod with a #6 AWG stranded copper grounding electrode conductor. The top of ground rods shall be buried approximately 24 inches below grade. All connections to ground rods shall be made with exothermic weld-type connectors; Cadweld by Pentair Erico Products, Thermoweld, Ultraweld by Harger, or approved equal. Connections to L-867 splice cans shall be with UL listed grounding connectors suitable for use in direct burial or concrete encasement applications. Connections to PAPI unit frame shall be as recommended by the manufacturer or with a UL listed grounding connector. All ground rods associated with the complete PAPI installation shall be bonded together with a #6 AWG solid copper counterpoise conductor. This counterpoise conductor shall be installed in the same trench located 10 inches above the power and control conductors, between each respective PAPI unit.

125615-3.6 GROUNDING REQUIREMENTS. Grounding shall conform to the following as applicable: The Contractor shall furnish and install all grounding shown on the Plans and/or as may be necessary or required to make a complete grounding system, as required by the latest NFPA 70 – National Electrical Code in force. The reliability of the grounding system is dependent on careful, proper installation, and choice of materials. Improper preparation of surfaces to be joined to make an electrical path, loose joints, or corrosion can introduce impedance that will seriously impair the ability of the ground path to protect personnel and equipment and to absorb transients that can cause noise in communications circuits. The following functions are particularly important to ensure a reliable ground system:

A. All products associated with the grounding system shall be UL-listed and labeled.

B. All bolted or mechanical connections shall be coated with a corrosion-preventative compound before joining, Sanchem Inc. “NO-OX-ID “A-Special” compound, Burndy Penetrox E, or approved equal.

C. Metallic surfaces to be joined shall be prepared by the removal of all non-conductive material, per 2020 NEC Article 250-12. All copper bus bars must be cleaned prior to making connections to remove surface oxidation.

D. Metallic raceway fittings shall be made up tight to provide a permanent low impedance path for all circuits. Metal conduit terminations in enclosures shall be bonded to the enclosure with UL-listed fittings suitable for grounding. Provide grounding bushings with bonding jumpers for all metal conduits entering service equipment (meter base, CT cabinet, main service breaker enclosure, etc.), generator breaker enclosures, and automatic transfer switch enclosures. Provide grounding bushings with bonding jumpers for all metal conduits entering an enclosure through concentric or eccentric knockouts that are punched or otherwise formed so as to impair the electrical connection to ground. Standard locknuts or bushings shall not be the sole means for bonding where a conduit enters an enclosure through a concentric or eccentric knockout.

E. Furnish and install ground rods at all locations where shown on the Plans or specified herein. Ground rods shall be spaced, as detailed on the Plans, and in no case spaced less than one rod length apart. All connections to ground rods and/or buried grounding electrode conductors shall be made with exothermic weld-type connectors; Cadweld by Pentair Erico Products, Thermoweld, Ultraweld by Harger, or approved equal. Exothermic-weld connections shall be installed in conformance with the respective manufacturer’s directions using molds, as required for each respective application. Bolted connections will not be permitted on ground rods or at buried grounding electrode conductors.

F. All connections, located above grade, between the different types of grounding conductors shall be made using UL-listed, double-compression, crimp-type connectors or UL-listed, bolted ground connectors. For ground connections to enclosures, cases, and frames of electrical equipment not supplied with ground lugs, the Contractor shall drill required holes for mounting a bolted, ground connector. All bolted, ground connectors shall be Burndy, Thomas and Betts, or approved equal. Tighten connections to comply with tightening torques in UL Standard 486A to assure permanent and effective grounding.

G. All metal equipment enclosures, conduits, cabinets, boxes, receptacles, etc. shall be bonded to the respective grounding system.

H. Each new feeder circuit and/or branch circuit shall include an equipment ground wire. Metal raceway or conduit shall not meet this requirement. The equipment ground wire from equipment shall not be smaller than allowed by 2020 NEC Table 250-122 “Minimum Size Conductors or Grounding Raceway and Equipment.” When conductors are adjusted in size to compensate for voltage drop, equipment-grounding conductors shall be adjusted proportionately according to circular mil area. All equipment ground wires shall be copper, either bare or insulated, green in color. Where the equipment grounding conductors are insulated, they shall be identified by the color green, and shall be the same insulation type as the phase conductors.

I. Install grounding electrode conductors and/or individual ground conductors in Schedule 80 PVC conduit. Coordinate the installation of PVC conduit sleeves into the PAPI foundations to accommodate grounding electrode conductor installations from the respective PAPI unit to the respective ground rod.

J. Grounding work affecting operations at a facility shall be coordinated with the Owner's Representative and to minimize downtime to existing systems. Contractor shall coordinate work and any power outages with the Owner's Representative. Any shutdown of existing systems shall be scheduled with and approved by the Owner's Representative prior to shutdown. All power systems (AC or DC) shall have provisions to lockout and tagout any circuit to help ensure the circuit is safe to work on for protection of personnel. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow U.S. Department of Labor Occupational Safety & Health Administration (OSHA) 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures including, but not limited to, 29 CFR section 1910.147 The Control of Hazardous Energy (lockout/tagout). Where a facility does not have lockout/tagout kits the Contractor shall provide adequate quantities of lockout/tagout kits suitable for use with the respective equipment. Where existing electrical equipment does not have features for lockout/tagout the Contractor will be responsible for providing the appropriate lockout/tagout equipment and measures to ensure the safety of personnel. All padlocks for use with lockout/tagout procedures shall have a different key. Provide lockout hasps to accommodate multiple padlocks where multiple people are working on the same system. Include lockout tags for each piece of equipment requiring servicing and shutdown. Compliance with Lockout/Tagout Procedures and all other safety procedures and requirements are the responsibility of the respective personnel working at the facility.

K. Never remove, alter, or attempt to repair conductors or conduit systems providing grounding or electrical bonding for any electrical equipment until all power is removed from the equipment. Warn all personnel of the ungrounded condition of the equipment. Display appropriate warning signs, such as danger tags, to warn personnel of the possible hazards.

L. Grounding work and modifications shall not be performed during a thunderstorm or when a thunderstorm is predicted in the area.

M. Per NFPA 70E Standard for Electrical Safety in the Workplace it defines Electrically Safe Work Condition as "A state in which an electrical conductor or circuit part has been disconnected from energized parts, locked/tagged in accordance with established standards, tested to verify the absence of voltage, and, if necessary, temporarily grounded for personnel protection." Prior to conducting tests or working on equipment, verify equipment enclosures and frames have a good and secure ground connection for the safety of personnel.

N. Where a conflict is determined with respect to grounding requirements per manufacturer installation instructions, National Electrical Code, and/or the Contract Documents, or there are other questions or concerns about the grounding requirements contact the Project Engineer of Record: Kevin Lightfoot for further directions. Safety of personnel is the top priority.

125615-3.7 PAPI OPERATION. The PAPI units shall be on 24 hours per day, 7 days a week.

125615-3.8 RESTORATION. All turf areas disturbed by the installation of the PAPI system and associated work shall be restored, graded, and seeded to establish a stand of grass to the satisfaction of the Engineer and will be considered as incidental to the installation of the PAPI, unless detailed otherwise herein.

125615-3.9 INSTRUCTION OF AIRPORT STAFF. Contractor shall provide instruction to airport staff in regard to the operation and maintenance of the PAPI system. Contractor shall demonstrate operating procedures, and items requiring routine maintenance. Provide Operation, Installation, and Maintenance Manuals for the respective PAPI systems.

125615-3.10 GROUND CHECK. Prior to final acceptance and activation, each completed PAPI system will be ground checked by the Resident Engineer/Resident Technician and/or Illinois Division of Aeronautics, and it shall be the Contractor's responsibility to have a representative present to make any necessary adjustments and/or corrections of the respective PAPI system installation. Ground check will be scheduled after the PAPI is installed and ready for check out. The ground check often includes confirmation and measurement of aiming angle of the PAPI, testing the PAPI, measurement of input voltage, measurement of input current, testing the photocell, confirmation of proper grounding, operational tests, and other tests. The Contractor shall be responsible for providing PAPI installations that pass the ground check. A copy of the PAPI Ground Check List is included in the Appendix.

125615-3.11 FLIGHT CHECK. Prior to final acceptance and activation, each completed PAPI system will be flight checked by Federal Aviation Administration and/or Illinois Division of Aeronautics, and it shall be the Contractor's responsibility to have a representative present to make any necessary adjustments in the aiming of the PAPI units. The flight check will be scheduled after the PAPI has passed the ground check. The Contractor shall be responsible for providing a PAPI installation that passes the respective flight check by Federal Aviation Administration. **Note the FAA will pay the costs for one flight check. In the event that additional flight checks are required as a result of Contractor efforts and installation, the costs associated with the additional flight checks will be the responsibility of and paid for by the Contractor.**

METHOD OF MEASUREMENT

125615-4.1 The 4 Box PAPI systems to be furnished and installed shall be measured for payment as a unit price per each and shall include a Type L-880(L) system consisting of four light units, all concrete and materials as required for foundations, all cable and conduit between and/or at the PAPI lighting units, grounding, splice cans, equipment, excavating, labor, tools, aiming and calibration equipment, testing, and incidentals necessary to furnish a complete and operational PAPI system as approved by the Resident Engineer/Resident Technician. The furnishing and installing of electrical equipment and materials in the vault will be incidental to the respective PAPI pay item and no additional compensation will be allowed.

All lockout/tagout procedures to ensure and maintain safety of personnel will be considered incidental to the respective item of work for which it applies, and no additional compensation will be allowed.

All vault or other equipment labeling, legend plates, arc flash risk labels, arc-flash hazard warning labels, and other equipment identification as detailed on the Plans and as specified herein will be incidental to the respective PAPI pay item and no additional compensation will be allowed.

Ground rods, grounding electrode conductors, connections, and associated grounding work included with PAPI systems will be considered incidental to the respective item for which they are installed, and no additional compensation will be made.

Ground resistance tests for the made electrode ground system at each PAPI unit will be considered incidental to the respective PAPI and no additional compensation will be allowed.

Testing the airfield lighting systems and the associated constant current regulator tests and cable tests will be considered incidental to the Contract and no additional compensation will be allowed.

Conduits, conduit nipples, conduit couplings, and other conduit fittings included with splice cans, junction structures, Navaid installations, base mounted airfield light fixtures, and/or other airfield fixtures, will be considered incidental to the respective item for which they are installed, and no additional compensation will be made.

BASIS OF PAYMENT

125615-5.1 Payment shall be made at the contract unit price per each. This price and payment shall be full compensation for furnishing and installing the PAPI and all associated equipment and materials, for all excavating, labor, tools, equipment, and incidentals necessary to complete this item of work. The furnishing and installing of electrical equipment and materials in the vault will be incidental to the respective PAPI pay item and no additional compensation will be allowed. Cable in duct, conduit or unit duct from the respective power source to the respective PAPI installation shall be paid for under items 108 and 110.

Payment will be made under:

Item AU125615 PAPI (L-880 System) - per each

END OF ITEM AS125615

ITEM – AR125967 RELOCATE REILS

DESCRIPTION

125967-1.1 This item of work shall consist of removal, relocation, and installing Runway End Identification Lights (REILS) at the locations shown on the Construction Plans. Each installation will be in accordance with the details on the Plans and these Special Provisions. Also included in this item will be the testing of the installation and all incidentals necessary to complete and place the lighting system into proper operation to the satisfaction of the Engineer.

125967-1.2 REFERENCES. Note: where FAA Advisory Circulars are referenced, they shall be the current issue or issues in effect.

A. ANSI C80.1 – Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.4 – Fittings Rigid Metal Conduit and EMT.

C. ANSI/IEEE STD 81, IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.

D. FAA AC No. 150/5340-30 (current issue in effect) “DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS

E. FAA AC No. 150/5345-42 (current issues in effect) “Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories”.

F. FAA AC No. 150/5345-47 (current issue in effect) “SPECIFICATION FOR SERIES TO SERIES ISOLATION TRANSFORMERS FOR AIRPORT LIGHTING SYSTEMS”.

G. FAA AC No. 150/5345-51 (current issue in effect) “SPECIFICATION FOR DISCHARGE TYPE FLASHING LIGHT EQUIPMENT”.

H. FAA AC No. 150/5345-53 “AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM” (current issue in effect) and AC 150/5345-53D, AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM Appendix 3 Addendum (current issue in effect).

I. FAA AC No. 150/5370-2 (current issue in effect) “OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

J. FAA Engineering Brief No. 67D Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures.

K. NFPA 70 – National Electrical Code (most current issue in force).

L. NFPA 70E – Standard for Electrical Safety in the Workplace

M. NFPA 2638645-1 = National Fire Protection Association IDN.

N. OSHA 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures

O. UL Standard 6 – Rigid Metal Conduit.

P. UL Standard 467 – Grounding and Bonding Equipment.

Q. UL Standard 486A-486B Wire Connectors.

R. UL Standard 514B – Conduit, Tubing and Cable Fittings.

125967-1.3 SHOP DRAWINGS. The Contractor shall furnish shop drawings for approval before ordering equipment and/or materials. Shop drawings are required for REIL units and materials to be used on the project. **Shop drawings shall be clear and legible. Copies that are illegible will be rejected.** The preferred shop drawing submittal format shall be electronic (PDF) copies. Shop drawings shall include the following information:

A. In order to expedite the shop drawing review, inspection and/or testing of materials and equipment, the Contractor shall furnish complete statements to the Project Engineer as to the origin and manufacturer of all materials and equipment to be used in the work. Such statements shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials and equipment.

B. Concrete mix design.

C. Provide cut sheets for L-867 light bases.

D. Provide cut sheets for series isolation transformers.

E. Provide cut sheets with manufacturer's name, catalog number, dimensions, material and UL listing for each type and size ground rod. Include certification of 100% domestic steel for ground rods. Include cut sheets for exothermic weld connections, ground lugs, and ground wire.

F. Provide cut sheets for all types of conduits used with the REIL installation (for example galvanized rigid steel conduit). Include certification that steel conduits are made with 100 percent domestic steel.

EQUIPMENT AND MATERIALS

125967-2.1 REILS. Nameplate data for existing REILS on Runway 29 End is as follows:

ADB Safegate Approach,
FAA L-849(L) Style A REIL-L
Runway End Identification Light,
Part Number REIL/A1101011
Single Step High Intensity,

Input: 2.8 -6.6 Amps, 50/60Hz,
Control: 2.8-6.6 Amps,
Options: Current Sensing
Light Engine: LED: 44A7302/0
ID No. 2017082400408
Primary: X

ADB Safegate Approach,
FAA L-849(L) Style A REIL-L
Runway End Identification Light,
Part Number REIL/A1101011
Single Step High Intensity,
Input: 2.8 -6.6 Amps, 50/60Hz,
Control: 2.8-6.6 Amps,
Options: Current Sensing
Light Engine: LED: 44A7302/0
ID No. 2017082400408
Secondary: X

125967-2.2 POWER AND CONTROL CABLE.

A. The REILS for relocation on Runway 29 will be powered by the Runway 11-29 lighting series circuit. Series circuit power cables to the REILS shall be one conductor No. 8, 5,000-Volt, FAA L-824, Type C, stranded, in unit duct in conformance with Item 108. Series circuit power cables to the REILS shall be paid for under Item AR108158, 1/C #8 5 KV UG Cable in UD.

B. Control cables between the REIL units shall be as recommended by the respective REIL manufacturer's instructions, per FAA AC 150/5345-51 (current issue in effect), and as detailed on the Plans.

125967-2.3 CONDUIT AND DUCTS. Conduit and ducts for the REIL systems shall conform to Item 110, per manufacturer's recommendations, as detailed on the Plans, and as specified herein. Conduits for airfield lighting series circuit power cables from the respective runway lighting system to each REIL unit shall be a separate 2-inch Schedule 40 minimum PVC or HDPE Conduit or 2-inch Galvanized Rigid Steel Conduit. Conduits for control cables from the REIL Primary Control Unit to the REIL Secondary unit shall be a separate 2-inch Galvanized Rigid Steel Conduit. Galvanized Rigid Steel Conduit is required for lightning protection of the REILS. Galvanized Rigid Steel Conduit shall be heavy wall, hot-dipped, galvanized steel pipe bearing the UL label and conforming to UL-6 and ANSI Specification C80.1. Couplings, connectors, and fittings for rigid steel conduit shall be threaded galvanized steel or galvanized malleable iron specifically designed and manufactured for the purpose. Fittings shall conform to ANSI C80.4 and UL-514B. Galvanized rigid steel conduit shall be produced from 100 percent domestic steel.

125967-2.4 REIL BASE/SPLICE/TRANSFORMER CANS. REIL Base/Splice/Transformer cans shall conform to the requirements of FAA AC 150/5345-42 (current issue(s) in effect) for Type L-867, Class IA, Size D (16-inch nominal diameter), 24-inch deep, and/or as detailed on the

Plans. Base cans shall include internal and external ground lugs. Base cans shall have 3/8" minimum thick galvanized steel covers, or aviation yellow powder coat painted steel covers with stainless steel bolts. Covers for splice cans containing high voltage airfield lighting cables shall include minimum 1/2-inch-high lettering labeled "**DANGER HIGH VOLTAGE KEEP OUT**" to comply with National Electrical Code Article 300.45 "Warning Signs" and National Electrical Code Article 314.71(E) "Suitable Covers". This will need to be coordinated with the splice can manufacturer. Lids for splice cans containing low voltage cables (rated 600 Volts and below) will be acceptable to use blank covers.

125967-2.5 SERIES CIRCUIT TRANSFORMERS. Series circuit isolation transformers for the Type L-849I(L) REIL units shall be manufactured to FAA Specification AC 150/5345-47 (current issue in effect) and shall be FAA-approved (ETL-Certified). Series circuit transformer shall be properly sized for the respective REIL units in accordance with the manufacturer's instructions.

125967-2.6 ANTI-SEIZE COMPOUND. Prior to installing the proposed base cans, splice cans, and/or other junction structures, the Contractor will apply an oxide-inhibiting, anti-seizing compound to all screws, bolts, nuts, breakable couplings, and all places where metal comes into contact with metal.

125967-2.7 STAINLESS STEEL BOLTS. All base plate mounting bolts shall be stainless steel.

125967-2.8 GROUND RODS. Ground rods shall be 3/4-inch diameter by 10-feet long UL listed Copper clad, with 10-mil minimum Copper coating. Steel used to manufacture ground rods shall be 100% domestic steel.

125967-2.9 CONCRETE. Concrete associated with the each REIL foundation pads and/or splice cans shall conform to Item 610 Portland Cement Concrete of the Standard Specifications for Construction of Airports.

CONSTRUCTION METHODS

125967-3.1 INSTALLATION OF REILS. The REILS shall be installed at the locations shown on the Plans. Installation of REILS systems shall conform to FAA AC No. 150/5345-51 (current issue in effect) titled "SPECIFICATION FOR DISCHARGE-TYPE FLASHING LIGHT EQUIPMENT", the respective manufacturer's instructions, as detailed on the Plans, and as specified herein. The Contractor shall install L-867 base/splice cans and construct concrete bases for the REIL units in accordance with the respective REIL manufacturer's recommendation. Because of the difference in manufacturers' installations, all required trenching, cable, and ducts between the primary and secondary units, associated hardware, mounting requirements, etc. shall be installed per the respective REIL manufacturer's recommendation and shall be considered part of the installation with no additional compensation.

REILS shall be aimed as detailed on the Plans and in accordance with the respective manufacturer's instructions.

Contractor shall coordinate work and any power outages with the Airport Manager, the respective Airport personnel, and the Resident Engineer/Resident Technician. Any shutdown of existing systems shall be scheduled with and approved by the Airport Manager prior to

shutdown. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow U.S. Department of Labor Occupational Safety & Health Administration (OSHA) 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures, including, but not limited to, 29 CFR Section 1910.147 The Control of Hazardous Energy (lockout/tagout).

Contractor shall comply with the requirements of FAA AC No. 150/5370-2 (current issue in effect) “OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION”.

Contractor shall comply with the applicable requirements of NFPA 70E – Standard for Electrical Safety in the Workplace.

Secure, identify, and place any temporary exposed wiring in conduit to prevent electrocution and fire ignition sources.

125967-3.2 ELECTRICAL. The Contractor shall furnish and install all electrical materials necessary for the complete and operational installation of the REIL systems as shown on the Plans and detailed herein. The complete installation and wiring shall be done in a neat, workmanlike manner. All electrical work shall comply with the requirements of the NFPA 70 - National Electrical Code (NEC) most current issue in force and the applicable Federal Aviation Administration standards, orders, and advisory circulars. Equipment shall be installed in conformance with the respective manufacturer’s directions and recommendations for the respective application. Any installations which void the UL listing, Intertek Testing Services verification/ETL listing, (or other third-party listing), and/or the manufacturer’s warranty of a device will not be permitted.

125967-3.3 CABLE INSTALLATION FOR REILS. Installation of cables shall conform to Item 108, the applicable sections of FAA AC 150/5345-51 (current issue in effect), per the respective equipment manufacturer’s recommendations, as detailed on the Plans, and as specified herein. Where cable splices are required, they shall conform to Item 108 and the details on the Plans. Power and control cables in conduit or duct between the REIL Primary unit and the REIL Secondary unit shall be installed as detailed on the Plans and in conformance with the respective REIL manufacturer’s recommendations and instructions. Cables and conduits between the REIL units will be considered incidental to the REIL installation and no additional compensation will be allowed.

125967-3.4 CONDUIT INSTALLATION FOR REILS. Installation of conduit shall conform to Item 110, the respective REIL manufacturer’s installation instructions and/or recommendations, as detailed on the Plans and as specified herein. Control cables between REIL units shall be installed in a separate dedicated conduit. Power cables between the REIL units shall be installed in a conduit separate from the control cables.

125967-3.5 GROUNDING FOR REILS. Grounding for REILS shall conform to the respective REIL manufacturer’s installation instructions, as detailed on the Plans, and as specified herein. Furnish and install two 3/4-inch diameter by 10-feet long Copper-clad ground rods spaced not less than one rod length apart, at each REIL unit. Bond each REIL unit housing and the REIL base can to the respective ground rod in accordance with the manufacturer’s instructions with a #6 AWG bare solid or stranded (per REIL manufacturer requirements) Copper grounding electrode conductor. The top of ground rods shall be buried 30 inches below grade. All

connections to ground rods shall be exothermic weld as manufactured by Cadweld, Thermoweld, Ultraweld, or approved equal. Connections to REIL unit frames shall be as recommended by the manufacturer or with a UL listed grounding connector. Provide multi-terminal ground bar or individual ground lugs to terminate each ground wire in each REIL unit.

125967-3.6 REIL OPERATION

A. In the automatic mode of operation the REILS shall be activated by L-854 radio receiver control with the runway lighting series circuit corresponding to the 100% brightness level of the respective runway lights as follows:

REIL Operation
3 clicks – Off
5 clicks – Off
7 clicks – 100% Brightness/On

B. In the manual mode of operation, the Type L-849I REILS shall be activated by the constant current regulator for the runway lighting series circuit corresponding to the 100% brightness level of the respective runway lights as follows:

REIL Operation
10% Brightness Level – Off
30% Brightness Level – Off
100% Brightness Level – On

C. The Contractor shall test and demonstrate proper operation for the Resident Engineer/Resident Technician, the Project Engineer of Record, and the Airport Manager or respective maintenance staff.

125967-3.7 GROUND CHECK. Prior to final acceptance and activation, each completed REIL system will be ground checked by the Illinois Division of Aeronautics and/or the Resident Engineer/Resident Technician, and it shall be the Contractor's responsibility to have a representative present to make any necessary adjustments and/or corrections of the respective REIL system installation. The Contractor shall be responsible for providing REIL systems that are installed properly and operate properly. See Appendix for REIL Ground Check forms.

125967-3.8 FLIGHT CHECK. Prior to final acceptance and activation, each completed REIL system will be flight checked by Federal Aviation Administration and/or Illinois Division of Aeronautics, and it shall be the Contractor's responsibility to have a representative present to make any necessary adjustments in the aiming of the respective REIL units. The Contractor shall be responsible for providing REIL systems that pass the flight check by Federal Aviation Administration and/or Illinois Division of Aeronautics. **Note: the FAA will pay the costs for one flight check. In the event that additional flight checks are required as a result of Contractor operations, the costs associated with the additional flight checks will be the responsibility of and paid for by the Contractor. FAA has noted the estimated cost for an additional flight check for the REILS will be approximately $5,000.00.**

METHOD OF MEASUREMENT

125967-4.1 The REIL systems to be removed, relocated and installed shall be measured for payment as a unit price per pair (primary unit and secondary unit) and shall include all removal work, storing the REILS in a safe and secure location until ready for relocation, concrete and materials as required for foundations, all cable and conduit from the respective runway lighting series circuit to the REIL units and all cable and conduit at and between the primary and secondary REIL units, base/splice/transformer/junction cans, equipment, grounding, excavating, restoration, labor, tools, labeling, testing, and incidentals necessary to furnish a complete and operational REIL system as approved by the Engineer.

Testing the airfield lighting systems and REILs will be considered incidental to the Contract and no additional compensation will be allowed.

Conduits, conduit nipples, conduit couplings, and other conduit fittings included with transformer base cans, junction structures, base mounted REILs, and/or splice cans will be considered incidental to the respective item for which they are installed, and no additional compensation will be made.

Ground rods, grounding electrode conductors, connections, and associated grounding work included with REILs will be considered incidental to the respective item for which they are installed, and no additional compensation will be made.

Ground resistance tests for the made electrode ground system at each REIL will be considered incidental to the to the respective item for which they are required, and no additional compensation will be allowed.

All lockout/tagout procedures to ensure and maintain safety of personnel will be considered incidental to the respective item of work for which it applies, and no additional compensation will be allowed.

BASIS OF PAYMENT

125967-5.1 Payment shall be made at the contract unit price per pair. This price and payment shall be full compensation for removal, relocation, and installation of the REIL units and bases; for furnishing and installing all equipment and materials; for all grounding, coordination, excavating, labor, tools, labeling, testing, restoration, and incidentals necessary to complete this item of work.

Payment will be made under:

Item AR125967 Relocate REILS - per PAIR

END OF ITEM AR125967

ITEM AR800476 – REMOVE AIRFIELD LIGHTING

DESCRIPTION

800476-1.1 This Item of work shall consist of the removal of base-and stake-mounted airfield lighting, removal of splice/transformer cans, the removal of Navaids (example wind cone, REILS, PAPI, PLASI, Etc.) and base/foundations, and the removal of other airfield lighting units in accordance with the details in the Construction Plans and in accordance with these Special Provisions. This item shall include removal of existing airfield lighting and/or Navaids designated for relocation or temporary relocation.

800476-1.2 REFERENCES. Note: where FAA Advisory Circulars are referenced, they shall be the current issue or issues in effect.

A. FAA AC No. 150/5370-2G “Operational Safety on Airports During Construction” (current issue in effect).

B. NFPA 70E – Standard for Electrical Safety in the Workplace

C. OSHA 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures.

CONSTRUCTION METHODS

800476-2.1 GENERAL

A. Contractor shall examine the site to determine the extent of the work.

B. Contractor shall coordinate work and any power outages with the Airport Manager and the Resident Engineer/Resident Technician. Any shutdown of existing systems shall be scheduled with and approved by the Airport Manager prior to shutdown. Once shut down, the circuits shall be labeled as such to prevent accidental energizing of the respective circuits. All personnel shall follow U.S. Department of Labor Occupational Safety & Health Administration (OSHA) 29 CFR Part 1910 Occupational Safety and Health Standards for electrical safety and lockout/tagout procedures including, but not limited to, 29 CFR section 1910.147 The Control of Hazardous Energy (lockout/tagout).

C. Contractor shall examine the site to determine the extent of the work. Contractor shall field verify existing site conditions. Contractor shall field verify the respective circuits and power sources prior to removing, disconnecting, relocating, working on, or connecting the respective airfield lighting, taxi sign, NAVAID, Vault equipment, or other device.

D. Contractor shall comply with the requirements of FAA AC No. 150/5370-2G “Operational Safety on Airports During Construction” (current issue in effect).

E. Contractor shall comply with the applicable requirements of NFPA 70E – Standard for Electrical Safety in the Workplace.

F. Power for each respective airfield lighting system and/or electrical junction structure shall be disconnected at the respective power source prior to removal. Contractor shall field verify to confirm the respective power source for each respective airfield lighting system or other device. The airfield lighting appears to have power from multiple sources.

G. Where detailed herein and/or to accommodate maintaining operation of the airfield lighting system, the Contractor shall furnish jumper cables and connector kits as required to place the airfield lighting back into operation. All temporary installations shall comply with National Electrical Code Article 590 – "Temporary Installations." The Contractor shall secure, identify, and place temporary exposed wiring in conduit, duct, or unit duct to prevent electrocution and fire ignition sources in conformance with the requirements of FAA AC 150/5370-2G "Operational Safety on Airports During Construction", Part 2.18.3 "Lighting and Visual NAVAIDs".

H. Existing airfield lighting cables associated with airfield lighting to be removed shall be removed where accessible and abandoned in place elsewhere unless it conflicts with new work and then it shall be removed at no additional cost to the Contact. If the Contractor elects to salvage the cable within the circuit to be removed, shown in the Construction Plans as cable to be abandoned, any cost associated with removal of the cable shall be considered incidental to the Contract and no additional compensation will be allowed.

800476-2.2 REMOVAL OF AIRFIELD LIGHTS AND SIGNS. The existing airfield lights, airfield guidance signs, and/or splice cans designated for removal shall be removed in their entirety. The Contractor shall remove the existing lights and/or signs including mounting stakes, concrete bases, base/transformer cans, foundations, and transformers. The electrical wire will be disconnected from each light and placed underground at a minimum depth of 18-in. If the Contractor elects to salvage the cable within the circuit of the lights to be removed, shown in the Construction Plans as cable to be abandoned, any cost associated with removal of the cable shall be considered incidental to the Contract and no additional compensation will be allowed. The existing lights, signs, and transformers shall be turned over to the Airport Manager. The existing mounting stakes and light bases shall be removed and disposed of off the Airport site in a legal manner. Any materials not salvaged by the Airport shall be disposed of off the airport site, in a legal manner, at the Contractor's own expense. The stake mounted lights, concrete base mounted lights, and/or splice cans shall be removed, and earth material will be placed in the hole made from the base and/or foundation removal. The disturbed area shall be seeded and mulched to establish a stand of grass. The seeding and mulching will be considered as an incidental item to the sign removal and/or light removal and no additional compensation will be allowed.

Obtaining the required borrow material from an offsite borrow, placing the borrow material, grading, seeding, and mulching the disturbed areas will be considered as an Incidental Item to the removal work and no additional compensation will be allowed.

800476-2.3 REMOVAL OF REILS**.** Removal of a REIL unit shall include the removal of the REIL, foundation, base cans, conduits, wiring, associated series circuit transformers, step-up transformers, step-down transformers and/or boost transformers, circuit breakers, and associated equipment and materials in the Airport Electrical Vault. Power for each respective REIL system shall be disconnected at the respective power source prior to removing the respective REIL system. **Power for the existing REIL systems located on Runway 11-29 at**

the Effingham County Airport are understood to be powered from the Runway 11-29 lighting series circuit constant current regulators located in the Airport Electrical Vault. Contractor shall field verify to confirm the respective power source for each REIL system.

The Contractor shall remove the REIL units when the runway is closed. The Contractor shall remove the REIL units and store them in a safe location until ready for relocation. The Contractor shall coordinate with and notify the Airport Manager and the Resident Engineer/Resident Technician and provide a schedule for REIL removals and the new REIL installations. The Contractor shall remove the existing REIL bases and dispose of them off the airport site in a legal manner. The existing electrical cables shall be disconnected, removed where accessible or in conflict with new work and abandoned in place elsewhere. Replacement series circuit cables in conduit shall be provided to accommodate maintaining operation of the respective airfield lighting series circuit from which the REILS were removed. The holes left from the removal of the concrete bases will be filled with earth material. The earth material will be compacted to prevent any future settlement. The earth material will be obtained from off the Airport site. The disturbed area will be restored, graded, and seeded to the satisfaction of the Engineer, and will be considered as an incidental item to the removal of the REIL units.

Remove existing ground rods associated with the REIL systems to be removed.

800476-2.4 REMOVAL OF AIRFIELD LIGHTING CABLE. The existing airfield lighting series circuit cables associated with the respective lighting systems to be removed shall be disconnected, removed where accessible, and abandoned in place elsewhere. airfield guidance signs designated for removal shall be removed in their entirety. The electrical wire will be disconnected from each light, sign, or other device and placed underground at a minimum depth of 18-in. If the Contractor elects to salvage the cable within the circuit of the lighting system to be removed, shown in the Construction Plans as cable to be abandoned, any cost associated with removal of the cable shall be considered incidental to the Contract and no additional compensation will be allowed.

800476-2.5 REMOVAL OF ELECTRICAL JUNCTION STRUCTURES. Removal of electrical junction structures shall include L-867 base cans, splice cans, handholes, and manholes. The existing electrical junction structures designated for removal shall be removed in their entirety. Any materials not salvaged by the Airport shall be disposed of off the airport site, in a legal manner, at the Contractor's own expense. The existing junction structures, bases, foundations, handholes, manholes, and associated materials designated for removal shall be disposed of off the airport site, in a legal manner, at the Contractor's own expense. Earth material will be placed in the hole made from respective removal. The disturbed area shall be restored.

800476-2.6 RESTORATION. All turf areas disturbed by the removal of airfield lighting, taxi signs, Navaids, junction structures, handholes, manholes, splice cans and associated work shall be restored, graded, and seeded in accordance with Item 901 Seeding and Item 908. All areas disturbed by work shall be restored to their original condition. The hole left from the removal of each base/foundation shall be filled with earth material. The earth material shall be compacted to prevent any future settlement. The earth material shall be obtained from off the Airport site. The restoration shall include any necessary topsoiling, fertilizing, liming, seeding, or mulching, as shown on the plans. All such work shall be performed to establish a stand of grass. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements

until final acceptance. Restoration shall be considered incidental to the pay item of which it is a component part.

BASIS OF PAYMENT

800476-3.1 This item of work will be paid for at the contract unit price bid price per lump sum for removal of the existing airfield lighting. This price and payment shall constitute full compensation for field verification of existing site conditions and power sources, disconnecting the respective power sources, removing the base-and stake-mounted airfield lights, removal of splice cans, removal of the existing wind cone including the support pole and base/foundation, removal of junction structures, handholes, and/or manholes, and removal of associated mounting stakes, bases, foundations, cables, ducts, splice cans, and transformers; for all excavating and backfilling; for furnishing all earth material; and for furnishing all coordination, labor, tools, equipment, and incidentals necessary to complete this item of work. Salvageable materials shall be turned over to the Airport. Any materials not salvaged by the Airport shall be legally disposed of off the Airport site by the Contractor at no additional cost to the Contract.

Payment will be made under:

Item AR800476 Remove Airfield Lighting - per L. SUM

END OF ITEM AR800476

APPENDIX A

Effingham County Memorial Airport

Extend Runway 11-29 and Taxiway “A”
to Runway End 29

Cable and Constant Current Regulator
Testing Forms

Engineering Firm	Hanson Professional Services Inc.
Airport Name	Effingham County Memorial Airport
Project	Extend Runway 11-29 and Taxiway A to Runway End 29
Illinois Project	1H2-4982, 1H2-4983
Hanson Project	22A0004D
Date	

TESTING FORMS

Prior to beginning airfield lighting removals, modifications, replacements, and/or cable installation all existing series circuit cables shall be Megger tested with an insulation resistance tester and recorded at the vault. All existing series circuit cable loops shall have the resistance measured with an Ohmmeter and recorded for each circuit at the vault. Each constant current regulator shall be tested with results recorded. Note: output voltage measurements are not required for constant current regulators that are not equipped with output voltage meters. Provide a True RMS Ammeter for current measurements.

Insulation resistance testing equipment for use with 5,000 Volt series circuit cables shall use an insulation resistance tester capable of testing the cables at 5,000 Volts. Older series circuit cables and/or cables in poor condition may require the test voltage to be performed at a voltage lower than 5,000 Volts (Example 1,000 Volts, 500 Volts, or less than 500 Volts). The respective test voltage shall be recorded for each cable insulation resistance test result.

Insulation resistance testing equipment for use with 600 Volt rated cables shall use a 500 Volt insulation resistance tester. The respective test voltage shall be recorded for each cable insulation resistance test result.

It is recommended to use the same insulation resistance test equipment throughout the project to ensure reliable comparative readings at the beginning of the project and at the completion of the project.

Disconnect the airfield lighting series circuit cables from the constant current regulator when performing cable insulation resistance tests (Megger Tests). Test the cables that go to the airfield for the respective airfield lighting series circuit. Connect the cable insulation resistance tester to one of the airfield lighting series circuit cables and to a good ground in the airport electrical vault such as the airport vault ground bus. Conduct the cable insulation resistance test on each respective cable for not less than 90 seconds. Record the test results at the end of the time duration for the test.

FAA Advisory Circular 150/5340-26C Maintenance of Airport Visual Aid Facilities provides guidance on Insulation Resistance Tests. Also refer to the user manual for the respective cable insulation resistance tester. Reasonably new series circuit cables and transformers with good connections should read 500 Mega-Ohms to 1,000 Mega-Ohms or higher. The readings should decrease with age. The resistance value declines over the service life of the circuit; a 10-20 percent decline per year may be considered normal. A yearly decline of 50 percent (4 percent monthly) or greater indicates the existence of a problem, such as a high resistance ground, serious deterioration of the circuit insulation, lightning damage, bad connections, bad splices, cable insulation

damage, or other failure. FAA Advisory Circular 150/5340-26C notes “Generally speaking, any circuit that measures less than 1 megohm is certainly destined for rapid failure.” Airfield lighting series circuits with cable insulation readings of less than 1 megohm are not uncommon for older circuits that are 20 years or more of age.

Based on information in FAA AC No. 150/5340-26C Maintenance of Airport Visual Aid Facilities, the cable insulation resistance value inevitably declines of the service life of the circuit; a 10-20 percent decline per year may be considered normal. In the event that the cable insulation resistance readings have declined more than 2 percent per month it might indicate cable damage due to lightning or damage as a result of Contractor operations. Where the cable insulation resistance readings have declined more than 2 percent per month over the project construction duration as a result of Contractor operations, Contractor will need to investigate, address, and repair the respective cable circuits.

All existing series circuit cable loops shall also have the resistance measured with an Ohmmeter and recorded for each circuit at the vault. The resistance of the series circuit loop with connections using #8 AWG copper conductor should be approximately 0.8 to 1 Ohm per thousand feet of cable length. The resistance of the series circuit loop with connections using #6 AWG copper conductor should be approximately 0.5 to 0.7 Ohm per thousand feet of cable length. The number of series circuit transformers and connections will affect the overall resistance of the series circuit loop and therefore the measurements might be slightly higher than the calculated resistance for the respective length of cable.

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Airport Name	Effingham County Memorial Airport
Project	Extend Runway 11-29 and Taxiway A to Runway End 29
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Hanson Project	22A0004D
Date	

TESTING FORMS

__Record the date for the respective tests.

__ Record the manufacture and model number of the insulation resistance tester used for the Megger tests. Note: it is recommended to use the same insulation resistance tester again after airfield lighting modifications, additions, and/or upgrades have been completed.

__ Record the manufacture and model number of the Ohmmeter used to measure resistance of each series circuit cable loop. Note: it is recommended to use the same Ohmmeter again after airfield lighting modifications, additions, and/or upgrades have been completed.

__ Record the manufacture and model number of the Ammeter used to measure current readings.

__Record personnel conducting tests.

__Record personnel observing tests.

Engineering Firm	Hanson Professional Services Inc.
Airport Name	Effingham County Memorial Airport
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TESTING FORMS

__ For each respective circuit conduct cable insulation resistance test (Megger test) at the vault and record test results. Time duration of test should not be less than 90 seconds.

Cable Under Test	Cable Insulation Resistance	Test Voltage	Time Duration
Runway 11-29 series circuit cable			
Runway 1-19 series circuit cable			
Taxiway A series circuit cable			
East-West Taxiway B series circuit cable			

Engineering Firm	Hanson Professional Services Inc.
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TESTING FORMS

__ Each respective lighting series circuit cable loop shall have the resistance tested and recorded at the vault. Use an Ohmmeter and measure the resistance of the series circuit loop at the Vault.

Cable Under Test	**Series Circuit Loop Resistance in Ohms**
Runway 11-29 series circuit cable	
Runway 1-19 series circuit cable	
Taxiway A series circuit cable	
East-West Taxiway B series circuit cable	

Engineering Firm	Hanson Professional Services Inc.
Airport Name	Effingham County Memorial Airport
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TESTING FORMS

Tests for constant current regulators shall include the following.

1. Follow safety procedures for all tests. Make sure each constant current regulator has a good and secured frame ground connection from the regulator housing to the respective vault ground bus and grounding electrode system, prior to operation and testing of each regulator.

2. The respective personnel performing airfield lighting work, vault work, and/or tests shall be familiar with and qualified to work on 5000 Volt airfield lighting series circuits, constant current regulators, and associated airport electrical vault equipment.

3. The respective personnel performing tests shall be familiar with the respective test equipment and the use and operation of the test equipment. The Contractor is responsible to employ the services of personnel qualified to perform the respective tests and qualified to work on 5000 Volt airfield lighting series circuits, constant current regulators, and associated airport electrical vault equipment.

4. Test each brightness step and measure and record the input current on Phase A and Phase B for the 240 VAC branch circuit to each CCR. Note: Provide a True RMS Ammeter for current measurements.

5. Test each brightness step and record the CCR output current to the series circuit lighting. Each CCR should be equipped with an output current meter. In the event the output current meter is not working properly or is out of calibration use a True RMS Ammeter for output current measurements and measure the current in the output series circuit conductor.

6. Test each brightness step and record the CCR output voltage for the series circuit lighting. Each CCR should be equipped with an output voltage meter. Where the CCR does not include an output voltage meter, the output voltage measurements are not required. Do not use a 0 to 600 Volt voltmeter to measure voltage across the CCR output terminals due to safety concerns and high voltages at the CCR output.

7. Note: Output voltage measurements are not required for constant current regulators that do not include an output voltage meter.

Engineering Firm	Hanson Professional Services Inc.
Airport Name	Effingham County Memorial Airport
Project	Extend Runway 11-29 and Taxiway A to Runway End 29
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Hanson Project	22A0004D
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TESTING FORMS

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #1 for East-West Taxiway B** by Manual Control and record input amperage, output amperage, and output voltage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT	OUTPUT VOLTS
B10	Phase A:		
	Phase B:		
B30	Phase A:		
	Phase B:		
B100	Phase A:		
	Phase B:		

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #1 for East-West Taxiway B** in remote mode by L-854 Radio Control and record input amperage, output amperage, and output voltage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT	OUTPUT VOLTS
B10	Phase A:		
	Phase B:		
B30	Phase A:		
	Phase B:		
B100	Phase A:		
	Phase B:		

Engineering Firm	Hanson Professional Services Inc.
Airport Name	Effingham County Memorial Airport
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Illinois Project	1H2-4982, 1H2-4983
Hanson Project	22A0004D
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TESTING FORMS

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #2 – Spare CCR for Taxiways on East-West Taxiway B circuit** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #2 – Spare CCR for Taxiways on East-West Taxiway B circuit** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

Engineering Firm	Hanson Professional Services Inc.
Airport Name	Effingham County Memorial Airport
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TESTING FORMS

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #2 – Spare CCR for Taxiways on Taxiway "A" circuit** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #2 – Spare CCR for Taxiways on Taxiway "A" circuit** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

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TESTING FORMS

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #3 for Taxiway "A"** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #3 for Taxiway "A"** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

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TESTING FORMS

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #4 for Runway 11-29** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT	OUTPUT VOLTS
B10	Phase A:		
	Phase B:		
B30	Phase A:		
	Phase B:		
B100	Phase A:		
	Phase B:		

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #4 for Runway 11-29** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT	OUTPUT VOLTS
B10	Phase A:		
	Phase B:		
B30	Phase A:		
	Phase B:		
B100	Phase A:		
	Phase B:		

Engineering Firm	Hanson Professional Services Inc.
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TESTING FORMS

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #5 – Spare CCR for Runway 11-29** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #5 – Spare CCR for Runway 11-29** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

Engineering Firm	Hanson Professional Services Inc.
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TESTING FORMS

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #6 for Runway 1-19** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #6 for Runway 1-19** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

Engineering Firm	Hanson Professional Services Inc.
Airport Name	Effingham County Memorial Airport
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TESTING FORMS

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #7 – Spare CCR for Runway 1-19** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

__ Prior to beginning airfield lighting work, removals, and/or relocations, test **CCR #7 – Spare CCR for Runway 1-19** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

Engineering Firm	Hanson Professional Services Inc.
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TESTING FORMS

After airfield lighting modifications, additions, and/or upgrades have been completed, series circuit cables shall be Megger tested with an insulation resistance tester and recorded at the vault. All series circuit cable loops shall have the resistance measured with an Ohmmeter and recorded for each circuit at the vault. Each constant current regulator shall be tested with results recorded. Record the date for the respective tests.

__ Record the manufacture and model number of the insulation resistance tester used for the Megger tests.

__ Record the manufacture and model number of the Ohmmeter used to measure resistance of each series circuit cable loop.

__ Record the manufacture and model number of the Ammeter used to measure current. Note: it is recommended to use the same Ammeter again after airfield lighting modifications, additions, and/or upgrades have been completed.

__Record personnel conducting tests.

__Record personnel observing tests.

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TESTING FORMS

__ After airfield lighting modifications, additions, and/or upgrades have been completed, conduct cable insulation resistance test (Megger test) for each respective circuit at the vault and record test results. Time duration of test should not be less than 90 seconds.

Cable Under Test	Cable Insulation Resistance	Test Voltage	Time Duration
Runway 11-29 series circuit cable			
Runway 1-19 series circuit cable			
Taxiway A series circuit cable			
East-West Taxiway B series circuit cable			

Engineering Firm	Hanson Professional Services Inc.
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TESTING FORMS

__ After airfield lighting modifications, additions, and/or upgrades have been completed, each respective lighting series circuit cable loop shall have the resistance tested and recorded at the vault. Use an Ohmmeter and measure the resistance of the series circuit loop at the Vault.

Cable Under Test	**Series Circuit Loop Resistance in Ohms**
Runway 11-29 series circuit cable	
Runway 1-19 series circuit cable	
Taxiway A series circuit cable	
East-West Taxiway B series circuit cable	

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TESTING FORMS

Tests for constant current regulators shall include the following.

1. Follow safety procedures for all tests. Make sure each constant current regulator has a good and secured frame ground connection from the regulator housing to the respective vault ground bus and grounding electrode system, prior to operation and testing of each regulator.

2. The respective personnel performing airfield lighting work, vault work, and/or tests shall be familiar with and qualified to work on 5000 Volt airfield lighting series circuits, constant current regulators, and associated airport electrical vault equipment.

3. The respective personnel performing tests shall be familiar with the respective test equipment and the use and operation of the test equipment. The Contractor is responsible to employ the services of personnel qualified to perform the respective tests and qualified to work on 5000 Volt airfield lighting series circuits, constant current regulators, and associated airport electrical vault equipment.

4. Test each brightness step and measure and record the input current on Phase A and Phase B for the 240 VAC branch circuit to each CCR. Note: Provide a True RMS Ammeter for current measurements.

5. Test each brightness step and record the CCR output current to the series circuit lighting. Each CCR should be equipped with an output current meter. In the event the output current meter is not working properly or is out of calibration use a True RMS Ammeter for output current measurements and measure the current in the output series circuit conductor.

6. Test each brightness step and record the CCR output voltage for the series circuit lighting. Each CCR should be equipped with an output voltage meter. Where the CCR does not include an output voltage meter, the output voltage measurements are not required. Do not use a 0 to 600 Volt voltmeter to measure voltage across the CCR output terminals due to safety concerns and high voltages at the CCR output.

7. Note: Output voltage measurements are not required for constant current regulators that do not include an output voltage meter.

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TESTING FORMS

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #1 for East-West Taxiway B** by Manual Control and record input amperage, output amperage, and output voltage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT	OUTPUT VOLTS
B10	Phase A:		
	Phase B:		
B30	Phase A:		
	Phase B:		
B100	Phase A:		
	Phase B:		

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #1 for East-West Taxiway B** in remote mode by L-854 Radio Control and record input amperage, output amperage, and output voltage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT	OUTPUT VOLTS
B10	Phase A:		
	Phase B:		
B30	Phase A:		
	Phase B:		
B100	Phase A:		
	Phase B:		

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TESTING FORMS

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #2 – Spare CCR for Taxiways on East-West Taxiway B circuit** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #2 – Spare CCR for Taxiways on East-West Taxiway B circuit** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

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TESTING FORMS

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #2 – Spare CCR for Taxiways on Taxiway "A" circuit** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #2 – Spare CCR for Taxiways on Taxiway "A" circuit** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

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TESTING FORMS

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #3 for Taxiway "A"** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT	OUTPUT VOLTS
B10	Phase A:		
	Phase B:		
B30	Phase A:		
	Phase B:		
B100	Phase A:		
	Phase B:		

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #3 for Taxiway "A"** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT	OUTPUT VOLTS
B10	Phase A:		
	Phase B:		
B30	Phase A:		
	Phase B:		
B100	Phase A:		
	Phase B:		

Engineering Firm	Hanson Professional Services Inc.
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TESTING FORMS

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #4 for Runway 11-29** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT	OUTPUT VOLTS
B10	Phase A:		
	Phase B:		
B30	Phase A:		
	Phase B:		
B100	Phase A:		
	Phase B:		

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #4 for Runway 11-29** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT	OUTPUT VOLTS
B10	Phase A:		
	Phase B:		
B30	Phase A:		
	Phase B:		
B100	Phase A:		
	Phase B:		

Engineering Firm	Hanson Professional Services Inc.
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TESTING FORMS

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #5 –Spare CCR for Runway 11-29** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #5 –Spare CCR for Runway 11-29** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

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TESTING FORMS

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #6 for Runway 1-19** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #6 for Runway 1-19** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

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TESTING FORMS

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #7 –Spare CCR for Runway 1-19** by Manual Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

__ After airfield lighting modifications, additions, and/or upgrades have been completed, test **CCR #7 –Spare CCR for Runway 1-19** in remote mode by L-854 Radio Control and record input and output amperage at each step.

STEP	INPUT CURRENT	OUTPUT CURRENT
B10	**Phase A:**	
	Phase B:	
B30	**Phase A:**	
	Phase B:	
B100	**Phase A:**	
	Phase B:	

APPENDIX B

Effingham County Memorial Airport

Extend Runway 11-29 and Taxiway “A”
to Runway End 29

REIL
GROUND CHECK LIST

Airport Identifier:	**1H2**
Airport Name:	**Effingham County Memorial Airport**
Location:	**Effingham County Memorial Airport,** **14449 East 1100th Avenue** **Effingham, Illinois 62401**
SBG No.:	**3-17-SBGP-TBD**
IDA No.:	**1H2-4982**
Hanson Project No.:	**22A0004C**
Date:	
Site Conditions:	

a. Inspect REIL to determine that it is installed correctly, at the proper height, at the correct location, level, and properly oriented.

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

c. Check REIL to determine that the lenses are clean and unscratched.

d. Test REIL feeder circuits/series circuits for continuity and insulation resistance to ground. Observe and record megger test for REIL feeder circuit/series circuit conductors.

Cable Under Test	**Cable Insulation Resistance**	**Test Voltage**	**Time Duration**
Respective runway lighting series circuit conductor			
Phase A conductor (for Voltage powered applications)			
Phase B conductor (for Voltage powered applications)			

e. Check fuses and circuit breakers to determine if they are of the proper rating.

f. Check REIL to determine that it is properly oriented with respect to the runway longitudinal sides and the threshold. Check REIL for proper location.

g. Check equipment covered by FAA specifications to determine if the manufacturers have supplied certified equipment. Also check the equipment for general conformance with requirements of the Plans, Specifications, and Special Provisions.

h. Inspect all cables, wiring, and splices to obtain assurance that the installation is per the Standard Specifications for Construction of Airports, the Special Provision Specifications, the Plans, the National Electrical Code, and local codes. Inspect and test insulation resistance of underground cables before backfilling.

i. Check all ducts and duct markers to determine that the installation is per the Standard Specifications for Construction of Airports, the Special Provision Specifications, and the Plans. Inspect underground ducts before backfill is made.

j. Check the input voltage at the power and control circuits to determine that the voltage is within limits required for proper equipment operation. Select the proper voltage tap on equipment where taps are provided. Circuitry should also be checked per the manufacturer's requirements.

k. Check base plates for damage during installation and refinish according to manufacturer's instructions and as acceptable to the Engineer.

l. Check the size and type of feeder conductor from the vault or power source to the REIL.

m. Record nameplate data for REIL.

n. Test REIL by respective control system and confirm proper operation. Check to see if Runway REIL's activate at Step 1 (Off), Step 2 (Off) and Step 3 (100% brightness) of L-854 Radio Receiver Output.

o. Check to see if the Primary REIL unit has a ground wire connection from its frame to the ground rod.

p. Check to see if the Secondary REIL unit has a ground wire connection from its frame to the ground rod.

q. Make sure each REIL has good ground. Test and record ground resistance of ground rod installation at each REIL Unit.

REIL LIGHT HOUSING UNIT	**Measured Ground Resistance in Ohms**
REIL Primary Light Unit	
REIL Secondary Light Unit	

r. Confirm Operation and Maintenance Manuals are provided for REIL.

s. Ground Check test results submitted by:

Name:	
Company:	
Date:	

APPENDIX C

Effingham County Memorial Airport

Extend Runway 11-29 and Taxiway “A”
to Runway End 29

PAPI
GROUND CHECK LIST

Airport Identifier:	**1H2**
Airport Name:	**Effingham County Memorial Airport**
Location:	**Effingham County Memorial Airport, 14449 East 1100th Avenue Effingham, Illinois 62401**
FAA ACIP No.:	**3-17-SBGP-TBD**
IDOT/IDA No.:	**1H2-4982**
Hanson Project No.:	**22A0004C**
Date:	
Site Conditions:	

a. Inspect PAPI to determine that it is installed correctly, at the proper height, at the correct location, level, and properly oriented.

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

c. Check PAPI to determine that the lenses are clean and unscratched and the channels in front of the lenses are clean.

d. Test PAPI feeder circuits for continuity and insulation resistance to ground. Observe and record megger test for PAPI feeder circuit conductors.

Cable Under Test	**Cable Insulation Resistance**	**Test Voltage**	**Time Duration**
Phase A Conductor			
Phase B Conductor			

e. Check fuses and circuit breakers to determine if they are of the proper rating.

f. Check PAPI to determine that it is properly oriented with respect to the runway longitudinal sides and the threshold. Check PAPI for proper location.

g. Check identification number or legend plate for PAPI unit to determine that the respective identification at the installation is as assigned in the Plans.

h. Check equipment covered by FAA specifications to determine if the manufacturers have supplied certified equipment. Also check the equipment for general conformance with requirements of the Plans, Specifications, and Special Provisions.

i. Inspect all cables, wiring, and splices to obtain assurance that the installation is per FAA AC 150/5370-10H Standard Specifications for Construction of Airports, Item L-108, the Plans, the National Electrical Code, and local codes. Inspect and test insulation resistance of underground cables before backfilling.

j. Check all ducts and duct markers to determine that the installation is per FAA AC 150/5370-10H Standard Specifications for Construction of Airports, Item L-110, and the Plans. Inspect underground ducts before backfill is made.

k. Check the input voltage at the power and control circuits to determine that the voltage is within limits required for proper equipment operation. Select the proper voltage tap on equipment where taps are provided. Circuitry should also be checked per the manufacturer's requirements.

l. Check base plates for damage during installation and refinish according to manufacturer's instructions and as acceptable to the Engineer.

m. Check the current or voltage at the lamps to determine if the regulator current or supply voltage is within specified tolerance. If a current or voltage exceeds rated values, the lamp life will be reduced.

n. Record nameplate data for PAPI.

Manufacturer:	
FAA Type:	
Part No.:	
ID No.:	
Power Requirement:	

o. Test PAPI by respective control system and confirm proper operation.

p. Check the size and type of feeder conductor from the vault or power source to the PAPI.

q. Make sure PAPI has good ground. Test and record ground resistance of ground rod installation at each PAPI Unit.

PAPI LIGHT HOUSING UNIT	**Ground Resistance Measurement in Ohms**
PAPI Light Housing Unit #1 (Closest to the Runway Pavement)	
PAPI Light Housing Unit #2	
PAPI Light Housing Unit #3	
PAPI Light Housing Unit #4 (Furthest from the Runway Pavement)	

r. Check to make sure equipment ground wires were run from the PAPI Power and Control Unit to each PAPI.

s. Observe and record the aiming angle of each PAPI Light Housing Unit.

PAPI LIGHT HOUSING UNIT	**MEASURED AIMING ANGLE**
PAPI Light Housing Unit #1 (Closest to the Runway Pavement)	
PAPI Light Housing Unit #2	
PAPI Light Housing Unit #3	
PAPI Light Housing Unit #4 (Furthest from the Runway Pavement)	

t. Observe operation of the PAPI Power and Control Unit photocell and confirm proper operation of day/night brightness levels.

u. Confirm Operation and Maintenance Manuals are provided for each PAPI unit.

v. Record input voltage and amperage at the PAPI under operation.

DAY TIME OPERATION	
Input Voltage:	
Input Amperage:	
NIGHTTIME OPERATION	
Input Voltage:	
Input Amperage:	
RECORD VOLTAGE AT POWER SOURCE	
Voltage:	

w. Ground Check test results submitted by:

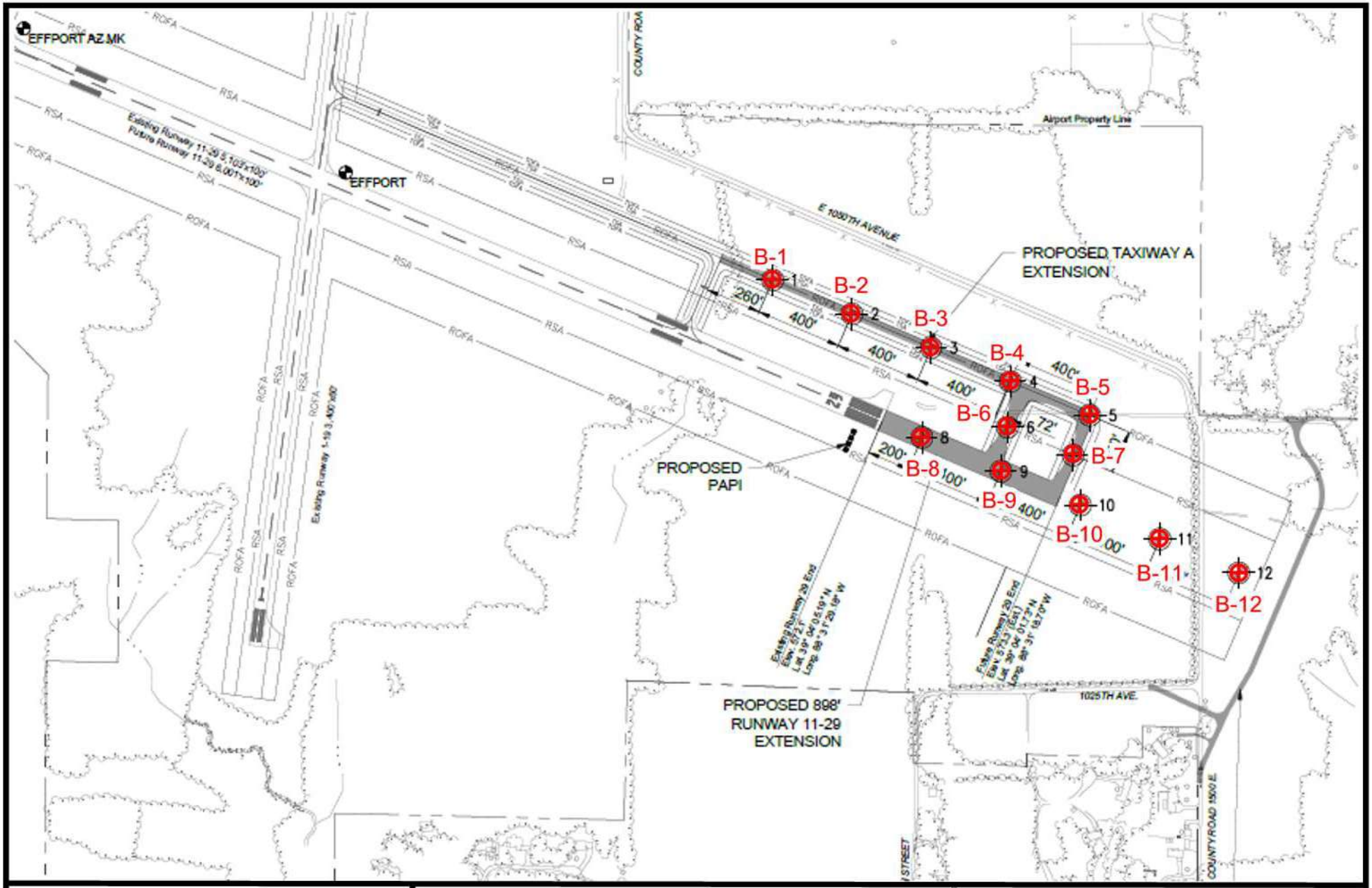
Name:	
Company:	
Date:	

APPENDIX D

Effingham County Memorial Airport

Extend Runway 11-29 and Taxiway “A”
to Runway End 29

BORING LOGS



Midwest Engineering and Testing, Inc.

geotechnical*environmental*materials engineers

Figure 2
Boring Location Diagram
Proposed Extension to Runway 11-29 and Taxiway A
Effingham County Memorial Airport
Effingham, Illinois

SCALE: Shown Above

PROJECT NO.: C33080

DATE: July 20, 2023

DRAWN BY: EB

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Proposed Extension to Runway 11-29 and Taxiway A
Location: Effingham County Memorial Airport
14449 East 1100th Avenue
Effingham, Illinois

Boring: B-1
Project No. : C33080
Date of Boring: June 20, 2023
Field Representative: Zach Wilcoxen

VISUAL SOIL CLASSIFICATION	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
8" Topsoil								
Brown silty CLAY (CL) Possible Fill	1	1-AU	8	4.5+	-	24	-	
	2							Dry during and upon completion of drilling
Brown and dark gray silty CLAY (CL) with sand	3	2-SS	7	2.0	2.1	23	92	
	4							
	5							
	6	3-SS	7	1.5	1.6	21	98	
Brown and gray silty CLAY (CL) with sand	7							
	8	4-SS	7	2.3	2.4	19	101	
	9							
	10							
Brown and gray sandy CLAY (CL)	11	5-SS	7	1.0	-	19	-	
END OF BORING @ 11.5 FEET	12							
	13							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Proposed Extension to Runway 11-29 and Taxiway A
Location: Effingham County Memorial Airport
14449 East 1100th Avenue
Effingham, Illinois

Boring: B-2
Project No. : C33080
Date of Boring: June 20, 2023
Field Representative: Zach Wilcoxen

VISUAL SOIL CLASSIFICATION	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
6" Topsoil								
Brown silty CLAY (CL) Possible Fill	1	1-AU	9	4.5	-	16	-	
	2							Dry during and upon completion of drilling
Brown and gray silty CLAY (CL)	3	2-SS	7	2.5	2.5	23	92	
	4							
	5							
	6	3-SS	6	1.8	1.5	21	98	
	7							
Brown and gray silty CLAY (CL) with sand	8	4-SS	7	2.5	2.2	19	100	
	9							
	10							
	11	5-SS	7	2.5	2.6	20	101	
END OF BORING @ 11.5 FEET	12							
	13							

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SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Proposed Extension to Runway 11-29 and Taxiway A
Location: Effingham County Memorial Airport
14449 East 1100th Avenue
Effingham, Illinois

Boring: B-3
Project No. : C33080
Date of Boring: June 20, 2023
Field Representative: Zach Wilcoxen

VISUAL SOIL CLASSIFICATION	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
6" Topsoil								
Brown silty CLAY (CL) Possible Fill	1	1-AU	8	4.5+	-	21	-	Dry during and upon completion of drilling
	2							
	3	2-SS	9	2.3	-	20	-	
	4							
	5							
Brown and gray silty CLAY (CL) with sand	6	3-SS	6	1.3	1.2	19	93	
	7							
	8	4-SS	7	2.0	-	19	-	
	9							
	10							
	11	5-SS	4	0.8	1.0	22	103	
END OF BORING @ 11.5 FEET	12							
	13							

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SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Proposed Extension to Runway 11-29 and Taxiway A
Location: Effingham County Memorial Airport
14449 East 1100th Avenue
Effingham, Illinois

Boring: B-4
Project No. : C33080
Date of Boring: June 20, 2023
Field Representative: Zach Wilcoxen

VISUAL SOIL CLASSIFICATION	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
6" Topsoil								
Brown silty CLAY (CL) Possible Fill	1	1-AU	5	4.5+	-	14	-	
	2							Dry during and upon completion of drilling
	3	2-SS	7	1.5	1.5	20	99	
Brown and gray silty CLAY (CL)	4							
	5							
	6	3-SS	6	1.5	1.6	20	102	
	7							
	8	4-SS	8	1.8	1.6	19	96	
Brown and gray silty CLAY (CL) with sand	9							
	10							
	11	5-SS	5	0.8	0.9	21	104	
END OF BORING @ 11.5 FEET	12							
	13							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Proposed Extension to Runway 11-29 and Taxiway A
Location: Effingham County Memorial Airport
14449 East 1100th Avenue
Effingham, Illinois

Boring: B-5
Project No. : C33080
Date of Boring: June 20, 2023
Field Representative: Zach Wilcoxen

VISUAL SOIL CLASSIFICATION	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
4" Oil and Chip								
Brown silty CLAY (CL) Possible Fill	1	1-AU	-	-	-	7	-	
	2							Dry during and upon completion of drilling
	3	2-SS	5	2.8	2.6	27	88	
Brown and gray silty CLAY (CL)	4							
	5							
	6	3-SS	5	1.0	1.2	29	88	
	7							
	8	4-SS	5	2.3	2.1	19	98	
Brown and gray silty CLAY (CL) with sand	9							
	10							
	11	5-SS	6	2.3	2.0	18	101	
END OF BORING @ 11.5 FEET	12							
	13							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Proposed Extension to Runway 11-29 and Taxiway A
Location: Effingham County Memorial Airport
14449 East 1100th Avenue
Effingham, Illinois

Boring: B-6
Project No. : C33080
Date of Boring: June 20, 2023
Field Representative: Zach Wilcoxen

VISUAL SOIL CLASSIFICATION	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
6" Topsoil								
Brown silty CLAY (CL) Possible Fill	1	1-AU	13	4.5+	-	11	-	
	2							Dry during and upon completion of drilling
	3	2-SS	8	2.0	1.6	23	86	
Brown and gray silty CLAY (CL)	4							
	5							
	6	3-SS	6	2.0	1.9	21	100	
	7							
	8	4-SS	5	1.8	1.8	20	104	
Brown and gray silty CLAY (CL) with sand	9							
	10							
	11	5-SS	6	0.5	-	21	-	
END OF BORING @ 11.5 FEET	12							
	13							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Proposed Extension to Runway 11-29 and Taxiway A
Location: Effingham County Memorial Airport
14449 East 1100th Avenue
Effingham, Illinois

Boring: B-7
Project No. : C33080
Date of Boring: June 20, 2023
Field Representative: Zach Wilcoxen

VISUAL SOIL CLASSIFICATION	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
8" Topsoil								
Brown silty CLAY (CL) Possible Fill	1	1-AU	7	4.5+	-	7	-	
	2							Dry during and upon completion of drilling
Brown and gray silty CLAY (CL)	3	2-SS	10	2.8	-	24	-	
	4							
	5							
Brown and gray silty CLAY (CL)	6	3-SS	6	1.5	1.6	20	100	
	7							
	8	4-SS	5	2.0	1.9	20	97	
Brown and gray silty CLAY (CL) with sand	9							
	10							
	11	5-SS	6	1.8	1.5	23	97	
END OF BORING @ 11.5 FEET	12							
	13							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Proposed Extension to Runway 11-29 and Taxiway A
Location: Effingham County Memorial Airport
14449 East 1100th Avenue
Effingham, Illinois

Boring: B-8
Project No. : C33080
Date of Boring: June 20, 2023
Field Representative: Zach Wilcoxen

VISUAL SOIL CLASSIFICATION	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
6" Topsoil								
Brown silty CLAY (CL) Possible Fill	1	1-AU	18	-	-	8	-	
	2							Dry during and upon completion of drilling
	3	2-SS	10	2.5	-	24	-	
Brown and gray silty CLAY (CL)	4							
	5							
	6	3-SS	7	1.0	1.0	30	77	
	7							
	8	4-SS	6	1.8	1.8	21	100	
Brown and gray silty CLAY (CL) with sand	9							
	10							
	11	5-SS	6	2.5	2.1	18	106	
END OF BORING @ 11.5 FEET	12							
	13							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Proposed Extension to Runway 11-29 and Taxiway A
Location: Effingham County Memorial Airport
14449 East 1100th Avenue
Effingham, Illinois

Boring: B-9
Project No. : C33080
Date of Boring: June 20, 2023
Field Representative: Zach Wilcoxen

VISUAL SOIL CLASSIFICATION	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
8" Topsoil								
Brown silty CLAY (CL) Possible Fill	1	1-AU	17	4.5+	-	12	-	Dry during and upon completion of drilling
	2							
	3	2-SS	9	2.8	2.7	24	88	
Brown and gray silty CLAY (CL)	4							
	5							
	6	3-SS	7	2.3	2.0	23	89	
	7							
	8	4-SS	5	1.8	1.8	21	99	
Brown and gray silty CLAY (CL) with sand	9							
	10							
	11	5-SS	8	2.0	2.0	20	100	
END OF BORING @ 11.5 FEET	12							
	13							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Proposed Extension to Runway 11-29 and Taxiway A
Location: Effingham County Memorial Airport
14449 East 1100th Avenue
Effingham, Illinois

Boring: B-10
Project No. : C33080
Date of Boring: June 20, 2023
Field Representative: Zach Wilcoxen

VISUAL SOIL CLASSIFICATION	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
6" Topsoil								
Brown silty CLAY (CL) Fill	1	1-AU	18	-	-	7	-	
	2							Dry during and upon completion of drilling
	3	2-SS	9	3.8	3.6	27	87	
Brown and gray silty CLAY (CL)	4							
	5							
	6	3-SS	8	1.8	1.7	24	88	
	7							
	8							
	9	4-SS	5	1.8	1.7	21	94	
Brown and gray silty CLAY (CL) with sand	10							
	11	5-SS	7	1.8	1.7	25	93	
END OF BORING @ 11.5 FEET	12							
	13							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Proposed Extension to Runway 11-29 and Taxiway A
Location: Effingham County Memorial Airport
14449 East 1100th Avenue
Effingham, Illinois

Boring: B-11
Project No. : C33080
Date of Boring: June 20, 2023
Field Representative: Zach Wilcoxen

VISUAL SOIL CLASSIFICATION	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
6" Topsoil								
Brown silty CLAY (CL) Possible Fill	1	1-AU	9	4.5+	-	16	-	
	2							Dry during and upon completion of drilling
	3	2-SS	7	1.5	1.6	23	95	
Brown and gray silty CLAY (CL)	4							
	5							
	6	3-SS	7	1.8	1.9	18	106	
	7							
Brown and gray silty CLAY (CL) with sand	8	4-SS	8	2.8	2.8	20	117	
	9							
	10							
Brown clayey SAND (SC)	11	5-SS	6	-	-	22	-	
END OF BORING @ 11.5 FEET	12							
	13							

Lines of Demarcation represent an approximate boundary between soil types. Variations may occur between sampling intervals and between boring locations, and the transition may be gradual. Dashed lines are indicative of potentially erratic or unknown changes, such as fill-to-natural soil zone transitions.

SOIL BORING LOG

MET Midwest Engineering and Testing, Inc.

Project Name: Proposed Extension to Runway 11-29 and Taxiway A
Location: Effingham County Memorial Airport
14449 East 1100th Avenue
Effingham, Illinois

Boring: B-12
Project No. : C33080
Date of Boring: June 20, 2023
Field Representative: Zach Wilcoxen

VISUAL SOIL CLASSIFICATION	Feet	Sample No.	N	Q_p (tsf)	Q_u (tsf)	MC (%)	Dd (pcf)	Remarks
10" Topsoil								
	1	1-AU	10	-	-	8	-	Dry during and upon completion of drilling
	2							
	3	2-SS	7	1.8	1.7	21	99	
Brown and gray silty CLAY (CL)	4							
	5							
	6	3-SS	7	2.5	2.1	22	94	
	7							
	8	4-SS	7	1.8	1.8	18	109	
Brown and gray silty CLAY (CL) with sand	9							
	10							
	11	5-SS	6	1.5	1.6	19	103	
END OF BORING @ 11.5 FEET	12							
	13							

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