



CONTRACT DOCUMENTS AND SPECIFICATIONS FOR AIRPORT IMPROVEMENT PROJECT

For Wharton Regional Airport

Wharton, Texas

TxDOT Solicitation No.: NTB2513WHRTN00024

TxDOT CSJ/Project No.: 2513WHRTN

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(Federally Funded Project)

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NOTICE TO BIDDERS

NOTICE TO BIDDERS
Wharton Regional Airport
TxDOT Solicitation No.: NTB2513WHRTN00024

Sealed bids for the construction of airport improvements at Wharton Regional Airport need to be addressed and delivered to Brandy Schwettmann, TxDOT Aviation Division, 6230 E. Stassney Lane, 2nd Floor, Austin, Texas 78744. The delivered package must be clearly marked as “Bid Proposal”. Bids will be received until 1:00PM, April 30, 2026, then publicly opened and read. Any bid received after closing time will be returned unopened.

In general, the Aviation Construction work consists of: Overlay Rehabilitation of Runway 14/32 and Taxiways.

Engineers’ Estimate of Probable Cost for this project is as follows:

Base Bid: \$3,268,800.00

Additive Alternate 1: \$286,000.00

Additive Alternate 2: \$756,600.00

Bidding documents may be examined: Offices of Civil PEs: 814 Thornwick Dr., Houston, TX 77079

Bidders may view and obtain plan sets, free of charge, from Plans Online at the following link <https://www.dot.state.tx.us/business/plansonline/ftpinfo.htm> on the TxDOT website. **Bidders are responsible for checking this website regularly for any changes to the bid documents, such as Addendums. TxDOT can only guarantee the accuracy of information on its Aviation Projects website located at <http://www.txdot.gov/inside-txdot/division/aviation/projects.html>. If another agency or construction data website references this project, please also refer to the TxDOT Aviation website mentioned above to verify the accuracy and completeness of the data.**

TxDOT Aviation uses the eGrants electronic grant management system for projects beginning Fiscal Year 2017. The awarded bidder will be required to electronically submit contract documents, pay request forms, change order requests, certified payroll, DBE and insurance certificates. Signing the Bid Form certifies that the bidder meets the eGrants minimum system requirements in the External User Manual found at <http://www.txdot.gov/government/funding/egrants-2016/aviation.html>

To be placed on the Bidders List for this project, please email your company name, mailing address, and your phone & email address to AVNRFQ@txdot.gov.

Technical questions concerning the specifications should be directed to Thomas Dodson at (281) 630-1888 or tdodson@civil-pes.com. Please call Contract Specialist, Brandy Schwettmann, TxDOT Aviation at 512-416-4531 for questions concerning the bid document or further information.

Minimum wage rates have been predetermined as required by law and are set forth in the specifications.

Cashier’s check, money order, or teller’s check drawn by or on a state or national bank, a savings and loan association, or a state or federally chartered credit union (collectively referred to as “bank”) in the amount of two percent (2%) of the total bid price stated in the bid, made payable without recourse to TxDOT Aviation, Agent for the Owner or a bid bond in the same amount from a reliable corporate surety authorized to do business in the State of Texas and acceptable to TxDOT Aviation, Agent for the

Owner must accompany each bid as a guarantee that the bidder, if successful, will enter into a contract, and make bond in accordance with the requirements of the specifications. TxDOT Aviation reserves the right to retain any check, bank money order or bank draft as liquidated damages in the event the bidder withdraws its bid after the bids are opened and before official rejection of the bid by TxDOT Aviation/Owner, or, if successful in securing the award of the contract, the successful bidder fails to enter into the contract and fails to furnish satisfactory performance and payment bonds.

All noted documents below shall be completed and submitted to be considered a complete Bid Package. If any of the listed documents are incomplete or missing, the bid will be deemed non-responsive.

Required Documents:
<input type="checkbox"/> Bid Form
<input type="checkbox"/> Bid Bond (must include the Power Attorney and claim notice page)
<input type="checkbox"/> Required Language in Proposals for AIP Contracts
<input type="checkbox"/> Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
<input type="checkbox"/> Buy American Certification
<input type="checkbox"/> Certification of Non-Segregated Facilities
<p><input type="checkbox"/> DBE Participation Plan: The DBE Participation Plan must be submitted <u>no later than 5 calendar days from bid opening</u>. <i>When computing any period of time described in this part, the day from which the period begins to run is not counted, and when the last day of the period is a Saturday, Sunday, or Federal holiday, the period extends to the next day that is not a Saturday, Sunday, or Federal holiday. Similarly, in circumstances where the recipient's offices are closed for all or part of the last day, the period extends to the next day on which the agency is open.</i></p> <p>1) DBE Commitment Agreement Form No. SMS.4901, 2) DBE Program Material/Supplier Form No. SMS.4901-MS and, 3) DBE Trucking Commitment Form No. SMS.4901-T.</p> <p>Please download the appropriate DBE Commitment Agreement <u>or</u> Good faith effort form from the TxDOT website at http://www.txdot.gov/business/partnerships/dbe-forms.html. There are three available DBE commitment forms. You must pick the commitment form that applies to your subcontract agreement. Then you and your DBE(s) must complete the form and return it with the signed DBE plan by the required date.</p> <p>4) Form 4000 Contractor's Certification Good Faith Effort (<u>if unable to meet specified goal</u>)</p>

The successful bidder will be required to furnish a Performance Bond and Payment Bond with the Power of Attorney and claim page, each in the full amount of the contract price, executed by a surety company or surety companies authorized to execute surety bonds under and in accordance with the laws of the State of Texas.

The Agent reserves the right to reject any bid and the right to waive technicalities if such waiver is in the best interest of the Owner and conforms to State and local laws and ordinances pertaining to the letting of construction contracts.

The Agent, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award. The Disadvantage Business Enterprise (DBE) Goal is 0%.

For all federally funded construction projects with a DBE goal, bidders shall use the attached DBE participation plan and appropriate commitment agreement form/s and submit these documents to TxDOT Aviation within 5 calendar days after the bid opening via email to AVNRFQ@txdot.gov.

The proposed contract is subject to 49 CFR Part 26 concerning the participation of Disadvantaged Business Enterprises and is under and subject to Executive Order 11246 of September 24, 1965, and to the Equal Opportunity Clause contained in the bidding documents.

The proposed contract is subject to the Aviation Safety and Capacity Expansion Act of 1990.

A Pre-Bid conference concerning this project will be held at 10:30AM on April 16, 2026, at Wharton Regional Airport located at 714 Robert Vonderau Drive., Wharton, TX 77488.

The City of Wharton, Wharton County, Texas

***REQUIRED LANGUAGE
IN PUBLISHED
ADVERTISEMENT FOR
AIP CONSTRUCTION
CONTRACTS***

REQUIRED LANGUAGE IN PUBLISHED ADVERTISEMENT FOR BIDS FOR AIP CONSTRUCTION CONTRACTS

A. Required Language In Published Advertisements For Bids All AIP Contracts:

(1) Policy. It is the policy of the Department of Transportation (DOT) that disadvantaged business enterprises as defined in 49 CFR Part 26 shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with Federal funds.

(2) Buy American Provision.

The proposed contract is subject to the Buy American provision under Section 9129 of the Aviation Safety and Capacity Expansion Act of 1990. Details of such requirement are contained in the Specifications.

B. Additional Language Required in Published Advertisement For Bids For AIP Contract Where The Sponsor Has A DBE Program In Effect Or Is Required By 49 CFR Part 26 To Have An Approved DBE Program.

All bidders and proposers shall make good faith efforts as defined in Appendix A of 49 CFR Part 26, Regulations of the Office of the Secretary of Transportation, to subcontract 0% of the dollar value of the prime contract to small business concerns owned and controlled by socially and economically disadvantaged include women, Blacks, Hispanics, Native Americans, Asian-Pacific Americans and Asian Indian Americans. The apparent successful bidder (proposer) will be required to submit information concerning the DBEs that will participate in this contract. The information will include the name and address for each DBE, a description of the work to be performed by each named firm, and the dollar value of the contract (subcontract). If the bidder fails to achieve the contract goal as stated herein, it will be required to provide documentation demonstrating that it made good faith efforts in attempting to do so. A bid that fails to meet these requirements will be considered non-responsive.

C. Required Notes for Contract over \$10,000.

The regulations and orders of the Secretary of Labor, OFCCP and FAR 152.61 require the contractor(s) include, in invitations for bids or negotiations for contract over \$10,000, the following notices:

- (1) The proposed contract is under and subject to Executive Order 11246 of September 24, 1965, and to the Equal Opportunity Clause. The Bidder's (Proposer's) attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth in the Specifications.
- (2) The Bidder (Proposer) must supply all the information required by the bid or proposal form.
- (3) The successful bidder will be required to submit a Certification of Non-segregated Facilities prior to award of the contract, and to notify prospective subcontractors of the

requirement for such a Certification where the amount of the subcontract exceeds \$10,000. Samples of the Certifications and Notice to Subcontractors appear in the Specifications.

- (4) Women will be afforded equal opportunity in all areas of employment. However, the employment of women shall not diminish the standards or requirements for the employment of minorities.

D. **Contract in Excess of \$50,000.**

For contracts of \$50,000 or more, a contractor having 50 or more employees, and his subcontractors having 50 or more employees and who may be awarded a subcontract of \$50,000 or more, will be required to maintain an affirmative action program within 120 days of the commencement of the contract.

E. **Additional Notices for \$1 Million Contracts.**

- (1) **Pre-award Equal Opportunity Compliance Reviews.** Where the bid of the apparent low responsible bidder is in the amount of \$1 million or more, the bidder and his known all-tier subcontractors which will be awarded subcontracts of \$1 million or more will be subject to full on-site, pre-award equal opportunity compliance reviews before the award of the contract for the purpose of determining whether the bidder and his subcontractor are able to comply with the provisions of the equal opportunity clause.
- (2) **Compliance Reports.** Within 30 days after award of this contract, the contractor shall file a compliance report (Standard Form 100) if:
 - (a) The contractor has not submitted a complete compliance report within 12 months preceding the date of award; and
 - (b) The contractor is within the definition of "employer" in Paragraphs 2e(3) of the instructions included in Standard Form 100.
- (3) The contractor shall require the subcontractor on all-tier subcontracts, irrespective of dollar amount, to file Standard Form 100 within 30 days after award of the subcontract if the above two conditions apply. Standard Form 100 will be furnished upon request.

***SPECIAL NOTICE TO
BIDDERS***

SPECIAL NOTICE TO BIDDERS

Buy American-Steel and Manufactured Products for Construction Contracts (Aviation Safety and Capacity Expansion Act of 1990)

(A) The Aviation Safety and Capacity Expansion Act of 1990 provides that preference be given to steel and manufactured products produced in the United States when funds are expended pursuant to grant issued under this Airport Improvements Program. The following terms apply:

1. Steel and manufactured products. As used in this clause, steel and manufactured products include (1) steel produced in the United States or (2) a manufactured product produced in the United States, if the cost of its components mined, produced or manufactured in the United States exceed 60 percent of the cost of all its components and final assembly has taken place in the United States. Components of foreign origin of the same class or kind as the products referred to in subparagraphs (b) (1) or (2) shall be treated as domestic.
2. Components. As used in this clause, components mean those articles, materials, and supplies incorporated directly into steel and manufactured products.
3. Cost of Components. This means the cost of production of the components, exclusive of final assembly labor costs.

(B) The successful bidder will be required to assure that only domestic steel and manufactured products will be used by the Contractor, subcontractor's materialmen, and suppliers in the performance of this contract, except those

1. That the U.S. Department of Transportation has determined, under the Aviation Safety and Capacity Expansion Act of 1990, are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality;
2. That the U.S. Department of Transportation has determined, under the Aviation Safety and Capacity Expansion Act of 1990, that domestic preference would be inconsistent with the public interest; or
3. That inclusion of domestic material will increase the cost of the overall project by contract more than 25 percent.

BIDDER QUALIFICATIONS

BIDDER QUALIFICATIONS

I. QUALIFICATIONS

- A. Each Bidder shall furnish the Texas Department of Transportation, Aviation Division satisfactory evidence of the Bidder's competency to perform the proposed work. Such evidence of competency shall consist of statements covering the Bidder's past experience on similar work, a list of equipment that would be available for the work, and a list of key personnel that would be available.
- B. In addition, each Bidder shall furnish the Texas Department of Transportation, Aviation Division satisfactory evidence of the Bidder's financial responsibility. Such evidence shall consist of a confidential statement or report of the Bidder's financial resources and liabilities as of the last calendar year or the Bidder's last fiscal year. Such statements or reports shall be prepared by a public accountant. At the time of submitting such financial statements or reports, the Bidder shall further certify whether the Bidder's financial responsibility is approximately the same as stated or reported by the public accountant. If the Bidder's financial responsibility has changed, the Bidder shall qualify the public accountant's statement or report to reflect the Bidder's true financial condition at the time such qualified statement or report is submitted to the Texas Department of Transportation.
- C. If a Bidder is fully prequalified or prequalified under the bidder's questionnaire with the Texas Department of Transportation (TxDOT) and is on the TxDOT current "bidders list", such evidence of current TxDOT prequalification may be submitted as evidence of financial responsibility and competency in lieu of the above certified statements or reports. The bidders must acknowledge and sign the type of pre-qualification on the bid form. Bidders understand their limitations of prequalification both financially and for approved work experience related to airport development projects.
- D. If awarded the contract the bidder shall be required to submit a TxDOT - Certificate of Insurance form naming the Texas Department of Transportation as an additional insured and with a waiver of subrogation in favor of the Texas Department of Transportation. Insurance requirements are listed in the **Aviation Division General Construction Contract Provisions, volume dated February 2013.**

II. SUBMISSION OF QUALIFICATIONS

- A. Each bidder shall submit the Bidder's "evidence of competency" and "evidence of financial responsibility", to the Texas Department of Transportation, Aviation Division at the date, time and location specified for opening bids. These items shall be submitted in the envelope with your bid marked with project number, location of airport, and name and business address of the bidder.
- B. Bids that do not include the qualification requirements listed above will be considered non-responsive and therefore disqualified.

C. BIDS SUBMITTED WITHOUT AKNOWLEDGEMENT OR SUBMISSION OF ALL QUALIFICATIONS WILL NOT BE READ.

INSTRUCTION TO BIDDERS

INSTRUCTIONS TO BIDDERS

IB-1. **The Bidder shall reference the Aviation Division General Construction Contract Provisions, volume dated February 2013, for all general contract provisions.** General Construction Contract Provisions may be obtained at TxDOT, Aviation Division, 6230 E. Stassney Ln., Second Floor, Austin, Texas 78744; Use latest version of referenced Advisory Circulars.

IB-2. The Bidder shall refer to Section 20, BID REQUIREMENTS AND CONDITIONS of the GENERAL PROVISIONS.

IB-3. The Bidder shall refer to: BIDDER QUALIFICATIONS section of the bid document and Section 20-02, PREQUALIFICATION OF BIDDERS of the GENERAL PROVISIONS.

IB-4. The Bidder must submit the completed bid on the formatted bid form furnished by TxDOT, with all blank spaces in the TxDOT bid form correctly typed in for each and every item for which a quantity is given.

The Bidder shall sign the bid in ink. If the bid is made by an individual, the individual's name and address must be shown. If made by a partnership, the name and address of each member of the partnership must be shown. If made by a corporation, the person signing the bid shall give the name of the state under the laws of which the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer.

IB-5. The Bidder shall submit completed copies of all items identified under “Bidder Qualifications”. ***Bids received without Bidder Qualifications will not be read.***

IB-6. The REQUIRED LANGUAGE IN PROPOSALS FOR AIP CONTRACTS, CERTIFICATION REGARDING DEBARMENT, CERTIFICATION REGARDING FOREIGN TRADE, BUY AMERICAN CERTIFICATION, CERTIFICATION OF BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY, and the CERTIFICATION OF NON-SEGREGATED FACILITIES, contained in the bid document shall be completed by the Bidder and submitted with the Bid.

IB-7. Receipt of all addenda issued shall be acknowledged by the Bidder in the space provided on the Bid Form.

IB-8. Bids may be rejected if they show any alteration of words or figures, additions not called for, conditional or uncalled for alternate bids, incomplete bids, any alteration of words or figures or changes not initialed by the person or persons signing the bid, or irregularities of any kind.

IB-9. The bid shall be accompanied by a Bid Guarantee of the character and in the amount as indicated in the bid.

IB-10. Any questions arising during the advertising period as to meaning or intent of the specifications will be answered by an addendum prepared by the Engineer. Contractor shall be responsible for obtaining addenda for each interested project at our website: <http://www.txdot.gov/inside-txdot/division/aviation/projects.html>. All addenda issued shall become a part of the contract documents.

Bidders are responsible for checking this website regularly for any changes to the bid documents, such as Addendums.

IB-11. The Texas Department of Transportation (TxDOT) shall accept as Disadvantaged Business Enterprises (DBEs) only those firms currently certified as such by the Texas Unified Certification Program (TUCP).

IB-12. Each bid submitted shall be placed in a sealed envelope plainly marked with the project number, location of airport, and name and business address of the Bidder on the outside. When sent by mail, preferably registered, the sealed bid, marked as indicated above, should be enclosed in an additional envelope. Bids, which are transmitted by telephone, by telegraph or by electronic means, will not be accepted.

IB-13. No bid will be considered unless received at the place specified in the advertisement before the time specified for opening all bids. Bids received after the bid opening time shall be returned to the Bidder unopened.

IB-14. Bids will be opened and read publicly at the time and place indicated in the Notice to Bidders.

IB-15. Generally, materials incorporated into a project, such as concrete, rebar, asphalt, etc., are tax exempt. Other items not incorporated into the project such as barricades and equipment rental may be subject to sales tax. A copy of the Texas Sales and Use Tax Exemption form is available through the State Comptroller website at <https://comptroller.texas.gov/forms/01-339.pdf> This form is a self-certification process. The contractor must complete the form and retain the document in their files. A copy of the form should be sent to the seller/supplier. Bidders should contact their tax consultant or the Texas Office of the Comptroller with any questions related to the payment of sales tax.

IB-16. In accordance with 49 CFR Part 26.53 the bidder/offerer must submit an acceptable DBE plan and commitment or good faith effort no later than 5 calendar days after bid opening as a matter of responsibility. For all federally funded construction projects with a DBE goal, bidders shall use the attached DBE participation plan and appropriate commitment agreement form/s and submit these documents to TxDOT Aviation within 5 calendar days after the bid opening via email to AVNRFQ@txdot.gov.

BID FORM

BID FORM

To obtain a formatted Bid Form, please go to either:

1. TxDOT Aviation Projects at:

<http://www.dot.state.tx.us/AVN/avninfo/proposal/construct/index.htm>

Or,

2. TxDOT Plans Online at:

<http://www.txdot.gov/inside-txdot/division/support/plans-online.html>

- The online formatted bid form should be accessed with Internet Explorer. It will not open when using Chrome.
- The bid form is formatted and allows for online input of numeric unit prices.
- Do not handwrite numeric unit prices on this formatted bid form.
- The formatted bid form should be completed online and then printed, signed and delivered to the appropriate location for the bid opening.

Bid Package Responsiveness Checklist:

The following are required in order for the bid to be responsive. Bids without the following will be deemed non-responsive.

To be included with or on Bid Form

- All blanks in the bid form filled in electronically
- Addenda acknowledged (if any) Handwritten acknowledgement of addenda, in excess of 3, is required
- Bid Form signed, original in ink
- Bid form qualifications acknowledged and signed, or prequalification letter enclosed (will be used to establish bidder responsibility)
- Qualification Acknowledgement or Qualification Statement Submitted
- 2% Bid Bond, Power of Attorney, and claim page with the correct project number
- Required Language in Proposals for AIP Contracts Form
- Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- Buy American Certification
- Certification of Non-Segregated Facilities

WITHIN 5 DAYS OF BID OPENING, SUBMIT DBE PLAN AND COMMITMENT AGREEMENTS TO AVNRFQ@txdot.gov IF APPLICABLE ON FEDERALLY FUNDED PROJECTS WITH A POSTED DBE GOAL

TxDOT may consider a bid non-responsive or disqualify a bidder after the reading of bids per General Provision 20-07 and General provision 20-13.

BID BOND

Bid Bond

Bid Bond - original equal to 2% of total bid.

A bid bond may be issued on any form acceptable to the bidder's Surety Company.

***SPECIAL INSTRUCTION TO
BIDDERS REGARDING EEO***

SPECIAL INSTRUCTION TO BIDDERS REGARDING EEO

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

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 work force in each trade on all construction work in the covered area, are as follows:

Goals for minority
participation in
each trade
27.4%

Goals for female
participation in
each trade
6.9%

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 is also subject to the goals for both its federally involved and non-federally involved construction.

The contractor's compliance with the executive order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR Part 60-4.3 (a), 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, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The contractor shall provide written notifications to the Director, OFCCP, within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employee 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 City of Wharton, Wharton County .

***REQUIRED LANGUAGE IN
PROPOSALS FOR AIP
CONTRACTS***

REQUIRED LANGUAGE IN PROPOSALS FOR AIP CONTRACTS

(Please complete & return in bid package)

Section 60-1.7(b) of the Regulations of the Secretary of Labor requires each bidder or prospective prime contractor and proposed subcontractor, where appropriate, to state in the bid or at the outset of negotiations for the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and if so, whether it has filed with the Joint Reporting Committee, the Director, an agency, or the former President's Committee on Equal Employment Opportunity all reports due under the applicable filing requirements. In any case in which a bidder or prospective prime contractor or proposed subcontractor which participated in a previous contract subject to Executive Order 10925, 11114, or 11246 has not filed a report due under the applicable filing documents, no contract or subcontract shall be awarded unless such contractor submits a report covering the delinquent period or such other period specified by the FAA or the Director, OFCCP.

Bid or Proposal Form. To effectuate the foregoing requirements, the sponsor is required to include in the bid or proposal form a statement substantially as follows:

The bidder (proposer) shall complete the following statements by checking the appropriate space.

The undersigned certifies on behalf of _____, that

It has developed and has on file at each establishment affirmative action programs pursuant to 41 CFR Part 60-2 (Affirmative Action Programs).

It is not subject to the requirements to develop an affirmative action program under 41 CFR Part 60-2 (Affirmative Action Programs).

The bidder (proposer) has _____ has not _____ participated in a previous contract subject to the equal opportunity clause prescribed by Executive Order 10925, or Executive Order 11114, or Executive Order 11246.

The bidder (proposer) has _____ has not _____ submitted all compliance reports in connection with any such contract due under the applicable filing requirements; and that representations indicating submission of required compliance reports signed by proposed subcontractors will be obtained prior to award of subcontracts.

If the bidder (proposer) has participated in a previous contract subject to the equal opportunity clause and has not submitted compliance reports due under applicable filing requirements, the Bidder (Proposer) shall submit a compliance report on Standard Form 100, 'Employee Information Report EEO-1 prior to the award of contract.

Standard Form 100 is normally furnished to contractors annually, based on a mailing list currently maintained by the Joint Reporting Committee. In the event a contractor has not received the form, he may obtain it by writing to the following address:

Joint Reporting Committee
1800 G Street
Washington, DC 20506
(2/92)

Signature of Company Official

Date

***CERTIFICATION
REGARDING DEBARMENT,
SUSPENSION,
INELIGIBILITY AND
VOLUNTARY EXCLUSION***

**Certification Regarding Debarment, Suspension,
Ineligibility and Voluntary Exclusion
(49 CFR PART 29 and Executive Order GA-48)
(Please complete & return in bid package)**

The bidder (offeror) certifies, by submission of this proposal or acceptance of this contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. It further agrees that by submitting this proposal that it will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the bidder/offeror/contractor or any lower tier participant is unable to certify to this statement, it shall attach an explanation to this solicitation/proposal.

**Certification Regarding Foreign Trade Restrictions
(49 CFR PART 30 and Executive Order GA-48)**

The contractor or subcontractor, by submission of an offer and/or execution of a contract, certifies that neither it, nor its holding companies or subsidiaries, is:

- a. is not owned or controlled by one or more citizens or nationals of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade representative (USTR);
- b. has not knowingly entered into any contract or subcontract for this project with a contractor that is a citizen or national of a foreign country on said list or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list.
- c. has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

By signing and dating this form Bidder is certifying that the responding Company, or any of its holding companies or subsidiaries, is not:

- a. Listed in Section 889 of the 2019 National Defense Authorization Act;
- b. Listed in Section 1260H of the 2021 National Defense Authorization Act; or
- c. Owned by the government of a country on the U.S. Department of Commerce's foreign adversaries list under 15 C.F.R Section 791.4; or
- d. Controlled by any governing or regulatory body located in a country on the U.S. Department of Commerce's foreign adversaries list under 15 C.F.R Section 791.4

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to a contractor or subcontractor who is unable to certify to the above. If the contractor knowingly procures or subcontracts for the supply of any product or service

of a foreign country on said list for use on the project, the Federal Aviation Administration may direct, through the sponsor, cancellation of the contract at no cost to the Government.

Further, the contractor agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The contractor may rely upon the certification of a prospective subcontractor unless it has knowledge that the certification is erroneous. The contractor shall provide immediate written notice to the sponsor if the contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The subcontractor agrees to provide immediate written notice to the contractor, if at any time it learns that its certification was erroneous by reason of changed circumstances.

This certification is a material representation of fact upon which reliance was placed when making the award. If it is later determined that the contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration may direct through the sponsor, cancellation of the contract or subcontract for default at no cost to the Government.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code, Section 1001.

Signature of Company Official

Date

**BUY AMERICAN
CERTIFICATION**

Buy American Certification
(Aviation Safety and Capacity Expansion Act of 1990)
(Please complete & return in bid package)

By submitting a bid/proposal under this solicitation, the contractor agrees to comply with 49 USC § 50101, which provides that Federal funds may not be obligated unless all steel and manufactured goods used in AIP-funded projects are produced in the United States, unless the FAA has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list. Except for those items listed by the offeror below or on a separate and clearly identified attachment to this bid/proposal, the offeror certifies that steel and each manufactured product, is produced in the United States (as defined in the clause Buy American - Steel and Manufactured Products for Construction Contracts) and that components of unknown origin are considered to have been produced or manufactured outside the United States.

We certify that we comply with this provision and don't have any exceptions to list.

-OR-

We certify that we comply with this provision except for the products listed below.

PRODUCT

COUNTRY OF ORIGIN

Signature of Company Official

Date

CERTIFICATION OF NON- SEGREGATED FACILITIES

CERTIFICATION OF NON-SEGREGATED FACILITIES

(Please complete & return in bid package)

**NOTICE TO PROSPECTIVE FEDERALLY ASSISTED
CONSTRUCTION CONTRACTORS
(41 CFR 60-1.8)**

- (1) A Certification of Non-Segregated Facilities must be submitted prior to the award of a federally assisted construction contract exceeding \$10,000 which is not exempt from the provisions of the equal opportunity clause.
- (2) Contractors receiving federally assisted construction contract awards exceeding \$10,000 which are not exempt from the provisions of the equal opportunity clause will be required to provide for the forwarding of the following notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the equal opportunity clause.

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

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR
CERTIFICATION OF NON-SEGREGATED FACILITIES**

- (1) A Certification of Non-Segregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the equal opportunity clause.
- (2) Contractors receiving subcontract awards exceeding \$10,000 which are not exempt from the provisions of the equal opportunity clause will be required to provide for the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the equal opportunity clause.

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

Signature of Company Official

Date

***DISADVANTAGED
BUSINESS ENTERPRISE***

Disadvantaged Business Enterprise in Federal-Aid Contracts



1. DESCRIPTION

The purpose of this Special Provision is to carry out the U.S. Department of Transportation's (DOT) policy of ensuring nondiscrimination in the award and administration of DOT-assisted Contracts and creating a level playing field on which firms owned and controlled by individuals who are determined to be socially and economically disadvantaged can compete fairly for DOT-assisted Contracts.

2. DISADVANTAGED BUSINESS ENTERPRISE IN FEDERAL-AID CONTRACTS

- 2.1. **Policy.** It is the policy of the DOT and the Texas Department of Transportation, Aviation Division (Department) that DBEs, as defined in 49 CFR Part 26, Subpart A, and the Department's DBE Program, will have the opportunity to participate in the performance of Contracts financed in whole or in part with federal funds. The DBE requirements of 49 CFR Part 26, and the Department's DBE Program, apply to this Contract as follows.

The Contractor will solicit DBEs through reasonable and available means, as defined in 49 CFR Part 26, Appendix A, and the Department's DBE Program, or show a good faith effort to meet the DBE goal for this Contract.

The Contractor, subrecipient, or subcontractor will not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. Carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted Contracts. Failure 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 Department deems appropriate.

The requirements of this Special Provision must be physically included in any subcontract.

By signing the Contract proposal, the Bidder is certifying that the DBE goal as stated in the proposal will be met by obtaining commitments from eligible DBEs or that the Bidder will provide acceptable evidence of good faith effort to meet the commitment.

2.2. Definitions.

- 2.2.1. **Administrative Reconsideration.** A process by which the low bidder may request reconsideration when the Department determines the good faith effort (GFE)

requirements have not been met.

- 2.2.2. **Commercially Useful Function (CUF).** A CUF occurs when a DBE has the responsibility for the execution of the work and carrying out such responsibilities by actually performing, managing, and supervising the work.
- 2.2.3. **Disadvantaged Business Enterprise (DBE).** A for-profit small business certified through the Texas Unified Certification Program in accordance with 49 CFR Part 26, that is at least 51% owned by one or more socially and economically disadvantaged individuals, or in the case of a publicly owned business, in which is at least 51% of the stock is owned by one or more socially and economically disadvantaged individuals, and whose management and daily business operations are controlled by one or more of the individuals who own it.
- 2.2.4. **DBE Joint Venture.** An association of a DBE firm and one or more other firms to carry out a single business enterprise for profit for which purpose they combine their property, capital, efforts, skills, and knowledge, and in which the DBE is responsible for a distinct, clearly defined portion of the work of the Contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.
- 2.2.5. **DOT.** The U.S. Department of Transportation, including the Office of the Secretary, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the Federal Aviation Administration (FAA).
- 2.2.6. **Federal-Aid Contract.** Any Contract between the Department and a Contractor that is paid for in whole or in part with DOT financial assistance.
- 2.2.7. **Good Faith Effort.** All necessary and reasonable steps to achieve the contract goal which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if not fully successful. Good faith efforts are evaluated prior to award and throughout performance of the Contract. For guidance on good faith efforts, see 49 CFR Part 26, Appendix A.
- 2.2.8. **North American Industry Classification System (NAICS).** A designation that best describes the primary business of a firm. The NAICS is described in the North American Industry Classification Manual—United States, which is available on the Internet at the U.S. Census Bureau website: <http://www.census.gov/eos/www/naics/>.
- 2.2.9. **Race-Conscious.** A measure or program that is focused specifically on assisting only DBEs, including women-owned businesses.
- 2.2.10. **Race-Neutral DBE Participation.** Any participation by a DBE through customary competitive procurement procedures.

- 2.2.11. **Texas Unified Certification Program (TUCP) Directory.** An online directory listing all DBEs currently certified by the TUCP. The Directory identifies DBE firms whose participation on a Contract may be counted toward achievement of the assigned DBE Contract goal.
- 2.3. **Contractor's Responsibilities.**
- 2.3.1. **DBE Liaison Officer.** Designate a DBE liaison officer who will administer the Contractor's DBE program and who will be responsible for maintenance of records of efforts and contacts made to subcontract with DBEs.
- 2.3.2. **Compliance Tracking System (CTS).** TxDOT Aviation uses the eGrants electronic grant management system for projects beginning Fiscal Year 2017. The awarded bidder will be required to electronically submit contract documents, pay request forms, change order requests, certified payroll, DBE/HUB reports and insurance certificates. Signing the Bid Form certifies that the bidder meets the eGrants minimum system requirements in the External User Manual found at <http://www.txdot.gov/government/funding/egrants-2016/aviation.html>.
- 2.3.3. **Apparent Low Bidder.** If the DBE documentation was not submitted with the bid, the apparent low bidder must submit a DBE plan and commitments to satisfy the DBE goal or submit good faith effort Form 2603 located at <http://www.txdot.gov/inside-txdot/forms-publications/doing-business/dbe-forms.html> and supporting documentation demonstrating why the goal could not be achieved, in whole or part, **no later than 5 calendar days after bid opening**. The means of transmittal and the risk of timely receipt of the information will be the bidder's responsibility and no extension of the 5-calendar- day timeframe will be allowed for any reason. The apparent low bidder may use the DBE forms provided in the bid document and must follow the instructions on the commitment form.
- 2.3.4. **DBE Contractor.** A DBE Contractor may receive credit toward the DBE goal for work performed by its own forces and work subcontracted to DBEs. In the event a DBE subcontracts to a non-DBE, that information must be reported monthly.
- 2.3.5. **DBE Committal.** Only those DBEs certified by the TUCP are eligible to be used for goal attainment. The Department maintains the TUCP DBE Directory. The Directory can be accessed at the following website:
<https://txdot.txdotcms.com/FrontEnd/VendorSearchPublic.asp?TN=txdot&XID=2340>.

A DBE must be certified on the day the commitment is considered and at time of subcontract execution. It is the Contractor's responsibility to ensure firms identified for participation are approved certified DBE firms.

The Bidder is responsible to ensure that all submittals are checked for accuracy. Any and all omissions, deletions, and/or errors that may affect the end result of the commitment package are the sole liabilities of the bidder.

Commitments in excess of the goal are considered race-neutral commitments.

2.3.6. **Good Faith Effort Requirements.** A Contractor who cannot meet the Contract goal, in whole or in part, must make adequate good faith efforts to obtain DBE participation as so stated and defined in 49 CFR Part 26, Appendix A.

2.3.6.1. **Administrative Reconsideration.** If the Department determines that the apparent low bidder has failed to satisfy the good faith efforts requirement, the Department will notify the Bidder of the failure and will give the Bidder an opportunity to provide written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so.

The Bidder must request an administrative reconsideration of that determination within 3 days of the date of receipt of the notice. The request must be submitted directly to the Texas Department of Transportation, Aviation Division, 125 East 11th Street, Austin, Texas 78701-2483.

If a request for administrative reconsideration is not filed within the period specified, the determination made is final and further administrative appeal is barred.

If a reconsideration request is timely received, the reconsideration decision will be made by the DBE liaison officer or, if the DBE liaison officer took part in the original determination, the Department Division Director will appoint another employee to perform the administrative reconsideration. The employee will hold a leadership position and will report directly to the Division Director.

The meeting or written documentation must be provided or held within 7 days of the date the request was submitted.

The Department will provide to the Bidder a written decision if the Bidder did or did not make adequate good faith efforts to meet the Contract goal. The reconsideration decision is final and is not administratively appealed to DOT.

2.3.7. **Determination of DBE Participation.** The work performed by the DBE must be reasonably construed to be included in the work area and NAICS work code identified by the Contractor in the approved commitment.

Participation by a DBE on a Contract will not be counted toward DBE goals until the amount of the participation has been paid to the DBE.

Payments made to a DBE that was not on the original commitment may be counted toward the Contract goal if that DBE was certified as a DBE before the execution of the subcontract and has performed a Commercially Useful Function.

The total amount paid to the DBE for work performed with its own forces is counted toward the DBE goal. When a DBE subcontracts part of the work of its Contract to another firm, the value of the subcontracted work may be counted toward DBE goals only if the subcontractor is itself a DBE.

DBE Goal credit for the DBE subcontractors leasing of equipment or purchasing of supplies from the Contractor or its affiliates is not allowed. Project materials or supplies acquired from an affiliate of the Contractor cannot directly or indirectly (second or lower tier subcontractor) be used for DBE goal credit.

If a DBE firm is declared ineligible due to DBE decertification after the execution of the DBE's subcontract, the DBE firm may complete the work and the DBE firm's participation will be counted toward the Contract goal. If the DBE firm is decertified before the DBE firm has signed a subcontract, the Contractor is obligated to replace the ineligible DBE firm or demonstrate that it has made good faith efforts to do so.

The Contractor may count 100% of its expenditure to a DBE manufacturer. According to 49 CFR 26.55(e)(1)(i), a DBE manufacturer is a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the Contract and of the general character described by the specifications.

The Contractor may count only 60% of its expenditure to a DBE regular dealer. According to 49 CFR 26.55(e)(2)(i), a DBE regular dealer is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles, or equipment of the general character described by the specifications and required under the Contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. A firm may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business if the firm both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment must be by a long-term lease agreement and not on an ad hoc or contract-by-contract basis. A long-term lease with a third-party transportation company is not eligible for 60% goal credit.

With respect to materials or supplies purchased from a DBE that is neither a manufacturer nor a regular dealer, the Contractor may count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site.

A Contractor may count toward its DBE goal a portion of the total value of the Contract amount paid to a DBE joint venture equal to the distinct, clearly defined portion of the work of the Contract performed by the DBE.

2.3.8. **Commercially Useful Function.** It is the Contractor's obligation to ensure that each DBE used on federal-assisted contracts performs a commercially useful function on the Contract.

The Department will monitor performance during the Contract to ensure each DBE is performing a CUF.

Under the terms established in 49 CFR 26.55, a DBE performs a CUF when it is responsible for execution of the work of the Contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved.

With respect to material and supplies used on the Contract, a DBE must be responsible for negotiating price, determining quality and quantity, ordering the material, installing the material, if applicable, and paying for the material itself.

With respect to trucking, the DBE trucking firm must own and operate at least one fully licensed, insured, and operational truck used on the Contract. 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. The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE that leases trucks equipped with drivers from a non-DBE is entitled to credit for the total value of transportation services provided by non-DBE leased trucks equipped with drivers not to exceed the value of transportation services on the Contract provided by DBE-owned trucks or leased trucks with DBE employee drivers. Additional participation by non-DBE owned trucks equipped with drivers receives credit only for the fee or commission it receives as a result of the lease arrangement.

A DBE does not perform a CUF when its role is limited to that of an extra participant in a transaction, Contract, or project through which funds are passed in order to obtain the appearance of DBE participation. The Department will evaluate similar transactions involving non-DBEs in order to determine whether a DBE is an extra participant.

If a DBE does not perform or exercise responsibility for at least 30% of the total cost of its Contract with its own work force, or the DBE subcontracts a greater portion of the work than would be expected on the basis of normal industry practice for the type of work involved, the Department will presume that the DBE is not performing a CUF.

If the Department determines that a DBE is not performing a CUF, no work performed by such DBE will count as eligible participation. The denial period of time may occur before or after a determination has been made by the Department.

In case of the denial of credit for non-performance of a CUF, the Contractor will be required to provide a substitute DBE to meet the Contract goal or provide an adequate good faith effort when applicable.

- 2.3.8.1. **Rebuttal of a Finding of No Commercially Useful Function.** Consistent with the provisions of 49 CFR 26.55(c)(4) & (5), before the Department makes a final finding that no CUF has been performed by a DBE, the Department will notify the DBE and provide the DBE the opportunity to provide rebuttal information.

CUF determinations are not subject to administrative appeal to DOT.

- 2.3.9. **Joint Check.** The use of joint checks between a Contractor and a DBE is allowed with Department approval. To obtain approval, the Contractor must submit a completed Form 2178, "DBE Joint Check Approval," to the Department.

The Department will closely monitor the use of joint checks to ensure that such a practice does not erode the independence of the DBE nor inhibit the DBE's ability to perform a CUF. When joint checks are utilized, DBE credit toward the Contract goal will be allowed only when the subcontractor is performing a CUF in accordance with 49 CFR 26.55(c)(1).

Long-term or open-ended joint checking arrangements may be a basis for further scrutiny and may result in the lack of participation towards the Contract goal requirement if DBE independence cannot be established.

Joint checks will not be allowed simply for the convenience of the Contractor.

If the proper procedures are not followed or the Department determines that the arrangements result in a lack of independence for the DBE involved, no credit for the DBE's participation as it relates to the material cost will be used toward the Contract goal requirement, and the Contractor will need to make up the difference elsewhere on the project.

- 2.3.10. **DBE Termination and Substitution.** No DBE named in the commitment submitted under Section 2.3.5. will be terminated for convenience, in whole or part, without the Department's approval. This includes, but is not limited to, instances in which a 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.

Unless consent is provided, the Contractor will not be entitled to any payment for work or material unless it is performed or supplied by the listed DBE.

The Contractor, prior to submitting its request to terminate, must first give written notice to the DBE of its intent to terminate and the reason for the termination. The Contractor will copy the Department on the Notice of Intent to terminate.

The DBE has 5 calendar days to respond to the Contractor's notice and will advise the Contractor and the Department of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Department should not approve the prime Contractor's request for termination.

The Department may provide a shorter response time if required in a particular case as a matter of public necessity.

The Department will consider both the Contractor's request and DBE's stated position prior to approving the request. The Department may provide a written approval only if it agrees, for reasons stated in its concurrence document, that the Contractor has good cause to terminate the DBE. If the Department does not approve the request, the Contractor must continue to use the committed DBE firm in accordance with the Contract. For guidance on what good cause includes, see 49 CFR 26.53.

Good cause does not exist if the Contractor seeks to terminate, reduce, or substitute a DBE it relied upon to obtain the Contract so that the Contractor can self-perform the work for which the DBE firm was engaged.

When a DBE subcontractor is terminated, make good faith efforts to find, as a substitute for the original DBE, another DBE to perform, at least to the extent needed to meet the established Contract goal, the work that the original DBE was to have performed under the Contract.

Submit the completed Form 4010, "DBE Termination Request," and Form 4011 "DBE Substitution Request," within seven (7) days, which may be extended for an additional 7 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. If the Department determines that good faith efforts were not demonstrated, the Contractor will have the opportunity to appeal the determination to the Aviation Division.

- 2.3.11. **Reports and Records.** By the 15th of each month and after work begins, report payments to meet the DBE goal and for DBE race-neutral participation on projects with or without goals. These payment reports will be required until all DBE subcontracting or material supply activity is completed. Negative payment reports are required when no activity has occurred in a monthly period.
- 2.3.12. Notify the Department if payment to any DBE subcontractor is withheld or reduced. Before receiving final payment from the Department, the Contractor must indicate a final payment on the compliance tracking system. The final payment is a summary of all payments made to the DBEs on the project. All records must be retained for a period of 3 years following completion of the Contract work and must be available at reasonable times and places for inspection by authorized representatives of the Department or the DOT. Provide copies of subcontracts or agreements and other

documentation upon request.

- 2.3.13. **Failure to Comply.** If the Department determines the Contractor has failed to demonstrate good faith efforts to meet the assigned goal, the Contractor will be given an opportunity for reconsideration by the Department.

A Contractor's failure to comply with the requirements of this Special Provision will constitute a material breach of this Contract. In such a case, the Department reserves the right to terminate the Contract; to deduct the amount of DBE goal not accomplished by DBEs from the money due or to become due the Contractor; or to secure a refund, not as a penalty but as liquidated damages, to the Department or such other remedy or remedies as the Department deems appropriate.

- 2.3.14. **Investigations.** The Department may conduct reviews or investigations of participants as necessary. All participants, including, but not limited to, DBEs and complainants using DBE Subcontractors to meet the Contract goal, are required to cooperate fully and promptly with compliance reviews, investigations, and other requests for information.

- 2.3.15. **Falsification and Misrepresentation.** If the Department determines that a Contractor or subcontractor was a knowing and willing participant in any intended or actual subcontracting arrangement contrived to artificially inflate DBE participation or any other business arrangement determined by the Department to be unallowable, or if the Contractor engages in repeated violations, falsification, or misrepresentation, the Department may:

- refuse to count any fraudulent or misrepresented DBE participation;
- withhold progress payments to the Contractor commensurate with the violation;
- reduce the Contractor's prequalification status;
- refer the matter to the Office of Inspector General of the US Department of Transportation for investigation; and/or
- seek any other available contractual remedy.

- 2.3.16. **Prompt Payment.** Texas Administrative Code, Title 43, Rule 9.208 requires contractors to promptly pay all subcontractors within 10 days after the date that the contractor receives payment for work performed by a subcontractor. In order to enforce Rule 9.208, the Contractor shall list the name and amount of each subcontract including DBE subcontractors that are proposed to meet the DBE goal, if any, in the CTS. The contractor will report payments to each subcontractor on a monthly basis and list reasons for nonpayment in the CTS.

DBE PARTICIPATION PLAN

**MUST BE SUBMITTED AND RECEIVED NO LATER THAN 5 CALENDAR DAYS FROM
 BID OPENING at the following email address: AVNRFO@txdot.gov**

TxDOT Project No.: 2513WHRTN	Project Airport: Wharton Regional Airport
Percentage Goal: 0%	Contractor:
Contractor Bid Amount:	Notes:

I propose to use the following DBE Plan in accordance with the requirements of the Disadvantaged Business Enterprise

TX TAX Vendor Number (11 Digit #)	Name of DBE Sub/Supplier*	Type of Work	Amount (\$)
			\$
			\$
			\$
			\$
			\$
b) Total Dollar Value of Participation			\$

Assurances Attachment of the bid document and intend to utilize the following DBE firm(s) in performance of the contract.
Commitment Agreement Forms from these DBE firm(s) are attached to this DBE Participation Plan.

*The VENDOR NUMBER(s) and SUBCONTRACTOR NAME(s) supplied on this report must match what appears in the Texas Unified Certification Program (TUCP) Directory.

Acceptance of this DBE Participation Plan fulfills the requirements for only this DBE contract(s), between General Contractor and Subcontractor(s).

 Signature of Company Official

 Date

Construction Contractors:

Please download the appropriate DBE Commitment Agreement or Good faith effort form from the TxDOT website at <http://www.txdot.gov/business/partnerships/dbe-forms.html>. There are three available DBE commitment forms.

- 1) DBE Commitment Agreement Form No. SMS.4901,
- 2) DBE Program Material/Supplier Form No. SMS.4901-MS and
- 3) DBE Trucking Commitment Form No. SMS.4901-T.

You must pick which commitment applies to your subcontract agreement. Then you and your DBE/s must complete the form and return it with the signed DBE plan by the required date.

- 4) Form 4000 Contractor's Certification Good Faith Effort **(if unable to meet specified goal)**

SPECIAL PROVISIONS

SPECIAL PROVISIONS

The following Special Provisions modify, amplify, or amend the Construction Contract General Provisions (February 2013) with respect to the clauses cited below and no other clauses or requirements of these items are waived or changed hereby. The Special Provisions shall take precedence over the General Provisions.

SP-1 TxDOT, Aviation will not withhold retainage in any amount on any partial payment made to the contractor. The contractor is eligible to receive payment up to 95% of the contract amount or installed work items if over or under the current contract amount before final acceptance of the project. Final payment will be made after acceptance of the work by the Engineer and TxDOT.

SP-2 Add to Section 90-06 PARTIAL PAYMENTS:

Upon receipt and approval of each partial payment request, the Agent shall pay the approved partial amount which is due and payable as provided herein within thirty (30) days of receipt by TxDOT Aviation.

SP-3 Add to Section 90-09 ACCEPTANCE AND FINAL PAYMENT

Upon receipt and approval of the final payment request, the Agent shall pay the approved final amount which is due and payable as provided herein within thirty (30) days of receipt by TxDOT Aviation.

SP-4 Add to Section 80-01 Subcontracting of Contract:

The following is applicable on contracts equal to or greater than \$500,000:

The prime contractor shall perform work with its own organization on at least 30% of the total original contract cost. The term “perform work with own organization” includes only:

- workers employed and paid directly by the Contractor or wholly owned subsidiary;
- equipment owned by the Contractor or wholly owned subsidiary;
- rented or leased equipment operated by the Contractor’s employees or wholly owned subsidiary’s employees;
- materials incorporated into the work; and
- labor provided by staff leasing firms licensed under Chapter 91 of the Texas Labor Code for nonsupervisory personnel if the Contractor or wholly owned subsidiary maintains direct control over the activities of the leased employees and includes them in the weekly payrolls. When staff leasing firms provide materials or equipment, they are considered subcontractors. In these instances, approval of staff leasing firms as a subcontractor may be required. Copies of cancelled checks and certified statements may be required to verify compliance with the requirements of this Section.

On projects with Performance Bonds, this requirement will be suspended if the contractor defaults and a takeover agreement is executed.

SP-5 Add Additional Federal Provisions

Compliance with Nondiscrimination Requirements

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the **Title VI List of Pertinent Nondiscrimination Statutes and Authorities**, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.
3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor’s obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.
4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a contractor’s noncompliance with the Non-discrimination provisions of this contract, the sponsor will impose such contract

sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:

- a. Withholding payments to the contractor under the contract until the contractor complies; and/or
 - b. Cancelling, terminating, or suspending a contract, in whole or in part.
5. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the sponsor to enter into any litigation to protect the interests of the sponsor. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

(Source: Appendix E of Appendix 4 of FAA Order 1400.11, Nondiscrimination in Federally Assisted Programs at the Federal Aviation Administration)

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);
- 49 CFR part 21 (Non-discrimination in Federally-Assisted Programs of The Department of Transportation—Effectuation of Title VI of The Civil Rights Act of 1964);
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 CFR parts 37 and 38;
- The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq.).

FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)

(Reference: 29 USC § 201, et seq.)

APPLICABILITY

The federal minimum wage provisions are contained in the Fair Labor Standards Act (FLSA) which is administered by the United States Department of Labor Wage and Hour Division. All contracts and subcontracts must meet and comply with the FLSA, including the recordkeeping standards of the Act.

MANDATORY CONTRACT LANGUAGE

All contracts and subcontracts that result from this solicitation incorporate the following provisions by reference, with the same force and effect as if given in full text. The contractor has full responsibility to monitor compliance to the referenced statute or regulation. The contractor must address any claims or disputes that pertain to a referenced requirement directly with the Federal Agency with enforcement responsibilities.

Requirement	Federal Agency with Enforcement Responsibilities
Federal Fair Labor Standards Act (29 USC 201)	U.S. Department of Labor – Wage and Hour Division

OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

(Reference 20 CFR part 1910)

APPLICABILITY

The United States Department of Labor Occupational Safety & Health Administration (OSHA) oversees the workplace health and safety standards wage provisions from the Occupational Safety and Health Act of 1970. All contracts and subcontracts must meet and comply with the Occupational Safety and Health Act of 1970.

MANDATORY CONTRACT LANGUAGE

All contracts and subcontracts that result from this solicitation incorporate the following provisions by reference, with the same force and effect as if given in full text. The contractor has full responsibility to monitor compliance to the referenced statute or regulation. The contractor must address any claims or disputes that pertain to a referenced requirement directly with the Federal Agency with enforcement responsibilities.

Requirement	Federal Agency with Enforcement Responsibilities
Occupational Safety and Health Act of 1970 (20 CFR Part 1910)	U.S. Department of Labor – Occupational Safety and Health Administration

ACCESS TO RECORDS AND REPORTS.

(Reference: 2 CFR § 200.326, 2 CFR § 200.333)

APPLICABILITY

Applies to all AIP-funded projects and must be included in all contracts and subcontracts.

MANDATORY CONTRACT LANGUAGE

The mandatory language that must be used on AIP funded project contracts is as follows:

ACCESS TO RECORDS AND REPORTS

The Contractor must maintain an acceptable cost accounting system. The Contractor agrees to provide the Sponsor, the Federal Aviation Administration, and the Comptroller General of the United States or any of their duly authorized representatives access to any books, documents, papers, and records of the contractor which are directly pertinent to the specific contract for the

purpose of making audit, examination, excerpts and transcriptions. The Contractor agrees to maintain all books, records and reports required under this contract for a period of not less than three years after final payment is made and all pending matters are closed.

TRADE RESTRICTION

(Reference: 49 CFR part 30)

APPLICABILITY

The trade restriction clause applies to all AIP-funded projects and must be included in all contracts and subcontracts.

MANDATORY CONTRACT LANGUAGE

The mandatory language is as follows:

TRADE RESTRICTION CLAUSE

The contractor or subcontractor, by submission of an offer and/or execution of a contract, certifies that it:

- a. is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR);
- b. has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list;
- c. has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR 30.17, no contract shall be awarded to a contractor or subcontractor who is unable to certify to the above. If the contractor knowingly procures or subcontracts for the supply of any product or service of a foreign country on said list for use on the project, the Federal Aviation Administration may direct through the Sponsor cancellation of the contract at no cost to the Government.

Further, the contractor agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The contractor may rely on the certification of a prospective subcontractor unless it has knowledge that the certification is erroneous.

The contractor shall provide immediate written notice to the sponsor if the contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become

erroneous by reason of changed circumstances. The subcontractor agrees to provide written notice to the contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

This certification is a material representation of fact upon which reliance was placed when making the award. If it is later determined that the contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration may direct through the Sponsor cancellation of the contract or subcontract for default at no cost to the Government.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code, Section 1001.

BREACH OF CONTRACT TERMS

(Reference 2 CFR § 200 Appendix II(A))

APPLICABILITY

This provision is required in all contracts that exceed the simplified acquisition threshold. This threshold, fixed at 41 USC 403(11), is presently set at \$100,000.

MANDATORY CONTRACT LANGUAGE

The regulation does not prescribe mandatory language; however, the following clause represents sample language that meets the intent of 2 CFR § 200 Appendix II(A). This provision requires grantees to incorporate administrative, contractual or legal remedies in instances where contractors violate or breach contract terms.

BREACH OF CONTRACT TERMS

Any violation or breach of terms of this contract on the part of the contractor or its subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement. The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder are in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

CLEAN AIR AND WATER POLLUTION CONTROL.

(Reference: 49 CFR § 18.36(i)(12)) Note, when the DOT adopts 2 CFR 200, this reference will change to 2 CFR § 200 Appendix II(G))

APPLICABILITY.

Incorporate in all professional service agreements, construction contracts and subcontracts that exceed \$100,000. (Note that the 2 CFR 200 will raise this level to \$150,000)

MANDATORY CONTRACT LANGUAGE.

CLEAN AIR AND WATER POLLUTION CONTROL

Contractors and subcontractors agree:

1. That any facility to be used in the performance of the contract or subcontract or to benefit from the contract is not listed on the Environmental Protection Agency (EPA) List of Violating Facilities;
2. To comply with all the requirements of Section 114 of the Clean Air Act, as amended, 42 U.S.C. 1857 et seq. and Section 308 of the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq. relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in Section 114 and Section 308 of the Acts, respectively, and all other regulations and guidelines issued thereunder;
3. That, as a condition for the award of this contract, the contractor or subcontractor will notify the awarding official of the receipt of any communication from the EPA indicating that a facility to be used for the performance of or benefit from the contract is under consideration to be listed on the EPA List of Violating Facilities;
4. To include or cause to be included in any construction contract or subcontract which exceeds \$100,000 the aforementioned criteria and requirements.

CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS.

(Reference: 2 CFR § 200 Appendix II (E))

APPLICABILITY.

Incorporate in all professional service agreements, construction contracts and subcontracts that exceed \$100,000.

MANDATORY CONTRACT LANGUAGE

CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS

1. Overtime Requirements.

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic, including watchmen and guards, in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; Liability for Unpaid Wages; Liquidated Damages.

In the event of any violation of the clause set forth in paragraph (1) above, the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1 above, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1 above.

3. Withholding for Unpaid Wages and Liquidated Damages.

The Federal Aviation Administration or the Sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 above.

4. Subcontractors.

The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs 1 through 4 and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1 through 4 of this section.

CERTIFICATION OF OFFERER/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS

The Engineer certifies, by acceptance of this Agreement, that the Engineer:

1.) is not a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

2.) is not a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

If the Engineer cannot certify both of the above representations, the Engineer is ineligible to accept this Agreement unless the Agent has received notification from the agency suspension and debarment official (SDO) that the SDO has considered suspension or debarment and determined that further action is not required to protect the Government's interests. The Engineer therefore must provide information to the Agent and the Sponsor about its tax liability or conviction to the Agent and the Sponsor, who will then notify the FAA Airports District Office, which will then notify the agency's SDO to facilitate completion of the required considerations before award decisions are made. The Engineer agrees that it will incorporate this provision for certification in all lower tier subcontracts.

VETERAN'S PREFERENCE

In the employment of labor (excluding executive, administrative, and supervisory positions), the Contractor and all sub-tier contractors must give preference to covered veterans as defined within Title 49 United States Code Section 47112. Covered veterans include Vietnam-era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns (as defined by 15 USC 632) owned and controlled by disabled veterans. This preference only applies when there are covered veterans readily available and qualified to perform the work to which the employment relates.

ENERGY CONSERVATION REQUIREMENTS

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to energy efficiency as contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 USC 6201et seq.).

TEXTING WHEN DRIVING

In accordance with Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving", (10/1/2009) and DOT Order 3902.10, "Text Messaging While Driving", (12/30/2009), the Federal Aviation Administration encourages recipients of Federal grant funds to adopt and enforce safety policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving when performing work related to a grant or subgrant. In support of this initiative, the Owner encourages the Contractor to promote policies and initiatives for its employees and other work personnel that decreases crashes by distracted drivers, including policies that ban text messaging while driving motor vehicles while performing work

activities associated with the project. The Contractor must include the substance of this clause in all sub-tier contracts exceeding \$3,500 that involve driving a motor vehicle in performance of work activities associated with the project.

SP-6 Add Notice Regarding Certificate of Interested Parties

A contract for \$1,000,000 or more will not be issued until the selected contractor submits a signed and notarized Certificate of Interested Parties (Form 1295), along with a Certification of Filing. The Certification of Filing may be obtained through the Texas Ethics Commission's filing application, https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm. The awarded contractor shall submit these documents with the signed agreement.

The Certificate of Interested Parties is mandated by Government Code §2252.908 and 1 Tex. Admin. Code §46.5.

SP-7 Change or replace definitions in Section 10

10-16 CHANGE ORDER. A written order to the Contractor covering changes in the plans, specifications, quantities and/or any other modification to the contract and establishes the basis of payment and contract time adjustment, if any, for the work affected by such changes.

10-47 SUPPLEMENTAL AGREEMENT. Written agreement entered into between the Contractor and the Agent and approved by the Surety, covering alterations and changes in the Contract. A supplemental agreement is used whenever the modifications include assignment of the Contract from one entity to another or other cases as desired by TxDOT.

SP-8 Amend the second and third paragraphs in Section 40-02.

A Change Order will be issued covering significant changes to the Contract. Significant changes occur when (1) the aggregate amount of altered work increases or decreases the awarded contract, or any major contract item, by more than 25 percent, assuming such increased or decreased work is within the scope of the originally awarded contract; or (2) work that is not within the scope of the originally awarded contract. Provide cost justification as requested, in an acceptable format. Payment will not be made for anticipated profits on work that is eliminated. These alterations and changes will not invalidate the Contract nor release the Surety. The Contractor is responsible for notifying the surety of any changes to the Contract. If TxDOT and the Contractor are unable to agree on a unit adjustment for any significant changes, it reserves the right to terminate negotiations with respect to the significant changes and make other arrangements for completion.

For AIP contracts, all change orders and/or supplemental agreements shall be approved by TxDOT and shall include valid wage determinations of the U.S. Secretary of Labor when the amount of the change order/supplemental agreement exceeds \$2,000. However, if the contractor elects to waive the limitations on work that increases or decreases the originally awarded contract or any major contract item by more than 25 percent, the change order/supplemental

agreement shall be subject to the same U.S. Secretary of Labor wage determination as was included in the originally awarded contract.

Delete the fourth paragraph in Section 40-02 as this is now covered in Section 10

40-03 OMITTED ITEMS. The Engineer may, in TxDOT's best interest, omit any contract item except major contract items. Such omissions of contract items shall not invalidate any other contract provision or requirement.

40-04 EXTRA WORK. Extra work that is necessary for acceptable completion of the project but is not within the general scope of the work covered by the original contract shall be covered by a Change Order as herein before defined in the subsection titled CHANGE ORDER of Section 10.

SP-9 CONSTRUCTION CONTRACT GENERAL PROVISIONS, VOLUME FEBRUARY 2013, SECTION 20

Delete the following sentence from Section 20-02 BID REQUIREMENTS AND CONDITIONS: "Each bidder shall submit written evidence from the State Comptroller's office that all applicable franchise taxes owed the State of Texas have been paid."

Delete Section 20-03 CONTENTS OF BID FORMS in its entirety and replace with: 20-03 CONTENTS OF BID FORMS. TxDOT shall furnish bidders with formatted bid forms. All statements, certifications, and other qualifications indicated in "Instructions to Bidders" or attached to the bid forms are necessary parts.

The Bidder must submit the completed bid on the bid form furnished by TxDOT, with all blank spaces in the TxDOT bid form correctly typed in for each and every item for which a quantity is given.

The Bidder shall sign the bid in ink. If the bid is made by an individual, the individual's name and address must be shown. If made by a partnership, the name and address of each member of the partnership must be shown. If made by a corporation, the person signing the bid shall give the name of the state under the laws of which the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer.

The plans, specifications, and other documents designated in the bid form shall be considered a part of the bid whether attached or not.

The Bidder may also submit an electronically printed bid. The bid must have pay items in the same order and with the exact information as on this bid form. If submitting an electronically printed bid, submit qualification/signature page of the bid form. The bidder is responsible for incorrect information and will be considered non-responsive if pay items are incorrect.

Delete the following sentences from Section 20-06 PREPARATION OF BID
"Make entries in ink."

“As an Alternative to hand-writing the unit prices in works in ink in the bid, submit a computer printout signed by the person authorized to bind the bidder. In the case of a joint venture, the persons authorized to bid the Bidders must sign the computer printout. As a General Provisions GP-20-3 minimum, computer printouts must contain the information in the format shown on the “Example of Bid Prices Submitted by Computer Printout” form in the bid.”

Add the following sentence to Section 20-06 PREPARATION OF BID:

“The bidder may also submit an electronically printed bid. The bid must have pay items in the same order and with the exact information as on this bid form. If submitting an electronically printed bid include signed qualification/signature page form the bid form. The bidder is responsible for incorrect information and will be considered non-responsive if pay items are incorrect.”

Change Section 20-06 PREPARATION OF BID, from “Execute the bid in ink.” to “Sign the bid in ink.”

Delete Items “I” from Section 20-07 NON-RESPONSIVE BIDS.

Delete the following sentence in Section 30-01 CONSIDERATION OF BIDS “If a bidder’s bid contains a discrepancy between unit bid prices written in words and unit bid prices written in numbers, the unit price written in words shall govern, unless obviously incorrect.

SP-10

Change DEFINITION OF TERMS Section 10-11 BID to read:

The offer of the bidder, when submitted on the approved formatted bid form or electronically printed alternative with qualifications/signature page, to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.

SP-11

The Agent, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

SP-12

Israel Boycott Certification and Prohibition: Pursuant to Texas Govt. Code Chap. 808 (HB89) and Chap. 2270 (SB253):

(a) “Boycott Israel” means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes.

(b) Bidder hereby certifies (1) it does not boycott Israel, and (2) shall not boycott Israel during the term of contract agreement.

WAGE RATES

Foundation Drill Operator, Truck Mounted.....	\$ 24.05	0.00
Front End Loader Operator, 3 CY or Less.....	\$ 19.34	0.00
Front End Loader Operator, Over 3 CY.....	\$ 20.00	0.00
Laborer, Common.....	\$ 16.69	0.00
Laborer, Utility.....	\$ 18.40	0.00
Loader/Backhoe Operator.....	\$ 19.94	0.00
Mechanic.....	\$ 23.35	0.00
Milling Machine Operator.....	\$ 19.88	0.00
Motor Grader Operator, Fine Grade.....	\$ 24.96	0.00
Motor Grader Operator, Rough.....	\$ 21.04	0.00
Pavement Marking Machine Operator.....	\$ 17.50	0.00
Pipelayer.....	\$ 17.56	0.00
Reclaimer/Pulverizer Operator....	\$ 19.67	0.00
Reinforcing Steel Worker.....	\$ 23.47	0.00
Roller Operator, Asphalt.....	\$ 18.13	0.00
Roller Operator, Other.....	\$ 16.94	0.00
Scraper Operator.....	\$ 17.21	0.00
Servicer.....	\$ 20.75	0.00
Spreader Box Operator.....	\$ 19.96	0.00
Truck Driver Lowboy Float.....	\$ 22.60	0.00
Truck Driver, Single Axle.....	\$ 19.20	0.00
Truck Driver, Single or Tandem Axle Dump Truck.....	\$ 19.19	0.00
Truck Driver, Tandem Axle Tractor with Semi Trailer.....	\$ 19.52	0.00
Work Zone Barricade Servicer.....	\$ 17.66	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this

contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates

in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE:

UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination

- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

=====

END OF GENERAL DECISION

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***TECHNICAL
SPECIFICATIONS***

CITY OF WHARTON, TX
AND
TEXAS DEPARTMENT OF TRANSPORTATION - AVIATION DIVISION

SPECIFICATIONS FOR OVERLAY REHABILITATION OF RUNWAY 14/32 AND TAXIWAYS
TXDOT CSJ NO. 2513WHRTN

ISSUED FOR BID

BASE BID – RUNWAY REHABILITATION AND TAXIWAY SURFACE TREATMENT

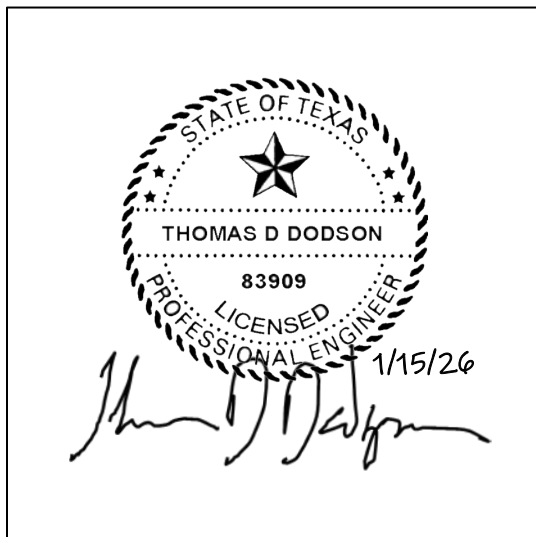
- Remove Taxiway B
- Prepare existing runway pavement for asphalt overlay
- Construct new pavement edges on connector taxiways
- Construct asphalt overlay and regrade runway shoulders
- Mark runway pavement
- Surface treat parallel and connecting taxiways

ALTERNATE 1 – REPLACE TAXIWAY B

- Install drainage culverts
- Construct asphalt pavement and grade shoulders
- Install edge lighting and signage
- Mark taxiway pavement

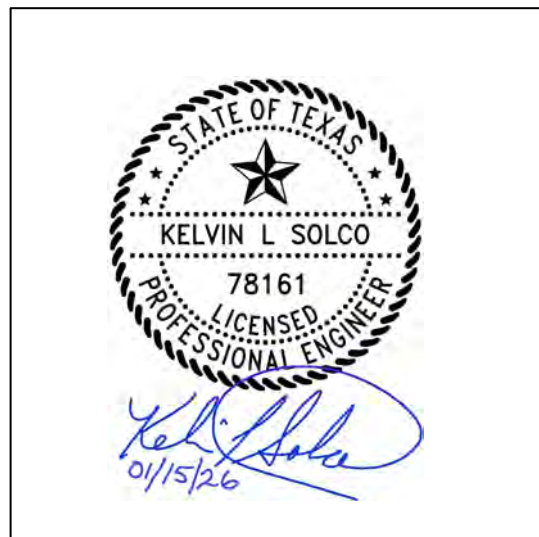
ALTERNATE 2 – REHABILITATE TAXIWAYS IN LIEU OF SURFACE TREATMENT

- Prepare existing parallel and connecting taxiway pavements for asphalt overlay
- Construct asphalt overlay and regrade taxiway shoulders
- Mark taxiway pavement



CIVIL PES, LLC

Texas Firm No. 18997



THE SOLCO GROUP, LLC

Texas Firm No. 22626

JANUARY 15, 2026

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Special Provision to Item Tx-247

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "Department" has been replaced with "Engineer".
- 2.1:** Delete those portions of Table 1 that refer to Grades 3, 4, or 5 materials.
- 2.1.2:** Delete sections 2.1.2.2 through 2.1.2.6 as those material types are not permitted.
- 2.4.1.:** Remove the requirement that personnel conducting sampling must be certified by the Department from the first paragraph.
- 2.4.1.:** Modify the third paragraph as follows: "Sample the stockpile for the Engineer when shown on the plans. When the Contractor samples the stockpile for the Engineer, the Engineer must witness the sampling of material ~~designated for the Engineer and the Materials and Tests Division (MTD)~~. The Engineer will label their sampling containers as "Engineer" ~~and "MTD,"~~ or as deemed necessary."
- 3.2.:** Remove requirements for inertial profiler.
- 4.1.:** Modify the entire section to read "Prepare subgrade as shown on the Plans."
- 4.3.:** Insert the following sentence at the beginning of paragraph 3: "Contractor is required to conduct his own testing for moisture content and density targets in accordance with Tex-113-E."
- 4.3.1.:** Remove Ordinary Compaction from this item.
- 4.3.2.:** Modify the first paragraph as follows: "Contractor is to test each proposed material to determine optimum moisture content and maximum dry density (proctor tests) in accordance with Tex-113-E and share the results with the Engineer for acceptance testing. Delivery of materials from separate sources will be considered different materials. Contractor is encouraged to conduct his own testing to ensure compaction is achieved prior to acceptance testing. Acceptance of an area will be contingent on the timely sharing of proctor results with the Engineer and advance notification of the need for testing of a completed area. No additional time will be granted when the Contractor fails to provide proctor results to the Engineer in a timely basis. Compact to a minimum of 100% of the maximum dry density and within $\pm 2.0\%$ of the optimum moisture content as determined in accordance with Tex-113-E, unless otherwise shown on the plans. Provide the Engineer with the beginning and ending station numbers of the area completed for testing. The Engineer will determine roadway density and moisture content of completed sections in accordance with Tex-115-E, Part I. The Engineer will determine random locations for testing in accordance with Tex-115-E, Part IV. Do not achieve density by drying the material after compaction. Upon notification from the Contractor that an area is ready for acceptance, RPR will select two random locations for every 3000 SY of installed material for testing of density and moisture content. FAILED TESTS WILL BE BACK-CHARGED TO THE CONTRACTOR."
- 4.3.3.:** Modify the last sentence of the paragraph as follows: "Miscellaneous and small areas ~~are not subject to density testing but~~ may be tested as directed when directed by the Engineer."
- 4.4.:** Change the first sentence of the second paragraph to read as follows: "Correct grade deviations greater than 1/4 in. in 16 ft. measured ~~longitudinally~~ in any direction."

- 4.6.: Remove Ride Quality from this item.
- 5.: Modify requirements of measurement in this item to include only Flexible Base (Complete in Place), by Square Yard. Delete all other descriptions under this section.
- 6.: Delete sections 6.2 and 6.3.

END OF SPECIAL PROVISION TO ITEM Tx-247

Item TX-247 Flexible Base

from 2024 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

1. DESCRIPTION

Construct a foundation course composed of flexible base.

2. MATERIALS

Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications. Notify the Engineer of the proposed material sources and of changes to material sources. The Engineer may sample and test project materials at any time before compaction throughout the duration of the project to assure specification compliance.

- 2.1. **Aggregate.** Furnish aggregate of the type and grade shown on the plans and meeting the requirements shown in Table 1. Each source must meet Table 1 requirements for liquid limit, plasticity index, and wet ball mill for the grade specified. Do not use additives, such as but not limited to lime, cement, or fly ash to modify aggregates to meet the requirements of Table 1, unless shown on the plans.

Unless otherwise shown on the plans, the unconfined compressive strength is waived when the flexible base material meets the #200 sieve requirement. When the #200 sieve requirement does not meet the specification in Table 1, the unconfined compressive strength is required.

**Table 1
Material Requirements**

Property	Test Method	Grade 1-2 ³	Grade 3	Grade 4	Grade 5
Master gradation sieve size (cumulative % retained)	Tex-110-E			As shown on the plans	
2-1/2"		0	0		0
1-3/4"		0-10	0-10		0-5
7/8"		10-35	-		10-35
3/8"		30-65	-		35-65
#4		45-75	45-75		45-75
#40		65-90	50-85		70-90
#200 ^{1, 2}		85-95	-		-
Liquid Limit, % Max		Tex-104-E	40		40
Plasticity Index, Max	Tex-106-E	10	12	10	
Plasticity index, Min ¹		As shown on the plans	As shown on the plans	As shown on the plans	
Wet ball mill, % Max	Tex-116-E	40	-	40	
Wet ball mill, % Max increase passing the #40 sieve		20	-	20	
Min compressive strength ² , psi	Tex-117-E				
lateral pressure 0 psi		35	-	-	
lateral pressure 3 psi		-	-	90	
lateral pressure 15 psi		175	-	175	

1. The #200 sieve test is only required to meet the waiver of the unconfined compressive strength requirement. The #200 sieve test requirement is only applicable to stockpile samples from Section 247.2.4.

2. Compressive strength and #200 sieve test requirements are waived when the flexible base is mixed with or without existing material and treated with cement, emulsion, foamed asphalt, or lime, unless otherwise shown on the plans.

3. Grade 3 may be substituted for Grade 1–2 or Grade 5 when the flexible base is mixed with or without existing material and treated with cement, emulsion, foamed asphalt, or lime, as approved. Grade 3 flexible base must meet the wet ball mill requirements of Grade 1–2 or Grade 5 as applicable

2.1.1. **Material Tolerances.** The Engineer may accept material if no more than one of the five most recent gradation tests has an individual sieve outside the specified limits of the gradation. This allowance does not apply to the #200 sieve requirement.

The Engineer may accept material if no more than one of the five most recent liquid limit or plasticity index tests is outside the specified limit. No single failing liquid limit or plasticity index test may exceed the allowable limit by more than 2 percentage points.

2.1.2. **Material Types.** Do not use fillers or binders unless approved. Furnish the type specified on the plans in accordance with the following:

2.1.2.1. **Type A.** Crushed stone produced and graded from oversize quarried aggregate that originates from a single, naturally occurring source. Do not use gravel or multiple sources.

2.1.2.2. ~~**Type B.** Crushed or uncrushed gravel. Blending of 2 or more sources is allowed.~~

2.1.2.3. ~~**Type C.** Crushed gravel with a minimum of 60% of the particles retained on a No. 4 sieve with 2 or more crushed faces as determined by [Tex 460 A](#), Part I. Blending of 2 or more sources is allowed.~~

2.1.2.4. ~~**Type D.** Type A material or crushed concrete. Crushed concrete containing gravel will be considered Type D material. Crushed concrete must meet the requirements in Section 247.2.1.3.2., "Recycled Material (Including Crushed Concrete) Requirements," and be managed in a way to provide for uniform quality. The Engineer may require separate dedicated stockpiles in order to verify compliance.~~

2.1.2.5. ~~**Type E.** Caliche, iron ore or as otherwise shown on the plans.~~

2.1.2.6. **Recycled Material. NOT USED.** Reclaimed asphalt pavement (RAP) and other recycled materials may be used when shown on the plans. Request approval to blend two or more sources of recycled materials. When RAP is allowed, do not exceed 20% RAP by weight, unless otherwise shown on the plans. The percentage limitations for other recycled materials will be as shown on the plans.

Provide recycled materials, other than RAP, that have a maximum sulfate content of 3,000 ppm when tested in accordance with Tex 145 E. Certify compliance with DMS 11000, "Evaluating and Using Nonhazardous Recyclable Materials Guidelines." In addition, recycled materials must be free of reinforcing steel and other objectionable material and have at most 1.5% deleterious material when tested in accordance with Tex 413 A. The liquid limit, plasticity index, wet ball mill, and compressive strength for all recycled materials are waived. When using RAP, crush RAP so that 100% passes the 2-in. sieve and does not exceed a maximum percent loss from decantation of 5.0% when tested in accordance with Tex 406 A. Test RAP without removing the asphalt. The final product must meet the requirements shown in Table 1 for the grade specified except when the Department requires a specific amount of Department furnished RAP be added to the blend, unless otherwise shown on the plans.

The Contractor is responsible for uniformly blending the recycled material with the flexible base material to build a stockpile to meet the percentages required. Any Contractor furnished surplus of recycled materials will remain the property of the Contractor. Remove Contractor owned recycled materials from the project and dispose of them in accordance with federal, state, and local regulations before project acceptance.

2.2. **Water.** Furnish water free of industrial wastes and other objectionable matter.

2.3. **Material Sources.** Expose the vertical faces of all strata of material proposed for use when non-commercial sources are used. Secure and process the material by successive vertical cuts extending through all exposed strata, when directed.

2.4. **Stockpile Approval.** Stockpile is approved when the Engineer's test results meet the material requirements shown in Table 1.

2.4.1. **Sampling.** The Contractor and the Engineer will sample flexible base from completed stockpiles in accordance with Tex-100-E. ~~Personnel conducting sampling must be certified by the Department approved soils and base certification program.~~

Sampling stockpiles may be located at the production site or at the project location. The Contractor will witness the Engineer's sampling and sample the stockpile for their own testing, and label as deemed necessary.

Sample the stockpile for the Engineer when shown on the plans. When the Contractor samples the stockpile for the Engineer, the Engineer must witness the sampling of material ~~designated for the Engineer and the Materials and Tests Division (MTD).~~ The Engineer will label their sampling containers as "Engineer" and ~~"MTD,"~~ or as deemed necessary.

The Engineer will take immediate possession of the sample containers for the Engineer ~~and MTD.~~ The Engineer will maintain custody of the samples until all testing and reporting are completed

2.4.2. **Referee Testing.** Referee Testing. Referee testing is applicable for stockpile testing only. MTD is the referee laboratory. MTD may designate a laboratory from the Department's MPL for Commercial Laboratories Approved for Flexible Base Referee Requests as the referee laboratory as deemed necessary. The designated laboratory cannot be performing any testing under this Item for the Engineer or Contractor.

The Contractor may request referee testing when the Engineer's test results fail to meet any of the material requirements shown in Table 1 and the Contractor's sample from Section 2.4.1., "Sampling," for the same failing Department test, passes. The tests must be performed by a laboratory listed on the Department's MPL for Commercial Laboratories Approved for Flexible Base Referee Requests. Submit the request by email within 5 working days after receiving failing test results from the Engineer. Include completed test reports passing the applicable requirements shown in Table 1 in the email.

Record and submit completed test reports electronically on Department-provided templates in their original format meeting the applicable material requirements shown in Table 1. Use Department-provided templates to record and calculate all test data. The Engineer and the Contractor will provide any available test results to the other party when requested.

3. EQUIPMENT

Provide machinery, tools, and equipment necessary for proper execution of the work.

3.1. **Rollers.** Provide rollers in accordance with Item 210, "Rolling." Provide proof rollers in accordance with Item 216, "Proof Rolling," when required.

3.2. **Inertial Profiler.** ~~When ride quality measurement is required, provide a high speed or lightweight inertial profiler certified at the Texas A&M Transportation Institute. Provide equipment certification documentation. Display a current decal on the equipment indicating the certification expiration date.~~

4. CONSTRUCTION

Construct each layer uniformly, free of loose or segregated areas, and with the required density and moisture content. Provide a smooth surface that conforms to the typical sections, lines, and grades shown on the plans or as directed.

Stockpile base material temporarily at an approved location before delivery to the roadway. Build stockpiles in layers no greater than 2 ft. thick. Stockpiles must have a total height between 10 and 16 ft. unless otherwise approved. After construction and acceptance of the stockpile in accordance with Section 247.2.4., "Stockpile Approval," loading from the stockpile for delivery is allowed. Load by making successive vertical cuts through the entire depth of the stockpile.

Do not add or remove material from temporary stockpiles that require sampling and testing before delivery, unless otherwise approved. Charges for additional sampling and testing required as a result of adding or removing material will be deducted from the Contractor's estimates.

Haul approved flexible base in clean trucks. Deliver the required quantity to each 100-ft. station or designated stockpile site as shown on the plans. Prepare stockpile sites as directed. When delivery is to the 100-ft. station, manipulate in conformance with the applicable Items.

- 4.1. **Preparation of Subgrade or Existing Base.** ~~Prepare subgrade as shown on the Plans. Remove or scarify existing asphalt concrete pavement in accordance with Item 105, "Removing Treated and Untreated Base and Asphalt Pavement," when shown on the plans or as directed. Shape the subgrade or existing base to conform to the typical sections shown on the plans or as directed.~~

~~When new base is required to be mixed with existing base, deliver, place, and spread the new flexible base in the required amount per station. Manipulate and thoroughly mix the new base with existing material to provide a uniform mixture to the specified depth before shaping.~~

~~Proof roll the roadbed in accordance with Item 216 before pulverizing or scarifying when shown on the plans or directed. Correct soft spots as directed.~~

- 4.2. **Placing.** Spread and shape flexible base into a uniform layer with an approved spreader the same day as delivered unless otherwise approved. Construct layers to the thickness shown on the plans. Maintain the shape of the course. Control dust by sprinkling, as directed. Correct or replace segregated areas as directed, at no additional expense to the Department.

Place successive base courses and finish courses using the same construction methods required for the first course.

- 4.3. **Compaction.** Compact using density control unless otherwise shown on the plans. Multiple lifts are permitted when shown on the plans or approved. Bring each layer to the moisture content directed. When necessary, sprinkle the material in accordance with Item 204, "Sprinkling." Maintain moisture during compaction within $\pm 2.0\%$ of the optimum moisture content as determined in accordance with Tex-113-E.

Begin rolling longitudinally at the sides and proceed toward the center, overlapping on successive trips by at least 1/2 the width of the roller unit. Begin rolling at the low side and progress toward the high side on superelevated curves. Offset alternating trips of the roller. Operate rollers at a speed between 2 and 6 mph as directed.

Contractor is required to conduct his own testing for moisture content and density targets in accordance with Tex-113-E. Rework, recompact, and refinish material that fails to meet or that loses required moisture,

density, stability, or finish requirements before the next course is placed or the project is accepted. Continue work until specification requirements are met. Perform the work at no additional expense to the Department.

Before final acceptance, the Engineer will select the locations of tests and measure the flexible base depth in accordance with Tex-140-E. Correct areas deficient by more than 1/2 in. in thickness by scarifying, adding material as required, reshaping, recompacting, and refinishing at the Contractor's expense.

4.3.1. **Ordinary Compaction.** ~~NOT USED. Roll using approved compaction equipment as directed. Correct irregularities, depressions, and weak spots immediately by scarifying the areas affected, adding or removing approved material as required, reshaping, and recompacting.~~

4.3.2. **Density and Moisture Control.** Contractor is to test each proposed material to determine optimum moisture content and maximum dry density (proctor tests) in accordance with Tex-113-E and share the results with the Engineer for acceptance testing. Delivery of materials from separate sources will be considered different materials. Contractor is encouraged to conduct his own testing to ensure compaction is achieved prior to acceptance testing. Acceptance of an area will be contingent on the timely sharing of proctor results with the Engineer and advance notification of the need for testing of a completed area. No additional time will be granted when the Contractor fails to provide proctor results to the Engineer in a timely basis. Compact to a minimum of 100% of the maximum dry density and within $\pm 2.0\%$ of the optimum moisture content as determined in accordance with Tex-113-E, unless otherwise shown on the plans. Provide the Engineer with the beginning and ending station numbers of the area completed for testing. The Engineer will determine roadway density and moisture content of completed sections in accordance with Tex-115-E, Part I. The Engineer will determine random locations for testing in accordance with Tex-115-E, Part IV. Do not achieve density by drying the material after compaction. Upon notification from the Contractor that an area is ready for acceptance, RPR will select two random locations for every 3000 SY of installed material for testing of density and moisture content. FAILED TESTS WILL BE BACK-CHARGED TO THE CONTRACTOR.

When the density is less than 100% of the maximum dry density, the Engineer may perform additional testing to determine the extent of the area to correct. The Engineer may accept the section if no more than one of the five most recent density tests is below the specified density and the failing test is no more than 3 pcf below the specified density.

4.3.3. **Miscellaneous and Small Areas.** Miscellaneous areas are those that typically involve handwork or discontinuous paving operations, such as temporary detours, driveways, mailbox turnouts, crossovers, gores, spot level-up areas, and other similar areas. Miscellaneous and small areas ~~are not subject to density testing but~~ may be tested ~~as directed~~ when directed by the Engineer.

4.4. **Finishing.** After completing compaction, clip, skin, or tight-blade the surface using a maintainer or subgrade trimmer to a depth of approximately 1/4 in. Remove loosened material and dispose of it at an approved location. Seal the clipped surface immediately by rolling using a pneumatic tire roller until a smooth surface is attained. Add small increments of water as needed during rolling. Shape and maintain the course and surface in conformity with the typical sections, lines, and grades as shown on the plans or as directed.

Correct grade deviations greater than 1/4 in. in 16 ft. measured ~~longitudinally~~ in any direction. Correct grade deviations greater than 1/4 in. over the entire width of the cross-section in areas where surfacing is to be placed. Correct by loosening and adding or removing material. Reshape and recompact in accordance with Section 247.4.3., "Compaction."

4.5. **Curing.** Cure the finished section until the moisture content is at least 2 percentage points below optimum or as directed before applying the next successive course or prime coat.

- 4.6. **Ride Quality.** ~~*NOT USED.*~~ This section applies to the final travel lanes that receive a 1 or 2 course surface treatment for the final surface, unless otherwise shown on the plans. Measure ride quality of the base course after placement of the prime coat and before placement of the surface treatment, unless otherwise approved. Use a certified profiler operator from the Department's MPL. When requested, furnish the Engineer documentation for the person certified to operate the profiler.

Provide all profile measurements to the Engineer in electronic data files within 3 days after placement of the prime coat using the format specified in [Tex-1001-S](#). The Engineer will use Department software to evaluate longitudinal profiles to determine areas requiring corrective action. Correct 0.1 mi. sections having an average international roughness index (IRI) value greater than 100.0 in. per mile to an IRI value of 100.0 in. per mile or less for each wheel path, unless otherwise shown on the plans.

Re-profile and correct sections that fail to maintain ride quality until placement of the next course, as directed. Correct re-profiled sections until specification requirements are met, as approved. Perform this work at no additional expense to the Department.

5. MEASUREMENT

Flexible base will be measured as follows:

- **Flexible Base (Complete In Place).** The ton, square yard, or any cubic yard method.
- ~~**Flexible Base (Roadway Delivery).** The ton or any cubic yard method.~~
- ~~**Flexible Base (Stockpile Delivery).** The ton, cubic yard in vehicle, or cubic yard in stockpile.~~

Measurement by the cubic yard in final position and square yard is a plans quantity measurement. The quantity to be paid for is the quantity shown in the proposal unless modified by Article 9.2., "Plans Quantity Measurement." Additional measurements or calculations will be made if adjustments of quantities are required.

Measurement is further defined for payment as follows.

- 5.1. ~~**Cubic Yard in Vehicle.** By the cubic yard in vehicles of uniform capacity at the point of delivery.~~
- 5.2. ~~**Cubic Yard in Stockpile.** By the cubic yard in the final stockpile position by the method of average end areas.~~
- 5.3. ~~**Cubic Yard in Final Position.** By the cubic yard in the completed and accepted final position. The volume of base course is computed in place by the method of average end areas between the original subgrade or existing base surfaces and the lines, grades, and slopes of the accepted base course as shown on the plans.~~
- 5.4. **Square Yard.** By the square yard of surface area in the completed and accepted final position. The surface area of the base course is based on the width of flexible base as shown on the plans.
- 5.5. ~~**Ton.** By the ton of dry weight in vehicles as delivered. The dry weight is determined by deducting the weight of the moisture in the material at the time of weighing from the gross weight of the material. The Engineer will determine the moisture content in the material in accordance with [Tex 103-E](#) from samples taken at the time of weighing.~~

When material is measured in trucks, the weight of the material will be determined on certified scales, or the Contractor must provide a set of standard platform truck scales at a location approved by the Engineer. Scales must conform to the requirements of Item 520, "Weighing and Measuring Equipment."

6. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for the types of work described below. No additional payment will be made for thickness or width exceeding that shown on the typical section or provided on the plans for cubic yard in the final position or square yard measurement.

Sprinkling and rolling, except proof rolling, will not be paid for directly, but will be subsidiary to this Item unless otherwise shown on the plans. When proof rolling is shown on the plans or directed, it will be paid for in accordance with Item 216.

Where subgrade is constructed under this Contract, correction of soft spots in the subgrade will be at the Contractor's expense. Where subgrade is not constructed under this Contract, correction of soft spots in the subgrade will be paid in conformance with pertinent Items or in accordance with Article 4.4., "Changes in the Work."

- 6.1. **Flexible Base (Complete in Place).** Payment will be made for the type and grade specified. For cubic yard measurement, "In Vehicle," "In Stockpile," or "In Final Position" will be specified. For square yard measurement, a depth will be specified. This price is full compensation for furnishing materials, temporary stockpiling, assistance provided in stockpile sampling and operations to level stockpiles for measurement, loading, hauling, delivery of materials, spreading, blading, mixing, shaping, placing, compacting, reworking, finishing, correcting locations where thickness is deficient, curing, furnishing scales and labor for weighing and measuring, equipment, labor, tools, and incidentals.
- 6.2. **Flexible Base (Roadway Delivery).** Payment will be made for the type and grade specified. For cubic yard measurement, "In Vehicle," "In Stockpile," or "In Final Position" will be specified. The unit price bid will not include processing at the roadway. This price is full compensation for furnishing materials, temporary stockpiling, assistance provided in stockpile sampling and operations to level stockpiles for measurement, loading, hauling, delivery of materials, furnishing scales and labor for weighing and measuring, and equipment, labor, tools, and incidentals.
- 6.3. **Flexible Base (Stockpile Delivery).** Payment will be made for the type and grade specified. For cubic yard measurement, "In Vehicle" or "In Stockpile" will be specified. The unit price bid will not include processing at the roadway. This price is full compensation for furnishing and disposing of materials, preparing the stockpile area, temporary or permanent stockpiling, assistance provided in stockpile sampling and operations to level stockpiles for measurement, loading, hauling, delivery of materials to the stockpile, furnishing scales and labor for weighing and measuring, and equipment, labor, tools, and incidentals.

Special Provision to Item Tx-260

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "Department" has been replaced with "Engineer".
- 2.1:** Delete those portions that discuss dry lime. Dry lime is not permitted in this project.
- 4.1:** Add the following as a last paragraph to Section 4.1: "Compact subgrade beneath pavement areas in accordance with Item P-152: Paragraph 2.10.".
- 4.3.1.:** Remove the paragraph as dry lime placement is not permitted.
- 4.5.:** Remove requirements for strength testing.
- 4.6.1.:** Remove Ordinary Compaction from this item.

END OF SPECIAL PROVISION TO ITEM Tx-260

Item TX-260 Lime Treatment (Road-Mixed)

from 2024 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

1. DESCRIPTION

Mix and compact lime, water, and subgrade or base (with or without asphaltic concrete pavement) in the roadway.

2. MATERIALS

Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications. Notify the Engineer of the proposed material sources and of changes to material sources. Obtain verification from the Engineer that the specification requirements are met before using the sources. The Engineer may sample and test project materials at any time before compaction. Use material definitions in accordance with [Tex-100-E](#).

2.1. **Lime.** Furnish lime that meets the requirements of [DMS-6350](#), "Lime and Lime Slurry." ~~When dry lime is required, provide dry quicklime. When lime slurry is required, provide commercial lime slurry or quicklime slurry. Do not use dry quicklime when sulfates are present in quantities greater than 3,000 parts per million (ppm).~~ When furnishing quicklime, provide it in bulk.

2.2. **Subgrade.** The Engineer will determine the sulfate content of the subgrade in accordance with [Tex-145-E](#) and organic content in accordance with [Tex-148-E](#) before lime treatment begins. Suspend operations when material to be treated has a sulfate content greater than 7,000 ppm or an organic content greater than 2.0%, unless otherwise directed.

2.3. **Flexible Base.** Unless otherwise shown on the plans, furnish base material that meets the requirements of Item 247, "Flexible Base," for the type and grade shown on the plans, before the addition of lime. Unless otherwise shown on the plans, the compressive strength of the flexible base is waived.

2.4. **Water.** Furnish water free of industrial wastes and other objectionable material.

2.5. **Asphalt.** When asphalt or emulsion is permitted for curing purposes, furnish materials that meet the requirements of Item 300, "Asphalts, Oils, and Emulsions," as shown on the plans or as directed.

2.6. **Mix Design.** The Engineer will determine the target lime content and optimum moisture content in accordance with [Tex-121-E](#) or prior experience with the project materials. The Contractor may propose a mix design developed in accordance with [Tex-121-E](#). The Engineer will use [Tex-121-E](#) to verify the Contractor's proposed mix design before acceptance. Reimburse the Department for subsequent mix designs or partial designs necessitated by changes in the material or requests by the Contractor. Limit the amount of recycled asphalt pavement to no more than 50% of the mix, unless otherwise shown on the plans or directed.

3. EQUIPMENT

Provide machinery, tools, and equipment necessary for proper execution of the work. Provide rollers in accordance with Item 210, "Rolling." Provide proof rollers in accordance with Item 216, "Proof Rolling," when required.

- 3.1. **Storage Facility.** Store quicklime in closed, weatherproof containers.
- 3.2. **Slurry Equipment.** Use slurry tanks equipped with agitation devices to slurry quicklime on the project or other approved location. The Engineer may approve other slurring methods.
Provide a pump for agitating the slurry when the distributor truck is not equipped with an agitator. Equip the distributor truck with a sampling device in accordance with [Tex-600-J](#), Part I, when using commercial lime slurry.
- 3.3. **Hydrated Lime Distribution Equipment.** Provide equipment to spread lime evenly across the area to be treated. Provide equipment with a rotary vane feeder to spread lime, when shown on the plans.
- 3.4. **Pulverization Equipment.** Provide pulverization equipment that:
- cuts and pulverizes material uniformly to the proper depth using cutters that plane to a uniform surface over the entire width of the cut,
 - provides a visible indication of the depth of cut at all times, and
 - uniformly mixes the materials.

4. CONSTRUCTION

Construct each layer uniformly, free of loose or segregated areas, and with the required density and moisture content. Provide a smooth surface that conforms to the typical sections, lines, and grades shown on the plans or as directed.

- 4.1. **Preparation of Subgrade or Existing Base for Treatment.** Before treating, remove existing asphalt concrete pavement in accordance with Item 105, "Removing Treated and Untreated Base and Asphalt Pavement," when shown on the plans or as directed. Shape existing material in conformance with applicable bid items to conform to typical sections shown on the plans and as directed.

Unless otherwise approved, proof roll the roadbed in accordance with Item 216 before pulverizing or scarifying existing material. Correct soft spots as directed.

When material is imported from a borrow source, notify the Engineer of the location of the borrow source well in advance to allow time for testing and approval to avoid delay to the project. Stockpile as directed. The Engineer will test the borrow source and determine the sulfate and organic contents. When the borrow source has a sulfate content greater than 3,000 ppm or an organic content greater than 2.0%, proceed as directed.

When new base material is required to be mixed with existing base, deliver, place, and spread the new material in the required amount per station. Manipulate and thoroughly mix new base with existing material to provide a uniform mixture to the specified depth before shaping.

Compact subgrade beneath pavement areas in accordance with Item P-152: Paragraph 2.10.

- 4.2. **Pulverization.** Pulverize or scarify existing material after shaping. If the material cannot be uniformly processed to the required depth in a single pass, excavate and windrow the material to expose a secondary grade to achieve processing to plan depth.
- 4.3. **Application of Lime.** Uniformly apply lime using ~~dry~~ or slurry placement as shown on the plans or as directed. Add lime at the percentage determined in accordance with Section 260.2.6., "Mix

Design." Apply lime only on an area where mixing can be completed during the same working day.

Start lime application only when the air temperature is at least 35°F and rising or is at least 40°F. The temperature will be taken in the shade and away from artificial heat. Suspend application when the Engineer determines that weather conditions are unsuitable.

Minimize dust and scattering of lime by wind. Do not apply lime when wind conditions, in the opinion of the Engineer, cause blowing lime to become dangerous to traffic or objectionable to adjacent property owners. When pebble grade quicklime is placed dry, mix the material and lime thoroughly at the time of lime application. Use of quicklime can be dangerous. Inform users of the recommended precautions for handling and storage.

4.3.1. **Dry Placement.** ~~NOT USED. Before applying lime, bring the prepared roadway to approximately two percentage points above optimum moisture content. When necessary, sprinkle in accordance with Item 204, "Sprinkling."~~ Distribute the required quantity of pebble grade quicklime using approved equipment.

4.3.2. **Slurry Placement.** Provide slurry free of objectionable materials, at or above the minimum dry solids content, and with a uniform consistency that will allow ease of handling and uniform application. Deliver commercial lime slurry to the jobsite or use quicklime to prepare lime slurry at the jobsite or other approved location, as specified. When dry quicklime is applied as slurry, use 80% of the amount shown on the plans.

Distribute slurry uniformly by making successive passes over a measured section of roadway until the specified lime content is reached. Uniformly spread the residue from quicklime slurry over the length of the roadway being processed, unless otherwise directed.

4.4. **Mixing.** Begin mixing within 6 hr. of application of lime. Lime exposed to the open air for 6 hr. or more between application and mixing, or that experiences excessive loss due to washing or blowing, will not be accepted for payment. Thoroughly mix the material and lime using approved equipment. When treating subgrade, bring the moisture content above the optimum moisture content to ensure adequate chemical reaction of the lime and subgrade materials.

Ensure 100% of the material passes a 2-1/2 in. sieve, except rock, before mellowing. Allow the mixture to mellow for 1–4 days, as directed. When pebble grade quicklime is used, allow the mixture to mellow for 2–

4 days, as directed. Sprinkle the treated materials during the mixing and mellowing operation, as directed, to achieve adequate hydration and proper moisture content. When the material to be treated has a sulfate content greater than 3,000 ppm but less than or equal to 7,000 ppm, mellow for a minimum of 7 days.

Maintain in a continuously moist condition by sprinkling in accordance with Item 204. After mellowing, resume mixing until a homogeneous, friable mixture is obtained. After mixing, the Engineer may sample the mixture at roadway moisture and test in accordance with [Tex-101-E](#), Part III, to determine compliance with the gradation requirements shown in Table 1.

Table 1
Gradation Requirements (Min % Passing)

Sieve Size	Base	Subgrade
1-3/4"	100	100
3/4"	85	85
#4	-	60

4.5. **Strength Testing.** ~~NOT USED. The Engineer will sample and test the lime-treated mixture for~~

~~unconfined compressive strength in accordance with [Tex 117-E](#), Part II. The unconfined compressive strength must be greater than 50 psi for lime treated subgrade and 150 psi for lime-treated flexible base or lime treated flexible base with existing material, unless otherwise shown on the plans.~~

- 4.6. **Compaction.** Compact the mixture using density control, unless otherwise shown on the plans. Multiple lifts are permitted when shown on the plans or approved. Bring each layer to the moisture content directed. Sprinkle the treated material in accordance with Item 204, or aerate the treated material to adjust the moisture content during compaction so that it is no more than 1.0% below optimum and 2.0% above optimum as determined in accordance with [Tex-121-E](#).

Begin rolling longitudinally at the sides and proceed toward the center, overlapping on successive trips by at least one-half the width of the roller unit. On superelevated curves, begin rolling at the low side and progress toward the high side. Offset alternating trips of the roller. Operate rollers at a speed between 2 and 6 mph as directed.

Before final acceptance, the Engineer will select the locations of tests in each unit and measure the treated depth in accordance with [Tex-140-E](#). Correct areas deficient by more than 1/2 in. in thickness or more than 1/2% in target lime content by adding lime as required, reshaping, recompacting, and refinishing at the Contractor's expense.

Rework, recompact, and refinish material that fails to meet or that loses required moisture, density, stability, or finish before the next course is placed or the project is accepted. Continue work until specification requirements are met. Rework in accordance with Section 260.4.7., "Reworking a Section." Perform the work at no additional expense to the Department.

- 4.6.1. **Ordinary Compaction.** ~~**NOT USED.** Roll using approved compaction equipment, as directed. Correct irregularities, depressions, and weak spots immediately by scarifying the areas affected, adding or removing treated material as required, reshaping, and recompacting.~~

- 4.6.2. **Density and Moisture Control.** Compact to at least 95% of the maximum density, and moisture content no more than 1.0% below optimum and 2.0% above optimum as determined in accordance with [Tex-121-E](#), unless otherwise shown on the plans. Provide the Engineer with the beginning and ending station numbers of the area completed for testing. The Engineer will determine roadway density and moisture content of completed sections in accordance with [Tex-115-E](#), Part I. The Engineer will determine random locations for testing in accordance with [Tex-115-E](#), Part IV.

When the density is less than 95% of the maximum dry density, the Engineer may perform additional testing to determine the extent of the area to correct. The Engineer may accept the section if no more than one of the five most recent density tests is below the specified density and the failing test is no more than 3 pcf below the specified density.

- 4.7. **Reworking a Section.** When a section is reworked within 72 hr. after completion of compaction, rework the section to provide the required density. When a section is reworked more than 72 hr. after completion of compaction, add additional lime at 25% of the percentage determined in accordance with Section 260.2.6., "Mix Design." Reworking includes loosening, adding material or removing unacceptable material if necessary, mixing as directed, compacting, and finishing. When density control is specified, determine a new maximum density of the reworked material in accordance with [Tex-121-E](#), and compact to at least 95% of this density.

- 4.8. **Finishing.** Immediately after completing compaction of the final course, clip, skin, or tight-blade the surface of the lime-treated material using a maintainer or subgrade trimmer to a depth of

approximately 1/4 in. Remove loosened material and dispose of at an approved location. Roll the clipped surface immediately using a pneumatic tire roller until a smooth surface is attained. Add small amounts of water as needed during rolling. Shape and maintain the course and surface in conformity with the typical sections, lines, and grades shown on the plans or as directed.

Finish grade of constructed subgrade to within 0.1 ft. in the cross-section and 0.1 ft. in 16 ft. measured longitudinally.

Correct grade deviations of constructed base greater than 1/4 in. in 16 ft. measured longitudinally or greater than 1/4 in. over the entire width of the cross-section in areas where surfacing is to be placed. Remove excess material, reshape, and roll using a pneumatic-tire roller. Correct as directed if material is more than 1/4 in. low. Do not surface patch. The 72-hr. time limit required for completion of placement, compaction, and finishing does not apply to finishing required just before applying the surface course.

4.9. **Miscellaneous and Small Areas.** Miscellaneous areas are those that typically involve handwork or discontinuous paving operations, such as temporary detours, driveways, mailbox turnouts, crossovers, gores, spot level-up areas, and other similar areas. Miscellaneous and small areas are not subject to density testing but may be tested as directed.

4.10. **Curing.** Cure for the minimum number of days shown in Table 2 by sprinkling in accordance with Item 204, or by applying an asphalt material at a rate of 0.05–0.20 gal. per square yard, as shown on the plans or as directed. Maintain moisture during curing. Upon completion of curing, maintain the moisture content in accordance with Section 132.3.5., “Maintenance of Moisture and Reworking,” for subgrade and Section 247.4.5., “Curing,” for bases before placing subsequent courses. Do not allow equipment on the finished course during curing except as required for sprinkling, unless otherwise approved. Apply seals or additional courses within 14 calendar days of final compaction.

Table 2
Min Curing Requirements before Placing Subsequent Courses¹

Untreated Material	Curing (Days)
PI ≤ 35	2
PI > 35	5

1. Subject to approval. Proof rolling may be required as an indicator of adequate curing.

5. MEASUREMENT

5.1. **Lime.** When lime is furnished in trucks, the weight of lime will be determined on certified scales, or the Contractor must provide a set of standard platform truck scales at an approved location approved. Scales must meet the requirements of Item 520, “Weighing and Measuring Equipment.”

5.1.1. **Commercial Lime Slurry.** Lime slurry will be measured by the ton (dry weight) as calculated from the minimum percent dry solids content of the slurry, multiplied by the weight of the slurry in tons delivered.

5.1.2. **Quicklime.**

5.1.2.1. **Dry.** Lime will be measured by the ton (dry weight) of the quicklime.

5.1.2.2. **Slurry.** Lime slurry will be measured by the ton (dry weight) of the quicklime used to prepare the slurry multiplied by a conversion factor of 1.28 to determine the quantity of equivalent hydrated

lime, which will be the basis of payment.

- 5.2. **Lime Treatment.** Lime treatment will be measured by the square yard of surface area. The dimensions for determining the surface areas are established by the widths shown on the plans and the lengths measured at placement.

6. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for in accordance with Section 260.6.1., "Lime," and Section 260.6.2., "Lime Treatment."

Furnishing and delivering new base will be paid for in accordance with Section 247.6.2., "Flexible Base (Roadway Delivery)." Mixing, spreading, blading, shaping, compacting, and finishing new or existing base material will be paid for under Section 260.6.2., "Lime Treatment." Removal and disposal of existing asphalt concrete pavement will be paid for in conformance with pertinent Items or in accordance with Article 4.4., "Changes in the Work."

Sprinkling and rolling, except proof rolling, will not be paid for directly, but will be subsidiary to this Item, unless otherwise shown on the plans. When proof rolling is shown on the plans or directed by the Engineer, it will be paid for in accordance with Item 216.

Where subgrade is constructed under this Contract, correction of soft spots in the subgrade or existing base will be at the Contractor's expense. Where subgrade is not constructed under this Contract, correction of soft spots in the subgrade or existing base will be paid for in accordance with pertinent Items or Article 4.4., "Changes in the Work."

Where subgrade to be treated under this Contract has sulfates greater than 7,000 ppm, work will be paid for in accordance with Article 4.4., "Changes in the Work."

Asphalt used solely for curing will not be paid for directly, but will be subsidiary to this Item. Asphalt placed for curing and priming will be paid for under Item 310, "Prime Coat."

- 6.1. **Lime.** Lime will be paid for at the unit price bid for "Quicklime (Dry)" or "Commercial or Quicklime (Slurry)." This price is full compensation for materials, delivery, equipment, labor, tools, and incidentals.

Lime used for reworking a section in accordance with Section 260.4.7., "Reworking a Section," will not be paid for directly, but will be subsidiary to this Item.

- 6.2. **Lime Treatment.** Lime treatment will be paid for at the unit price bid for "Lime Treatment (Existing Material)," "Lime Treatment (New Base)," or "Lime Treatment (Mixing Existing Material and New Base)," for the depth specified. No payment will be made for thickness or width exceeding that shown on the plans. This price is full compensation for shaping existing material, loosening, mixing, pulverizing, spreading, applying lime, compacting, finishing, curing, curing materials, blading, shaping and maintaining shape, replacing mixture, disposing of loosened materials, processing, hauling, preparing secondary subgrade, water, equipment, labor, tools, and incidentals.

Special Provision to Item Tx-316

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "Department" has been replaced with "Engineer".
- 1:** Modify the second sentence in the first paragraph as follows: "Construct a surface treatment consisting of ~~one or more~~ TWO applications of a single layer of asphalt material covered with a single layer of aggregate."
- 3.1.1.:** Delete the Section as Transverse Variable Rate Distributor is not used in this Item.
- 4.1.:** Add the following sentence to the paragraph: "Apply seal coat two times as called for in the plans."
- 4.2.:** Add a new first bullet point as follows: "result in stockpiles being within the Runway Object Free Area (ROFA) once the runway is returned to service".
- 4.2.:** Delete the requirement to locate stockpiles a minimum of 30 feet from roadway.
- 4.3.:** Delete the Section as aggregate furnished by the Department is not used in this Item.
- 4.6.:** Modify the fourth sentence of the paragraph as follows: "When shown on the plans and as called for in Item P-101 mill surfaces as shown on the plans, treat and remove vegetation. Milled surfaces are not to receive the seal coat, and blade pavement edges. ~~When directed, apply a tack coat before applying the hot asphalt rubber treatment on an existing wearing surface in accordance with Section 340.2.5., "Tack Coat."~~
- 4.7.:** Modify Table 13 to remove requirements for mixture types DG-B, DG-C, and DG-F.
- 4.8.5.:** Modify the second sentence of the second paragraph as follows: "The Engineer ~~will submit~~ may collect one split sample ~~to the Materials and Tests Division (MTD) for testing and retain the other split sample.~~"
- 4.8.5.:** Remove the third and fourth paragraph from this section. The Engineer will not hold samples of the binders.
- 4.13.:** Add the following to the end of the paragraph: ". Excess aggregate cannot be swept off the edge of the pavement(s) or to places that will result in FOD once the airfield is returned to service. Collect excess aggregate to the satisfaction of the Engineer and Airport staff and remove it from the airport."
- 5.2.:** Delete the paragraph and insert a new paragraph as follows: "There is no separate measurement for payment under "Aggregate". Include costs for Aggregates in Item Seal Coat Application."
- 5.3** Delete the paragraph.
- 5.4.:** Add paragraph 5.4 and include the following: "Seal Coat Application. Installed seal coat is measured by the square yard for each instance of an application of asphalt material followed by an application of aggregate, rolling, patching, and brooming."

- 6.: Modify the first sentence of the Section as follows: "The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit prices bid for "Asphalt," ~~"Aggregate,"~~ "and Seal Coat Application" and ~~"Loading, Hauling, and Distributing Aggregate"~~ of the types-grades specified on the plans."

END OF SPECIAL PROVISION TO ITEM Tx-316

Item TX-316 Seal Coat

from 2024 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

1. DESCRIPTION

Construct a surface treatment consisting of ~~one or more~~ TWO applications of a single layer of asphalt material covered with a single layer of aggregate.

2. MATERIALS

Furnish materials of the type and grade shown on the plans in accordance with the following:

2.1. **Asphalt.** Furnish asphalt materials meeting the requirements of Item 300, "Asphalts, Oils, and Emulsions."

Furnish Type II ~~or Type III~~ asphalt rubber (A-R) binder in accordance with Section 300.2.10., "Asphalt-Rubber Binders," as shown on the plans. Furnish a blend design for approval. Include in the design, at a minimum, the following:

- manufacturer and grade of asphalt cement;
- manufacturer and grade of crumb rubber;
- manufacturer, type, and percentage of extender oil, if used;
- test report pertinent to crumb rubber gradation in accordance with Tex-200-F, Part I;
- design percentage of crumb rubber versus asphalt content;
- blending temperature; and
- test results on the properties at reaction times of 60, 90, 240, 360, and 1,440 min. in accordance with Section 300.2.10., "Asphalt-Rubber Binders."

Furnish a new A-R blend design if the grade or source for any of the components changes.

If a tack coat is specified when using A-R, unless otherwise shown on the plans or approved, furnish CSS-1H, SS-1H, or a performance-grade (PG) binder with a minimum high-temperature grade of PG 58 for tack coat binder. Do not dilute emulsified asphalt at the terminal, in the field, or at any other location before use. If required, verify that emulsified asphalt proposed for use meets the minimum residual asphalt percentage specified in Item 300.

2.2. **Aggregate.** Furnish aggregate meeting Item 302, "Aggregates for Surface Treatments," of the type and grade shown on the plans. Unless otherwise shown on the plans, furnish aggregate with a minimum Surface Aggregate Classification B.

2.3. **Materials Selections.** Furnish asphalt and aggregate shown on the plans.

3. EQUIPMENT

3.1. **Distributor.** Furnish a distributor that will apply the asphalt material uniformly at the specified rate or as directed.

3.1.1. **Transverse Variable Rate.** ~~NOT USED. When a transverse variable rate is shown on the plans, ensure that the nozzles outside the wheel paths will output a predetermined percentage more asphalt material by volume than the nozzles over the wheel paths. Use a dual spray bar distributor as desired to provide for a transverse variable rate.~~

- 3.1.2. **Agitation for Asphalt-Rubber.** If using A-R, furnish a distributor capable of keeping the rubber in uniform suspension and adequately mixing the asphalt, rubber, and any additional additives.
- 3.1.3. **Calibration.**
- 3.1.3.1. **Transverse Distribution.** Furnish a distributor test report, less than 1 yr. old, when tested in accordance with [Tex-922-K](#), Part III. The ~~Department~~ **Engineer** reserves the right to witness the calibration testing. Notify the Engineer 3 days before calibration testing.
- Include the following documentation on the test report:
- the serial number of the distributor,
 - a method that identifies the actual nozzle set used in the test, and
 - the fan width of the nozzle set at a 12-in. bar height.
- When a transverse variable rate is required, and a single spray bar is to be used, perform the test using the type and grade of asphalt material to be used on the project. The Engineer may verify the transverse rate and distribution at any time. If verification does not meet the requirements, correct deficiencies and furnish a new test report.
- 3.1.3.2. **Tank Volume.** Furnish a volumetric calibration and strap stick for the distributor tank in accordance with [Tex-922-K](#), Part I.
- Provide documentation of distributor calibration performed not more than 5 yr. before the date first used on the project. The Engineer may verify calibration accuracy in accordance with [Tex-922-K](#), Part II.
- 3.1.4. **Computerized Distributor.** When paying for asphalt material by weight, the Engineer may allow use of the computerized distributor display to verify application rates. Verify application rate accuracy at a frequency acceptable to the Engineer.
- 3.2. **Aggregate Spreader.** Use a continuous-feed, self-propelled spreader to apply aggregate uniformly at the specified rate or as directed. If racked in aggregate is specified on the plans, furnish a second aggregate spreader for the racked in aggregate to apply aggregate uniformly at the specified rate.
- 3.3. **Rollers.** Unless otherwise shown on the plans, furnish light pneumatic-tire rollers in accordance with Item 210, "Rolling."
- 3.4. **Broom.** Furnish rotary, self-propelled brooms.
- 3.5. **Asphalt Storage and Handling Equipment.** When the plans or the Engineer allows storage tanks, furnish a thermometer in each tank to indicate the asphalt temperature continuously. Keep equipment clean and free of leaks. Keep asphalt material free of contamination.
- 3.6. **Aggregate Haul Trucks.** Unless otherwise approved, use trucks of uniform capacity to deliver the aggregate. Provide documentation showing measurements and calculation in cubic yards. Clearly mark the calibrated level. Truck size may be limited when shown on the plans.
- 3.7. **Digital Distance Measuring Instrument.** Furnish a vehicle with a calibrated digital distance measuring instrument accurate to ± 6 ft. per mile.

4. CONSTRUCTION

4.1. **General.** Comply with the seal coat season as shown on the plans. Asphalt and aggregate rates shown on the plans are for estimating purposes only. Adjust the rates for existing conditions as directed. Apply seal coat two times as called for in the plans.

4.2. **Temporary Aggregate Stockpiles.** The Engineer will approve the location of temporary aggregate stockpiles on the right of way before delivery. Place stockpiles in a manner that will not:

- result in stockpiles being within the Runway Object Free Area (ROFA) once the runway is returned to service.
- obstruct traffic or sight distance,
- interfere with the access from abutting property, or
- interfere with roadway drainage.

~~Locate stockpiles a minimum of 30 ft. from roadway when possible. Sign and barricade as shown on the plans.~~

4.3. **Aggregate Furnished by the Department.** ~~NOT USED. When shown on the plans, the Department will furnish aggregate to the Contractor without cost. Stockpile locations are shown on the plans.~~

4.4. **Adverse Weather Conditions.** Do not place surface treatments when, in the Engineer's opinion, general weather conditions are unsuitable. Meet the requirements for air and surface temperature shown below.

4.4.1. **Standard Temperature Limitations.** Apply seal coat when air temperature is above 50°F and rising. Do not apply seal coat when air temperature is 60°F and falling. In all cases, do not apply seal coat when surface temperature is below 60°F.

4.4.2. **Polymer-Modified Asphalt Cement Temperature Limitations.** When using materials described in Section 300.2.2., "Polymer Modified Asphalt Cement," apply seal coat when air temperature is above 70°F and rising. Do not apply seal coat when air temperature is 80°F and falling. In all cases, do not apply seal coat when surface temperature is below 70°F.

4.4.3. **Asphalt-Rubber Temperature Limitations.** Do not place hot A-R seal coat when, in the Engineer's opinion, general weather conditions are unsuitable. Apply seal coat when the air temperature is 80°F and above, or above 70°F and rising. In all cases, do not apply seal coat when surface temperature is below 70°F.

4.4.4. **Cool Weather Night Air Temperature.** The Engineer reserves the right to review the National Oceanic and Atmospheric Administration (NOAA) weather forecast and determine if the nightly air temperature is suitable for asphalt placement to prevent aggregate loss.

4.4.5. **Cold Weather Application.** When asphalt application is allowed outside of the above temperature restrictions, the Engineer will approve the binder grade and the air and surface temperatures for asphalt material application. Apply seal coat at air and surface temperatures as directed.

4.5. **Mixing Hot A-R Binder.** If using A-R, mix in accordance with the approved blend design required in Section 316.2.1., "Asphalt."

At the end of each shift, provide the Engineer RPR with production documentation, which includes the following:

- amount and temperature of asphalt cement before addition of rubber,

- amount of rubber and any extender added,
- viscosity of each hot A-R batch just before roadway placement, and
- time of the rubber additions and viscosity tests.

4.6. **Surface Preparation.** Remove existing raised pavement markers. Repair any damage incurred by removal as directed. Remove dirt, dust, or other harmful material before sealing. When shown on the plans and as called for in Item P-101, mill surfaces as shown on the plans, treat and remove vegetation. ~~and blade pavement edges. When directed, apply a tack coat before applying the hot asphalt rubber treatment on an existing wearing surface in accordance with Section 340.2.5., "Tack Coat."~~

4.7. **Rock Land and Shot.**

4.7.1. **Definitions.**

A "rock land" is the area covered at the aggregate rate directed with 1 truckload of aggregate.

A "shot" is the area covered by 1 distributor load of asphalt material.

4.7.2. **Setting Lengths.** Calculate the lengths of both rock land and shot. Adjust shot length to be an even multiple of the rock land. Verify that the distributor has enough asphalt material to complete the entire shot length. Mark shot length before applying asphalt. When directed, mark length of each rock land to verify the aggregate rate.

4.8. **Asphalt Placement.**

4.8.1. **General.** The maximum shot width is the width of the current transverse distribution test required under Section 316.3.1.3.1., "Transverse Distribution," or the width of the aggregate spreader box, whichever is less. Adjust the shot width so operations do not encroach on traffic or interfere with the traffic control plan, as directed. Use paper or other approved material at the beginning and end of each shot to construct a straight transverse joint and to prevent overlapping of the asphalt. Unless otherwise approved, match longitudinal joints with the lane lines. The Engineer may require a string line if necessary to keep joints straight with no overlapping. Use sufficient pressure to flare the nozzles fully.

Select an application temperature, as approved, in accordance with Item 300. Uniformly apply the asphalt material at the rate directed, within 15° F of the approved temperature, and not above the maximum allowable temperature.

4.8.2. **Limitations.** Do not apply asphalt to the roadway until:

- traffic control methods and devices are in place as shown on the plans or as directed,
- the loaded aggregate spreader is in position and ready to begin,
- haul trucks are loaded with enough aggregate to cover the shot area and are in place behind the spreader box, and
- rollers are in place behind the haul trucks.

4.8.3. **Nonuniform Application.** Stop application if it is not uniform due to streaking, ridging, puddling, or flowing off the roadway surface. Verify equipment condition, operating procedures, application temperature, and material properties. Determine and correct the cause of nonuniform application. If the cause is high or low emulsion viscosity, replace emulsion with material that corrects the problem.

4.8.4. **Test Strips.** The Engineer may stop asphalt application and require construction of test strips at the Contractor's expense if any of the following occurs:

nonuniformity of application continues after corrective action;

- nonuniformity of application continues after corrective action;
- on three consecutive shots, application rate differs by more than 0.03 gal. per square yard from the rate directed; or
- any shot differs by more than 0.05 gal. per square yard from the rate directed.

The Engineer will approve the test strip location. The Engineer may require additional test strips until surface treatment application meets specification requirements.

- 4.8.5. **Sampling.** Collect all samples in accordance with Tex-500-C from the distributor and with witness by the Engineer.

At least once per project, collect split samples of each binder grade and source used. The Engineer will ~~submit~~ may collect one split sample to the Materials and Tests Division (MTD) for testing ~~and retain the other split sample.~~

In addition, collect one sample of each binder grade and source used on the project for each production day. The Engineer will retain these samples.

~~The Engineer will keep all retained samples for 1 yr. for hot applied binders and cutback asphalts, or for 2 mo. for emulsified asphalts. The Engineer may submit retained samples to MTD for testing as necessary or as requested by MTD.~~

~~The Department will furnish sampling containers in accordance with Tex 500-C~~

- 4.9. **Aggregate Placement.** As soon as possible, apply aggregate uniformly at the rate directed without causing the rock to roll over.

- 4.9.1. **Nonuniform Application.** Stop application if it is not uniform in the transverse direction. Verify equipment condition, operating procedures, and transverse application rate. The transverse application rate should be within 1 lb. Determine and correct the cause of nonuniform application.

- 4.10. **Rolling.** Start rolling operation on each shot as soon as aggregate is applied. Use sufficient rollers to cover the entire mat width in one pass, i.e., one direction. Roll in a staggered pattern. Unless otherwise shown on the plans, make a minimum of:

- five passes; or
- three passes when the asphalt material is an emulsion.

If rollers are unable to keep up with the spreader box, stop application until rollers have caught up, or furnish additional rollers. Keep roller tires asphalt-free.

- 4.11. **Patching.** Before rolling, repair spots where coverage is incomplete. Repair can be made by hand spotting or other approved method. When necessary, apply additional asphalt material to embed aggregate.

- 4.12. **Racked-in Aggregate.** If specified on the plans, apply racked-in aggregate after patching, uniformly at the rate directed. The racked-in aggregate must be applied before opening the roadway or intersection to traffic.

- 4.13. **Brooming.** After rolling, sweep as soon as aggregate has sufficiently bonded to remove excess. In areas of racked-in aggregate, sweep as directed. Excess aggregate cannot be swept off the edge of the pavement(s) or places that will result in FOD once the airfield is returned to service. Collect excess aggregate to the satisfaction of the Engineer and RPR and remove it from the airport.

- 4.14. **Final Acceptance.** Maintain seal coat until the Engineer accepts the work. Repair any surface failures. Before final project acceptance, remove all temporary stockpiles and restore the area to the original contour and grade.

5. **MEASUREMENT**

- 5.1. **Asphalt Material.** Unless otherwise shown on the plans, asphalt material will be measured by one of the following methods:
- 5.1.1. **Volume.** Asphalt material, including all components, will be measured at the applied temperature by strapping the tank before and after road application. The distributor calibrated strap stick will be used for measuring the asphalt level in the distributor asphalt tank. The certified tank chart will be used to determine the beginning gallons and the final gallons in the distributor tank. The quantity to be measured for payment will be the difference between the beginning gallons and the final gallons.
- 5.1.2. **Weight.** Asphalt material will be measured in tons using certified scales meeting the requirements of Item 520, "Weighing and Measuring Equipment," unless otherwise approved. The transporting truck must have a seal attached to the draining device and other openings. Random checking on public scales at the Contractor's expense may be required to verify weight accuracy.
- Upon work completion or temporary suspension, any remaining asphalt material will be weighed by a certified public weigher, or measured by volume in a calibrated distributor or tank and the quantity converted to tons at the measured temperature. The quantity to be measured will be the number of tons received minus the number of tons remaining after all directed work is complete and minus the amount used for other items.
- 5.1.3. **Quantity Adjustments.** When shown on the plans, the measured quantity will be adjusted to compensate for variation in required application or residual rates for different types of asphalt.
- 5.1.4. **Aggregate.** Aggregate will be measured by the cubic yard in the trucks as applied on the road. Strike off the loaded aggregate for accurate measurement when directed. *There is no separate measurement for payment under "Aggregate". Include costs for Aggregates in Item Seal Coat Application.*
- 5.2. **Loading, Hauling, and Distributing Aggregate.** When the Department furnishes the aggregate, the loading, hauling, and distributing will be measured by the cubic yard in the trucks as applied on the road.
- 5.3. *Seal Coat Application. Installed seal coat is measured by the square yard for each instance of an application of asphalt material followed by the application of aggregate, rolling, patching, and brooming, and accepted by the Engineer.*

6. **PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit prices bid for "Asphalt," "~~Aggregate~~," "and Seal Coat Application" and "~~Loading, Hauling, and Distributing Aggregate~~" of the types-grades specified on the plans. These prices are full compensation for surface preparation; furnishing, preparing, hauling, and placing materials; removing existing pavement markers and excess aggregate; rolling; cleaning up stockpiles; and equipment, labor, tools, and incidentals.

Special Provision to Item Tx-341

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "Department" has been replaced with "Engineer".
- 2.5:** Modify the paragraph to reference Item P-603 of this project manual.
- 2.7:** Delete the Section as Recycled Materials is not used in this Item.
- 2.8.:** Delete the Section as Substitute Binders are not used in this Item.
- 4.:** Modify the second sentence in the first paragraph as follows: "Anytime during the project, the Engineer may perform production and placement tests as necessary in accordance with General Conditions Section 50 Item 5, "Control of the Work."
- 4.3.:** Add the following sentence to the beginning of the first paragraph: "Follow requirements of Item C-100 and this section for the OCP."
- 4.4.1.:** Delete "DG-B Fine Base", "DG-D Coarse Surface", and "DG-F Fine Mixture" from the available gradations in Table 8 for use in this project.
- 4.4.2.1.4.:** Delete the requirement to physically provide aggregate with the Job Mix Formula submittal.
- 4.4.2.1.5.:** Delete the requirement to physically provide asphalt with the Job Mix Formula submittal.
- 4.4.2.2.1.:** Modify the first sentence of the paragraph as follows: "The Engineer will use a third-party Department SGC, calibrated in accordance with Tex-241-F, to mold samples for laboratory mixture design verification."
- 4.7.:** Modify Table 13 to remove requirements for mixture types DG-B, DG-C, and DG-F.
- 4.7.2.1.:** Modify the first sentence of the paragraph as follows: "Clean the surface before placing the tack coat. ~~The Engineer will set the rate between 0.04 and 0.10 gal. of residual asphalt per square yard of surface area.~~ Apply a uniform tack coat at the specified rate from Item P-603 unless otherwise directed."
- 4.7.2.2.:** Remove references to Engineer sampling tack coat under this Item.
- 4.8.:** Insert the following as a second sentence in the second paragraph: "Contractor is - at his own expense - to cut the cores in the presence of the RPR, and turn over the cores to the Engineer."
- 4.9.2.2.2.:** Remove the second paragraph from this section. The Engineer will not collect or hold samples of the binder.
- 4.9.3.3.:** Modify the second sentence as follows: "At the Contractor's option and at his own cost, After the Engineer returns the cores, the Contractor may retrieve and test the cores to verify the Engineer's test results for in-place air voids.
- 5.2.:** Remove references to measurement or payment for Tack Coat in this Item. See Item P-603 for direction and requirements on Tack Coat.

6.3.: Add the following to the end of this section: "IMPORTANT: TAP can be applied to lots with an average payment adjustment value greater than 1.000 to offset lots that are calculated with an average payment adjustment value less than 1.000. However, final payment under this item will not exceed the final Quantity placed minus quantity left in place without payment multiplied by the Bid price under this Item."

END OF SPECIAL PROVISION TO ITEM Tx-341

Item TX-341 Dense-Graded Hot-Mix Asphalt

from 2024 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

1. DESCRIPTION

Construct a hot-mix asphalt (HMA) pavement layer composed of a compacted, dense-graded mixture of aggregate, asphalt binder, and additives mixed hot in a mixing plant. Payment adjustments will apply to HMA placed under this Specification unless the HMA is deemed exempt in accordance with Section 341.4.9.4., "Exempt Production."

2. MATERIALS

Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications.

Notify the Engineer of all material sources and before changing any material source or formulation. The Engineer will verify that the specification requirements are met and document all material source changes when the Contractor makes a source or formulation change. The Engineer may sample and test project materials anytime during the project to verify specification compliance in accordance with Item 6, "Control of Materials."

2.1. **Aggregate.** Furnish aggregates from sources that conform to the requirements shown in Table 1 and this Section. Aggregate requirements in this Section, including those shown in Table 1, may be modified or eliminated when shown on the plans. Additional aggregate requirements may be specified when shown on the plans. Provide aggregate stockpiles that meet the definitions in this Section for coarse, intermediate, or fine aggregate. Aggregate from reclaimed asphalt pavement (RAP) is not required to meet Table 1 requirements unless otherwise shown on the plans. Supply aggregates that meet the definitions in [Tex-100-E](#) for crushed gravel or crushed stone. The Engineer will designate the plant or the quarry as the sampling location. Provide samples from materials produced for the project. The Engineer will establish the Surface Aggregate Classification (SAC) and perform Los Angeles abrasion, magnesium sulfate soundness, and Micro-Deval tests. Perform all other aggregate quality tests shown in Table 1. Document all test results in the mixture design report. The Engineer may perform tests on independent or split samples to verify Contractor test results. Stockpile aggregates for each source and type separately. Determine aggregate gradations for mixture design and production testing based on the washed sieve analysis in accordance with [Tex-200-F](#), Part II.

2.1.1. **Coarse Aggregate.** Coarse aggregate stockpiles must have no more than 20% material passing the No. 8 sieve. Aggregates from sources listed in the Department's Bituminous Rated Source Quality Catalog (BRSQC) are preapproved for use. Use only the rated values for HMA listed in the BRSQC. Rated values for surface treatment (ST) do not apply to coarse aggregate sources used in HMA.

For sources not listed in the Department's BRSQC:

- build an individual stockpile for each material;
- request the Department test the stockpile for specification compliance;
- allow 30 calendar days for the Engineer to sample, test, and report results;
- use only when tested and approved; and
- once approved, do not add additional material to the stockpile unless otherwise allowed by the Engineer.

Provide coarse aggregate with at least the minimum SAC shown on the plans. SAC requirements apply only to aggregates used on the surface of travel lanes, unless otherwise shown on the plans. The SAC for sources in the Department's *Aggregate Quality Monitoring Program* (AQMP) ([Tex-499-A](#)) is listed in the BRSQC.

- 2.1.1.1. **Blending Class A and Class B Aggregates.** Class B aggregate meeting all other requirements shown in Table 1 may be blended with a Class A aggregate to meet requirements for Class A materials, unless otherwise shown on the plans. When blending Class A and Class B aggregates to meet a Class A requirement, ensure that at least 50% by weight, or volume if required, of the material retained on the No. 4 sieve comes from the Class A aggregate source, unless otherwise shown on the plans. Blend by volume if the bulk specific gravities of the Class A and Class B aggregates differ by more than 0.300. Coarse aggregate from RAP and recycled asphalt shingles (RAS) will be considered as Class B aggregate for blending purposes.

The Engineer may perform tests anytime during production, when the Contractor blends Class A and Class B aggregates to meet a Class A requirement. The Engineer will use the Department's mix design template, when electing to verify conformance, to calculate the percent of Class A aggregate retained on the No. 4 sieve by inputting the bin percentages shown from readouts in the control room at the time of production and stockpile gradations measured at the time of production. The Engineer may determine the gradations based on either washed or dry sieve analysis from samples obtained from individual aggregate cold feed bins or aggregate stockpiles. The Engineer may perform spot checks to verify the percent of Class A aggregate retained on the No. 4 sieve. The Engineer will use the gradations supplied by the Contractor in the mixture design report as an input for the template. A failing spot check will require confirmation with a stockpile gradation determined by the Engineer.

- 2.1.1.2. **Micro-Deval Abrasion.** The Engineer will perform at least one Micro-Deval abrasion test in accordance with [Tex-461-A](#) for each coarse aggregate source used in the mixture design that has a rated source soundness magnesium (RSSM) loss value greater than 15 as listed in the BRSQC. The Engineer will perform testing before the start of production and may perform additional testing anytime during production. The Engineer may obtain the coarse aggregate samples from each coarse aggregate source or may require the Contractor to obtain the samples. The Engineer may waive all Micro-Deval testing based on a satisfactory test history of the same aggregate source.

The Engineer will estimate the magnesium sulfate soundness loss for each coarse aggregate source, when tested, using the following formula:

$$Mg_{est.} = (RSSM)(MD_{act.}/RSMD)$$

where:

$Mg_{est.}$ = magnesium sulfate soundness loss

$RSSM$ = rated source soundness magnesium

$MD_{act.}$ = actual Micro-Deval percent loss

$RSMD$ = rated source Micro-Deval

When the estimated magnesium sulfate soundness loss is greater than the maximum magnesium sulfate soundness loss specified, the coarse aggregate source will not be allowed for use unless otherwise approved. The Engineer will consult the Materials and Tests Division, and additional testing may be required before granting approval.

- 2.1.2. **Intermediate Aggregate.** Aggregates not meeting the definition of coarse or fine aggregate will be defined as intermediate aggregate. Supply intermediate aggregates, when used, that are free of organic impurities. Supply intermediate aggregate from coarse aggregate sources, when used, that meet the requirements shown in Table 1, unless otherwise approved.

Test the stockpile if 10% or more of the stockpile is retained on the No. 4 sieve, and verify that it meets the requirements in Table 1 for crushed face count ([Tex-460-A](#)) and flat and elongated particles ([Tex-280-F](#)).

2.1.3.

Fine Aggregate. Fine aggregates consist of manufactured sands, screenings, and field sands. Fine aggregate stockpiles must meet the fine aggregate properties in accordance with Table 1 and the gradation requirements in accordance with Table 2. Supply fine aggregates that are free of organic impurities. The Engineer may test the fine aggregate in accordance with [Tex-408-A](#) to verify the material is free of organic impurities. Unless otherwise shown on the plans, at most 10% of the total aggregate may be field sand or other uncrushed fine aggregate. Use fine aggregate, except field sand, from coarse aggregate sources that meet the requirements shown in Table 1, unless otherwise approved.

Test the stockpile if 10% or more of the stockpile is retained on the No. 4 sieve and verify that it meets the requirements in Table 1 for crushed face count ([Tex-460-A](#)) and flat and elongated particles ([Tex-280-F](#)).

**Table 1
Aggregate Quality Requirements**

Property	Test Method	Requirement
Coarse Aggregate		
SAC	Tex-499-A (AQMP)	As shown on the plans
Deleterious material, %, Max	Tex-217-F , Part I	1.5
Decantation, %, Max	Tex-217-F , Part II	1.5
Micro-Deval abrasion, %	Tex-461-A	Note ¹
Los Angeles abrasion, %, Max	Tex-410-A	40
Magnesium sulfate soundness, 5 cycles, %, Max	Tex-411-A	30
Crushed face count, ² %, Min	Tex-460-A , Part I	85
Flat and elongated particles @ 5:1, %, Max	Tex-280-F	10
Fine Aggregate		
Linear shrinkage, %, Max	Tex-107-E	3
Sand equivalent, %, Min	Tex-203-F	45 ³
Organic impurities	Tex-408-A	Note ⁴

1. Used to estimate the magnesium sulfate soundness loss in accordance with Section 341.2.1.1.2., "Micro- Deval Abrasion."
2. Only applies to crushed gravel.
3. The Department may perform [Tex-252-F](#) on fine aggregates not meeting this minimum requirement. Fine aggregates with a methylene blue value of 10.0 mg/g or less may be used.
4. Optional test.

**Table 2
Gradation Requirements for Fine Aggregate**

Sieve Size	% Passing by Wt. Or Volume
3/8"	100
#8	70-100
#200	0-30

2.2.

Mineral Filler. Mineral filler consists of finely divided mineral matter such as agricultural lime, crusher fines, hydrated lime, or fly ash. Mineral filler is allowed unless otherwise shown on the plans. Use no

more than 2% hydrated lime or fly ash, unless otherwise shown on the plans. Use no more than 1% hydrated lime if a substitute binder is used, unless otherwise shown on the plans or allowed. Test all mineral fillers except hydrated lime and fly ash in accordance with [Tex-107-E](#) to ensure specification compliance. The plans may require or disallow specific mineral fillers. Provide mineral filler, when used, that:

- is dry enough, free-flowing, and free of clumps and foreign matter as determined by the Engineer;
- does not exceed 3% linear shrinkage when tested in accordance with [Tex-107-E](#); and
- meets the gradation requirements shown in Table 3, unless otherwise shown on the plans.

Table 3
Gradation Requirements for Mineral Filler

Sieve Size	% Passing by Wt. or Volume
#8	100
#200	55–100

- 2.3. **Baghouse Fines.** Fines collected by the baghouse or other dust-collecting equipment may be reintroduced into the mixing drum.
- 2.4. **Asphalt Binder.** Furnish the type and grade of performance-graded (PG) asphalt binder shown on the plans that meets the requirements of Item 300, "Asphalts, Oils, and Emulsions."
- 2.5. **Tack Coat.** ~~See Item P-603. Furnish CSS 1H, SS 1H, EBL, or a PG binder with a minimum high-temperature grade of PG 58 for tack coat binder in accordance with Item 300. Specialized tack coat materials on the MPL for *Tracking Resistant Asphalt Interlayer* (TRAIL) will be allowed or required when shown on the plans. Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use, unless required in conformance with the manufacturer's recommendation for approved TRAIL products on the MPL.~~
- 2.6. **Additives.** Use the type of additive specified when shown on the plans. Use the rate of additive specified in conformance with the manufacturer's recommendation. Additives that facilitate mixing and compaction or improve the quality of the mixture are allowed when approved. Provide the Engineer with documentation such as the bill of lading showing the quantity of additives used in the project unless otherwise directed.
- 2.6.1. **Lime and Liquid Antistripping Agent.** Lime or liquid antistripping agent is required when shown on the plans. When lime or a liquid antistripping agent is used, add in accordance with Item 301, "Asphalt Antistripping Agents." Do not add lime directly into the mixing drum of any plant where lime is removed through the exhaust stream unless the plant has a baghouse or dust collection system that reintroduces the lime into the drum.
- 2.6.2. **Warm-Mix Asphalt (WMA).** WMA is defined as HMA that is produced within a target temperature discharge range of 215°F and 275°F using approved WMA additives or processes from the MPL.
- WMA is allowed for use on all projects and is required when shown on the plans. When WMA is required, the maximum placement or target discharge temperature for WMA will be set at a value at or below 275°F.

Department-approved WMA additives or processes may be used to facilitate mixing and compaction of HMA produced at target discharge temperatures above 275°F; however, such mixtures will not be defined as WMA.

- 2.6.3. **Compaction Aid.** Compaction aid is defined as a Department-approved chemical warm-mix additive, denoted as “chemical additive” on the MPL, that is used to facilitate mixing and compaction of HMA at a discharge temperature greater than 275°F.

Compaction aid is allowed for use on all projects. Compaction aid is required when shown on the plans or as required in Section 341.4.7.1., “Weather Conditions.”

Warm-mix foaming processes, denoted as “foaming process” on the MPL, may be used to facilitate mixing and compaction of HMA at target discharge temperatures greater than 275°F; however, warm-mix foaming processes are not defined as a compaction aid.

- ~~2.7. **Recycled Materials, NOT USED.** Use of RAP and RAS is permitted unless otherwise shown on the plans. Use of RAS is restricted to only intermediate and base mixes unless otherwise shown on the plans. Do not exceed the maximum allowable percentages of RAP and RAS in accordance with Table 4. The allowable percentages in accordance with Table 4 may be decreased or increased when shown on the plans. Determine the asphalt binder content and gradation of the RAP and RAS stockpiles for mixture design purposes in accordance with [Tex 236 F](#), Part I. The Engineer may verify the asphalt binder content of the stockpiles anytime during production. Perform other tests on RAP and RAS when shown on the plans. Asphalt binder from RAP and RAS is designated as recycled asphalt binder. Calculate and ensure that the ratio of the recycled asphalt binder to total binder does not exceed the percentages in accordance with Table 5 during mixture design and HMA production when RAP or RAS is used. Use a separate cold feed bin for each stockpile of RAP and RAS during HMA production. Surface, intermediate, and base mixes referenced in Table 4 and Table 5 are defined as follows, unless otherwise shown on the plans.~~

- ~~■ **Surface.** The final HMA lift placed at the top of the pavement structure.~~
- ~~■ **Intermediate.** Mixtures placed below an HMA surface mix and less than or equal to 8.0 in. below the riding surface.~~
- ~~■ **Base.** Mixtures placed greater than 8.0 in. below the riding surface. Unless otherwise shown on the plans, mixtures used for bond breaker are defined as base mixtures.~~

- ~~2.7.1. **RAP.** RAP is salvaged, milled, pulverized, broken, or crushed asphalt pavement. Fractionated RAP is defined as a stockpile that contains RAP material with at least 95.0% passing the 1/2 in. sieve, before burning in the ignition oven, unless otherwise approved. The Engineer may allow the Contractor to use an alternate to the 1/2 in. screen to fractionate the RAP.~~

~~Use of Contractor owned RAP, including HMA plant waste, is permitted unless otherwise shown on the plans. Department owned RAP stockpiles are available for the Contractor’s use when the stockpile locations are shown on the plans. If Department owned RAP is available for the Contractor’s use, the Contractor may use Contractor owned fractionated RAP and replace it with an equal quantity of Department owned RAP. Department owned RAP generated by required work on the Contract is available for the Contractor’s use when shown on the plans. Perform any necessary tests to ensure Contractor or Department owned RAP is appropriate for use. The Department will not perform any tests or assume any liability for the quality of the Department owned RAP unless otherwise shown on the plans. The Contractor will retain ownership of RAP generated on the project when shown on the plans.~~

~~Do not use Department or Contractor owned RAP contaminated with dirt or other objectionable materials. Do not use Department or Contractor owned RAP if the decantation value exceeds 5% and the plasticity index is greater than 8. Test the stockpiled RAP for decantation in accordance with [Tex 406 A](#), Part I. Determine the plasticity index in accordance with [Tex 106 E](#) if the decantation value~~

exceeds 5%. The decantation and plasticity index requirements do not apply to RAP samples with asphalt removed by extraction or ignition.

Do not intermingle Contractor-owned RAP stockpiles with Department-owned RAP stockpiles. Remove unused Contractor-owned RAP material from the project site upon completion of the project. Return unused Department-owned RAP to the designated stockpile location.

Table 4
Max Allowable Amounts of RAP¹
Max Allowable Fractionated RAP (%)

Surface	Intermediate	Base
20.0	30.0	35.0

1. Must also meet the recycled binder to total binder ratio shown in Table 5.

2.7.2. ~~RAS. RAS is defined as processed asphalt shingle material from manufacturing of asphalt roofing shingles or from re-roofing residential structures. Post-manufactured RAS is processed manufacturer's shingle scrap byproduct. Post-consumer RAS is processed shingle scrap removed from residential structures. Use of post-manufactured RAS or post-consumer RAS (tear-offs) is not permitted in surface mixtures unless otherwise shown on the plans. RAS may be used in intermediate and base mixtures unless otherwise shown on the plans. Up to 3% RAS may be used separately or as a replacement for fractionated RAP in accordance with Table 4 and Table 5. RAS may be used separately or in conjunction with RAP. Comply with all regulatory requirements stipulated for RAS by TCEQ.~~

~~Process the RAS by ambient grinding or granulating such that 100% of the particles pass the 3/8 in. sieve when tested in accordance with [Tex 200-F](#), Part I. Perform a sieve analysis on processed RAS material before extraction (or ignition) of the asphalt binder.~~

~~Add sand meeting the requirements of Table 1 and Table 2, or fine RAP, to RAS stockpiles if needed to keep the processed material workable. Any stockpile that contains RAS will be considered a RAS stockpile and be limited to no more than 3.0% of the HMA mixture in accordance with Table 4.~~

~~Certify compliance of the RAS with [DMS-11000](#), "Evaluating and Using Nonhazardous Recyclable Materials Guidelines." Treat RAS as an established nonhazardous recyclable material if it has not come into contact with any hazardous materials. Use RAS from shingle sources on the MPL. Remove all materials that are not part of the shingle, such as wood, paper, metal, plastic, and felt paper, before use. Determine the deleterious content of RAS material for mixture design purposes in accordance with [Tex 217-F](#), Part III. Do not use RAS if deleterious materials are more than 0.5% of the stockpiled RAS, unless otherwise approved. Submit a sample for approval before submitting the mixture design. The Department will perform the testing for deleterious material of RAS to determine specification compliance.~~

2.8. ~~Substitute Binders. NOT USED. No binder substitution will be allowed when shown on the plans. The Contractor may use a substitute PG binder shown in Table 5 instead of the PG binder originally specified, if using recycled materials, and if the substitute PG binder and mixture made with the substitute PG binder meet the following.~~

- ~~■ The substitute binder meets the specification requirements for the substitute binder grade in accordance with Section 300.2.11., "Performance Graded Binders."~~
- ~~■ The mixture has less than 10.0 mm of rutting on the Hamburg wheel test ([Tex 242-F](#)) after the number of passes required for the originally specified binder. Use of substitute PG binders may be~~

allowed only at the discretion of the Engineer if the Hamburg wheel test results are between 10.0 mm and 12.5 mm.

Table 5
Allowable PG Binders and Max Recycled Binder Ratios

Originally Specified PG Binder	Allowable Substitute PG-Binder for Surface Mixes	Allowable Substitute PG-Binder for Intermediate and Base Mixes	Max Ratio of Recycled Binder ¹ to Total Binder (%)		
			Surface	Intermediate	Base
76-22	70-22	70-22	15.0	25.0	30.0
70-22	Note ²	64-22	15.0	25.0	30.0
64-22	Note ²	Note ²	15.0	25.0	30.0
76-28	70-28	70-28	15.0	25.0	30.0
70-28	Note ²	64-28	15.0	25.0	30.0
64-28	Note ²	Note ²	15.0	25.0	30.0

1. Combined recycled binder from RAP and RAS. RAS is not permitted in surface mixtures unless otherwise shown on the plans.

2. No binder substitution is allowed.

3. EQUIPMENT

Provide required or necessary equipment in accordance with Item 320, "Equipment for Asphalt Concrete Pavement."

4. CONSTRUCTION

Produce, haul, place, and compact the specified paving mixture. In addition to tests required in accordance with the Specification, the Contractor may perform other QC tests as necessary. Anytime during the project, the Engineer may perform production and placement tests as necessary in accordance with General Conditions Section 50 Item 5, "Control of the Work." Schedule and participate in a mandatory pre-paving meeting with the Engineer on or before the first day of paving unless otherwise shown on the plans.

- 4.1. **Certification.** Personnel certified by the Department-approved HMA certification program must conduct all mixture designs, sampling, and testing in accordance with Table 6. Supply the Engineer with a list of certified personnel and copies of their current certificates before beginning production and when personnel changes are made. Provide a mixture design developed and signed by a Level 2-certified specialist. Provide Level 1A-certified specialists at the plant during production operations. Provide Level 1B-certified specialists to conduct placement tests. Provide Level AGG101-certified specialists for aggregate testing.

Table 6
Test Methods, Test Responsibility, and Min Certification Levels

Test Description	Test Method	Contractor	Engineer	Level ¹
Aggregate and Recycled Material Testing				
Sampling	Tex-221-F	✓	✓	1A/AGG101
Dry sieve	Tex-200-F , Part I	✓	✓	1A/AGG101
Washed sieve	Tex-200-F , Part II	✓	✓	1A/AGG101
Deleterious material	Tex-217-F , Part I and Part III	✓	✓	AGG101

Test Description	Test Method	Contractor	Engineer	Level ¹
Decantation	Tex-217-F , Part II	✓	✓	AGG101
Los Angeles abrasion	Tex-410-A	–	✓	Department
Magnesium sulfate soundness	Tex-411-A	–	✓	Department
Micro-Deval abrasion	Tex-461-A	–	✓	AGG101
Crushed face count	Tex-460-A	✓	✓	AGG101
Flat and elongated particles	Tex-280-F	✓	✓	AGG101
Linear shrinkage	Tex-107-E	✓	✓	AGG101
Sand equivalent	Tex-203-F	✓	✓	AGG101
Methylene blue test	Tex-252-F	–	✓	Department
Bulk-specific gravity	Tex-201-F	✓	✓	AGG101
Organic impurities	Tex-408-A	✓	✓	AGG101
Asphalt Binder and Tack Coat Sampling				
Asphalt binder sampling	Tex-500-C , Part II	✓	✓	1A/1B
Tack coat sampling	Tex-500-C , Part III	✓	✓	1A/1B
Mix Design and Verification				
Design and job-mix formula (JMF) changes	Tex-204-F	✓	✓	2
Mixing	Tex-205-F	✓	✓	2
Molding (Superpave gyratory compactor [SGC])	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F , Part I and Part VI	✓	✓	1A
Rice gravity	Tex-227-F , Part II	✓	✓	1A
Ignition oven correction factors ²	Tex-236-F , Part II	✓	✓	1A
Indirect tensile strength	Tex-226-F	✓	✓	1A
Hamburg wheel test	Tex-242-F	✓	✓	1A
Witnessing mixing of correction factors	Tex-236-F , Part III	–	✓	1A/Department
Boil test	Tex-530-C	✓	✓	1A
Production Testing				
Selecting production random numbers	Tex-225-F , Part I	–	✓	1A
Mixture sampling	Tex-222-F	✓	✓	1A/1B
Molding (SGC)	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F , Part I and Part VI	✓	✓	1A
Rice gravity	Tex-227-F , Part II	✓	✓	1A
Gradation and asphalt binder content ²	Tex-236-F , Part I	✓	✓	1A
Control charts	Tex-233-F	✓	✓	1A
Moisture content	Tex-212-F , Part II	✓	✓	1A/AGG101
Hamburg wheel test	Tex-242-F	✓	✓	1A
Micro-Deval abrasion	Tex-461-A	–	✓	AGG101
Boil test	Tex-530-C	✓	✓	1A
Abson recovery	Tex-211-F	–	✓	Department
Placement Testing				
Selecting placement random numbers	Tex-225-F , Part II	–	✓	1B

Test Description	Test Method	Contractor	Engineer	Level ¹
Trimming roadway cores	51-F , Part I and Part II	✓	✓	1A/1B
In-place air voids	07-F , Part I and Part VI	✓	✓	1A
In-place density (nuclear method)	Tex-207-F , Part III	✓	–	1B
Establish rolling pattern	Tex-207-F , Part IV	✓	–	1B
Control charts	Tex-233-F	✓	✓	1A
Ride quality measurement	Tex-1001-S	✓	✓	Note ³
Segregation (density profile)	Tex-207-F , Part V	✓	✓	1B
Longitudinal joint density	Tex-207-F , Part VII	✓	✓	1B
Thermal profile	Tex-244-F	✓	–	1B
Shear bond strength test	Tex-249-F	–	✓	Department

- Levels 1A, 1B, AGG101, and 2 are certification levels provided by the Hot Mix Asphalt Center certification program.
- Refer to Section 341.4.9.2.3., "Production Testing," for exceptions to using an ignition oven.
- Profiler and operator are required to be certified at the Texas A&M Transportation Institute facility when surface test Type B is specified.

4.2. **Reporting and Responsibilities.** Use Department-provided templates to record and calculate all test data, including mixture design, production and placement QC and QA, control charts, thermal profiles, segregation density profiles, and longitudinal joint density. Obtain the current version of the templates from the Department's website or from the Engineer. The Engineer and the Contractor will provide any available test results to the other party when requested. The maximum allowable time for the Contractor and Engineer to exchange test data is as shown in Table 7, unless otherwise approved. The Engineer and the Contractor will immediately report to the other party any test result that requires suspension of production or placement, or a payment adjustment less than 1.000, or that fails to meet the specification requirements. Record and electronically submit all test results and pertinent information on Department-provided templates.

Subsequent sublots placed after test results are available to the Contractor, which require suspension of operations, may be considered unauthorized work. Unauthorized work will be accepted or rejected at the discretion of the Engineer in accordance with Article 5.3., "Conformity with Plans, Specifications, and Special Provisions."

Table 7 Reporting Schedule

Description	Reported By	Reported To	To Be Reported Within
Production Quality Control			
Gradation ¹	Contractor	Engineer	1 working day of completion of the subplot
Asphalt binder content ¹			
Laboratory-molded density ²			
Moisture content ³			
Boil test ⁴			
Production Quality Assurance			
Gradation ³	Engineer	Contractor	1 working day of completion of the subplot
Asphalt binder content ³			
Laboratory-molded density ¹			

Description	Reported By	Reported To	To Be Reported Within
Hamburg wheel test ⁵			
Boil test ⁴			
Binder tests ⁵			

Placement Quality Control			
In-place air voids ²	Contractor	Engineer	1 working day of completion of the lot
Segregation ¹			
Longitudinal joint density ¹			
Thermal profile ¹			
Placement Quality Assurance			
In-place air voids ¹	Engineer	Contractor	1 working day after receiving the trimmed cores ⁶
Segregation ³			1 working day of completion of the lot
Longitudinal joint density ³			
Thermal profile ³			
Aging ratio ⁵			
Shear bond strength test ⁵	5 working days after receiving the cores		
Payment adjustment summary	Engineer	Contractor	2 working days of performing all required tests and receiving Contractor test data

1. These tests are required on every subplot.
2. Optional test. When performed on split samples, report the results as soon as they become available.
3. To be performed at the frequency shown in Table 16 or as shown on the plans.
4. When shown on the plans.
5. To be reported as soon as the results become available.
6. Two days are allowed if cores cannot be dried to constant weight within 1 day.

The Engineer will use the Department-provided template to calculate all payment adjustment factors for the lot. Sublot samples may be discarded after the Engineer and Contractor sign off on the payment adjustment summary documentation for the lot.

Use the procedures described in [Tex-233-F](#) to plot the results of all QC and QA testing. Update the control charts as soon as test results for each subplot become available. Make the control charts readily accessible at the field laboratory. The Engineer may suspend production for failure to update control charts.

- 4.3. **Quality Control Plan (QCP).** Follow requirements of Item C-100 and this section for the QCP. Develop and follow the QCP in detail. Obtain approval for changes to the QCP made during the project. The Engineer may suspend operations if the Contractor fails to comply with the QCP.

Submit a written QCP before the mandatory pre-paving meeting. Receive approval of the QCP before beginning production. Include the following items in the QCP.

- 4.3.1. **Project Personnel.** For project personnel, include:
- a list of individuals responsible for QC with authority to take corrective action,
 - current contact information for each individual listed, and
 - current copies of certification documents for individuals performing specified QC functions.
- 4.3.2. **Material Delivery and Storage.** For material delivery and storage, include:
- the sequence of material processing, delivery, and minimum quantities to assure continuous plant operations;
 - aggregate stockpiling procedures to avoid contamination and segregation;
 - frequency, type, and timing of aggregate stockpile testing to assure conformance with material requirements before mixture production; and
 - procedure for monitoring the quality and variability of asphalt binder.
- 4.3.3. **Production.** For production, include:
- loader operation procedures to avoid contamination in cold bins;
 - procedures for calibrating and controlling cold feeds;
 - procedures to eliminate debris or oversized material;
 - procedures for adding and verifying rates of each applicable mixture component (e.g., aggregate, asphalt binder, RAP, RAS, lime, liquid antistripping, compaction aid, foaming process, and WMA);
 - procedures for reporting job control test results; and
 - procedures to avoid segregation and drain-down in the silo.
- 4.3.4. **Loading and Transporting.** For loading and transporting, include:
- type and application method for release agents, and
 - truck-loading procedures to avoid segregation.
- 4.3.5. **Placement and Compaction.** For placement and compaction, include:
- proposed agenda for mandatory pre-paving meeting, including date and location;
 - proposed paving plan (e.g., production rate, paving widths, joint offsets, and lift thicknesses);
 - type and application method for release agents in the paver and on rollers, shovels, lutes, and other utensils;
 - procedures for the transfer of mixture into the paver while avoiding physical and thermal segregation and preventing material spillage;
 - process to balance production, delivery, paving, and compaction to achieve continuous placement operations and good ride quality;
 - paver operations (e.g., speed, operation of wings, and height of mixture in auger chamber) to avoid physical and thermal segregation and other surface irregularities; and
 - procedures to construct quality longitudinal and transverse joints.
- 4.4. **Mixture Design.**
- 4.4.1. **Design Requirements.** Use the dense-graded design procedure provided in [Tex-204-F](#), unless otherwise shown on the plans. Design the mixture to meet the requirements shown in Tables 1, 2, 3, 4, 5, 8, 9, and 10.

Design the mixture using an SGC, and 50 gyrations as the design number of gyrations (Ndesign). Use a target laboratory-molded density of 96.0% to design the mixture; however, adjustments can be made to the Ndesign value as shown in Table 9. The Ndesign level may be reduced to at least 35 gyrations at the Contractor's discretion.

Use a Department-approved laboratory on the MPL to perform the Hamburg wheel test and provide results with the mixture design, or provide the laboratory mixture and request that the Department perform the Hamburg wheel test. Upon receiving the sample from the Contractor, the Engineer will be allowed 10 working days to provide the Contractor with Hamburg wheel test results on the laboratory mixture design.

~~The Engineer will provide the mixture design when shown on the plans. The Contractor may submit a new mixture design anytime during the project. The Engineer will verify and approve all mixture designs (JMF1) before the Contractor can begin production.~~

Provide the Engineer with a mixture design report using the Department-provided template. Include the following items in the report:

- the combined aggregate gradation, source, specific gravity, and percent of each material used;
- the binder source and optimum design asphalt content;
- asphalt binder content and aggregate gradation of RAP and RAS stockpiles;
- the Ndesign level used on the SGC;
- results of all applicable tests;
- the mixing and molding temperatures;
- the signature of the Level 2 person or persons who performed the design;
- the date the mixture design was performed; and
- a unique identification number for the mixture design.

Table 8
Master Gradation Limits (% Passing by Wt. or Volume) and Void in Mineral Aggregate (VMA) Requirements

Sieve Size	DG-B Fine Base	DG-C Coarse Surface	DG-D Fine Surface	DG-F Fine Mixture
2"	–	–	–	–
1-1/2"	100.0 ¹	–	–	–
1"	98.0–100.0	100.0 ¹	–	–
3/4"	84.0–98.0	95.0–100.0	100.0 ¹	–
1/2"	–	–	98.0–100.0	100.0 ¹
3/8"	60.0–80.0	70.0–85.0	85.0–100.0	98.0–100.0
#4	40.0–60.0	43.0–63.0	50.0–70.0	70.0–90.0
#8	29.0–43.0	32.0–44.0	35.0–46.0	38.0–48.0
#30	13.0–28.0	14.0–28.0	15.0–29.0	12.0–27.0
#50	6.0–20.0	7.0–21.0	7.0–20.0	6.0–19.0
#200	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0
Design (VMA), % Min				
–	13.0	14.0	15.0	16.0
Production (Plant-Produced) (VMA), % Min				
–	12.5	13.5	14.5	15.5

1. Defined as Max sieve size. No tolerance allowed.

**Table 9
Laboratory Mixture Design Properties**

Mixture Property	Test Method	Requirement
Target laboratory-molded density, %	Tex-207-F	96.0
Design gyrations (N _{design})	Tex-241-F	50 ¹
Indirect tensile strength (dry), psi	Tex-226-F	85–200 ²
Boil test ³	Tex-530-C	–

1. Adjust within a range of 35–100 gyrations when shown on the plans, in accordance with the specification, or when mutually agreed between the Engineer and Contractor.
2. The Engineer may allow the indirect tensile test strength to exceed 200 psi if the corresponding Hamburg wheel rut depth is >2.5 mm and <12.5 mm.
3. When shown on the plans. Used to establish baseline for comparison to production results.

**Table 10
Hamburg Wheel Test Requirements**

High-Temperature Binder Grade	Test Method	Min # of Passes at 12.5-mm ¹ Rut Depth, Tested at 50°C
PG 64 or lower	Tex-242-F	10,000 ²
PG 70		15,000 ³
PG 76 or higher		20,000

1. The Hamburg wheel test will have a minimum rut depth of 2.5 mm.
2. May be decreased to at least 5,000 passes when shown on the plans.
3. May be decreased to at least 10,000 passes when shown on the plans.

4.4.2. **Job-Mix Formula Approval.** The JMF is the combined aggregate gradation, N_{design} level, and target asphalt percentage used to establish target values for hot-mix production. JMF1 is the original laboratory mixture design used to produce the trial batch. When WMA is used, JMF1 may be designed and submitted to the Engineer without including the WMA additive, foaming process, or compaction aid. When WMA or a compaction aid is used, document the additive or process used and recommended rate in the JMF1 submittal. The Engineer and the Contractor will verify JMF1 based on plant-produced mixture from the trial batch, unless otherwise approved. The Engineer may accept an existing mixture design previously used on a Department project and may waive the trial batch to verify JMF1. The Department may require the Contractor to reimburse the Department for verification tests if more than two trial batches per design are required.

4.4.2.1. **Contractor’s Responsibilities.**

4.4.2.1.1. **Providing Superpave Gyratory Compactor.** Provide an SGC in accordance with Item 504, “Field Office and Laboratory,” and make the SGC available to the Engineer for use in molding production samples.

4.4.2.1.2. **Gyratory Compactor Correlation Factors.** Use [Tex-206-F](#), Part II, to perform a gyratory compactor correlation when the Engineer uses a different SGC. Apply the correlation factor to all subsequent production test results.

4.4.2.1.3. **Submitting JMF1.** Furnish a mix design report (JMF1) with representative samples of all component materials and request approval to produce the trial batch. Provide approximately 25 lb. of the design mixture if opting to have the Department perform the Hamburg wheel test on the laboratory mixture, and request that the Department perform the test.

~~4.4.2.1.4. **Supplying Aggregates.** Provide approximately 40 lb. of each aggregate stockpile unless otherwise directed.~~

~~4.4.2.1.5. **Supplying Asphalt.** Provide at least 1 gal. of the asphalt material and enough quantities of any additives proposed for use.~~

4.4.2.1.6. **Ignition Oven Correction Factors.** Notify the Engineer before performing [Tex-236-F](#), Part II. Allow the Engineer to witness the mixing of ignition oven correction factor sample. Determine the aggregate and asphalt correction factors from the ignition oven in accordance with [Tex-236-F](#), Part II.

If the Engineer witnesses the mixing of the ignition oven correction factor samples, provide the Engineer with identically prepared samples of the mixtures before the trial batch production, including all additives (except water), and blank samples used to determine the correction factors for the ignition oven used for QA testing during production.

Correction factors established from a previously approved mixture design may be used for the current mixture design if the mixture design and ignition oven are the same as previously used, unless otherwise directed. Correction factors must be performed every 12 mo.

4.4.2.1.7. **Boil Test.** When shown on the plans, perform the test and retain the tested sample from [Tex-530-C](#) until completion of the project or as directed. Use this sample for comparison purposes during production.

4.4.2.1.8. **Trial Batch Production.** Provide a plant-produced trial batch upon receiving conditional approval of JMF1 and authorization to produce a trial batch. If applicable, include the WMA additive, foaming process, or compaction aid for verification testing of JMF1 and development of JMF2. Produce a trial batch mixture that meets the requirements shown in Tables 4, 5, and 11. The Engineer may accept test results from recent production of the same mixture instead of a new trial batch.

4.4.2.1.9. **Trial Batch Production Equipment.** Use only equipment and materials proposed for use on the project to produce the trial batch.

4.4.2.1.10. **Trial Batch Quantity.** Produce enough quantity of the trial batch to ensure that the mixture meets the specification requirements.

4.4.2.1.11. **Number of Trial Batches.** Produce trial batches as necessary to obtain a mixture that meets the specification requirements.

4.4.2.1.12. **Trial Batch Sampling.** Obtain a representative sample of the trial batch and split it into three equal portions in accordance with [Tex-222-F](#). Label these portions as "Contractor," "Engineer," and "Referee." Deliver samples to the appropriate laboratory as directed.

4.4.2.1.13. **Trial Batch Testing.** Test the trial batch to ensure the mixture produced using the proposed JMF1 meets the mixture requirements shown in Table 11. Ensure the trial batch mixture is also in compliance with the Hamburg wheel requirement shown in Table 10. Use a Department-approved laboratory listed on the MPL to perform the Hamburg wheel test on the trial batch mixture, or request that the Department perform the Hamburg wheel test. Provide approximately 25 lb. of the trial batch mixture if opting to have the Department perform the Hamburg wheel test, and request that the Department perform the test. Upon receiving the sample from the Contractor, the Engineer will be allowed 10 working days to provide the Contractor with Hamburg wheel test results on the trial batch. Provide the Engineer with a copy of the trial batch test results.

4.4.2.1.14. **Development of JMF2.** After the Engineer grants full approval of JMF1, evaluate the trial batch test results, determine the optimum mixture proportions, and submit as JMF2. Adjust the asphalt binder content or gradation to achieve the specified target laboratory-molded density. The asphalt binder content established for JMF2 is not required to be within any tolerance of the optimum asphalt binder content established for JMF1; however, mixture produced using JMF2 must meet the VMA requirements for production shown in Table 8. If the optimum asphalt binder content for JMF2 is more than 0.5% lower than the optimum asphalt binder content for JMF1, the Engineer may perform or require the Contractor to perform [Tex-226-F](#) on Lot 1 production to confirm the indirect tensile strength does not exceed 200 psi. Verify that JMF2 meets the mixture requirements shown in Table 4 and Table 5.

4.4.2.1.15. **Mixture Production.** Use JMF2 to produce Lot 1 in accordance with Section 341.4.9.3.1.1., "Lot 1 Placement," after receiving approval for JMF2 and a passing Hamburg wheel result on the trial batch from a laboratory listed on the MPL. Once JMF2 is approved, and without receiving the results from the Department's Hamburg wheel test on the trial batch, the Contractor may proceed to Lot 1 production at their own risk.

Notify the Engineer if electing to proceed without Hamburg wheel test results from the trial batch. Note that the Engineer may require up to the entire subplot of any mixture failing the Hamburg wheel test to be removed and replaced at the Contractor's expense.

4.4.2.1.16. **Development of JMF3.** Evaluate the test results from Lot 1, determine the optimum mixture proportions, and submit as JMF3 for use in Lot 2.

4.4.2.1.17. **JMF Adjustments.** If JMF adjustments are necessary to achieve the specified requirements, make the adjustments before beginning a new lot. The adjusted JMF must:

- be provided to the Engineer in writing before the start of a new lot,
- be numbered in sequence to the previous JMF,
- meet the mixture requirements in accordance with Table 4 and Table 5,
- meet the master gradation limits in accordance with Table 8, and
- be within the operational tolerances of JMF2 in accordance with Table 11.

4.4.2.1.18. **Requesting Referee Testing.** Use referee testing, if needed, in accordance with Section 341.4.9.1., "Referee Testing," to resolve testing differences with the Engineer.

Table 11 Operational Tolerances

Description	Test Method	Allowable Difference Between JMF2 and JMF1 Target ¹	Allowable Difference Between Current JMF and JMF2 ²	Allowable Difference Between Contractor and Engineer ³
Individual % retained on #8 sieve and larger	Tex-200-F or Tex-236-F	Must be Within Master Gradation Limits in Table 8	±5.0 ⁴	±5.0
Individual % retained on sieves smaller than #8 and larger than #200			±3.0 ⁴	±3.0
% passing the #200 sieve			±2.0 ⁴	±1.6
Asphalt binder content, %	Tex-236-F	±0.5	±0.3	±0.3
Laboratory-molded density, %	Tex-207-F	±1.0	±1.0	±1.0
In-place air voids, %		-	-	±1.0
Laboratory-molded bulk specific gravity		-	-	±0.020

VMA, %, Min	Tex-204-F	Note ⁵	Note ⁵	–
Theoretical maximum specific (Rice) gravity	Tex-227-F	–	–	±0.020

1. JMF1 is the approved laboratory mixture design used for producing the trial batch. JMF2 is the approved mixture design developed from the trial batch used to produce Lot 1.
2. Current JMF is JMF3 or higher. JMF3 is the approved mixture design used to produce Lot 2.
3. Contractor may request referee testing when values exceed these tolerances.
4. When within these tolerances, mixture production gradations may fall outside the master gradation limits; however, the % passing the #200 will be considered out of tolerance when outside the master gradation limits.
5. Verify that Table 8 requirements are met for VMA.

4.4.2.2. **Engineer’s Responsibilities.**

4.4.2.2.1. **Superpave Gyratory Compactor.** The Engineer will use a ~~third-party~~ Department SGC, calibrated in accordance with [Tex-241-F](#), to mold samples for laboratory mixture design verification. For molding trial batch and production specimens, the Engineer will use the Contractor-provided SGC at the field laboratory or provide and use a Department SGC at an alternate location.

4.4.2.2.2. **Conditional Approval of JMF1 and Authorizing Trial Batch.** The Engineer will review and verify conformance with the following information within 2 working days of receipt:

- the Contractor’s mix design report (JMF1);
- the Contractor-provided Hamburg wheel test results;
- all required materials including aggregates, asphalt, additives, and recycled materials; and
- the mixture specifications.

The Engineer will grant the Contractor conditional approval of JMF1 if the information provided on the paper copy of JMF1 indicates that the Contractor’s mixture design meets the specifications. When the Contractor does not provide Hamburg wheel test results with laboratory mixture design, 10 working days are allowed for conditional approval of JMF1. The Engineer will base full approval of JMF1 on the test results on mixture from the trial batch.

Unless waived, the Engineer will determine the Micro-Deval abrasion loss in accordance with Section 341.2.1.1.2., “Micro-Deval Abrasion.” If the Engineer’s test results are pending after 2 working days, conditional approval of JMF1 will still be granted within 2 working days of receiving JMF1. When the Engineer’s test results become available, they will be used for specification compliance.

The Contractor is authorized to produce a trial batch after the Engineer grants conditional approval of JMF1.

4.4.2.2.3. **Hamburg Wheel Testing of JMF1.** If the Contractor requests the option to have the Department perform the Hamburg wheel test on the laboratory mixture, the Engineer will mold samples in accordance with [Tex-242-F](#) to verify compliance with the Hamburg wheel test requirement shown in Table 10. Upon receiving the sample from the Contractor, the Engineer will be allowed 10 working days to provide the Contractor with Hamburg wheel test results on the laboratory mixture design.

4.4.2.2.4. **Ignition Oven Correction Factors.** The Engineer will determine ignition oven correction factors by one of the following options.

- Witness the mixing of ignition oven correction factor samples by the Contractor in accordance with [Tex-236-F](#), Part III. The Engineer will use the identically prepared samples provided by the Contractor to determine the aggregate and asphalt correction factors for the ignition oven in accordance with [Tex-236-F](#), Part II.

- If the Engineer does not witness the mixing of ignition oven correction factor samples, the Engineer will prepare the samples to determine the aggregate and asphalt correction factors for the ignition oven in accordance with [Tex-236-F](#), Part II. Notify the Contractor before performing [Tex-236-F](#), Part II. Allow the Contractor to witness the Engineer performing [Tex-236-F](#), Part II.

Correction factors must be performed every 12 mo. to be used for QA testing during production.

- 4.4.2.2.5. **Testing the Trial Batch.** Within 1 full working day, the Engineer will sample and test the trial batch to ensure that the mixture meets the requirements shown in Table 11. If the Contractor requests the option to have the Department perform the Hamburg wheel test on the trial batch mixture, the Engineer will mold samples in accordance with [Tex-242-F](#) to verify compliance with the Hamburg wheel test requirement shown in Table 10.

The Engineer will have the option to perform the following tests on the trial batch.

- [Tex-226-F](#), to verify that the indirect tensile strength meets the requirement shown in Table 9.
- [Tex-530-C](#), to retain and use for comparison purposes during production.

- 4.4.2.2.6. **Full Approval of JMF1.** The Engineer will grant full approval of JMF1 and authorize the Contractor to proceed with developing JMF2 if the Engineer's results for the trial batch meet the requirements shown in Tables 8, 9, and 10. The Engineer will notify the Contractor that an additional trial batch is required if the trial batch does not meet these requirements.

- 4.4.2.2.7. **Approval of JMF2.** The Engineer will approve JMF2 within 1 working day if the mixture meets the requirements shown in Table 5 and Table 8. The asphalt binder content established for JMF2 is not required to be within any tolerance of the optimum asphalt binder content established for JMF1; however, mixture produced using JMF2 must meet the VMA requirements shown in Table 8. If the optimum asphalt binder content for JMF2 is more than 0.5% lower than the optimum asphalt binder content for JMF1, the Engineer may perform or require the Contractor to perform [Tex-226-F](#) on Lot 1 production to confirm the indirect tensile strength does not exceed 200 psi.

- 4.4.2.2.8. **Approval of Lot 1 Production.** The Engineer will authorize the Contractor to proceed with JMF2 for Lot 1 production after a passing Hamburg wheel test result on the trial batch is achieved from a laboratory listed on the MPL. The Contractor may proceed at their own risk with Lot 1 production without the results from the Hamburg wheel test on the trial batch.

If the Department-approved laboratory's sample from the trial batch fails the Hamburg wheel test, the Engineer will suspend production until further Hamburg wheel tests meet the specified values. The Engineer may require up to the entire subplot of any mixture failing the Hamburg wheel test be removed and replaced at the Contractor's expense.

- 4.4.2.2.9. **Approval of JMF3 and Subsequent JMF Changes.** JMF3 and subsequent JMF changes are approved if they meet the mixture requirements shown in Table 4 and Table 5, and the master gradation limits shown in Table 8, and they are within the operational tolerances of JMF2 shown in Table 11. The addition of a WMA additive to facilitate mixing or as a compaction aid does not require a new laboratory mixture design or trial batch. Current JMF changes that exceed the operational tolerances of JMF2 in accordance with Table 11 may require a new laboratory mixture design, trial batch, or both.

- 4.5. **Production Operations.** Perform a new trial batch when the plant or plant location is changed. All source changes for asphalt will require a passing Hamburg wheel test result from a laboratory listed on

the MPL. The Contractor may proceed at their own risk with Lot 1 production without the results from the Hamburg wheel test on the trial batch. All aggregate source changes will require a new laboratory mixture design and trial batch. Take corrective action and receive approval to proceed after any production suspension for noncompliance with the specification. Submit a new mix design and perform a new trial batch when the asphalt binder content of:

- any RAP stockpile used in the mix is more than 0.5% higher than the value shown in the mixture design report, or
- RAS stockpile used in the mix is more than 2.0% higher than the value shown in the mixture design report.

4.5.1. **Storage and Heating of Materials.** Do not heat the asphalt binder above the temperatures specified in Item 300, or outside the manufacturer's recommended values. Provide the Engineer with daily records of asphalt binder and HMA discharge temperatures (in legible and discernible increments) in accordance with Item 320, unless otherwise directed. Do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr. unless otherwise approved.

4.5.2. **Mixing and Discharge of Materials.** Notify the Engineer of the target discharge temperature and produce the mixture within 25°F of the target. Monitor the temperature of the material in the truck before shipping to ensure that it does not exceed the maximum production temperatures shown in Table 12. The Department will not pay for or allow placement of any mixture produced above the maximum production temperatures shown in Table 12.

Table 12
Max Production Temperature

High-Temperature Binder Grade ¹	Max Production Temperature (°F)
PG 64	325 ²
PG 70	335 ²
PG 76	345 ²

1. The high-temperature binder grade refers to the high- temperature grade of the virgin asphalt binder used to produce the mixture.
2. The Max production temperature of WMA is 275°F.

Produce WMA within the target discharge temperature range of 215–275°F when WMA is required. Take corrective action anytime the discharge temperature of the WMA exceeds the target discharge range. The Engineer may suspend production operations if the Contractor's corrective action is not successful at controlling the production temperature within the target discharge range. Note that when WMA is produced, it may be necessary to adjust burners to ensure complete combustion such that no burner fuel residue remains in the mixture.

Control the mixing time and temperature so that substantially all moisture is removed from the mixture before discharging from the plant. Determine the moisture content, if requested, by oven-drying in accordance with [Tex-212-F](#), Part II, and verify that the mixture contains no more than 0.2% of moisture by weight. Obtain the sample immediately after discharging the mixture into the truck and perform the test promptly.

4.6. **Hauling Operations.** Clean all truck beds before use to ensure that mixture is not contaminated. Use a release agent listed on the MPL to coat the inside bed of the truck when necessary. Do not use diesel or any release agent not listed on the MPL.

Use equipment for hauling as defined in Section 341.4.7.3.3., "Hauling Equipment." Use other hauling equipment only when allowed.

- 4.7. **Placement Operations.** Collect haul tickets from each load of mixture delivered to the project and provide the Department's copy to the Engineer approximately every hour, or as directed. Use a handheld thermal camera or infrared thermometer, when a thermal imaging system is not used, to measure and record the internal temperature of the mixture as discharged from the truck or material transfer device (MTD) before or as the mix enters the paver. Measure the mixture temperature at a minimum frequency of one per ten trucks, or as approved. Include an approximate station number or Global Positioning System coordinates of the location where the temperature was taken on each ticket. Ensure the mixture meets the temperature requirements shown in Table 12. Calculate the daily yield and cumulative yield for the specified lift and provide to the Engineer at the end of paving operations for each day unless otherwise directed. The Engineer may suspend production if the Contractor fails to produce and provide haul tickets and yield calculations by the end of paving operations for each day.

Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. Offset longitudinal joints of successive courses of hot mix by at least 6 in. Place mixture so that longitudinal joints on the surface course coincide within 6 in. of lane lines, are not placed in the wheel path, or will not be covered with pavement markings, or as directed. Ensure that all finished surfaces will drain properly. Place the mixture at the rate or thickness shown on the plans. The Engineer will use the guidelines shown in Table 13 to determine the compacted lift thickness of each layer when multiple lifts are required. The thickness determined is based on the rate of 110 lb. per square yard for each inch of pavement, unless otherwise shown on the plans.

**Table 13
Compacted Lift Thickness and Required Core Height**

Mixture Type	Compacted Lift Thickness Guidelines		Min Untrimmed Core Height Eligible for Testing (in.)
	Min (in.)	Max (in.)	
DG-B	2.50	5.00	1.75
DG-C	2.00	4.00	1.50
DG-D	1.50	3.00	1.25
DG-F	1.25	2.50	1.25

- 4.7.1. **Weather Conditions.**

- 4.7.1.1. **When Using a Thermal Imaging System.** Place mixture when the roadway surface is dry and the roadway surface temperature is at or above the temperatures shown in Table 14A, unless otherwise approved or as shown on the plans. Place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable as determined by the Engineer. Provide output data from the thermal imaging system to demonstrate to the Engineer that no recurring severe thermal segregation exists in accordance with Section 341.4.7.3.1.2., "Thermal Imaging System."

**Table 14A
Min Pavement Surface Temperatures**

High-Temperature Binder Grade ¹	Min Pavement Surface Temperatures (°F)	
	Subsurface Layers	Surface Layers
PG 64	35	40

PG 70	45 ²	50 ²
PG 76	45 ²	50 ²

1. The high-temperature binder grade refers to the high-temperature grade of the virgin asphalt binder used to produce the mixture.
2. The Contractor may pave at temperatures 10°F lower than these values when a chemical WMA additive is used as a compaction aid in the mixture or when using WMA.

4.7.1.2.

When Not Using a Thermal Imaging System. When using a thermal camera instead of the thermal imaging system, place mixture when the roadway surface temperature is at or above the temperatures shown in Table 14B, unless otherwise approved or as shown on the plans. Measure the roadway surface temperature using a handheld thermal camera or infrared thermometer. The Engineer may allow mixture placement to begin before the roadway surface reaches the required temperature if conditions are such that the roadway surface will reach the required temperature within 2 hr. of beginning placement operations. Place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable as determined by the Engineer.

**Table 14B
Min Pavement Surface Temperatures**

High-Temperature Binder Grade ¹	Min Pavement Surface Temperatures (°F)	
	Subsurface Layers	Surface Layers
PG 64	45	50
PG 70	55 ²	60 ²
PG 76	60 ²	60 ²

1. The high-temperature binder grade refers to the high-temperature grade of the virgin asphalt binder used to produce the mixture.
2. The Contractor may pave at temperatures 10°F lower than these values when a chemical WMA additive is used as a compaction aid in the mixture, when using WMA, or when using a paving process with equipment that eliminates thermal segregation. In such cases, for each subplot and in the presence of the Engineer, use a handheld thermal camera operated in accordance with [Tex-244-F](#) to demonstrate to the satisfaction of the Engineer that the uncompacted mat has no more than 10°F of thermal segregation.

4.7.2. **Tack Coat.**

4.7.2.1.

Application. Clean the surface before placing the tack coat. ~~The Engineer will set the rate between 0.04 and 0.10 gal. of residual asphalt per square yard of surface area.~~ Apply a uniform tack coat at the specified rate ~~from Item P-603~~ unless otherwise directed. Apply the tack coat in a uniform manner to avoid streaks and other irregular patterns. Apply the tack coat to all surfaces that will come in contact with the subsequent HMA placement, unless otherwise directed. Apply adequate overlap of the tack coat in the longitudinal direction during placement of the mat to ensure bond of adjacent mats, unless otherwise directed. Allow adequate time for emulsion to break completely before placing any material. Prevent splattering of tack coat when placed adjacent to curb, gutter, and structures. Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use, unless required in conformance with the manufacturer's recommendation for approved TRAIL product use, or when shown on the plans.

4.7.2.2.

Sampling. The Engineer will obtain at least one sample of the tack coat binder per project per source in accordance with [Tex 500 C](#), Part III, and test it to verify compliance with Item 300. The Engineer will notify the Contractor when the sampling will occur and will witness the collection of the sample from the

asphalt distributor immediately before use. Label the can with the corresponding lot and subplot numbers, producer, producer facility location, grade, district, date sampled, all applicable bills of lading (if available), and project information, including highway and control section job (CSJ) number. For emulsions, the Engineer may test as often as necessary to ensure the residual of the emulsion is greater than or equal to the specification requirement in Item 300.

- 4.7.3. **Lay-Down Operations.** Use the placement temperatures shown in Table 15 to establish the minimum placement temperature of the mixture delivered to the paving operation.

Table 15
Min Mixture Placement Temperature

High-Temperature Binder Grade¹	Min Placement Temperature^{2,3,4} (°F)
PG 64	260
PG 70	270
PG 76	280

1. The high-temperature binder grade refers to the high-temperature grade of the virgin asphalt binder used to produce the mixture.
2. The mixture temperature must be measured using a handheld thermal camera or infrared thermometer immediately before entering MTD or paver.
3. Min placement temperatures may be reduced 20°F if using a chemical WMA additive as a compaction aid, MTD with remixing capabilities, or paver hopper insert with remixing capabilities.
4. When using WMA, the minimum placement temperature is 215°F.

- 4.7.3.1. **Thermal Profile.** Use a handheld thermal camera or a thermal imaging system to obtain a continuous thermal profile in accordance with [Tex-244-F](#). Thermal profiles are not applicable in areas described in Section 341.4.9.3.1.4., "Miscellaneous Areas."

4.7.3.1.1. **Thermal Segregation.**

- 4.7.3.1.1.1. **Moderate.** Any areas that have a temperature differential greater than 25°F, but not exceeding 50°F.

- 4.7.3.1.1.2. **Severe.** Any areas that have a temperature differential greater than 50°F.

- 4.7.3.1.2. **Thermal Imaging System.** Review the output results when a thermal imaging system is used, and provide the automated report described in [Tex-244-F](#) to the Engineer daily, unless otherwise directed. Modify the paving process as necessary to eliminate any recurring (moderate or severe) thermal segregation identified by the thermal imaging system.

The Engineer may suspend paving operations if the Contractor cannot successfully modify the paving process to eliminate recurring severe thermal segregation. Density profiles are not required and not applicable when using a thermal imaging system.

Provide the Engineer with electronic copies of all daily data files that can be used with the thermal imaging system software to generate temperature profile plots daily or as requested.

- 4.7.3.1.3. **Thermal Camera.** Provide the Engineer with the thermal profile of every subplot within 1 working day of the completion of each lot. When requested by the Engineer, provide the thermal images generated using the thermal camera. Report the results of each thermal profile in accordance with Section 341.4.2., "Reporting and Responsibilities." The Engineer will use a handheld thermal camera to obtain a thermal profile at least once per project.

Take immediate corrective action to eliminate recurring moderate thermal segregation when a handheld thermal camera is used.

Suspend operations and take immediate corrective action to eliminate severe thermal segregation unless otherwise directed. Resume operations when the Engineer determines that subsequent production will meet the requirements of this Section. No production or placement payment adjustments greater than 1.000 will be paid for any subplot that contains severe thermal segregation. Evaluate areas with severe thermal segregation by performing density profiles in accordance with Section 341.4.9.3.3.3., "Segregation (Density Profile)." Remove and replace the material in any areas that have severe thermal segregation and a failing result for segregation (density profile), unless otherwise directed. The subplot in question may receive a production and placement payment adjustment greater than 1.000, if applicable, when the defective material is successfully removed and replaced.

- 4.7.3.2. **Windrow Operations.** Operate windrow pickup equipment so that when hot mix is placed in windrows, substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.
- 4.7.3.3. **Hauling Equipment.** Use belly dump, live-bottom, or end dump trucks to haul and transfer mixture. Except for paving miscellaneous areas, end dump trucks are allowed only when used in conjunction with an MTD with remixing capability or when a thermal imaging system is used, unless otherwise approved.
- 4.7.3.4. **Screed Heaters.** Turn off screed heaters to prevent overheating of the mat if the paver stops for more than 5 min. The Engineer may evaluate the suspect area in accordance with Section 341.4.9.3.3.5., "Recovered Asphalt Dynamic Shear Rheometer (DSR)," if the screed heater remains on for more than 5 min. while the paver is stopped.
- 4.8. **Compaction.** Compact the pavement uniformly to contain between 3.8% and 8.5% in-place air voids. Take immediate corrective action to bring the operation within 3.8% and 8.5% when the in-place air voids exceed the range of these tolerances. The Engineer will allow paving to resume when the proposed corrective action is likely to yield between 3.8% and 8.5% in-place air voids.

Obtain cores in areas placed under exempt production, as directed, at locations determined by the Engineer. Contractor is - at his own expense - to cut the cores in the presence of the RPR, and turn over the cores to the Engineer. The Engineer may test these cores and suspend operations or require removal and replacement if the in-place air voids are less than 2.7% or more than 9.9%. Areas defined in Section 341.4.9.3.1.4., "Miscellaneous Areas," are not subject to in-place air void determination.

Furnish the type, size, and number of rollers necessary to ensure desired compaction. Use additional rollers as required to remove any roller marks. Use only water or an approved release agent on rollers, tamps, and other compaction equipment unless otherwise directed.

Use the control strip method shown in [Tex-207-F](#), Part IV, on the first day of production to establish the rolling pattern that will produce the desired in-place air voids, unless otherwise directed.

Use tamps to thoroughly compact the edges of the pavement along curbs, headers, and similar structures and in locations that will not allow thorough compaction using rollers. The Engineer may require rolling using a trench roller on widened areas, in trenches, and in other limited areas.

Complete all compaction operations using breakdown rollers before the pavement temperature drops below 180°F, unless otherwise allowed. Compaction using a pneumatic or light finish roller operated in static mode is allowed for pavement temperatures above 160°F.

Allow the compacted pavement to cool to 160°F or lower before opening to traffic, unless otherwise directed. Sprinkle the finished mat with water or limewater, when directed, to expedite opening the roadway to traffic.

- 4.9. **Acceptance Plan.** Payment adjustments for the material will be in accordance with Article 341.6., "Payment."

Sample and test the hot mix on a lot and subplot basis. Suspend production if the production payment factor shown in Section 341.6.1., "Production Payment Adjustment Factors," or the placement payment factor shown in Section 341.6.2., "Placement Payment Adjustment Factors," for two consecutive lots is below 1.000. Resume production once test results or other information indicates to the satisfaction of the Engineer that the next material produced or placed will result in payment factors of at least 1.000.

- 4.9.1. **Referee Testing.** The Materials and Tests Division is the referee laboratory. The Contractor may request referee testing if a "remove and replace" condition is determined based on the Engineer's test results, or if the differences between Contractor and Engineer test results exceed the maximum allowable difference in accordance with Table 11 and the differences cannot be resolved. The Contractor may also request referee testing if the Engineer's test results require suspension of production and the Contractor's test results are within specification limits. Make the request within 5 working days after receiving test results and cores from the Engineer. Referee tests will be performed only on the subplot in question and only for the tests in question. Allow 10 working days from the time the referee laboratory receives the samples for test results to be reported. The Department may require the Contractor to reimburse the Department for referee tests if more than three referee tests per project are required and the Engineer's test results are closer to the referee test results than the Contractor's test results.

The Materials and Tests Division will determine the laboratory-molded density based on the molded specific gravity and the maximum theoretical specific gravity of the referee sample. The in-place air voids will be determined based on the bulk specific gravity of the cores, as determined by the referee laboratory, and the Engineer's average maximum theoretical specific gravity for the lot. Except for "remove and replace" conditions, referee test results are final and will establish payment adjustment factors for the subplot in question. The Contractor may decline referee testing and accept the Engineer's test results when the placement payment adjustment factor for any subplot results in a "remove and replace" condition. Placement sublots subject to be removed and replaced will be further evaluated in accordance with Section 341.6.2.2., "Placement Sublots Subject to Removal and Replacement."

- 4.9.2. **Production Acceptance.**

- 4.9.2.1. **Production Lot.** A production lot consists of four equal sublots. The default quantity for Lot 1 is 1,000 ton; however, when requested by the Contractor, the Engineer may increase the quantity for Lot 1 to no more than 4,000 ton. The Engineer will select subsequent lot sizes based on the anticipated daily production such that approximately three–four sublots are produced each day. The lot size will be between 1,000 ton and 4,000 ton. The Engineer may change the lot size before the Contractor begins any lot.

If the optimum asphalt binder content for JMF2 is more than 0.5% lower than the optimum asphalt binder content for JMF1, the Engineer may perform or require the Contractor to perform [Tex-226-F](#) on Lot 1 to confirm the indirect tensile strength does not exceed 200 psi. Take corrective action to bring the mixture within specification compliance if the indirect tensile strength exceeds 200 psi, unless otherwise directed.

4.9.2.1.1. **Incomplete Production Lots.** If a lot is begun but cannot be completed, such as on the last day of production or in other circumstances deemed appropriate, the Engineer may close the lot. Adjust the payment for the incomplete lot in accordance with Section 341.6.1., "Production Payment Adjustment Factors." Close all lots within 5 working days unless otherwise allowed.

4.9.2.2. **Production Sampling.**

4.9.2.2.1. **Mixture Sampling.** The Engineer will perform or witness the sampling of production sublots from trucks at the plant in accordance with [Tex-222-F](#). The sampler will split each sample into three equal portions in accordance with [Tex-200-F](#) and label these portions as "Contractor," "Engineer," and "Referee." The Engineer will perform or witness the sample splitting and take immediate possession of the samples labeled "Engineer" and "Referee." The Engineer will maintain the custody of the samples labeled "Engineer" and "Referee" until the Department's testing is completed.

4.9.2.2.1.1. **Random Sample.** At the beginning of the project, the Engineer will select random numbers for all production sublots. Determine sample locations in accordance with [Tex-225-F](#). Take one sample for each subplot at the randomly selected location. The Engineer will perform or witness the sampling of production sublots.

4.9.2.2.1.2. **Blind Sample.** For one subplot per lot, the Engineer will sample, split, and test a "blind" production sample instead of the random sample collected by the Contractor. The location of the Engineer's "blind" sample will not be disclosed to the Contractor before sampling. The Engineer's "blind" sample may be randomly selected in accordance with [Tex-225-F](#) for any subplot or selected at the discretion of the Engineer. The Engineer may sample and test an additional blind sample when the random sampling process does not result in obtaining a sample.

For one subplot per lot, the Contractor must obtain from the Engineer a "blind" production sample collected by the Engineer. If desired, the Contractor may witness the collection of blind samples. Test either the "blind" or the random sample; however, referee testing for the subplot (if applicable) will be based on a comparison of results from the "blind" sample.

4.9.2.2.2. **Asphalt Binder Sampling.** The Engineer will witness the Contractor obtain a 1-qt. sample of the asphalt binder for each lot of mixture produced. The Contractor will notify the Engineer when the sampling will occur. Obtain the sample at approximately the same time the mixture random sample is obtained. Sample from a port located immediately upstream from the mixing drum or pug mill and upstream from the introduction of any additives in accordance with [Tex-500-C](#), Part II. Label the can with the corresponding lot and subplot numbers, producer name, producer facility, grade, District, date sampled, all applicable bills of lading (if available), and project information, including highway and CSJ number. The Engineer will retain these samples for 1 yr. The Engineer may also obtain independent samples. If obtaining an independent asphalt binder sample and upon request of the Contractor, the Engineer will split a sample of the asphalt binder with the Contractor.

~~At least once per project, the Engineer will collect split samples of each binder grade and source used. The Engineer will submit one split sample to the Materials and Tests Division to verify compliance with Item 300, and will retain the other split sample for 1 yr.~~

4.9.2.3. **Production Testing.** The Contractor and Engineer must perform production tests shown in Table 16. The Contractor has the option to verify the Engineer’s test results on split samples provided by the Engineer. Determine compliance with operational tolerances shown in Table 11 for all sublots.

Take immediate corrective action if the Engineer’s laboratory-molded density on any subplot is less than 95.0% or greater than 97.0% to bring the mixture within these tolerances. The Engineer may suspend operations if the Contractor’s corrective actions do not produce acceptable results. The Engineer will allow production to resume when the proposed corrective action is likely to yield acceptable results.

The Engineer may allow alternate methods for determining the asphalt binder content and aggregate gradation if the aggregate mineralogy is such that [Tex-236-F](#), Part I does not yield reliable results. Provide evidence that results from [Tex-236-F](#), Part I are not reliable before requesting permission to use an alternate method unless otherwise directed. Use the applicable test procedure as directed if an alternate test method is allowed.

Table 16 Production and Placement Testing Frequency

Description	Test Method	Min Contractor Testing Frequency	Min Engineer Testing Frequency
Individual % retained on #8 sieve and larger	Tex-200-F or Tex-236-F	1 per subplot	1 per 12 sublots ¹
Individual % retained on sieves smaller than #8 and larger than #200			
% passing #200 sieve			
Laboratory-molded density	Tex-207-F	-	1 per subplot ¹
Laboratory-molded bulk specific gravity			
In-place air voids			
VMA	Tex-204-F		
Segregation (density profile)	Tex-207-F , Part V	1 per subplot ²	1 per project
Longitudinal joint density	Tex-207-F , Part VII	1 per subplot ³	1 per project
Moisture content	Tex-212-F , Part II	When directed	1 per project
Theoretical maximum specific (Rice) gravity	Tex-227-F	-	1 per subplot ¹
Asphalt binder content	Tex-236-F , Part I	1 per subplot	1 per lot ¹
Thermal profile	Tex-244-F	1 per subplot ²	1 per project
Hamburg wheel test	Tex-242-F	-	
Deleterious in RAS ⁴	Tex-217-F , Part III	-	
Asphalt binder sampling and testing ^{4,5}	Tex-500-C , Part II	-	
Tack coat sampling and testing	Tex-500-C , Part III	-	
Boil test ⁶	Tex-530-C	1 per lot	
Shear bond strength test ⁷	Tex-249-F	-	

1. For production defined in Section 341.4.9.4., “Exempt Production,” the Engineer will perform one test per day if 100 ton or more is produced. For exempt production, no testing is required when < 100 ton is produced.
2. To be performed in the presence of the Engineer when not using the thermal imaging system, unless otherwise approved.
3. To be performed in the presence of the Engineer.
4. Testing performed by the Materials and Tests Division or designated laboratory.

5. Sampling performed by the Contractor. The Engineer will witness sampling and retain the samples for 1 yr.
6. When shown on the plans.
7. Testing performed by the Materials and Tests Division or District for informational purposes on a sample obtained by the Contractor within the first four lots of the project.

4.9.2.4. **Operational Tolerances.** Control the production process within the operational tolerances shown in Table 11. When production is suspended, the Engineer will allow production to resume when test results or other information indicates the next mixture produced will be within the operational tolerances.

4.9.2.4.1. **Gradation.** Suspend operation and take corrective action if any aggregate is retained on the maximum sieve size shown in Table 8. A subplot is defined as out of tolerance if either the Engineer's or the Contractor's test results are out of operational tolerance. Suspend production when test results for gradation exceed the operational tolerances shown in Table 11 for three consecutive sublots on the same sieve or four consecutive sublots on any sieve, unless otherwise directed. The consecutive sublots may be from more than one lot.

4.9.2.4.2. **Asphalt Binder Content.** A subplot is defined as out of operational tolerance if either the Engineer's or the Contractor's test results exceed the values shown in Table 11. No production or placement payment adjustments greater than 1.000 will be paid for any subplot that is out of operational tolerance for asphalt binder content. Suspend production and shipment of the mixture if the Engineer's or the Contractor's asphalt binder content deviates from the current JMF by more than 0.5% for any subplot.

4.9.2.4.3. **VMAs.** The Engineer will determine the VMA for every subplot. For sublots when the Engineer does not determine asphalt binder content, the Engineer will use the asphalt binder content results from QC testing performed by the Contractor to determine VMA.

Take immediate corrective action if the VMA value for any subplot is less than the minimum VMA requirement for production shown in Table 8. Suspend production and shipment of the mixture if the Engineer's VMA results on two consecutive sublots are below the minimum VMA requirement for production shown in Table 8. No production or placement payment adjustments greater than 1.000 will be paid for any subplot that does not meet the minimum VMA requirement for production shown in Table 8 based on the Engineer's VMA determination.

Suspend production and shipment of the mixture if the Engineer's VMA result is more than 0.5% below the minimum VMA requirement for production shown in Table 8. In addition to suspending production, the Engineer may require removal and replacement or may allow the subplot to be left in place without payment.

4.9.2.4.4. **Hamburg Wheel Test.** The Engineer may perform a Hamburg wheel test on plant-produced mixture anytime during production. Suspend production until further Hamburg wheel tests meet the specified values when the production samples fail the Hamburg wheel test criteria shown in Table 10. The Engineer may require up to the entire subplot of any mixture failing the Hamburg wheel test to be removed and replaced at the Contractor's expense.

If the Department-approved laboratory's Hamburg wheel test on plant-produced mixture results in a "remove and replace" condition, the Contractor may request that the Materials and Tests Division determine the final disposition of the material in question by re-testing the failing material.

4.9.2.5. **Individual Loads of Hot Mix.** The Engineer may reject individual truckloads of hot mix. When a load of hot mix is rejected for reasons other than temperature, contamination, or excessive uncoated particles, the Contractor may request that the rejected load be tested. Make this request within 4 hr. of rejection.

The Engineer will sample and test the mixture. If test results are within the operational tolerances shown in Table 11, payment will be made for the load. If test results are not within operational tolerances, no payment will be made for the load.

4.9.3. **Placement Acceptance.**

4.9.3.1. **Placement Lot.** A placement lot consists of four placement sublots. A placement subplot consists of the area placed during a production subplot.

4.9.3.1.1. **Lot 1 Placement.** Placement payment adjustments greater than 1.000 for Lot 1 will be in accordance with Section 341.6.2., "Placement Payment Adjustment Factors"; however, no placement adjustment less than 1.000 will be assessed for any subplot placed in Lot 1 when the in-place air voids are greater than or equal to 2.7% and less than or equal to 9.9%. Remove and replace any subplot with in-place air voids less than 2.7% or greater than 9.9%.

4.9.3.1.2. **Incomplete Placement Lots.** An incomplete placement lot consists of the area placed as described in Section 341.4.9.2.1.1., "Incomplete Production Lots," excluding areas defined in Section 341.4.9.3.1.4., "Miscellaneous Areas." Placement sampling is required if the random sample plan for production resulted in a sample being obtained from an incomplete production subplot.

4.9.3.1.3. **Shoulders, Ramps, Etc.** Shoulders, ramps, intersections, acceleration lanes, deceleration lanes, and turn lanes are subject to in-place air void determination and payment adjustments unless shown on the plans as not eligible for in-place air void determination. Intersections may be considered miscellaneous areas when determined by the Engineer.

4.9.3.1.4. **Miscellaneous Areas.** Miscellaneous areas include areas that typically involve significant handwork or discontinuous paving operations, such as temporary detours, driveways, mailbox turnouts, crossovers, gores, spot level-up areas, pavement repair sections less than 300 ft., and other similar areas. Temporary detours are subject to in-place air void determination when shown on the plans. Miscellaneous areas also include level-ups and thin overlays when the layer thickness shown on the plans is less than the minimum untrimmed core height eligible for testing in accordance with Table 13. The specified layer thickness is based on the rate of 110 lb. per square yard for each inch of pavement unless another rate is shown on the plans. When "Level Up" is listed as part of the bid item description, a payment adjustment factor of 1.000 will be assigned for all placement sublots as described in Article 341.6., "Payment." Miscellaneous areas are not eligible for random placement sampling locations. Compact miscellaneous areas in accordance with Section 341.4.8., "Compaction." Miscellaneous areas are not subject to in-place air void determination, thermal profiles testing, segregation (density profiles), or longitudinal joint density evaluations.

4.9.3.2. **Placement Sampling.** The Engineer will select random numbers for all placement sublots at the beginning of the project. The Engineer will provide the Contractor with the placement random numbers only immediately after the subplot is completed. Mark the roadway location at the completion of each subplot and record the station number. Determine one random sample location for each placement subplot in accordance with [Tex-225-F](#). Adjust the random sample location by no more than necessary to achieve a 2-ft. clearance if the location is within 2 ft. of a joint or pavement edge.

Shoulders, ramps, intersections, acceleration lanes, deceleration lanes, and turn lanes are always eligible for selection as a random sample location; however, if a random sample location falls on one of these areas and the area is shown on the plans as not subject to in-place air void determination, cores will not be taken for the subplot and a 1.000 pay factor will be assigned to that subplot.

Provide the equipment and means to obtain and trim roadway cores onsite. Onsite is defined as in close proximity to where the cores are taken. Obtain the cores within 1 working day of the time the placement subplot is completed, unless otherwise approved. Obtain two 6-in. diameter cores side-by-side from within 1 ft. of the random location provided for the placement subplot. Mark the cores for identification, measure and record the untrimmed core height, and provide the information to the Engineer. The Engineer will witness the coring operation and measurement of the core thickness. Visually inspect each core and verify that the current paving layer is bonded to the underlying layer. Take corrective action if an adequate bond does not exist between the current and underlying layer to ensure that an adequate bond will be achieved during subsequent placement operations.

Trim the cores immediately after obtaining them from the roadway in accordance with [Tex-251-F](#) if the core heights meet the minimum untrimmed value in accordance with Table 13. Trim the cores onsite in the presence of the Engineer. Use a permanent marker or paint pen to record the lot and subplot numbers on each core, as well as the designation as Core A or Core B. The Engineer may require additional information to be marked on the core and may choose to sign or initial the core. The Engineer will take custody of the cores immediately after witnessing the trimming of the cores and will retain custody of the cores until the Department's testing is completed. Before turning the trimmed cores over to the Engineer, the Contractor may wrap the trimmed cores or secure them in a manner that will reduce the risk of possible damage occurring during transport by the Engineer. After testing, the Engineer will return the cores to the Contractor.

The Engineer may have the cores transported back to the Department's laboratory at the HMA plant via the Contractor's haul truck or other designated vehicle. In such cases where the cores will be out of the Engineer's possession during transport, the Engineer will use Department-provided security bags and the Protocol for Roadway Core Custody located on the Department's website to provide a secure means and process that protect the integrity of the cores during transport.

Decide whether to include the pair of cores in the air void determination for that subplot if the core height before trimming is less than the minimum untrimmed value shown in Table 13. Trim the cores in accordance with [Tex-251-F](#) before delivering to the Engineer if electing to have the cores included in the air void determination. If electing to not have the cores included in air void determination, inform the Engineer of the decision, and deliver untrimmed cores to the Engineer. The placement pay factor for the subplot will be 1.000 if cores will not be included in air void determination.

Instead of the Contractor trimming the cores onsite immediately after coring, the Engineer and the Contractor may mutually agree to have the trimming operations performed at an alternate location, such as a field laboratory or other similar location. In such cases, the Engineer will take possession of the cores immediately after they are obtained from the roadway and will retain custody of the cores until testing is completed. Either the Department or Contractor representative may perform trimming of the cores. The Engineer will witness all trimming operations in cases where the Contractor representative performs the trimming operation.

Dry the core holes and tack the sides and bottom immediately after obtaining the cores. Fill the hole with the same type of mixture and properly compact the mixture. Repair core holes using other methods when approved.

- 4.9.3.3. **Placement Testing.** Perform placement tests in accordance with Table 16. At the Contractor's option and at his own cost. ~~After the Engineer returns the cores,~~ the Contractor may retrieve and test the cores to verify the Engineer's test results for in-place air voids. The allowable differences between the Contractor's and Engineer's test results are shown in Table 11.

4.9.3.3.1. **In-Place Air Voids.** The Engineer will measure in-place air voids in accordance with [Tex-207-F](#) and [Tex-227-F](#). Before drying to a constant weight, cores may be pre-dried using a CoreDry or similar vacuum device to remove excess moisture. The Engineer will average the values obtained for all sublots in the production lot to determine the theoretical maximum specific gravity. The Engineer will use the average air void content for in-place air voids.

The Engineer will use the vacuum method to seal the core if required in accordance with [Tex-207-F](#). The Engineer will use the test results from the unsealed core to determine the placement payment adjustment factor if the sealed core yields a higher specific gravity than the unsealed core. After determining the in-place air void content, the Engineer will return the cores and provide test results to the Contractor.

4.9.3.3.2. **Informational Shear Bond Strength Testing.** The Engineer will select one random subplot within the first four lots of the project for shear bond strength testing. Obtain full-depth cores in accordance with [Tex-249-F](#) unless the HMA is being placed directly on concrete pavement. Label the cores with lot and subplot numbers and provide to the Engineer. Inspector must use pertinent Department form to document the CSJ number, producer of the tack coat, mix type, and shot rate. The Engineer will ship the cores to the Materials and Tests Division or District laboratory for shear bond strength testing. Results from these tests will not be used for specification compliance.

4.9.3.3.3. **Segregation (Density Profile).** Test for segregation using density profiles in accordance with [Tex-207-F](#), Part V. Density profiles are not required and are not applicable when using a thermal imaging system. Density profiles are not applicable in areas described in Section 341.4.9.3.1.4., "Miscellaneous Areas."

Perform at least one density profile per subplot. Perform additional density profiles when any of the following conditions occur, unless otherwise approved:

- areas that are identified by either the Contractor or the Engineer with severe thermal segregation,
- any visibly segregated areas that exist,
- the paver stops due to lack of material being delivered to the paving operations and the temperature of the uncompacted mat before the initial breakdown rolling is less than the temperatures shown in Table 17.

Table 17
Min Uncompacted Mat Temperature Requiring Segregation Profile¹

High-Temperature Binder Grade ²	Min Temperature of Uncompacted Mat Allowed Before Initial Breakdown Rolling ^{3,4,5} (°F)
PG 64	<250
PG 70	<260
PG 76	<270

1. Applicable only to paver stops that occur due to lack of material being delivered to the paving operations and when not using a thermal imaging system.
2. The high-temperature binder grade refers to the high-temperature grade of the virgin asphalt binder used to produce the mixture.
3. The surface of the uncompacted mat must be measured using a handheld thermal camera or infrared thermometer.

4. Min uncompacted mat temperature requiring a segregation profile may be reduced 20°F if using a chemical WMA additive as a compaction aid, MTD with remixing capabilities, or paver hopper insert with remixing capabilities.
5. When using WMA, the Min uncompacted mat temperature requiring a segregation profile is 215°F.

Provide the Engineer with the density profile of every subplot in the lot within 1 working day of the completion of each lot. Report the results of each density profile in accordance with Section 341.4.2., "Reporting and Responsibilities."

The density profile is considered failing if it exceeds the tolerances shown in Table 18. When a thermal imaging system is not used, the Engineer will measure the density profile at least once per project. The Engineer's density profile results will be used when available. The Engineer may require the Contractor to remove and replace the area in question if the area fails the density profile and has surface irregularities as defined in Section 341.4.9.3.3.6., "Irregularities." The subplot in question may receive a production and placement payment adjustment greater than 1.000, if applicable, when the defective material is successfully removed and replaced.

Investigate density profile failures and take corrective actions during production and placement to eliminate the segregation. Suspend production if two consecutive density profiles fail unless otherwise approved. Resume production after the Engineer approves changes to production or placement methods.

**Table 18
Segregation (Density Profile) Acceptance Criteria**

Mixture Type	Max Allowable Density Range (highest to lowest, pcf)	Max Allowable Density Range (average to lowest, pcf)
DG-B	8.0	5.0
DG-C, DG-D, and DG-F	6.0	3.0

4.9.3.3.4. **Longitudinal Joint Density.**

4.9.3.3.4.1. **Informational Tests.** Perform joint density evaluations while establishing the rolling pattern and verify that the joint density is no more than 3.0 pcf below the density taken at or near the center of the mat. Adjust the rolling pattern, if needed, to achieve the desired joint density. Perform additional joint density evaluations, at least once per subplot, unless otherwise directed.

4.9.3.3.4.2. **Record Tests.** Perform a joint density evaluation for each subplot at each pavement edge that is or will become a longitudinal joint. Joint density evaluations are not applicable in areas described in Section 341.4.9.3.1.4., "Miscellaneous Areas." Determine the joint density in accordance with [Tex-207-E](#), Part VII. Record the joint density information and submit results on Department forms to the Engineer. The evaluation is considered failing if the joint density is more than 3.0 pcf below the density taken at the core random sample location and the correlated joint density is less than 90.0%. The Engineer will make independent joint density verification at least once per project and may make independent joint density verifications at the random sample locations. The Engineer's joint density test results will be used when available.

Provide the Engineer with the joint density of every subplot in the lot within 1 working day of the completion of each lot. Report the results of each joint density in accordance with Section 341.4.2., "Reporting and Responsibilities."

Investigate joint density failures and take corrective actions during production and placement to improve the joint density. Suspend production if the evaluations on two consecutive sublots fail, unless otherwise approved. Resume production after the Engineer approves changes to production or placement methods.

4.9.3.3.5. **Recovered Asphalt Dynamic Shear Rheometer (DSR).** The Engineer may take production samples or cores from suspect areas of the project to determine recovered asphalt properties. Asphalt binders with an aging ratio greater than 3.5 do not meet the requirements for recovered asphalt properties and may be deemed defective when tested and evaluated by the Materials and Tests Division. The aging ratio is the DSR value of the extracted binder divided by the DSR value of the original unaged binder. Obtain DSR values in accordance with AASHTO T 315 at the specified high-temperature PG of the asphalt. The Engineer may require removal and replacement of the defective material at the Contractor's expense. The asphalt binder will be recovered for testing from production samples or cores in accordance with [Tex-211-F](#).

4.9.3.3.6. **Irregularities.** Identify and correct irregularities, including segregation, rutting, raveling, flushing, fat spots, mat slippage, irregular color, irregular texture, roller marks, tears, gouges, streaks, uncoated aggregate particles, or broken aggregate particles. The Engineer may also identify irregularities, and in such cases, the Engineer will promptly notify the Contractor. If the Engineer determines that the irregularity will adversely affect pavement performance, the Engineer may require the Contractor to remove and replace (at the Contractor's expense) areas of the pavement that contain irregularities. The Engineer may also require the Contractor to remove and replace (at the Contractor's expense) areas where the mixture does not bond to the existing pavement.

If irregularities are detected, the Engineer may require the Contractor to immediately suspend operations or may allow the Contractor to continue operations for no more than 1 day while the Contractor is taking appropriate corrective action.

4.9.4. **Exempt Production.** The mixture may be deemed as exempt production when mutually agreed upon between the Engineer and the Contractor, or when shown on the plans. Exempt production may be used for the following conditions.

- Anticipated daily production is less than 500 ton.
- Total production for the project is less than 5,000 ton.
- Pavement repair sections are equal to or greater than 300 ft. For pavement repair sections less than 300 ft., refer to Section 341.4.9.3.1.4., "Miscellaneous Areas."

Exempt production is not eligible for referee testing. For exempt production, the Contractor is relieved of all production and placement QC and QA sampling and testing requirements, except for coring operations when required by the Engineer. When mutually agreed upon between the Engineer and the Contractor, production sampling will be allowed at the point of delivery. When 100 ton or more per day is produced, the Engineer must perform acceptance tests for production and placement in accordance with Table 16. If the specification requirements listed below are met, the production and placement pay factors are 1.000:

- produce, haul, place, and compact the mixture in compliance with the specification and as directed;
- control mixture production to yield a laboratory-molded density that is within $\pm 1.0\%$ of the target laboratory-molded density as tested by the Engineer;
- compact the mixture in accordance with Section 341.4.8., "Compaction;"

- when a thermal imaging system is not used, the Engineer may perform segregation (density profiles) and thermal profiles in accordance with the specification; and
- all other specification requirements.

4.9.5. **Ride Quality.** Measure ride quality in accordance with Item 585, "Ride Quality for Pavement Surfaces," unless otherwise shown on the plans.

5. MEASUREMENT

5.1. **Dense-Graded HMA.** Hot mix will be measured by the ton of composite hot mix, which includes asphalt, aggregate, and additives. Measure the weight on scales in accordance with Item 520, "Weighing and Measuring Equipment."

~~5.2. **Tack Coat.** Tack coat will be measured at the applied temperature by strapping the tank before and after road application and determining the net volume in gallons from the calibrated distributor. The Engineer will witness all strapping operations for volume determination. All tack, including emulsions, will be measured by the gallon applied.~~

The Engineer may allow the use of a metering device to determine asphalt volume used and application rate if the device is accurate within 1.5% of the strapped volume.

6. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under Section 341.5.1., "Dense-Graded HMA," will be paid for at the unit price bid for "Dense-Graded Hot-Mix Asphalt" of the mixture type, SAC, and binder specified. These prices are full compensation for surface preparation, materials, placement, equipment, labor, tools, and incidentals.

The work performed and materials furnished in accordance with this Item and measured as provided under Section 341.5.2., "Tack Coat," will be paid for at the unit price bid for "Tack Coat" of the tack coat provided. These prices are full compensation for materials, placement, equipment, labor, tools, and incidentals.

Payment adjustments will be applied as determined in accordance with this Item; however, a payment adjustment factor of 1.000 will be assigned for all placement sublots for level-ups only when "Level Up" is listed as part of the bid item description. A payment adjustment factor of 1.000 will be assigned to all production and placement sublots when "Exempt" is listed as part of the bid item description, and all testing requirements are met.

Payment for each subplot, including applicable payment adjustments greater than 1.000, will be paid only for sublots when the Contractor supplies the Engineer with the required documentation for production and placement QC and QA, thermal profiles, segregation density profiles, and longitudinal joint densities in accordance with Section 341.4.2., "Reporting and Responsibilities." When a thermal imaging system is used, documentation is not required for segregation density profiles on individual sublots; however, the thermal imaging system automated reports described in [Tex-244-F](#) are required.

Trial batches will not be paid for unless they are included in pavement work approved by the Department. Payment adjustment for ride quality will be determined in accordance with Item 585.

6.1. **Production Payment Adjustment Factors.** The production payment adjustment factor is based on the laboratory-molded density using the Engineer's test results. The bulk specific gravities of the samples from each subplot will be divided by the Engineer's maximum theoretical specific gravity for the subplot.

The individual sample densities for the subplot will be averaged to determine the production payment adjustment factor in accordance with Table 19 for each subplot, using the deviation from the target laboratory-molded density in accordance with Table 9. The production payment adjustment factor for completed lots will be the average of the payment adjustment factors for the four sublots sampled within that lot.

Table 19
Production Payment Adjustment Factors for Laboratory-Molded Density¹

Absolute Deviation from Target Laboratory-Molded Density	Production Payment Adjustment Factor (Target Laboratory-Molded Density)
0.0	1.050
0.1	1.050
0.2	1.050
0.3	1.044
0.4	1.038
0.5	1.031
0.6	1.025
0.7	1.019
0.8	1.013
0.9	1.006
1.0	1.000
1.1	0.965
1.2	0.930
1.3	0.895
1.4	0.860
1.5	0.825
1.6	0.790
1.7	0.755
1.8	0.720
>1.8	Remove and replace

1. If the Engineer’s laboratory-molded density on any subplot is <95.0% or >97.0%, take immediate corrective action to bring the mixture within these tolerances. The Engineer may suspend operations if the Contractor’s corrective actions do not produce acceptable results. The Engineer will allow production to resume when the proposed corrective action is likely to yield acceptable results.

6.1.1. **Payment for Incomplete Production Lots.** Production payment adjustments for incomplete lots, described under Section 341.4.9.2.1.1., “Incomplete Production Lots,” will be calculated using the average production payment factors from all sublots sampled.

A production payment factor of 1.000 will be assigned to any lot when the random sampling plan did not result in collection of any samples within the first subplot.

6.1.2. **Production Sublots Subject to Removal and Replacement.** If after referee testing the laboratory-molded density for any subplot results in a “remove and replace” condition as shown in Table 19, the Engineer may require removal and replacement or may allow the subplot to be left in place without payment. The Engineer may also accept the subplot in accordance with Section 5.3.1., “Acceptance of Defective or Unauthorized Work.” Replacement material meeting the requirements of this Item will be paid for in accordance with this Section.

6.2. **Placement Payment Adjustment Factors.** The placement payment adjustment factor is based on in-place air voids using the Engineer’s test results. The bulk specific gravities of the cores from each subplot

will be divided by the Engineer's average maximum theoretical specific gravity for the lot. The individual core densities for the subplot will be averaged to determine the placement payment adjustment factor in accordance with Table 20 for each subplot that requires in-place air void measurement. A placement payment adjustment factor of 1.000 will be assigned to the entire subplot when the random sample location falls in an area shown on the plans as not subject to in-place air void determination. A placement payment adjustment factor of 1.000 will be assigned to quantities placed in areas described in Section 341.4.9.3.1.4., "Miscellaneous Areas." The placement payment adjustment factor for completed lots will be the average of the placement payment adjustment factors for up to four sublots within that lot.

Table 20
Placement Payment Adjustment Factors for In-Place Air Voids

In-Place Air Voids	Placement Pay Adjustment Factor	In-Place Air Voids	Placement Payment Adjustment Factor
<2.7	Remove and replace	6.4	1.042
2.7	0.710	6.5	1.040
2.8	0.740	6.6	1.038
2.9	0.770	6.7	1.036
3.0	0.800	6.8	1.034
3.1	0.830	6.9	1.032
3.2	0.860	7.0	1.030
3.3	0.890	7.1	1.028
3.4	0.920	7.2	1.026
3.5	0.950	7.3	1.024
3.6	0.980	7.4	1.022
3.7	0.998	7.5	1.020
3.8	1.002	7.6	1.018
3.9	1.006	7.7	1.016
4.0	1.010	7.8	1.014
4.1	1.014	7.9	1.012
4.2	1.018	8.0	1.010
4.3	1.022	8.1	1.008
4.4	1.026	8.2	1.006
4.5	1.030	8.3	1.004
4.6	1.034	8.4	1.002
4.7	1.038	8.5	1.000
4.8	1.042	8.6	0.998
4.9	1.046	8.7	0.996
5.0	1.050	8.8	0.994
5.1	1.050	8.9	0.992
5.2	1.050	9.0	0.990
5.3	1.050	9.1	0.960
5.4	1.050	9.2	0.930
5.5	1.050	9.3	0.900
5.6	1.050	9.4	0.870
5.7	1.050	9.5	0.840
5.8	1.050	9.6	0.810
5.9	1.050	9.7	0.780
6.0	1.050	9.8	0.750
6.1	1.048	9.9	0.720

In-Place Air Voids	Placement Pay Adjustment Factor	In-Place Air Voids	Placement Payment Adjustment Factor
6.2	1.046	>9.9	Remove and replace
6.3	1.044	-	-

6.2.1. **Payment for Incomplete Placement Lots.** Payment adjustments for incomplete placement lots described under Section 341.4.9.3.1.2., "Incomplete Placement Lots," will be calculated using the average of the placement payment factors from all sublots sampled and sublots where the random location falls in an area shown on the plans as not eligible for in-place air void determination.

If the random sampling plan results in production samples, but not in placement samples, the random core location and placement adjustment factor for the subplot will be determined by applying the placement random number to the length of the subplot placed.

If the random sampling plan results in placement samples, but not in production samples, no placement adjustment factor will apply for that subplot placed.

A placement payment adjustment factor of 1.000 will be assigned to any lot when the random sampling plan did not result in collection of any production samples.

6.2.2. **Placement Sublots Subject to Removal and Replacement.** If after referee testing the placement payment adjustment factor for any subplot results in a "remove and replace" condition as shown in Table 20, the Engineer will choose the location of two cores to be taken within 3 ft. of the original failing core location. The Contractor must obtain the cores in the presence of the Engineer. The Engineer will take immediate possession of the untrimmed cores and submit the untrimmed cores to the Materials and Tests Division, where they will be trimmed, if necessary, and tested for bulk specific gravity within 10 working days of receipt.

The bulk specific gravity of each core from each subplot will be divided by the Engineer's average maximum theoretical specific gravity for the lot. The individual core densities for the subplot will be averaged to determine the new payment adjustment factor of the subplot in question. If the new payment adjustment factor is 0.720 or greater, the new payment adjustment factor will apply to that subplot. If the new payment adjustment factor is less than 0.720, no payment will be made for the subplot. Remove and replace the failing subplot, or the Engineer may allow the subplot to be left in place without payment. The Engineer may also accept the subplot in accordance with Section 5.3.1., "Acceptance of Defective or Unauthorized Work." Replacement material meeting the requirements of this Item will be paid for in accordance with this Section.

6.3. **Total Adjusted Pay (TAP) Calculation.** TAP will be based on the applicable payment adjustment factors for production and placement for each lot.

$$TAP = (A+B)/2$$

where:

A = Bid price × production lot quantity × average payment adjustment factor for the production lot

B = Bid price × placement lot quantity × average payment adjustment factor for the placement lot + (bid price × quantity placed in miscellaneous areas × 1.000)

Production lot quantity = Quantity actually placed - quantity left in place without payment

Placement lot quantity = Quantity actually placed - quantity left in place without payment - quantity placed in miscellaneous areas

IMPORTANT: TAP can be applied to lots with an average payment adjustment value greater than 1,000 to offset lots that are calculated with an average payment adjustment value less than 1,000. However, final payment under this item will not exceed the final Quantity actually placed minus quantity left in place without payment, multiplied by the Bid price under this Item.

Special Provision to Item Tx-464

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "Department" has been replaced with "Engineer".
- Table 1:** Remove references to all pipe except Class IV. Pipe for this project is to be Class IV.
- 5.:** Modify the second sentence of the first paragraph as follows: "This price is full compensation for excavation, shaping, bedding, constructing, furnishing, transporting, placing, and joining pipes; shaping the bed; cutting pipes on skew or slope; connecting to new or existing structures; breaking back, removing, and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends on skew or slope, backfill; and equipment, labor, tools, and incidentals."
- 5.:** Delete the second and third sentences of the second paragraph of this Section.

END OF SPECIAL PROVISION TO ITEM Tx-464

Item 464 Reinforced Concrete Pipe

from 2024 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

1. DESCRIPTION

Furnish and install reinforced concrete pipe, materials for precast concrete pipe culverts, or precast concrete storm drain mains, laterals, stubs, and inlet leads.

2. MATERIALS

2.1. **Fabrication.** Multi-project fabrication plants, as defined in [DMS-7305](#), "Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures," must be approved by the Materials and Tests Division in accordance with [DMS-7305](#) before furnishing precast reinforced concrete pipe for Department projects. The Department's MPL includes approved multi-project reinforced concrete pipe fabrication plants.

Furnish material and fabricate reinforced concrete pipe in accordance with [DMS-7305](#).

2.2. **Design.**

2.2.1. **General.** The class and D-load equivalents are shown in Table 1. Furnish arch pipe in accordance with ASTM C506 and the dimensions shown in Table 2. Furnish horizontal elliptical pipe in accordance with ASTM C507 and the dimensions shown in Table 3. For arch pipe and horizontal elliptical pipe, the minimum height of cover required is 1 ft.

**Table 1 Circular Pipe
ASTM C76 and ASTM C655**

Class	D-Load
†	800
‡	1,000
§	1,350
¶	2,000
⋈	3,000

Table 2 Arch Pipe

Design Size	Equivalent Diameter (in.)	Rise (in.)	Span (in.)
1	18	13-1/2	22
2	21	15-1/2	26
3	24	18	28-1/2
4	30	22-1/2	36-1/4
5	36	26-5/8	43-3/4
6	42	31-5/16	51-1/8
7	48	36	58-1/2
8	54	40	65
9	60	45	73
10	72	54	88

Table 3 Horizontal Elliptical Pipe

Design Size	Equivalent Diameter (in.)	Rise (in.)	Span (in.)
0	15	12	19
1	18	14	23
2	24	19	30
3	27	22	34
4	30	24	38
5	33	27	42
6	36	29	45
7	39	32	49
8	42	34	53
9	48	38	60
10	54	43	68

2.2.2. **Jacking, Boring, or Tunneling.** Design pipe for jacking, boring, or tunneling considering the specific installation conditions such as the soil conditions, installation methods, anticipated deflection angles, and jacking stresses. Provide design notes and drawings signed and sealed by a Texas licensed professional engineer when requested. Provide steel reinforcement in bell and spigot.

2.3. **Marking.** Furnish each section of reinforced concrete pipe marked with the following information in accordance with [DMS-7305](#):

- class or D-load of pipe,
- ASTM designation,
- date of manufacture,
- pipe size,
- name or trademark of fabricator and plant location,
- designation "TX" for precast units fabricated in accordance with [DMS-7305](#),
- designated fabricator's approval stamp for each approved unit,
- pipe to be used for jacking and boring (when applicable), and
- designation "SR" for pipe meeting sulfate-resistant concrete plan requirements (when applicable).

Clearly mark one end of each section during the process of manufacture or immediately thereafter for pipe with elliptical reinforcement. Mark the pipe on the inside and outside of opposite walls to show the location of the top or bottom of the pipe as it should be installed unless the external shape of the pipe is such that the correct position of the top and bottom is obvious. Mark the pipe section by indenting or painting with waterproof paint.

2.4. **Inspection.** Provide access for inspection of the finished pipe at the project site before and during installation.

2.5. **Causes for Rejection.** Individual sections of pipe may be rejected for any of the conditions stated in the [DMS-7305](#) Annex.

2.6. **Repairs.** Make repairs, if necessary, in accordance with the [DMS-7305](#) Annex.

- 2.7. **Jointing Materials.** Use any of the following materials for the making of joints unless otherwise shown on the plans. Furnish a manufacturer’s certificate of compliance for all jointing materials except mortar.
- 2.7.1. **Mortar.** Provide mortar for joints that meets the requirements of Section 464.3.3., “Jointing.”
- 2.7.2. **Cold-Applied, Plastic Asphalt Sewer Joint Compound.** Provide a material that consists of natural or processed asphalt base, suitable volatile solvents, and inert filler. Ensure the consistency is such that the ends of the pipe can be coated with a layer of the compound up to 1/2 in. thick by trowel. Provide a joint compound that cures to a firm, stiff plastic condition after application. Provide a material of a uniform mixture. Stir any small separation found in the container into a uniform mix before using.

Provide a material that meets the requirements shown in Table 4 when tested in accordance with [Tex-526-C](#).

Table 4
Cold-Applied, Plastic Asphalt Sewer Joint Compound Material Requirements

Composition	Analysis
Asphalt base, 100%-% volatiles-% ash, % by weight	28-45
Volatiles, 212°F evaporation, 24 hr., % by weight	10-26
Mineral matter, determined as ash, % by weight	30-55
Consistency, cone penetration, 150 q, 5 sec., 77°F	150-275

- 2.7.3. **Rubber Gaskets.** Provide gaskets that conform to ASTM C1619 Class A or Class C. Meet the requirements of ASTM C443 for design of the pipe joints and permissible variations in dimensions.
- 2.7.4. **Pre-Formed Flexible Joint Sealants.** Pre-formed flexible joint sealants may be used for sealing joints of tongue-and-groove concrete pipe. Provide flexible joint sealants that meet the requirements of ASTM C990. Use flexible joint sealants that do not depend on oxidizing, evaporating, or chemical action for its adhesive or cohesive strength. Supply in extruded rope form of suitable cross-section. Provide a size of the pre-formed flexible joint sealant in conformance with the manufacturer’s recommendations and large enough to properly seal the joint. Protect flexible joint sealants with a suitable wrapper able to maintain the integrity of the jointing material when the wrapper is removed.

3. CONSTRUCTION

- 3.1. **Excavation, Shaping, Bedding, and Backfill.** Excavate, shape, bed, and backfill in accordance with Item 400, “Excavation and Backfill for Structures,” except where jacking, boring, or tunneling methods are permitted. Jack, bore, or tunnel the pipe in accordance with Item 476, “Jacking, Boring, or Tunneling Pipe or Box.” Immediate backfilling is permitted if joints consist of materials other than mortar. Take special precautions in placing and compacting the backfill to avoid any movement of the pipe or damage to the joints. Do not use heavy earth-moving equipment to haul over the structure until at least 4 ft. of permanent or temporary compacted fill has been placed over the structure, unless otherwise shown on the plans or permitted in writing. Remove and replace pipe damaged by the Contractor at no expense to the Department.
- 3.2. **Laying Pipe.** Start the laying of pipe on the bedding at the outlet end with the spigot or tongue end pointing downstream and proceed toward the inlet end with the abutting sections properly

matched, true to the established lines and grades unless otherwise authorized. Fit, match, and lay the pipe to form a smooth, uniform conduit. Cut cross trenches in the foundation to allow the barrel of the pipe to rest firmly on the bedding where bell-and-spigot pipe is used. Cut cross trenches no more than 2 in. larger than the bell ends of the pipe. Lower sections of pipe into the trench without damaging the pipe or disturbing the bedding and the sides of the trench. Carefully clean the ends of the pipe before the pipe is placed. Prevent earthen or bedding material from entering the pipe as it is laid. Lay the pipe in the trench, when elliptical pipe with circular reinforcing or circular pipe with elliptical reinforcing is used, so the markings for the top or bottom are not more than 5° from the vertical plane through the longitudinal axis of the pipe. Remove and re-lay, without extra compensation, pipe that is not in alignment or shows excessive settlement after laying.

Lay multiple lines of reinforced concrete pipe with the centerlines of the individual barrels parallel. Use the clear distances between outer surfaces of adjacent pipes shown in Table 5 unless otherwise shown on the plans. Use the equivalent diameter from Table 2 or Table 3 for arch pipe or horizontal elliptical pipe to determine the clear distance requirement shown in Table 5.

Table 5
Minimum Clear Distance Between Pipes

Equivalent Diameter	Min Clear Distance
18 in.	9 in.
24 in.	11 in.
30 in.	1 ft. 1 in.
36 in.	1 ft. 3 in.
42 in.	1 ft. 5 in.
48 in.	1 ft. 7 in.
54 in.	1 ft. 11 in.
60–84 in.	2 ft.

3.3. **Jointing.** Make available an appropriate rolling device similar to an automobile mechanic's "creeper" for conveyance through small-size pipe structures.

3.3.1. **Joints Sealed with Hydraulic Cement Mortar.** Use Type S mortar meeting the requirements of ASTM C270. Clean and wet the pipe ends before making the joint. Plaster the lower half of the bell or groove and the upper half of the tongue or spigot with mortar. Pack mortar into the joint from both inside and outside the pipe after the pipes are tightly jointed. Finish the inside smooth and flush with adjacent joints of pipe.

Form a bead of semicircular cross-section over tongue-and-groove joints outside the pipe, extending at least 1 in. on each side of the joint. Form the mortar for bell-and-spigot joints to a 45° fillet between the outer edge of the bell and the spigot. Cure mortar joints by keeping the joints wet for at least 48 hr. or until the backfill has been completed, whichever is first. Place fill or backfill once the mortar jointing material has cured for at least 6 hr. Conduct jointing only when the atmospheric temperature is above 40°F. Protect mortared joints against freezing by backfilling or other approved methods for at least 24 hr.

Driveway culverts do not require mortar banding on the outside of the pipe.

Furnish pipes, with approval, that are large enough for a person to enter with the groove between 1/2 in. and 3/4 in. longer than the tongue. Such pipe may be laid and backfilled without mortar joints. Clean the space on the interior of the pipe between the end of the tongue and the groove of all foreign material, thoroughly wet and fill with mortar around the entire circumference of the pipe, and finish flush after the backfilling has been completed.

- 3.3.2. **Joints Using Cold-Applied, Plastic Asphalt Sewer Joint Compound.** Ensure both ends of the pipes are clean and dry. Trowel or otherwise place a 1/2-in. thick layer of the compound in the groove end of the pipe covering at least 2/3 of the joint face around the entire circumference. Shove home the tongue end of the next pipe with enough pressure to make a tight joint. Remove any excess mastic projecting into the pipe after the joint is made. Backfill after the joint has been inspected and approved.
- 3.3.3. **Joints Using Rubber Gaskets.** Make the joint assembly in conformance with the recommendations of the gasket manufacturer. Make joints watertight when using rubber gaskets. Backfill after the joint has been inspected and approved.
- 3.3.4. **Joints Using Pre-Formed Flexible Joint Sealants.** Install pre-formed flexible joint sealants in conformance with the manufacturer's recommendations. Place the joint sealer so no dirt or other deleterious materials contact the joint sealing material. Pull or push home the pipe with enough force to properly seal the joint. Remove any joint material pushed out into the interior of the pipe that would tend to obstruct the flow. Store pre-formed flexible joint sealants in an area warmed naturally or artificially to above 70°F in an approved manner when the atmospheric temperature is below 60°F. Apply flexible joint sealants to pipe joints immediately before placing pipe in trench, and connect pipe to previously laid pipe. Backfill after the joint has been inspected and approved.
- 3.4. **Connections and Stub Ends.** Make connections of concrete pipe to existing pipes, pipe storm drains, or storm drain appurtenances as shown on the plans.
- Mortar or concrete the bottom of existing structures if necessary to eliminate any drainage pockets created by the connections. Repair any damage to the existing structure resulting from making the connections.
- Make connections between concrete pipe and corrugated metal pipe with a suitable concrete collar and a minimum thickness of 4 in. unless otherwise shown on the plans.
- Finish stub ends for connections to future work not shown on the plans by installing watertight plugs into the free end of the pipe.
- Fill lift holes with concrete, mortar, or precast concrete plugs after the pipe is in place.

4. MEASUREMENT

This Item will be measured by the foot. Measurement will be made between the ends of the pipe barrel along the flow line, not including safety end treatments. Safety end treatments will be measured in accordance with Item 467, "Safety End Treatment." Pipe that will be jacked, bored, or tunneled will be measured in accordance with Item 476. Measurement of spurs, branches, or new connecting pipe will be made from the intersection of the flow line with the outside surface of the pipe into which it connects. Where inlets, headwalls, catch basins, manholes, junction chambers, or other structures are included in lines of pipe, the length of pipe tying into the structure wall will be included for measurement, but no other portion of the structure length or width will be included.

For multiple pipes, the measured length will be the sum of the lengths of the barrels.

This is a plans quantity measurement Item. The quantity to be paid is the quantity shown in the proposal, unless modified by Article 9.2., "Plans Quantity Measurement." Additional measurements or calculations will be made if adjustments of quantities are required.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Reinforced Concrete Pipe," "Reinforced Concrete Pipe (Arch)," or "Reinforced Concrete Pipe (Elliptical)" of the size and D-load specified or of the size and class specified. This price is full compensation for excavation, shaping, bedding, constructing, furnishing, transporting, placing, and joining pipes; shaping the bed; cutting pipes on skew or slope; connecting to new or existing structures; breaking back, removing, and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends on skew or slope, backfill; and equipment, labor, tools, and incidentals.

Protection methods for excavations greater than 5 ft. deep will be measured and paid for as required under Item 402, "Trench Excavation Protection," or Item 403, "Temporary Special Shoring." ~~Excavation, shaping, bedding, and backfill will be paid for in accordance with Item 400.~~ When jacking, boring, or tunneling is used at the Contractor's option, payment will be made under this Item. ~~When jacking, boring, or tunneling is required, payment will be made under Item 476.~~

Item 467 Safety End Treatment

from 2024 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

1. DESCRIPTION

Furnish, construct, and install safety end treatments for drainage structures, or install or replace pipe runners or pipe runner assemblies on existing drainage structures.

2. MATERIALS

2.1. **General.** Furnish materials in accordance with the following.

- Item 420, "Concrete Substructures"
- Item 421, "Hydraulic Cement Concrete"
- Item 432, "Riprap"
- Item 440, "Reinforcement for Concrete"
- Item 442, "Metal for Structures"
- Item 445, "Galvanizing"
- Item 460, "Corrugated Metal Pipe"
- Item 464, "Reinforced Concrete Pipe"

Use Class C concrete for cast-in-place and precast concrete units unless otherwise shown on the plans. Furnish cast-in-place or precast safety end treatments unless otherwise shown on the plans. Furnish Class B concrete for concrete riprap unless otherwise shown on the plans. Provide galvanized steel for prefabricated metal end sections in accordance with Item 460.

Furnish pipe runners in accordance with the following:

- ASTM A1085;
- ASTM A53, Type E or S, Grade B;
- ASTM A500, Grade B; or
- API 5L, Grade X42.

Furnish plates and angles in accordance with ASTM A36. Furnish nuts and bolts in accordance with ASTM A307. Galvanize pipes, plates, angles, nuts, and bolts in accordance with Item 445.

2.2. **Fabrication.** Fabricate cast-in-place concrete units and precast units in accordance with Item 420. Provide either prefabricated metal end sections or mitered corrugated metal pipe (CMP) when specified for the pipe structure unless otherwise shown on the plans.

Provide one of the following when reinforced concrete pipe (RCP) is specified for the pipe structure, unless otherwise shown on the plans:

- mitered RCP, or
- precast safety end treatment (SET) units. Provide riprap only if the plans specifically require it for this alternative.

2.2.1. **SET Types.**

2.2.1.1. **Type I.** Provide Type I SET consisting of reinforced concrete headwalls or wingwalls and pipe runners as shown on the plans when required.

2.2.1.2. **Type II.** Provide Type II SET as shown on the plans consisting of the following:

- CMP or RCP mitered to the proper slope, concrete riprap, and pipe runners, when required;

- prefabricated metal end sections, concrete riprap, and pipe runners, when required; or
 - precast SET units, concrete riprap, when required, and pipe runners, when required.
- 2.2.2. **Lifting Holes.** Provide no more than four lifting holes in each section for precast units. Lifting holes may be cast, cut into fresh concrete after form removal, or drilled. Provide lifting holes large enough for adequate lifting devices based on the size and weight of the section. The maximum hole diameter is 3 in. at the inside surface of the wall and 4 in. at the outside surface. Cut no more than one longitudinal wire or two circumferential wires per layer of reinforcing steel when locating lift holes. Repair spalled areas around lifting holes.
- 2.2.3. **Marking.** Clearly mark the following on each precast unit, mitered CMP, mitered RCP, or metal end section before shipment from the casting or fabrication yard:
- the date of manufacture,
 - the name or trademark of the manufacturer, and
 - the type and size designation.
- 2.2.4. **Storage and Shipment.** Store precast units on a level surface. Do not place any loads on precast units until the design strength is reached. Do not ship units until design strength requirements have been met.
- 2.2.5. **Causes for Rejection.** Precast units may be rejected for not meeting any one of the specification requirements. Individual units may also be rejected for fractures or cracks passing through the wall or surface defects indicating honeycombed or open texture surfaces. Remove rejected units from the project and replace with acceptable units meeting the requirements of this Item.
- 2.2.6. **Defects and Repairs.** Occasional imperfections in manufacture or accidental damage sustained during handling may be repaired in accordance with the Department's *Concrete Repair Manual*. The repaired units will be acceptable if they conform to the requirements of this Item and the repairs are sound and properly finished and cured in conformance with pertinent specifications. Repair damaged galvanizing in accordance with Section 445.3.4., "Repairs."

3. CONSTRUCTION

- 3.1. **General.** Remove portions of existing structures in accordance with Section 420.4.8., "Extending Existing Substructures." Drill, dowel, and grout in accordance with Item 420. Furnish concrete riprap in accordance with Item 432.
- Provide riprap on all prefabricated metal end sections.
- 3.2. **Excavation, Shaping, Bedding, and Backfill.** Excavate, shape, bed, and backfill in accordance with Item 400, "Excavation and Backfill for Structures." Take special precautions in placing and compacting the backfill to avoid any movement or damage to the units. Bed precast units on foundations of firm and stable material accurately shaped to conform to the bases of the units.
- 3.3. **Placement of Precast Units.** Provide adequate means to lift and place the precast units. Fill lifting holes with mortar or concrete and cure. Precast concrete or mortar plugs may be used.
- 3.4. **Connections.** Make connections to new or existing structures as shown on the plans. Furnish jointing material in accordance with Item 464.
- Also remove a length of the existing pipe from the headwall to the joint when removing existing headwalls as shown on the plans or as approved. Re-lay the removed pipe if approved, or furnish and lay a length of new pipe.
- 3.5. **Install or Replace Pipe Runners or Assemblies.** Install or replace individual pipe runners or pipe runner assemblies on existing drainage structures as shown on the plans.

4. MEASUREMENT

SETs of all types will be measured by each barrel of each structure end.

Pipe runners or pipe runner assemblies installed or replaced on existing structure will be measured by each installed or replaced on each structure end.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for the various designations of "Safety End Treatment" specified as follows:

- "SET (Type I) (Barrel Span) (Wall Height) (Slope, Horizontal:Vertical) (Orientation, Cross or Parallel)";
- "SET (Type I) (Pipe Diameter or Design) (Slope, Horizontal:Vertical) (Orientation, Cross or Parallel)";
- "SET (Type II) (Pipe Diameter or Design) (Pipe Material) (Slope, Horizontal:Vertical) (Orientation, Cross or Parallel)";
- "SET (Pipe Runner)"; and
- "SET (Pipe Runner Assembly)."

For payment purposes, the wingwall heights of Type I SETs for box culverts will be rounded to the nearest foot.

This price is full compensation for constructing, furnishing, transporting, and installing the end treatments; pipe runners, or pipe runner assemblies, connecting to existing structure; breaking back, removing and disposing of portions of the existing structure, removing and disposing of existing pipe runner or pipe runner assemblies, and replacing portions of the existing structure as required to make connections; excavation and backfill; furnishing concrete, reinforcing steel, CMP or RCP, and pipe runners; and concrete riprap, nuts, bolts, plates, angles, equipment, labor, tools, and incidentals.

The removal and re-laying of existing pipe or the furnishing of new pipe to replace existing pipe will not be paid for directly, but will be subsidiary to this Item.

The mitered length of CMP or RCP that is a part of the SET (Type II) will not be paid for directly, but will be subsidiary to this Item. The limits for payment for pipe will be as shown on the plans and paid for in accordance with the pertinent bid item.

The limits of riprap to be included in the unit price bid for each SET will be shown on the plans. Any riprap placed beyond the limits shown will be paid for in accordance with Item 432. Riprap between multiple precast SET units will be required as shown on the plans and is included in the unit price bid for SET.

When precast SETs are provided as an option to mitered RCP, riprap aprons will not be required unless shown on the plans. The plans will show the limits of the riprap to be included with the precast SET for payment.

Special Provision to Item C-100 Contractor Quality Control Program (CQCP)

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor’s convenience.

- General:** there are several, but not all instances where “RPR” has been replaced with “Engineer”.
- 100-2.b:** Add the following line item to the CQCP: “(7) Documentation on the grade control for paving installation.” and renumber the items afterward.
- 100-7:** Modify the paragraph as follows: “For projects that include Item P-401 or Item TX341, Item P 403, and Item P 404, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements as listed below: ~~in the following paragraphs of ASTM D3666, Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials:~~

<u>Item</u>	<u>Reference Section</u>	<u>Notes</u>
<u>ASTM D3666</u>	<u>8.1.3 Equipment Calibration and Checks</u>	
	<u>8.1.9 Equipment Calibration, Standardization, and Check Records</u>	
	<u>8.1.12 Test Methods and Procedures</u>	
<u>Tx-341</u>	<u>Table 6 - Test Methods, Test Responsibility, and Minimum Certification Levels</u>	<u>For those items, including certification Level that are the Contractor’s responsibility</u>

- 100-9:** Add the following sentence to the first paragraph: “Contractor is to prepare a Quality Control Plan (QCP) following this section and Item TX341.”

END OF SPECIAL PROVISION TO ITEM C-100

Item C-100 Contractor Quality Control Program (CQCP)

from FAA Specifications for Construction of Airports – AC 150/5370-10H

100-1 General. Quality is more than test results. Quality is the combination of proper materials, testing, workmanship, equipment, inspection, and documentation of the project. Establishing and maintaining a culture of quality is key to achieving a quality project. The Contractor shall establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The Contractor shall establish a CQCP that will:

- a. Provide qualified personnel to develop and implement the CQCP.
- b. Provide for the production of acceptable quality materials.
- c. Provide sufficient information to assure that the specification requirements can be met.
- d. Document the CQCP process.

The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the CQCP has been reviewed and approved by the ~~Engineer~~ Resident Project Representative (RPR). No partial payment will be made for materials subject to specific quality control (QC) requirements until the CQCP has been reviewed and approved.

The QC requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the quality assurance (QA) testing requirements. QA testing requirements are the responsibility of the ~~Engineer~~ RPR or Contractor as specified in the specifications.

A Quality Control (QC)/Quality Assurance (QA) workshop with the Engineer, Resident Project Representative (RPR), Contractor, subcontractors, testing laboratories, and Owner's representative must be held prior to start of construction. The QC/QA workshop will be facilitated by the Contractor. The Contractor shall coordinate with the Airport and the RPR on time and location of the QC/QA workshop. Items to be addressed, at a minimum, will include:

- a. Review of the CQCP including submittals, QC Testing, Action & Suspension Limits for Production, Corrective Action Plans, Distribution of QC reports, and Control Charts.
- b. Discussion of the QA program.
- c. Discussion of the QC and QA Organization and authority including coordination and information exchange between QC and QA.
- d. Establish regular meetings to discuss control of materials, methods and testing.
- e. Establishment of the overall QC culture.

100-2 Description of program.

a. General description. The Contractor shall establish a CQCP to perform QC inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. The CQCP shall ensure conformance to applicable specifications and plans with respect to materials, off-site fabrication, workmanship, construction, finish, and functional performance. The CQCP shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of QC.

b. Contractor Quality Control Program (CQCP). The Contractor shall describe the CQCP in a written document that shall be reviewed and approved by the ~~Engineer RPR~~ prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the ~~Engineer RPR~~ for review and approval at least 10 calendar days before the CQCP Workshop. The Contractor's CQCP and QC testing laboratory must be approved in writing by the ~~Engineer RPR prior to the Notice to Proceed (NTP).~~ ~~The Contractor's CQCP and QC testing laboratory must be approved in writing by the Engineer~~ prior to the start of work items included in the CQCP (earthwork, base, stabilized base, paving, etc.).

The CQCP shall be organized to address, as a minimum, the following:

- (1) QC organization and resumes of key staff
- (2) Project progress schedule
- (3) Submittals schedule
- (4) Inspection requirements
- (5) QC testing plan
- (6) Documentation of QC activities and distribution of QC reports
- (7) Documentation on grade control for paving installation.
- (8) Requirements for corrective action when QC and/or QA acceptance criteria are not met
- (9) Material quality and construction means and methods. Address all elements applicable to the project that affect the quality of the pavement structure including subgrade, subbase, base, and surface course. Some elements that must be addressed include, but is not limited to mix design, aggregate grading, stockpile management, mixing and transporting, placing and finishing, quality control testing and inspection, smoothness, laydown plan, equipment, and temperature management plan.

The Contractor must add any additional elements to the CQCP that is necessary to adequately control all production and/or construction processes required by this contract.

100-3 CQCP organization. The CQCP shall be implemented by the establishment of a QC organization. An organizational chart shall be developed to show all QC personnel, their authority, and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all QC staff by name and function, and shall indicate the total staff required to implement all elements of the CQCP, including inspection and testing for each item of work. If necessary, different technicians can be used for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the CQCP, the personnel assigned shall be subject to the qualification requirements of paragraphs 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The QC organization shall, as a minimum, consist of the following personnel:

a. Program Administrator. The Contractor Quality Control Program Administrator (CQCPA) must be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The CQCPA must have a minimum of five (5) years of experience in QC pavement construction with prior QC experience on a project of comparable size and scope as the contract.

Included in the five (5) years of paving/QC experience, the CQCPA must meet at least one of the following requirements:

- (1) Professional Engineer with one (1) year of airport paving experience.
- (2) Engineer-in-training with two (2) years of airport paving experience.
- (3) National Institute for Certification in Engineering Technologies (NICET) Civil Engineering Technology Level IV with three (3) years of airport paving experience.

- (4) An individual with four (4) years of airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

The CQCPA must have full authority to institute any and all actions necessary for the successful implementation of the CQCP to ensure compliance with the contract plans and technical specifications. The CQCPA authority must include the ability to immediately stop production until materials and/or processes are in compliance with contract specifications. The CQCPA must report directly to a principal officer of the construction firm. The CQCPA may supervise the Quality Control Program on more than one project provided that person can be at the job site within two (2) hours after being notified of a problem.

b. QC technicians. A sufficient number of QC technicians necessary to adequately implement the CQCP must be provided. These personnel must be either Engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II in Civil Engineering Technology or higher, and shall have a minimum of two (2) years of experience in their area of expertise.

The QC technicians must report directly to the CQCPA and shall perform the following functions:

- (1) Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by paragraph 100-6.
- (2) Performance of all QC tests as required by the technical specifications and paragraph 100-8.
- (3) Performance of tests for the RPR when required by the technical specifications.

Certification at an equivalent level of qualification and experience by a state or nationally recognized organization will be acceptable in lieu of NICET certification.

c. Staffing levels. The Contractor shall provide sufficient qualified QC personnel to monitor each work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians shall be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The CQCP shall state where different technicians will be required for different work elements.

100-4 Project progress schedule. Critical QC activities must be shown on the project schedule as required by Section 80, paragraph 80-03, *Execution and Progress*.

100-5 Submittals schedule. The Contractor shall submit a detailed listing of all submittals (for example, mix designs, material certifications) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include as a minimum:

- a. Specification item number
- b. Item description
- c. Description of submittal
- d. Specification paragraph requiring submittal
- e. Scheduled date of submittal

100-6 Inspection requirements. QC inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by paragraph 100-9.

Inspections shall be performed as needed to ensure continuing compliance with contract requirements until completion of the particular feature of work. Inspections shall include the following minimum requirements:

- a. During plant operation for material production, QC test results and periodic inspections shall be used to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the

approved mix design and other requirements of the technical specifications. All equipment used in proportioning and mixing shall be inspected to ensure its proper operating condition. The CQCP shall detail how these and other QC functions will be accomplished and used.

b. During field operations, QC test results and periodic inspections shall be used to ensure the quality of all materials and workmanship. All equipment used in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The CQCP shall document how these and other QC functions will be accomplished and used.

100-7 Contractor QC testing facility.

a. For projects that include Item P-401 or Item TX341, ~~Item P-403, and Item P-404~~, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements as listed below: ~~in the following paragraphs of ASTM D3666, Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials:~~

<u>Item</u>	<u>Reference Section</u>	<u>Notes</u>
<u>ASTM D3666</u>	<u>8.1.3 Equipment Calibration and Checks</u>	
	<u>8.1.9 Equipment Calibration, Standardization, and Check Records</u>	
	<u>8.1.12 Test Methods and Procedures</u>	
<u>Tx-341</u>	<u>Table 6 - Test Methods, Test Responsibility, and Minimum Certification Levels</u>	<u>For those items, including certification Level that are the Contractor's responsibility</u>

b. For projects that include Item P-501, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM C1077, Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation:

- 7 Test Methods and Procedures
- 8 Facilities, Equipment, and Supplemental Procedures

100-8 QC testing plan. As a part of the overall CQCP, the Contractor shall implement a QC testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by each technical specification Item, as well as any additional QC tests that the Contractor deems necessary to adequately control production and/or construction processes.

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

- a. Specification item number (e.g., P-401 TX341)
- b. Item description (e.g., Hot Mix Asphalt Pavements)
- c. Test type (e.g., gradation, grade, asphalt content)
- d. Test standard (e.g., ASTM or American Association of State Highway and Transportation Officials (AASHTO) test number, as applicable)
- e. Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated)
- f. Responsibility (e.g., plant technician)
- g. Control requirements (e.g., target, permissible deviations)

The QC testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples in accordance with ASTM D3665. The RPR shall be provided the opportunity to witness QC sampling and testing.

All QC test results shall be documented by the Contractor as required by paragraph 100-9.

100-9 Documentation. Contractor is to prepare a Quality Control Plan (QCP) following this section and Item TX341. The Contractor shall maintain current QC records of all inspections and tests performed. These records shall include factual evidence that the required QC inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the RPR daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCPA.

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

a. Daily inspection reports. Each Contractor QC technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. These technician's daily reports shall provide factual evidence that continuous QC inspections have been performed and shall, as a minimum, include the following:

- (1) Technical specification item number and description
- (2) Compliance with approved submittals
- (3) Proper storage of materials and equipment
- (4) Proper operation of all equipment
- (5) Adherence to plans and technical specifications
- (6) Summary of any necessary corrective actions
- (7) Safety inspection.
- (8) Photographs and/or video

The daily inspection reports shall identify all QC inspections and QC tests conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible QC technician and the CQCPA. The RPR shall be provided at least one copy of each daily inspection report on the work day following the day of record. When QC inspection and test results are recorded and transmitted electronically, the results must be archived.

b. Daily test reports. The Contractor shall be responsible for establishing a system that will record all QC test results. Daily test reports shall document the following information:

- (1) Technical specification item number and description
- (2) Test designation
- (3) Location
- (4) Date of test
- (5) Control requirements
- (6) Test results
- (7) Causes for rejection
- (8) Recommended remedial actions

(9) Retests

Test results from each day's work period shall be submitted to the RPR prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical QC charts. When QC daily test results are recorded and transmitted electronically, the results must be archived.

- 100-10 Corrective action requirements.** The CQCP shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the CQCP as a whole, and for individual items of work contained in the technical specifications.

The CQCP shall detail how the results of QC inspections and tests will be used for determining the need for corrective action and shall contain clear rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Contractor shall establish and use statistical QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.

- 100-11 Inspection and/or observations by the RPR.** All items of material and equipment are subject to inspection and/or observation by the RPR at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate QC system in conformance with the requirements detailed here and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to inspection and/or observation by the RPR at the site for the same purpose.

Inspection and/or observations by the RPR does not relieve the Contractor of performing QC inspections of either on-site or off-site Contractor's or subcontractor's work.

100-12 Noncompliance.

- a. The ~~Engineer~~ Resident Project Representative (RPR) will provide written notice to the Contractor of any noncompliance with their CQCP. After receipt of such notice, the Contractor must take corrective action.
- b. When QC activities do not comply with either the CQCP or the contract provisions or when the Contractor fails to properly operate and maintain an effective CQCP, and no effective corrective actions have been taken after notification of non-compliance, the ~~Engineer~~ RPR will recommend the Owner take the following actions:
 - (1) Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or
 - (2) Order the Contractor to stop operations until appropriate corrective actions are taken.

METHOD OF MEASUREMENT

- 100-13 Basis of measurement and payment.** Contractor Quality Control Program (CQCP) is for the personnel, tests, facilities and documentation required to implement the CQCP. The CQCP will be paid as a lump sum with the following schedule of partial payments:
- a. With first pay request, 25% with approval of CQCP and completion of the Quality Control (QC)/Quality Assurance (QA) workshop.
 - b. When 25% or more of the original contract is earned, an additional 25%.
 - c. When 50% or more of the original contract is earned, an additional 20%.
 - d. When 75% or more of the original contract is earned, an additional 20%.
 - e. After final inspection and acceptance of project, the final 10%.

BASIS OF PAYMENT

100-14 Payment will be made under:

Item C-100 Contractor Quality Control Program (COCP), per Lump Sum

REFERENCES

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

National Institute for Certification in Engineering Technologies (NICET)

ASTM International (ASTM)

ASTM C1077 Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation

ASTM D3665 Standard Practice for Random Sampling of Construction Materials

ASTM D3666 Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

END ITEM C-100

Special Provision to Item C-102 Temporary Air and Water Pollution, Soil Erosion and Siltation Control

from FAA Specifications for Construction of Airports – AC 150/5370-10H

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** There are several, but not all instances where "RPR" has been replaced with "Engineer".
- 102-2.1:** Remove paragraph and replace with the following: Apply permanent seeding and sodding as soon as construction work in the disturbed area is complete. See specification T-904 sodding and T-901 seeding.
- 102-2.2:** Remove Mulches section.
- 102-2.3:** Remove Fertilizer section.
- 102-2.4:** Remove Slope Drains section.
- 102-4.1:** Remove listed method of measurement Items a through d.
- 102-5.1** Remove listed basis of payment Items C102.5a through C102.5d.

END OF SPECIAL PROVISION TO ITEM C-102

Item C-102 Temporary Air and Water Pollution, Soil Erosion and Siltation Control

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

102-1. This item shall consist of temporary control measures as shown on the plans or as ordered by the Resident Project Representative (RPR) during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

Temporary erosion control shall be in accordance with the approved erosion control plan; the approved Construction Safety and Phasing Plan (CSPP) and AC 150/5370-2, Operational Safety on Airports During Construction. The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

Temporary control measures shall be designed, installed, and maintained to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near public-use airports.

MATERIALS

102-2.1 Grass. ~~Grass that will not compete with the grasses sown later for permanent cover per Item T-901 shall be a quick growing species (such as ryegrass, Italian ryegrass, or cereal grasses) suitable to the area providing a temporary cover. Selected grass species shall not create a wildlife attractant.~~ Apply permanent seeding and sodding as soon as construction work in the disturbed area is complete. See specification T-904 sodding and T-901 seeding.

102-2.2 Mulches. ~~Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials per Item T-908. Mulches shall not create a wildlife attractant.~~

102-2.3 Fertilizer. ~~Fertilizer shall be a standard commercial grade and shall conform to all federal and state regulations and to the standards of the Association of Official Agricultural Chemists.~~

102-2.4 Slope drains. ~~Slope drains may be constructed of pipe, fiber mats, rubble, concrete, asphalt, or other materials that will adequately control erosion.~~

102-2.5 Silt fence. Silt fence shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life. Silt fence shall meet the requirements of ASTM D6461.

102-2.6 Other. All other materials shall meet commercial grade standards and shall be approved by the ~~RPR~~ Engineer before being incorporated into the project.

CONSTRUCTION METHODS

102-3.1 General. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

The RPR shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

102-3.2 Schedule. Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the RPR.

102-3.3 Construction details. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching, and other specified slope protection work in stages as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit.

Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The RPR shall limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the ~~RPR~~ Engineer.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the ~~RPR~~ Engineer. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the RPR, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

102-3.4 Installation, maintenance, and removal of silt fence. Silt fences shall extend a minimum of 16 inches (41 cm) and a maximum of 34 inches (86 cm) above the ground surface. Posts shall be placed no more than 10 feet (3 m) in the center. Filter fabric shall be cut from a continuous roll to the length required minimizing joints where possible. When joints are necessary, the fabric shall be spliced at a support post with a minimum 12-inch (300-mm) overlap and securely sealed. A trench shall be excavated approximately 4 inches (100 mm) deep by 4 inches (100 mm) wide on the upslope side of the silt fence. The trench shall be backfilled and the soil compacted over the silt fence fabric. The Contractor shall remove and dispose of silt that accumulates during construction and prior to establishment of permanent erosion control. The fence shall be maintained in good working condition until permanent erosion control is established. Silt fence shall be removed upon approval of the RPR Engineer.

METHOD OF MEASUREMENT

102-4.1 Temporary erosion and pollution control work required will be performed as scheduled or directed by the RPR. Completed and accepted work will be measured as follows:

- a. ~~Temporary seeding and mulching will be measured by the square yard (square meter).~~
- b. ~~Temporary slope drains will be measured by the linear foot (meter).~~
- c. ~~Temporary benches, dikes, dams, and sediment basins will be measured by the cubic yard (cubic meter) of excavation performed, including necessary cleaning of sediment basins, and the cubic yard (cubic meter) of embankment placed as directed by the RPR.~~
- d. ~~All fertilizing will be measured by the ton (kg).~~
- e. Installation and maintain and remove reinforced filter fabric fence (Type 2) will be measured by the linear foot.
- f. Installation and maintain and remove construction exit (Type 3) will be measured by each.

102-4.2 Control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor.

BASIS OF PAYMENT

102-5.1 Accepted quantities of temporary water pollution, soil erosion, and siltation control work ordered by the RPR and measured as provided in paragraph 102-4.1 will be paid for under:

- | | | | |
|----------------------------|--|---|-----------------|
| Item C 102 5.1a | Temporary seeding and mulching | per square yard (square meter) | Item |
| C 102 5.1b | Temporary slope drains | per linear foot (meter) | |
| Item C 102 5.1c | Temporary benches, dikes, dams, and sediment basins | per cubic yard (cubic meter) | |
| Item C 102 5.1d | Fertilizing | per ton (kg) | |
| Item C-102-1 | Installation and maintain and remove reinforced filter fabric fence (Type 2) | per linear foot | |
| Item C-102-2 | Installation and maintain and remove construction exit (Type 3) | per square yard | |

Where other directed work falls within the specifications for a work item that has a contract price, the units of work

shall be measured and paid for at the contract unit price bid for the various items.

Temporary control features not covered by contract items that are ordered by the RPR Engineer will be paid for in accordance with Section 90, paragraph 90-05 *Payment for Extra Work*.

REFERENCES

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

Advisory Circulars (AC)

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

AC 150/5370-2 Operational Safety on Airports During Construction

ASTM International (ASTM)

ASTM D6461 Standard Specification for Silt Fence Materials

United States Department of Agriculture (USDA)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM C-102

Special Provision to Item C-105 Mobilization

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "RPR" has been replaced with "Engineer".
- 105-2:** Modify the first sentence as follows: "Payment for Mobilization shall be tied to project earned value milestones up to no more than 8 percent of the total project cost until the project is completed. Any amount in excess of the 8 percent limit will be withheld from payment until the final payment".
- 105-4.1:** Add the following paragraph: "Safety. Contractor is to provide safety measures throughout the project. Safety procedures are to follow Item SS-106 and the Plans. This includes the use of escorts across airfield pavements that remain in use for aircraft operations or as called in the Plans. All flagmen and escorts are to have a working Unicom radio, are to be proficient in speaking the English language, and are to be trained in the use of the radio to broadcast information to users of the airport."
- 105-4.2:** Add the following paragraph: "Barricades. Contractor is to provide barricades for Airport Operations Areas (AOA) throughout the project. Barricades are to follow Item SS-106 and the Plans. Contractor is to provide and maintain barricades as shown on the plans and details. When phasing requires barricades to be relocated, move barricades during the phase changes to achieve barricade placements as shown on the Plans. When Plans show requirements for Runway Closure Markers, provide closure markers as detailed in the Plans at the locations shown PRIOR to beginning work on the closed runway and/or safety areas. Closure markers are to be maintained continuously during the runway closure."
- 105-4.3:** Add the following paragraph: "Survey Control. The Plans provide horizontal and vertical controls for the Work in this project. Monuments for controls are on airport property. Contractor is to provide the construction layout as outlined in Section 50-06 of the General Provisions."
- 105-4.4:** Add the following paragraph: "Staging. Contractor is to utilize the staging area(s) as shown on the plans for his staging area and employee parking. Access to the staging area to be securely maintained as outlined in 105-4.1."
- 105-4.5:** Add the following paragraph: "Access and Haul Roads. Haul routes are as shown on the plans. Contractor is to video-document the condition of haul routes prior to beginning construction for proof of pavement condition. Deterioration of pavement during construction will be contractor's responsibility to repair to a condition at or better than the condition documented prior to construction start at no additional expense to the Owner or Agent."
- 105-4.6:** Add the following paragraph: "Demobilization. Upon completion of the work and final inspection item correction, the Contractor is to demobilize. This includes but is not limited to removal of stockpiled unused material(s), demolished materials, equipment, barricades, and trash. Return of the staging and stockpile areas to a pre-construction condition will be required prior to final acceptance."
- 105-5:** Modify the paragraph as follows: "Any costs associated with the Airport Safety, Traffic Control (except for those specifically outlined for payment in Item SS-106), Survey Control, Staging, Haul Roads, and Demobilization requirements will not be measured for separate payment but will be considered subsidiary to the bid item "Mobilization". Based upon the contract lump sum price for "Mobilization", subject to the limits under paragraph 105-2, partial payments will be allowed as follows:

- a. With first pay request, 25% or 2.0% of the original executed contract amount, whichever is less.
- b. When 25% or more of the original contract is earned, an additional 25% or up to 4.0% of the original executed contract amount, whichever is less.
- c. When 50% or more of the original contract is earned, an additional 40% or up to 7.8% of the original executed contract amount, whichever is less.
- d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation*, the ~~final 10%~~, the remaining amount bid."

END OF SPECIAL PROVISION TO ITEM C-105

Item C-105 Mobilization

FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

- 105-1** **Description.** This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.
- 105-2** **Mobilization limit.** Payment for Mobilization shall be tied to project earned value milestones up to no more than 8 percent of the total project cost until the project is completed. Any amount in excess of the 8 percent limit will be withheld from payment until the final payment.
- 105-3** **Posted notices.** Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster "Equal Employment Opportunity is the Law" in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL "Notice to All Employees" Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.
- 105-4** **Engineer/RPR field office.** An Engineer/RPR field office is not required.
- 105-4.1 Safety. Contractor is to provide safety measures throughout the project. Safety procedures are to follow Item SS-106 and the Plans. This includes the use of escorts across airfield pavements that remain in use for aircraft operations or as called in the Plans. All flagmen and escorts are to have a working Unicom radio, are to be proficient in speaking the English language, and are to be trained in the use of the radio to broadcast information to users of the airport.
- 105-4.2 Barricades. Contractor is to provide barricades for Airport Operations Areas (AOA) throughout the project. Barricades are to follow Item SS-106 and the Plans. Contractor is to provide and maintain barricades as shown on the plans and details. When phasing requires barricades to be relocated, move barricades during the phase changes to achieve barricade placements as shown on the Plans. When Plans show requirements for Runway Closure Markers, provide closure markers as detailed in the Plans at the locations shown PRIOR to beginning work on the closed runway and/or safety areas. Closure markers are to be maintained continuously during the runway closure.
- 105-4.3 Survey Control. The Plans provide horizontal and vertical controls for the Work in this project. Monuments for controls are on airport property. Contractor is to provide the construction layout as outlined in Section 50-06 of the General Provisions.
- 105-4.4 Staging. Contractor is to utilize the staging area(s) as shown on the plans for his staging area. This applies to employee parking as well. Access to the staging area to be securely maintained as outlined in 105-5.
- 105-4.5 Access and Haul Roads. Haul routes are as shown on the plans. Contractor is to video-document the condition of haul routes prior to beginning construction for proof of pavement condition. Deterioration of pavement during construction will be contractor's responsibility to repair to a condition at or better than the condition documented prior to construction start at no additional expense to the Owner or Agent.
- 105-4.6 Demobilization. Upon completion of the work and final inspection item correction, the Contractor is to demobilize. This includes but is not limited to removal of stockpiled unused material(s), demolished materials, equipment, barricades, and trash. Return of the staging and stockpile areas to a pre-construction condition will be required prior to final acceptance.

METHOD OF MEASUREMENT

- 105-5 **Basis of measurement and payment.** Any costs associated with the Airport Safety, Traffic Control (except for those specifically outlined for payment in Item SS-106), Survey Control, Staging, Haul Roads, and Demobilization requirements will not be measured for separate payment but will be considered subsidiary to the bid item "Mobilization". Based upon the contract lump sum price for "Mobilization", subject to the limits under paragraph 105-2, partial payments will be allowed as follows:
- a. With first pay request, 25% or up to 2.0% of the original executed contract amount, whichever is less.
 - b. When 25% or more of the original contract is earned, an additional 25% or up to 4.0% of the original executed contract amount, whichever is less.
 - c. When 50% or more of the original contract is earned, an additional 40% or up to 7.8% of the original executed contract amount, whichever is less.
 - d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation*, the ~~final 10%~~, remaining amount bid.

BASIS OF PAYMENT

- 105-6 **Payment will be made under:**
C-105-1: Mobilization, per Lump Sum

REFERENCES

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

Office of Federal Contract Compliance Programs (OFCCP)
Executive Order 11246, as amended
EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster
United States Department of Labor, Wage and Hour Division (WHD)
WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END ITEM C-105

Special Provision to Item P-101 Preparation / Removal of Existing Pavements

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "RPR" has been replaced with "Engineer".
- 101-1.1:** Add the following as a second sentence to the paragraph: "References to "cold milling" herein are to be understood as milling of asphalt pavement to the depth as noted in the Plans."
- 101-1.2:** Add the following paragraph: "This item also includes removal of airfield lighting equipment when shown in the Plans. The affected equipment may be critical to safe operation of the airport and Contractor is to follow the Construction Safety and Phasing Plan for sequence of work involving disconnection and removal of airfield lighting equipment. Additionally, proper security of the airfield lighting power supply is to be carried out following safety protocols including but not limited to CFR 29 Parts 1926 and 1910 to ensure safety of personnel prior to any work on or near the affected circuits."
- 101-3.1:** Add the following sentences to the paragraph: "The landside and airside pavements to remain in this project are NOT capable of handling heavy construction equipment. Contractor is to consider the weight-carrying capacity of the pavement in the selection of pavement removal equipment. Repositioning of pavement removal equipment will not be permitted to move along existing runway pavement without using methods to prevent existing runway and distribute load(s). Damage to pavement that is to remain resulting from the Contractor's equipment is to be repaired IMMEDIATELY by the Contractor at no additional cost to the Owner or Agent."
- 101-3.1.a:** Insert the following after the fourth sentence in the first paragraph as follows: "Removed concrete pavement slabs are to become property of the Contractor and are to be removed from the airport. If the material is to be wasted on the airport site, it shall be reduced to a maximum size of []".
- 101-3.1.b:** Modify the paragraph as follows: "Asphalt pavement to be removed shall be cut to the full depth of the asphalt pavement around the ultimate exposed edge perimeter of the area to be removed. Contractor is to take all precautions to prevent damage to the sawcut edges through the installation of the replacement pavement. In no case is the removal of asphalt to risk the delamination or separation of asphalt layer(s) in the existing adjacent pavement. REMOVED ASPHALT REMAINS PROPERTY OF THE OWNER. Collect, haul, and dispose of removed asphalt on airport property to location as shown on the Plans. If the material is to be wasted on the airport site, it shall be broken to a maximum particle size of 1 inch (25 mm). When shown on the Plans, remove asphalt surfacing by sawcutting the full-depth of asphalt and removing all asphalt and the underlying base. Grade to new edge of asphalt following items P-152 and revegetation specifications."
- 101-3.2:** Modify the first paragraph as follows: "Remove all vegetation ~~and debris~~ from cracks to a minimum depth of 1 inch (25 mm), regardless of whether the cracks are repaired under section 101-3.9 or not. If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the ~~RPR~~ Engineer, and allow manufacturer's recommended time for the herbicide to kill the vegetation before removing the vegetation. When directed by the Engineer, fill all open cracks greater than 1/4 inch (6 mm) wide) with a crack sealant per ASTM D6690. The crack sealant, preparation, and application shall

be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch (3 mm), not to exceed ¼ inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface."

- 101-3.2: Modify the first sentence in the third paragraph as follows: "When directed by the Engineer, wider cracks (up to 1 inch wide) may are to be filled with a mixture of emulsified asphalt and aggregate."
- 101-3.2: Modify the last paragraph to remove references to overlay since a seal coat will be placed over the existing pavement, and remove references to concrete overlay.
- 101-3.3: Remove this paragraph as there is no foreign substance to remove.
- 101-3.3.a: Remove this paragraph as there are no concrete pavement spalls to repair
- 101-3.5: Modify the second sentence in the paragraph as follows: "The milling machine or grinder shall operate without tearing or gouging the underlying surface or breaking up the underlying asphalt layer(s)."
- 101-3.5.a: Modify the paragraph as follows: "~~Patching~~ Transition for Overlay. The milling machine shall be capable of cutting a vertical edge without chipping or spalling the edges of the remaining pavement and it shall have a positive method of controlling the depth of cut. The ~~RPR Contractor~~ shall layout the area to be milled, based on the Plans, which are for milling to provide at least 1 1/2 inches of overlay, with a straightedge in increments of 1 foot (30 cm) widths. The RPR will review the laid-out limits of each area with the Contractor before the Contractor begins milling. ~~The area to be milled shall cover only the failed area.~~ Any excessive area that is milled because the Contractor doesn't have the appropriate milling machine, or areas that are damaged because of his negligence, shall be repaired by the Contractor at the Contractor's Expense."
- 101-3.5.b: Remove this paragraph as there is no requirement for surface correction under this item.
- 101-3.6.b: Modify the paragraph as follows: "Repair joints and open cracks in accordance with paragraph 101-3.2. Open cracks to be repaired under this item are to be identified by the RPR in advance of beginning the repairs."
- 101-3.8: Remove this paragraph as joint sealing is not applicable.
- 101-3.9: Modify the first sentence in the paragraph to add removal of vegetation and delete removal of old joint sealants to the required elements to be addressed before application of crack sealant.
- 101-3.9.1: Remove requirements to widen existing cracks.
- 101-3.9.2: Remove requirements to remove existing crack sealant from existing sealed cracks.
- 101-3.9.4.c: Add the following paragraph: "c. Removal of airfield lighting conduit conductor and counterpoise. When shown on the Plans or when previously abandoned conduit, conductor, or counterpoise requires removal for carrying out the work, remove conduit, conductor, and/or counterpoise wire. At circuit cuts that become splices for new work, make the cut within an existing junction box and at the proposed location of a new junction box, providing sufficient slack for connection and maintenance of the spliced conductors. Removed materials become property of the Contractor and are to be disposed of off airport property following proper codes and laws."
- 101-3.9.4.d: Add the following paragraph: "d. Removal of edge lighting. When shown on the Plans, remove existing stake-mounted edge light fixture and adjacent junction box – including secondary transformer."

Removed materials become property of the Contractor and are to be disposed of off airport property following proper codes and laws."

- 101-3.9.4.e: Add the following paragraph: "e. **Removal of airfield signs.** When shown on the Plans, remove existing airfield sign fixture, concrete base, and associated junction box(es) – including secondary transformer. Contractor is to verify the condition of the existing sign(s) and its connection to the lighting circuitry prior to removal. This verification is to occur prior to preparing shop drawings, fabrication, or installation of equipment to enable proper tie-in of new equipment to the existing lighting circuitry. Existing signs are to be carefully removed from the foundation for re-use. SIGNS THAT ARE IDENTIFIED FOR RE-USE THAT ARE REMOVED FROM THE PROJECT AND/OR DAMAGED DUE TO INSUFFICIENT PROTECTION WILL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. Demolish the foundation, junction box, and appurtenances. Removed materials (except for the sign) become property of the Contractor and are to be disposed of off airport property following proper codes and laws. Store the sign in a safe location on the airport for re-use.
- 101-4.2 Modify the measurement of joint and crack repair as follows: "The unit of measurement for joint and crack repair shall be the linear foot (meter) of joint, crack, for each size of open cracks as measured by the RPR."
- 101-4.4 Add the following section: "**Removal of airfield lighting conduit, conductor and/or counterpoise.** The unit of measure for removing conduit, conductor (insulated wire), and counterpoise (bare wire) shall be by the linear foot of each and all in any combination on the same alignment, approved by the RPR.
- 101-4.5 Add the following section: "**Removal of airfield edge lights.** The unit of measure for edge lighting removal shall be by each light fixture location, approved by the RPR. If the light fixture is missing from the location of the fixture, the measure will still be by each for removal of the junction box, secondary transformer, and other appurtenance associated with the light fixture."
- 101-4.6 Add the following section: "**Removal of airfield signs.** The unit of measure for airfield sign removal shall be by each sign, approved by the RPR."

END OF SPECIAL PROVISION TO ITEM P-101

Item P-101 Preparation / Removal of Existing Pavements

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

101-1.1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement and other miscellaneous items. References to "cold milling" herein are to be understood as milling of asphalt pavement to the depth as noted in the Plans. The work shall be accomplished in accordance with these specifications and the applicable plans.

101-1.2 This item also includes removal of airfield lighting equipment when shown in the Plans. The affected equipment may be critical to safe operation of the airport and Contractor is to follow the Construction Safety and Phasing Plan for sequence of work involving disconnection and removal of airfield lighting equipment. Additionally, proper security of the airfield lighting power supply is to be carried out following safety protocols including but not limited to CFR 29 Part 1926 and 1910 to ensure safety of personnel prior to any work on or near the affected circuits.

EQUIPMENT AND MATERIALS

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

CONSTRUCTION

101-3.1 **Removal of existing pavement.** The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement. The landside and airside pavements to remain in this project are NOT capable of handling heavy construction equipment. Contractor is to consider the weight-carrying capacity of the pavement in the selection of pavement removal equipment. Repositioning of pavement removal equipment will not be permitted to move along existing runway pavement without using methods to prevent existing runway and distribute load(s). Damage to pavement that is to remain resulting from the Contractor's equipment is to be repaired IMMEDIATELY by the Contractor at no additional cost to the Owner or Agent.

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

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

- b. **Asphalt pavement removal.** Asphalt pavement to be removed shall be cut to the full depth of the asphalt pavement around the ultimate exposed edge perimeter of the area to be removed. Contractor is to take all precautions to prevent damage to the sawcut edges through the installation of the replacement pavement. In no case is the removal of asphalt to risk the delamination or separation of asphalt layer(s) in the existing

adjacent pavement. REMOVED ASPHALT REMAINS PROPERTY OF THE OWNER. Collect, haul, and dispose of removed asphalt on airport property to location as shown on the Plans. If the material is to be wasted on the airport site, it shall be broken to a maximum particle size of 1 inch (25 mm). When shown on the Plans, remove asphalt surfacing by sawcutting the full-depth of asphalt and removing all asphalt and the underlying base. Grade to new edge of asphalt following items P-152 and revegetation specifications.

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

101-3.2 Preparation of joints and cracks prior to overlay/surface treatment. Remove all vegetation and debris from cracks to a minimum depth of 1 inch (25 mm), regardless of whether the cracks are repaired under section 101-3.9 or not. If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the RPR Engineer, and allow manufacturer’s recommended time for the herbicide to kill the vegetation before removing the vegetation. When directed by the Engineer, fill all open cracks greater than 1/4 inch (6 mm) wide) with a crack sealant per ASTM D6690. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch (3 mm), not to exceed 1/4 inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface.

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

When directed by the Engineer, wider cracks (up to 1 inch wide) may are to be filled with a mixture of emulsified asphalt and aggregate. The aggregate shall consist of limestone, volcanic ash, sand, or other material that will cure to form a hard substance. The combined gradation shall be as shown in the following table.

Gradation

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

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

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

101-3.3 ~~Removal of foreign substances/contaminates NOT USED. Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the RPR Engineer in the field during construction.~~

~~Chemicals, heater scarifier (asphaltic concrete only), and/or rotary grinding may be used. If chemicals are used, they shall comply with the state's environmental protection regulations. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the RPR Engineer that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the RPR Engineer.~~

~~Removal of foreign substances shall not proceed until approved by the RPR Engineer. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed of in areas indicated in this specification or shown on the plans.~~

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

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

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

101-3.5 ~~Cold milling (also known as milling). Milling shall be performed with a power-operated milling machine or grinder, capable of producing a uniform finished surface. The milling machine or grinder shall operate without tearing or gouging the underlying surface or breaking up the underlying asphalt layer(s). The milling machine or grinder shall be equipped with grade and slope controls, and a positive means of dust control. All millings shall be removed and disposed of into areas designated on the Plans. If the Contractor mills or grinds deeper or wider than the plans specify, the Contractor shall replace the material removed with new material at the Contractor's Expense.~~

~~a. **Patching Transition for Overlay.** The milling machine shall be capable of cutting a vertical edge without chipping or spalling the edges of the remaining pavement and it shall have a positive method of controlling the depth of cut. The RPR Contractor shall layout the area to be milled, based on the Plans, which are for milling to provide at least 1 1/2 inches of overlay, with a straightedge in increments of 1 foot (30 cm) widths. The RPR will review the laid-out limits of each area with the Contractor before the Contractor begins milling. The area to be milled shall cover only the failed area. Any excessive area that is milled because the Contractor doesn't have the appropriate milling machine, or areas that are damaged because of his negligence, shall be repaired by the Contractor at the Contractor's Expense.~~

- b. **Profiling, grade correction, or surface correction.** ~~NOT USED.~~ The milling machine shall have a minimum width of 7 feet (2 m) and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch (+0 mm and -6mm) of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to remove the millings or cuttings from the pavement and load them into a truck. All millings shall be removed and disposed of off the airport.
- c. **Clean-up.** The Contractor shall sweep the milled surface daily and immediately after the milling until all residual materials are removed from the pavement surface. Prior to paving, the Contractor shall wet down the milled pavement and thoroughly sweep and/or blow the surface to remove loose residual material. Waste materials shall be collected and removed from the pavement surface and adjacent areas by sweeping or vacuuming. Waste materials shall be removed and disposed off Airport property.

101-3.6. Preparation of asphalt pavement surfaces prior to surface treatment. Existing asphalt pavements to be treated with a surface treatment (see Item Tx-316) shall be prepared as follows:

- a. Patch asphalt pavement surfaces that have been softened by petroleum derivatives or have failed due to any other cause. Remove damaged pavement to the full depth of the damage and replace with new asphalt pavement similar to that of the existing pavement in accordance with paragraph 101-3.4b.
- b. Repair joints and open cracks in accordance with paragraph 101-3.2. Open cracks to be repaired under this item are to be identified by the RPR in advance of beginning the repairs.
- c. Remove oil or grease that has not penetrated the asphalt pavement by scrubbing with a detergent and washing thoroughly with clean water. After cleaning, treat these areas with an oil spot primer recommended by the surface treatment binder manufacturer to be compatible with the surface treatment products.
- d. Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film.

101-3.7 Maintenance. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR Engineer. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 Preparation of Joints in Rigid Pavement prior to resealing. ~~NOT USED.~~ Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method used cleans the joint and does not damage the joint.

101-3.8.1 Removal of Existing Joint Sealant. ~~NOT USED.~~ All existing joint sealants will be removed by plowing or use of hand tools. Any remaining sealant and or debris will be removed by use of wire brushes or other tools as necessary. Resaw joints removing no more than 1/16 inch (2 mm) from each joint face. Immediately after sawing, flush out joint with water and other tools as necessary to completely remove the slurry.

101-3.8.2 Cleaning prior to sealing. ~~NOT USED.~~ Immediately before sealing, joints shall be cleaned by removing any remaining laitance and other foreign material. Allow sufficient time to dry out joints prior to sealing. Joint surfaces will be surface dry prior to installation of sealant.

101-3.8.3 Joint sealant. Joint material and installation will be in accordance with Not Applicable.

- 101-3.9 Preparation of Cracks in Flexible Pavement prior to sealing.** Prior to application of sealant material, clean the joint of vegetation and dry the joints of all scale, dirt, dust, ~~old sealant~~, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method used cleans the cracks and does not damage the pavement.
- 101-3.9.1 Preparation of Crack.** ~~Widen crack with [router] [random crack saw] by removing a minimum of 1/16 inch (2 mm) from each side of crack.~~ Immediately before sealing, cracks will be blown out with a hot air lance combined with oil- and water-free compressed air.
- 101-3.9.2 Removal of Existing Crack Sealant.** ~~NOT USED. Existing sealants will be removed by [routing] [random crack saw]. Following [routing] [sawing] any remaining debris will be removed by use of a hot lance combined with oil and water free compressed air.~~
- 101-3.9.3 Crack Sealant.** Crack sealant material and installation will be in accordance with Item P-605.
- 101-3.9.4 Removal of Pipe and other Buried Structures.**
- a. **Removal of Existing Pipe Material.** Not Used.
 - b. **Removal of Inlets/Manholes.** Not Used.
 - c. *Removal of airfield lighting conduit conductor and counterpoise. When shown on the Plans or when previously abandoned conduit, conductor, or counterpoise requires removal for carrying out the work, remove conduit, conductor, and/ or counterpoise wire. At circuit cuts that become splices for new work, make the cut within an existing junction box and at the proposed location of a new junction box, providing sufficient slack for connection and maintenance of the spliced conductors. Removed materials become property of the Contractor and are to be disposed of off airport property following proper codes and laws.*
 - d. *Removal of edge lighting. When shown on the Plans, remove existing stake-mounted edge light fixture and adjacent junction box – including secondary transformer. Removed materials become property of the Contractor and are to be disposed of off airport property following proper codes and laws.*
 - e. *Removal of airfield signs. When shown on the Plans, remove existing airfield sign fixture, concrete base, and associated junction box(es) – including secondary transformer. Contractor is to verify the condition of the existing sign(s) and its connection to the lighting circuitry prior to removal. This verification is to occur prior to preparing shop drawings, fabrication, or installation of equipment to enable proper tie-in of new equipment to the existing lighting circuitry. Existing signs are to be carefully removed from the foundation for re-use. SIGNS THAT ARE IDENTIFIED FOR RE-USE THAT ARE REMOVED FROM THE PROJECT AND/OR DAMAGED DUE TO INSUFFICIENT PROTECTION WILL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. Demolish the foundation, junction box, and appurtenances. Removed materials (except for the sign) become property of the Contractor and are to be disposed of off airport property following proper codes and laws. Store the sign in a safe location on the airport for re-use.*

METHOD OF MEASUREMENT

- 101-4.1 Pavement removal.** The unit of measurement for pavement removal shall be the number of square yards (square meters) removed by the Contractor. Any pavement removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal. Dowel bar installation shall be incidental to pavement removal.

- 101-4.2 **Joint and crack repair.** The unit of measurement for joint and crack repair shall be the linear foot (meter) of joint, crack, for each size of open cracks as measured by the RPR.
- 101-4.3 **Cold milling.** The unit of measure for cold milling shall be per square yard (square meter). The location and average depth of the cold milling shall be as shown on the plans. If the initial cut does not correct the condition, the Contractor shall re-mill the area and will be paid as additional depth per square yard for the total depth of milling.
- 101-4.4 Removal of airfield lighting conduit, conductor and/or counterpoise. The unit of measure for removing conduit, conductor (insulated wire), and counterpoise (bare wire) shall be by the linear foot of each and all in any combination on the same alignment, approved by the RPR.
- 101-4.5 Removal of airfield edge lights. The unit of measure for edge lighting removal shall be by each light fixture location with removal of the junction box, secondary transformer, and other appurtenance associated with the light fixture, approved by the RPR. If the light fixture is missing from the location of the fixture, the measure will still be by each for removal of the junction box, secondary transformer, and other appurtenance associated with the light fixture.
- 101-4.6 Removal of airfield signs. The unit of measure for airfield sign removal shall be by each sign, approved by the RPR.

BASIS OF PAYMENT

- 101-5.1 **Payment.** Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, **sawcutting at limits (when a component)**, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item P-101-1	Mill asphalt pavement (2") – per Square Yard
Item P-101-2	Mill asphalt pavement (additional depth) – per Square Yard
Item P-101-3	Seal open cracks in existing asphalt up to 1 inch wide – per Linear Foot
Item P-101-4	Demolish asphalt pavement – per Square Yard
Item P-101-5	Demolish concrete pavement – per Square Yard
Item P-101-6	Remove airfield lighting conduit, conductor, and counterpoise – per Linear Foot
Item P-101-7	Remove airfield edge light and Brooks-style junction box – per Each
Item P-101-8	Salvage airfield sign and demolish concrete foundation – per Each

REFERENCES

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

	Advisory Circulars (AC)
AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements.
	ASTM International (ASTM)
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

END OF ITEM P-101

Special Provision to Item P-152 Excavation, Subgrade, and Embankment

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "RPR" has been replaced with "Engineer".
- 152-1.2.b:** Delete a portion of the last sentence: "~~or from areas outside the airport boundaries.~~" Contractor is required to utilize borrow from on-airport stockpiles and sources of soil for shoulder grading as borrow.
- 152-1.3:** Modify the paragraph as follows: "Any material containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. The Contractor shall excavate areas suspected to be unsuitable to uncover the limits of the material in question. Engineer is to classify and delineate material as unsuitable. Unsuitable material, that is suitable for topsoil may be used on the embankment slope when approved by the Engineer RPR. Replacement of unsuitable materials will be embanked from the stockpile areas as needed to replace unsuitable materials."
- 152-2.1:** Modify the first paragraph as follows: "Before beginning excavation, grading, and embankment operations in any area, the area shall be completely cleared and stripped of sod and topsoil in accordance with Item T-905, grubbed, in accordance with Item P-151."
- 152-2.2:** Modify the second paragraph as follows: "All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the Engineer RPR. Stockpile the top 2 inches of topsoil in accordance with item T-905 from areas to be excavated or embanked, storing the topsoil in a location acceptable to the Engineer and Owner. Protect stockpiles from wind erosion. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of as shown on the plans."
- 152-2.2:** Remove subparagraphs **b.** through **d.**
- 152-2.2:** Add the following NEW subparagraph: "**b. Shoulder grading. Adjacent to overlaid pavement, approximately ten (10) feet off the pavement edge is to be regraded to meet the new elevation of the overlaid pavement. This is accomplished by removing the top two inches of topsoil in accordance with item T-905, and embanking material obtained from stockpiles (borrow areas) on the airport to meet new grade requirements by "shoulder grading."**"
- 152-2.5:** Add the following sentence to the paragraph: "Contractor is to obtain proctor values of subgrade soils to use in determination of compaction requirements. Share results of proctor values with RPR and Engineer for use in acceptance testing."
- 152-2.8:** Modify the last sentence of fourth paragraph as follows: ". The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times, including the cutting of temporary swales if needed to drain areas in the construction that are susceptible to holding water."
- 152-2.8:** Add the following sentence to the end of the sixth paragraph: "Contractor is to observe weather conditions and confirm soil temperatures are above dew point temperature to prevent additional moisture from entering any soil being aerated."

- 152-2.8: Add the following sentence to the end of the seventh paragraph: "Contractor is to share the results of the Proctor test(s) with the RPR and Engineer for use in acceptance testing."
- 152-2.8: Modify the eighth paragraph as follows: "Density tests will be taken by the Engineer RPR for every 3,000 square yards or each day's production of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the Engineer RPR. Density tests as a percentage of standard compaction will require Contractor to provide proctor test results to Engineer."
- 152-2.10: Add the following to the end of the first paragraph: "CONDUCT TESTS ON SUBGRADE PRIOR TO LIME STABILIZATION. Failed tests conducted by the Engineer will be back charged to the Contractor."
- 152-2.14: Modify the first paragraph as follows: "During the course of work under this item – including shoulder grading, Contractor is to isolate topsoil to re-spread per Item T-905 to re-establish vegetation as soon as possible. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-905. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles will not be allowed within 250 feet of any existing or proposed runway or taxiway, whether closed to aircraft traffic or not. Stockpiles shall be located as shown on the plans and the approved CSPP, and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the Engineer RPR, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling."
- 152-3.1: Replace the paragraph with: "Measurement for shoulder grading and subgrade compaction will be by the square yard of shoulder: typically, inclusive of the width of the work conducted by the running length."
- 152-3.2: Modify the paragraph as follows: "Measurement for payment specified by the cubic yard (cubic meter) shall be computed by the average end areas of design cross sections. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by cross-sections generated by the Contractor shown on the plans, subject to verification by the Engineer RPR. The Contractor is to conduct surveyed cross-sections at any location(s) before excavation begins and for each pay application that includes a quantity for payment under this Item. The cross-sections, both before and after excavation, will be used to determine the excavation quantity for payment. At the Contractor's option, measurement of excavation may be based on plan quantity. The quantity listed on the bid form may be accepted by the Contractor as correct and as the total amount for payment under this pay item. Contractor has the option to accept the plan quantity and will not be required to conduct field cross-sections in support of pay requests. Contractor is to provide a written acceptance of plan quantity to Engineer before beginning any activities under this item. Upon executing this option, it is considered final and not subject to reversion."
- 152-4.1 Modify the first sentence of the paragraph as follows: "Shoulder grading" and "subgrade compaction" payment shall be made at the contract unit price per square yard.

END OF SPECIAL PROVISION TO ITEM P-152

Item P-152 Excavation, Subgrade, and Embankment

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

- 152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.
- 152-1.2 **Classification.** All material excavated shall be classified as defined below:
- a. **Unclassified excavation.** Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature .
 - b. **Borrow excavation.** Borrow excavation shall consist of approved material required for the construction of embankments or for other portions of the work in excess of the quantity of usable material available from required excavations. Borrow material shall be obtained from areas designated by the Engineer within the limits of the airport property but outside the normal limits of necessary grading, ~~or from areas outside the airport boundaries.~~
- 152-1.3 **Unsuitable excavation.** Any material containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. The Contractor shall excavate areas suspected to be unsuitable to uncover the limits of the material in question. Engineer is to classify and delineate material as unsuitable. Unsuitable material, that is suitable for topsoil may be used on the embankment slope when approved by the Engineer, RPR. Replacement of unsuitable materials will be embanked from the stockpile areas as needed to replace unsuitable materials.

CONSTRUCTION METHODS

- 152-2.1 **General.** Before beginning excavation, grading, and embankment operations in any area, the area shall be completely cleared and stripped of sod and topsoil in accordance with Item T-905. ~~grubbed, in accordance with Item P-151.~~
- The suitability of material to be placed in embankments shall be subject to approval by the Engineer, RPR. All unsuitable material shall be disposed of in waste areas as shown on the plans. All waste areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of waste areas shall be specified on the plans or approved by the Engineer, RPR.
- When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the RPR, Agent, Owner and Engineer notified per Section 70, paragraph 70-20. At the direction of the Engineer, RPR, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.
- Areas outside the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches (100 mm), to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches (100 mm) in their greatest dimension will not be permitted in the top 6 inches (150 mm) of the subgrade.
- If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the Engineer, RPR, who shall arrange for their removal if necessary. The Contractor, at their own expense, shall

satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

a. **Blasting.** Blasting shall not be allowed.

152-2.2 **Excavation.** No excavation shall be started until the work has been staked out by the Contractor and the RPR has obtained from the Contractor, the survey notes of the elevations and measurements of the ground surface. The Contractor and Engineer RPR shall agree that the original ground lines shown on the original topographic mapping are accurate, or agree to any adjustments made to the original ground lines.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the Engineer RPR. Stockpile the top 2 inches of topsoil in accordance with item T-905 from areas to be excavated or embanked, storing the topsoil in a location acceptable to the Engineer and Owner. Protect stockpiles from wind erosion. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the Engineer RPR. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

a. **Selective grading.** ~~When selective grading is indicated on the plans,~~ The more suitable material designated by the Engineer RPR shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

b. **Shoulder grading.** Adjacent to overlaid pavement, approximately ten (10) feet off the pavement edge is to be regraded to meet the new elevation of the overlaid pavement. This is accomplished by removing the top two inches of topsoil in accordance with item T-905, and embanking material obtained from stockpiles (stockpile and grading areas) on the airport to meet new grade requirements by "shoulder grading".

~~b. **Undercutting.** Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches (300 mm) below the subgrade or to the depth specified by the RPR. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be [] disposed of at locations shown on the plans. [] disposed off the airport. The cost is incidental to this item. [] This excavated material shall be paid for at the contract unit price per cubic yard (per cubic meter) for []. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary backfill will constitute a part of the embankment. Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans. Undercutting will be paid as [unclassified excavation] [rock excavation]~~

~~c. **Overbreak.** Over break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the RPR. All over break shall be graded or removed by the Contractor and disposed of as directed by the RPR. The RPR shall determine if the displacement of such material was unavoidable and their own decision shall be final. Payment will not be made for the removal~~

and disposal of over break that the RPR determines as avoidable. Unavoidable over break will be classified as "Unclassified Excavation."

- d. **Removal of utilities.** The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by the Contractor as indicated on the plans. All existing foundations shall be excavated at least 2 feet (60 cm) below the grade top of subgrade or as indicated on the plans, and the material disposed of as directed by the Engineer RPR. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

152-2.3 **Stockpile and Grading Excavation Borrow excavation.** Borrow areas within the airport property are indicated on the plans. Borrow excavation shall be made only at these designated locations and within the horizontal and vertical limits as staked or as directed by the RPR-Engineer. All unsuitable material shall be disposed of by the Contractor as shown on the plans. All borrow pits shall be opened to expose the various strata of acceptable material to allow obtaining a uniform product. Borrow areas shall be drained and left in a neat, presentable condition with all slopes dressed uniformly. Borrow areas shall not create a hazardous wildlife attractant.

152-2.4 **Drainage excavation.** Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the Engineer RPR. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 **Preparation of cut areas or areas where existing pavement has been removed.** In those areas on which a subbase or base course is to be placed, the top 8 inches (300 mm) of subgrade shall be compacted to not less than 100 % of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D-698. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318. Contractor is to obtain proctor values of subgrade soils to use in determination of compaction requirements. Share results of proctor values with RPR and Engineer for use in acceptance testing.

152-2.6 **Preparation of embankment area.** All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches (150 mm) and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-2.7 **Control Strip.** The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the Engineer, RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the Engineer, RPR.

152-2.8 Formation of embankments. The material shall be constructed in lifts as established in the control strip, but not less than 6 inches (150 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the Engineer, RPR. Materials such as brush, hedge, roots, stumps, grass, and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained due to rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times, including the cutting of temporary swales if needed to drain areas in the construction that are susceptible to holding water.

The material in each lift shall be within -2 to 0% of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation. If nuclear density machines are to be used for density determination, the machines shall be calibrated in accordance with ASTM D6938.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density. Contractor is to observe weather conditions and confirm soil temperatures are above dew point temperature to prevent additional moisture from entering any soil being aerated.

The Contractor will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D698. A new Proctor shall be obtained for each soil type based on visual classification. Contractor is to share the results of the Proctor test(s) with the RPR and Engineer for use in acceptance testing.

Density tests will be taken by the Engineer, RPR for every 3,000 square yards or each day's production of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the Engineer, RPR. Density tests as a percentage of standard compaction will require Contractor to provide proctor test results to Engineer.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D698. Under all areas to be paved, the embankments shall be compacted to a depth of 8 inches and to a density of not

less than 95 percent of the maximum density as determined by ASTM D698. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 2 inches (100 mm) which shall be prepared for a seedbed in accordance with Item T-905 and Items T-901 and T-904.

The in-place field density shall be determined in accordance with ASTM 6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. The RPR Engineer shall perform all in-place density tests. If the specified density is not attained, the area represented by the test or as designated by the Engineer RPR shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 12 inches (300 mm) of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the Engineer RPR and the finer material shall be used to fill the voids forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment material shall not be disposed of except at places and in the manner designated on the plans or by the Engineer RPR.

~~When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet (60 cm) in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift shall not be constructed above an elevation 4 feet (1.2 m) below the finished subgrade.~~

There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in lifts, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, *shoulder grading*, or other items.

152-2.9 **Proof rolling.** Not Used. See 2.10 below for subgrade compaction.

152-2.10 **Compaction requirements.** The subgrade under areas to be paved shall be compacted to a depth of 8 inches and to a density of not less than 95 percent of the maximum dry density as determined by ASTM D698. ~~The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of [12 inches (300 mm)] and to a density of not less than [95] percent of the maximum density as determined by ASTM [D698].~~ The material to be compacted shall be ~~within ± 2 to 0%~~ of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the $\frac{3}{4}$ inch (19.0 mm) sieve, follow the methods in ASTM D698. Tests for moisture content and compaction will be taken at a minimum of 3000 S.Y. of subgrade. All quality assurance testing shall be done by the RPR Engineer. CONDUCT TESTS ON SUBGRADE PRIOR TO LIME STABILIZATION. Failed tests conducted by the Engineer will be back charged to the Contractor.

The in-place field density shall be determined in accordance with ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938 within 12 months prior to its use on this contract. The gage shall be field standardized daily. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified. If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached. All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the RPR Engineer and the finished subgrade shall be maintained.

- 152-2.11 Finishing and protection of subgrade.** Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the Engineer RPR.

- 152-2.12 Haul.** All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

- 152-2.13 Surface Tolerances.** In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the R Engineer RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

- a. **Smoothness.** The finished surface shall not vary more than +/- ½ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.
- b. **Grade.** The grade and crown shall be measured on a 50-foot (15-m) cross-section interval ~~grid~~ and shall be within +/-0.05 feet (15 mm) of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to be placed, grade shall not vary more than 0.10 feet (30 mm) from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.14 Topsoil. During the course of work under this item – including shoulder grading, Contractor is to isolate topsoil to re-spread per Item T-905 to re-establish vegetation as soon as possible. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-905. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations.

Stockpiles will not be allowed within 250 feet of any existing or proposed runway or taxiway, whether closed to aircraft traffic or not. Stockpiles shall be located as shown on the plans and the approved CSPP, and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the Engineer, RPR, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans and as required in Item T-905. Topsoil shall be paid for as provided in Item T-905. No direct payment will be made for topsoil under Item P-152.

METHOD OF MEASUREMENT

152-3.1 Measurement for shoulder grading and subgrade compaction will be by the square yard: typically, inclusive of the width of the work conducted by the running length.

152-3.2 Measurement for payment specified by the cubic yard (cubic meter) shall be computed by the average end areas of design cross sections. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by cross-sections generated by the Contractor shown on the plans, subject to verification by the Engineer, RPR. The Contractor is to conduct surveyed cross-sections at any location(s) before excavation begins and for each pay application that includes a quantity for payment under this item. The cross-sections, both before and after excavation, will be used to determine the excavation quantity for payment. At the Contractor's option, measurement of excavation may be based on plan quantity. The quantity listed on the bid form may be accepted by the Contractor as correct and as the total amount for payment under this pay item. Contractor has the option to accept the plan quantity and will not be required to conduct field cross-sections in support of pay requests. Contractor is to provide a written acceptance of plan quantity to Engineer before beginning any activities under this item. Upon executing this option, it is considered final and not subject to reversion.

BASIS OF PAYMENT

152-4.1 "Shoulder grading" and "subgrade compaction" payment shall be made at the contract unit price per square yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.2 Payment for unclassified excavation shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

- Item P-152-1 Shoulder Grading per square yard.
- Item P-152-2 Subgrade Compaction per square yard.
- Item P-152-3 Unclassified Excavation per cubic yard.

REFERENCES

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

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180 Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

ASTM International (ASTM)

ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))

ASTM D1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2700 kN-m/m³))

ASTM D6938 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Advisory Circulars (AC)

AC 150/5370-2 Operational Safety on Airports During Construction

Software

FAARFIELD FAA Rigid and Flexible Iterative Elastic Layered Design

U.S. Department of Transportation

FAA RD-76-66 Design and Construction of Airport Pavements on Expansive Soils

END OF ITEM P-152

Special Provision to Item P-603 Emulsified Asphalt Tack Coat

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

General: there are several, but not all instances where "RPR" has been replaced with "Engineer".

603-3.2: Modify the first sentence in the third paragraph as follows: "The distributor truck shall be equipped with a ~~minimum 12-foot (3.7 m)~~ spreader spray bar capable of applying tack coat to a width compatible with the asphalt paving lane width, and with individual nozzle control with computer-controlled application rates."

END OF SPECIAL PROVISION TO ITEM P-603

Item P-603 Emulsified Asphalt Tack Coat

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

- 603-1.1 This item shall consist of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

MATERIALS

- 603-2.1 **Asphalt materials.** The asphalt material shall be an emulsified asphalt as specified in ASTM D3628 as an asphalt application for tack coat appropriate to local conditions. The emulsified asphalt shall not be diluted. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt material to the Engineer ~~Resident Project Representative (RPR)~~ before the asphalt material is applied for review and acceptance. The furnishing of COA for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

CONSTRUCTION METHODS

- 603-3.1 **Weather limitations.** The tack coat shall be applied only when the existing surface is dry and the atmospheric temperature is 50°F (10°C) or above; the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the Engineer ~~RPR~~.
- 603-3.2 **Equipment.** The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven (700) feet per minute (213 m per minute).

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a ~~minimum 12 foot (3.7 m)~~ spreader spray bar capable of applying tack coat to a width compatible with the asphalt paving lane width, and with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the Engineer ~~RPR~~.

A power broom and/or power blower suitable for cleaning the surfaces to which the asphalt tack coat is to be applied shall be provided.

- 603-3.3 Application of emulsified asphalt material.** The emulsified asphalt shall not be diluted. Immediately before applying the emulsified asphalt tack coat, the full width of surface to be treated shall be swept with a power broom and/or power blower to remove all loose dirt and other objectionable material.

The emulsified asphalt material shall be uniformly applied with an asphalt distributor at the rates appropriate for the conditions and surface specified in the table below. The type of asphalt material and application rate shall be approved by the Engineer RPR prior to application.

Emulsified Asphalt

Surface Type	Residual Rate, gal/SY (L/square meter)	Emulsion Application Bar Rate, gal/SY (L/square meter)
New asphalt	0.02-0.05 (0.09-0.23)	0.03-0.07 (0.13-0.32)
Existing asphalt	0.04-0.07 (0.18-0.32)	0.06-0.11 (0.27-0.50)
Milled Surface	0.04-0.08 (0.18-0.36)	0.06-0.12 (0.27-0.54)
Concrete	0.03-0.05 (0.13-0.23)	0.05-0.08 (0.23-0.36)

After application of the tack coat, the surface shall be allowed to cure without being disturbed for the period of time necessary to permit drying and setting of the tack coat. This period shall be determined by the Engineer RPR. The Contractor shall protect the tack coat and maintain the surface until the next course has been placed. When the tack coat has been disturbed by the Contractor, tack coat shall be reapplied at the Contractor's expense.

- 603-3.4 Freight and waybills** The Contractor shall submit waybills and delivery tickets, during progress of the work. Before the final statement is allowed, file with the RPR certified waybills and certified delivery tickets for all emulsified asphalt materials used in the construction of the pavement covered by the contract. Do not remove emulsified asphalt material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

METHOD OF MEASUREMENT

- 603-4.1** The emulsified asphalt material for tack coat shall be measured by the gallon (liter). Volume shall be corrected to the volume at 60°F (16°C) in accordance with ASTM D1250. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

BASIS OF PAYMENT

- 603.5-1** Payment shall be made at the contract unit price per gallon (liter) of emulsified asphalt material. This price shall be full compensation for furnishing all materials, for all preparation, delivery, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-603-1 Emulsified Asphalt Tack Coat - per gallon (liter)

REFERENCES

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

ASTM International (ASTM)

ASTM D1250 Standard Guide for Use of the Petroleum Measurement Tables

ASTM D2995 Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors

ASTM D3628 Standard Practice for Selection and Use of Emulsified Asphalts

END OF ITEM P-603

Special Provision to Item P-605 Joint Sealants for Pavements

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "RPR" has been replaced with "Engineer".
- 605-2.2:** Modify the paragraph to remove backer rods from this Item.
- 605-2.3:** Modify the paragraph to remove bond breaker tape from this Item.
- 605-3.2.a:** Modify the paragraph to remove tractor-mounted routing tools from this Item.
- 605-3.2.b:** Modify the paragraph to remove concrete saw from this Item.
- 605-3.2.c:** Modify the paragraph to add hot air lance under this Item as follows: "The Contractor must demonstrate hot-air lance sandblasting equipment including the air compressor, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the Engineer Resident Project Representative (RPR), that the method cleans the joint and does not damage the joint.
- 605-3.2.d:** Modify the paragraph to remove water blasting equipment from this Item.
- 605-3.2.g:** Modify the paragraph to remove cold-applied, single-component sealing equipment from this Item.
- 605-3.3.a:** Modify the paragraph to remove sawing from this Item.
- 605-4.1:** Modify the paragraph to define measurement for this item under Item P-101. There is no separate measurement for payment for work under this item.
- 605-5.1:** Modify the paragraph to define payment for this item under Item P-101. There is no separate payment for work under this item.

END OF SPECIAL PROVISION TO ITEM P-605

Item P-605 Joint Sealants for Pavements

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

605-1.1 This item shall consist of providing and installing a resilient and adhesive joint sealing material capable of effectively sealing joints in pavement; joints between different types of pavements; and open cracks in existing pavement.

MATERIALS

605-2.1 Joint sealants. Joint sealant materials shall meet the requirements of ASTM D6690 Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

Each lot or batch of sealant shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, the safe heating temperature, and shall be accompanied by the manufacturer's certification stating that the sealant meets the requirements of this specification.

605-2.2 Backer rod. NOT USED. The material furnished shall be a compressible, non-shrinking, non-staining, non-absorbing material that is non-reactive with the joint sealant in accordance with ASTM D5249. The backer rod material shall be 25% ± 5 % larger in diameter than the nominal width of the joint.

605-2.3 Bond breaking tapes. NOT USED. Provide a bond breaking tape or separating material that is a flexible, non-shrinkable, non-absorbing, non-staining, and non-reacting adhesive backed tape. The material shall have a melting point at least 5°F (3°C) greater than the pouring temperature of the sealant being used when tested in accordance with ASTM D789. The bond breaker tape shall be approximately 1/8 inch (3 mm) wider than the nominal width of the joint and shall not bond to the joint sealant.

CONSTRUCTION METHODS

605-3.1 Time of application. Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. The pavement temperature shall be 50°F (10°C) and rising at the time of application of the poured joint sealing material. Do not apply sealant if moisture is observed in the joint.

605-3.2 Equipment. Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and maintained in satisfactory condition at all times. Submit a list of proposed equipment to be used in performance of construction work including descriptive data, ten (10) business days prior to use on the project.

a. **Tractor-mounted routing tool.** NOT USED. Provide a routing tool, used for removing old sealant from the joints, of such shape and dimensions and so mounted on the tractor that it will not damage the sides of the joints. The tool shall be designed so that it can be adjusted to remove the old material to varying depths as required. The use of V-shaped tools or rotary impact routing devices will not be permitted. Hand-operated spindle routing devices may be used to clean and enlarge random cracks.

b. **Concrete saw.** NOT USED. Provide a self-propelled power saw, with water-cooled diamond or abrasive saw blades, for cutting joints to the depths and widths specified.

c. **Hot Air Lance Sandblasting equipment.** The Contractor must demonstrate hot air lance sandblasting equipment including the air compressor, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the Engineer Resident Project Representative (RPR), that the method cleans the joint and does not damage the joint.

d. **Waterblasting equipment.** NOT USED. The Contractor must demonstrate waterblasting equipment including the pumps, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

e. **Hand tools.** Hand tools may be used, when approved, for removing defective sealant from a crack and repairing or cleaning the crack faces. Hand tools should be carefully evaluated for potential spalling effects prior to approval for use.

f. **Hot-poured sealing equipment.** The unit applicators used for heating and installing ASTM D6690 joint sealant materials shall be mobile and shall be equipped with a double-boiler, agitator-type kettle with an oil medium in the outer space for heat transfer; a direct-connected pressure-type extruding device with a nozzle shaped for inserting in the joint to be filled; positive temperature devices for controlling the temperature of the transfer oil and sealant; and a recording type thermometer for indicating the temperature of the sealant. The applicator unit shall be designed so that the sealant will circulate through the delivery hose and return to the inner kettle when not in use.

g. **Cold-applied, single-component sealing equipment.** ~~NOT USED. The equipment for installing ASTM D5893 single component joint sealants shall consist of an extrusion pump, air compressor, following plate, hoses, and nozzle for transferring the sealant from the storage container into the joint opening. The dimension of the nozzle shall be such that the tip of the nozzle will extend into the joint to allow sealing from the bottom of the joint to the top. Maintain the initially approved equipment in good working condition, serviced in accordance with the supplier's instructions, and unaltered in any way without obtaining prior approval. Small hand held air powered equipment (i.e., caulking guns) may be used for small applications.~~

605-3.3 Preparation of joints. Pavement joints for application of material in this specification must be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

a. **Sawing** ~~NOT USED. All joints shall be sawed in accordance with specifications and plan details. Immediately after sawing the joint, the resulting slurry shall be completely removed from joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary.~~

b. **Sealing.** Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, filler, protrusions of hardened concrete, old sealant and other foreign material from the sides and upper edges of the joint space to be sealed. Cleaning shall be accomplished by hot air lance as specified in paragraph 605-3.2. The newly exposed concrete joint faces and the pavement surface extending a minimum of 1/2 inch (12 mm) from the joint edge shall be sandblasted clean. Sandblasting shall be accomplished in a minimum of two passes. One pass per joint face with the nozzle held at an angle directly toward the joint face and not more than 3 inches (75 mm) from it. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave them completely free of debris and water. The joint faces shall be surface dry when the seal is applied.

c. **Backer Rod.** When the joint opening is of a greater depth than indicated for the sealant depth, plug or seal off the lower portion of the joint opening using a backer rod in accordance with paragraph 605-2.2 to prevent the entrance of the sealant below the specified depth. Take care to ensure that the backer rod is placed at the specified depth and is not stretched or twisted during installation.

d. **Bond-breaking tape.** Where inserts or filler materials contain bitumen, or the depth of the joint opening does not allow for the use of a backup material, insert a bond-separating tape breaker in accordance with paragraph 605-2.3 to prevent incompatibility with the filler materials and three-sided adhesion of the sealant. Securely bond the tape to the bottom of the joint opening so it will not float up into the new sealant.

605-3.4 Installation of sealants. Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by the RPR before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet (15 m) ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to 1/8 inch (3 mm) \pm 1/16 inch (2 mm) below the top of pavement surface; or bottom of groove for grooved pavement. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity

methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the RPR. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

605-3.5 Inspection. The Contractor shall inspect the joint sealant for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids. Sealants exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified at no additional cost to the airport.

605-3.6 Clean-up. Upon completion of the project, remove all unused materials from the site and leave the pavement in a clean condition.

METHOD OF MEASUREMENT

~~605-4.1 Measurement for payment under this item will be carried out as outlined in Item P-101. Joint sealing material shall be measured by the linear foot (meter) of sealant in place, completed, and accepted.~~

BASIS OF PAYMENT

~~605-5.1 Payment under this item will be carried out as outlined in Item P-101. Payment for joint sealing material shall be made at the contract unit price per linear foot (meter). The price shall be full compensation for furnishing all materials, for all preparation, delivering, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.~~

~~Payment will be made under:~~

~~Item P 605 5.1 Joint Sealing Filler, per linear foot (meter)~~

REFERENCES

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

ASTM International (ASTM)

ASTM D789 Standard Test Method for Determination of Relative Viscosity of Polyamide (PA)

ASTM D5249 Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints

ASTM D6690 Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt

Advisory Circulars (AC)

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

END OF ITEM P-605

Special Provision to Item P-620 Runway and Taxiway Marking from FAA Specifications for Construction of Airports – AC 150/5370-10H

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** There are several, but not all instances where "RPR" has been replaced with "Engineer".
- 602-2.2b:** Remove second sentence under section **b. Reflective Media**.

END OF SPECIAL PROVISION TO ITEM P-620

Item P-620 Runway and Taxiway Marking

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

620-1.1 This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). The terms “paint” and “marking material” as well as “painting” and “application of markings” are interchangeable throughout this specification.

MATERIALS

620-2.1 Materials acceptance. The Contractor shall furnish manufacturer’s certified test reports, for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer’s surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Resident Project Representative (RPR) Engineer prior to the initial application of markings. The reports can be used for material acceptance or the RPR may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR.

620-2.2 Marking materials.

Table 1. Marking Materials

Paint ¹				Glass Beads ²	
Type	Color	Fed Std. 595 Number	Application Rate Maximum	Type	Application Rate Minimum
Temporary Marking Waterborne Type I or II	White	37925	230 ft ² /gal	No beads	N/A
Temporary Marking Waterborne Type I or II	Yellow	33538	230 ft ² /gal	No beads	N/A
Temporary Marking Waterborne Type I or II	Black	37038	230 ft ² /gal	No beads	N/A
Waterborne Type I or II	White	37925	115 ft ² /gal	I, Grade A	7 lb./gal
Waterborne Type I or II	Yellow	33538	115 ft ² /gal	I, Grade A	7 lb./gal
Waterborne Type I or II	Black	37038	115 ft ² /gal	No beads	N/A

¹ See paragraph 620-2.2a

² See paragraph 620-2.2b

a. Paint. Paint shall be **waterborne** in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595 per table 1 above.

Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952F, [Type II] . The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis.

b. Reflective Media. Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D [Type I].

~~Glass beads for red and pink paint shall meet the requirements for [Type I, Gradation A].~~

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

Glass beads shall not be used in black and green paint. Type III glass beads shall not be used in red and pink paint.

CONSTRUCTION METHODS

620-3.1 Weather limitations. Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer's recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures do not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers' recommendations for application and dry time.

620-3.2 Equipment. Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

620-3.3 Preparation of surfaces. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminants that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the RPR Engineer. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

a. Preparation of new pavement surfaces. The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the RPR Engineer to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.

b. Preparation of pavement to remove existing markings. Existing pavement markings shall be removed by rotary grinding, water blasting, or by other methods approved by the RPR Engineer minimizing damage to the pavement surface. The removal area may need to be larger than the area of the markings to eliminate ghost markings. After removal of markings on asphalt pavements, apply a fog seal or seal coat to 'block out' the removal area to eliminate 'ghost' markings.

c. Preparation of pavement markings prior to remarking. Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by

the RPR. After removal, the surface shall be cleaned of all residue or debris.

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufacturer's application and surface preparation requirements must be submitted to the RPR prior to the initial application of markings.

620-3.4 Layout of markings. The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the plans.

620-3.5 Application. A period of [30] days shall elapse between placement of surface course or seal coat and application of the permanent paint markings. Paint shall be applied to the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the RPR.

The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

Marking Dimensions and Spacing Tolerance

Dimension and Spacing	Tolerance
36 inch (910 mm) or less	±1/2 inch (12 mm)
greater than 36 inches to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
greater than 60 feet (18.3 m)	±3 inch (76 mm)

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.

Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint or green paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made.

Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed.

620-3.6 Application--preformed thermoplastic airport pavement markings.

Preformed thermoplastic pavement markings not used.

620-3.7 Control strip. Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the RPR. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly embedded and evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

620-3.8 Retro-reflectance. Reflectance shall be measured with a portable retro-reflectometer meeting ASTM E1710 (or equivalent). A total of 6 reading shall be taken over a 6 square foot area with 3 readings taken from

each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other.

Minimum Retro-Reflectance Values

Material	Retro-reflectance mcd/m ² /lux		
	White	Yellow	Red
Initial Type I	300	175	35
Initial Type III	600	300	35
Initial Thermoplastic	225	100	35
All materials, remark when less than ¹	100	75	10

¹ Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance

620-3.9 Protection and cleanup. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the RPR. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

METHOD OF MEASUREMENT

620-4.1a The quantity of surface preparation shall be measured by the number of square feet for each type of surface preparation specified in paragraph 620-3.3.

620-4.1b The quantity of markings shall be paid for shall be measured by the number of square feet of reflective painting.

620-4.1c The quantity of temporary markings to be paid for shall be the number of square feet of painting performed in accordance with the specifications and accepted by the RPR-Engineer. Temporary marking includes surface preparation, application, and complete removal of the temporary marking.

BASIS OF PAYMENT

620-5.1 This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR Engineer in accordance with these specifications.

620-5.1a Payment for surface preparation shall be made at the contract price for the number of square feet for each type of surface preparation specified in paragraph 620-3.3.

620-5.2b Payment for markings shall be made at the contract price for by the number of square feet of reflective painting.

620-5.4c Payment for temporary markings shall be made at the contract price for the number of square feet of painting. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools,

and incidentals necessary to complete the item.

Payment will be made under:

Item P-620-1	Paint Marking Removal – per square feet
Item P-620-2	Blackout/Black Outline – per square feet
Item P-620-3	Retro-Reflective Pavement Marking (Yellow) – per square feet
Item P-620-4	Retro-Reflective Pavement Marking (White) – per square feet
Item P-620-5	Non-Reflective Pavement Marking (Yellow) – per square feet
Item P-620-6	Non-Reflective Pavement Marking (White) – per square feet

REFERENCES

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

ASTM International (ASTM)

ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retro reflectometer.
ASTM E2302	Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

Code of Federal Regulations (CFR)

40 CFR Part 60, Appendix A-7, Method 24	Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings
29 CFR Part 1910.1200 Hazard Communication	

Federal Specifications (FED SPEC)

FED SPEC TT-B-1325D	Beads (Glass Spheres) Retro-Reflective
FED SPEC TT-P-1952F	Paint, Traffic and Airfield Marking, Waterborne
FED STD 595	Colors used in Government Procurement
Commercial Item Description	
Commercial Item Description	
A-A-2886B	Paint, Traffic,
Solvent Based Advisory Circulars (AC)	
AC 150/5340-1	Standards for Airport Markings
AC 150/5320-12	Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

END OF ITEM P-620

Special Provision to Item P-629 Thermoplastic Coal Tar Emulsion Surface Treatments

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "RPR" has been replaced with "Engineer".
- 629-4.3:** Modify the paragraph as follows: "Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil, loose paint markings, loose aggregate, rubber-based crack or joint sealant applied to the pavement surface, or any type of objectionable surface film. Remove oil or grease by scrubbing with a detergent, then wash thoroughly with clean water. Any additional surface preparation, such as crack repair, shall be in accordance with P-101-3.6. Existing sealant on the pavement surface surrounding sealed cracks that utilized a rubber-based material must be removed from the surface by blasting, scraping, or other approved means. The sealant within the crack may remain."
- 629-7.2** Insert the following paragraph: "Removal of Rubber-based Crack Seal Surface. For previously repaired cracks that have a rubber-based crack seal, measure removed sealant by the linear foot of crack seal as measured by the Engineer."

END OF SPECIAL PROVISION TO ITEM P-629

Item P-629 Thermoplastic Coal Tar Emulsion Surface Treatments

from FAA Standard Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

629-1.1 This item shall consist of an application of a thermoplastic coal tar emulsion Sand Slurry Seal applied to an existing, previously prepared asphalt surface, including airport pavements serving small airplanes, roads, and other general applications. Thermoplastic resin coal tar emulsion products provide a fuel-resistant surface where pavements are subjected to fuel spills. Thermoplastic resin coal tar emulsion products assist in pavement preservation through reducing the rate of pavement oxidation. The application of the surface treatment shall be in accordance with these specifications and shall conform to the dimensions shown on the plans or as directed by the Engineer. ~~Resident Project Representative (RPR).~~

MATERIALS

629-2.1 **Thermoplastic coal tar emulsion.** The emulsion material shall be a thermoplastic coal tar emulsion made up of plastic resin and emulsified coal tar pitch. The thermoplastic coal tar emulsion shall be manufactured as a complete product and tested at the manufacturing plant for material certification. The cured thermoplastic coal tar emulsion sample must pass the fuel-resistance test in accordance with ASTM D5727.

629-2.2 **Manufacturer’s certifications.** The Contractor shall furnish the manufacturer’s certification of Analysis (COA) that all thermoplastic coal tar emulsion shipped to the project meets the following testing requirements:

Thermoplastic Coal Tar Emulsion Properties

Property	Standard	Requirement
Water content	ASTM D5727, Section 6.1.6	≤58%
Ash of Residue	ASTM D5727, Section 6.1.9	≤ 15%
Flexibility	ASTM D5727, Section 6.1.14	1 rating
Resistance to Kerosene	ASTM D5727, Section 6.1.12	Pass with no loss of adhesion and no softening of film
Softening Point	ASTM D36	>212°F (100°C)

629-2.3 **Manufacturer sampling.** A sample of undiluted thermoplastic coal tar emulsion shall be obtained at the production facility from each consignment shipped to the job. Manufacturer shall store the samples in containers that are sealed against contamination and retained for a period of six months. Samples shall be stored at room temperature and not be subjected to freezing temperatures.

629-2.4 **Water.** Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use. The temperature of the water added during mixing shall be at least 50°F (10°C).

629-2.5 **Handling and storage.** All emulsion stored on-site shall be agitated at least once per day for a minimum of 15 minutes. The distributor or applicator, pumps and all tools shall be maintained in satisfactory working condition. Spray bar nozzles, pumps, or other equipment can be cleaned mechanically or with clean water.

629-2.6 **Health, safety, and environment.** The Contractor must provide a complete Safety Data Sheet (SDS) in accordance with U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), Regulations (Standards – 29 CFR), 1910.1200 which establishes the requirement and minimum information for the SDS for hazardous materials. The SDS, Section II, shall include the Chemical Abstracts Service (CAS) registry numbers for all applicable hazardous ingredients in the coal tar emulsion product. The Contractor must provide the

manufacturer's certification that the product complies with the Code of Federal Regulation (CFR) Title 40 – Protection of Environment. The manufacturer's certification shall address compliance for Air Programs, Part 59, National Volatile Organic Compound Emission Standards for Consumer and Commercial Products (for the airport location) and Water Programs, Part 116, Designation of Hazardous Substances.

COMPOSITION AND APPLICATION

629-3.0 Thermoplastic coal tar emulsion sand slurry seal.

629-3.1 **Quantities of materials per square yard.** Based on the data in this specification, the Contractor shall submit the proportions of thermoplastic coal tar emulsion and aggregate proposed for use to the RPR for approval prior to the start of operations. A copy of the mix design and test data required by this specification shall be submitted to the Engineer, RPR for approval along with the above information. No thermoplastic coal tar emulsion sand slurry seal shall be produced for payment until a j

ob mix formula has been approved in writing by the Engineer-RPR.

Application Rate

Composition ¹ lbs/gal (kg/l)	Application Rate ² lb/yd ² (kg/m ²)
17-19 (2.04-2.28)	4 (2.17)

¹ Aggregate (lbs) shall be mixed homogeneously with the thermoplastic coal tar emulsion (gals).

² Minimum application rate of uncured thermoplastic coal tar emulsion sand slurry seal.

629-3.2 **Aggregate.** The aggregate shall consist of sound, durable crushed igneous type stone (crushed basalt, granite, trap rock, etc.), clean washed masonry sand, or clean washed manufactured silica sand, be free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from coatings of clay, organic matter, and other deleterious materials. Aggregate shall have a minimum Mohs hardness of 6. The aggregate shall meet the gradation in the table below when tested in accordance with ASTM C136.

The Contractor shall provide a certification showing particle size analysis and properties of the material delivered for use on the project.

Aggregate Material Gradation Requirements

Sieve Designation (square openings)	Percentage by Weight Passing Sieves
No. 4 (4.75 mm)	100
No. 8 (2.36 mm)	99.5-100
No. 16 (1.18 mm)	85-100
No. 30 (600 μm)	50-90
No. 50 (300 μm)	15-55
No. 100 (150 μm)	0-20
No. 200 (75 μm)	0-20

629-3.3 Application

a. Application of prime coat. After preparation of the pavement and acceptance by the RPR, the prime coat shall be applied to the pavement surface only where thermoplastic coal tar emulsion sand slurry seal will be applied. Apply a prime coat of thermoplastic coal tar emulsion diluted with 50% water at the rate of 0.10 gallons of mix per square yard (0.45 l/m²).

b. Application of sand slurry seal. The surface shall be pre-wet by fogging ahead of the spreader box. Water used in pre-wetting the surface shall be applied at such a rate that the entire surface is damp with no apparent flowing water in front of the spreader box. The mixture shall be of the desired consistency when deposited on the surface, and no additional elements shall be added. A sufficient amount of mixture shall be carried in the spreader box at all times so that even distribution is obtained. No clumped or unmixed aggregate shall be permitted. No segregation of the thermoplastic coal tar emulsion and aggregate fines from the coarse aggregate will be permitted.

Upon completion of the work, the thermoplastic coal tar emulsion sand slurry seal shall have no bare spots or cracks through which liquids or foreign matter could penetrate to the underlying pavement. The finished surface shall present a uniform texture.

In areas where the spreader box cannot be used, the thermoplastic coal tar emulsion sand slurry seal shall be applied by means of a hand squeegee.

629-3.4 Equipment and Tools.

a. Mobile mixing machine. The mobile mixing machine shall be a truck-mounted mobile mixing plant with a towed-type spreader box. It shall have a water tank and water pump capable of delivering a constant volume of water.

The mobile mixing machine shall have an agitated storage tank for the thermoplastic coal tar emulsion and a non-shearing peristaltic pump with variable rate of flow for the delivery of this material. The mobile mixing machine shall have a hopper for holding aggregate, supplying this material to the mixing chamber by a conveyor belt. The rate of aggregate delivery shall be mechanically dependent upon the speed of the peristaltic pump.

The mobile mixing machine shall be a continuous-flow mixing unit capable of delivering predetermined quantities of thermoplastic coal tar emulsion, aggregate, and if necessary, water, to the mixing chamber and discharging the thoroughly mixed material on a continuous basis. The mobile mixing machine shall deliver the materials to the mixing chamber in a constant proportion in a manner not dependent on power plant or vehicle speed. The machine shall be equipped with a water spray bar capable of fogging the pavement surface to aid in the application process.

Attached to the mixing machine shall be a mechanical-type squeegee distributor, equipped with flexible material in contact with the surface to prevent loss of material from the distributor. It shall be maintained to prevent loss of micro-surfacing on varying grades and adjusted to assure uniform spread. The spreader box may have an adjustable width.

b. Prime coat distributor. The prime coat distributor shall be either a truck-mounted 300 to 3,000-gallon (1136 to 11356 liter) tank or a trailer-mounted unit with a 300 to 1000-gallon tank (1136 to 3785 liters) containing suitably driven mixing blades to combine predetermined quantities of thermoplastic emulsion and water into a homogeneous mixture. It shall be equipped with a diaphragm style pump capable of delivering a constant volume of material to a spray wand or spray bar. The device shall have a bottom ball valve capable of delivering material to a squeegee spreader or a drag box.

c. **Auxiliary equipment.** Other tools or equipment such as power brooms, power blowers, air compressors, hand brooms, hand squeegees, etc., shall be provided as required.

d. **Calibration.** The Contractor shall furnish all equipment, materials and labor necessary to calibrate the equipment. It shall be calibrated to assure that it will produce and apply a mix that conforms to the job mix formula. Commercial equipment should be provided with a method of calibration by the manufacturer. All calibrations shall be made with the approved job materials prior to applying the Micro-Surface to the pavement. A copy of the calibration test results shall be furnished to the Engineer and RPR.

629-3.5 **Control strip.** A qualified manufacturer's representative shall be present in the field to assist the Contractor in applying control areas and/or control strips. The area to be tested will be designated by the RPR and will be located on the existing pavement.

The control strip shall determine the quality of the mixture in place as well as the performance of the equipment. The same equipment and method of operations shall be used on the control strip as will be used on the remainder of the work. If the control strip should prove to be unsatisfactory, the necessary adjustments to the mix composition, application rate, placement operations and equipment shall be made. Additional control strips shall be placed and evaluated if required.

629-3.6 **Friction characteristics.** Friction testing is not required for sand slurry installations.

CONSTRUCTION METHODS

629-4.1 **Worker safety.** The Contractor shall obtain a SDS for both the thermoplastic coal tar emulsion product and aggregate and require workmen to follow the manufacturer's recommended safety precautions.

629-4.2 **Weather limitations.** The material shall not be applied when the humidity or impending weather conditions will not allow proper drying or when the atmospheric or pavement temperature is below 50°F (10°C), unless otherwise directed by the Engineer, RPR.

During application of thermoplastic coal tar emulsion surface treatment, account for wind drift. Cover existing buildings, structures, runway edge lights, taxiway edge lights, informational signs, retro-reflective marking and in-pavement duct markers as necessary to protect against overspray before applying the emulsion. Should thermoplastic coal tar emulsion surface treatment get on any light or marker fixture, promptly clean the fixture. If cleaning is not satisfactory to the RPR and Airport Staff, the Contractor shall replace any light, sign or marker with equivalent equipment at no cost to the Agent or Owner.

629-4.3 **Preparation of asphalt pavement surfaces.** Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil, loose paint markings, loose aggregate, rubber-based crack or joint sealant applied to the pavement surface, or any type of objectionable surface film. Remove oil or grease by scrubbing with a detergent, then wash thoroughly with clean water. Any additional surface preparation, such as crack repair, shall be in accordance with P-101-3.6. Existing sealant on the pavement surface surrounding sealed cracks that utilized a rubber-based material must be removed from the surface by blasting, scraping, or other approved means. The sealant within the crack may remain.

629-4.4 **Application.** Application shall be in accordance with paragraph 629-3.3.

629-4.5 **Curing.** The mixture shall be permitted to dry for a minimum of 24 hours after the application, before opening to traffic or painting, and shall be sufficiently cured to drive over without damage to the installation. Any damage to the uncured mixture caused by the Contractor will be the responsibility of the Contractor to repair.

QUALITY CONTROL (QC)

- 629-5.1 Field emulsion sampling.** All emulsion sampling methods shall be in accordance with ASTM D140. Samples must be taken from the center of an agitated bulk storage tank after a minimum of 15 minutes of continual agitation.
- 629-5.2 Field composite mix sampling.** Composite mix of thermoplastic coal emulsion and aggregate shall be taken directly from the pug mill of the mobile mixing machine for micro-surface and sand slurry installations into a sealed 1-gallon container to be weighed. The minimum weight of composite mix shall be the following:
- ~~a. Type A Micro Surface Composite Mix – Minimum 14 pounds per gallon~~
 - ~~b. Type B Micro Surface Composite Mix – Minimum 13.5 pounds per gallon~~
 - c. Sand Slurry Composite Mix – Minimum 13 pounds per gallon
- 629-5.3 Manufacturer's representation.** The manufacturer's representative shall have knowledge of the material, procedures, and equipment described in the specification and shall be responsible for verifying the job mix formula submitted to the Engineer RPR and shall oversee the preparation and application of the thermoplastic coal tar emulsion surface treatment. Documentation of the manufacturer representative's experience and knowledge for applying the thermoplastic coal tar emulsion surface treatment shall be furnished to the Engineer RPR a minimum of 10 work days prior to placement of the control strips. The cost of the manufacturer's representative shall be included in the bid price.
- 629-5.4 Contractor qualifications.** The Contractor shall provide the Engineer RPR Contractor qualifications for applicators, personnel, and equipment. The Contractor shall also provide, from the thermoplastic coal tar emulsion Manufacturer, documentation that the Contractor is certified to apply the thermoplastic coal tar emulsion surface treatment. Contractor shall provide documentation for at least three (3) applications similar to this project completed in the past two (2) years.

MATERIAL ACCEPTANCE

- 629-6.1 Friction tests.** Not Required

METHOD OF MEASUREMENT

- 629-7.1 Measurement.** The Thermoplastic Coal Tar Emulsion Sand Slurry Seal shall be measured by the square yard of installed area designated by the Engineer and as measured by the Engineer RPR.
- 629-7.2 Removal of Rubber-based Crack Seal Surface. For previously repaired cracks that have a rubber-based crack seal, measure removed sealant by the linear foot of crack seal as measured by the Engineer.**

BASIS OF PAYMENT

- 629-8.1 Payment.** Payment shall be made at the contract unit price per square yard (square meter) for the Thermoplastic Coal Tar Emulsion. This price shall fully compensate the Contractor for furnishing all materials and for all labor, equipment tools and incidentals necessary to complete the thermoplastic coal tar emulsion product installation, including mix design and data sheets stipulated in these specifications.

Payment will be made under:

- | | |
|--------------|--|
| Item P-629-1 | Remove Surface Rubber Crack Seal for Surface Treatment – per linear foot |
| Item P-629-2 | Thermoplastic Coal Tar Emulsion Sand Slurry Seal – per square foot |

REFERENCES

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

ASTM International (ASTM)

ASTM D36	Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D140	Standard Practice for Sampling Bituminous Materials
ASTM D5340	Standard Test Method for Airport Pavement Condition Index Surveys
ASTM D5727	Standard Specification for Emulsified Refined Coal Tar (Mineral Colloid Type)

Advisory Circulars (AC)

AC 150/5320-12	Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces
AC 150/5320-17	Airfield Pavement Surface Evaluation and Rating (PASER) Manuals

Code of Federal Regulations (CFR)

29 CFR Part 1910.1200	Hazard Communication
40 CFR	Protection of the Environment

END OF ITEM P-629

Special Provision to Item L-108 Underground Power Cable for Airports

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "RPR" has been replaced with "Engineer".
- 108-2.6:** Modify the section as follows: "Concrete to be in accordance with Item 421, Class A. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures."
- 108-3.6:** Modify the first paragraph as follows: "If shown on the plans or included in the job specifications, bare solid #6 AWG copper counterpoise wire shall be installed for lightning protection of the underground cables. ~~The RPR shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.~~"
- 108-3.6:** Add the following as a second paragraph: "When the alignment of the cable is parallel to a pavement edge, install counterpoise in a separate trench approximately halfway between the edge of pavement and the cable / conduit. When the cable is not parallel to pavement such as crossing an infield, install the counterpoise a minimum of four (4) inches above the cable / conduit. Bond the counterpoise at each adjacent light fixture base grounding lug with an exothermic weld. If there is no fixture within 500 hundred feet, exothermically weld the counterpoise to a ground rod in accordance paragraph 2.3."
- 108-3.6:** Delete paragraphs a., b. and c.
- 108-3.7:** Modify the second paragraph as follows: "Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed a minimum of four inches above the duct bank, or at the top of subgrade, whichever is less. Reference details on the construction plans."

END OF SPECIAL PROVISION TO ITEM L-108

Item L-108 Underground Power Cable for Airports

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

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

EQUIPMENT AND MATERIALS

108-2.1 General.

- a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program per AC 150/5345-53, current version.
- b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the Engineer, RPR.
- c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the Engineer, RPR) and replaced with materials that comply with these specifications at the Contractor's cost.
- d. All materials and equipment used to construct this item shall be submitted to the Engineer, RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.
- e. The data submitted shall be sufficient, in the opinion of the Engineer, RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format. The Engineer, RPR reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.
- f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall maintain a minimum insulation resistance in accordance with paragraph 108-3.10e with isolation transformers connected in new circuits and new segments of existing circuits through

the end of the contract warranty period when tested in accordance with AC 150/5340-26, Maintenance Airport Visual Aid Facilities, paragraph 5.1.3.1, Insulation Resistance Test.

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

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type THWN-2, 75°C for installation in conduit and RHW-2, 75°C for direct burial installations. Conductors for parallel (voltage) circuits shall be type and size and installed in accordance with NFPA-70, National Electrical Code.

Unless noted otherwise, all 600-volt and less non-airfield lighting conductor sizes are based on a 75°C, THWN-2, 600-volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit/duct sizes are based on the use of THWN-2, 600-volt insulated conductors. The Contractor shall make the necessary increase in conduit/duct sizes for other types of wire insulation. In no case shall the conduit/duct size be reduced. The minimum power circuit wire size shall be #12 AWG.

Conductor sizes may have been adjusted due to voltage drop or other engineering considerations. Equipment provided by the Contractor shall be capable of accepting the quantity and sizes of conductors shown in the Contract Documents. All conductors, pigtails, cable step-down adapters, cable step-up adapters, terminal blocks and splicing materials necessary to complete the cable termination/splice shall be considered incidental to the respective pay items provided.

Cable type, size, number of conductors, strand and service voltage shall be as specified in the Contract Document.

- 108-2.3 Bare copper wire (counterpoise, bare copper wire ground and ground rods).** Wire for counterpoise or ground installations for airfield lighting systems shall be No. 6 AWG bare solid copper wire for counterpoise and/or No. 6 AWG insulated stranded for grounding bond wire per ASTM B3 and ASTM B8, and shall be bare copper wire. For voltage powered circuits, the equipment grounding conductor shall comply with NEC Article 250.

Ground rods shall be copper-clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 8 feet (2.4 m) long and 3/4 inch (19 mm) in diameter.

- 108-2.4 Cable connections.** In-line connections or splices of underground primary cables shall be of the type called for on the plans and shall be one of the types listed below. No separate payment will be made for cable connections.
- a.** The cast splice. A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3M™ Company, "Scotchcast" Kit No. 82-B, or an approved equivalent, used for potting the splice is acceptable.

- b. The field-attached plug-in splice. Field attached plug-in splices shall be installed as shown on the plans. The Contractor shall determine the outside diameter of the cable to be spliced and furnish appropriately sized connector kits and/or adapters. Tape or heat shrink tubing with integral sealant shall be in accordance with the manufacturer's requirements. Primary Connector Kits manufactured by Amerace, "Super Kit", Integro "Complete Kit", or approved equal is acceptable.
- c. The factory-molded plug-in splice. Specification for L-823 Connectors, Factory-Molded to Individual Conductors, is acceptable.
- d. The taped or heat-shrink splice. Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape is acceptable. The rubber tape should meet the requirements of ASTM D4388, and the plastic tape should comply with Military Specification MIL-I-24391 or Commercial Item Description A-A-55809. Heat shrinkable tubing shall be heavy-wall, self-sealing tubing rated for the voltage of the wire being spliced and suitable for direct-buried installations. The tubing shall be factory coated with a thermoplastic adhesive-sealant that will adhere to the insulation of the wire being spliced forming a moisture- and dirt-proof seal. Additionally, heat shrinkable tubing for multi-conductor cables, shielded cables, and armored cables shall be factory kits that are designed for the application. Heat shrinkable tubing and tubing kits shall be manufactured by Tyco Electronics/ Raychem Corporation, Energy Division, or approved equivalent.

In all the above cases, connections of cable conductors shall be made using crimp connectors using a crimping tool designed to make a complete crimp before the tool can be removed. All L-823/L-824 splices and terminations shall be made per the manufacturer's recommendations and listings.

All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved equivalent, except that a light base ground clamp connector shall be used for attachment to the light base. All exothermic connections shall be made per the manufacturer's recommendations and listings.

- 108-2.5 **Splicer qualifications.** Every airfield lighting cable splicer shall be qualified in making airport cable splices and terminations on cables rated at or above 5,000 volts AC. The Contractor shall submit to the Engineer RPR proof of the qualifications of each proposed cable splicer for the airport cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.
- 108-2.6 **Concrete.** Concrete to be in accordance with Item 421, Class A. ~~Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures~~
- 108-2.7 **Flowable backfill.** Flowable material used to backfill trenches for power cable trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.
- 108-2.8 **Cable identification tags.** Cable identification tags shall be made from a non-corrosive material with the circuit identification stamped or etched onto the tag. The tags shall be of the type as detailed on the plans.
- 108-2.9 **Tape.** Electrical tapes shall be Scotch™ Electrical Tapes –Scotch™ 88 (1-1/2 inch (38 mm) wide) and Scotch™ 130C ® linerless rubber splicing tape (2-inch (50 mm) wide), as manufactured by the Minnesota Mining and Manufacturing Company (3MTM), or an approved equivalent.
- 108-2.10 **Electrical coating.** Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equivalent.

- 108-2.11 Existing circuits.** Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the Engineer. RPR. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall record the results on forms acceptable to the Engineer. RPR. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the existing circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.
- 108-2.12 Detectable warning tape.** Plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend tape shall be polyethylene film with a metalized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item. ~~Detectable warning tape for communication cables shall be orange.~~ Detectable warning tape color code shall comply with the APWA Uniform Color Code.

CONSTRUCTION METHODS

- 108-3.1 General.** The Contractor shall install the specified cable at the approximate locations indicated on the plans. Unless otherwise shown on the plans, all cable required to cross under pavements expected to carry aircraft loads shall be installed in concrete encased duct banks. Cable shall be run without splices, from fixture to fixture.
- Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections unless otherwise authorized in writing by the Engineer. RPR or shown on the plans.
- In addition to connectors being installed at individual isolation transformers, L-823 cable connectors for maintenance and test points shall be installed at locations shown on the plans. Cable circuit identification markers shall be installed on both sides of the L-823 connectors installed and on both sides of slack loops where a future connector would be installed.
- Provide not less than 3 feet (1 m) of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. Where provisions must be made for testing or for future above grade connections, provide enough slack to allow the cable to be extended at least one foot (30 cm) vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the Engineer. RPR .
- Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch (6 mm) in size. The cable circuit identification shall match the circuits noted on the construction plans.
- 108-3.2 Installation in duct banks or conduits.** This item includes the installation of the cable in duct banks or conduit per the following paragraphs. The maximum number and voltage ratings of cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be per the latest version of the National Electric Code, or the code of the local agency or authority having jurisdiction.

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

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

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

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

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

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

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

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

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

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

- When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches (91 cm) unless otherwise specified.
- Minimum cable depth when crossing under a railroad track, shall be 42 inches (1 m) unless otherwise specified.

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

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

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

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

- (1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.
- (2) Trenching, etc., in cable areas shall then proceed, with approval of the Engineer RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

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

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

The second and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent material. If the cable is to be installed in locations or areas where other compaction requirements are

specified (under pavements, embankments, etc.) the backfill compaction shall be backfill with controlled low strength material (CLSM) in accordance with P-153.

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

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

c. Restoration. Following restoration of all trenching near airport movement surfaces, the Contractor shall visually inspect the area for foreign object debris (FOD) and remove any that is found. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the topsoiling and seeding as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be backfill with controlled low strength material (CLSM) in accordance with P-153. Restoration shall be considered incidental to the pay item of which it is a component part.

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

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

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

- a. Cast splices. These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the Engineer RPR .
- b. Field-attached plug-in splices. These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint or (3) On connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.
- c. Factory-molded plug-in splices. These shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) Wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint. or (3) On connector kits so equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.
- ~~d. Taped or heat shrink splices. A taped splice shall be made in the following manner:~~

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

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

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

- e. Assembly. Surfaces of equipment or conductors being terminated or connected shall be prepared in accordance with industry standard practice and manufacturer's recommendations. All surfaces to be connected shall be thoroughly cleaned to remove all dirt, grease, oxides, nonconductive films, or other foreign material. Paints and other nonconductive coatings shall be removed to expose base metal. Clean all surfaces at least 1/4

inch (6.4 mm) beyond all sides of the larger bonded area on all mating surfaces. Use a joint compound suitable for the materials used in the connection. Repair painted/coated surface to original condition after completing the connection.

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

When the alignment of the cable is parallel to a pavement edge, install counterpoise in a separate trench approximately halfway between the edge of pavement and the cable / conduit. When the cable is not parallel to pavement such as crossing an infield, install the counterpoise a minimum of four (4) inches above the cable / conduit. Bond the counterpoise at each adjacent light fixture base grounding lug with an exothermic weld. If there is no fixture within 500 hundred feet, exothermically weld the counterpoise to a ground rod in accordance paragraph 2.3.

~~a. Equipotential. may be used by the RPR for areas that have high rates of lightning strikes. The counterpoise size is determined by the RPR. The equipotential method is applicable to all airfield lighting systems; i.e. runway, taxiway, apron touchdown zone, centerline, edge, threshold and approach lighting systems. The equipotential method is also successfully applied to provide lightning protection for power, signal and communication systems. The light bases, counterpoise, etc all components are bonded together and bonded to the vault power system ground loop/electrode.~~

~~Counterpoise wire shall be installed in the same trench for the entire length of buried cable, conduits and duct banks that are installed to contain airfield cables. The counterpoise is centered over the cable/conduit/duct to be protected.~~

~~The counterpoise conductor shall be installed no less than 8 inches (200 mm) minimum or 12 inches (300 mm) maximum above the raceway or cable to be protected, except as permitted below:~~

- ~~(1) The minimum counterpoise conductor height above the raceway or cable to be protected shall be permitted to be adjusted subject to coordination with the airfield lighting and pavement designs.~~
- ~~(2) The counterpoise conductor height above the protected raceway(s) or cable(s) shall be calculated to ensure that the raceway or cable is within a 45-degree area of protection, (45 degrees on each side of vertical creating a 90 degree angle).~~

~~The counterpoise conductor shall be bonded to each metallic light base, mounting stake, and metallic airfield lighting component.~~

~~All metallic airfield lighting components in the field circuit on the output side of the constant current regulator (CCR) or other power source shall be bonded to the airfield lighting counterpoise system.~~

~~All components rise and fall at the same potential; with no potential difference, no damaging arcing and no damaging current flow.~~

~~See AC 150/5340-30, Design and Installation Details for Airport Visual Aids and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Equipotential Method of lightning protection.~~

Reference FAA STD-019E, Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment, Part 4.1.1.7.

~~b. Isolation—used in areas where lightning strikes are not common. Counterpoise size is selected by the RPR. The isolation method is an alternate method for use only with edge lights installed in turf and stabilized soils and raceways installed parallel to and adjacent to the edge of the pavement. NFPA 780 uses 15 feet to define “adjacent to”.~~

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

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

~~See AC 150/5340-30, Design and Installation Details for Airport Visual Aids and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Isolation Method of lightning protection.~~

~~c. Common Installation requirements. [When a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.~~

~~When a nonmetallic light base is used, the grounding electrode shall be bonded to the metallic light fixture or metallic base plate with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.]~~

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

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

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

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

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

108-3.7 Counterpoise installation above multiple conduits and duct banks. Counterpoise wires shall be installed above multiple conduits/duct banks for airfield lighting cables, with the intent being to provide a complete area of protection over the airfield lighting cables. When multiple conduits and/or duct banks for airfield cable are

installed in the same trench, the number and location of counterpoise wires above the conduits shall be adequate to provide a complete area of protection measured 45 degrees each side of vertical.

Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed a minimum of four inches above the duct bank, or at the top of subgrade, whichever is less. Reference details on the construction plans.

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

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

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

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

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

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

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

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

- d. That all affected circuits (existing and new) are free from unspecified grounds.
- e. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than 30 megohms. Verify continuity of all series airfield lighting circuits prior to energization.
- f. That the insulation resistance to ground of all new non-grounded conductors of new multiple circuits or circuit segments is not less than 100 megohms.
- g. That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.
- h. That all affected circuits (existing and new) are operable. Tests shall be conducted that include operating each control not less than 10 times and the continuous operation of each lighting and power circuit for not less than 1/2 hour.
- i. That the impedance to ground of each ground rod does not exceed 12 ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be used, as described by American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81, to verify this requirement. As an alternate, clamp-on style ground impedance test meters may be used to satisfy the impedance testing requirement. Test equipment and its calibration sheets shall be submitted for review and approval by the Engineer RPR prior to performing the testing.

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

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

METHOD OF MEASUREMENT

- 108-4.1 Cable installed in trench, conduit, or duct bank and counterpoise shall be measured by the linear foot of cable, accepted by the Engineer. Separate measurement shall be made for each cable in an alignment.
- 108-4.2 No separate measurement for payment will be made for ground rods.

BASIS OF PAYMENT

- 108-5.1 Payment will be made at the unit price bid for cable at the size and type indicated, installed in trench, duct bank, or conduit, in place and accepted. This price shall be full compensation for trenching, pulling cable, furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item. The cost of all excavation, backfill, dewatering and restoration regardless of the type of material encountered shall be included in the unit price bid for the work.

Payment will be made under:

- Item L-108-1 #8 AWG, L-824, Type C, 5kV Cable, in Conduit – per Linear Foot (meter)
- Item L-108-2 #6 Stranded, BSDC Counterpoise with ground rods and connectors, including Trenching and Backfill – per Linear Foot (meter)

REFERENCES

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

Advisory Circulars (AC)

AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description

A-A-59544A	Cable and Wire, Electrical (Power, Fixed Installation)
A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic

ASTM International (ASTM)

ASTM B3	Standard Specification for Soft or Annealed Copper Wire
ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM D4388	Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes

Mil Spec

MIL-PRF-23586F	Performance Specification: Sealing Compound (with Accelerator), Silicone Rubber, Electrical
MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
NFPA-780	Standard for the Installation of Lightning Protection Systems

American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
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Federal Aviation Administration Standard

FAA STD-019E	Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment
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END OF ITEM L-108

Special Provision to Item L-110 Airport Underground Electrical Duct Banks and Conduits

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "RPR" has been replaced with "Engineer".
- 110-3.2:** Modify the first sentence of the last paragraph as follows: "When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located, disconnected from its power supply, and exposed by hand tools."
- 110-5.1:** Modify the second sentence of the section as follows: "This price shall be full compensation for removal and disposal of existing duct banks and conduits as shown on the plans, furnishing all materials and for all preparation, assembly, and installation of these materials, fabrication and installation of duct markers, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications."

END OF SPECIAL PROVISION TO ITEM L-110

Item L-110 Airport Underground Electrical Duct Banks and Conduits

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

- 110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 General.

- a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer. ~~RPR.~~
- b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the Engineer. ~~RPR.~~ Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the Engineer. ~~RPR.~~ and replaced with materials, that comply with these specifications, at the Contractor's cost.
- c. All materials and equipment used to construct this item shall be submitted to the Engineer. ~~RPR.~~ for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.
- d. The data submitted shall be sufficient, in the opinion of the Engineer. ~~RPR.~~, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The Engineer. ~~RPR.~~ reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.
- e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

- 110-2.2 **Steel conduit.** Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits

or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mils of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth."

110-2.3 Plastic conduit. Plastic conduit and fittings shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

- a. Type I—Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.
- b. Type II—Schedule 40 PVC suitable for either above ground or underground use.
- c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.
- d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

110-2.4 Split conduit. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

110-2.5 Conduit spacers. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high-grade, high-density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 Concrete. Concrete shall be proportioned, placed, and cured per *Item 421, Class A*. ~~Item P-610, Concrete for Miscellaneous Structures.~~

110-2.7 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another Engineer RPR- approved third party certification program. Precast concrete structures shall conform to ASTM C478.

110-2.8 Flowable backfill. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

110-2.9 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), ~~orange (telephone/fiber optic cabling)~~ with continuous legend

magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

CONSTRUCTION METHODS

110-3.1 General. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The Engineer ~~RPR~~ shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

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

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the Engineer RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the Engineer RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the Engineer RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.

Unless otherwise specified, excavated materials that are deemed by the Engineer RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the Engineer RPR and compacted per Item P-152.

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

- a. Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred
- b. Trenching, etc., in cable areas shall then proceed with approval of the Engineer RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

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

110-3.2 Duct banks. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the Engineer ~~RPR~~ for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located, disconnected from its power supply, and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the Engineer ~~RPR~~.

110-3.3 Conduits without concrete encasement. Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall

be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 4 inches (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4-inch (6.3 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the Engineer, ~~RPR~~ for review prior to use.

- 110-3.4 Markers.** The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the Engineer, ~~RPR~~, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the Engineer, ~~RPR~~. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the Engineer, ~~RPR~~. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

- 110-3.5 Backfilling for conduits.** For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand

tampers. The remaining trench shall then be backfilled and compacted per Item P-152 except that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during back filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the Engineer ~~RPR~~.

- 110-3.6 Backfilling for duct banks.** After the concrete has cured, the remaining trench shall be backfilled and compacted per Item P-152 "Excavation and Embankment" except that the material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements of Item P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet (76 m) of duct bank or one work period's construction, whichever is less.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the Engineer ~~RPR~~.

- 110-3.7 Restoration.** Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include topsoiling and seedings shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

- 110-3.8 Ownership of removed cable.** All abandoned and demolished cable and conductors, including counterpoise, that are removed from the project are to become property of the Contractor and are to be removed from the airport.

METHOD OF MEASUREMENT

- 110-4.1** Underground conduits and duct banks shall be measured by the linear feet (meter) of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated material, and restoration, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

- 110-5.1** Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, including trench and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for removal and disposal of existing

duct banks and conduits as shown on the plans, furnishing all materials and for all preparation, assembly, and installation of these materials, fabrication and installation of duct markers, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

Payment will be made under:

- Item L-110-1 1-Way, 2" Sch 40 PVC Non-Encased Conduit, incl trenching and backfill - per linear foot (meter)
- Item L-110-2 4-Way, 2" Sch 40 PVC Concrete-Encased Conduits in Duct, incl trenching and backfill - per linear foot (meter)

REFERENCES

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

Advisory Circular (AC)

- AC 150/5340-30 Design and Installation Details for Airport Visual Aids
- AC 150/5345-53 Airport Lighting Equipment Certification Program

ASTM International (ASTM)

- ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

National Fire Protection Association (NFPA)

- NFPA-70 National Electrical Code (NEC)

Underwriters Laboratories (UL)

- UL Standard 6 Electrical Rigid Metal Conduit - Steel
- UL Standard 514B Conduit, Tubing, and Cable Fittings
- UL Standard 514C Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
- UL Standard 1242 Electrical Intermediate Metal Conduit Steel
- UL Standard 651 Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
- UL Standard 651A Type EB and A Rigid PVC Conduit and HDPE Conduit

END OF ITEM L-110

Special Provision to Item L-115 Electrical Manholes and Junction Structures

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "RPR" has been replaced with "Engineer".
- 115-2.4:** Modify the first sentence of the paragraph as follows: "Junction boxes shall be ~~L-867 Class 1 (non-load bearing)~~ or L-868 Class 1 (load bearing) airport light bases that are encased in concrete. See details in the Plans."
- 115-2.6:** Modify the section as follows: "All concrete used in structures shall conform to the requirements of Item 421, for Class A. ~~P-610, Concrete for Miscellaneous Structures~~"
- 115-3.2:** Modify the second sentence as follows: "The concrete and construction methods shall conform to the requirements specified in Item 421, for Class A and Item 467. ~~Item P-610.~~"

END OF SPECIAL PROVISION TO ITEM L-115

Item L-115 Electrical Manholes and Junction Structures

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

- 115-1.1 This item shall consist of electrical manholes and junction structures (hand holes, pull boxes, junction cans, etc.) installed per this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the Engineer RPR. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the Engineer RPR .

EQUIPMENT AND MATERIALS

- 115-2.1 **General.**

- a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the Engineer RPR.
- b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the Engineer RPR) and replaced with materials that comply with these specifications at the Contractor's cost.
- c. All materials and equipment used to construct this item shall be submitted to the Engineer RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.
- d. The data submitted shall be sufficient, in the opinion of the Engineer RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The Engineer RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.
- e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least [twelve (12) months] from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

- 115-2.2 **Concrete structures.** Concrete shall be proportioned, placed, and cured per Item 421, Class A, Item P-610, Concrete for Miscellaneous Structures. Cast-in-place concrete structures shall be as shown on the plans.

115-2.3 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program. Provide precast concrete structures where shown on the plans.

Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand 30,000 lb. aircraft loads, unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans.

Threaded inserts and pulling eyes shall be cast in as shown on the plans.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the Engineer RPR shall be submitted by the Contractor to allow for a full evaluation by the Engineer RPR. The Engineer RPR shall review per the process defined in the General Provisions.

115-2.4 Junction boxes. Junction boxes shall be ~~L-867 Class 1 (non-load bearing)~~ or L-868 Class 1 (load bearing) airport light bases that are encased in concrete. See details in the Plans. The light bases shall have a L-894 blank cover, gasket, and stainless steel hardware. All bolts, studs, nuts, lock washers, and other similar fasteners used for the light fixture assemblies must be fabricated from 316L (equivalent to EN 1.4404), 18-8, 410, or 416 stainless steel. If 18-8, 410, or 416 stainless steel is utilized it shall be passivated and be free from any discoloration. Covers shall be 3/8-inch (9-mm) thickness for L-867 and 3/4-inch (19-mm) thickness for L-868. All junction boxes shall be provided with both internal and external ground lugs.

115-2.5 Mortar. The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

115-2.6 Concrete. All concrete used in structures shall conform to the requirements of Item 421, for Class A. -P-610, Concrete for Miscellaneous Structures.

115-2.7 Frames and covers. The frames shall conform to one of the following requirements:

- a. ASTM A48 Gray iron castings
- b. ASTM A47 Malleable iron castings
- c. ASTM A27 Steel castings
- d. ASTM A283, Grade D Structural steel for grates and frames
- e. ASTM A536 Ductile iron castings
- f. ASTM A897 Austempered ductile iron castings

All castings specified shall withstand a maximum tire pressure of 250 psi and maximum load of 30,000 lbs.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

Each frame and cover unit shall be provided with fastening members to prevent it from being dislodged by traffic, but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

Each cover shall have the word "ELECTRIC" or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

Each manhole shall be provided with a "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" safety warning sign as detailed in the Contract Documents and in accordance with OSHA 1910.146 (c)(2).

- 115-2.8 **Ladders.** Ladders, if specified, shall be galvanized steel or as shown on the plans.
- 115-2.9 **Reinforcing steel.** All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.
- 115-2.10 **Bedding/special backfill.** Bedding or special backfill shall be as shown on the plans.
- ~~115-2.11 **Flowable backfill.** Flowable material used to backfill shall conform to the requirements of Item P-153, Controlled Low-Strength Material.~~
- ~~115-2.12 **Cable trays.** Cable trays shall be of [galvanized steel] [plastic] [aluminum]. Cable trays shall be located as shown on the plans.~~
- 115-2.13 **Plastic conduit.** Plastic conduit shall comply with Item L-110, Airport Underground Electrical Duct Banks and Conduits.
- 115-2.14 **Conduit terminators.** Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.
- 115-2.15 **Pulling-in irons.** Pulling-in irons shall be manufactured with 7/8-inch (22 mm) diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2-inch (12 mm) diameter with an ultimate strength of 270,000 psi (1862 MPa)). Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.
- 115-2.16 **Ground rods.** Ground rods shall be one piece, copper clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 8 feet (2.4 m) long nor less than 5/8 inch (16 mm) in diameter.

CONSTRUCTION METHODS

- 115-3.1 **Unclassified excavation.** It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the Engineer ~~RPR~~ without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans ~~or as staked by the RPR~~. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the RPR. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be 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 RPR. Structures shall be placed after the RPR has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 inches (150 mm) of sand or a material approved by the Engineer RPR as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

- 115-3.2 Concrete structures.** Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item 421, for Class A and Item 467, Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the Engineer RPR before the concrete is placed.
- 115-3.3 Precast unit installations.** Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.
- 115-3.4 Placement and treatment of castings, frames and fittings.** All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the Engineer RPR and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the RPR and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor's expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

115-3.5 **Installation of ladders.** ~~NOT USED. Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.~~

115-3.6 **Removal of sheeting and bracing.** In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The Engineer RPR may direct the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

115-3.7 **Backfilling.** After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches (150 mm) in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the Engineer RPR.

Backfill shall not be placed against any structure until approval is given by the RPR. In the case of concrete, such approval shall not be given until tests made by the laboratory under supervision of the RPR establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the Engineer RPR may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

115-3.8 **Connection of duct banks.** To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

115-3.9 **Grounding.** A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 inches (150 mm) above the floor. The ground rod shall be installed within one foot (30 cm) of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4-inch (100 mm) diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

A grounding bus of 4/0 bare stranded copper shall be exothermically bonded to the ground rod and loop the concrete structure walls. The ground bus shall be a minimum of one foot (30 cm) above the floor of the structure and separate from other cables. No. 2 American wire gauge (AWG) bare copper pigtailed shall bond the grounding bus to all cable trays and other metal hardware within the concrete structure. Connections to the grounding bus shall be exothermic. If an exothermic weld is not possible, connections to the grounding bus shall be made by using connectors approved for direct burial in soil or concrete per UL 467. Hardware connections may be mechanical, using a lug designed for that purpose.

- 115-3.10 Cleanup and repair.** After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer's recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

- 115-3.11 Restoration.** After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective Item L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD) and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

- 115-3.12 Inspection.** Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

- 115-3.13 Manhole elevation adjustments.** The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.

The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

- 115-3.14 Duct extension to existing ducts.** Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

METHOD OF MEASUREMENT

- 115-4.1** Electrical manholes and junction structures shall be measured by each unit completed in place and accepted. The following items shall be included in the price of each unit: All required excavation and dewatering; sheeting and bracing; all required backfilling with on-site materials; restoration of all surfaces and finished grading and turfing; all required connections; temporary cables and connections; and ground rod testing
- 115-4.2** Manhole elevation adjustments shall be measured by the completed unit installed, in place, completed, and accepted. Separate measurement shall not be made for the various types and sizes.

BASIS OF PAYMENT

- 115-5.1** The accepted quantity of electrical manholes and junction structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.
- 115-5.2** Payment shall be made at the contract unit price for manhole elevation adjustments. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary, including but not limited to, spacers, concrete, rebar, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required, to complete this item as shown in the plans and to the satisfaction of the Engineer ~~RPR~~.

Payment will be made under:

Item L-115-1 Precast Airfield Base Can - per Each

REFERENCES

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

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/IEEE STD 81 IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Advisory Circular (AC)

AC 150/5345-7 Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits

AC 150/5345-26 Specification for L-823 Plug and Receptacle, Cable Connectors

AC 150/5345-42 Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories

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

AC 150/5345-53 Airport Lighting Equipment Certification Program

Commercial Item Description (CID)

A-A 59544 Cable and Wire, Electrical (Power, Fixed Installation)

ASTM International (ASTM)

ASTM A27 Standard Specification for Steel Castings, Carbon, for General Application

ASTM A47 Standard Specification for Ferritic Malleable Iron Castings

ASTM A48 Standard Specification for Gray Iron Castings

ASTM A123 Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products

ASTM A283 Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates

ASTM A536 Standard Specification for Ductile Iron Castings

ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

ASTM A897 Standard Specification for Austempered Ductile Iron Castings

ASTM C144 Standard Specification for Aggregate for Masonry Mortar

ASTM C150 Standard Specification for Portland Cement

ASTM C206 Standard Specification for Finishing Hydrated Lime

FAA Engineering Brief (EB)

EB #83 In Pavement Light Fixture Bolts

Mil Spec

MIL-P-21035 Paint High Zinc Dust Content, Galvanizing Repair

National Fire Protection Association (NFPA)

NFPA-70 National Electrical Code (NEC)

END OF ITEM L-115

Special Provision to Item L-125 Installation of Airport Lighting Systems

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** there are several, but not all instances where "RPR" has been replaced with "Engineer".
- 125-3.4:** Insert the following as a third sentence in the second paragraph: "Similarly, pre-cast base cans in concrete are to be set on a foundation of compacted base material and set in place before filling the remaining void with soil and compacting in accordance with Item P-152."
- 125-4.1:** Add the following as a second paragraph: Signs will be measured by the number of each type and number of modules installed as completed units in place, ready for operation, and accepted by the Engineer.
- 125-5.1:** Modify the second sentence as follows: "This payment will be full compensation for furnishing all materials, including precast concrete, base can, connection points, fixtures, secondary transformer, connectors, splices, and for all preparation, assembly, and installation of these materials including excavation and installation of precast components, and backfill, and for all labor, equipment, tools and incidentals necessary to complete this item."

END OF SPECIAL PROVISION TO ITEM L-125

Item L-125 Installation of Airport Lighting Systems

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

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

EQUIPMENT AND MATERIALS

125-2.1 **General.**

- a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not perform as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.
- b. Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the Engineer RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the Engineer RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.
- c. All materials and equipment used shall be submitted to the Engineer RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.
- d. The data submitted shall be sufficient, in the opinion of the Engineer RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format, tabbed by specification section. The Engineer RPR reserves the right to reject any or all equipment, materials or procedures, which, in the Engineer's RPR's opinion, does not meet the system design and the standards and codes, specified herein.
- e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

EQUIPMENT AND MATERIALS

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

- 125-2.3 **Cable and Counterpoise.** Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.
- 125-2.4 **Tape.** Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 130J-23 and 88 respectively, as manufactured by 3M Company or an approved equal.
- 125-2.5 **Cable Connections.** Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.
- 125-2.6 **Retroreflective Markers.** Not required.
- 125-2.7 **Runway and Taxiway Lights.** Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Lamps shall be of size and type indicated, or as required by fixture manufacturer for each lighting fixture required under this contract. Filters shall be of colors conforming to the specification for the light concerned or to the standard referenced.

Lights – see plans

Type	Class	Mode	Style	Option	Base	Filter	Transformer	Notes
{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }

- 125-2.8 **Runway and Taxiway Signs.** Runway and Taxiway Guidance Signs should conform to the requirements of AC 150/5345-44.

Signs – see plans

Type	Size	Style	Class	Mode	Notes
{ }	{ }	{ }	{ }	{ }	{ }

- 125-2.9 **Runway End Identifier Light (REIL).** Not required.
- 125-2.10 **Precision Approach Path Indicator (PAPI).** Not required.
- 125-2.11 **Circuit Selector Cabinet.** The circuit selector cabinet shall meet the requirements of AC 150/5345-5, Type L-847, [one] [two] [three] [four] circuit control [as indicated], Class [A, indoor] [B, outdoor], Rating [1, for 6.6 amperes] [2, for 20 amperes].
- 125-2.12 **Light Base and Transformer Housings.** Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be Type L-868, Class 1A, Size B shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.
- 125-2.13 **Isolation Transformers.** Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

INSTALLATION

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

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

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

Cast base cans in concrete following Item 421, Class A; either on-site or off-site, away from the active airfield to create precast base cans as shown in the plans. Provide sufficient 2-inch metallic, threaded hubs aligned in order to connect bases in series with hubs extended to outside of precast concrete. Set base level, at the location as shown on the plans.

Furnish a light base ground for each can consisting of a #6 AWG bare solid copper wire jumper, bonded to an external ground lug on the base before casting and extending outside the precast base for connection to ground rod installed adjacent to the base. Furnish also an internal bonding conductor of sufficient length to connect to the light fixture base plate when removed from the can. Wire to be #6 AWG stranded copper wire rated to 600V with green XHHW insulation. Connect to internal ground lug on the base can. Make connections following manufacturer's recommendations.

Signs, using salvaged sign hardware, are to be founded on concrete foundations, cast-in-place as shown on the Plans. Orient sign to be 90 degrees from direction of runway or taxiway centerline, as shown on the Plans. Offset sign foundation (pad) to meet requirements for edge of sign frame offset distance from edge of pavement. Sign pad to extend at least 18 inches for the edge of the sign frame all-around and shall be at least 6 inches thick, reinforced. Edges of the pad are to be chamfered one inch.

Each sign pad is to include a base can with a L-894 blank (solid) metal cover, cast into the pad. Set the top of the base can so that its cover is no more than 1/4 inch above the surrounding concrete, and also has couplings for sign feet. One of the couplings is to connect to the base can to provide pathway for conductors into the sign without any exterior conduits.

Project wire slack in each base can and sign can. Provide at least three feet of slack, or at least enough to permit the connections to be made above ground outside the can.

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

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

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

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. Similarly, pre-cast base cans in concrete are to be set on a foundation of compacted base material and set in place before filling the remaining

void with soil and compacting in accordance with Item P-152. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

METHOD OF MEASUREMENT

125-4.1 Runway and taxiway lights will be measured by the number of each type installed as completed units in place, ready for operation, and accepted by the Engineer_RPR.

Signs will be measured by the number of each type and number of modules installed as completed units in place, ready for operations, and accepted by the Engineer.

BASIS OF PAYMENT

125-5.1 Payment will be made at the Contract unit price for each complete runway or taxiway light, guidance sign, reflective marker, runway end identification light, precision approach path indicator, or abbreviated precision approach path indicator installed by the Contractor and accepted by the Engineer_RPR. This payment will be full compensation for furnishing all materials, including precast concrete, base can, connection points, fixtures, secondary transformer, connectors, and splices, and for all preparation, assembly, and installation of these materials including excavation, setting precast components, and backfill, and for all labor, equipment, tools and incidentals necessary to complete this item.

Payment will be made under:

Item L-125-1	L-861 Base Mounted Runway Edge Light with Yellow/White Lens - per Each
Item L-125-2	L-861T(L) Base Mounted Taxiway Edge Light - per Each
Item L-125-3	Salvage and Reinstall Sign, 1 Module, including new pad and base can – Per Each
Item L-125-4	Salvage and Reinstall Sign, 2 Module, including new pad and base can – Per Each

REFERENCES

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

Advisory Circulars (AC)

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

- AC 150/5345-46 Specification for Runway and Taxiway Light Fixtures
- AC 150/5345-47 Specification for Series to Series Isolation Transformers for Airport Lighting Systems
- AC 150/5345-51 Specification for Discharge-Type Flashing Light Equipment
- AC 150/5345-53 Airport Lighting Equipment Certification Program

Engineering Brief (EB)

- EB No. 67 Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures

END OF ITEM L-125

Special Provision to Item T-901 Seeding from FAA Specifications for Construction of Airports – AC 150/5370-10H

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** There are several, but not all instances where "RPR" has been replaced with "Engineer".
- 901-4.1:** Add to the section: There shall be no separate measurement for the seeding of parking, staging and laydown area. Seeding for parking, staging and laydown area shall be incidental to mobilization.
- 901-5.1** Add to the section: There shall be no separate payment for the seeding of parking, staging and laydown area. Seeding for parking, staging and laydown area shall be incidental to mobilization.

END OF SPECIAL PROVISION TO ITEM T-901

Item T-901 Seeding

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

901-1.1 This item shall consist of soil preparation, seeding, fertilizing, watering, and maintaining the areas shown on the plans or as directed by the RPR Engineer in accordance with these specifications.

MATERIALS

901-2.1 Seed. The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Federal Specification JJJ-S-181, Federal Specification, Seeds, Agricultural.

Seed shall be furnished separately or in mixtures in standard containers labeled in conformance with the Agricultural Marketing Service (AMS) Seed Act and applicable state seed laws with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the RPR duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

Seeds shall be applied as follows:

Seed Properties and Rate of Application

Seed	Minimum Seed Purity (Percent)	Minimum Germination (Percent)	Rate of Application lb./acre (or lb./1,000 S.F.)
Bermudagrass	95	80	2.4 lbs./Acre
Green Sprangletop			0.3 lbs./Acre
Sideoats Grama (South Texas)			4.5 lbs./Acre

Seeding shall be performed during the period between [January] and [May] inclusive, unless otherwise approved by the RPR Engineer.

901-2.2 Lime. Not required

901-2.3 Fertilizer. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon.

No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

- a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or
- c. A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be [15-5-10] commercial fertilizer and shall be spread at the rate of [60 pounds of Nitrogen (from mixed fertilizer) per acre].

901-2.4 Soil for repairs. The soil for filling and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the RPR before being placed.

CONSTRUCTION DETAILS

901-3.1 Advance preparation and cleanup. After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

When the area to be seeded is sparsely sodded, weedy, barren, and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

901-3.2 Dry application method.

a. **Liming.** Not required.

b. **Fertilizing.** Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate that will provide not less than the minimum quantity stated in paragraph 901-2.3.

c. **Seeding.** Grass seed shall be sown at the rate specified in paragraph 901-2.1 immediately after fertilization. The fertilizer and seed shall be raked within the depth range stated in the special provisions. Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plants or in the special provisions, a cover crop shall be sown by the same methods required for grass and legume seeding.

d. Rolling. After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawn roller, weighing 40 to 65 pounds per foot (60 to 97 kg per meter) of width for clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot (223 to 298 kg per meter) of width for sandy or light soils.

901-3.3 Wet application method.

a. General. The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

b. Spraying equipment. The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (190 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 lb. / sq inches (690 kPa). The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipelines shall be capable of providing clearance for 5/8 inch (16 mm) solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distances varying from 20 to 100 feet (6 to 30 m). One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet (15 m) in length shall be provided to which the nozzles may be connected.

c. Mixtures. Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. The Contractor shall identify to the RPR all sources of water at least two (2) weeks

prior to use. The RPR may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the RPR following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within two (2) hours from the time they were mixed, or they shall be wasted and disposed of at approved locations.

d. Spraying. Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches (75 mm), after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high- pressure spray that shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to ensure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area.

Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the RPR, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

901-3.4 Maintenance of seeded areas. The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the RPR Engineer. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

When either the dry or wet application method outlined above is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the RPR. A grass stand shall be considered adequate when bare spots are one square foot (0.01 sq m) or less, randomly dispersed, and do not exceed 3% of the area seeded.

METHOD OF MEASUREMENT

901-4.1 The quantity of seeding to be paid for shall be the number of units acre measured on the ground surface, completed, and accepted.

There shall be no separate measurement for the seeding of parking, staging and laydown area. Seeding for parking, staging and laydown area shall be incidental to mobilization.

BASIS OF PAYMENT

901-5.1 Payment shall be made at the contract unit price per acre or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item 901-5.1 Seeding - per acre

There shall be no separate payment for the seeding of parking, staging and laydown area. Seeding for parking, staging and laydown area shall be incidental to mobilization.

REFERENCES

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

ASTM International (ASTM)

ASTM C602 Standard Specification for Agricultural Liming Materials Federal Specifications (FED SPEC)

FED SPEC JJJ-S-181, Federal Specification, Seeds, Agricultural Advisory Circulars (AC)

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-901

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Special Provision to Item T-904 Sodding

from FAA Specifications for Construction of Airports – AC 150/5370-10H

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

- General:** There are several, but not all instances where "RPR" has been replaced with "Engineer".
- 904-2-1:** Replace in the paragraph: Species stated in the special provisions has been replaced with Bermudagrass and shall not contain bird attractants such as foxtail millet. Thickness not less than stated in the special provisions has been replaced with thickness not less than 1 inch.
- 904-3.6:** Replace in the paragraph: replace "until it has become established and its continued growth assured" with, "at the Contractor's expense for a period of no less than fourteen (14) days after installation. After that fourteen-day period and when directed in writing by the Engineer, apply additional watering to continue sod establishment".
- 904-4.2:** Add the following method of measurement. 904-4.2 Water shall be measured by the thousand gallons, rounded to the nearest 100 gallons. Contractor is to dip tanks in the presence of the RPR to measure gallons of water applied on-site.
- 904-5.2** Add the following basis of payment. 905-5.2 Watering, when directed by the Engineer, will be paid for on the basis of the contract unit price per gallon, which price shall be full compensation for all labor, equipment, materials, and incidentals necessary to satisfactorily complete the items as specified.

END OF SPECIAL PROVISION TO ITEM T-904

Item T-904 Sodding

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

904-1.1 This item shall consist of furnishing, hauling, and placing approved live sod on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the RPR.

MATERIALS

904-2.1 Sod. Sod furnished by the Contractor shall have a good cover of living or growing grass. This shall be interpreted to include grass that is seasonally dormant during the cold or dry seasons and capable of renewing growth after the dormant period. All sod shall be obtained from areas where the soil is reasonably fertile and contains a high percentage of loamy topsoil. Sod shall be cut or stripped from living, thickly matted turf relatively free of weeds or other undesirable foreign plants, large stones, roots, or other materials that might be detrimental to the development of the sod or to future maintenance. At least 70% of the plants in the cut sod shall be composed of ~~the species stated in the special provisions~~, Bermudagrass and shall not contain bird attractants such as foxtail millet, and any vegetation more than 6 inches (150 mm) in height shall be mowed to a height of 3 inches (75 mm) or less before sod is lifted. Sod, including the soil containing the roots and the plant growth showing above, shall be cut uniformly to a thickness not less ~~than stated on the special provisions~~ 1 inch.

904-2.2 Lime. Not required.

904-2.3 Fertilizer. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

- a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or
- c. A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be [15-5-10] commercial fertilizer and shall be spread at the rate of [60 pounds of Nitrogen (from mixed fertilizer) per acre].

904-2.4 Water. The water shall be sufficiently free from oil, acid, alkali, salt, or other harmful materials that would inhibit the growth of grass.

904-2.5 Soil for repairs. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the RPR before being placed.

CONSTRUCTION METHODS

904-3.1 General. Areas to be solid, strip, or spot sodded shall be shown on the plans. Areas requiring special ground surface preparation such as tilling and those areas in a satisfactory condition that are to remain undisturbed shall also be shown on the plans.

Suitable equipment necessary for proper preparation of the ground surface and for the handling and placing of all required materials shall be on hand, in good condition, and shall be approved by the RPR Engineer before the various operations are started. The Contractor shall demonstrate to the RPR before starting the various operations that the application of required materials will be made at the specified rates.

904-3.2 Preparing the ground surface. After grading of areas has been completed and before applying fertilizer and limestone, areas to be sodded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris which might interfere with sodding, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes occurs after grading of areas and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage. This may include filling gullies, smoothing irregularities, and repairing other incidental damage.

904-3.3 Applying fertilizer and ground limestone. Following ground surface preparation, fertilizer shall be uniformly spread at a rate which will provide not less than the minimum quantity of each fertilizer ingredient, as stated in the special provisions. If use of ground limestone is required, it shall then be spread at a rate that will provide not less than the minimum quantity stated in the special provisions.

These materials shall be incorporated into the soil to a depth of not less than 2 inches (50 mm) by discing, raking, or other suitable methods. Any stones larger than 2 inches (50 mm) in any diameter, large clods, roots, and other litter brought to the surface by this operation shall be removed.

904-3.4 Obtaining and delivering sod. After inspection and approval of the source of sod by the RPR, the sod shall be cut with approved sod cutters to such a thickness that after it has been transported and placed on the prepared bed, but before it has been compacted, it shall have a uniform thickness of not less than 2 inches (50 mm). Sod sections or strips shall be cut in uniform widths, not less than 10 inches (250 mm), and in lengths of not less than 18 inches (0.5 m), but of such length as may be readily lifted without breaking, tearing, or loss of soil. Where strips are required, the sod must be rolled without damage with the grass folded inside. The Contractor may be required to mow high grass before cutting sod.

The sod shall be transplanted within 24 hours from the time it is stripped, unless circumstances beyond the Contractor's control make storing necessary. In such cases, sod shall be stacked, kept moist, and protected from exposure to the air and sun and shall be kept from freezing. Sod shall be cut and moved only when the soil moisture conditions are such that favorable results can be expected. Where the soil is too dry, approval to cut sod may be granted only after it has been watered sufficiently to moisten the soil to the depth the sod is to be cut.

904-3.5 Laying sod. Sodding shall be performed only during the seasons when satisfactory results can be expected. Frozen sod shall not be used and sod shall not be placed upon frozen soil. Sod may be transplanted during periods of drought with the approval of the RPR Engineer, provided the sod bed is watered to moisten the soil to a depth of at least 4 inches (100 mm) immediately prior to laying the sod.

The sod shall be moist and shall be placed on a moist earth bed. Pitch forks shall not be used to handle sod, and dumping from vehicles shall not be permitted. The sod shall be carefully placed by hand, edge to edge and with staggered joints, in rows at right angles to the slopes, commencing at the base of the area to be sodded and working upward. The sod shall immediately be pressed firmly into contact with the sod bed by tamping or rolling with approved equipment to provide a true and even surface, and ensure knitting without displacement of the sod or deformation of the surfaces of sodded areas. Where the sod may be displaced during sodding operations, the workmen, when replacing it, shall work from ladders or treaded planks to prevent further displacement. Screened soil of good quality shall be used to fill all cracks between sods. The quantity of the fill soil shall not cause smothering of the grass. Where the grades are such that the flow of water will be from paved surfaces across sodded areas, the surface of the soil in the sod after compaction shall be set approximately one inch (25 mm) below the pavement edge.

Where the flow will be over the sodded areas and onto the paved surfaces around manholes and inlets, the surface of the soil in the sod after compaction shall be placed flush with pavement edges.

On slopes steeper than one (1) vertical to 2-1/2 horizontal and in v-shaped or flat-bottom ditches or gutters, the sod shall be pegged with wooden pegs not less than 12 inches (300 mm) in length and have a cross-sectional area of not less than 3/4 sq inch (18 sq mm). The pegs shall be driven flush with the surface of the sod.

904-3.6 Watering. Adequate water and watering equipment must be on hand before sodding begins, and sod shall be kept moist ~~until it has become established and its continued growth assured~~ at the Contractor's expense for a period of no less than fourteen (14) days after installation. After that fourteen day period and when directed in writing by the Engineer, apply additional watering to continue sod establishment. In all cases, watering shall be done in a manner that will avoid erosion from the application of excessive quantities and will avoid damage to the finished surface.

904-3.7 Establishing turf. The Contractor shall provide general care for the sodded areas as soon as the sod has been laid and shall continue until final inspection and acceptance of the work. All sodded areas shall be protected against traffic or other use by warning signs or barricades approved by the RPR. The Contractor shall mow the sodded areas with approved mowing equipment, depending upon climatic and growth conditions and the needs for mowing specific areas. Weeds or other undesirable vegetation shall be mowed and the clippings raked and removed from the area.

904-3.8 Repairing. When the surface has become gullied or otherwise damaged during the period covered by this contract, the affected areas shall be repaired to re-establish the grade and the condition of the soil, as directed by the ~~RPR~~ Engineer, and shall then be sodded as specified in paragraph 904-3.5.

METHOD OF MEASUREMENT

904-4.1 This item shall be measured on the basis of the area in square yards (square meters) of the surface covered with sod and accepted.

904-4.2 Water shall be measured by the thousand gallons, rounded to the nearest 100 gallons. Contractor is to dip tanks in the presence of the RPR to measure gallons of water applied on-site.

BASIS OF PAYMENT

904-5.1 This item will be paid for on the basis of the contract unit price per square yard (square meter) for sodding, which price shall be full compensation for all labor, equipment, material, staking, and incidentals necessary to satisfactorily complete the items as specified.

904-5.2.

Payment will be made under: Watering, when directed by the Engineer, will be paid for on the basis of the contract unit price per gallon, which price shall be full compensation for all labor, equipment, materials, and incidentals necessary to satisfactorily complete the items as specified.

Item T-904-5.1	Block Sod - per square yard (square meter)
Item T-904-5.2	Watering – per 1,000 gallons

REFERENCES

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

ASTM International (ASTM)

ASTM C602 Standard Specification for Agricultural Liming Materials

Advisory Circulars (AC)

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-904

Special Provision to Item T-905 Topsoil
from FAA Specifications for Construction of Airports – AC 150/5370-10H

The following notations indicate changes, additions, deletions to the standard specification list above. They are specified in the document but are highlighted here for the bidder and contractor's convenience.

General: There are several, but not all instances where "RPR" has been replaced with "Engineer".

END OF SPECIAL PROVISION TO ITEM T-905

Item T-905 Topsoil

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

905-1.1 This item shall consist of preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the ~~RPR~~ Engineer.

MATERIALS

905-2.1 Topsoil. Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches (50 mm) or more in diameter), and clay lumps or similar objects. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sod and herbaceous growth such as grass and weeds are not to be removed but shall be thoroughly broken up and intermixed with the soil during handling operations. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means, shall be removed. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall be not less than 3% nor more than 20% as determined by the wet-combustion method (chromic acid reduction). There shall be not less than 20% nor more than 80% of the material passing the 200 mesh (75 µm) sieve as determined by the wash test in accordance with ASTM C117.

Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.

905-2.2 Inspection and tests. Within 10 days following acceptance of the bid, the RPR shall be notified of the source of topsoil to be furnished by the Contractor. The topsoil shall be inspected to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the Contractor may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths, for testing purposes as specified in paragraph 905-2.1.

CONSTRUCTION METHODS

905-3.1 General. Areas to be topsoiled shall be shown on the plans. If topsoil is available on the site, the location of the stockpiles or areas to be stripped of topsoil and the stripping depths shall be shown on the plans.

Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the ~~RPR~~ Engineer before the various operations are started.

905-3.2 Preparing the ground surface. Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the ~~RPR~~ Engineer, to a

minimum depth of 2 inches (50 mm) to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches (50 mm) in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

Grades in the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be smooth-graded, and the surface left at the prescribed grades in an even and compacted condition to prevent the formation of low places or pockets where water will stand.

905-3.3 Obtaining topsoil. Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, rubbish or stones found on such areas, which may interfere with subsequent operations, shall be removed using methods approved by the RPR Engineer. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means shall be removed.

When suitable topsoil is available on the site, the Contractor shall remove this material from the designated areas and to the depth as directed by the RPR Engineer. The topsoil shall be spread on areas already tilled and smooth-graded or stockpiled in areas approved by the RPR Engineer. Any topsoil stockpiled by the Contractor shall be rehandled and placed without additional compensation. Any topsoil that has been stockpiled on the site by others, and is required for topsoil purposes, shall be removed, and placed by the Contractor. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding.

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the RPR. The Contractor shall notify the RPR sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

905-3.4 Placing topsoil. The topsoil shall be evenly spread on the prepared areas to a uniform depth of 2 inches (50 mm) after compaction, unless otherwise shown on the plans or stated in the special provisions. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turfing operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2 inches (50 mm) or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the Contractor. After spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the RPR. The compacted topsoil surface shall conform to the required lines, grades, and cross-sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

METHOD OF MEASUREMENT

905-4.1 Topsoil obtained on the site shall be measured by the number of cubic yards (cubic meters) of topsoil measured in its original position and stripped or excavated. Topsoil stockpiled by others and removed for topsoil by the Contractor shall be measured by the number of cubic yards (cubic meters) of topsoil measured in the stockpile. Topsoil shall be measured by volume in cubic yards (cubic meters) computed by the method of end areas.

905-4.2 Topsoil obtained off the site shall be measured by the number of cubic yards (cubic meters) of topsoil measured in its original position and stripped or excavated. Topsoil shall be measured by volume in cubic yards (meters) computed by the method of end areas.

BASIS OF PAYMENT

905-5.1 Payment will be made at the contract unit price per cubic yard (cubic meter) for topsoil (obtained on the site). This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

905-5.2 Payment will be made at the contract unit price per cubic yard (cubic meter) for topsoil (obtained off the site). This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item T-905-5.1 2" Topsoil (Obtained on Site or Removed from Stockpile) - per cubic yard (cubic meter)

Item T-905-5.2 2" Topsoil (Furnished from Off the Site) - per cubic yard (cubic meter)

REFERENCES

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

ASTM International (ASTM)

ASTM C117 Materials Finer than 75 μ m (No. 200) Sieve in Mineral Aggregates by Washing

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-905

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Item SS-100 – TxDOT Standard Specifications References

DESCRIPTION

- 100-1.1 Some specifications in the Contract reference the standard specifications of the Texas Department of Transportation. These specifications are included in "Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges", published September 1, 2024. These specifications are referred to in other Items and in the plans as "Standard Specifications." A copy of these Standard Specifications may be obtained from TxDOT online.
- 100-1.2 Some of the Standard Specifications are included in the project manual, and any modifications to those included specifications are to replace the Standard Specification. Otherwise, the Standard Specifications are incorporated by reference when they are stated as such within the specifications of this Contract. Unless specifically noted otherwise, the most current specification shall apply. When a specification is referenced, its inclusion to the specifications should be treated as though the specification was included directly in the Contract.
- 100-1.3 When the Standard Specifications references "Department" it is herein changed to "Agent".

MEASUREMENT AND PAYMENT

- 100-2.1 When shown as a pay item in the bid form, payment for items outlined in a Standard Specification will be by the units depicted in the bid form. If a Standard Specification includes payment items that are NOT included in the bid form, the item is to be considered subsidiary to an item in which it is contained and there will be no separate payment for the item in the Standard Specification.

END OF ITEM SS-100

Special Specification Item SS-106 Safety Plan Compliance Document (SPCD)

from FAA Specifications for Construction of Airports – AC 150/5370-10H

DESCRIPTION

106.1 The Safety Plan Compliance Document (SPCD) details how the contractor will comply with the Construction Safety and Phasing Plan (CSPP) drawings including Airport Security, Low Profile Barricades and Runway Closure Markers (Lighted) and CSPP Report. The contractor shall review the CSPP plans and report and define all safety plan details including but not limited to security, barricades, runway closure equipment, specific hazard equipment and lighting, contractor's points of contact, construction equipment heights by preparing an SPCD that the airport reviews for approval prior to issuance of a notice-to-proceed.

METHOD OF MEASUREMENT

106.2 Based upon the contract lump sum price for "Safety Plan Compliance Document" partial payments will be allowed as follows:

- a) With first pay request, 25%.
- b) When 25% or more of the original contract is earned, an additional 25%.
- c) When 50% or more of the original contract is earned, an additional 40%.
- d) Final Inspection, Staging area clean-up and delivery of all Project Closeout materials the final 10%.

BASIS OF PAYMENT

106.3 Payment will be made under:

- | | |
|---------------|--|
| Item SS-106-1 | Construction Safety Plan Compliance Document (SPCD) – per Lumpsum |
| Item SS-106-2 | Low Profile Barricades – per Linear Feet |
| Item SS-106-3 | Runway Closure Markers (Lighted) – per Each |
| Item SS-106-4 | Airport Security will not be paid for directly but will be considered subsidiary to Item SS-106 SPCD |

END OF ITEM SS-106

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Item SS-106SUPP – Construction Safety Plan Compliance

DESCRIPTION

- 106SUPP-1.1 This Safety Plan Compliance Document (SPCD) is to show the Contractor’s compliance with the approved Construction Safety Phasing Plan (CSPP) per FAA requirements 150/5370-2G and Item SS-106, Construction Safety and Phasing. The Contractor is to certify that they will comply with each section of Item SS-106. Any Section below that is filled with a response of "No" is to be discussed in an attachment to this certification and submitted to the Engineer.

SUBMITTALS

- 106SUPP-2.1 Prior to the Contractor entering the site for mobilization but no more than 21 calendar days after contract execution, this SPCD is to be filled out by the Contractor and submitted to the Engineer for review. Any comments, changes, or additional requested information shall be completed by the Contractor and submitted to the Engineer for approval as part of the SPCD. The accepted version of this SPCD is to be executed by a principle for the Contractor and submitted to TxDOT Aviation Division. A copy is to be kept on file with the Contractor on-site.

MATERIALS

- 106SUPP-3.1 NOT USED.

EQUIPMENT

- 106 SUPP-4.1 NOT USED.

OPERATION

- 106SUPP-5.1 **Section 1 - Coordination:** This project will be completed in accordance with Section 1: “Coordination” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

- 106SUPP-5.2 **Section 2 - Phasing:** This project will be completed in accordance with Section 2: “Phasing” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

- 106SUPP-5.3 **Section 3 – Areas of Operations Affected by Construction Activity:** This project will be completed in accordance with Section 3 “Areas of Operations Affected by Construction Activity” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

- 106SUPP-5.4 **Section 4 – Protection of Navigational Aids (NAVAIDS):** This project shall be completed in accordance with Section 4 “Protection of Navigational Aids (NAVAIDS)” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.5. Section 5 – Contractor Access: This project shall be completed in accordance with Section 5 “Contractor Access” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.6. Section 6 – Wildlife Management: This project shall be completed in accordance with Section 6 “Wildlife Management” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.7. Section 7 – Foreign Object Debris (FOD) Management: This project shall be completed in accordance with Section 7 “Foreign Object Debris (FOD) Management” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.8. Section 8 – Hazardous Materials (HAZMAT) Management: This project shall be completed in accordance with Section 8 “Hazardous Materials (HAZMAT) Management” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.9. Section 9 – Notification of Construction Activities: This project shall be completed in accordance with Section 9 “Notification of Construction Activities” of the approved Construction Safety Plan Compliance Document.

Yes _____ No _____

Role	Name	Email	Phone / Text
Wharton Regional Airport:	Dwayne Pospisil	dpospisil@cityofwharton.com	979-532-3210
TxDOT Aviation:	Robert Johnson, PE	robert.n.johnson@txdot.gov	512-979-7295
Engineer:	Thomas Dodson, PE	tdodson@civil-pes.com	281-630-1888
RPR:			
Acceptance Testing Lab:			
Contractor:			
Materials Testing Lab:			
Subcontractor:			

106SUPP-5.10. **Section 10 – Inspection Requirements:** This project shall be completed in accordance with Section 10 “Inspection Requirements” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.11. **Section 11 – Underground Utilities:** This project shall be completed in accordance with Section 11 “Underground Utilities” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.12. **Section 12 – Penalties:** This project shall be completed in accordance with Section 12 “Penalties” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.13. ~~**Section 13 – Special Conditions:** This project shall be completed in accordance with Section 13 “Special Conditions” of the approved Construction Safety Phasing Plan.~~

106SUPP-5.14. **Section 14 – Runway and Taxiway Visual Aids:** This project shall be completed in accordance with 14 “Runway and Taxiway Visual Aids” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.15. **Section 15 – Marking and Signs for Access Routes:** This project shall be completed in accordance with Section 15 “Marking and Signs for Access Routes” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.16. **Section 16 – Hazard Marking and Lighting:** This project shall be completed in accordance with Section 16 “Hazard Marking and Lighting” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.17. **Section 17 – Work Zone Lighting for Nighttime Construction (if applicable):** This project shall be completed in accordance with Section 17 “Work zone lighting for nighttime construction” of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.18. Section 18 – Protection of Safety Areas, Object Free Areas, Object Free Zones, and Approach / Departure Surfaces: This project shall be completed in accordance with Section 18 "Protection of Safety Areas, Object Free Areas, Object Free Zones, and Approach / Departure Surfaces" of the approved Construction Safety Phasing Plan.

Yes _____ No _____

106SUPP-5.19. Section 19 – Other Limitations on Construction: This project shall be completed in accordance with Section 19 "Other Limitations on Construction" of the approved Construction Safety Phasing Plan.

Yes _____ No _____

EXECUTION

I certify for the work identified herein, the responses to the sections above are correct as marked, and that I will comply with the approved Construction Safety Phasing Plan as outlined above.

Contractor's Authorized Representative

Signed: _____

Date: _____

/ _____
Print Name / Title

END OF ITEM SS-106SUPP

***GEOTECHNICAL
REPORT***

PAVEMENT MATERIALS AND GEOTECHNICAL INVESTIGATION
REHABILITATION OF RUNWAY AND TAXIWAY AT WHARTON REGIONAL AIRPORT
TxDOT Project No./CSJ: 2413WHRTN
Wharton County, Texas

SUBMITTED TO

Civil PEs, LLC.

814 Thornwick Drive
HOUSTON, TEXAS 77079

BY

HVJ ASSOCIATES, INC.

Houston, Texas

September 9, 2025

REPORT NO. HGT2210070.4





Houston | 6120 S. Dairy Ashford Rd.
Austin | Houston, TX 77072-1010
Dallas | 281.933.7388 Ph
San Antonio | 281.933.7293 Fax
www.hvj.com

September 9, 2025

Mr. Thomas D. Dodson, P.E.
President
Civil PEs, LLC.
814 Thornwick Drive
Houston, Texas 77079

Re: Pavement Materials Study
Rehabilitation of Runway and Taxiway at Wharton Regional Airport
ARM, Wharton, Wharton County, Texas
Owner/Sponsor: City of Wharton, Texas
Agent: Texas Department of Transportation – Aviation Division
Client: Civil PEs, LLC.
TxDOT CSJ/Project No.: 2413WHRTN
HVJ Report No.: HGT2210070.4

Dear Mr. Dodson:


Submitted herein is the final data report of our pavement materials and geotechnical investigation for the above referenced project. The study satisfies the scope of work described in Article 1.01 of the Agreement for Professional Services between Civil PEs, LLC (Engineer) and HVJ Associates, Inc. (Geotechnical Engineer), dated February 21, 2025, and is subject to the limitations presented in this report.

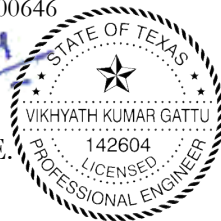
It has been a pleasure to work with you on this project and we appreciate the opportunity to be of service. Please notify us if there are questions or if we may be of further assistance.


Sincerely,

HVJ ASSOCIATES, INC.

Texas Firm Registration No. F-000646


Vikhyath Kumar Gattu, P.E.
Project Manager




Ajay Pisati, E.I.T.
Staff Engineer

The seal appearing on this document was authorized by Vikhyath Kumar Gattu, PE 142604 on September 9, 2025. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Act.

VG/AP/MH

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Plate

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1 INTRODUCTION

1.1 Project Description

HVJ Associates, Inc. (HVJ) was retained by Civil PEs, LLC under a professional services agreement dated February 21, 2025, to perform pavement materials and geotechnical investigations on the existing Runway 14/32 and Taxiways A, B, C, and D at Wharton Regional Airport (identified as ARM by Federal Aviation Administration). The airport, owned and supported by the City of Wharton, is located within the Houston-Galveston region, at 714 Robert Vonderau Road in Wharton, Wharton County, Texas. It is situated approximately 5 miles southwest of the Wharton city center, and lies just south of US 59/Lloyd Bentsen Hwy. The Site Vicinity Map showing the approximate project alignment is presented on Plate 1 of this report.

Based on our conversation with Civil PEs, we understand that the overall purpose of the above-referenced project is to gather data on the existing pavement sections and natural subgrade conditions on both the runway and taxiways to determine whether the pavement has sufficient strength or is under-strength, and to assess the need for rehabilitation (Mill or Chipseal and Asphalt overlay). HVJ's scope of work for this project is limited to coring the pavement at the locations provided by Civil PEs, to measure layer thicknesses and to obtain samples of the pavement materials, treated subgrade (if present), and natural subgrade beneath each pavement core, along with photographic documentation of the materials recovered from each core. Our scope of work also includes conducting in-situ field testing on the existing undisturbed natural subgrade beneath the pavement cores using Dynamic Cone Penetration (DCP) tests. It is Civil PEs who will evaluate our findings and determine the suitability of the runway and taxiways for an overlay or whether they need to be reconstructed. Pavement thickness design and construction phase services are not part of HVJ's scope of work. However, this report includes the estimate of layer strengths in terms of modulus values calculated using the Dynamic Cone Penetration (DCP) testing and natural subgrade index properties obtained from laboratory testing to provide adequate information for Civil PEs' use in the evaluation of existing pavements and identify areas where repairs or rehabilitation may be needed.

1.2 Pavement and Geotechnical Investigation Program

The objective of this study is to perform pavement materials exploration, field testing, and laboratory testing of the natural subgrade, and to report the findings. The following objectives were accomplished in our study:

- The existing pavement at Runway 14/32 and the taxiways was cored at seven (7) and six (6) different locations, respectively, to obtain the pavement material thicknesses, including the pavement surface, base material, and treated subgrade (if present).
- Upon completion of pavement materials coring, in-place Dynamic Cone Penetration (DCP) tests were performed on the natural subgrade to a depth of 30 inches below the bottom of each pavement core.
- Following the DCP tests, the natural subgrade soils were augered to a depth of approximately 12 inches and sampled for laboratory testing to determine the classification.

Subsequent sections of this report contain descriptions of the field exploration and laboratory testing program, and general subsurface conditions.

2 FIELD EXPLORATION

2.1 General

The field exploration program for the project was conducted on March 19 and 20, 2025. The pavement materials and subgrade conditions at the site were evaluated by coring at 13 different locations, as identified in Table 2-1. Pavement coring was performed using portable coring equipment, in-situ testing was conducted using a Dynamic Cone Penetrometer (DCP), and natural subgrade samples were obtained using gasoline powered auger equipment. Upon completion of coring and in-situ testing, the pavement cores were backfilled with early-strength, non-shrink grout and patched at the surface with cold mix asphalt. The approximate pavement core locations are shown on Plate 2 of this report.

2.2 Dynamic Cone Penetration Test

The Dynamic Cone Penetrometer (DCP) testing method is used as a rapid means of assessing the thickness, in-situ strength, and other material characteristics of undisturbed soil and compacted materials below a pavement structure. DCP tests were performed on the natural subgrade soils just beneath pavement cores to a desired depth of 30 inches along the Runway and the Taxiway (in general accordance with the ASTM D6951 standard). The DCP test procedure consisted of lifting the sliding hammer (17.6 lb.) to the handle and then releasing, to record the number of blow counts and depth on a DCP Test form. Blow counts were measured from the vertical scale attached it and recorded for each six-inch deflection in inches/blow. The testing was finalized once the desired depth (total penetration) was reached. The recorded blow counts can be used to describe stiffness, estimate an in-situ CBR strength from an appropriate chart, or other material characteristics. The test results are presented in Appendix D and Appendix E of the report.

2.3 Survey Data

Survey information including station, offset and elevation were not available. The GPS coordinates obtained by a handheld GPS device at each pavement core location and approximate elevations estimated from Topo View are included in Table 2-1.

Table 2-1 – Borehole Survey Data

Location	Pavement Core No.	Latitude	Longitude	Elevation, Feet ¹
Runway 14/32	R-1	29.260056°	-96.158139°	100
	RE-1	29.259667°	-96.157722°	99
	R-3	29.257167°	-96.156306°	99
	RE-2	29.254972°	-96.155000°	98
	R-5	29.251417°	-96.152556°	98
	R-6	29.250167°	-96.151694°	97
	R-7	29.248639°	-96.150778°	97
Taxiways	T-1	29.260500°	-96.157472°	99
	T-2	29.257444°	-96.155722°	99
	T-3	29.254556°	-96.153833°	99
	T-5	29.250139°	-96.151028°	97

Location	Pavement Core No.	Latitude	Longitude	Elevation, Feet ¹
	T-6	29.249361°	-96.150556°	97
	T-7	29.248722°	-96.150083°	97

1. Surface elevation estimated from Topo View, developed by USGS. The surface elevation is referenced to above the MSL (Mean Sea Level).

3 LABORATORY TESTING

3.1 General

The natural subgrade soil samples obtained beneath the pavement cores were tested in the laboratory to determine applicable physical properties. Tests were performed according to the relevant TxDOT Standards. The laboratory program included moisture content, Atterberg limits, and percent finer than No. 200 sieve.

The moisture content, Atterberg limits and percent finer than No. 200 sieve results were utilized to verify field classifications by the Unified Soils Classification System. The type and number of tests performed for this investigation are summarized in Table 3-1.

Table 0-1 – Type and Number of Laboratory Tests

Laboratory Test	Number of Tests
Moisture Content (Tex-103-E)	13
Liquid Limit (Tex-104-E)	13
Plastic Limit (Tex-105-E)	13
% Passing #200 Sieve (Tex-111-E)	13

A summary of laboratory test results presented in Appendix B.

3.2 Atterberg Limits

Selected samples were tested to determine the Atterberg Limits in accordance with TEX-104-E and 105-E. The Atterberg Limits test is used to classify the soil by the Unified Soil Classification System (USCS). The Atterberg Limits test consists of two parts: a liquid limit test and a plastic limit test. The liquid limit equipment setup consists of a brass cup partially filled with soil which is grooved with a specialized grooving tool, and then dropped freely from a specified height to the rubber base below at a constant rate of 2 drops per second. The liquid limit test is performed on soil that has been sieved through the No. 40 sieve and brought to a moisture content that would close the 1/2-inch groove within 20 to 30 blows for two consecutive tests. The moisture content of the soil is then measured and recorded as the liquid limit. The second part of the test consists of rolling a remolded sample between the tips of the fingers and a glass plate until transverse cracks appear at a rolled diameter of 1/8-inch. The moisture content of the rolled sample is taken and recorded as the plastic limit.

3.3 Percent Passing the No. 200 Sieve

Select soil samples were tested in accordance with TEX-111-E to determine the amount of material finer than the No. 200 sieve for use in classification. An oven dried sample of material is weighed then washed over a 75- μ m (No. 200) sieve, allowing clay and other particles to be dispersed and removed from the soil. The retained material is oven dried then reweighed. The loss in mass resulting from the washing is calculated as mass percent of the original sample and is reported as the percentage of material finer than a No. 200 sieve.

3.4 Moisture Content

Moisture content testing was performed on select soil samples to determine the in-situ state of moisture of the soil. A fresh sample was weighed before being placed in an oven with a controlled temperature of 230°F and dried back to a constant mass. Upon the drying and reweighing of the sample, the total mass of water lost was recorded. The ratio of the water loss to the dried mass is recorded as the moisture content. This test was performed in accordance with TEX-103-E.

4 SITE CHARACTERIZATION

4.1 Natural Subgrade

HVJ's interpretation of natural subgrade conditions at the project site is based on information obtained beneath the cored locations. Our findings on natural subgrade are limited to the proposed exploration depth and can't be generalized across the site, and to deeper depths. Natural Subgrade conditions can vary significantly over relatively short distances, and such variations may not be captured by the limited number of cores conducted. If significant variations in natural subgrade outside the explored zones or depths in this project become relevant, additional subsurface exploration programs may be required to re-evaluate or revise the findings presented in this report.

The cohesive natural subgrade soils (CH and CL) were observed in all the thirteen locations and predominantly consisted of Lean Clay with Sand and Sandy Lean Clay, with presence of Fat Clay with Sand (CH) at T-5.

Table 4-1 – Existing Natural Subgrade Index Properties

Location	Pavement Core	Depth of Natural Subgrade Tested ¹	Liquid Limit (%)	Plasticity Index (%)	% Passing #200 Sieve	USCS Classification
Runway 14/32	R-1	1.25' – 2.25'	47	30	66.6	Sandy Lean Clay (CL)
	RE-1	1.15' – 2.15'	44	28	71.6	Lean Clay with Sand (CL)
	R-3	1.0' – 2.0'	44	29	73.6	Lean Clay with Sand (CL)
	RE-2	1.20' – 2.20'	49	32	71.8	Lean Clay with Sand (CL)
	R-5	1.0' – 2.0'	45	27	70.7	Lean Clay with Sand (CL)
	R-6	1.30' – 2.30'	41	25	72.9	Lean Clay with Sand (CL)
	R-7	1.20' – 2.20'	43	27	77.1	Lean Clay with Sand (CL)
Taxiways	T-1	1.0' – 2.0'	47	31	74.8	Lean Clay with Sand (CL)
	T-2	1.125' – 2.125'	40	20	66.7	Sandy Lean Clay (CL)
	T-3	1.60' – 2.60'	43	28	66.7	Sandy Lean Clay (CL)
	T-5	1.50' – 2.50'	50	33	70.1	Fat Clay with Sand (CH)
	T-6	1.30' – 2.30'	31	11	52.4	Sandy Lean Clay (CL)

Location	Pavement Core	Depth of Natural Subgrade Tested ¹	Liquid Limit (%)	Plasticity Index (%)	% Passing #200 Sieve	USCS Classification
	T-7	1.25' – 2.25'	35	13	57.9	Sandy Lean Clay (CL)

Notes:

1. Natural subgrade soils obtained beneath the pavement core using gasoline powered auger equipment after performing DCP tests.

4.2 Existing Pavement Thickness

The pavement thickness information obtained at the pavement core locations is summarized in the Table 4-2. The photographed core samples on Runway and Taxiways are presented in Appendix A and Appendix B respectively.

Table 4-2 – Existing Pavement Thicknesses

Pavement Core	Surface Course/Asphalt Thickness ³			Base Course Description and Thickness	Underlying Treated Subgrade Material Thickness	Total Pavement Core Thickness, Inches
	2 nd Overlay	1 st Overlay	Original			
R-1	2.5"	1.5"	1.75"	Asphaltic Base - 9.25"	N/E ¹	15
RE-1	1.5"	1.0"	1.75"	Asphaltic Base - 9.75"	N/E ¹	14
R-3	0.75"	2.25"	3.0"	River Rock - 6.0"	N/E ¹	12
RE-2	N/E ¹	1.75"	3.0"	River Rock - 9.75"	N/E ¹	14.5
R-5	2.75"	1.25"	3.0"	River Rock - 5.5"	N/E ¹	12.5
R-6	1.5"	1.5"	4.0"	Crushed Limestone - 8.5"	N/E ¹	15.5
R-7	1.5"	1.75"	3.25"	Crushed Limestone - 8.0"	N/E ¹	14.5
T-1	2.25"	2.0"	1.75"	Asphaltic Base - 6.0"	N/E ¹	12
T-2	2.0"	2.0"	1.75"	Asphaltic Base - 7.75"	N/E ¹	13.5
T-3	N/E ¹	N/E ¹	2.75"	Crushed Limestone - 8.25"	Treated Subgrade - 8" ²	19
T-5	N/E ¹	N/E ¹	2.5"	Crushed Limestone - 10"	Treated Subgrade - 5.5" ²	18
T-6	1.25"	0.75"	2.5"	Crushed Limestone - 11.5"	N/E ¹	16
T-7	1.5"	2.0"	2.0"	Crushed Limestone - 9.5"	N/E ¹	15

Notes:

1. Not encountered in the pavement core.

2. Performed qualitative determination for the presence of calcium-based stabilization materials using phenolphthalein.
3. The delineation of original asphalt layers and subsequent overlays is approximate and based on visual observations, available records such as as-built plans, overlay history, and core sampling wherever applicable. Actual layer boundaries across the site may vary due to construction practices, weathering, and material blending over time.

4.3 Dynamic Core Penetration Test Summary

The following Table 4-3 summarizes the DCP data collected from the site and DCP correlated Elastic modulus.

Table 4-3 – Summary of DCP Data and Correlated Elastic Modulus

Location	Pavement Core	Regression Line Equation (x versus y) ¹	Coefficient of Determination (R Squared) ²	Root Mean Square Error (RMSE) ³	Average DCP correlated Elastic Modulus (E _{Avg})
Runway 14/32	R-1	$y = 0.4945x + 5.1429^*$	0.989	1.041	13.5
	RE-1	$y = 0.75x + 1.5^*$	0.975	1.960	11.6
	R-3	$y = 0.3221x + 5.3105^*$	0.982	1.363	18.9
	RE-2	$y = 0.4726x + 5.6166^*$	0.984	1.193	14.0
	R-5	$y = 0.5899x + 5.2591^*$	0.983	1.377	12.1
	R-6	$y = 0.333x + 6.8114^*$	0.971	2.231	17.4
	R-7	$y = 0.4174x + 4.8936^*$	0.987	1.035	15.8
Taxiways	T-1	$y = 0.8439x + 3.4849^*$	0.998	0.190	9.6
	T-2	$y = 0.4613x + 1.8561^*$	0.960	2.901	14.7
	T-3	$y = 0.5908x + 6.5378^*$	0.965	2.558	11.8
	T-5	$y = 0.5431x + 4.6392^*$	0.995	0.469	12.9
	T-6	$y = 0.4927x + 5.3872^*$	0.977	1.684	13.9
	T-7	$y = 0.4962x + 5.4946^*$	0.984	1.176	13.6

1. Where x = cumulative DCP blow counts, y = penetration depth
- * The line of best fit is calculated based on the field recorded cumulative DCP blow counts corresponding to each penetration depth.
2. Indicates how well the regression line fits the data (field recorded cumulative DCP blow counts vs penetration depth); values closer to 1.0 suggest a stronger correlation.
3. Measure of the difference between field-recorded cumulative blow counts and those predicted by the regression line. It indicates how far off the predictions are, on average. A lower RMSE value suggests better model accuracy, while a higher value indicates greater deviation from actual field data.

5 LIMITATIONS

This investigation was performed for the exclusive use of Civil PEs, LLC., City of Wharton, and TxDOT Aviation Division for the proposed Wharton Regional Airport (ARM) Runway and Taxiway rehabilitation project, in Wharton, Wharton County, Texas. HVJ has endeavored to comply with generally accepted geotechnical engineering practice common in the local area. HVJ makes no warranty, expressed or implied. The contents of this report are based on data obtained from subsurface exploration, laboratory testing, the project information provided to us and our experience with similar soils and site conditions. The methods used indicate subsurface conditions only at the specific locations where samples were obtained, only at the time they were obtained, and only to the depths penetrated. Samples cannot be relied on to accurately reflect the strata variations that usually exist between sampling locations. Should any subsurface conditions other than those described in our boring logs be encountered, HVJ should be immediately notified so that further investigation and supplemental recommendations can be provided.

PLATES



Google Earth
Image © 2025 Airbus

			6120 S. Dairy Ashford Road Houston, Texas 77072-1010 281.933.7388 Ph 281.933.7293 Fax		
DATE: 4/23/2025	APPROVED BY: VG	PREPARED BY: AP	SITE VICINITY MAP REHABILITATION OF RUNWAY AND TAXIWAY AT WHARTON REGIONAL AIRPORT (TXDOT CSJ No.: 2413WHRTN)		
PROJECT NO.: HGT2210070.4	DRAWING NO.: PLATE 1				



LEGEND:



APPROXIMATE PAVEMENT CORE LOCATIONS

HVJ
ASSOCIATES
6120 S. Dairy Ashford Road
Houston, Texas 77072-1010
281.933.7388 Ph
281.933.7293 Fax

DATE: 4/23/2025	APPROVED BY: VG	PREPARED BY: AP
-----------------	--------------------	--------------------

PAVEMENT CORE LOCATIONS
REHABILITATION OF RUNWAY AND TAXIWAY AT WHARTON
REGIONAL AIRPORT (TxDOT CSJ No.: 2413WHRTN)

PROJECT NO.: HGT2210070.4	DRAWING NO.: PLATE 2
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APPENDIX A


PAVEMENT CORE PICTURES ON RUNWAY



Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
R-1	2.5"	1.5"	1.75"	9.25" Asphaltic Base	N/E	Sandy Lean Clay (CL)

Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
RE-1	1.5"	1.0"	1.75"	9.75" Asphaltic Base	N/E	Lean Clay with Sand (CL)

Note: N/E indicates 'not encountered'


		6120 S. Dairy Ashford Road Houston, Texas 77072-1010 281.933.7388 Ph 281.933.7293 Fax	
DATE: 03/25/2025	APPROVED BY: VG	PREPARED BY: AP	
PAVEMENT THICKNESS REHABILITATION OF RUNWAY AND TAXIWAY AT WHARTON REGIONAL AIRPORT (TxDOT CSJ No. 2413WHRTN)			
PROJECT NO.: HGT2210070.4	DRAWING NO.: APPENDIX A-1		



Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
R-3	0.75"	2.25"	3.0"	6" River Rock	N/E	Lean Clay with Sand (CL)

Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
RE-2	N/E	1.75"	3.0"	9.75" River Rock	N/E	Lean Clay with Sand (CL)

Note: N/E indicates 'not encountered'


		6120 S. Dairy Ashford Road Houston, Texas 77072-1010 281.933.7388 Ph 281.933.7293 Fax	
DATE: 03/25/2025	APPROVED BY: VG	PREPARED BY: AP	
PAVEMENT THICKNESS REHABILITATION OF RUNWAY AND TAXIWAY AT WHARTON REGIONAL AIRPORT (TxDOT CSJ No. 2413WHRTN)			
PROJECT NO.: HGT2210070.4		DRAWING NO.: APPENDIX A-2	



Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
R-5	2.75"	1.25"	3.0"	5.5" River Rock	N/E	Lean Clay with Sand (CL)

Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
R-6	1.5"	1.5"	4.0"	8.5" Crushed Limestone	N/E	Lean Clay with Sand (CL)


Note: N/E indicates 'not encountered'

		6120 S. Dairy Ashford Road Houston, Texas 77072-1010 281.933.7388 Ph 281.933.7293 Fax	
DATE: 03/25/2025	APPROVED BY: VG	PREPARED BY: AP	
PAVEMENT THICKNESS REHABILITATION OF RUNWAY AND TAXIWAY AT WHARTON REGIONAL AIRPORT (TxDOT CSJ No. 2413WHR TN)			
PROJECT NO.: HGT2210070.4	DRAWING NO.: APPENDIX A-3		



Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
R-7	1.5"	1.75"	3.25"	8" Crushed Limestone	N/E	Lean Clay with Sand (CL)

Note: N/E indicates 'not encountered'

		6120 S. Dairy Ashford Road Houston, Texas 77072-1010 281.933.7388 Ph 281.933.7293 Fax	
DATE: 03/25/2025	APPROVED BY: VG	PREPARED BY: AP	
PAVEMENT THICKNESS REHABILITATION OF RUNWAY AND TAXIWAY AT WHARTON REGIONAL AIRPORT (TxDOT CSJ No. 2413WHRTN)			
PROJECT NO.: HGT2210070.4		DRAWING NO.: APPENDIX A-4	

APPENDIX B


PAVEMENT CORE PICTURES ON TAXIWAY



Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
T-1	2.25"	2.0"	1.75"	6" Asphaltic Base	N/E	Lean Clay with Sand (CL)

Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
T-2	2.0"	2.0"	1.75"	7.75" Asphaltic Base	N/E	Sandy Lean Clay (CL)

Note: N/E indicates 'not encountered'


		6120 S. Dairy Ashford Road Houston, Texas 77072-1010 281.933.7388 Ph 281.933.7293 Fax	
DATE: 03/25/2025	APPROVED BY: VG	PREPARED BY: AP	
PAVEMENT THICKNESS REHABILITATION OF RUNWAY AND TAXIWAY AT WHARTON REGIONAL AIRPORT (TxDOT CSJ No. 2413WHRTN)			
PROJECT NO.: HGT2210070.4	DRAWING NO.: APPENDIX B-1		



Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
T-3	N/E	N/E	2.75"	8.25" Crushed Limestone	8" Treated Subgrade	Sandy Lean Clay (CL)

Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
T-5	N/E	N/E	2.5"	10" Crushed Limestone	5.5" Treated Subgrade	Fat Clay with Sand (CH)

Note: N/E indicates 'not encountered'


		6120 S. Dairy Ashford Road Houston, Texas 77072-1010 281.933.7388 Ph 281.933.7293 Fax	
DATE: 03/25/2025	APPROVED BY: VG	PREPARED BY: AP	
PAVEMENT THICKNESS REHABILITATION OF RUNWAY AND TAXIWAY AT WHARTON REGIONAL AIRPORT (TxDOT CSJ No. 2413WHRTN)			
PROJECT NO.: HGT2210070.4		DRAWING NO.: APPENDIX B-2	



Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
T-6	1.25"	0.75"	2.5"	11.5" Crushed Limestone	N/E	Sandy Lean Clay (CL)

Core #	Surface Course/Asphalt Thickness			Base Material Thickness and Description	Treated Subgrade Material Thickness and Description	Natural Subgrade Material Description
	2 nd Overlay	1 st Overlay	Original			
T-7	1.5"	2.0"	2.0"	9.5" Crushed Limestone	N/E	Sandy Lean Clay (CL)

Note: N/E indicates 'not encountered'

		6120 S. Dairy Ashford Road Houston, Texas 77072-1010 281.933.7388 Ph 281.933.7293 Fax	
DATE: 03/25/2025	APPROVED BY: VG	PREPARED BY: AP	
PAVEMENT THICKNESS REHABILITATION OF RUNWAY AND TAXIWAY AT WHARTON REGIONAL AIRPORT (TxDOT CSJ No. 2413WHR TN)			
PROJECT NO.: HGT2210070.4	DRAWING NO.: APPENDIX B-3		

APPENDIX C

SUMMARY OF LABORATORY TEST RESULTS

Company Name: HVJ Associates, Inc.

Project: Rehabilitation of Runway and Taxiway at Wharton Regional Airport (TxDOT CSJ No. 2413WHRTN)

Location: Wharton, Wharton County, Texas

Project Number: HGT2210070.4

Pavement Core	Depth (feet)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Passing #200 Sieve	Moisture Content (%)
R-1	1.25' - 2.25'	47	17	30	66.6	26
R-3	1.0' - 2.0'	44	15	29	73.6	23
R-5	1.0' - 2.0'	45	18	27	70.7	24
R-6	1.30' - 2.30'	41	16	25	72.9	24
R-7	1.20' - 2.20'	43	16	27	77.1	26
T-1	1.0' - 2.0'	47	16	31	74.8	28
T-2	1.125' - 2.125'	40	20	20	66.7	28
T-3	1.60' - 2.60'	43	15	28	66.7	23
T-5	1.50' - 2.50'	50	17	33	70.1	23
T-6	1.30' - 2.30'	31	20	11	52.4	26
T-7	1.25' - 2.25'	35	22	13	57.9	29
RE-1	1.15' - 2.15'	44	16	28	71.6	23
RE-2	1.20' - 2.20'	49	17	32	71.8	24
Total:		13	13	13	13	13

APPENDIX D
DCP TEST RESULTS ON RUNWAY



TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID: R-1	SAMPLED DATE: 03/19/2025		
TEST NUMBER: 1	LETTING DATE:		
SAMPLE STATUS:	CONTROLLING CSJ: 2413WHRTN		
COUNTY: Wharton	SPEC YEAR: 2014		
SAMPLED BY: Frank Reyes	SPEC ITEM:		
SAMPLE LOCATION: Wharton Regional Airport Runway	SPECIAL PROVISION:		
MATERIAL CODE:	GRADE:		
MATERIAL NAME: Natural Subgrade			
PRODUCER:			
AREA ENGINEER:	PROJECT MANAGER:		
COURSE/LIFT:	STATION:	DIST. FROM CL:	
Long. (x): -96.158139°	Latitude (y): 29.260056°	Elev. (z):	
Material Classification: All other types	Weather: Cloudy		
Hammer Weight: 8-KG [17.6-lbs.]	Water Table Depth (ft.):		
Pavement Conditions:	Depth of zero point below surface (in.):		0.50
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.5	0	0.00				
4	6.5	4	6.00	5.0	7.1	YES	YES
8	12.5	12	12.00	10.8	11.7	YES	YES
12	18.5	24	18.00	16.9	15.6	YES	YES
16	24.5	40	24.00	23.4	19.2	YES	YES
10	30.5	50	30.00	13.8	13.7	YES	YES
					13.5	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	13.5	3.9	Yes-Accepted if proof rolling passes

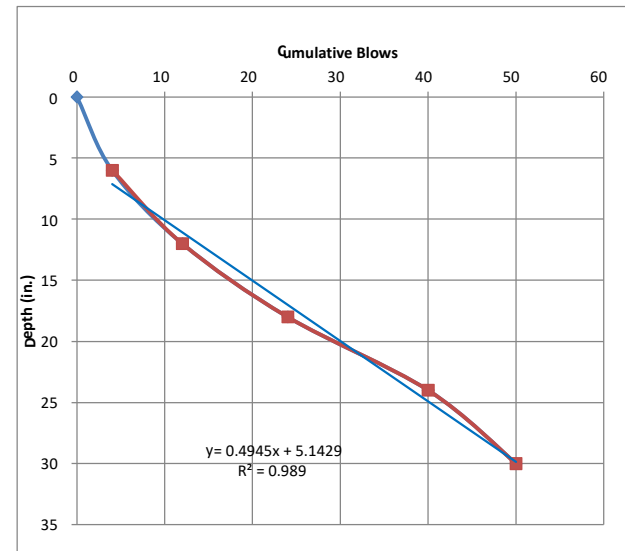
Remarks:

Test Method: D6951	Tested By: Frank Reyes	Tested Date: 04/22/2025
--------------------	------------------------	-------------------------

Test Stamp Code: J.E.	Omit Test:	Completed Date: 04/22/2025	Reviewed By: AP/VG
-----------------------	------------	----------------------------	--------------------

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:





TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	RE-1	SAMPLED DATE:	03/19/2025
TEST NUMBER:	1	LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	2413WHRTN
COUNTY:	Wharton	SPEC YEAR:	2014
SAMPLED BY:	Frank Reyes	SPEC ITEM:	
SAMPLE LOCATION:	Wharton Regional Airport Runway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Natural Subgrade		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	
COURSE/LIFT:		STATION:	
Long. (x):	-96.157722°	Latitude (y):	29.259667°
		Elev. (z):	
Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.40
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.4	0	0.00				
8	6.4	8	6.00	10.8	11.7	YES	YES
6	12.4	14	12.00	7.8	9.5	YES	YES
6	18.4	20	18.00	7.8	9.5	YES	YES
8	24.4	28	24.00	10.8	11.7	YES	YES
12	30.4	40	30.00	16.9	15.6	YES	YES
					11.6	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	11.6	3.9	Yes-Accepted if proof rolling passes

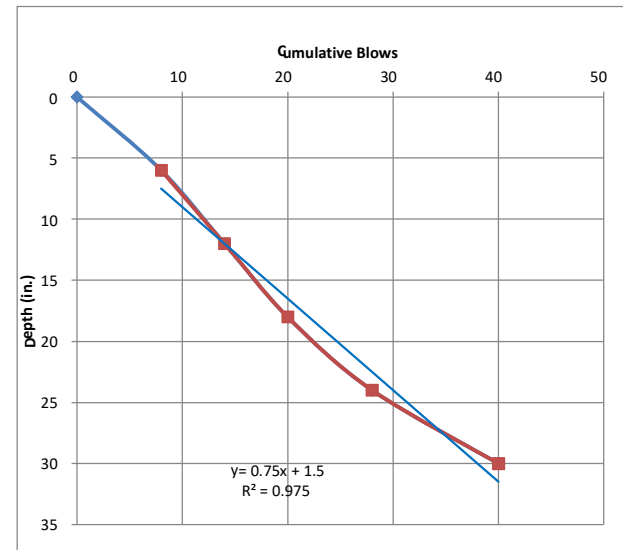
Remarks:

Test Method: Tested By: Tested Date:
D6951 Frank Reyes 04/22/2025

Test Stamp Code: Omit Test: Completed Date: Reviewed By:
J.E. 04/22/2025 AP/VG

Locked By: TxDOT: District: Area:

Authorized By: Authorized Date:





TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID: R-3	SAMPLED DATE: 03/19/2025		
TEST NUMBER: 1	LETTING DATE:		
SAMPLE STATUS:	CONTROLLING CSJ: 2413WHRTN		
COUNTY: Wharton	SPEC YEAR: 2014		
SAMPLED BY: Frank Reyes	SPEC ITEM:		
SAMPLE LOCATION: Wharton Regional Airport Runway	SPECIAL PROVISION:		
MATERIAL CODE:	GRADE:		
MATERIAL NAME: Natural Subgrade			
PRODUCER:			
AREA ENGINEER:	PROJECT MANAGER:		
COURSE/LIFT:	STATION:	DIST. FROM CL:	
Long. (x): -96.156306°	Latitude (y): 29.257167°	Elev. (z):	
Material Classification: All other types	Weather: Cloudy		
Hammer Weight: 8-KG [17.6-lbs.]	Water Table Depth (ft.):		
Pavement Conditions:	Depth of zero point below surface (in.):		0.30
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.3	0	0.00				
7	6.3	7	6.00	9.3	10.6	YES	YES
12	12.3	19	12.00	16.9	15.6	YES	YES
16	18.3	35	18.00	23.4	19.2	YES	YES
21	24.3	56	24.00	31.7	23.3	YES	YES
24	30.3	80	30.00	36.8	25.6	YES	YES
					18.9	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	18.9	3.9	Yes-Accepted if proof rolling passes

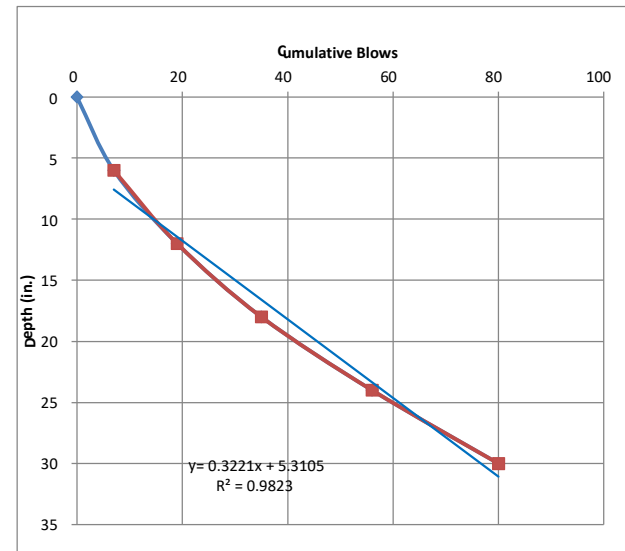
Remarks:

Test Method: D6951	Tested By: Frank Reyes	Tested Date: 04/22/2025
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Test Stamp Code: J.E.	Omit Test:	Completed Date: 04/22/2025	Reviewed By: AP/VG
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Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:





TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	RE-2	SAMPLED DATE:	03/19/2025
TEST NUMBER:	1	LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	2413WHRTN
COUNTY:	Wharton	SPEC YEAR:	2014
SAMPLED BY:	Frank Reyes	SPEC ITEM:	
SAMPLE LOCATION:	Wharton Regional Airport Runway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Natural Subgrade		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	
COURSE/LIFT:		STATION:	
Long. (x):	-96.155000°	Latitude (y):	29.254972°
		Elev. (z):	
Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.30
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.3	0	0.00				
4	6.3	4	6.00	5.0	7.1	YES	YES
8	12.3	12	12.00	10.8	11.7	YES	YES
11	18.3	23	18.00	15.4	14.7	YES	YES
16	24.3	39	24.00	23.4	19.2	YES	YES
14	30.3	53	30.00	20.1	17.4	YES	YES
					14.0	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	14.0	3.9	Yes-Accepted if proof rolling passes

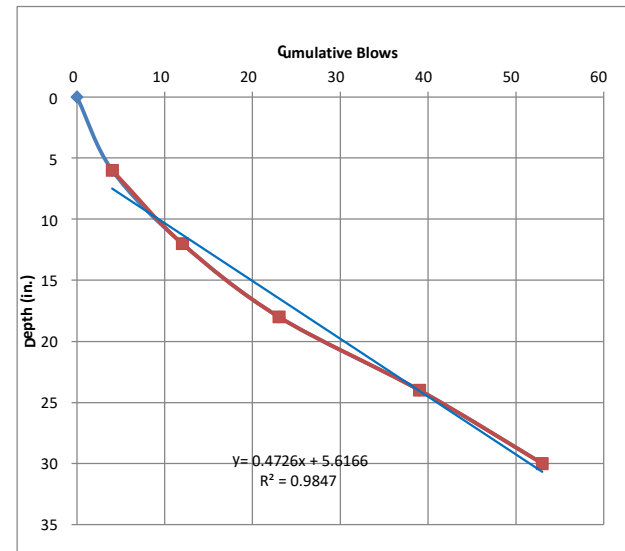
Remarks:

Test Method: Tested By:	Tested Date:
D6951 Frank Reyes	04/22/2025

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.		04/22/2025	AP/VG

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:





TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

[Refresh Workbook](#)

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	R-5	SAMPLED DATE:	03/19/2025
TEST NUMBER:	1	LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	2413WHRTN
COUNTY:	Wharton	SPEC YEAR:	2014
SAMPLED BY:	Frank Reyes	SPEC ITEM:	
SAMPLE LOCATION:	Wharton Regional Airport Runway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Natural Subgrade		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	
COURSE/LIFT:		STATION:	
Long. (x):	-96.152556°	Latitude (y):	29.251417°
		Elev. (z):	
Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.40
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.4	0	0.00				
4	6.4	4	6.00	5.0	7.1	YES	YES
6	12.4	10	12.00	7.8	9.5	YES	YES
9	18.4	19	18.00	12.3	12.7	YES	YES
13	24.4	32	24.00	18.5	16.5	YES	YES
11	30.4	43	30.00	15.4	14.7	YES	YES
					12.1	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	12.1	3.9	Yes-Accepted if proof rolling passes

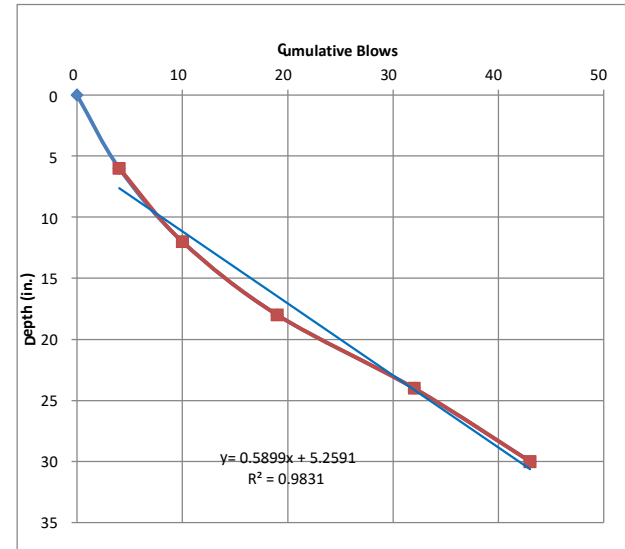
Remarks:

Test Method: Tested By:	Tested Date:
D6951 Frank Reyes	04/22/2025

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.		04/22/2025	AP/VG

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:





TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

[Refresh Workbook](#)

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID: R-6	SAMPLED DATE: 03/19/2025		
TEST NUMBER: 1	LETTING DATE:		
SAMPLE STATUS:	CONTROLLING CSJ: 2413WHRTN		
COUNTY: Wharton	SPEC YEAR: 2014		
SAMPLED BY: Frank Reyes	SPEC ITEM:		
SAMPLE LOCATION: Wharton Regional Airport Runway	SPECIAL PROVISION:		
MATERIAL CODE:	GRADE:		
MATERIAL NAME: Natural Subgrade			
PRODUCER:			
AREA ENGINEER:	PROJECT MANAGER:		
COURSE/LIFT:	STATION:	DIST. FROM CL:	
Long. (x): -96.151694°	Latitude (y): 29.250167°	Elev. (z):	
Material Classification: All other types	Weather: Cloudy		
Hammer Weight: 8-KG [17.6-lbs.]	Water Table Depth (ft.):		
Pavement Conditions:	Depth of zero point below surface (in.):		0.40
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.4	0	0.00				
4	6.4	4	6.00	5.0	7.1	YES	YES
9	12.4	13	12.00	12.3	12.7	YES	YES
15	18.4	28	18.00	21.8	18.3	YES	YES
22	24.4	50	24.00	33.4	24.1	YES	YES
23	30.4	73	30.00	35.1	24.9	YES	YES
					17.4	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	17.4	3.9	Yes-Accepted if proof rolling passes

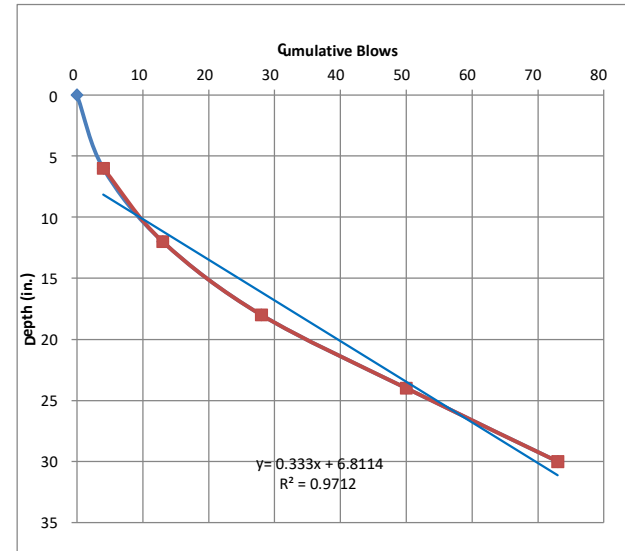
Remarks:

Test Method: D6951	Tested By: Frank Reyes	Tested Date: 04/22/2025
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Test Stamp Code: J.E.	Omit Test:	Completed Date: 04/22/2025	Reviewed By: AP/VG
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Locked By:	TxDOT:	District:	Area:
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Authorized By:	Authorized Date:
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TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	R-7	SAMPLED DATE:	03/19/2025
TEST NUMBER:	1	LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	2413WHRTN
COUNTY:	Wharton	SPEC YEAR:	2014
SAMPLED BY:	Frank Reyes	SPEC ITEM:	
SAMPLE LOCATION:	Wharton Regional Airport Runway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Natural Subgrade		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

COURSE/LIFT:		STATION:		DIST. FROM CL:	
Long. (x):	-96.150778°	Latitude (y):	29.248639°	Elev. (z):	

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.40
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.4	0	0.00				
6	6.4	6	6.00	7.8	9.5	YES	YES
9	12.4	15	12.00	12.3	12.7	YES	YES
14	18.4	29	18.00	20.1	17.4	YES	YES
16	24.4	45	24.00	23.4	19.2	YES	YES
17	30.4	62	30.00	25.0	20.0	YES	YES
					15.8	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	15.8	3.9	Yes-Accepted if proof rolling passes

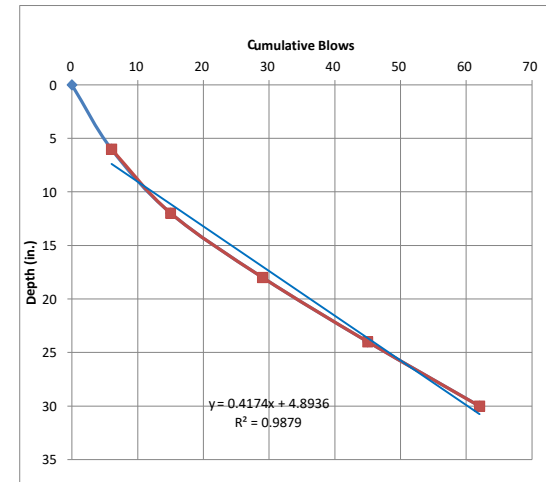
Remarks:

Test Method: D6951 | Tested By: Frank Reyes | Tested Date: 04/22/2025

Test Stamp Code: J.E. | Omit Test: | Completed Date: 04/22/2025 | Reviewed By: AP/VG

Locked By: | TxDOT: | District: | Area:

Authorized By: | Authorized Date:



APPENDIX E
DCP TEST RESULTS ON TAXIWAY



TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

Refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	T-1	SAMPLED DATE:	03/20/2025
TEST NUMBER:	1	LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	2413WHRTN
COUNTY:	Wharton	SPEC YEAR:	2014
SAMPLED BY:	Frank Reyes	SPEC ITEM:	
SAMPLE LOCATION:	Wharton Regional Airport Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Natural Subgrade		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	
COURSE/LIFT:		STATION:	
Long. (x):	-96.157472°	Latitude (y):	29.260500°
		DIST. FROM CL:	
		Elev. (z):	
Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.30
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.3	0	0.00				
3	6.3	3	6.00	3.6	5.8	YES	YES
7	12.3	10	12.00	9.3	10.6	YES	YES
7	18.3	17	18.00	9.3	10.6	YES	YES
8	24.3	25	24.00	10.8	11.7	YES	YES
6	30.3	31	30.00	7.8	9.5	YES	YES
					9.6	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	9.6	3.9	Yes-Accepted if proof rolling passes

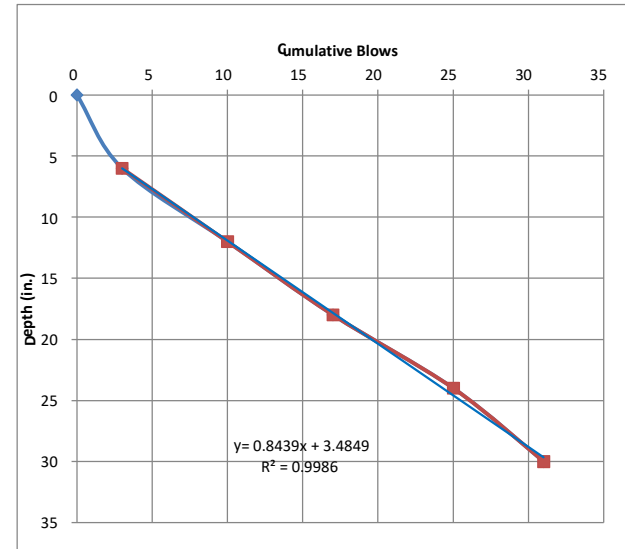
Remarks:

Test Method: Tested By: Tested Date:
D6951 Frank Reyes 04/22/2025

Test Stamp Code: Omit Test: Completed Date: Reviewed By:
J.E. 04/22/2025 AP/VG

Locked By: TxDOT: District: Area:

Authorized By: Authorized Date:





TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	T-2	SAMPLED DATE:	03/20/2025
TEST NUMBER:	1	LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	2413WHRTN
COUNTY:	Wharton	SPEC YEAR:	2014
SAMPLED BY:	Frank Reyes	SPEC ITEM:	
SAMPLE LOCATION:	Wharton Regional Airport Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Natural Subgrade		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	

COURSE/LIFT:	STATION:	DIST. FROM CL:
Long. (x): -96.155722°	Latitude (y): 29.257444°	Elev. (z):

Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.30
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.3	0	0.00				
5	6.3	5	6.00	6.4	8.4	YES	YES
22	12.3	27	12.00	33.4	24.1	YES	YES
11	18.3	38	18.00	15.4	14.7	YES	YES
10	24.3	48	24.00	13.8	13.7	YES	YES
9	30.3	57	30.00	12.3	12.7	YES	YES
					14.7	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	14.7	3.9	Yes-Accepted if proof rolling passes

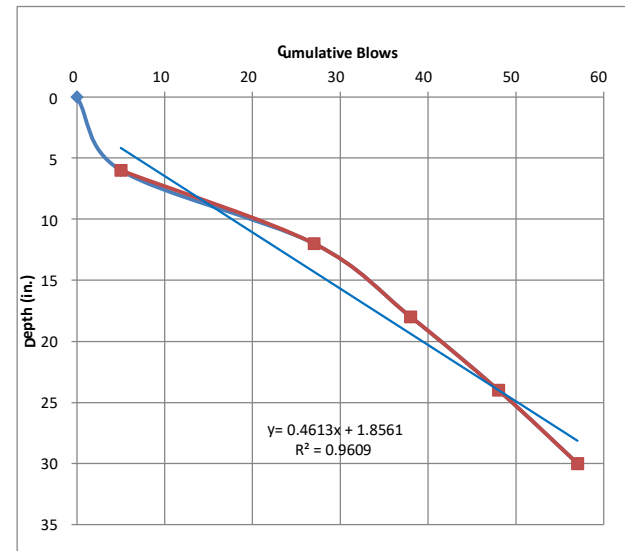
Remarks:

Test Method: Tested By:	Tested Date:
D6951 Frank Reyes	04/22/2025

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.		04/22/2025	AP/VG

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:





TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

[Refresh Workbook](#)

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	T-3	SAMPLED DATE:	03/20/2025
TEST NUMBER:	1	LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	2413WHRTN
COUNTY:	Wharton	SPEC YEAR:	2014
SAMPLED BY:	Frank Reyes	SPEC ITEM:	
SAMPLE LOCATION:	Wharton Regional Airport Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Natural Subgrade		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	
COURSE/LIFT:		STATION:	
Long. (x):	-96.153833°	Latitude (y):	29.254556°
		Elev. (z):	
Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.20
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.2	0	0.00				
3	6.2	3	6.00	3.6	5.8	YES	YES
5	12.2	8	12.00	6.4	8.4	YES	YES
8	18.2	16	18.00	10.8	11.7	YES	YES
12	24.2	28	24.00	16.9	15.6	YES	YES
14	30.2	42	30.00	20.1	17.4	YES	YES
					11.8	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	11.8	3.9	Yes-Accepted if proof rolling passes

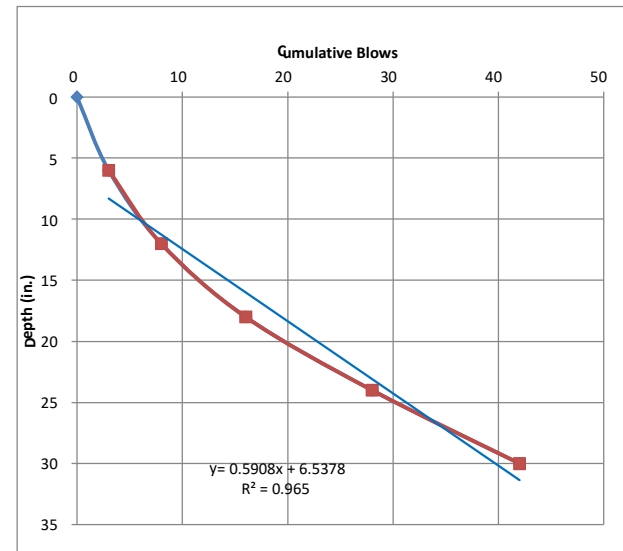
Remarks:

Test Method: Tested By: Tested Date:
D6951 Frank Reyes 04/22/2025

Test Stamp Code: Omit Test: Completed Date: Reviewed By:
J.E. 04/22/2025 AP/VG

Locked By: TxDOT: District: Area:

Authorized By: Authorized Date:





TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	1-5	SAMPLED DATE:	03/20/2025
TEST NUMBER:	1	LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	2413WHRTN
COUNTY:	Wharton	SPEC YEAR:	2014
SAMPLED BY:	Frank Reyes	SPEC ITEM:	
SAMPLE LOCATION:	Wharton Regional Airport Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Natural Subgrade		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	
COURSE/LIFT:		STATION:	
Long. (x):	-96.151028°	Latitude (y):	29.250139°
		Elev. (z):	
Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.40
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.4	0	0.00				
4	6.4	4	6.00	5.0	7.1	YES	YES
8	12.4	12	12.00	10.8	11.7	YES	YES
12	18.4	24	18.00	16.9	15.6	YES	YES
12	24.4	36	24.00	16.9	15.6	YES	YES
11	30.4	47	30.00	15.4	14.7	YES	YES
					12.9	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	12.9	3.9	Yes-Accepted if proof rolling passes

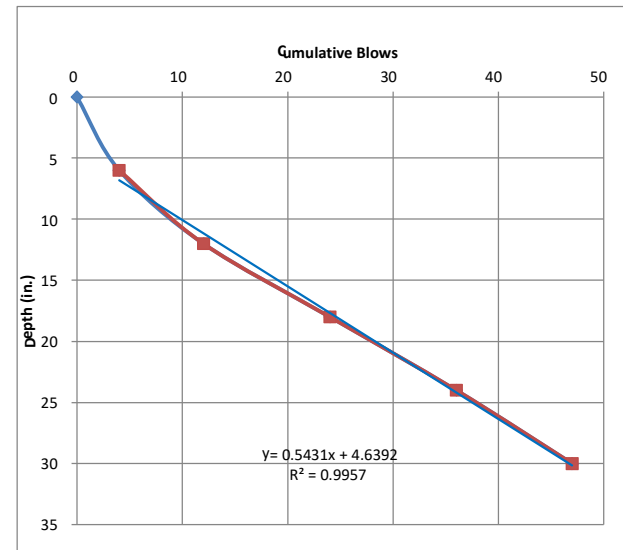
Remarks:

Test Method: Tested By: Tested Date:
D6951 Frank Reyes 04/22/2025

Test Stamp Code: Omit Test: Completed Date: Reviewed By:
J.E. 04/22/2025 AP/VG

Locked By: TxDOT: District: Area:

Authorized By: Authorized Date:





TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	1-6	SAMPLED DATE:	03/20/2025
TEST NUMBER:	1	LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	2413WHRTN
COUNTY:	Wharton	SPEC YEAR:	2014
SAMPLED BY:	Frank Reyes	SPEC ITEM:	
SAMPLE LOCATION:	Wharton Regional Airport Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Natural Subgrade		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	
COURSE/LIFT:		STATION:	
Long. (x):	-96.150556°	Latitude (y):	29.249361°
		Elev. (z):	
Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.20
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.2	0	0.00				
5	6.2	5	6.00	6.4	8.4	YES	YES
7	12.2	12	12.00	9.3	10.6	YES	YES
10	18.2	22	18.00	13.8	13.7	YES	YES
15	24.2	37	24.00	21.8	18.3	YES	YES
15	30.2	52	30.00	21.8	18.3	YES	YES
					13.9	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	13.9	3.9	Yes-Accepted if proof rolling passes

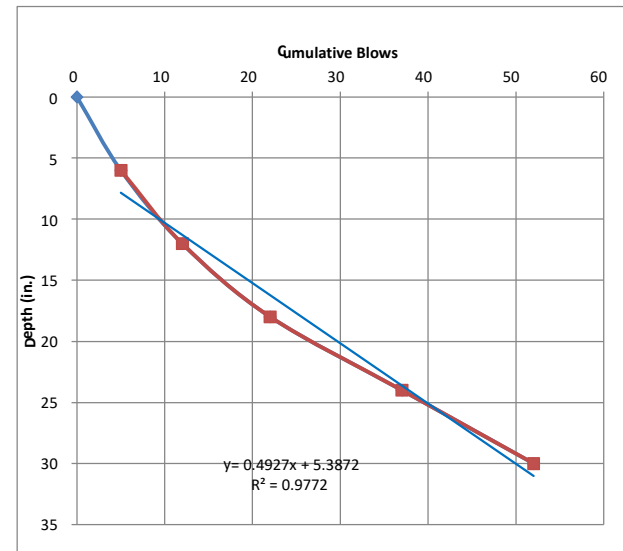
Remarks:

Test Method: Tested By:	Tested Date:
D6951 Frank Reyes	04/22/2025

Test Stamp Code:	Omit Test:	Completed Date:	Reviewed By:
J.E.		04/22/2025	AP/VG

Locked By:	TxDOT:	District:	Area:

Authorized By:	Authorized Date:





TEXAS DEPARTMENT OF TRANSPORTATION

Dynamic Cone Penetrometer (DCP) Data Analysis
ASTM - D6951

refresh Workbook

ASTM - D6951 :: File Version: 10/21/16 07:33:30

SAMPLE ID:	T-7	SAMPLED DATE:	03/20/2025
TEST NUMBER:	1	LETTING DATE:	
SAMPLE STATUS:		CONTROLLING CSJ:	2413WHRTN
COUNTY:	Wharton	SPEC YEAR:	2014
SAMPLED BY:	Frank Reyes	SPEC ITEM:	
SAMPLE LOCATION:	Wharton Regional Airport Taxiway	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Natural Subgrade		
PRODUCER:			
AREA ENGINEER:		PROJECT MANAGER:	
COURSE/LIFT:		STATION:	
Long. (x):	-96.150083°	Latitude (y):	29.248722°
		Elev. (z):	
Material Classification:	All other types	Weather:	Cloudy
Hammer Weight:	8-KG [17.6-lbs.]	Water Table Depth (ft.):	
Pavement Conditions:		Depth of zero point below surface (in.):	0.20
Design Modulus (E) ksi:	3.9		

DCP DATA ANALYSIS

# of Blows	Penetration (6 in. intervals)	Cumulative Blows	Cumulative Penetration	CBR	E (ksi)	E > E (design)?	E > 0.5 E design
0	0.2	0	0.00				
4	6.2	4	6.00	5.0	7.1	YES	YES
8	12.2	12	12.00	10.8	11.7	YES	YES
10	18.2	22	18.00	13.8	13.7	YES	YES
15	24.2	37	24.00	21.8	18.3	YES	YES
14	30.2	51	30.00	20.1	17.4	YES	YES
					13.6	Compare E to 0.5 E design	Additional DCP testing needed

Layer	Eavg.	E (design)	E avg. ≥ E (design)
	13.6	3.9	Yes-Accepted if proof rolling passes

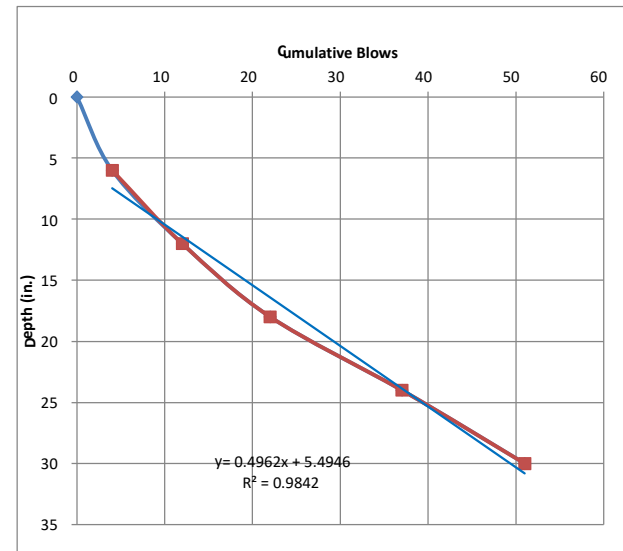
Remarks:

Test Method: Tested By: Tested Date:
D6951 Frank Reyes 04/22/2025

Test Stamp Code: Omit Test: Completed Date: Reviewed By:
J.E. 04/22/2025 AP/VG

Locked By: TxDOT: District: Area:

Authorized By: Authorized Date:



DRAWING INDEX

WHARTON REGIONAL AIRPORT - OVERLAY REHABILITATION OF RUNWAY 14/32 AND TAXIWAYS

ISSUED FOR BID: PLANS TABLE OF CONTENTS

2513WHRTN

SHEET NO.	DESCRIPTION	FULL-SIZE	HALF-SIZE
		SHEET SCALE	SHEET SCALE
G-001	COVER SHEET AND INDEX	N.T.S.	N.T.S.
G-002	GENERAL NOTES	N.T.S.	N.T.S.
G-003	QUANTITIES	N.T.S.	N.T.S.
G-101	EXISTING SITE LAYOUT	1" to 200'	1" to 400'
G-102	SURVEY CONTROL PLAN	1" to 200'	1" to 400'
G-103	PROJECT LAYOUT	1" to 200'	1" to 400'
G-201	SWPPP - SHEET 1 OF 2 BASE BID	1" to 50'	1" to 100'
G-202	SWPPP - SHEET 2 OF 2 BASE BID	1" to 50'	1" to 100'
G-203	SWPPP - SHEET 1 OF 2 BID ALT 1	1" to 50'	1" to 100'
G-204	SWPPP - SHEET 1 OF 2 BID ALT 2	1" to 50'	1" to 100'
G-205	SWPPP - SHEET 2 OF 2 BID ALT 2	1" to 50'	1" to 100'
G-206	SWPPP SUMMARY NOTES	N.T.S.	N.T.S.
G-207	TEMPORARY EROSION, SEDIMENT AND WATER POLL CNTL MEAS	N.T.S.	N.T.S.
G-401	CONSTRUCTION SAFETY AND PHASING PLAN - NOTES	N.T.S.	N.T.S.
G-402	CONSTRUCTION SAFETY AND PHASING PLAN - OVERALL LAYOUT	1" to 200'	1" to 400'
G-403	CONSTRUCTION SAFETY AND PHASING PLAN PHASE 1 - BASE BID AND ALT 1	1" to 200'	1" to 400'
G-404	CONSTRUCTION SAFETY AND PHASING PLAN PHASE 2 - BASE BID AND ALT 1	1" to 200'	1" to 400'
G-405	CONSTRUCTION SAFETY AND PHASING PLAN PHASE 1 - BASE BID AND ALT 2	1" to 200'	1" to 400'
G-406	CONSTRUCTION SAFETY AND PHASING PLAN PHASE 2 - BASE BID AND ALT 2	1" to 200'	1" to 400'
G-407	CONSTRUCTION SAFETY AND PHASING PLAN - NOTES AND DETAILS	N.T.S.	N.T.S.
DC-101	DEMOLITION LAYOUT - BASE BID SHEET 1	1" to 50'	1" to 100'
DC-102	DEMOLITION LAYOUT - BASE BID SHEET 2	1" to 50'	1" to 100'
DC-103	DEMOLITION LAYOUT - BASE BID SHEET 3	1" to 20'	1" to 40'
DC-104	DEMOLITION LAYOUT - ALT 1 SHEET 1	1" to 50'	1" to 100'
DC-105	DEMOLITION LAYOUT - ALT 2 SHEET 1	1" to 50'	1" to 100'
DC-106	DEMOLITION LAYOUT - ALT 2 SHEET 2	1" to 50'	1" to 100'
DC-107	PAVEMENT REMOVAL SECTIONS AND DETAILS	N.T.S.	N.T.S.
DC-401	MARKING REMOVAL LAYOUT - SHEET 1 OF 2 BASE BID	1" to 50'	1" to 100'
DC-402	MARKING REMOVAL LAYOUT - SHEET 2 OF 2 BASE BID	1" to 50'	1" to 100'
DC-403	MARKING REMOVAL LAYOUT - BID ALT 2	1" to 50'	1" to 100'
DC-501	AIRFIELD LIGHTING DEMOLITION - BASE BID SHEET 1	1" to 20'	1" to 40'
DC-502	AIRFIELD LIGHTING DEMOLITION - BASE BID SHEET 2	1" to 20'	1" to 40'
DC-503	AIRFIELD LIGHTING DEMOLITION - ALT 1 SHEET 1	1" to 20'	1" to 40'
C-101	RUNWAY PROFILE - BASE BID SHEET 1	1" to 5'/50'	1" to 10'/100'
C-102	RUNWAY PROFILE - BASE BID SHEET 2	1" to 5'/50'	1" to 10'/100'
C-103	CONN TAXIWAY PROFILES - BASE BID AND ALT 1	1" to 5'/50'	1" to 10'/100'
C-104	TAXIWAY A PROFILE - ALT 2 SHEET 1	1" to 5'/50'	1" to 10'/100'
C-105	TAXIWAY A PROFILE - ALT 2 SHEET 2	1" to 5'/50'	1" to 10'/100'
C-106	CONN TAXIWAY PROFILES - ALT 2 SHEET 1	1" to 5'/50'	1" to 10'/100'
C-301	PAVING LAYOUT - BASE BID SHEET 1	1" to 50'	1" to 100'
C-302	PAVING LAYOUT - BASE BID SHEET 2	1" to 50'	1" to 100'
C-303	PAVING LAYOUT - BASE BID SHEET 3	1" to 50'	1" to 100'
C-304	PAVING AND CULVERT LAYOUT - ALT 1 SHEET 1	1" to 20'	1" to 40'
C-305	PAVING LAYOUT - ALT 2 SHEET 1	1" to 50'	1" to 100'
C-306	PAVING LAYOUT - ALT 2 SHEET 2	1" to 50'	1" to 100'
C-307	PAVING SECTIONS AND DETAILS - SHEET 1	N.T.S.	N.T.S.
C-308	PAVING SECTIONS AND DETAILS - SHEET 2	N.T.S.	N.T.S.
C-311	RUNWAY PAVING ELEVATIONS - SHEET 1	1" to 30'	1" to 60'
C-312	RUNWAY PAVING ELEVATIONS - SHEET 2	1" to 30'	1" to 60'
C-313	RUNWAY PAVING ELEVATIONS - SHEET 3	1" to 30'	1" to 60'
C-314	CONN TAXIWAY PAVING ELEVATIONS BASE BID SHEET 1	1" to 30'	1" to 60'
C-315	CONN TAXIWAY B PAVING ELEVATIONS - ALT 1 SHEET 1	1" to 30'	1" to 60'

ISSUED FOR BID: PLANS TABLE OF CONTENTS

2513WHRTN

SHEET NO.	DESCRIPTION	FULL-SIZE SHEET SCALE	HALF-SIZE SHEET SCALE
C-401	TEMPORARY PAVEMENT MARKING - SHEET 1 OF 2 BASE BID AND BID ALT 2	1" to 50'	1" to 100'
C-402	TEMPORARY PAVEMENT MARKING - SHEET 2 OF 2 BASE BID AND BID ALT 2	1" to 50'	1" to 100'
C-403	TEMPORARY PAVEMENT MARKING - BID ALT 1	1" to 50'	1" to 100'
C-404	TEMPORARY PAVEMENT MARKING DETAILS	N.T.S.	N.T.S.
C-405	FINAL PAVEMENT MARKING - SHEET 1 OF 2 BASE BID AND ALT 2	1" to 50'	1" to 100'
C-406	FINAL PAVEMENT MARKING - SHEET 2 OF 2 BASE BID AND ALT 2	1" to 50'	1" to 100'
C-407	FINAL PAVEMENT MARKING - BID ALT 1	1" to 50'	1" to 100'
C-408	FINAL PAVEMENT MARKING DETAILS	N.T.S.	N.T.S.
C-501	RUNWAY LIGHTING AND SIGNAGE LAYOUT - BASE BID SHEET 1	1" to 20'	1" to 40'
C-502	TAXIWAY B LIGHTING AND SIGNAGE LAYOUT - ALT 1 SHEET 1	1" to 20'	1" to 40'
C-503	LIGHTING AND SIGNAGE DETAILS SHEET 1 OF 4	N.T.S.	N.T.S.
C-504	LIGHTING AND SIGNAGE DETAILS SHEET 2 OF 4	N.T.S.	N.T.S.
C-505	LIGHTING AND SIGNAGE DETAILS SHEET 3 OF 4	N.T.S.	N.T.S.
C-506	LIGHTING AND SIGNAGE DETAILS SHEET 4 OF 4	N.T.S.	N.T.S.