

CITY OF ST. LOUIS
SERVICE AGREEMENT FOR
JOINT & CRACK SEALING SERVICES

LAMBERT- ST. LOUIS INTERNATIONAL AIRPORT®



CONTRACT NO.: 70814

CONTRACT NOT-TO- EXCEED AMOUNT: \$586,875.00

CONTRACTOR: Scodeller Construction, Inc.
4410-C S. 40th Street
St. Joseph, Missouri 64503

FEDERAL I.D. #38 - 2625522

ESTIMATED ANNUAL ENCUMBRANCES:

| | |
|--------------|--------------|
| FY 2016-2017 | \$150,000.00 |
| FY 2017-2018 | \$187,500.00 |
| FY 2018-2019 | \$187,500.00 |
| FY 2019-2020 | \$ 61,875.00 |

CONTRACT AUTHORIZED BY: **ORDINANCE NO.** 70272
 BUDGET ACCOUNT: 5638

LAMBERT-ST. LOUIS INTERNATIONAL AIRPORT
ST. LOUIS, MISSOURI

CITY OF ST. LOUIS
SERVICE AGREEMENT FOR
JOINT & CRACK SEALING SERVICES
LAMBERT- ST. LOUIS INTERNATIONAL AIRPORT

This Agreement, made and entered into this 2nd day of November, 2016 ("Agreement"), by and between the City of St. Louis, a municipal corporation of the State of Missouri (the "City") and Scodeller Construction, Inc.. ("Contractor").

WITNESSETH THAT:

WHEREAS, City owns and operates Lambert-St. Louis International Airport (the "Airport"); and

WHEREAS, City seeks to contract with the Contractor for Joint & Crack Sealing Services as more fully described herein.

NOW, THEREFORE, in consideration of the payments, terms, conditions, agreements, hereinafter set forth, to be made and performed by City, the Contractor hereby promises and agrees that it will faithfully perform all the services called for by this Agreement, in the manner and under the terms, covenant, and conditions hereinafter set forth.

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Maps

EXHIBIT B.....N/A

FAA Advisory Circular No. 150/5380-6C

EXHIBIT C.....N/A

Affidavit (Missouri Unauthorized Aliens Law)

EXHIBIT D.....N/A

Living Wage Bulletin

Confidential
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2020-01-16 13:35:46 +0000

**CITY OF ST. LOUIS
LAMBERT - ST. LOUIS INTERNATIONAL AIRPORT**

APPENDIX "A"

**TECHNICAL SPECIFICATIONS
(JOINT & CRACK SEALING SERVICES)**

1. DEFINITIONS

The following terms and definitions are used in this agreement:

- A. **"Agreement"** means the contract between the City of St. Louis and Scodeller Construction, Inc.
- B. **"Airport"** means the property owned by the City at Lambert-St. Louis International Airport.
- C. **"Airport Representative"** means the Airport Deputy Director of Operations and Maintenance or his/her authorized or designated representative.
- D. **"City"** means the City of St. Louis, owner and operator of Lambert-St. Louis International Airport.
- E. **"Commencement Date"** means the date the term of this Agreement begins which is November 1, 2016 as provided for in Appendix A, Section 4.
- F. **"Contractor"** used herein means Scodeller Construction, Inc.
- G. **"Contract Year"** means a consecutive twelve (12) calendar month period beginning on the Commencement Date and each twelve (12) consecutive calendar month period thereafter during the term of this Agreement.
- H. **"days"** means consecutive calendar days unless otherwise expressly stated.
- I. **"Director"** as used herein refers to the Director of Airports of the City of St. Louis and to his/her authorized representatives or designated representative.
- J. **"Expiration Date"** means the date the term of this Agreement ends which is October 31, 2019 as provided for in Appendix A, Section 5.
- K. **"Extras"** means additional service work or modifications, additions, or extras.
- L. **"Holiday"** means New Years Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, and Christmas Day.

- M. “**Provision**” means any term, covenant, warranty, condition, or provision under this Agreement.

2. **SCOPE OF WORK**

The Contractor shall furnish all primary and support equipment, supplies, tools and materials, and all labor personnel and supervision required to perform joint and crack sealing work, subject to the specifications of this Agreement (the “**Work**”) on the Airport runways, taxiways, and terminal apron areas as requested and directed by the Airport Representative in writing.

- A. The Contractor, prior to performing any Work under this Agreement, shall supply the Airport Representative with telephone numbers of supervisory personnel who are on twenty-four (24) hour call. When called, said supervisory personnel shall be able to respond on behalf of the Contractor as needed to immediately correct any deficiencies discovered and attributed by the Airport Representative to the Contractor’s Work.
- B. The Contractor shall provide qualified and experienced personnel to perform the Work as specified herein.
- C. All Work shall be performed between the hours of 12:00 A.M. (midnight) and 5:00 A.M. Monday through Friday (central time) unless other times are agreed upon in writing by the Contractor, the Airport Representative, and if applicable, the affected airline. Contractor acknowledges, covenants, stipulates, warrants, and agrees that under no circumstances will Work be allowed to cause delay or cancellation of airline flights or otherwise interfere with the safe and efficient operation and/or administration of the Airport.
- D. The Work shall be planned and scheduled so that it is contiguous to the extent practical. **Exhibit A** entitled “Maps” (which is attached hereto and incorporated herein) shows the general layout of the areas in which the Contractor can expect to perform the Work. **Exhibit B** entitled “FAA Advisory Circular 150/5380-6C (which is attached hereto and incorporated herein) describes the types of “**Joints or Cracks**” to be repaired and sealed.

3. **TECHNICAL REQUIREMENTS/SPECIFICATIONS**

- A. Materials

The Contractor hereby covenants, stipulates, warrants, and agrees that the Contractor shall provide and install joint sealer and/or crack filler materials as specified in FAA Advisory Circular 150/5380-6C which is attached hereto as **Exhibit B**, in accordance with the Provisions of this Agreement.

B. Equipment

The Contractor hereby warrants, covenants, stipulates and agrees that all machines, tools and equipment used in the performance of the Work required by these specifications shall consist of but not be limited to the equipment listed for pavement maintenance in FAA Advisory Circular 150/5380-6C (see **Exhibit B**). All Contractor equipment used in the performance of this Agreement shall be maintained in a satisfactory and safe working condition at all times.

C. Preparation of Joints

In regard to the preparation of the Joints, the Contractor hereby warrants, covenants, stipulates and agrees as follows:

1. All Joints shall be sawed in accordance with details shown in Appendix C of FAA Advisory Circular 150/5380-6C. Immediately before sealing, the Joints shall be thoroughly cleaned of all remaining laitance, curing compound, and other foreign material. Cleaning shall be accomplished by sandblasting. Sandblasting shall be accomplished on 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 three (3) inches from it. Upon completion of cleaning, the Joints shall be blown out with compressed air and shall be free of oil and water. Only air compressors with operable oil and water traps shall be used to prepare the Joints for sealing. The Joint faces shall be surface dry when the seal is applied.

D. Preparation of Random Cracks

In regard to the Preparation of Random Cracks, the Contractor hereby warrants, covenants, stipulates, and agrees as follows:

1. All random cracks shall be sawed using a random crack saw in accordance with the details shown in Appendix C of FAA Advisory Circular 150/5380-6C. Immediately before sealing, the cracks shall be thoroughly cleaned of all remaining laitance and other foreign material. Cleaning may be accomplished by forced air and shall be free of all oil, water, or loose material. The crack shall be surface dry when the seal is applied.

E. Incidental Pavement Repairs

In regard to Incidental Pavement Repairs, directly caused by negligent acts by the Contractor, the Contractor hereby warrants, covenants, stipulates, and agrees as follows:

1. Corner breaks at two (2) feet or less from the joint and not requiring full depth replacement shall be considered incidental to the Work performed. Said breaks shall be repaired at no additional charge to the City by the Contractor, as directed by the Airport Representative.
2. Pavement spalls along joints up to six (6) inches from the joint and not requiring full depth replacement shall be considered incidental to the Work performed. Said spalls shall be repaired at no additional charge to the City by the Contractor, as shown in Appendix C, Figure C-5, C-6, or C-7 of FAA Advisory Circular 150/5380-6C.
3. If so directed by the Airport Representative, corner breaks and/or spalls not considered as incidental pavement repairs may be repaired by the Contractor on a time and materials basis as Extra Work in accordance with Appendix A, Sections 2, 4, and 7D.

4. **SPECIAL PROVISIONS**

Contractor hereby warrants, covenants, stipulates, and agrees to strictly comply with the following special Provisions:

- A. Contractor shall place and maintain weighted-barricades at all closed sections of pavement. When placing the Joint Sealant, barricades shall be separated by a maximum ten (10) feet, outside-to-outside. Barricades may be separated by a maximum of twenty-five (25) feet, outside to outside, during all other construction activities.
- B. Contractor shall maintain an area of operations and shall keep all debris clear of active areas of the airfield (apron, taxiways, and runways).
- C. The tallest construction equipment allowed in the construction area shall be no more than ten (10) feet without prior written approval by the Airport Representative. All construction equipment shall have appropriate flags and flashing lights as per Advisory Circular 150/5210-5D, and shall be properly marked with the Contractor's name.
- D. Contractor shall be directed by the Airport Representative in writing as to the order of phases. The Contractor shall not commence another phase until the previous phase has been completed to the satisfaction of the Airport Representative. Contractor shall coordinate with the Airport Representative for closures of gates a minimum of two (2) days prior to the closure.
- E. No sawing of new concrete Joints in new locations is anticipated in this project. While using the saw cutting method for cleaning the existing Joints, the Contractor shall not increase the existing Joint width by more than one-eighth

(1/8th) of an inch and shall not increase the depth of the existing Joint.

- F. Contractor shall air blast the joint clean prior to resealing the Joint. When cleaning the existing Joints, Contractor warrants, represents, and agrees that the Contractor will not damage existing non-extruding pre-molded compressible material. If the pre-molded compressible material is damaged, the Contractor shall repair the Joint at no additional cost to the satisfaction of the Airport Representative. No joint shall be left unsealed for more than a 48-hour period.
- G. Backer Rods shall be an acceptable bond breaker.
- H. No Backer Rods shall be left exposed in the pavement joints at the end of a day's work without prior written approval of the Airport Representative.
- I. The volume of Joint Sealant required can be calculated and the Contractor may be compensated for the Joint Sealant in excess of this amount, provided that this excess is not due to saw-cutting the joint too wide, placing the Backer Rod too low, or from the Joint Sealant flowing around the Backer Rod and into the joint, or from other related construction problems, as determined in the sole judgment of the Airport Representative.
- J. Contractor shall promptly report any property of the City or third parties damaged by its operations. The Contractor shall make no repairs or replacements to City property without the prior written approval of the Airport Director.

5. EXTRA WORK

- A. At the written request and direction of the Director, additional Emergency Pavement Repair Services work or modifications, additions, or extras ("Extras") to the Joint & Crack Sealing Services may be required. The fee or charge for Extras will be agreed upon up front in writing on a case by case basis as described herein and in Appendix A, Section 10.A of this Agreement. For all work conducted under this Agreement, the total amount to be paid to the Contractor must not exceed the total Contract Not-To-Exceed Amount of this Agreement. (See Appendix A, Section 10.D).
- B. Any work not herein specified which may be fairly implied as included in the Agreement, of which the Director will be the sole and absolute judge, will be done by the Contractor without extra charge. The Contractor will do all Extras that may be requested or ordered by the Director in writing. No claim for Extras will be allowed in favor of the Contractor unless such Extras have been ordered in advance by written request of the Director. The Contractor will furnish the Director with itemized bills for all items included under this heading, and such bills may be verified or audited by the City. All bills for Extras done in any month, will be submitted to the Director, in writing, before the 15th day of the following month,

and the amounts therein must be in accordance with the daily time, material, and equipment statements duly approved by the Director. As proof of costs, the Contractor will submit copies of itemized invoices received from the Contractor's approved subcontractor(s) which have been previously reviewed and approved by the Contractor. Extras will be paid for on the basis of a fixed amount or rate or charge or any combination thereof to be agreed upon and approved by the Contractor and the Director in writing prior to such Extras being performed. (See Appendix A, Section 10.A).

6. **TERM**

The term of this Agreement will be for three (3) years beginning on the Commencement Date specified below and ending thirty-six (36) months thereafter unless terminated or cancelled as provided for in Appendix B, Section 2. This Agreement is expressly subject to, and will not become effective or binding on the City until, fully executed by all signatories of the City. The commencement and expiration dates will be as follows:

Commencement Date: November 1, 2016 Expiration Date: October 31, 2019

7. **ADMINISTRATIVE PROCEDURES**

- A. Before work under this Agreement commences, the Contractor will designate, by written notice to the Airport Representative, an experienced, competent and knowledgeable, full-time employee of the Contractor as the Contractor's "**Project Coordinator**". The Project Coordinator will be fully authorized to act for the Contractor in all matters covered by this Agreement. The Contractor will also furnish all supervisory personnel with copies of these specifications and will make certain that all such personnel understand the provisions thereof.
- B. When necessary, or as requested by the Airport Representative, the Contractor will make periodic reports and recommendations to the Airport Representative with respect to conditions, transactions, situations or circumstances encountered by the Contractor relating to the services to be performed under this Agreement.
- C. The Contractor's performance hereunder must be in accordance with the highest standards of care, skill, and diligence provided by professionals who perform services similar to the services contemplated by this Agreement. All work will be executed in the most workmanlike, safe and substantial manner and everything will be furnished by Contractor that is necessary to complete and perfect the aforesaid work according to the design and intention, whether particularly specified or not which may be inferred from this Agreement and its specifications. Work which should properly be performed by skilled laborers, will not be attempted by common laborers.

- D. The Contractor will ensure that all equipment and temporary offices and trailers used on the job are conspicuously marked with both the name and telephone number of the Contractor. (if applicable)
- E. Daily site clean-up must be accomplished by the Contractor. This clean-up must include the placing of material, tools, and equipment in a neat, safe, and orderly arrangement. Equipment must never be allowed to block access to existing facilities. Rubbish, debris, rubble, and garbage must be properly removed daily and disposed of by the Contractor in accordance with all applicable local, state, and federal laws and regulations. The Contractor will acknowledge, stipulate, and agree that the City and its officers, agents, representatives, or employees are not responsible or liable for, in any way whatsoever, for any hazardous condition created by, arising out of, or incidental to the Joint & Crack Sealing Services performed by the Contractor or its officers, employees, contractors, representatives, or agents under this Agreement. (See Appendix B, Section 1 entitled "Insurance and Indemnification.")
- F. The Contractor will furnish, and have on the job at all times, ample equipment to properly and safely carry out the work contemplated herein including such tool or equipment as may be necessary to meet emergency requirements.
- G. The Contractor will give personal attention to the performance of this Agreement and will furnish to the Airport Representative a listing of all employees (including subcontractor's employees) performing services under this Agreement. (See also Appendix B, Section 3 entitled "Assignment and Subcontracting") This listing of said employees will be updated and maintained by the Contractor throughout the term of this Agreement. The Contractor will be present, either in person, or have a duly authorized representative (i.e., Project Coordinator or supervisory personnel) at the site of the work continuously during working hours, throughout the progress of the work, to receive directions or furnish information. Any instructions or directions given to the Project Coordinator or supervisory personnel of the Contractor will be considered the same as given to the Contractor in person.
- H. Contractor, at its cost, will be required to secure all applicable permits and licenses and approvals required or necessary to fulfill the Provisions of the Agreement.
- I. The Contractor will attend a pre-performance conference prior to commencement of any work under this Agreement. Said conference will be after the date of Agreement execution, and prior to start of the work.
- J. The work to be performed under this Agreement is on an active Airport. Therefore, prior to the start of any work under this Agreement, the Contractor will provide the Airport Representative with a work schedule which will

indicate a proposed sequence and time schedule of the work to be accomplished for the Airport Representative's prior written approval. (See Appendix A, Section 2, entitled "Scope of Work".)

- K. In case of an emergency, the Director, Operations Supervisor, or either of their representatives, will have authority to order the Contractor to immediately terminate work and clear the area of personnel and equipment. The Contractor will immediately comply to such an order with all possible speed.
- L. The Airport Representative will determine the amount, classifications, acceptability, and fitness of all work to be done, and will decide all questions which may arise relative to the proper performance of this Agreement, and his decisions will be final and conclusive, except as provided for in Appendix A, Section 12.
- M. The City reserves the right to solicit bids and award contracts to other contractors for any modifications or additions to the Joint & Crack Sealing Services. The City reserves the right to furnish components, parts, supplies, and materials at its discretion or to perform the work contemplated herein. (See Appendix A, Sections 10.B. and 24.G).

8. RULES AND REGULATIONS

- A. Contractor warrants, covenants, represents, stipulates, and agrees that the Contractor will comply with all applicable rules and regulations including, resolutions, plans, operating directives, Airport certification manual, and directives promulgated or established by the Airport Authority, the Airport Commission, the Director, or the City, as they may be amended from time to time, in performing the work or services contemplated herein or the Provisions of this Agreement. Contractor warrants, covenants, represents, stipulates, and agrees that the Contractor will comply with all statutes, laws, ordinances, orders, judgments, decrees, permits, regulations, environmental plans and programs, environmental permits, directions, and requirements of the City as may be amended from time to time, and all federal, state, city, local and other governmental authorities, now or hereafter applicable, in performing the Provisions of this Agreement and the work or services contemplated herein.
- B. The Contractor will be responsible for compliance with all Airport Security Regulations, Airport Security procedures, and TSA 1500 as they may be amended from time to time. Any and all violations by the Contractor or its officers, employees, subcontractors, independent contractors, agents, or representatives pertaining to Airport Security resulting in a fine or penalty to the City or the Contractor, or its officers, employees, agents, or representatives, will be the responsibility of the Contractor. City will be reimbursed (within ten (10) days of the City's request) for any such fines or penalties imposed on the City.

- C. The Contractor will be responsible for the work of all subcontractors and agents, and all work must be kept under the Contractor's control. A complete list of all such subcontractors will be submitted to the Director for his/her prior written approval (See Appendix B, Section 3 herein).
- D. The Contractor will not be entitled to any claim for damages or losses whatsoever against the City or its officers, employees, agents, representatives, due to hindrance or delay from any cause whatever in the progress of the work or any portion thereof including without limitation, loss of profits, and actual, consequential, special, or incidental damages.

9. REPAIR OF DAMAGE

The Contractor will promptly report any property of the City or third parties damaged by Contractor's operations or employees. The Contractor will make no repairs or replacements to City property without the prior written approval of the Airport Director.

10. PAYMENTS

- A. The Contractor shall submit to the Airport Representative for payment by the City, a monthly-itemized invoice for work performed under this Agreement at the rates and amounts outlined in the attached Appendix C, subject to and in accordance with the Provisions of this Agreement. The invoice shall state: a) Contract Number; b) Ordinance Numbers, c) service performed, and d) date the service was performed. For Extras authorized in writing by the Director, the Contractor will invoice the City the actual labor, parts, and materials required to complete the modifications or additions authorized in writing by the Director as set out in Appendix A, Section 5.
- B. Nothing in this Agreement will be construed or interpreted to create a debt, liability, or obligation of any kind whatsoever on the City for the City to order or request any particular amount of work or services. (See also Appendix A, Sections 7.M. and 24.G.)
- C. The Contractor warrants, covenants, represents, stipulates, and agrees to submit invoices for the services and work performed pursuant to this Agreement in a timely manner and as provided for in this Agreement. The Contractor acknowledges and agrees that the City will not be required or obligated to pay any invoice submitted to the City by the Contractor more than six (6) months after the expiration or earlier termination of this Agreement or be responsible for any costs or expenses incurred by the Contractor for services or work performed pursuant to the Agreement for which invoices have not been submitted to the City for payment within six (6) months of the expiration or earlier termination of this Agreement.

- D. The total Contract Not-To Exceed Amount of this Agreement is Five Hundred and Eighty-Six Thousand Eight Hundred and Seventy-Five Dollars (\$586,875.00).

11. NOTICE OF LOSS OR CLAIMS

- A. The Contractor will indemnify, defend, and save harmless the City, its officers, employees, and agents from all suits or actions, or losses brought against or suffered by the City, its officers, employees or agents, for or on account of any injuries or damages received or sustained by any party or parties by or from the Contractor, his employees, representative, or agents, in the performance of the work herein specified, or in consequence of any negligence in guarding the same, or any defective materials or equipment used, or by or on account of any act or omission of the said Contractor.
- B. The Contractor will indemnify, defend, and save harmless the City, its officers, employees, representatives, and agents from the payment of any and all claims, demands, damages, or costs arising out of any infringement, or alleged infringement of intellectual property rights including, without limitation, the use of any patent or patented device, article, system, arrangement, material or process used by the Contractor or its officers, employees, representative, or agent in the execution of this Agreement.
- C. The Contractor shall within seven (7) days of service or demand, provide written notification to the Director of all suits or action or losses arising out of the Agreement.

12. REPLACEMENT OF PERSONNEL

Contractor agrees to promptly replace the manager or any employee working under this Agreement should the Airport Director feel and recommend that such should be done for the good of the services being rendered. The Airport Director's decision will be final and binding.

13. PROHIBITED ACTS

Contractor will not do or permit to be done any act which:

- A. Will invalidate or be in conflict with any insurance policies covering the Airport or the City, or any part thereof, or upon the contents of any building thereon;
- B. Will increase rates of any insurance, extended coverage or rental insurance on the Airport or the City, or any part thereof, or upon the contents of any building thereon;

- C. In the opinion of the Airport Representative, will constitute a hazardous condition, so as to increase risks normally attendant upon the operations enumerated in this Agreement;
- D. Will constitute a nuisance in or on the Airport or which may result in creation, commission, or maintenance of a nuisance in or on the Airport; or
- E. May interfere with the effectiveness or accessibility of the drainage of any sewage system, fire protection system, sprinkler system, alarm system, fire hydrants and hoses if any, installed or located in or on the Airport.
- F. If by reason of the Contractor's failure to comply with the provisions of this section, any fire insurance, extended coverage or rental insurance rate on the Airport, or any part thereof, or upon the contents of any building thereon will be at any time higher than it otherwise would be, then the Contractor will on demand, pay the City the increase in the cost of insurance premiums paid or payable by the Airport which was charged because of such violation by the Contractor. For the purpose of this section, "Airport" includes all structures or improvements located thereon.

14. RIGHT OF REVIEW

Contractor has the right to take any decision or direction of the Airport Representative to the Director for his/her review and decision. The decision of the Director will be final and binding. All requests for review must be in writing and within 24 hours of the Airport Representative's decision in dispute, and must set forth clearly the cause for such request of review. No review will be allowed by the Director which has not first been considered by the Airport Representative. (See Appendix A, Section 7.L).

15. GOVERNING LAW AND FORUM SELECTION

This Agreement is made and entered into in the State of Missouri, and Missouri law, the City's charter and ordinances, as they may be amended from time to time, will govern and apply to this Agreement. Any cause of action, claim, suit, demand, or other case or controversy arising from or related to this Agreement must be brought only in a federal or state court in The City of St. Louis, Missouri. Contractor and the City hereby admit and consent to the jurisdiction and venue of such courts. The Provisions of this section survive the expiration or early termination of this Agreement.

16. **WAIVERS OF LIEN**

Upon completion of work contemplated herein, and if requested by the City, the Contractor will submit within five (5) business days of the City's request full waivers of lien from every entity involved in the performance of this Agreement. Lien waivers must be submitted on forms and executed in a manner acceptable to the Airport Representative. Contractor will warrant, covenant, represent, stipulate, and agree not to permit any mechanics' or materialmen's liens or any other lien or encumbrance to be attached or foreclosed upon the City's property or any part or parcel thereof, or on the improvements thereon, by reason of any work or labor performed or materials furnished by any mechanic, materialman, contractor, or any other reason.

17. **FACILITIES PROVIDED BY THE AIRPORT**

City, subject to and in accordance with the Provisions of this Agreement, will provide the right of ingress and egress to all areas herein specified in order for the Contractor to perform the work and services contemplated herein.

18. **PRECAUTIONARY MEASURES**

Contractor warrants, covenants, represents, stipulates, and agrees the Contractor shall exercise every precaution to prevent injury to persons or damage to property and avoid inconvenience to the City's travelers, licensees, and invitees, or airlines operating at the Airport, or other users of the Airport. Contractor shall without limiting the generality hereof, place such watchmen, erect such barricades and railings, give such warnings, display such lights, signals, or signs and exercise such precautions against fire, or electrocution, and take such other precautions as may be necessary, proper or desirable.

19. **STORAGE AND STAGING AREA**

- A. Location of storage and transfer area ("**Transfer Area**") will be assigned by the Airport Representative in writing (if applicable). If assigned, the Transfer Area will be used for storage of the Contractor's equipment and property, and will be maintained by the Contractor at its cost and to the City's standards as provided for in this Agreement. Assignment of the Transfer Area will be based on availability of space.
- B. The Contractor is responsible for the security of its equipment and must maintain and improve the Transfer Area as directed by the Airport Representative. The Contractor acknowledges, stipulates, and agrees that the City (including its officers, employees, agents or representatives) will not be responsible or liable for any vandalism, theft, casualty, loss, or damages of any kind whatsoever to the Contractor's equipment, containers, compactors, parts, tools, or supplies, or other

personal property.

- C. City, subject to and in accordance with the Provisions of this Agreement, will provide the right of ingress and egress to all areas required in the performance of the Contractor's services.

20. BADGING

- A. The Contractor shall comply with all applicable federal, state and local governmental laws and regulations as well as rules and regulations of the Airport as may be amended from time to time. (See Appendix A, Section 8.A)
- B. The Contractor at its cost shall supply to and update as needed for the Airport Police Security Operations Bureau, a list of the Contractor's employees to be issued an Airport Employee Badge.
- C. The Contractor at its cost, if requested by the City, shall provide verification of a five (5) to ten (10) year employee background check of each employee to be issued an Airport Employee Badge.
- D. The Contractor shall, when requested and ordered by the Airport Representative, schedule with the Airport Police Security Operations Bureau to have each employee, to be issued an Airport ID Badge, fingerprinted, for a criminal history check. This process will be used to issue Airport Identification Badges to all Contractor employees assigned to work within the Security Identification Display Area ("SIDA"). The Contractor shall maintain at all times adequate control of said identification badges. All employees issued identification badges will be required to attend the SIDA class offered by the Airport Police. The Contractor shall bear the cost of providing badges for the Contractor's employees working under this Agreement. The cost for badging is approximately \$80.00 per employee and includes the cost of the badge, background check, fingerprinting and the SIDA course. Replacement cost for lost, stolen, or damaged identification badges will be the sole responsibility of the Contractor.
- E. The Contractor is responsible for compliance with all Airport Security Regulations, Airport Security procedures, and TSA 1542 as they may be amended from time to time. Any and all violations by the Contractor or its officers, employees, subcontractors, agents, or representatives pertaining to Airport Security resulting in a fine or penalty to the City or the Contractor, or its officers, employees, agents, or representatives, will be the responsibility of the Contractor. The City will be reimbursed (within ten (10) days of the City's request) for any such fines or penalties imposed on the City (See Appendix A, Section 8.B).
- F. Due to the amount of time needed to complete the badging process, it is recommended that the Contractor begin the process at least thirty (30) days prior

to November 1st of each year that this Agreement is in effect.

21. UNIFORMS

Contractor, at its costs, shall provide uniforms for all its employees assigned to the Airport. Such uniforms are to bear the company's name and be approved by the Airport Representative in writing.

22. PERFORMANCE & PAYMENT BOND

- A. At or prior to the execution of this Agreement, the Contractor shall immediately execute a performance bond and a payment bond each in the amount of One Hundred Thousand Dollars (\$100,000.00) with surety satisfactory to the City conditioned on the full and faithful performance of all Provisions of this Agreement to be executed. Affirmation by the Surety Company to execute the performance bonds and the payment bonds must be executed by Attorney-In-Fact for the surety company before a licensed Notary Public. The payment bonds must comply with the coverage requirements and conditions of Section 107.170 RSMo. The City will allow submittal of one year renewable bonds to meet the requirements of this Section 22. The Contractor shall notify the City no later than thirty (30) days prior to the termination, cancellation, or non-extension of the performance bonds and/or payment bonds and if the Contractor's performance bonds and/or payment bonds are terminated, cancelled, not renewed or extended, the Contractor shall promptly provide the City with a replacement bond(s) in full compliance with this Section 22. Any sum or sums derived from said performance and/or payment bonds will be used for the completion of this Agreement and the payment of laborers and material suppliers, as the case may be.
- B. Copies of the performance bonds and the payment bonds, in a form acceptable to the City, must be given to the Airport Representative for approval before the work of this Agreement begins.

23. MISSOURI UNAUTHORIZED ALIENS LAW

As a condition precedent for the award of this Agreement and prior to performing any work or services under this Agreement, the Contractor, shall, pursuant to the applicable provisions of Sections 285.525 through 285.555 of the Revised Statutes of Missouri 2000, as amended (the "**Missouri Unauthorized Aliens Law**"), by sworn affidavit and provision of documentation, affirm its enrollment and participation in a federal work authorization program with respect to the employees working in connection with this Agreement. The Contractor shall also affirm in said affidavit that it does not knowingly employ any person who is an unauthorized alien in connection with this Agreement pursuant to the Missouri Unauthorized Aliens Law. A copy of an affidavit in a form acceptable to the City is attached hereto and incorporated herein as **Exhibit C** entitled "Affidavit". Contractor's failure to

comply at all times with the Missouri Unauthorized Aliens Law or the provisions of this Agreement related to the Missouri Unauthorized Aliens Law may result in the termination of this Agreement by the City and/or the City seeking other remedies available to the City at law or in equity. In addition, the State of Missouri may impose penalties or remedies for violations of the Missouri Unauthorized Aliens Law as set forth therein. The Contractor shall promptly and timely deliver to the City a fully executed original of the Affidavit (see Exhibit C) including any required documentation in accordance with the Missouri Unauthorized Aliens Law prior to performing any work under this Agreement.

24. GENERAL PROVISIONS

- A. The Contractor is, and at all times hereunder, will be and remain an independent contractor and nothing herein will be interpreted or construed to mean that the Contractor or any of its employees or agents is an employee or agent of the City.
- B. The Contractor shall coordinate the services performed under this Agreement with the Airport Representative designated by the Airport Director.
- C. This Agreement will be the entire agreement and no amendment or modification will be made (except as expressly provided for herein) unless in writing and signed by the parties hereto.
- D. The City of St. Louis and the Contractor agree that this Agreement and all contracts entered into under the Provisions of this Agreement are binding upon the parties hereto and their successors and permitted assigns.
- E. A waiver by either party of the Provisions hereto to be performed, kept, or observed by the other party will not be construed as or operate as a waiver of any subsequent default or breach of any of the terms, covenants, or conditions of this Agreement. Any waiver by either party must be in writing and signed by the party waiving.
- F. The Contractor shall keep and maintain such records and reports as are necessary for the City to determine compliance with the obligations of this Agreement. Such records must be maintained by the Contractor for at least three (3) years after the expiration or termination of this Agreement. The City reserves the right to investigate, audit, and review, upon written request, such records and documents, in order to determine compliance with this Agreement. (See Appendix B, Section 6 entitled "Right To Audit Clause").
- G. Contractor acknowledges, understands, stipulates, and agrees that the City retains the right to receive bids and award contracts on any modifications, deletions, or additions to the Joint & Crack Sealing Services contemplated herein. In addition, the City retains the right to furnish materials or supplies at its discretion, or

perform for itself, any work contemplated herein. (See Appendix A, Sections 7.M and 10.B).

- H. No alderman, commissioner, director, board member, officer, employee or other agent of the City will be personally liable under or in connection with the Agreement.
- I. Neither party will be deemed in violation of this Agreement, if it is prevented from performing any of the obligations hereunder by reason of strikes, boycotts, labor disputes, embargoes, shortage of material, acts of God, acts of a public enemy, acts of a superior governmental authority, riots, rebellion, or sabotage, or any other circumstances for which it is not responsible and which is not within its control. (See Appendix A, Section 24K).
- J. In the event any Provision herein contained is held to be invalid by a court of competent jurisdiction, the invalidity of any such Provision will in no way affect any other Provision, herein contained, provided the invalidity of such Provision does not materially prejudice either party hereto in its respective rights and obligations contained in the valid Provisions of this Agreement.
- K. Time is of the essence in this Agreement. The parties agree that time will be of the essence in the performance of each and every obligation and understanding of this Agreement.
- L. Unless otherwise expressly provided for herein, when the consent, approval, waiver, release, or certification ("**Approval**") of either party is required under the terms of this Agreement, such Approval must be in writing and signed by the party making the Approval. Whenever the Approval of the City or the Director of Airports is required, the Approval must be from the City's Director of Airports or his/her authorized or designated representative.

25. PREVAILING WAGE AND FRINGE BENEFITS

The Contractor warrants, covenants, represents, stipulates, and agrees that all employees and subcontractor's employees performing any work under and subject to the terms of this Agreement at the Airport will be paid not less than the prevailing hourly rate of wages and fringe benefits as determined by the United States Secretary of Labor, or his/her authorized representative, in accordance with prevailing rates in the locality of the metropolitan St. Louis area pursuant to 41 U.S.C. 351 ex seq., as amended, except for any person engaged in an executive, administrative or professional capacity. This Section 25 is subject to and is in accordance with City Ordinance No. 62124.

26. **MEDIA INQUIRIES / ADVERTISING**

- A. If contacted by any media entity or other third party ("**Media Entity**") about this Agreement or the services or work performed by the Contractor under this Agreement ("**Airport Project**"), the Contractor will refer the Media Entity to the Airport's Public Relations Manager. This includes, without limitation, trade publications.
- B. Contractor acknowledges and agrees that any printed articles, press releases, web articles, social media communications or case studies about an Airport Project must be approved in writing by the Airport's Public Relations Manager prior to being made public by the Contractor. Contractor will have no right to use the trademarks, symbols, logos, trade names or the name of the City or the Airport, either directly or indirectly, in connection with any production, promotional service, publication or advertising without the prior written consent of the Airport's Public Relations Manager.
- C. Contractor will treat all knowledge of the City's intentions, operations or procedures, and business as confidential and at no time divulge such information without the prior written consent of the Director, unless otherwise required by a court order or subpoena. Contractor will timely inform the City of any such order or subpoena prior to releasing said confidential information.
- D. Advertisements discussing an Airport Project must be approved by the Airport's Public Relations Manager in writing prior to publication or must include a prominent disclaimer that neither the City nor the Airport necessarily endorses the Contractor's work.
- E. Any quotes or testimonials from City or Airport staff may not be used unless pre-approved in writing by the Airport's Public Relations Manager.
- F. Photos taken by Contractor of Airport Projects must be pre-approved in writing by the Airport's Public Relations Manager. Contractor acknowledges and understands that some photos may contain security-sensitive information and publication may violate federal laws or regulations or Airport security rules or procedures.
- G. The Airport's Public Relations office must be given at least three (3) business days' notice to review request and materials. The Airport's Public Relations office coordinates media, web, postings, printed materials, advertisements and other public communication about Airport Projects. Public Relations main number is: 314-426-8125.

27. **CUSTOMER SERVICE**

Contractor, on behalf of itself and all subcontractors, acknowledges that customer service to the traveling public is a primary concern for the City and that customer service is the shared responsibility of all employees at the Airport, no matter their role or function. Contractor agrees that all employees performing service at the Airport pursuant to this Agreement shall:

- A. Demonstrate excellent customer service at all times when in contact with users of the Airport.
- B. Act in a courteous and helpful manner at all times with travelers, fellow employees, and all other users of the Airport, including but not limited to, appropriate greetings and assistance to travelers.
- C. Ensure that travelers have a positive Airport experience and must at all times behave in a businesslike and professional manner while on Airport property.
- D. Speak English, except when necessary to accommodate customers; refrain from using foul or inappropriate language in public areas; smile and use a pleasant tone of voice when conversing with travelers and all other Airport users; be actively working while on duty and refrain from gathering and "chatting" in groups while on duty, unless necessary; refrain from the use of non-business cell phones while on duty; refrain from napping or sleeping in public areas.
- E. Not utilize public seating, boarding areas, gate areas or lounge areas within the terminals and concourses. The above areas are intended for use by the traveling public and not as rest or lounge facilities for employees.
- F. Additionally, Contractor agrees that it shall:
 - 1. Provide proper training of all employees including on-going customer service training and for the certification or licensing of employees in all areas of service as their duties might legally require.
 - 2. Participate in the Airport's customer service program if required by the Director in writing.
 - 3. Respond in writing to every complaint issued regarding its employees interaction with the public, written or oral, within seven (7) calendar days of the complaint and shall make good faith efforts to explain, resolve or rectify the cause of the complaint. Contractor shall provide the Director with a copy of each such complaint and its written response thereto.
 - 4. Generate a written Customer Service Plan (the "**Plan**") for its employees that is provided to the Director for approval upon fifteen (15) days written

notice. Should the Director not approve the Plan, Contractor shall revise and resubmit the Plan within fifteen (15) days of written notice of the denial.

28. INSPECTIONS

- A. The Airport Representative will at all times have free access to the work, as well as the equipment, and shops of the Contractor for the purpose of determining Contractor's compliance with the Provisions of this Agreement. The Airport Representative may perform periodic inspections of the work as outlined in the Agreement, to determine that services performed by the Contractor meet with required standards and the Contractor will be required to timely and promptly make any improvements as required by the Airport Representative at no additional charge to the City (See Appendix A, Sections 2 & 7).

29. FAILURE TO PERFORM

- A. If the Airport Representative determines at his/her sole discretion that the quality or quantity of any work required to be performed under this Agreement is unacceptable or that the Contractor has failed or refused to perform the job or work, the City may take reasonable and necessary actions to perform the work or remedy the Contractor's failed or under performance(s) (see Appendix A, Section 9.C and 9.L). All reasonable costs or expenses incurred by the City will be promptly and timely paid or reimbursed by the Contractor as provided for herein. The City may deduct such costs, plus 15 % for administrative costs, from any payments due to the Contractor under the Agreement or the City may invoice the Contractor for such costs which shall be due within thirty (30) days of the City's written request. Subsequent to receipt of notice that the City will perform the work or remedy the breach or default, the Contractor shall not undertake further performance of such work without the specific prior authorization from the Airport Representative.
- B. The work, if necessary, and any other actions taken by the City pursuant to this subsection may only be performed after first providing at least five (5) working days' notice to Contractor of such failure to comply during which time the Contractor may demonstrate to the City why no such alleged failure is present or to timely remedy such alleged failure. However, the City's right to perform such work will not arise, if such failure cannot be reasonably cured within five (5) working days and the Contractor promptly and with due diligence takes prompt and appropriate corrective action and diligently pursues until the failure is corrected to the City's reasonable satisfaction.

**CITY OF ST. LOUIS
LAMBERT - ST. LOUIS INTERNATIONAL AIRPORT**

APPENDIX "B"

**GENERAL SPECIFICATIONS
(JOINT & CRACK SEALING SERVICES)**

1. INSURANCE AND INDEMNIFICATION

- A. The Contractor, at its expense, at all times during the term hereof, will cause St. Louis County, the City, and its Board of Alderman and the Airport Commission, and the State of Missouri for the benefit of the State of Missouri's Legal Expense Fund and the Missouri Highway and Transportation Commission, and their respective officers, employees, and agents and the Contractor to be insured **on an occurrence basis** against all claims and demands by third persons for bodily injury (including wrongful death) and property damage arising or alleged to arise out of the activities or omissions of the Contractor, its officers, agents, employees, contractors, subcontractors, licensees, invitees, representatives, and independent contractors pursuant to this Agreement under the following types of coverage:
1. Comprehensive General Liability;
 2. Comprehensive Automobile Liability (any vehicles, including owned, hired and non-owned).
- B. **The minimum limits of coverage for the above classes of insurance must equal a single limit of Ten Million Dollars (\$10,000,000.00) comprised of such primary and excess policies of insurance as the Contractor finds it feasible to purchase during the term of this Agreement** and will name St. Louis County, the City, and its Board of Alderman and the Airport Commission, and the State of Missouri for the benefit of the State of Missouri's Legal Expense Fund and the Missouri Highway and Transportation Commission, and their respective officers, employees, and agents (the "CITY" as used in this Section) by endorsement as an "Additional Insured". Prior to execution of this Agreement, Contractor will provide certificates of said insurance and all endorsements required pursuant to this Agreement to the Airport Representative in form and content satisfactory to the City. In addition, the Contractor will also mail or fax a copy of the Certificate of Insurance and all required endorsements to:

St. Louis Airport Police Department
P.O. Box 10212, Lambert Station
St. Louis, Missouri 63145
Attn: Sharon Wilson, Bureau of Security Operations
Phone: 314-426-8002
Fax: 314-890-1325

- C. Such liability insurance coverage must also extend to damage, destruction and injury to CITY owned or leased property and CITY personnel, and caused by or resulting from work, acts, operations, or omissions of Contractor, its officers, agents, employees, contractors, subcontractors, licensees, invitees, representatives, and independent contractors and, contractual liability insurance sufficient to cover Contractor's indemnity obligations hereunder. The CITY will have no liability for any premiums charged for such coverage, and the inclusion of the CITY as an Additional Insured is not intended to, and does not make the CITY a partner or joint venturer with Contractor in its operations hereunder. Each such insurance policy must provide primary coverage to the CITY when any policy issued to the CITY provides duplicate or similar coverage and in such circumstances, the CITY's policy will be excess over Contractor's policy.
- D. The Contractor will protect, defend, and hold St. Louis County, the City, and its Board of Alderman and the Airport Commission, and the State of Missouri for the benefit of the State of Missouri's Legal Expense Fund and the Missouri Highway and Transportation Commission, and their respective officers, employees, and agents completely harmless from and against all liabilities, losses, suits, claims, judgments, and fines or demands arising by reason of injury or death of any person or damage to any property, including all reasonable costs for investigation and defense thereof (including but not limited to attorneys' fees, court costs, and expert fees), of any nature whatsoever arising out of or incident to this Agreement and the use or occupancy of the City's premises and the acts or omissions of Contractor's officers, agents, employees, contractors, subcontractors, licensees, invitees, or independent contractors regardless of where the injury, death, or damage may occur, unless and to the extent such injury, death or damage is caused by the negligence of the City. The Director or his/her designee will give to Contractor reasonable notice of any such claims or actions. The Contractor will also use counsel reasonably acceptable to the City Counselor of the City or his/her designee, after consultation with the Director or his/her designee, in carrying out its obligations hereunder. The Provisions of this section survive the expiration or early termination of this Agreement.
- E. The Contractor will maintain Worker's Compensation and Employer's Liability Insurance at least at the statutory requirement and in accordance with Missouri laws and regulations. Contractor will require that all of its subcontractors or licensees similarly provide such coverage. The City, its officers, employees, or agents will not be liable or responsible for any claims or actions occasioned by Contractor's failure to comply with the provisions of this subsection. The indemnification provisions of this Agreement apply to this subsection. It is expressly agreed that the employees of the Contractor are not employees of the City for any purpose, and that employees of the City are not employees of the Contractor.

2. CANCELLATION

- A. The City retains the right to cancel this Agreement immediately upon written notice to the Contractor, if the Contractor should fail to properly keep any Provision of this Agreement; or, if the quality of service should fall below the specified standards as determined by the City; or, if the Contractor should fail or refuse to render the amount of service required.
- B. The Contractor has the right to cancel this Agreement if the City fails to keep, perform, or observe any material Provision of this Agreement for a period of thirty (30) Days after written notice by the Contractor specifying such material breach by the City; provided, however, that such material breach which can be cured, but which cannot with due diligence be cured within such thirty (30) Days, shall not give rise to the Contractor's right to terminate this Agreement if corrective action is instituted by the City within such thirty (30) Days and diligently pursued until the material breach is corrected.
- C. The Contractor retains the right to cancel this Agreement without cause upon (90) Days written notice to the City. There will be no liability to the Contractor and such a cancellation will be deemed a no fault cancellation.
- D. The City retains the right to cancel this Agreement without cause upon (30) Days written notice to the Contractor. There will be no liability to the City and such a cancellation will be deemed a no fault cancellation.
- E. Notwithstanding anything to the contrary herein, it is expressly understood by the parties hereto that this Agreement will terminate immediately upon the failure of budgetary appropriations with no resulting liability to the City.
- F. If requested in writing by the Airport Representative or in the event of cancellation, termination, or the expiration of this Agreement, all tools, parts, equipment, supplies, materials, maps, plans and specifications, manuals, schedules, records, files, logs, work product, or property paid for, supplied or owned by the City will be returned to the City by the Contractor within one (1) business day.

3. ASSIGNMENT AND SUBCONTRACTING

- A. Contractor will not assign or transfer this Agreement without the prior written approval of the City, as provided for in Ordinance 63687 approved in 1996. At least 90 days prior to any contemplated assignment of this Agreement, Contractor will submit a written request to the City along with a copy of the proposed assignment agreement. The City reserves the right to refuse without cause or justification, such requests. No assignment will be made or will be effective unless Contractor is not in default on any of the other terms, covenants, and

conditions herein contained. The party to whom such assignment is made will expressly assume in writing the terms, covenants, and conditions of this Agreement. The parties to this Agreement understand and agree that the Contractor is and will remain responsible for the performance of its assigns under this Agreement. No assignment will be effective as it pertains to the City until such time as the City receives a fully executed copy of the approved assignment agreement as provided for above.

- B. Contractor will not subcontract or transfer any part of the services or work to be performed hereunder without the prior written approval of the Director of Airports. At least 60 days prior to any contemplated subcontracting of service or work or the transfer of any part of the services or work to be performed hereunder, Contractor will submit a written request to the Director of Airports. This request must include a copy of the proposed subcontract or agreement. The City reserves the right to refuse without cause or justification, such requests. At a minimum, any sub-contractor agreement must expressly require strict compliance with the terms, covenants, and conditions of this Agreement. The Contractor will furnish all authorized subcontractors or agents a copy of this Agreement. The parties understand and agree that the Contractor is responsible for the performance of its subcontractors or agents under this Agreement. No subcontract or any other agreement will be effective as it pertains to the City until such time as the City receives a fully executed copy of the approved subcontract or agreement as provided for above.
- C. Any such assignment or transfer or subcontracting of services without the consent of the City, as provided for above, will constitute default on the part of the Contractor under this Agreement. No action or failure to act on the part of any officer, agent, or employee of the City will constitute a waiver by the City of this provision.
- D. The City has approved the following M/W/DBE subcontractors for participation under this Agreement at the percentage participation goals as set out below:

| | | |
|---|------------|--------------|
| Clean-Tek Flooring Systems, Inc. | MBE | 2.96% |
| Ahrens Contracting, Inc. | WBE | .47% |
| Tramar Contracting, Inc. | WBE | 3.27% |

4. AFFIRMATIVE ACTION PROGRAM AND NON-DISCRIMINATION

- A. Contractor agrees during performance under this Agreement, that discrimination will not be permitted against any employee, worker, or applicant for employment because of race, creed, color, religion, sex, age, disability, national ancestry or origin.
- B. Contractor agrees during performance under this Agreement, that all printed or

circulated solicitations, or other advertisement or publication for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive meaningful consideration for employment without regard to race, creed, color, religion, sex, age, disability, national origin or ancestry.

- C. Contractor agrees during performance under this Agreement, that should it be determined by the Contractor or City that Contractor will be unable to conform to the approved positive employment program, submitted to determine eligibility under the Fair Employment Division Practices Provisions of the City Code, will notify the Fair Employment Division of the St. Louis Council on Human Relations within ten days as to the steps to be taken by the Contractor to achieve the provisions of this program.
- D. Contractor will permit reasonable access by the City to such persons, reports and records as are necessary for the purpose of ascertaining compliance with fair employment practices.
- E. In the event of the Contractor's non-compliance with the nondiscrimination clauses of this Agreement, or to furnish information or permit records and accounts to be inspected, within twenty days from the date requested, this Agreement may be canceled, terminated, or suspended in whole or part and Contractor may be declared ineligible for further City contracts for a period of one year, by the option of the City; provided further in the event this Agreement is canceled, terminated, or suspended for failure to comply with fair employment practices, the Contractor will have no claim for any damages against the City.
- F. Contractor further agrees that these clauses (A through E) on discrimination and equal opportunity practices in all matters of employment and training for employment will be incorporated by Contractor in all contracts or agreements entered into with suppliers of materials or services, contractors and subcontractors and all labor organizations furnishing skilled, unskilled and craft union skilled labor, or who may perform any such labor or services in connection with this Agreement.
- G. Whenever the Contractor is sued or threatened with litigation by a subcontractor, vendor, individual, group or association, as a result of compliance with the clauses (A through F) of these provisions relating to fair employment practices, such contractor will notify the City Counselor in writing of such suit or threatened suit within ten days.
- H. The Contractor must submit evidence from the City's Civil Rights Enforcement Agency (CREA) stating that Contractor has complied with the City's requirements for an affirmative action program as required by the Mayor's Executive Order on Equal Opportunity in Employment.

- I. Contractor shall comply with all applicable nondiscriminatory requirements that may be imposed pursuant to the Federal Aviation Act of 1958, as amended; Title VI of the Civil Rights Act of 1964, as amended; 49 C.F.R. Parts 21, 23, and 26, as said regulations may be amended; and state and local laws.

5. **MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE MBE/WBE) PARTICIPATION**

A. Definitions:

As used in this requirement, "Minority Business Enterprise" or "MBE" and "Women Business Enterprise" or "WBE" are defined as follows:

1. **"Minority Business Enterprise" or "MBE"** means a minority business enterprise as defined in the Mayor's Executive Order #28, as amended.
2. **"Women Business Enterprise" or "WBE"** means a women's business enterprise as defined the Mayor's Executive Order #28, as amended.

B. Policy:

It is the policy of the City of St. Louis Airport Authority to ensure the maximum utilization of minority and women's business enterprises in contracting and the provision of goods and services to the City, its departments, agencies and authorized representative and to all entities receiving City funds or City-administered government funds while at the same time maintaining the quality of goods and services provided to the City and its subrecipients through the competitive bidding process. The provisions of this Policy apply to all contracts awarded by the City, its departments and agencies and to all recipients of City funds or City-administered government funds and will be liberally construed for the accomplishments of its policies and purposes.

C. Goal:

A goal of 25% MBE and 5% WBE utilization has been established in connection with this Agreement. This goal is based on the original Agreement amount and remains in effect throughout the term of this Agreement. If an award of this Agreement is made and the MBE/WBE participation is less than this Agreement goal, the Contractor shall continue good faith efforts throughout the term of this Agreement to increase MBE/WBE participation and to meet this Agreement goal. **Please note: Contractors that have been certified as either an MBE or WBE are still required to fill both goals. In addition, Contractors that have been certified as an MBE and a WBE can only be used to fulfill either the MBE goal or the WBE goal, not both goals.**

D. Obligation:

1. The Contractor agrees to take all reasonable steps to ensure that MBEs/WBEs have maximum opportunity to participate in contracts and subcontracts financed by the City of St. Louis Airport Authority provided under this Agreement. The Contractor shall not discriminate on the basis of race, color, national origin, or sex in the award or in the performance of contracts financed by the City of St. Louis Airport Authority.
2. A current Directory of M/W/BE certified firms is available online at www.flystl.com/businessdiversitydevelopment.

E. Eligibility:

Contractor should access the online directory to obtain a list of eligible MBEs/WBEs and to determine the eligibility of the MBE/WBE firms it intends to utilize in this Agreement.

F. Counting MBE/WBE Participation toward Goals:

MBE/WBE participation towards the attainment of the goals will be credited on the basis of the total subcontract prices agreed to between the Contractor and subcontractors for the contract items being sublet as reflected on the “**MBE/WBE Utilization Plan**”.

G. Post Award Compliance:

If the contract is awarded on less than full MBE/WBE goal participation, such award will not relieve the Contractor of the responsibility to continue good faith efforts to maximize participation of MBEs/WBEs during the term of this Agreement.

H. Substitution of MBE/WBE Firms after Award:

1. The Contractor will conform to the scheduled amount of MBE/WBE participation. When a listed MBE/WBE is unwilling or unable to perform the items of work or supply the goods or services specified in the MBE/WBE Utilization Plan, the Contractor will immediately notify the contracting department and City of St. Louis Airport Authority Business Diversity Development (BDD) office prior to replacement of the firm.

2. Substitutions of MBE/WBE must be approved in writing by the Director. (See Appendix B, Section 3.B.) Substitutions of MBE/WBE will be allowed only when the MBE/WBE has failed to perform due to a default (material breach) of its subcontract or agreement. Contractor understands, warrants, and agrees that it shall not cancel or terminate its agreement with the MBE/WBE without cause and shall timely forward supporting documentation substantiating the cause of the default or termination to the Director for review.

I. Good Faith Efforts:

When the M/WBE goals cannot be met, the Bidder shall document and submit justification utilizing the Contractor's **"Good Faith Efforts Report Form"** and provide a statement as to why the goals could not be met. The quality and intensity of the Contractor's good faith efforts will be evaluated by the City. The contractor must demonstrate the good faith efforts taken to meet the M/WBE goals, including but not limited to the following:

1. Efforts made to select portions of the work proposed to be performed by M/WBEs in order to increase the likelihood of achieving the stated goal, including, where appropriate, but not limited to, breaking down contracts into economically feasible units to facilitate M/WBE participation. Selection of portions of work are required to at least equal the goal for M/WBE utilization specified in the contract.
2. Written notification at least (14) calendar days prior to the opening of bids, soliciting individual M/WBEs interested in participation in the contract as a subcontractor, regular dealer, manufacturer, consultant, or service agency and for what specific items or type of work.
3. Written notification to disadvantaged economic development assistance agencies and organizations which provide assistance in recruitment and placement of M/WBEs, of the type of work, supplies, or services being considered for M/WBEs on this contract.
4. Efforts made to negotiate with M/WBEs for specific items of work including evidence on:
 - a. The names, addresses, telephone numbers of M/WBEs who were contacted, the dates of initial contact and whether initial solicitations of interest were followed up by contacting the M/WBEs to determine with certainty whether the M/WBE is interested. Personal or phone contacts are expected.
 - b. A description of the information provided the M/WBEs regarding the

plans and specifications and estimated quantities for portions of the work to be performed.

- c. A statement of why additional agreements with M/WBEs were not reached, and
 - d. Documentation of each M/WBE contacted but rejected and the reasons for the rejection.
- 5. Absence of any agreements between the contractor and the M/WBE in which M/WBE promises not to provide subcontracting quotations to other bidders.
 - 6. Efforts made to assist the M/WBEs that need assistance in obtaining bonding, insurance, or lines of credit required by the contractor.
 - 7. Documentation that qualified M/WBEs are not available, or not interested.
 - 8. Attendance at any meeting scheduled by the user department, or the SLDC to encourage better contractor-subcontractor relationships, forthcoming M/WBE utilization opportunities (i.e. pre-bid, workshops, seminars), etc.
 - 9. Advertisement, in general circulation media, trade association publications, disadvantaged-focused media, of interest in utilizing M/WBEs and area of interest.
 - 10. Efforts to effectively use the services of available disadvantaged community organizations; disadvantaged contractor's groups; local, state and federal disadvantaged business assistance offices; and other organizations that provide assistance in recruitment and placement of M/WBEs.
 - 11. Examples of actions not acceptable as reasons for failure to meet the M/WBE goal.
 - a. M/WBE unable to provide performance and/or payment bonds.
 - b. Rejection of reasonable bid based on price.
 - c. M/WBE would not agree to perform items of work at the unit bid price.
 - d. Union versus nonunion status.
 - e. Contractor normally would perform all or most of the work of the contract.

- f. Solicitation by mail only.
 - g. Restricting to only those general group of items which may be listed in bids under such headings "Items Subcontractible to M/WBE firms".
12. The demonstration of good faith efforts by the contractor must, in the end, prove the contractor had actively and aggressively sought out M/WBEs to participate in the project.
13. The information provided will be evaluated to determine if the low bidder is responsive. All the information provided must be accurate and complete in every detail. The apparent low bidder's attainment of the M/WBE goal or demonstration of good faith effort will assist in determining the award of the contract.

J. Record Keeping Requirements:

The Contractor shall keep such records (copies of subcontracts, paid invoices, documentation of correspondence) as are necessary for the City of St. Louis Airport Authority to determine compliance with the MBE/WBE contract obligations. The City of St. Louis Airport Authority reserves the right to investigate, monitor and/or review actions, statements, and documents submitted by any contractor, subcontractor, or MBE/WBE.

K. Reporting Requirement:

The Contractor shall submit monthly reports on MBE/WBE involvement to the City of St. Louis Airport Authority Business Diversity Development Office via the BDD online reporting system. Actual payments to MBEs/WBEs will be verified. The Contractor shall ensure its subcontractors are also submitting monthly reports on MBE/WBE participation via the BDD online reporting System.

1. Liquidated Damages. The Contractor hereby agrees and stipulates that their or their subcontractor(s)'s failure to comply with the MBE/WBE reporting requirements could result in an administrative and/or financial burden to the City. Therefore, the Contractor agrees and stipulates that the Director, on behalf of the City, may elect to implement liquidated damages after written notice to the Contractor for failure to report. The stated liquidated damages in this sub-Section are cumulative over the term of this Agreement and are in addition to any other remedies City may have under this Agreement or at law or in equity:
- a. The first failure to report violation will result in a warning letter;

- b. The second failure to report violation will require Contractor to pay liquidated damages to the City not to exceed \$25.00 for each week past due;
 - c. For the third failure to report violation will require Contractor to pay liquidated damages to the City not to exceed \$50.00 for each week past due; and
 - d. For the fourth failure to report violation will require Contractor to pay liquidated damages to the City not to exceed \$75.00 for each week past due.
 - 2. Payment of Liquidated Damages. All liquidated damages will be deducted by the City's next payment schedule. In the case there is no future payment(s), the Contractor will make the liquidated damage payment to the City within 30 days written notice of the violation.
 - 3. Notice. For any failure to report a violation specified in this section with associated liquidated damages, the City will provide written notice. including liquidated damages due and payable to the City.
- L. Applicability of Provisions to MBE/WBE Contractors:
- These provisions are applicable to all contractors including MBE/WBE contractors. If the MBE/WBE contractor intends to sublet any portion of this Agreement, the MBE/WBE contractor shall comply with provisions regarding contractor and subcontractor relationships.

6. RIGHT TO AUDIT CLAUSE

- A. The Contractor's "**records**" must be open to inspection and subject to audit and reproduction during normal working hours and kept within the greater St. Louis metropolitan area. A City representative may perform such audits or an outside representative engaged by the City. The City or its designee may conduct such audits or inspections throughout the term of this Agreement, and for a period of three years after the early termination or the expiration of this Agreement or longer if required by law.
- B. The Contractor's "**records**" as referred to in this Agreement include any and all information, materials, and data of every kind and character, including without limitation, records, books, papers, documents, subscriptions, recordings, agreements, purchase orders, leases, contracts, communities, arrangements, notes, daily diaries superintendent reports, drawings, receipts, vouchers and memoranda, and any and all other agreements, sources of information and matters that may in City's judgment have any bearing on or pertain to any matters, rights, duties or

obligations under or covered by this Agreement. Such records subject to audit also include, but are not limited to, those records necessary to evaluate and verify direct and indirect costs, (including overhead allocations) as they may apply to costs associated with this Agreement. Such records include (hard copy, as well as computer readable data if reasonably available), written policies and procedures; time sheets; payroll registers; cancelled checks; original estimates; estimating work sheets; correspondence; change order files (including documentation covering negotiated settlements); backcharge logs and supporting documentation; general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends; and any other Contractor records which may have a bearing on matters of interest to the City in connection with the Contractor's work for the City (all foregoing hereinafter referred to as "records") to the extent necessary to adequately permit evaluation of:

1. Contractor's compliance with the Provisions of this Agreement or the performance of the services contemplated herein; or
2. Compliance with provisions for pricing, change orders, invoices or claims submitted by the Contractor or any of its payees or subcontractors, if any.

7. **LIVING WAGE**

A. Living Wage Compliance Provisions: Any work ordered by the City under this Agreement is subject to the St. Louis Living Wage Ordinance Number 65597 (the "**Ordinance**") and the "**Regulations**" associated therewith, as may be amended from time to time, both of which are incorporated herein by this reference. The Ordinance and Regulations require the following compliance measures, and Contractor hereby warrants, represents, stipulates, and agrees to strictly comply with these measures beginning on the Commencement Date of this Agreement:

1. **Minimum Compensation:** Contractor hereby agrees to pay an initial hourly wage to each employee performing services related to this Agreement in an amount no less than the amount stated on the attached Living Wage Bulletin (See **Exhibit D**) which is attached hereto and incorporated herein. The initial rate will be adjusted each year no later than April 1, and Contractor hereby agrees to adjust the initial hourly rate to the adjusted rate specified in the Living Wage Bulletin at the time the Living Wage Bulletin is issued.
2. **Notification:** Contractor shall provide the Living Wage Bulletin together with the "Notice of Coverage" to all employees in English, Spanish, and any other languages spoken by a significant number of the Contractor's employees within thirty (30) days of the effective date of this Agreement for existing employees and within thirty (30) days of employment for new employees.

3. **Posting:** Contractor shall post the Living Wage Bulletin, together with a “Notice of Coverage”, in English, Spanish, and any other languages spoken by a significant number of the Contractor’s employees, in a prominent place in a communal area of each worksite covered by this Agreement.
4. **Subcontractors:** Contractor hereby agrees to require Subcontractors, as defined in the Regulations, to comply with the requirements of the Living Wage Regulations, and hereby agrees to be responsible for the compliance of such Subcontractors. Contractor shall include these Living Wage Compliance Provisions in any contract with such Subcontractors.
5. **Term of Compliance:** Beginning on the effective date of this Agreement, Contractor hereby agrees to comply with these Living Wage Compliance Provisions and with the Regulations for as long as work related to this Agreement is being performed by Contractor’s employees, and to submit the reports required by the Regulations for each calendar year or portion thereof during which such work is performed.
6. **Reporting:** Contractor shall provide the Annual Reports and attachments required by the Ordinance and Regulations.
7. **Penalties:** Contractor acknowledges and agrees that failure to comply with any provision of the Ordinance or Regulations may result in penalties specified in the Ordinance and Regulations, which penalties may include, without limitation, suspension or termination of this Agreement, forfeiture and/or repayment of City funds, disbarment, and/or the payment of liquidated damages, as provided in the Ordinance and Regulations.
8. **Acknowledgements:** Contractor acknowledges receipt of a copy of the Ordinance and Regulations.

8. **CIVIL RIGHTS GENERAL PROVISIONS**

- A. The Contractor agrees that it will comply with pertinent statuses, Executive Orders and such rules as are promulgated to ensure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.
- B. The provisions bind the Contractor and sub tier contractors from the bid solicitation period through the completion of the contract. This provision is in addition to that required of Title VI of the Civil Rights Act of 1964.

9. **CIVIL RIGHTS AND NON-DISCRIMINATION PROVISIONS**

- A. During the performance of this Agreement, the Contractor, for itself, its assignees, and successors in interest agrees as follows:
1. **Compliance with Regulations:** The Contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts And Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this Agreement.
 2. **Non-discrimination:** The Contractor, with regard to the work performed by it during this Agreement, 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 Nondiscrimination Acts and Authorities, including employment practices when this Agreement 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 Nondiscrimination Acts And Authorities 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 Nondiscrimination Acts And Authorities 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 this Section, the City 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 this Agreement until the contractor complies; and/or
 - b. Cancelling, terminating, or suspending this Agreement, in whole or in part.
 6. **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.
- B. During the performance of this Agreement, 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:
1. 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);
 2. 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);
 3. 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);
 4. 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;
 5. The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);

6. 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);
7. 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);
8. 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;
9. 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);
10. 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;
11. 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); or
12. 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).

10. FEDERAL FAIR LABOR STANDARDS ACT PROVISION

- A. All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR Sect. 201, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA

sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part time workers.

- B. The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

11. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

All Contracts and subcontracts that result from this solicitation incorporate by reference the requirements of 29 CFR Section 1910 with the same force and effect as if given in full text. Contractor must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The Contractor retains full responsibility to monitor its compliance and their subcontractor's compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (20 CFR Part 1910). Contractor must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

12. SEISMIC SAFETY

When applicable, the Contractor agrees to ensure that all work performed under this Agreement, including work performed by its subcontractor(s), conforms to a building code standard that provides a level of seismic safety and substantially equivalent to standards established by the National Earthquake Hazards Reduction Program ("NEHRP"). Local building codes that model their code after the current version of the International Building Code meet the NEHRP equivalency level for seismic safety.

13. DISTRACTED DRIVING

The City encourages the Contractor to promote policies and initiatives for its employees and other work personnel that decreases the crashes by distracted drivers, including policies that ban text messaging while driving motor vehicles while performing work activities associated with this Agreement. The Contractor must include the substance of this section in all sub contracts that involve driving a motor vehicle in performance of the work associated with this Agreement.

14. CLEAN AIR AND WATER POLLUTION CONTROL

Contractor agrees to comply with all applicable standards, Executive Orders, and regulations issued pursuant to the Clean Air Act (42 U.S.C. Sec. 740-7671q) and the

Federal Water Pollution Act as amended (33 U.S.C. Sec. 1251-1387). The Contractor agrees to report any violation to the City immediately upon discovery. The City assumes responsibility for notifying the Environmental Protection Agency and the Federal Aviation Administration.

15. NOTICE PROVISION

Except as herein otherwise expressly provided, all notices required to be given to the City hereunder must be in writing and must be delivered personally or be sent by certified mail return receipt requested, or overnight courier to:

Rhonda Hamm Niebruegge
Airport Director
St. Louis Airport Authority
P.O. Box 10212
St. Louis, MO 63145

With a copy to:

Ron Stella
St. Louis Airport Authority
P.O. Box 10212
St. Louis, MO 63145

And a copy to:

Robert Salarano
St. Louis Airport Authority
P.O. Box 10212
St. Louis, MO 63145

All notices, demands, and requests by the City to the Contractor must be sent to:

Jeames English
Scodeller Construction, Inc.
4410-C S. 40th Street
St. Joseph, Missouri 64503

The City or Contractor may designate in writing from time to time any changes in addresses or any addresses of substitutes or supplementary persons in connection with said notices. The effective date of service of any such notice shall be deemed received at the earlier of actual receipt or the dates such notice is mailed to the Contractor or the Airport Director.

CITY OF ST. LOUIS
LAMBERT - ST. LOUIS INTERNATIONAL AIRPORT

APPENDIX "C"
RATES FOR JOINT & CRACK SEALING SERVICES

| | Price Per Linear Ft. Year 1 | Price Per Linear Ft. Year 2 | Price Per Linear Ft. Year 3 |
|--------------|--------------------------------|--------------------------------|--------------------------------|
| Runway Area | \$3.30 per linear ft. | \$3.53 per linear ft. | \$3.77 per linear ft. |
| Taxiway Area | \$3.30 per linear ft. | \$3.53 per linear ft. | \$3.77 per linear ft. |
| Apron Area | \$3.67 per linear ft. | \$3.70 per linear ft. | \$3.96 per linear ft. |

IN WITNESS WHEREOF, the parties have hereunto affixed their hands and seals as set forth below:

SCODELLER CONSTRUCTION, INC.

ATTEST:

BY: [Signature] 9/20/16
Date

BY: [Signature] 9-20-16
Date

THE CITY OF ST. LOUIS, MISSOURI, OWNER AND OPERATOR OF
LAMBERT-ST. LOUIS INTERNATIONAL AIRPORT:

The foregoing Agreement was approved on this 5th day of October, 2016,
by the Airport Commission.

BY: [Signature] 9/30/16
Director of Airports Date

The foregoing Agreement was approved by the Board of Estimate and Apportionment at its
meeting on October 19, 2016.

BY: [Signature] 10/19/16
Secretary Date
Board of Estimate & Apportionment

APPROVED AS TO FORM BY:

COUNTERSIGNED BY:

[Signature] 9-30-2016
City Counselor Date

[Signature]
Comptroller Date

ATTESTED TO BY:

[Signature] NOV 02 2016
Register Date

COMPTROLLER'S OFFICE
DOCUMENT # 70814

Exhibit A

Maps

Confidential
garvinm@stlouis-mo.gov
2020-01-16 13:35:46 +0000

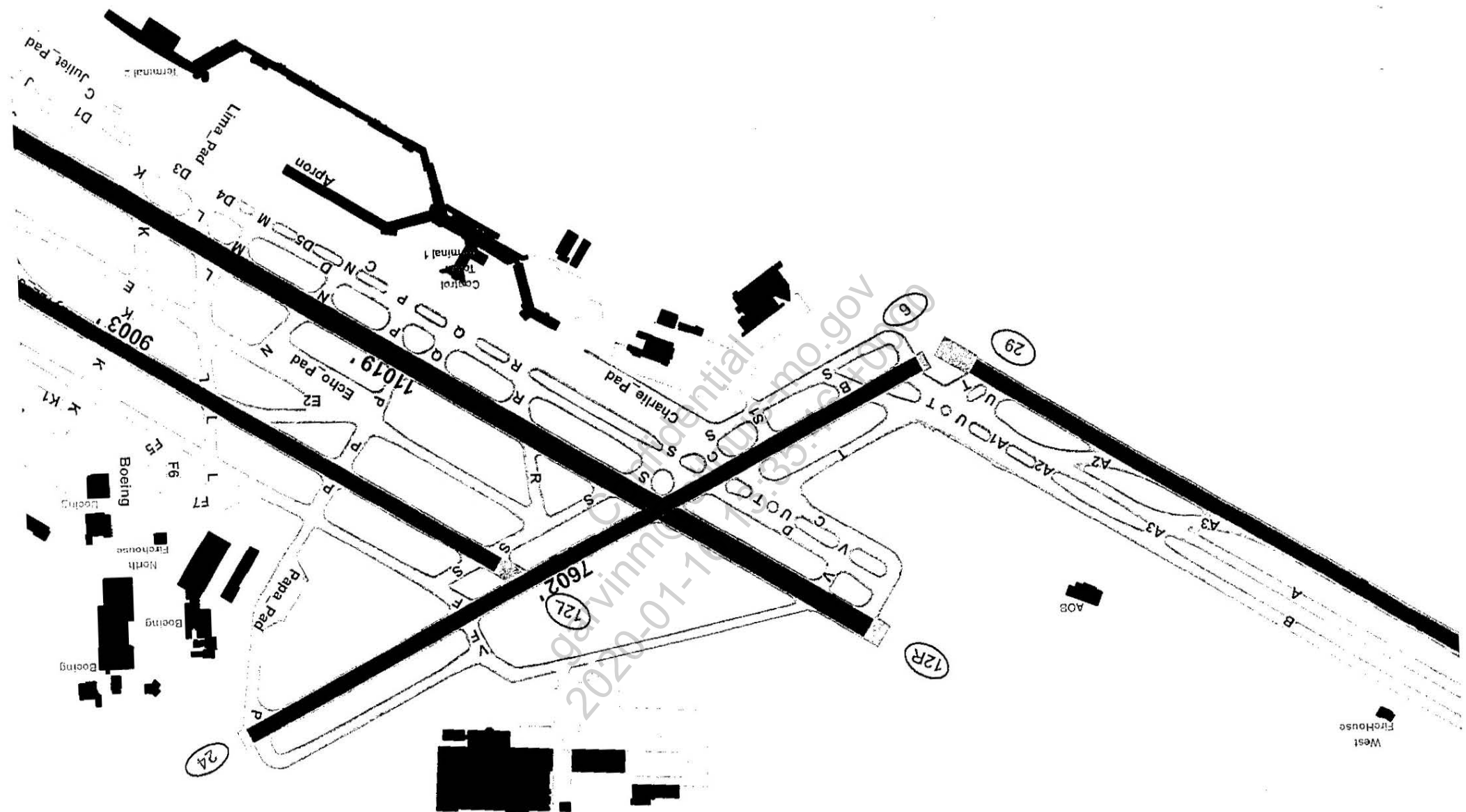


Exhibit B

FAA Advisory Circular 150/5380-6C

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garvinm@stlouis-mo.gov
2020-01-16 13:35:46 +0000



U.S. Department
of Transportation

Federal Aviation
Administration

Advisory Circular

| | | |
|--|---|---|
| Subject: Guidelines and Procedures for Maintenance of Airport Pavements | Date: 10/10/2014 Initiated by: AAS-100 | AC No: 150/5380-6C Change: |
|--|---|---|

1. **Purpose.** This advisory circular (AC) provides guidelines and procedures for maintaining airport pavements.
2. **Cancellation.** This AC cancels AC 150/5380-6B, Guidelines and Procedures for Maintenance of Airport Pavements, dated September 28, 2007.
3. **Application.** The guidelines and procedures contained in this AC are recommended by the Federal Aviation Administration (FAA) for the maintenance and minor repairs of airport pavements. This AC offers general guidance for maintenance and is neither binding nor regulatory.

Use of this AC is not mandatory. For major maintenance projects, the airport should utilize plans and specifications developed under the direction of a pavement design engineer.

For all maintenance and repair projects funded with federal grant monies through the Airport Improvement Program (AIP) and with revenue from the Passenger Facility Charge (PFC) Program, the airport must use the guidelines and specifications for materials and methods in AC 150/5370-10, Standards for Specifying Construction of Airports. Pavement maintenance discussed in this AC is specific to airfield pavements. Maintenance of airport access roads and other non-aeronautical pavements may typically use state highway standards.

4. **Principal changes.** The AC contains the following principal changes:
 - a. Revised and reformatted entire AC.
 - b. Added paragraph on operational safety on airports during construction in Chapter 1.
 - c. Simplified Chapter 2. Moved information on friction, drainage, etc., into Chapter 2.
 - d. Added paragraph on wildlife hazard attractants and mitigation with respect to drainage systems to Chapter 2.
 - e. Split Table 6-1 into two tables; updated and simplified tables for Quick Guide for Maintenance and Repair of Common Rigid Pavement Surface Problems and Quick Guide for Maintenance and Repair of Common Flexible Pavement Surface problems.

- f. Deleted Tables 6-2 through 6-10 from previous release.
- g. Deleted "Pavement Maintenance Management Program" from appendices. Information has been moved to AC 150/5380-7, Airport Pavement Management Program (PMP).
- h. Deleted "Generic Specifications" and "Generic Typical Details" and replaced with typical repair procedures.
- i. Updated Bibliography.

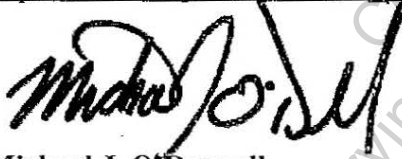
5. Related reading material. The publications in Appendix B, Bibliography, provide further guidance and technical information.

6. Metric units. Throughout this AC, U. S. customary units will be used followed with "soft" (rounded) conversion to metric units. The U. S. customary units govern.

7. Comments or suggestions for improvements to this AC should be sent to:

Federal Aviation Administration
Airport Engineering Division (AAS-100)
800 Independence Avenue, S.W.
Washington, DC 20591

8. Copies of this AC. This AC is available on the FAA Airport website:
http://www.faa.gov/regulations_policies/advisory_circulars/.



Michael J. O'Donnell
Director of Airport Safety and Standards

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Chapter 1. Introduction to Airport Pavement Maintenance

1.1. General.

This advisory circular (AC) provides information on the types of pavement distress that occur to airport pavements and typical corrective action during preventive and remedial maintenance activities. Maintenance includes preventive and any regular or recurring work necessary to preserve existing airport pavements in good condition. Replacing individual parts and mending portions of a pavement are considered minor repair. Typical preventive and regular or recurring pavement maintenance includes: routine cleaning, filling, and/or sealing of cracks; patching pavement; seal coating; grading pavement edges; maintaining pavement drainage systems; and restoring pavement markings. Timely maintenance and repair of pavements is essential in maintaining adequate load-carrying capacity, good ride quality necessary for the safe operation of aircraft, good friction characteristics under all weather conditions, and minimizing the potential for foreign object debris (FOD).

Some older pavements were not designed for today's aircraft fleet and are exposed to much greater loads than those initially considered. FAA airport pavement design is based upon a minimum 20-year structural life, with the understanding that regular, routine maintenance is performed. Without regular maintenance, the pavement may not achieve the intended structural life.

Airport pavements require continual routine maintenance, rehabilitation and upgrading. Immediately after completion, airport pavements begin a gradual deterioration attributable to weather and loading. Normal distresses in the pavement structure due to weathering, fatigue effects, and differential movement in the underlying subbase occur over a period of years. This gradual deterioration is accelerated by, among other things, faulty construction techniques, substandard materials, or poor workmanship. Traffic loads in excess of those forecast during pavement design may also contribute to shortened pavement life.

The most effective means of preserving airport runways, taxiways, aprons, and other pavement areas is to implement a comprehensive maintenance program. An effective maintenance program takes a coordinated, budgeted, and systematic approach to both preventive and remedial maintenance. A systematic approach ensures continual vigilance and many airports using this approach have experienced tangible benefits. The comprehensive maintenance program should be updated annually and feature a schedule of inspections and a list of required equipment and products. The airport should systematically make repairs and take preventive measures when necessary.

Airport Improvement Program (AIP) grants require many airports to develop and maintain an effective airport pavement maintenance-management program. The FAA also encourages airports that are not specifically required to develop maintenance programs to do so as a means of preserving their facilities. Refer to AC 150/5380-7, Airport Pavement Management Program (PMP), for information on PMP.

Early detection and repair of pavement defects is the most important preventive maintenance procedure. Failure to perform routine maintenance during the early stages of deterioration will

eventually result in serious pavement distresses that require extensive repairs that will be costly in terms of dollars and closure time. The cause of pavement distresses must first be determined so an airport can select a repair method that not only corrects the present damage, but will also prevent or retard its progression.

Airports should prioritize long term solutions rather than focusing on immediate, short-term remedies. The selection of a rehabilitation method should consider both economic and engineering impacts of all practicable alternatives. The cost of rehabilitation alternatives should be compared over some finite period of time (life cycle), considering the future economic consequences of a repair method as well as the initial rehabilitation maintenance costs.

1.2. Operational safety on airports during construction.

Airports are complex environments, and procedures and conditions associated with construction and maintenance activities often affect aircraft operations and can jeopardize operational safety. Safety considerations are paramount and may make operational impacts unavoidable. However, careful planning, scheduling, and coordination of construction and maintenance activities can minimize disruption of normal aircraft operations and avoid situations that compromise the airport's operational safety. An airport operator has overall responsibility for all activities on an airport, including construction and maintenance. The airport operator must understand how construction and maintenance activities and aircraft operations affect one another to be able to develop an effective plan to complete the project.

An effective project construction safety and phasing plan (CSPP) should be developed for maintenance activities. The development of the CSPP includes identifying the areas of the airport affected by the project; the impact to normal airport operations, if any, and any temporary changes that are required with respect to air traffic operations, aircraft rescue and fire fighting (ARFF) or other operations; and how risk will be managed. AC 150/5370-2, Operational Safety on Airports During Construction, provides additional information and guidance about safety on airports during construction.

Chapter 2. Airport Pavements

2.1. General.

This chapter is a very general and brief overview of airport pavements. Airport pavements are designed, constructed, and maintained to support the critical loads imposed by aircraft. Airport pavements produce a firm, stable, smooth, skid-resistant, all-year, all-weather surface free of debris or other particles that may be blown or picked up by propeller wash or jet blast. The quality and thickness of the pavement must ensure the pavement will not fail under the imposed loads and the pavement must be durable enough to withstand the abrasive action of traffic, adverse weather conditions, and other deteriorating influences. To ensure the necessary strength of the pavement and to prevent unmanageable distresses from developing, the airport should consider various design, construction, and material-related parameters. For guidance and design standards for pavements, refer to AC 150/5320-6, Airport Pavement Design and Evaluation. For materials and methods for construction of airports, refer to AC 150/5370-10, Standards for Specifying Construction of Airports. The ACs are available at http://www.faa.gov/regulations_policies/advisory_circulars/.

2.2. Types of pavements.

Pavements generally fall into two types: flexible and rigid. Figure 2-1 shows a typical pavement structure and acceptable materials for each layer.

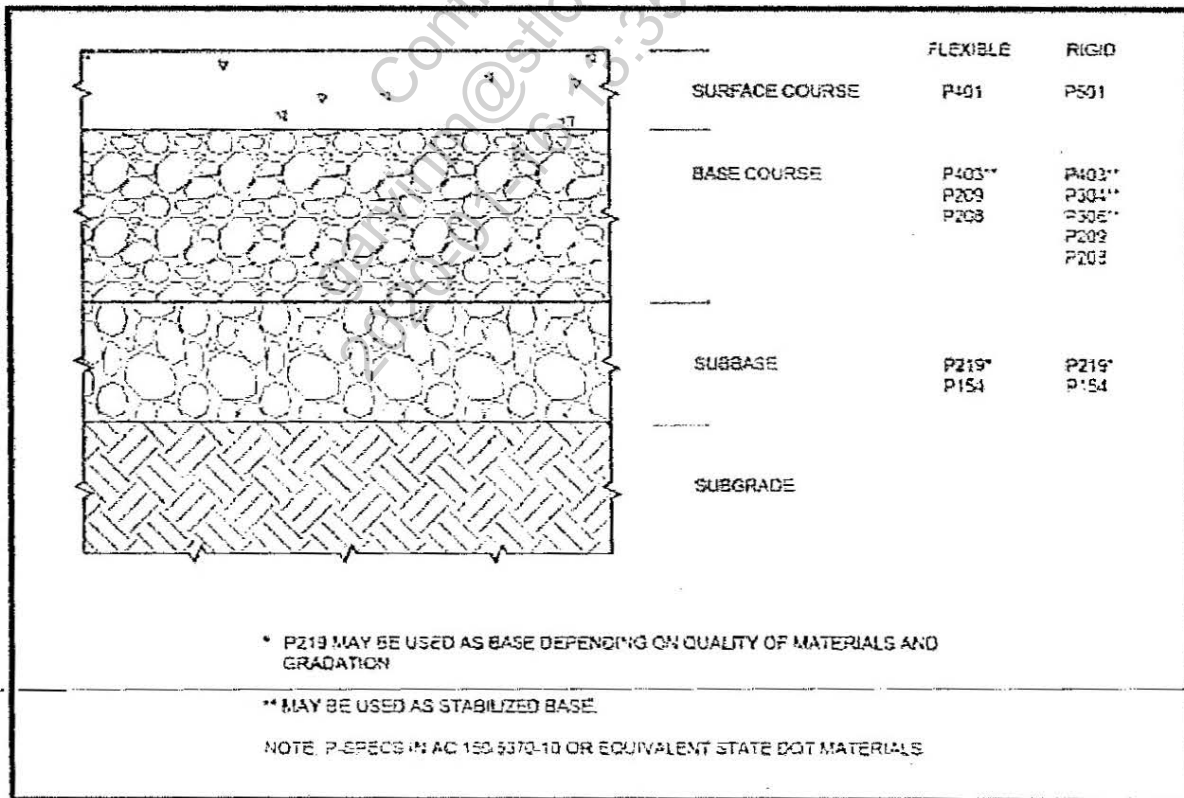


Figure 2-1. Typical pavement structure

2.2.1. Flexible pavement composition and structure. Flexible pavements support loads through bearing. They comprise several layers of carefully selected materials designed to gradually distribute loads from the pavement surface to the layers underneath. The design ensures the load transmitted to each successive layer does not exceed the layer's load-bearing capacity. The various layers composing a flexible pavement section and the functions the various layers perform are described below.

a. Bituminous surface (wearing course). The bituminous surface, or wearing course, is made up of a mixture of various selected aggregates bound together with asphalt cement or other bituminous binders. The material used in the surface course is commonly referred to as Hot-Mix Asphalt (HMA). The HMA prevents the penetration of surface water into the base course; provides a smooth, well-bonded surface free from loose particles, which might endanger aircraft or people; resists the stresses caused by aircraft loads; and supplies a skid-resistant surface without causing undue wear on tires.

b. Base course. The base course serves as the principal structural component of the flexible pavement. It distributes the imposed wheel load to the pavement foundation, the subbase, and/or the subgrade. The base course must have sufficient quality and thickness to prevent failure in the subgrade and/or subbase, withstand the stresses produced in the base itself, resist vertical pressures that tend to produce consolidation and distortion of the surface course, and resist volume changes caused by fluctuations in its moisture content. The quality of the base course is a function of its composition, physical properties, and compaction of the material. The materials composing the base course are select hard, durable aggregates, which generally fall into two main classes: stabilized and granular. The stabilized bases normally consist of crushed or uncrushed aggregate bound with a stabilizer, such as portland cement or asphalt cement. The granular bases normally consist of crushed or uncrushed aggregate constructed on a prepared subgrade.

c. Subbase. The subbase layer is used in areas where frost action is severe or the subgrade soil is weak. The subbase course functions like the base course, but the material requirements for the subbase are not as strict as those for the base course because the subbase is subjected to lower load stresses. The subbase consists of stabilized or properly compacted granular material.

d. Subgrade. The subgrade is the soil layer that forms the foundation of the pavement section. Subgrade soils are subjected to lower stresses than the surface, base, and subbase courses. Since load stresses decrease with depth, the controlling subgrade stress usually lies at the top of the subgrade. The combined thickness of subbase, base, and surface course must be great enough to reduce the stresses occurring in the subgrade to values that will not cause excessive distortion or displacement of the subgrade soil layer.

2.2.2. Rigid pavement composition and structure. Rigid pavements support loads through flexural action. Rigid pavements normally use portland cement concrete (PCC) as the prime structural element. Depending on conditions, engineers may design the PCC pavement slab with plain, lightly reinforced, continuously reinforced, or pre-stressed concrete. The PCC pavement slab is usually placed on a compacted granular or treated subbase supported by a compacted subgrade. The subbase provides uniform stable support and may provide subsurface drainage. The PCC pavement slab has considerable flexural strength and spreads the applied loads over a

large area. Rigid pavement strength is most economically built into the PCC pavement slab itself with optimum use of low-cost materials under the slab. The various layers composing a rigid pavement section and the functions the various layers perform are described below.

- a. **PCC pavement slab (surface course).** The PCC pavement slab provides structural support to the aircraft, provides a skid-resistant surface, and prevents the infiltration of surface water into the subbase.
- b. **Base.** The base provides uniform stable support for the pavement slab. The base also serves to control frost action, provide subsurface drainage, control swelling of subgrade soils, provide a stable construction platform for rigid pavement construction, and prevent pumping of fine-grained soils. Rigid pavements generally require a minimum base thickness of 4 inches (10 cm).
- c. **Stabilized base.** All new rigid pavements designed to accommodate aircraft weighing 100,000 pounds (45,000 kg) or more must have a stabilized base. The structural benefit imparted to a pavement section by a stabilized base is reflected in the modulus of subgrade reaction assigned to the foundation.
- d. **Subbase.** The subbase layer is used in areas where frost action is severe or the subgrade soil is weak. The subbase course functions like the base course, but the material requirements for the subbase are not as strict as those for the base course because the subbase is subjected to lower load stresses. The subbase consists of stabilized or properly compacted granular material.
- e. **Subgrade.** The subgrade is the soil layer that forms the foundation of the pavement section. Subgrade soils are subjected to lower stresses than the surface and subbase courses. These stresses decrease with depth, and the controlling subgrade stress is usually at the top of the subgrade unless unusual conditions exist. Unusual conditions, such as a layered subgrade or sharply varying water content or densities, may change the locations of the controlling stress. The soils investigation should check for these conditions. The pavement structure above the subgrade must be capable of reducing stresses imposed on the subgrade to values that are low enough to prevent excessive distortion or displacement of the subgrade soil layer.

2.3. Drainage of airport pavements.

Maintenance of the airport drainage system is essential in airport pavement preventive maintenance. No other factor plays a more important role in the ability of a pavement to withstand the effects of weather and traffic. The drainage system collects and removes surface water runoff, removes excess ground water, lowers the water table, and protects slopes from erosion. An inadequate drainage system can cause saturation of the subgrade and subbase, slope erosion, and loss of the load-bearing capacity of the paved surfaces.

Water has a detrimental effect on pavement performance, primarily by either weakening subsurface materials or eroding material by free water movement. For flexible pavements, the weakening of the base, subbase, or subgrade when saturated with water is one of the main causes of pavement failures. In rigid pavement, free water, trapped between the concrete surface and an impermeable layer directly beneath the concrete, will move due to pressure caused by loadings. This movement of water (referred to as pumping) erodes the subsurface material, creating voids

under the concrete surface. In frost areas, subsurface water will contribute to frost damage by heaving during freezing and loss of subgrade support during thawing. Poor subsurface drainage can also contribute to secondary damage such as durability cracking (D cracking) or swelling of subsurface materials.

The type, speed, and volume of traffic will influence the criteria used in the design of pavement drainage systems. For rigid pavements, pumping is greatly increased as the volume and speed of the traffic increases. For flexible pavements, the buildup of pore pressures as a result of high-volume, high-speed traffic is a primary cause of the weakening of the pavement structure. For these reasons, the criteria for a subsurface drainage system under airfield runways and taxiways will be more stringent than for airfield parking aprons or other pavements that have low-volume and low-speed traffic.

The two types of water to be considered are surface water and subsurface water. Surface water is the most important source of water and the source of most concern. Subsurface water is important in frost areas and areas of very high water table or areas of artesian water because the free water collects under the surface by freeze/thaw action. In many areas, perched water may develop under pavements due to a reduced rate of evaporation of the water from the surface. Where drainage is required for surface and subsurface water, it is generally good practice for each system to function independently.

a. Surface drainage. Surface drainage controls, collects, and disposes of water from rainstorms and melting snow and ice that accumulate on the surface of the pavement and nearby ground. Surface drainage of pavements is achieved by constructing the pavement surface and adjacent ground in a way that allows for adequate runoff. The water may be collected at the edges of the paved surface. Although some water will enter the pavement structure through cracks, open joints, and other surface openings, this penetration may be kept to a minimum by proper surface maintenance procedures. Surface water should not be allowed to enter a subdrainage system because it often contains soil particles that may cause the subdrains to silt up.

b. Subsurface drainage. Subsurface drainage is provided for the pavement by a permeable layer of aggregate or permeable stabilized layers with longitudinal pipes for collecting the water and outlet pipes for rapid removal of the water from the subsurface drainage system. Subsurface drains may also consist of perforated collection pipes or conduits in a permeable sand or gravel trench encased in geotextiles with outlet pipes. These systems remove excess water from pavement foundations to prevent weakening of the base and subgrade and to reduce damage from frost action. Subsurface drainage placed at the pavement edge also minimizes surface runoff from entering the perimeter of the pavement structure.

AC 150/5320-5, Airport Drainage Design, contains additional guidance and technical information on airport drainage.

2.3.1. Maintenance of subsurface drainage systems. Commitment to maintenance is as important as providing subsurface drainage systems. In fact, an improperly maintained drainage system can cause more damage to the pavement structure than if no drainage were provided at all. Poor maintenance leads to clogged or silted outlets and edge-drain pipes, missing rodent

screens, excessive growth of vegetation blocking outlet pipes and openings on daylighted bases, and growth of vegetation in side ditches. These problems can potentially cause the back up of water within the pavement system, thereby defeating the purpose of providing the drainage system. Inspections and maintenance of subsurface drainage systems should be made an integral part of the policy of any agency installing these systems.

2.3.2. Drainage inspection. The pavement maintenance program should take into account the importance of adequate drainage of surface and ground water because water is directly or partly responsible for many pavement failures and deterioration. Sufficient drainage for collection and disposal of surface runoff and excess ground water is vital to the stability and serviceability of pavement foundations. Trained personnel should conduct periodic and complete inspections of drainage systems and record and correct defective conditions of surface and subsurface drainage systems. Runway and taxiway edge drains and catch basins should be inspected at intervals (e.g., spring, summer, fall, and winter) and monitored following unusually heavy rainfall. The personnel making the inspection should look for distress signals that may indicate impending problems including: ponding of water; soil buildup at pavement edges preventing runoff; eroded ditches and spill basins; broken or displaced inlet grates or manhole covers; clogged or silted inlet grates and manhole covers; blocked subsurface drainage outlets; broken or deformed pipes; backfill settlement over pipes; erosion around inlets; generally poor shoulder shaping and random erosion; and discoloration of pavement at joints or cracks.

2.3.3. Wildlife hazard attractants and mitigation. Throughout the planning, design, construction, and maintenance of airport surface storm drainage and subsurface drainage systems the airport must emphasize and address the elimination and/or mitigation of drainage features in the project(s) that could attract hazardous wildlife on and/or around an airport. Refer to the following documents and sites for guidance on wildlife hazards at airports:

a. AC 150/5200-33, Hazardous Wildlife Attractants On or Near Airports, contains guidance on certain land uses that have the potential to attract hazardous wildlife on or near airports. The AC is available at: http://www.faa.gov/airports/resources/advisory_circulars/.

b. Wildlife Hazard Management at Airports, A Manual for Airport Personnel and additional information on wildlife issues can be found on the FAA Wildlife Hazard Mitigation website at: http://www.faa.gov/airports/airport_safety/wildlife/.

2.4. Pavement Management Program (PMP).

A PMP provides one method of establishing an effective maintenance and repair system. A PMP is a systematic and consistent procedure for scheduling maintenance and rehabilitation based on maximizing benefits and minimizing costs. A PMP not only evaluates the present condition of a pavement, but also can be used to forecast its future condition. By projecting the rate of deterioration, a PMP can facilitate a life-cycle cost analysis for pavement maintenance/repair procedures and help determine the best alternative.

The primary component of any PMP is the ability to track a pavement's deterioration and determine the cause of the deterioration. This requires an evaluation procedure that is objective, systematic, and repeatable. One such procedure is the Pavement Condition Index (PCI). The

PCI is a rating of the surface condition of a pavement and indicates functional performance. A PCI evaluation may also provide an indication of the pavement's structural performance. Periodic PCI determinations on the same pavement will show the change in performance level over time. Airports can use the pavement condition survey to develop pavement performance data. Distress intensity recorded over time helps determine how the pavement is performing. The rate at which the distress intensity increases is a good indicator of the pavement performance. The PCI is determined in accordance with procedures contained in ASTM D5340, Standard Test Method for Airport Pavement Condition Index Surveys. Refer to AC 150/5380-7 for additional information on PMP.

2.5. Friction.

Airports should maintain runway pavements that provide surfaces with good friction characteristics under all weather conditions. Over time, the skid-resistance of runway pavement deteriorates due to a number of factors, the primary ones being mechanical wear and polishing action from aircraft tires rolling or braking on the pavement and the accumulation of contaminants, chiefly rubber, on the pavement surface. The effect of these two factors is directly dependent upon the volume and type of aircraft traffic. Other influences on the rate of deterioration includes, but is not limited to, local weather conditions, the type of pavement (HMA or PCC), the materials used in original construction, any subsequent surface treatment, drainage, and airport maintenance practices.

AC 150/5320-12, Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces, provides guidance on frequency and procedures for conducting friction surveys. Visual observations made during a pavement inspection are an inadequate predictor of skid resistance.

Contaminants, such as rubber deposits, dust particles, jet fuel, oil spillage, water, snow, ice, and slush, all cause friction loss on runway pavement surfaces. Removal and runway treatment for snow, ice, and slush are covered in AC 150/5200-30, Airport Winter Safety and Operations. The most persistent contaminant problem is deposit of rubber from tires of landing jet aircraft. Rubber deposits occur at the touchdown areas on runways and can be quite extensive. Heavy rubber deposits can completely cover the pavement surface texture causing loss of aircraft braking capability and directional control, particularly when runways are wet.

2.6. Nondestructive Testing (NDT).

In addition to collecting information from visual inspections of the pavement areas and historical construction records, airports should consider collecting data from nondestructive testing. Such data may be used to evaluate the pavement load-carrying capacity. Refer to AC 150/5370-11, Use of Nondestructive Testing Devices in the Evaluation of Airport Pavements, for information on NDT.

Chapter 3. Pavement Distress

3.1. General.

This chapter provides a discussion and description of the types of pavement distress and relates them to likely causal factors. Various external signs or indicators make the deterioration of a pavement apparent, and often reveal the probable causes of the failure. AC 150/5380-7, ASTM D5340, and ASTM D6433, Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys, provide additional information on distresses.

3.2. Types of pavement distress.

The discussions of problems related to pavement distress are generally based on whether the pavement has a flexible or rigid surface type.

3.2.1. Flexible pavement distresses.

a. Cracking. Cracks in flexible pavements are caused by deflection of the surface over an unstable foundation, shrinkage of the surface, thermal expansion and contraction of the surface, poorly constructed lane joints, or reflection cracking. The following types of cracks commonly occur in flexible pavements.

(1) Longitudinal and transverse cracks. Longitudinal and transverse cracks may result from shrinkage or contraction of the HMA surface. Shrinkage of the surface material is caused by oxidation and age hardening of the asphalt material. Contraction is caused by thermal fluctuations. Poorly constructed paving lane joints may accelerate the development of longitudinal joint cracks. This type of cracking is not load associated.

(2) Block cracking. Block cracks are interconnected cracks that divide the pavement into approximately rectangular pieces. The blocks may range in size from approximately 1 foot by 1 foot (0.3 m by 0.3 m) to 10 feet by 10 feet (3 m by 3 m). Block cracking is caused mainly by contraction of the asphalt and daily temperature cycling that results in daily stress/strain cycling. It is not load associated. The occurrence of block cracking usually indicates that the asphalt has hardened significantly. Block cracking normally occurs over a large portion of pavement area, but sometimes will occur only in non-traffic areas. Block cracking differs from alligator cracking which is discussed in (4) below.

(3) Reflection cracking. Vertical or horizontal movement in the pavement beneath an overlay cause this type of distress. This movement may be due to expansion and contraction caused by temperature and moisture changes or traffic loads. The cracks in HMA overlays reflect the crack pattern or joint pattern in the underlying pavement. They occur most frequently in HMA overlays on PCC pavements. However, they may also occur on overlays of HMA pavements when cracks or joints in the old pavement have not been properly repaired.

(4) Alligator or fatigue cracking. Alligator or fatigue cracking is a series of interconnecting cracks caused by fatigue failure of the HMA surface under repeated traffic loading. The cracking begins at the bottom of the HMA surface (or stabilized base) where tensile stress and strain are highest under a wheel load. The cracks propagate to the surface

initially as a series of parallel cracks. After repeated traffic loading or excessive deflection of the HMA surface over a weakened or under-designed foundation or interlayer, the cracks connect, forming many sided sharp angled pieces that develop a pattern resembling chicken wire or alligator skin. The pieces are less than 2 feet (0.6 m) on the longest side.

(5) Slippage cracks. Slippage cracks appear when braking or turning wheels cause the pavement surface to slide and deform. This usually occurs when there is a low-strength surface mix or poor bond between the surface and the next layer of the pavement structure. These cracks are crescent or half-moon-shaped with the two ends pointing away from the direction of traffic.

b. Disintegration. Disintegration in a flexible pavement is typically caused by climate, insufficient compaction of the surface, insufficient asphalt binder in the mix, loss of adhesion between the asphalt coating and aggregate particles, or severe overheating of the mix. The following types of disintegration commonly occur.

(1) Raveling. Raveling is the wearing away of the pavement surface caused by the dislodging of aggregate particles. This distress may indicate that the asphalt binder has aged and hardened significantly. As the raveling continues, larger pieces break free, and the pavement takes on a rough and jagged appearance which can produce a significant source for FOD.

(2) Weathering. Weathering is the wearing away of the asphalt binder and fine aggregate matrix from the pavement surface. The asphalt surface begins to show signs of aging which may be accelerated by climatic conditions. Loss of fine aggregate matrix is noticeable and may be accompanied by fading of the asphalt pavement color.

(3) Potholes. A pothole is defined as a disruption in the pavement surface where a portion of the pavement material has broken away, leaving a hole. Most potholes are caused by fatigue of the pavement surface. As fatigue cracks develop, they interlock forming alligator cracking. When the sections of cracked pavement work loose, they may eventually be picked out of the surface by continued wheel loads, and form a pothole. In northern climates, where freeze-thaw cycles are severe, pothole development is exacerbated due to the continuous freeze-thaw action and may not be related solely to traffic patterns. Although possible, potholes are not a common distress to airfields.

(4) Asphalt stripping. Asphalt stripping is caused by moisture infiltration into the HMA pavement structure leading to "stripping" of the bituminous binder from the aggregate particles. Asphalt stripping of HMA pavements may also be caused by cyclic water-vapor pressures within the mixture scrubbing the binder from the aggregates.

(5) Jet blast erosion. Jet blast erosion is defined as a darkened area of pavement surface where the bituminous binder has been burned or carbonized. Localized burned areas may vary in depth up to approximately 1/2-inch (13 mm).

(6) Patching and utility cut patch. A patch is defined as an area where the original pavement has been removed and replaced by a filler material. Deterioration of a patch typically progresses at a higher rate than the original pavement. Deterioration of patch areas affects the ride quality and creates FOD potential.

c. Distortion. Distortion in flexible pavements is caused by foundation settlement, insufficient compaction of the pavement courses, a lack of stability in the bituminous mix, poor bond between the surface and the underlying layer of the pavement structure, and swelling soils or frost action in the subgrade. The following types of distortion commonly occur in flexible pavement.

(1) Rutting. A rut is characterized by a surface depression in the wheel path. In many instances, ruts become noticeable only after a rainfall when the wheel paths fill with water. This type of distress is caused by a permanent deformation in any one of the pavement layers or subgrade, resulting from the consolidation or displacement of the materials due to traffic loads.

(2) Corrugation. Corrugation results from a form of plastic surface movement typified by ripples across the surface. Corrugation can be caused by a lack of stability in the mix or a poor bond between material layers.

(3) Shoving. Shoving is the localized bulging of a pavement surface. It can be caused by lack of stability in the mix, shear movement at an interlayer, or lateral stresses produced by adjacent PCC pavement during expansion.

(4) Depressions. Depressions are localized low areas of limited size. Light depressions are typically only noticeable after a rain, when ponding creates "birdbath" areas. Depressions may result from heavier traffic than the pavement was designed for; localized settlement of the underlying pavement layers; or poor construction methods.

(5) Swelling. An upward bulge in the pavement's surface characterizes swelling. It may occur sharply over a small area or as a longer gradual wave. Both types of swelling may be accompanied by surface cracking. A swell is usually caused by frost action surrounding dissimilar material types in the subgrade or by swelling soil.

d. Loss of skid resistance. Factors that decrease the skid resistance of a pavement surface and can lead to hydroplaning include too much asphalt in the bituminous mix; too heavy a tack coat; poor aggregate which is subject to wear; paint; and buildup of contaminants. In flexible pavements, a loss of skid resistance may result from the following distresses.

(1) Polished aggregate. Aggregate polishing is caused by repeated traffic applications. Polished aggregate is present when the portion of aggregate extending above the asphalt is either very small, of poor quality, or there are no rough or angular particles to provide good skid resistance.

(2) Contaminants. Accumulation of rubber particles, oils, or other external materials on the pavement surface will reduce the skid resistance of a pavement. In addition, buildup of rubber deposits in pavement grooves will reduce the effectiveness of the grooves and increase the likelihood of hydroplaning.

(3) Bleeding. Bleeding is characterized by a film of bituminous material on the pavement surface that resembles a shiny, glass-like, reflecting surface that usually becomes quite sticky. It is caused by excessive amounts of asphalt binder in the mix and/or low air-void content. Bleeding occurs when asphalt binder fills the voids in the mix during hot weather and

then expands out onto the surface of the pavement. Bleeding may also result when an excessive tack coat is applied prior to placement of the HMA surface. Since the bleeding process is not reversible during cold weather, asphalt binder will accumulate on the surface. Extensive bleeding may cause a severe reduction in skid resistance.

(4) Fuel/oil spillage. Continuous fuel/oil spillage on a HMA surface will soften the asphalt. Areas subject to only minor fuel/oil spillage will usually heal without repair, and only minor damage will result.

3.2.2. Rigid pavement distresses.

a. Cracking. Cracks in rigid pavements often result from stresses caused by expansion and contraction or warping of the pavement. Overloading, loss of subgrade support, and insufficient and/or improperly cut joints acting singly or in combination are also possible causes. The following types of cracking typically occur in rigid pavements.

(1) Longitudinal, transverse, and diagonal cracks. A combination of repeated loads and shrinkage stresses usually causes this type of distress. It is characterized by cracks that divide the slab into two or three pieces that may indicate poor construction techniques, underlying pavement layers that are structurally inadequate for the applied load, or pavement overloads.

(2) Corner breaks. Load repetition, combined with loss of support and curling stresses, usually causes cracks at the slab corner. The lack of support may be caused by pumping or loss of load transfer at the joint. Corner breaks are characterized by a crack that intersects the joints at a distance less than or equal to one-half of the slab length on both sides, measured from the corner of the slab. A corner break differs from a corner spall in that the break extends vertically through the entire slab thickness; a corner spall intersects the joint at an angle.

(3) Durability "D" cracking. D cracking usually appears as a pattern of cracks running in the vicinity of and parallel to a joint or linear crack. It is caused by the concrete's inability to withstand environmental factors such as freeze-thaw cycles because of variable expansive aggregates. This type of cracking may eventually lead to disintegration of the concrete within 1 to 2 feet (0.3 m to 0.6 m) of the joint or crack.

(4) Shrinkage cracking. Shrinkage cracks are hairline cracks that are usually only a few feet long and do not extend across the entire slab. They are formed during the setting and curing of the concrete and usually do not extend through the depth of the slab. Typically, shrinkage cracks do not extend greater than 1/4-inch (6 mm) from the slab surface and may be primarily in the finished surface paste only.

(5) Shattered slab/intersecting cracks. A shattered slab is defined as a slab where intersecting cracks break up the slab into four or more pieces. This is primarily caused by overloading due to traffic and/or inadequate foundation support.

b. Joint seal damage. Joint seal damage is any condition that enables incompressible foreign material such as soil or rocks to accumulate in the joints or that allows infiltration of water. Accumulation of foreign materials prevents the slabs from expanding and may result in

buckling, shattering, or spalling. Water infiltration through joint seal damage can cause pumping or deterioration of the base. Typical types of joint seal damage include stripping of joint sealant, extrusion of joint sealant, hardening of the filler (oxidation), loss of bond to the slab edges, and absence of sealant in the joint. Joint seal damage is caused by improper joint width, use of the wrong type of sealant, incorrect application, not properly cleaning the joint before sealing, and/or climate (aging).

c. Disintegration. Disintegration is the breaking up of a pavement into small, loose pieces including the dislodging of aggregate particles. Improper curing and finishing of the concrete, unsuitable aggregates, and improper mixing of the concrete can cause this distress. Disintegration typically falls into the following categories.

(1) Scaling, map cracking, and crazing. Scaling is the disintegration and loss of the wearing surface. A surface weakened by improper curing or finishing and freeze-thaw cycles can lead to scaling. Map cracking or crazing refers to a network of shallow hairline cracks that extend only through the upper surface of the concrete. Crazing usually results from improper curing and/or finishing of the concrete and may lead to scaling of the surface.

(2) Alkali-Silica Reactivity (ASR). ASR is another source of distress associated with map cracking. ASR is caused by an expansive reaction between alkalis and certain reactive silica minerals, which forms a gel. The gel absorbs water, causing expansion, which may damage the concrete and adjacent structures. Alkalis are most often introduced by the portland cement within the pavement. ASR may be indicated by cracking of the concrete pavement (often in a map pattern); white, brown, gray or other colored gel or staining that may be present at the crack surface; and/or an increase in concrete volume (expansion) that may result in distortion of adjacent or integral structures or physical elements.

(3) Joint spalling. Joint spalling is the breakdown of the slab edges within 2 feet (0.6 m) of the side of the joint. A joint spall usually does not extend vertically through the slab but intersects the joint at an angle. Joint spalling often results from excessive stresses at the joint or crack caused by infiltration of incompressible materials or weak concrete at the joint (caused by overworking) combined with traffic loads. Joint spalling also results when dowels, which prevent slab movement, become misaligned either through improper placement or improper slippage preparation.

(4) Corner spalling. Corner spalling is the raveling or breakdown of the slab within approximately 2 feet (0.6 m) of the corner. It differs from a corner break in that the spall usually angles downward to intersect the joint, while a break extends vertically through the slab. The same mechanisms that cause joint spalling often cause corner spalling, but this type of distress may appear sooner because of increased exposure.

(5) Blowups. Blowups, although not common, usually occur at a transverse crack or joint that is not wide enough to permit expansion of the concrete slabs. Insufficient width may result from infiltration of incompressible materials into the joint space or by gradual closure of the joint caused by expansion of the concrete due to ASR. When expansive pressure cannot be relieved, a localized upward movement of the slab edges (buckling) or shattering will occur in the vicinity of the joint. Blowups normally occur only in thin pavement sections, although

blowups can also appear at drainage structures (manholes, inlets, etc.). The frequency and severity of blowups may increase with an asphalt overlay due to the additional heat absorbed by the dark asphalt surface. They generally occur during hot weather because of the additional thermal expansion of the concrete.

(6) Popouts. A popout is defined as a small piece of pavement that breaks loose from the concrete surface. This is caused by freeze-thaw action in combination with expansive aggregates and can be caused by ASR. Popouts usually range from approximately 1 to 4 inches (2.5 to 10 cm) in diameter and from 1/2 to 2 inches (1.3 to 5 cm) deep. A popout may also be caused by a singular piece of large aggregate that breaks loose from the concrete surface or caused by clay balls in the concrete mix.

(7) Patching. A patch is defined as an area where the original pavement has been removed and replaced by a filler material. Deterioration of a patch typically progresses at a higher rate than the original pavement. Patching is usually divided into two types:

(a) Small. A small patch is defined as an area less than 5 ft² (0.5 m²).

(b) Large and utility cuts. A large patch is defined as an area greater than 5 ft² (0.5 m²). A utility cut is defined as a patch that has replaced the original pavement due to placement of underground utilities.

d. Distortion. Distortion refers to a change in the pavement surface's original position, and it results from foundation settlement, expansive soils, frost-susceptible soils, or loss of fines through improperly designed subdrains or drainage systems. The following types of distortion generally occur.

(1) Pumping. The deflection of the slab when loaded may cause pumping, which is characterized by the ejection of water and underlying material through the joints or cracks in a pavement. As the water is ejected, it carries particles of gravel, sand, clay, or silt with it, resulting in a progressive loss of pavement support that can lead to cracking. Evidence of pumping includes surface staining and base or subgrade material on the pavement close to joints or cracks. Pumping near joints indicates poor joint-load transfer, a poor joint seal, and/or the presence of ground water.

(2) Settlement or faulting. Settlement or faulting is a difference in elevation at a joint or crack caused by upheaval or non-uniform consolidation of the underlying pavement layer(s) material. This condition may result from loss of fines, frost heave, or swelling soils.

e. Loss of skid resistance. Skid resistance refers to the ability of a pavement to provide a surface with the desired friction characteristics under all weather conditions. It is a function of the surface texture. Loss of skid resistance is caused by the wearing down of the textured surface through normal wear and tear or the buildup of contaminants.

(1) Polished aggregates. Some aggregates become polished quickly under traffic. Naturally polished aggregates create skid hazards if used in the pavement without crushing. Crushing the naturally polished aggregates creates rough angular faces that provide good skid resistance.

(2) **Contaminants.** Rubber deposits building up over a period of time will reduce the surface friction characteristics of a pavement. Oil spills and other contaminants will also reduce the surface friction characteristics. In addition, buildup of rubber deposits in pavement grooves will reduce the effectiveness of the grooves and increase the likelihood of hydroplaning.

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Chapter 4. Guidelines for Inspection of Pavements.

4.1. Introduction to pavement inspection.

Airports should prioritize the upkeep and repair of all pavement surfaces in the aircraft operating areas of the airport to help ensure safe aircraft operations. While deterioration of the pavements from usage and exposure to the environment cannot be completely prevented, a timely and effective maintenance program can minimize this deterioration. Adequate and timely maintenance is the greatest single means of controlling pavement deterioration. The failure of airport pavements and drainage features can be directly attributed to inadequate maintenance characterized by the absence of a vigorously followed inspection program. Maintenance, no matter how effectively carried out, cannot overcome or compensate for a major design or construction inadequacy, but it can prevent the total and possibly disastrous failure that can result from such deficiencies. Maintenance inspections reveal at an early stage where a problem exists and provide warning and sufficient time to perform corrective action. Postponement of minor maintenance may evolve into major pavement repairs. Visible evidence of excessive stress and/or environmental distress in pavement systems may include cracks, holes, depressions, and other types of pavement distresses. The formation of distresses in airport pavements may severely affect the structural integrity, ride quality, and safety of airport pavements. To alleviate the effects of distresses and to improve the airport pavement serviceability, airports should adopt an effective and timely inspection and maintenance program and adequate repair procedures.

Although there are numerous distress types associated with airfield pavements, a particular concern on airfield pavements is the possibility that pavement distress will generate loose material that may strike aircraft propellers or be ingested into jet engines. This loose material and the resulting damage are commonly labeled as FOD. FOD can cause considerable damage to an aircraft and increase the cost of maintaining the aircraft in a safe operating condition. More important, FOD can cause undetected damage to an aircraft, making it unsafe to operate. All pavement inspections should address the issue of FOD to minimize its potential hazard. AC 150/5210-24, Airport Foreign Object Debris (FOD) Management, provides guidance on reducing FOD hazards.

AC 150/5200-18, Airport Safety Self-Inspection, provides information on airport self-inspection operational items such as pavement areas, safety areas, markings, signs, lighting, aircraft rescue and fire fighting, fueling operations, navigational aids, ground vehicles, obstructions, public protection, hazard management, construction, and snow and ice control.

4.2. Inspection procedures.

Maintenance is an ongoing process and a critical responsibility of airport personnel. Effective maintenance programs require a series of scheduled, periodic inspections, conducted by experienced engineers, technicians, or maintenance personnel. These inspections must be controlled to ensure that each element or feature is thoroughly inspected, potential problem areas are identified, and proper corrective measures are recommended and implemented. The maintenance program must provide for adequate follow-up to ensure corrective work is expeditiously accomplished and recorded. The organization and scope of maintenance activities

will vary in complexity and degree from airport to airport, however, the general types of maintenance required will be similar.

4.2.1. Inspection schedules. The airport is responsible for establishing a schedule for regular and routine pavement inspections to ensure all areas are thoroughly inspected. Conditions that may adversely affect the pavement, such as severe weather, may necessitate additional inspections. Airport personnel should also solicit reports from airport users and conduct daily drive-by-type inspections.

4.2.2. Recordkeeping. The airport should prepare and maintain records of all inspections and maintenance performed. These records should document the existing distresses, locations, probable causes, remedial actions required, and any follow up inspections and maintenance required. Records of materials and equipment used for maintenance and repair work should also be kept on file for future reference. Periodic review of these references may help reduce maintenance costs and improve pavement performance. AC 150/5380-7, Airport Pavement Management Program (PMP), provides additional guidance.

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Chapter 5. Materials and Equipment

5.1. General.

Maintenance includes any regular or recurring work necessary to preserve existing airport pavements in good condition. Work typically involves the care or cleaning of existing airport pavement and incidental or minor pavement repair. Maintenance activities typically require a work crew of two to six people who are trained in the various repair techniques and who are familiar with the materials and equipment necessary to perform the routine pavement maintenance. Work requiring more staff is typically beyond the scope of normal maintenance activities. The following sections identify commonly used materials and equipment for normal maintenance activities. Additional information on materials and methods is also available in AC 150/5370-10. Equivalent state pavement specifications may also be used.

5.2. Common materials for maintenance and repair.

The materials listed below are commonly used for maintenance and repair of pavements.

5.2.1. Hot-mix asphalt (HMA). HMA is a blend of asphalt binder and well-graded, high-quality aggregates. The materials are mixed in a plant and placed and compacted while hot. HMA is used for construction of new airfield pavement and patching and overlay of airfield pavements. HMA for maintenance and repair should be equivalent or better than the existing pavement. P-401, Hot Mix Asphalt (HMA) Pavements or P-403, Hot Mix Asphalt (HMA) Pavements (Base, Leveling or Surface Course) in AC 150/5370-10; or equivalent state pavement specifications should be used.

5.2.2. Tack coat. A tack coat is a light application of emulsified asphalt applied to an existing pavement to provide a bond with an overlying course, such as a HMA overlay. A tack coat is also used on the sides of an existing pavement that has been cut vertically before patching. Asphalt emulsions are manufactured in several grades and are selected by the desired setting time. P-603, Bituminous Tack Coat in AC 150/5370-10 or equivalent state specifications may be used.

5.2.3. Crack and joint sealing material. Material for sealing cracks should meet ASTM standards for the type of pavement and service for which the sealant is intended.

a. ASTM D5893, Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements.

b. ASTM D6690, Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

c. ASTM D5249, Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints.

5.2.4. Crack filler material. Material for filling cracks should meet ASTM D5078, Standard Specification for Crack Filler, Hot-Applied, for Asphalt Concrete and Portland Cement Concrete Pavements.

5.2.5. Concrete. Concrete is a blend of portland cement, fine and coarse aggregate, and water, with or without additives. Concrete is used to repair a distressed portland cement concrete pavement so it may be used at its original designed capacity. P-501, Portland Cement Concrete Pavement in AC 150/5370-10 or equivalent state pavement specifications with non-reactive materials may be used.

5.2.6. Other materials and products. There are many other products available, such as epoxy resins and special concrete mixtures, that may be used for repair of pavements. The selection and use of these products must be in accordance with the manufacturers' requirements for the intended application. Local experience and conditions dictate acceptable products. State Departments of Transportation (DOTs) may also maintain list of materials that have performed well in a geographic area.

AC 150/5370-10 is another good source of information on materials and methods used for construction on airports.

5.3. Equipment for pavement maintenance.

There are many different types and models of equipment airports can use for pavement maintenance. Some commonly used pavement maintenance equipment include the following.

5.3.1. Power Saws. A pavement power saw is usually a one-person-operated, dolly-mounted unit with an abrasive circular blade. This type of saw can cut a straight line through flexible or rigid pavements and leave vertical sides. A random crack saw has a small diameter saw blade capable of tracking the crack.

5.3.2. Jackhammers. Jackhammers with chisel heads are commonly used for removal of existing pavement surfaces. Jackhammers must be used with caution to avoid damage to remaining pavement. Light, 30 pound (14 kg) or less, chipping hammers should be used to prepare partial depth repair patches.

5.3.3. Pavement grinders. A pavement grinder may be a one-person-operated, dolly-mounted unit with an abrasive cylindrical head 4 inches (10 cm) or more wide, or it may be variable-width diamond grinding equipment. Diamond grinding is a common rehabilitation technique used for tasks as varied as paint removal and pavement texturing.

5.3.4. Hand tools. Hand tools such as chisels, sledgehammers, shovels, pry bars, and picks can be used to remove deteriorated pavement. Rakes, lutes, and other such hand tools are used to move and level material placed in a patch area.

5.3.5. Front-end loaders and skid-steer loaders. Front-end loaders are useful when loading trucks with removed pavement. Skid-steer loaders are small versatile loaders that can be equipped with numerous attachments such as brooms or milling heads. Their small size and maneuverability make them ideal for maintenance activities.

5.3.6. Asphalt kettle. Asphalt kettles are usually small-tractor-mounted units that have the capacity to heat and store 40 to 500 gallons (150 to 2000 liters) of bituminous material. A pump forces the liquid material through spray nozzles located on a hand-held hose. These

units are used for priming and tacking on small jobs and for crack or surface sealing of HMA surfaces.

5.3.7. Vibratory plate compactors. Vibratory plate compactors are hand-operated units used to compact granular base or HMA plant-mix materials.

5.3.8. Vibratory and non-vibratory steel-wheel rollers. Steel-wheel rollers are used to compact material, including HMA in patchwork areas. Smaller rollers can be hand operated, while large rollers are self-powered.

5.3.9. Joint plow. A joint plow is used to remove old sealer from joints. This is usually a specially made tool attached to a small loader or tractor.

5.3.10. Joint router. A joint router is used to clear existing cracks or joints to be resealed. A router is usually a self-powered machine operating a rotary cutting tool. A rotary routing tool with a V-shaped end can be used for cleaning out random cracks. The use of a random crack saw is preferred for PCC pavements.

5.3.11. Random crack saw. A random crack saw is designed to follow irregular crack patterns in concrete and asphalt surfaces. The crack saw utilizes small diameter, dry-cut diamond blades in standard widths to create smooth sided cuts to prepare surfaces for proper crack filling. A center mounted blade configuration allows a crack saw to pivot about its own axis to more exactly follow random crack patterns easily.

5.3.12. Air compressor and sand blasting. Sand blasting may be used for final removal of old joint sealant, and is recommended for the final cleaning method for PCC surfaces prior to application of new sealant. Joints and cracks should be blown out with clean, dry compressed air immediately before applying new sealant. Air compressors must be equipped with oil and moisture traps to prevent contaminating the cleaned surface.

5.3.13. Pavement sweeper. A pavement sweeper can be used for cleaning the pavement surface and removing excess aggregate before and after repairs.

5.3.14. Heating kettle. A heating kettle is a mobile, indirect-fired double boiler used to melt hot-applied joint sealing material. It is equipped with a means to agitate and circulate the sealer to ensure uniform heating and melting of the entire charge in the kettle. Sealants may be applied to joints with an applicator attached directly to a pump unit on the kettle.

5.3.15. Pouring pot. A pouring pot, hand carried or mounted on a hand-pushed pot dolly, is used to pour hot sealing materials into a prepared crack or joint.

5.3.16. High-pressure water. High-pressure water, with the proper selection of spray nozzle and pressure, can be used to clean out joints prior to resealing and to clean vertical faces of pavement to be patched. Pressure should be monitored and controlled to the minimum necessary to minimize any damage to the remaining pavement.

5.3.17. Hot air lance. A hot air lance can be used to dry and heat cracks in existing bituminous material.

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Chapter 6. Pavement Repair Methods.

6.1. General.

This chapter describes various repair methods airports can use to correct airfield pavement distress. While these repair methods apply to specific types of distress and pavements, methods used should take into account the possibility of foreign object debris (FOD) damage to aircraft. FOD is defined as any object, live or not, located in an inappropriate location in the airport environment that has the capacity to injure airport or air carrier personnel and damage aircraft. FOD damage is any damage attributed to a foreign object that can be expressed in physical or economic terms, which may or may not downgrade the product's safety or performance characteristics. Repair activities may leave potential FOD at or near the repair sites. All maintenance activities must include quality control to assure that repairs are conducted properly and clean-up activities undertaken to remove FOD potential. AC 150/5210-24 provides additional guidance to help manage debris hazards associated with maintenance activities.

The first step in rehabilitating or preparing a pavement for repair is to identify the causes of distress. Then, the proper procedures for repairing - which will not only correct the damage, but also prevent or retard its further occurrence - may be applied. Pavement repairs should be made as quickly as possible after the need for them arises to help ensure continued and safe aircraft operations. Airports should perform repairs at early stages of distress, even when the distresses are considered minor. A delay in repairing pavements may allow minor distresses to progress into major failures. While deterioration of pavements due to traffic and adverse weather conditions cannot be completely prevented, maintenance and repair programs can significantly reduce the rate of deterioration and minimize the damage.

Weather conditions may limit repair measures undertaken to prevent further pavement damage. For example, rehabilitation by crack filling is more effective in cool and dry weather conditions, whereas pothole patches, seal coats, and other surface treatments require warm, dry weather for best results. This does not mean that resurfacing work cannot be performed under cold and damp conditions or that crack filling cannot be done in warm weather. Rather, these repairs just require much greater care when made during such periods. The procedures in Appendix A list the weather and temperature limitations for each repair procedure. When emergency pavement repairs are required and weather conditions exceed the procedure recommendations, the initial repair will be temporary and replaced as soon as weather conditions permit.

6.2. Repair methods for flexible pavements.

6.2.1. General. The selection of a repair method for flexible pavements will depend on the type of damage; climate; experience; and availability of materials among others. Table 6-1 summarizes some common problems and potential repair methods.

6.2.2. Crack repair. Cracks take many forms, such as longitudinal, transverse, block, alligator, slippage, and reflection cracks. For some, such as longitudinal and transverse cracks, simple crack filling may be the proper corrective action. Refer to Appendix A1 and Figure A-1 for crack repair in flexible pavement.

6.2.3. Partial and full depth repair. Some cracks may require partial or full depth repair of the damaged pavement. Partial depth repairs may be an alternative for pavements greater than 5 inches (13 cm) thick. Full depth repairs are typically required for pavement less than 5 inches (13 cm) thick. Refer to Appendix A2 and Figure A-2 for partial depth crack repair in flexible pavement. Refer to Appendix A3 and Figure A-3 for full depth crack repair in flexible pavement.

6.3. Repair methods for rigid pavements.

6.3.1. General. The selection of a repair method for rigid pavements will depend on the type of damage, climate, experience, and availability of materials among others. Table 6-2 summarizes some common problems and potential repair methods. Refer to Appendix A4 and Figure A-4 for a plan view of typical rigid pavement full depth repairs including a corner break; partial slab replacement; and full depth slab replacement.

6.3.1.1. Crack repair and joint sealing. Sealing cracks prevents surface moisture from entering the pavement structure. This type of repair may require establishing a sealant reservoir. A concrete saw is preferable to router equipment because a router can cause micro-cracks in the adjacent concrete pavement. Shrinkage cracks are non-structural and non-propagating cracks that are cosmetic and typically do not require repairs.

Refer to AC 150/5370-10, Items P-604 Compression Joint Seals for Concrete Pavements and P-605, Joint Sealants for Concrete Pavements for information and guidance on joint and crack sealants. A silicone sealant per ASTM D5893 can be used for edge joints between flexible and rigid pavements. Silicone should not be used to seal flexible pavement to flexible pavement joints.

6.3.1.2. Full depth repair. Full depth rigid pavement repair requires the complete removal of the damaged concrete pavement. The base and sub base material may also require repair if they are damaged during removal of the pavement or by water infiltration and subsequent pumping action.

a. Corner break. A corner break is a crack that intersects the joints of a slab at a distance less than or equal to one-half the slab length on both sides of the slab, measured from the corner of the slab. The crack extends vertically through the entire slab thickness. Load repetition combined with loss of support and curling stresses cause corner breaks. Refer to Appendix A5 and Figure A-5 for full depth repair of a corner break.

b. Partial slab replacement. Refer to Appendix A6 and Figure A-6 for partial slab replacement procedures.

c. Full slab replacement. Refer to Appendix A7 and Figure A-7 for full slab replacement procedures.

6.3.1.3. Partial depth repair

a. Joint spall repair. Joint spalling is the breakdown of the slab edges within 2 feet (0.6 m) of the side of the joint. A joint spall usually does not extend vertically through the slab,

intersecting the joint at an angle. Refer to Appendix A8 and Figure A-8 for joint spall repair procedures.

6.4. Temporary patching of rigid pavements.

Broken rigid pavement areas can be patched with flexible pavement as an interim measure. Full-depth HMA repairs will interrupt the structural integrity of the rigid pavement and may lead to additional failures. Such full-depth repairs are considered temporary, and corrective long-term repairs must be scheduled.

The minimum depth of repair for portland cement concrete should be 2 inches (5 cm). Repairs made thinner than 2 inches (5 cm) usually deteriorate quickly on an airfield pavement. (Most distresses needing repair will extend at least 2 inches (5 cm) into the pavement.) Rigid pavement repairs that are thinner than 2 inches (5 cm) may benefit from the use of epoxy materials.

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Table 6-1. Quick guide for maintenance and repair of common flexible pavement surface problems

| Problem | Repair | Probable Cause |
|---|---|---|
| Weathering/ Oxidation | <ul style="list-style-type: none"> - Apply surface treatment - Overlay | <ul style="list-style-type: none"> - Environment - Lack of timely surface treatments |
| Cracks | <ul style="list-style-type: none"> - Remove old sealer material if present - Clean and prepare cracks - Seal/reseal cracks - Joint heating may be an option for longitudinal cracks when under the direction of an engineer. (Operate heaters to avoid excessive heat on the pavement.) | <ul style="list-style-type: none"> - Age - Environmental conditions - Bitumen too hard or overheated in mix - Sealant defects (e.g., incorrect application temperature, improper sealant selection, improper crack preparation) |
| Alligator or fatigue cracking | <ul style="list-style-type: none"> - Remove and replace damaged pavement, including the base and/or subbase course if required. | <ul style="list-style-type: none"> - Base and/or Subgrade failure - Overload - Under-designed surface course (too thin) |
| Patches | <ul style="list-style-type: none"> - Remove/replace. - Repair and Resurface | <ul style="list-style-type: none"> - Inadequate/Improper repair detail/material - Age |
| Surface irregularities (e.g., rutting, wash-boarding, birdbaths) | <ul style="list-style-type: none"> - Remove and replace damaged areas - Surface grinding/milling | <ul style="list-style-type: none"> - Traffic - Age |
| Loss of Skid Resistance | <ul style="list-style-type: none"> - Remove rubber/surface contamination - Apply surface treatment | <ul style="list-style-type: none"> - Rubber deposits/surface contamination - Polished aggregate - Improper surface treatment |
| Bleeding | <ul style="list-style-type: none"> - Blot with sand and remove sand prior to resuming aircraft operations. Excessive bleeding may require removal and replacement of pavement. | <ul style="list-style-type: none"> - Overly rich mix/low air void content. Bleeding may be a precursor to other surface deformities forming, e.g., rutting, wash-boarding, etc. |
| Drainage | <ul style="list-style-type: none"> - Grade pavement shoulders, clear drainage path - Clean out drainage structures, e.g., edge drains, outfalls, etc. | <ul style="list-style-type: none"> - Poor maintenance of drainage facilities - Poor maintenance of grade |

Table 6-2. Quick guide for maintenance and repair of common rigid pavement surface problems

| Problem | Repair | Probable Cause |
|-------------------------|--|--|
| Joint sealant damage | - Remove old sealant, clean joints, reseal | - Age - Environmental conditions - Sealant defects (e.g., incorrect application temperature, improper sealant selection, improper joint preparation) |
| Cracks | - Clean and seal cracks - Repair/replace slab - Evaluate adequacy of pavement structure; may require strengthening | - Loss of slab support - Load repetition; curling stresses; and shrinkage stresses |
| Corner Breaks | - Seal and maintain until full depth patch | - Loss of slab support - Load repetition and curling stresses |
| Joint spalling | - Remove loose material; refill with approved product; reseal - Partial depth repair | - Latent defects, i.e., excessive finishing - Incompressible matter in joint spaces - Snow plow damage |
| Slab blowup | - Replace slab in blowup area; clean and reseal joints. | - Incompressible material in joints preventing slab from expanding |
| Loss of Skid Resistance | - Remove rubber/surface contamination. - Grinding. | - Rubber deposits/surface contamination - Age, i.e., surface wear |
| Drainage | - Grade pavement shoulders, clear drainage path - Clean out drainage structures, e.g., edge drains, outfalls, etc. | - Poor maintenance of drainage facilities - Poor maintenance of grade |
| Popouts | - Remove FOD | - Material |
| Patches | - Remove/replace | - Inadequate/Improper repair detail/material - Age |

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Appendix A. Repair Procedures

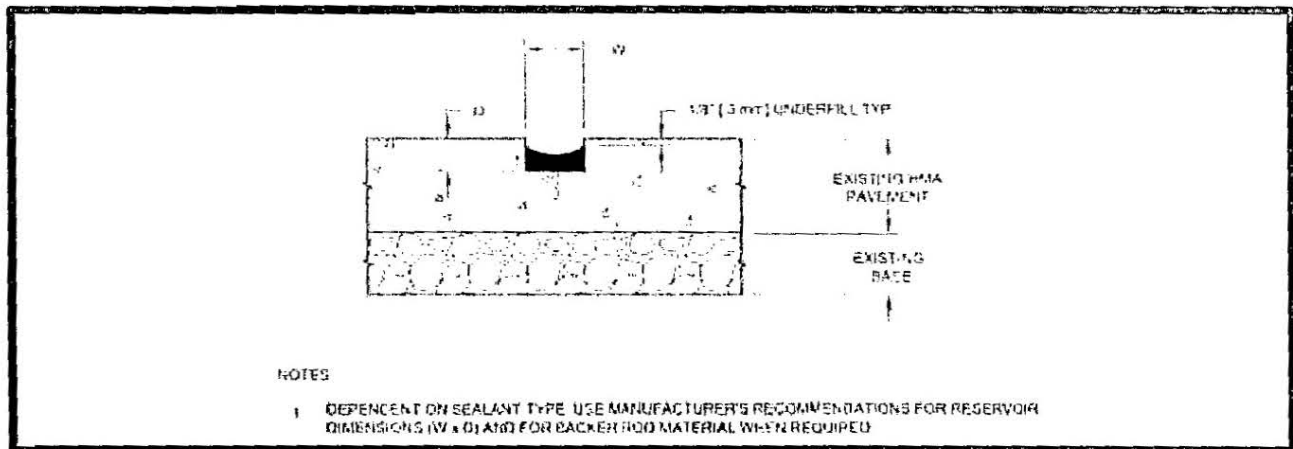
The following typical details and repair procedures are intended for use for minor maintenance repair of airport pavements. For major maintenance projects, the airport should utilize plans and specifications developed under the direction of a pavement design engineer.

For all maintenance and repair projects funded with federal grant monies through the Airport Improvement Program (AIP) and with revenue from the Passenger Facility Charge (PFC) Program, the airport must use the guidelines and specifications for materials and methods in AC 150/5370-10, Standards for Specifying Construction of Airports.

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A1. PROCEDURE FOR CRACK REPAIR OF FLEXIBLE PAVEMENT**Figure A-1. Crack repair of flexible pavement****WEATHER AND TEMPERATURE REQUIREMENTS**

- Do not begin crack repair during inclement weather.
- The pavement temperature should be 50°F (10°C) and rising or meet the manufacturer's recommendations at the time of application of the crack sealing material.
- Do not apply sealant if moisture is observed in the crack.

PREPARATION

To choose sealant:

- Consider your geographic area, climate, and past performance of the sealant
- Hot-applied sealants must meet the requirements of ASTM D6690
- Cold-applied sealants must meet the requirements of ASTM D977

REPAIR PROCEDURE

Use this procedure to repair cracks less than 1 inch (2.5 cm) in width in flexible pavements.

1. Review the construction safety and phasing plan (CSPP). Ensure all pavement closures have all required items in place, such as lighted Xs,

barricades, signs, etc.; and all NOTAMS have been issued for affected areas of the airfield.

2. Mark the limits of the area of crack repair.
3. Use an air compressor with an operable oil and water trap to clean all cracks with compressed hot air.
4. If necessary, saw or rout the cracks to the required width and depth. Use the sealant manufacturer's specifications to determine the sealant reservoir dimensions (W x D).
5. Inspect the cracks for proper width, depth, alignment, and preparation. Make sure the crack surface faces are dry.
6. To obtain the width and depth ratio required by the sealant manufacturer's specifications may require installation of backer rod. Make sure the backer rod:
 - Meets the requirements of ASTM D5249
 - Is compatible with the sealant
 - Is 25% larger in diameter than the width of the sealant reservoir
7. Apply the sealant uniformly from the bottom to the top of the crack avoiding voids or entrapping air.
8. Make sure the surface of the sealant remains ¼ inch to ⅜ inch (6 mm to 9 mm) below the existing pavement surface.
9. Do not allow traffic until the sealants have cured.
10. Completely clean the work area before opening to aircraft traffic.

MATERIAL REQUIREMENTS

| | |
|------------|---|
| ASTM D977 | Standard Specification for Emulsified Asphalt |
| 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 Pavements |

State Department of Transportation specifications for pavements

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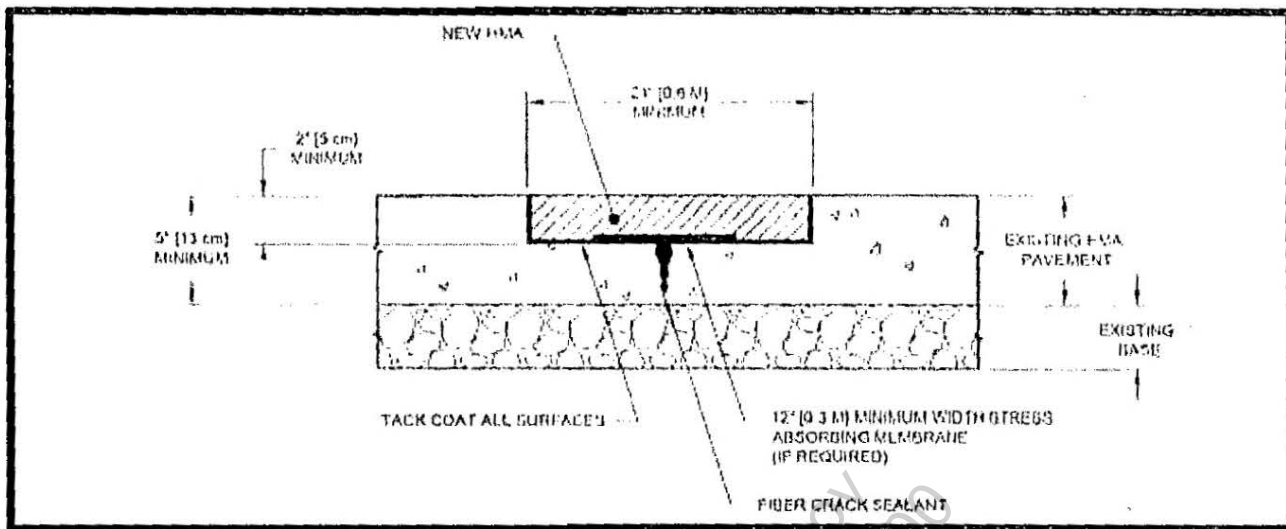
A2. PARTIAL DEPTH CRACK REPAIR IN FLEXIBLE PAVEMENT

Figure A-2. Partial depth crack repair in flexible pavement

WEATHER AND TEMPERATURE REQUIREMENTS

- Do not begin crack repair during inclement weather.
- HMA should not be placed upon a wet surface or when the surface temperature of the underlying course is less than 45°F (7°C).
- The pavement temperature should be 50°F (10°C) and rising or meet the manufacturer's recommendations at the time of application of the crack sealing material.
- Do not apply sealant if moisture is observed in the crack.

REPAIR PROCEDURE

Use this procedure to repair HMA Pavements that are 5 inches (13 cm) or greater in thickness with cracks greater than 1 inch (2.5 cm).

1. Review the construction safety and phasing plan (CSPP). Ensure all pavement closures have all required items in place, such as lighted Xs, barricades, signs, etc.; and all NOTAMS have been issued for affected areas of the airfield.
2. Mark the limits of the area of crack repair.
3. Saw cut or mill out an area 24 inches (0.6 m) wide by 2 to 3 inches (5 to 8 cm) deep centered on the crack. Extend the saw cut or mill out the area a minimum of 12 inches (30 cm) beyond the limits of the distressed pavement area.
4. Use an air compressor with an operable oil and water trap to clean all cracks with compressed hot air.
5. Fill the crack flush with fiber crack filler per the sealant manufacturer's specifications. Apply the sealant uniformly from the bottom to the top of the crack avoiding voids or entrapping air.
6. Apply a 12 inch (30 cm) repair membrane centered over the crack. (Installation of the membrane is optional.)
7. Apply a tack coat to the bottom and sides of the repair area. Make sure the tack meets the requirements of P-603 and ASTM D3628.
8. Fill the patch area with HMA equivalent or better than the existing pavement. Use P-401, P-403 or equivalent State DOT dense mix and compact to the minimum density specified.
9. Use a straight-edge to verify the patch is flush with adjacent pavement.
10. Do not allow traffic until the HMA has cured.
11. Completely clean the work area before opening to aircraft traffic.

MATERIAL REQUIREMENTS

| | |
|---|--|
| ASTM D977 | Standard Specification for Emulsified Asphalt |
| ASTM D3628 | Standard Practice for Selection and Use of Emulsified Asphalts |
| ASTM D6690 | Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements |
| P-401 | Hot Mix Asphalt (HMA) Pavements, AC 150/5370-10, Standards for Specifying Construction of Airports |
| P-403 | Hot Mix Asphalt (HMA) Pavements (Base, Leveling, or Surface Course), AC 150/5370-10, Standards for Specifying Construction of Airports |
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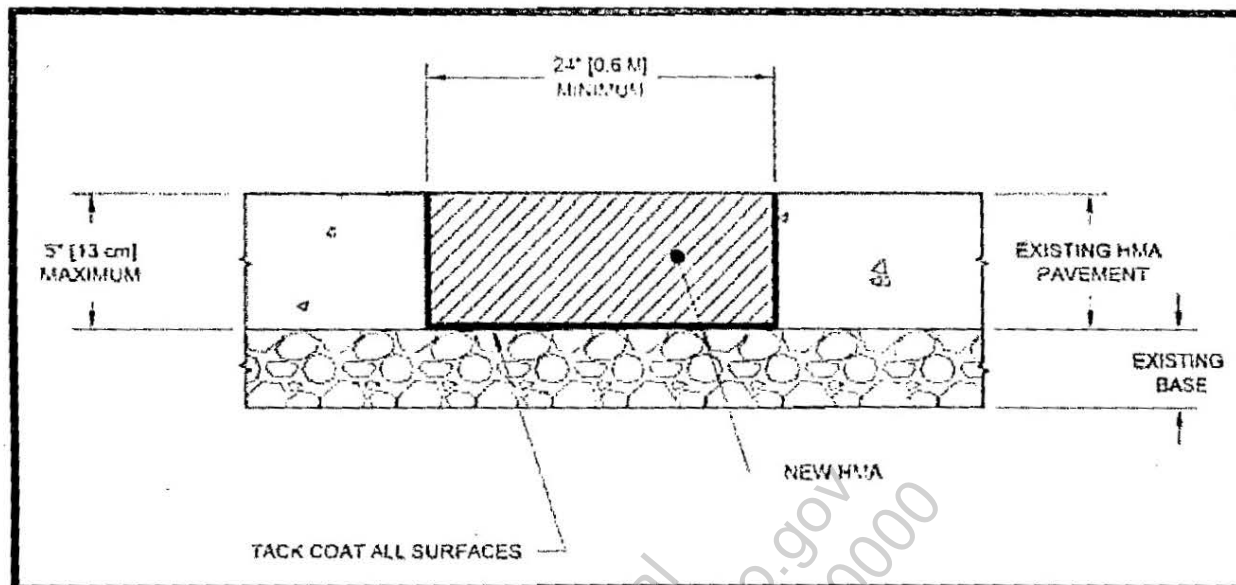
A3. FULL DEPTH CRACK REPAIR IN FLEXIBLE PAVEMENT

Figure A-3. Full depth crack repair in flexible pavement

WEATHER AND TEMPERATURE REQUIREMENTS

- Do not begin crack repair during inclement weather.
- HMA should not be placed upon a wet surface or when the surface temperature of the underlying course is less than 45°F (7°C).

REPAIR PROCEDURE

Use this procedure to conduct full depth repairs of flexible pavements and to repair cracks greater than 1 inch (2.5 cm) in flexible pavements 5 inches (13 cm) or less in thickness.

1. Review the construction safety and phasing plan (CSPP). Ensure all pavement closures have all required items in place, such as lighted Xs, barricades, etc.; and all NOTAMS have been issued for affected areas of the airfield.
2. Mark the limits of the area of crack repair.
3. Saw cut or mill out an area 24 inches (0.6 m) wide to the full depth of the HMA centered on the crack. Extend the saw cut or mill out an area a minimum of 12 inches (30 cm) beyond the limits of the distressed pavement area.
4. Repair and re-compact the base as necessary.
5. Apply a tack coat to the bottom and sides of the repair area. Make sure the tack meets the requirements of P-603 and ASTM D3628.
6. Fill the patch area with HMA equivalent to or better than the existing pavement. Use P-401, P-403 or equivalent State DOT dense mix and compact to the minimum density specified.
7. Use a straight-edge to verify that the patch is flush with adjacent pavement.
8. Do not allow traffic until HMA has cured.
9. Completely clean the work area before opening to aircraft traffic.

MATERIAL REQUIREMENTS

| | |
|------------|--|
| ASTM D977 | Standard Specification for Emulsified Asphalt |
| ASTM D3628 | Standard Practice for Selection and Use of Emulsified Asphalts |
| ASTM D6690 | Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements |
| P-401 | Hot Mix Asphalt (HMA) Pavements, AC 150/5370-10, Standards for Specifying Construction of Airports |
| P-403 | Hot Mix Asphalt (HMA) Pavements (Base, Leveling, or Surface Course), AC 150/5370-10, Standards for Specifying Construction of Airports |
| P-603 | Bituminous Tack Coat, AC 150/5370-10, Standards for Specifying Construction of Airports |

State Department of Transportation specifications for pavements

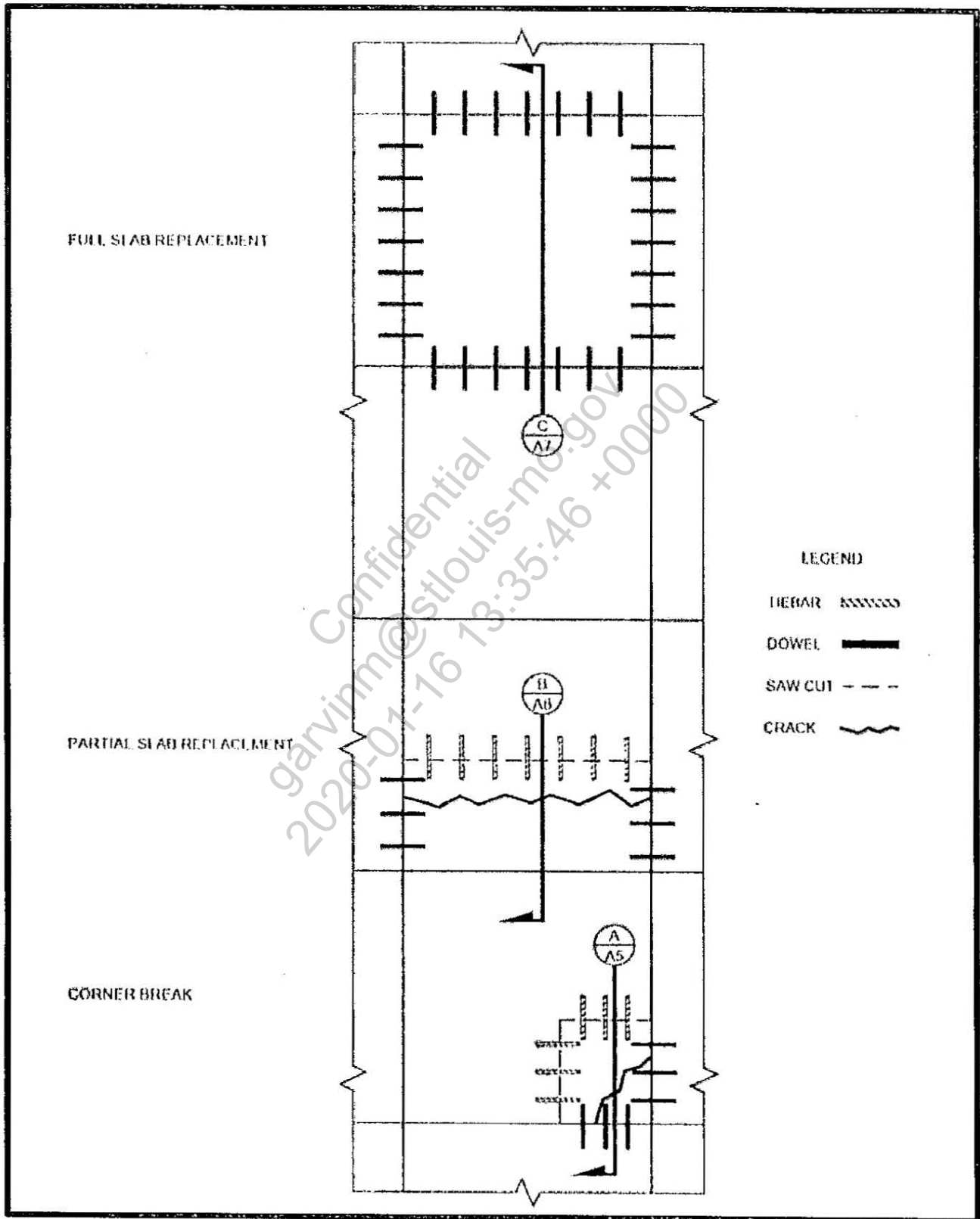
A4. RIGID PAVEMENT REPAIR – PLAN VIEW

Figure A-4. Rigid pavement repair – plan view

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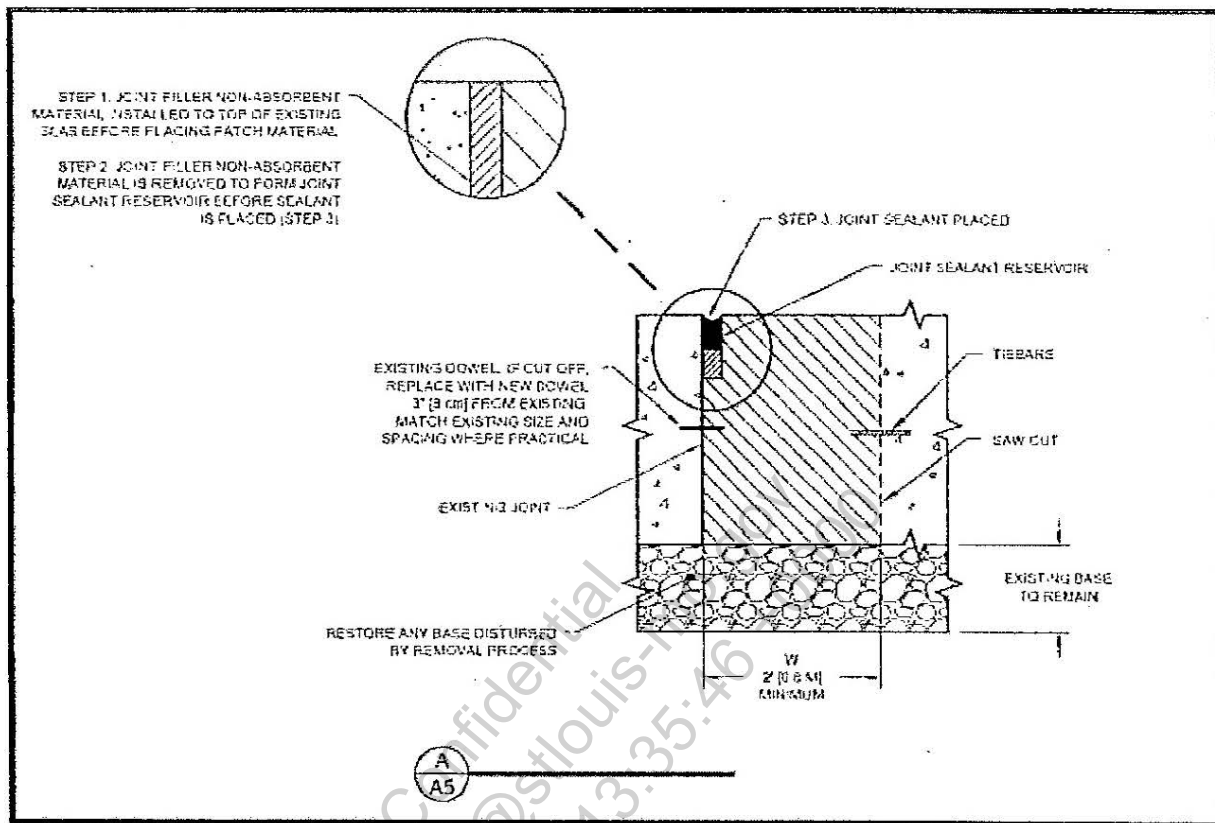
A5. FULL DEPTH REPAIR IN RIGID PAVEMENT – CORNER BREAK

Figure A-5. Full depth repair in rigid pavement – corner break

Repair Procedure and Weather and Temperature Requirements are on the back of this page.

MATERIAL REQUIREMENTS

| | |
|------------|--|
| ASTM A1078 | Standard Specification for Epoxy-Coated Steel Dowels for Concrete Pavement |
| ASTM A615 | Standard Specifications for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement |
| ASTM C309 | Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete |
| ASTM D6690 | Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements |
| P-501 | Portland Cement Concrete (PCC) Pavement, AC 150/5370-10, Standards for Specifying Construction of Airports |

State Department of Transportation specifications for pavements

WEATHER AND TEMPERATURE REQUIREMENTS

- Do not begin repairs during inclement weather.
- Do not place concrete unless the ambient temperature is at least 40°F (4°C) and rising and the concrete temperature is greater than or equal to 50°F (10°C).
- Do not place concrete on frozen base, ice, or snow.
- When the ambient temperature exceeds 85°F (29°C), sprinkle the adjacent concrete and base with water immediately before placing concrete.
- Place concrete at the coolest temperature practicable, and never allow the placed concrete temperature to exceed 90°F (32°C).

REPAIR PROCEDURE

1. Review the construction safety and phasing plan (CSPP). Ensure all pavement closures have all required items in place, such as lighted Xs, barricades, etc.; and all NOTAMS have been issued for affected areas of the airfield.
2. Mark the limits of the area to be repaired. For corner breaks the repair area should be square.
3. Make a full-depth saw cut along the constructed joints at least 2 feet (0.6 m) beyond the limits of the break and make saw cuts perpendicular to the constructed joints from these points until they intersect. See Figure A-4.
4. If dowels or tie bars are present along any edges, either of the following options is acceptable:
 - If dowels or tie bars will be exposed and saved, saw edges full depth just beyond the end of the dowels or tie bars. Carefully saw joints on the joint line to within 1 inch (2.5 cm) of the depth of the dowel or tie bar. Use light 30 pound (14 kg) or less jackhammers or other approved equipment to carefully break up and remove the narrow strips of concrete along the doweled edges.
 - If dowel or tie bars are cut and replaced, make a full depth saw cut along the constructed joint cutting the dowels and tie bars.
5. Take care to prevent damage to remaining dowels, tie bars, or concrete.
6. Use light weight equipment, i.e., jackhammers less than 30 pounds (14 kg), hand tools, etc., to remove the remaining damaged PCC pavement. Work from inside the saw cut toward the edge of the slab of the area being removed to prevent damage to the pavement remaining.
7. Remove by hand all loose material and vacuum to minimize any disturbance to the subgrade or base materials.
8. Restore subgrade or base material if required.
9. Install deformed tie-bars in each face of the parent panel by drilling horizontal holes into the face and using an epoxy bonding agent.
10. If existing dowel bars have been cut and removed, install new dowel bars of the type and size of the existing dowel bars in the joint that parallels the direction of traffic. On aprons and areas where traffic may be oblique to joints, install dowels in both joint faces.
11. Install dowels by drilling and epoxying into the PCC pavement at least 3 inches (8 cm) from the location of the existing dowels which were cut off. Space dowel bars at least 3 inches (8 cm) from the edge of the repair area and at least one bar spacing apart at corners of intersecting joints.
12. Oil the exposed ends of dowel bars prior to backfilling the repair area with concrete.
13. Install nonabsorbent board or other approved material within the limits of the joint seal reservoir (Step 1). The nonabsorbent board will be a standard ½ inch (13 mm) asphalt impregnated fiber-board or other approved material. For joints wider than ½ inch (13 mm), adjust the width of the nonabsorbent board to fit the joint width.
14. Fill the repair area with concrete and consolidate with a vibrator. Concrete should meet the requirements of P-501 or State DOT specifications for pavements.
15. Finish the surface to match existing pavement.
16. Spray with curing compound per ASTM C309.
17. Remove the nonabsorbent board (Step 2) and place joint sealant per ASTM D6690 and manufacturer's requirements (Step 3).
18. Do not allow traffic until the patch has cured.
19. Completely clean the work area before opening the pavement to aircraft traffic.

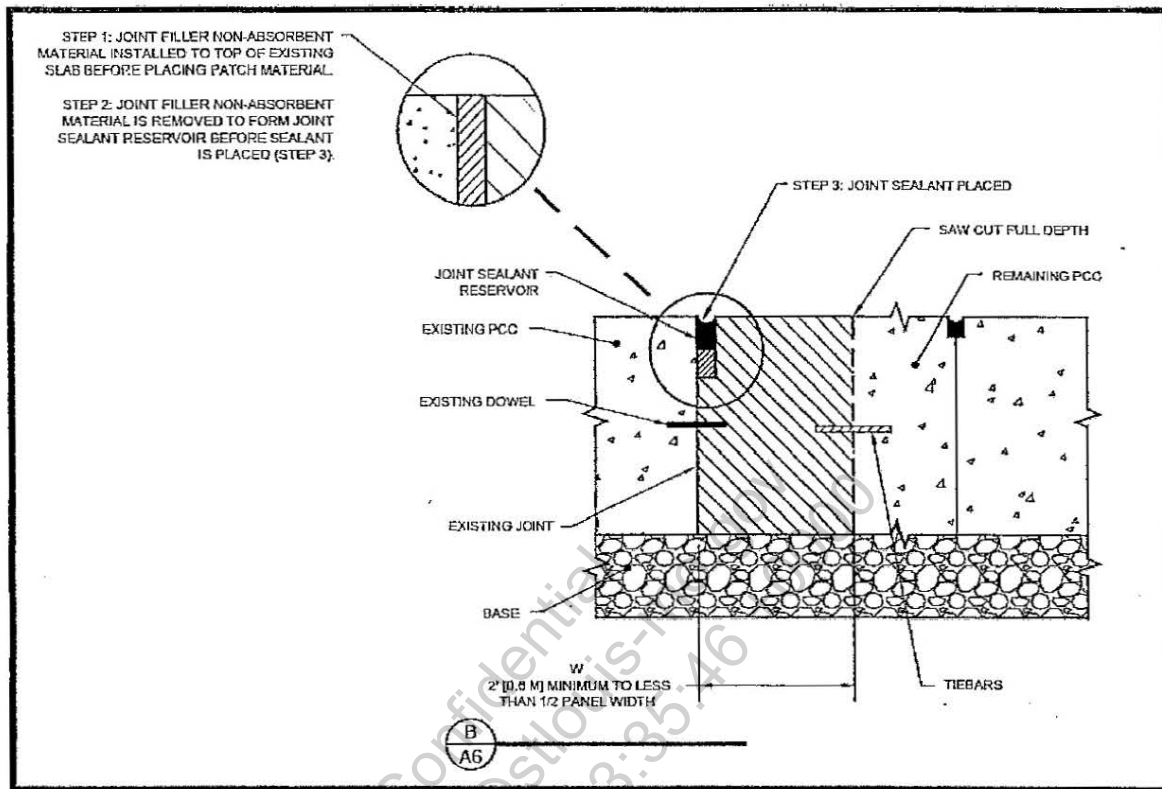
A6. FULL DEPTH REPAIR IN RIGID PAVEMENT – PARTIAL SLAB REPLACEMENT

Figure A-6. Full depth repair in rigid pavement – partial slab replacement

Repair Procedure and Weather and Temperature Requirements are on the back of this page.

MATERIAL REQUIREMENTS

| | |
|------------|--|
| ASTM A1078 | Standard Specification for Epoxy-Coated Steel Dowels for Concrete Pavement |
| ASTM A615 | Standard Specifications for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement |
| ASTM C309 | Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete |
| ASTM D6690 | Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements |
| P-501 | Portland Cement Concrete (PCC) Pavement, AC 150/5370-10, Standards for Specifying Construction of Airports |

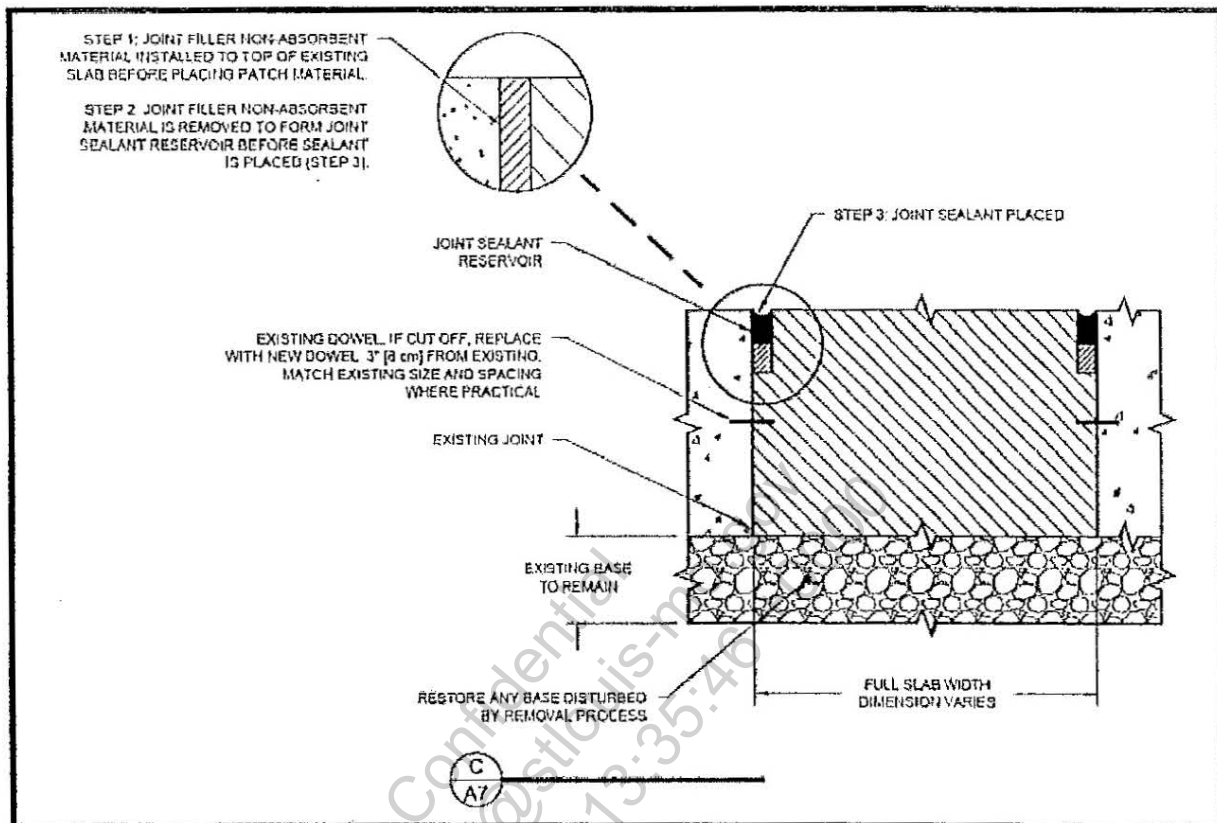
State Department of Transportation specifications for pavements

WEATHER AND TEMPERATURE REQUIREMENTS

- Do not begin repairs during inclement weather.
- Do not place concrete unless the ambient temperature is at least 40°F (4°C) and rising and the concrete temperature is greater than or equal to 50°F (10°C).
- Do not place concrete on frozen base, ice, or snow.
- When the ambient temperature exceeds 85°F (29°C), sprinkle the adjacent concrete and base with water immediately before placing concrete.
- Place concrete at the coolest temperature practicable, and never allow the placed concrete temperature to exceed 90°F (32°C).

REPAIR PROCEDURE

1. Review the construction safety and phasing plan (CSPP). Ensure all pavement closures have all required items in place, such as lighted Xs, barricades, etc.; and all NOTAMS have been issued for affected areas of the airfield.
2. Mark the limits of the area to be repaired.
3. Make a full-depth saw cut along the constructed joints at least 2 feet (0.6 m) beyond the limits of the damaged pavement and make a saw cut perpendicular to the constructed joints from these points across the width of the pavement panel. See Figure A-4.
4. If dowels or tie bars are present along any edges, either of the following options is acceptable:
 - If dowels or tie bars will be exposed and saved, saw edges full depth just beyond the end of the dowels or tie bars. Carefully saw joints on the joint line to within 1 inch (2.5 cm) of the depth of the dowel or tie bar. Carefully break up and remove the narrow strips of concrete along doweled edges using light 30 pound (14 kg) or less jackhammers, or other approved equipment.
 - If dowels or tie bars are to be cut and replaced, make a full depth saw cut along the constructed joint cutting the dowels and tie bars.
5. Take care to prevent damage to the dowels, tie bars, or to concrete that remains in place.
6. Make additional saw cuts within the limits of the repair area, dividing the repair area into quarters.
7. Use light weight equipment, i.e., jackhammers less than 30 pounds (14 kg), hand tools, etc., to remove the damaged PCC pavement. Work from inside the saw cut toward the interior of the area being removed to prevent damage to the pavement remaining.
8. Remove by hand all loose material and vacuum to minimize any disturbance to the subgrade or base materials.
9. Restore subgrade or base material if required.
10. Install deformed tie-bars in the face of the parent panel by drilling horizontal holes in to the face and using an epoxy bonding agent.
11. If existing dowel bars have been cut and removed, install dowel bars of the type and size of the existing dowel bars in the joints that are parallel to the direction of traffic. On aprons and areas where traffic may be oblique to joints, install dowels in both joint faces.
12. Install dowels by drilling and epoxying into the PCC pavement at least 3 inches (8 cm) from the location of the existing cut dowels. Space dowel bars at least 3 inches (8 cm) from the edge of the repair area and at least one bar spacing apart at corners of intersecting joints.
13. Oil the exposed ends of dowel bars prior to backfilling repair area with concrete.
14. Install nonabsorbent board or other approved material within the limits of the joint seal reservoir (Step 1). The nonabsorbent board will be a standard ½ inch (13 mm) asphalt impregnated fiber-board. For joints wider than ½ inch (13 mm), adjust the width of the nonabsorbent board to fit the joint width.
15. Fill the repair area with concrete and consolidate with a vibrator. Use concrete meeting the requirements of P-501 or State DOT specifications for pavements.
16. Finish the surface to match the existing surface.
17. Spray with curing compound per ASTM C309.
18. Remove the nonabsorbent board or other approved material (Step 2) and place joint sealant per ASTM D6690 (Step 3).
19. Thoroughly clean the work area before opening the pavement to aircraft traffic.
20. Do not allow traffic until the concrete has cured.

A7. FULL DEPTH REPAIR IN RIGID PAVEMENT – FULL SLAB REPLACEMENT**Figure A-7. Full depth repair in rigid pavement – full slab replacement**

Repair Procedure and Weather and Temperature Requirements are on the back of this page.

MATERIAL REQUIREMENTS

| | |
|------------|--|
| ASTM A1078 | Standard Specification for Epoxy-Coated Steel Dowels for Concrete Pavement |
| ASTM A615 | Standard Specifications for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement |
| ASTM C309 | Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete |
| ASTM D6690 | Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements |
| P-501 | Portland Cement Concrete (PCC) Pavement, AC 150/5370-10, Standards for Specifying Construction of Airports |

State Department of Transportation specifications for pavements

WEATHER AND TEMPERATURE REQUIREMENTS

- Do not begin repairs during inclement weather.
- Do not place concrete unless the ambient temperature is at least 40°F (4°C) and rising and the concrete temperature is greater than or equal to 50°F (10°C).
- Do not place concrete on frozen base, ice, or snow.
- When the ambient temperature exceeds 85°F (29°C), sprinkle the adjacent concrete and base with water immediately before placing concrete.
- Place concrete at the coolest temperature practicable, and never allow the placed concrete temperature to exceed 90°F (32°C).

REPAIR PROCEDURE

1. Review the construction safety and phasing plan (CSPP). Ensure all pavement closures have all required items in place, such as lighted Xs, barricades, etc.; and all NOTAMS have been issued for affected areas of the airfield.
2. Mark the limits of the area to be repaired.
3. Make a full-depth saw cut along the constructed joints at least 2 feet (0.6 m) beyond the limits of the damaged pavement and make a saw cut perpendicular to the constructed joints from these points across the width of the pavement panel.
4. If dowels or tie bars are present along any edges, either of the following options is acceptable:
 - If dowels or tie bars will be exposed and saved, edges will be sawed full depth just beyond the end of the dowels or tie bars. Carefully saw joints on the joint line to within 1 inch (2.5 cm) of the depth of the dowel or tie bar. Carefully break up the narrow strips of concrete along doweled edges using light 30 pound (14 kg) or less jackhammers, or other approved equipment.
 - If dowels or tie bars are to be cut and replaced, make a full depth saw cut along the constructed joint cutting the dowels and tie bars.
5. Take care to prevent damage to the dowels, tie bars, or to concrete that remains in place.
6. Make additional saw cuts within the limits of the repair area dividing the repair area into quarters.
7. Use light weight equipment, i.e., jackhammers less than 30 pounds (14 kg), hand tools, etc., to remove the damaged PCC pavement. Work from inside the saw cut toward the interior of the area being removed to prevent damage to the pavement remaining.
8. Remove by hand all loose material and vacuum to minimize any disturbance to the subgrade or base materials.
9. Restore subgrade or base material if required.
10. If existing dowel bars have been cut and removed, install dowel bars of the type and size of the existing dowel bars in the joints that are parallel to the direction of traffic. On aprons and areas where traffic may be oblique to joints, install dowels in both joint faces.
11. Install dowels by drilling and epoxying into the PCC pavement at least 3 inches (8 cm) from the location of the existing dowels which were cut off. Space dowel bars at least 3 inches (8 cm) from the edge of the repair area and at least one bar spacing apart at corners of intersecting joints.
12. Oil the exposed ends of dowel bars prior to backfilling repair area with concrete.
13. Install nonabsorbent board or other approved material within the limits of the joint seal reservoir (Step 1). The nonabsorbent board will be a standard ½ inch (13 mm) asphalt impregnated fiber-board. For joints wider than ½ inch (13 mm), adjust the width of the nonabsorbent board to fit the joint width.
14. Fill the repair area with concrete and consolidate with a vibrator. Use concrete meeting the requirements of P-501 or State DOT specifications for pavements.
15. Finish the surface to match the existing surface.
16. Spray with curing compound per ASTM C309.
17. Remove the nonabsorbent board or other approved material (Step 2) and place joint sealant per ASTM D6690 (Step 3).
18. Thoroughly clean the work area before opening the pavement to aircraft traffic.
19. Do not allow traffic until the concrete has cured.

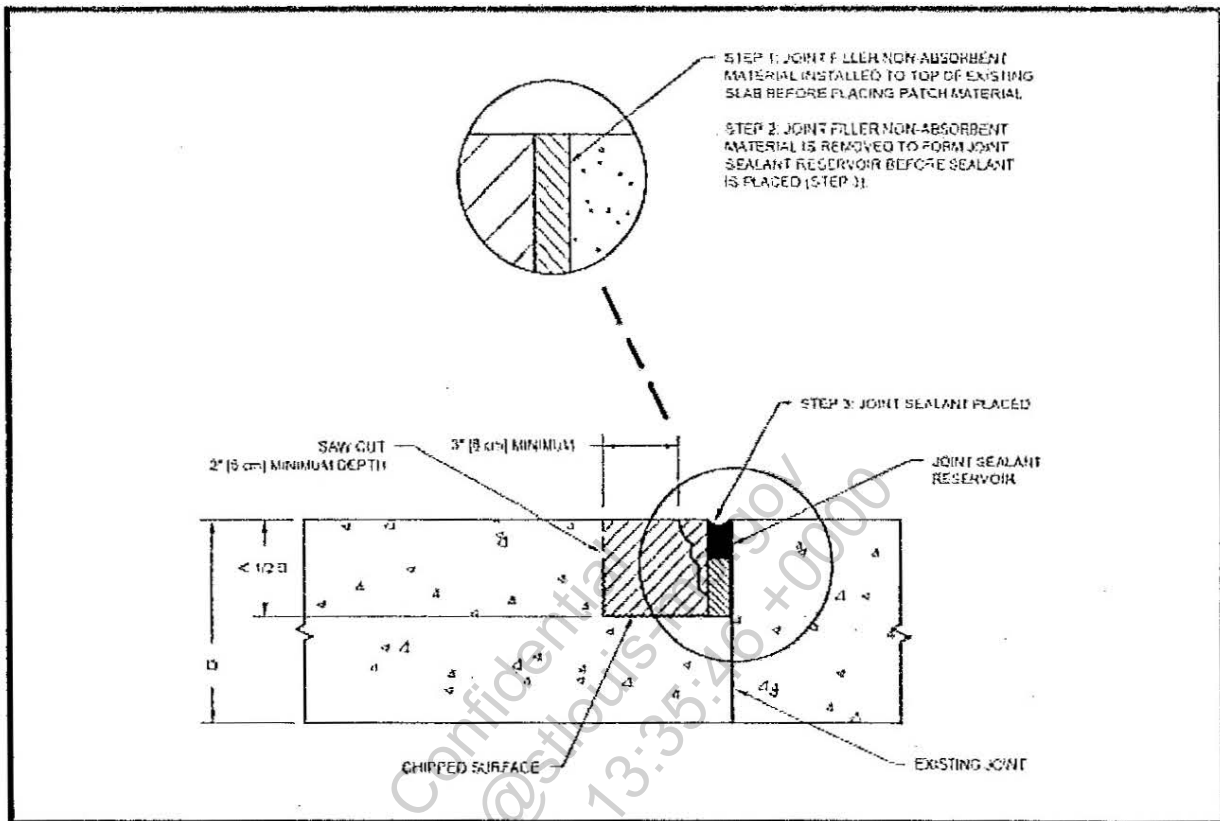
A8. JOINT SPALL REPAIR IN RIGID PAVEMENT

Figure A-8. Joint spall repair in rigid pavement

Repair Procedure and Weather and Temperature Requirements are on the back of this page.

MATERIAL REQUIREMENTS

| | |
|------------|--|
| ASTM C309 | Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete |
| ASTM C881 | Standard Specifications for Epoxy-Resin-Base Bonding Systems for Concrete |
| ASTM D6690 | Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements |
| P-501 | Portland Cement Concrete (PCC) Pavement, AC 150/5370-10, Standards for Specifying Construction of Airports |

State Department of Transportation specifications for pavements

WEATHER AND TEMPERATURE REQUIREMENTS

- Do not begin repairs during inclement weather.
- Do not place concrete unless the ambient temperature is at least 40°F (4°C) and rising and the concrete temperature is greater than or equal to 50°F (10°C).
- Do not place concrete on frozen base, ice, or snow.
- When the ambient temperature exceeds 85°F (29°C), sprinkle the adjacent concrete and base with water immediately before placing concrete.
- Place concrete at the coolest temperature practicable, and never allow the placed concrete temperature to exceed 90°F (32°C).

REPAIR PROCEDURE

1. Review the construction safety and phasing plan (CSPP). Ensure all pavement closures have all required items in place, such as lighted Xs, barricades, etc.; and all NOTAMS have been issued for affected areas of the airfield.
2. Mark the limits of the area of spall repair.
3. Make vertical saw cuts a minimum of 2 inches (5 cm) in depth and approximately 3 inches (8 cm) beyond the limit of the spall area. Saw cuts should be straight lines defining the perimeter of the spall repair area. The spall repair area should be a rectangular area.
4. When there are adjacent spall repair areas within a slab, the minimum distance between spall repair areas is 1-1/2 feet (45 cm). When spall repair areas are less than 1-1/2 feet (45 cm) apart, combine the spall repair areas into one repair. When the spall repair areas are greater than 1-1/2 feet (45 cm) apart, maintain separate spall repair areas.
5. Chip out and remove all unsound concrete and at least 1/2 inch (13 mm) of visually sound concrete between the saw cut and the joint, or crack.
6. Use light weight equipment, i.e., jackhammers less than 30 pounds (14 kg), hand tools, etc., to remove the damaged PCC pavement. Work from inside the saw cut toward the joint to prevent damage to the remaining pavement.
7. Remove all loose material by hand and vacuum to minimize any damage to the remaining pavement.
8. Clean the spall repair area with high-pressure water.
9. Place nonabsorbent board or other approved material (Step 1) in the existing joint and form a new joint sealant reservoir adjacent to the repair area. Maintain the joint through the full depth of the spall repair and prevent a bond between the patch and the adjacent slab.
10. Prepare the surface of the joint repair area in accordance with the manufacturer's recommendations for the material used for the repair. This may require treating the surface of the spall repair with a neat cement grout or a liquid bonding agent.
11. Place the patch.
12. Finish the patch to match the texture of the adjacent pavement.
13. Cure the patch in accordance with the material manufacturer's recommendations.
14. Remove the nonabsorbent board or other approved material from the joint (Step 2) and place joint sealant per ASTM D6690 (Step 3).
15. Protect the patch from traffic until the material has set.
16. Thoroughly clean the work area before opening the pavement to aircraft traffic.

Appendix B. Bibliography

1. American Concrete Pavement Association (ACPA), <http://www.acpa.org/>:
 - Guidelines for Full-Depth Repair (TB002P), 1995.
 - Guidelines for Partial-Depth Repair (TB003P), 1998.
 - Joint and Crack Sealing and Repair for Concrete Pavements (TB012P), 1993.
 - Diamond Grinding and Concrete Pavement Restoration (TB008P), 2000.
 - Concrete Pavement Restoration Guide: Procedures for Preserving Concrete Pavements (TB020P), 1998.
 - Concrete Repair Manual for Airfields (JP002P), 2003.
 - Concrete Crack and Partial-Depth Spall Repair Manual (JP003P), 2004.
2. The Asphalt Institute (AI), <http://www.asphaltinstitute.org/>:
 - Asphalt in Pavement Preservation and Maintenance, MS-16, 4th Edition.
 - The Basic Asphalt Emulsion Manual, MS-19, 4th Edition.
 - Asphalt Overlays for Highway and Street Rehabilitation, MS-17, 3rd Edition.
3. Advisory Circulars, http://www.faa.gov/airports/resources/advisory_circulars/:
 - AC 150/5200-18, Airport Safety Self-Inspection.
 - AC 150/5200-30, Airport Winter Safety and Operations.
 - AC 150/5200-33, Hazardous Wildlife Attractants On or Near Airports.
 - AC 150/5210-24, Airport Foreign Object Debris (FOD) Management.
 - AC 150/5320-5, Airport Drainage Design.
 - AC 150/5320-6, Airport Pavement Design and Evaluation.
 - AC 150/5320-12, Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces.
 - AC 150/5220-22, Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns.
 - AC 150/5370-2, Operational Safety on Airports During Construction.

- AC 150/5370-10, Standards for Specifying Construction of Airports.
 - AC 150/5370-11, Use of Nondestructive Testing Devices in the Evaluation of Airport Pavements.
 - AC 150/5380-7, Airport Pavement Management Program.
4. Unified Facilities Criteria (UFC), http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4:
- UFC 3-270-01, Asphalt Maintenance and Repair, 15 March 2001.
 - UFC 3-270-02, Asphalt Crack Repair, 15 March 2001.
 - UFC 3-270-03, Concrete Crack and Partial-Depth Spall Repair, 15 March 2001.
 - UFC 3-270-04, Concrete Repair, 15 March 2001.

Confidential
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Exhibit C
Affidavit
(Missouri Unauthorized Aliens Law)

Confidential
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2020-01-16 13:35:46 +0000

STATE OF Missouri)
)SS.
COUNTY OF Buchanan)

AFFIDAVIT

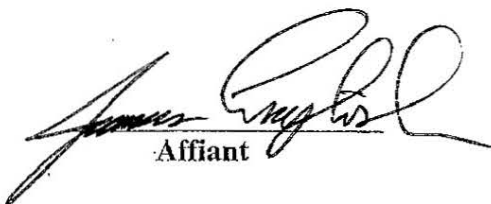
Before me, the undersigned Notary Public, personally appeared James English (Name of Affiant) who, by me being duly sworn, deposed as follows:

My name is James English (Name of Affiant), I am of sound mind, capable of making this Affidavit, and personally acquainted with the facts herein stated:

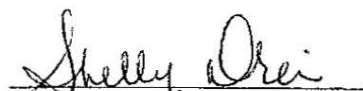
I am the Division Manager (Position/Title) of Scodeller Construction Inc (Contractor).

I have the legal authority to make the following assertions:

1. Scodeller Construction Inc (Contractor) is currently enrolled in and actively participates in a federal work authorization program with respect to the employees working in connection with Joint + Crack Sealing Services (the "Agreement"), as required pursuant to Sections 285.525 through 285.555 of the Revised Statutes of Missouri 2000, as amended.
2. Pursuant to Sections 285.525 through 285.555 of the Revised Statutes of Missouri 2000, as amended, Scodeller Construction Inc (Contractor) does not knowingly employ any person who is an unauthorized alien in connection with the Agreement.


Affiant

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my official seal this 8th day of August, 2016.


Notary Public

My Commission Expires: 5/31/17

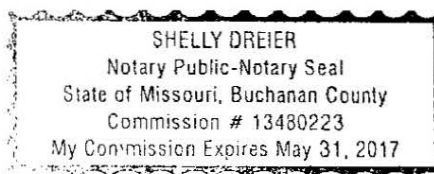


Exhibit D

**ST. LOUIS LIVING WAGE ORDINANCE
LIVING WAGE ADJUSTMENT BULLETIN**

**NOTICE OF ST. LOUIS LIVING WAGE RATES
EFFECTIVE APRIL 1, 2016**

In accordance with Ordinance No. 65597, the St. Louis Living Wage Ordinance ("Ordinance") and the Regulations associated therewith, the City Compliance Official for the City of St. Louis has determined that the following living wage rates are now in effect for employees of covered contracts:

- 1) Where health benefits as defined in the Ordinance are provided to the employee, the living wage rate is **\$12.60** per hour (130% of the federal poverty guideline for a family of three); and
- 2) Where health benefits as defined in the Ordinance are not provided to the employee, the living wage rate is **\$16.87** per hour (130% of the federal poverty guideline for a family of three, plus fringe benefit rates as defined in the Ordinance).
- 3) Fringe benefit rate defined under Chapter 6.20 of the Revised Code of the City of St. Louis: **\$4.27** per hour

These rates are based upon federal poverty level income guidelines as defined in the Ordinance and are effective as of **APRIL 1, 2016**. These rates will be further adjusted when the federal poverty guidelines are adjusted by the U.S. Department of Health & Human Services, or pursuant to Chapter 6.20 of the Revised Code of the City of St. Louis.

The Ordinance applies to employers who are covered by the Ordinance as defined in the Ordinance, where the contract or grant is entered into or renewed after the effective date of the Ordinance, which is November 3, 2002. A copy of the Ordinance may be viewed online at <https://www.stlouis-mo.gov/government/city-laws/ordinances/ordinance.cfm?ord=65597> or obtained from:

City of St. Louis Living Wage Program Office
St. Louis, Missouri
(314) 426-8106

Dated: February 5, 2016