REVISED

STATEMENT OF WORK

FOR THE

LANDSIDE PAVEMENT MAINTENANCE, REPAIR, AND MARKING SERVICES

AT

WASHINGTON DULLES INTERNATIONAL AIRPORT

AND

RONALD REAGAN WASHINGTON NATIONAL AIRPORT

Metropolitan Washington Airports Authority (MWAA)
Engineering and Maintenance Department (MA-220/MA-121)
Maintenance Engineering Division (MA-226/MA-120)

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I. INTRODUCTION

The Metropolitan Washington Airports Authority (Airports Authority) is responsible for the operations, repair, and maintenance of Washington Dulles International Airport (IAD) and Ronald Reagan Washington National Airport (DCA) in accordance with the airport safety standards and practices. It is imperative that all work adhere to the scope of work. The requirements in this SOW include, but are not limited to, the following items: repairs to bituminous and Portland cement concrete (PCC), restripping and pavement markings, curb, gutter and sidewalk repairs, soil stabilization, full-depth reclamation and crack sealing. These repairs also include incidental items associated with roadways and sidewalks outside of the Air Operations Area (AOA) at IAD and DCA.

II. DEFINITIONS

AIRPORT OPERATIONS AREA (AOA) - The AOA is the portion of the airport used or intended to be used for landing, takeoff, or land maneuvering of aircraft.

CONTRACTING OFFICER (CO) - The Contracting Officer (CO) is the individual responsible for executing all contractual aspects, such as the terms, scope, price, or conditions of this contract on behalf of the Airports Authority.

CONTRACTING OFFICER’S TECHNICAL REPRESENTATIVE (COTR) - The Contracting Officer’s Technical Representative (COTR) is an Airports Authority employee, designated by the Contracting Officer to ensure the terms of the contract are being met by the Contractor.

CONTRACTOR - Pertaining to this document, the word “CONTRACTOR” refers to the company awarded this contract. It also defines all personnel and subcontractor hired by the Contractor to perform any services specified within this contract.

CONTRACT SERVICE CALL ORDER - A document authorizing the contractor to perform services as outlined in the statement of work. For the purpose of this particular statement of work, the weekly schedule issued by the COTR shall be considered the contract call order.

FAA - Federal Aviation Administration.

FDR - Full Depth Reclamation

HMA - Hot Mixed Asphalt

METROPOLITAN WASHINGTON AIRPORTS AUTHORITY (MWAA) - Metropolitan Washington Airports Authority is the governing body which operates Washington Dulles International Airport. Also referred to as “the Airports Authority”.
O & I – Orders and Instructions

PCC – Portland Cement Concrete

QASP – Quality Assurance Surveillance Program

QUALITY ASSURANCE (QA) - Quality Assurance is a program used by the Airports Authority to ensure the Contractor is providing the services of this contract as defined by the contract specifications.

QUALITY CONTROL (QC) - Quality Control is a program designed by the contractor to monitor its performance in this contract to ensure services are provided on a consistent standard at all times.

SECURITY OFFICER - A Security officer is a person employed at the airport in a capacity to ensure a safe workplace. A Security officer can be a Police Officer, an employee of a Contractor hired to perform such services, or an Airport Operations Officer.

VDOT- Virginia Department of Transportation

III. STATEMENT OF WORK

The Contractor shall provide pavement maintenance and pavement marking services with all necessary labor, materials, tools, equipment with operator, and supervision to perform landside roadway, parking lot, sidewalk, curb and gutter and associated roadway incidental maintenance and repairs. The Contractor shall perform specified maintenance and repairs based on a contract service call order issued by the Contracting Officer’s Technical Representative (COTR). The COTR shall determine the type of repair for each contractor work assignment and issue a contract service call order to the Contractor. The COTR shall approve any changes to the contract service call order once it has been issued to the Contractor. Work tasks commonly associated with each repair or pavement marking service shall be the responsibility of the Contractor. These tasks include mobilization/demobilization, traffic control, and thorough clean up.

1. Work location, limits of construction, and work scope description shall be specified by the COTR prior to commencement of each work assignment, unless otherwise instructed by the COTR. All excavated and/or demolished material shall be removed and disposed of off airport property by the Contractor to an approved disposal site at the end of each workday.

2. The Contractor shall comply with all federal, state, and local rules and regulations governing the handling and disposal of excavated and/or demolished materials. It shall be the Contractor’s responsibility to verify and record existing lines, grades, and elevations prior to making any repairs. Areas disturbed by the Contractor outside the limits of construction shall be
restored to their original condition at the Contractor’s expense. All repair work shall be completed in accordance with the contract specifications.

3. At the end of each work day the Contractor shall fully complete a contractor work report that includes the quantity, location, and materials used. This report shall be submitted along with the invoice for payment and may be requested electronically at any time by the COTR.

4. Response Time - The Contractor shall respond to each Call Order within 48 hours of being issued. Scope of service, location, and the required completion time periods shall be specified on the Call Order. The response shall be directed to the COTR and include work plan information as to the expected time and date of work commencement and planned completion date. Call Orders issued shall be completed by planned completion date unless extended by the COTR. The Contractor shall be allowed exception to the time limit specified only for weather restrictions.

5. Call Order Procedure (DCA)

   a. Individual Call Orders will be developed as scopes of work are defined. The Contractor will be asked to prepare and submit a proposal for each call order. It is the intent of the Authority to negotiate fixed price call orders prior to the start of work. The unit rates in the Contract Section III, Schedule, shall be used as the basis for call order proposals. Services may be requested in an intermittent manner. The scope and complexity will vary widely.

   b. Call Order proposals shall be submitted with a detailed breakdown to permit analysis of all labor in accordance with Contract Section III, Schedule, as well as material, equipment, and subcontractor costs and markups for labor classifications not included in Section III, Schedule. If a classification is not listed in Section III, Schedule, the Contractor shall provide a detailed proposal as indicated in Contract Section VI, Special Provision 08, Additional Labor Rates and Markup.

   c. The Contractor's personnel shall report to the COTR whenever on the Airport for work. Prior to leaving the Airport, the foreman will submit a Daily Work Report listing each individual call order to the COTR for approval.

   d. The COTR will maintain the service log based of daily work reports submitted by the Contractor. The daily work report shall contain but not be limited to the following: call order number, number of workers on a task, their trades, units of work completed, description of the work taking place, material delivered, equipment used and any other information as requested by the COTR.
e. The Contractor shall designate a Superintendent to oversee the project site at all times. This person must coordinate all work activities with the COTR.

IV. CONTRACTOR MATERIAL AND PERFORMANCE REQUIREMENTS

Materials and services provided under this contract shall be performed in accordance with the current edition and revisions to the VDOT Road and Bridge Specifications manual, this document and MWAA’s current Design Manual.

1. Demolition of existing sidewalk and curbing shall be carried out as per Sections 508.01 & 508.02.

2. Excavation shall be done in accordance with Section 303, 303.01 - 303.05.

3. No. 21A stone shall be supplied in conformance with Sections 208, 208.01 - 208.06 and spread uniformly and compacted to 95 percent density in areas as directed by the COTR.

4. Pavement milling shall be accomplished by mechanical means specifically designed for pavement milling operations. Spoil material generated from the pavement milling operations shall be removed from the airport daily. Milling depth and pavement overlays shall be two inches unless otherwise directed by the COTR.

5. Pothole repair depth for bituminous pavement shall be up to six inches. Use approved plant-produced patching mixture as fill material for pothole repairs. Cold patch materials may be used as directed by the COTR. **Potholes on the DIAAH and other critical areas shall be repaired within a 48 hour period after reporting as directed by the COTR.** A separate line item will be provided for emergency pothole repairs.

6. For bituminous concrete pavement repairs see Exhibit BC-1, Bituminous Concrete Pavement and Repairs in this document and applicable sections of the current version of VDOT Road and Bridge Specifications. For overlays, the bituminous concrete surface (wearing) course shall be two inches thick and shall be VDOT Superpave Type SM12.5D or mix equivalent unless otherwise instructed by the COTR. All overlay materials shall conform to **Division II – Materials** in the current version and supplements of the VDOT Road and Bridge Specifications.

7. Portland cement concrete partial depth repairs shall follow Exhibit PCC-1, Portland Cement Concrete Partial Depth Repair. The Contractor shall be responsible for supplying the necessary water where an airport connection is not available. Joint sealing filler shall conform to applicable sections of the current version and supplements of the VDOT Road and Bridge Specifications.
8. Cold patch asphalt purchased and installed by the Contractor must be of a polymer modified cold asphalt base and be capable of being applied in wet conditions or in holes which have standing water. There are at least three known companies that provide this product. In no particular order they are International Roadway Research (Instant Road Repair), The EZ Street Company (EZ Street) and Proline Products LLC, (Proline Cold Asphalt). There may be more companies that provide this product and it is incumbent upon the Contractor to research.

9. Crack sealing of bituminous concrete surfaces shall follow Exhibit CS-1, Crack Sealing for Bituminous Concrete Pavement, Section 312- Seal Coat and other applicable sections in the current version and supplements of the VDOT Road and Bridge Specifications.

10. Curb, curb cut ramps, gutter, sidewalk, and apron repair shall follow Section 508 and other applicable sections in the current version and supplements of the VDOT Road and Bridge Specifications and Exhibit CSR-1, Curb and Sidewalk Repair.

11. Full-depth reclamation (FDR) is defined as those processes in which all of the asphalt pavement layers and some portion of the underlying unbound layers are pulverized, stabilized, and compacted in place. This is most commonly performed using hydraulic cement, lime, foamed asphalt or asphalt emulsion as the primary stabilizing additives and to a typical depth of 6 to 12 inches. FDR process shall comply with Exhibit FDR and meet the performance requirements specified herein.

12. Soil stabilization is a process for stabilizing weak and/or poorly compacted soils and leveling structures, including bridge approaches and departures by injecting a specially formulated polyurethane into soils. Foam injection and soil stabilization shall comply with Exhibit SJ-1 and meet the performance requirements specified herein.

13. In performing services under this contract, the Contractor shall maintain and control traffic in accordance with the Commonwealth of Virginia and the Manual of Uniform Traffic Control Devices (MUTCD) and the COTR or Airport Operations. The Contractor may be required to submit a traffic control plan to the COTR for review and approval prior to performing any repair work.

14. For bituminous mill and overlays, The Contractor shall apply a tack or prime coat of asphalt conforming to the applicable requirements of the current version and supplements of the VDOT Road and Bridge Specifications. Liquid asphalt classified as cutbacks or emulsions shall be applied ahead of paving operations and the time interval between applying and placing the paving mixture shall be sufficient to ensure a tacky residue has formed to provide maximum adhesion of the paving mixture to the base. The Contractor shall not place the paving
mixture on tack or prime coat that has been damaged by traffic or contaminated by foreign material.

15. Pavement marking shall be installed as per Section 704.03. Pavement marking Services shall include, but not be limited to, establishing the location of pavement markings, application of pavement markings with reflective material, eradication of existing markings, repair and replacement of snow plowable pavement markers, and all incidental expenses necessary to fulfill the requirements of the contract documents.

16. Supervision shall be performed by the Contractor. The Contractor’s supervisor shall be responsible for maintaining control of the Contractor’s personnel and equipment, fueling, and maintaining contractor-owned equipment.

17. The Contractor shall provide material testing and quality control (QC) for all repair work. Additionally, the COTR or a third-party inspection agency designated by the COTR will perform inspections.

18. The Contractor shall provide submittals in accordance with the specification requirements.

19. Work areas and access routes shall be kept clean and free of construction debris at all times. The Contractor’s cleaning efforts shall begin as soon as practicable after shift’s work has begun, and shall continue until ordered stopped by the COTR and/or Airport Operations Officer on duty. Sweeping and vacuuming must be performed prior to using compressed air to blow out the hole. **All haul routes must be swept and kept free of millings and debris.**

20. There are no dumping sites at Ronald Reagan Washington National Airport. Therefore, all debris associated with this contract shall be removed from the Airport daily. The Authority will make arrangements for a small storage area for The Contractor's equipment and materials.

21. The Contractor and associated subcontractors are responsible for obeying all rules and regulations for hauling materials, equipment, and/or personnel to and from the airport. There are no dumping sites at Dulles. All waste material including but not limited to milled or waste asphalt, demolished concrete, earth, and construction debris shall be removed from the airport daily by the Contractor to an approved disposal site. No dumping will be permitted on airport property. Hauling over public roads shall be the Contractor’s sole responsibility, and shall be done in accordance with state and local laws and regulations.

22. Submittals may be requested for proposed repair material including mix design, plant tickets, and materials certifications, to the COTR for approval. No materials shall be produced or used in work for payment under this contract until appropriate approvals have been obtained from the COTR.
23. Mobilization and demobilization shall be included in the unit costs for each line item listed in the Cost Schedule. This work shall consist of performing preparatory operations, including moving personnel and equipment to and from the project site.

24. The Contractor’s on-site supervisor shall be responsible for maintaining control of the Contractor’s personnel and equipment, fueling, and maintaining contractor-owned equipment. The on-site supervisor must be able to speak and write in English fluently in order to properly communicate with the Inspector, the Airport Operations, and the COTR.

25. The Contractor shall be able to provide material testing and quality control (QC) for all repair work. Additionally, the COTR or a third-party inspection agency designated by the COTR will perform inspections. The Contractor shall provide copies of the material delivery tickets as requested by the COTR. All work which fails to meet the QC testing requirements shall be removed and replaced at no cost to the Airports Authority.

26. Seeding and Mulching shall be performed in accordance with section 603.01 through 03 and includes but is not limited to preparing soil bed, applying lime, fertilizer seed and mulch, reseeding, remulching and watering as necessary until the vegetative cover is accepted.

27. Sod shall be applied in accordance with section 6.04.01 through 03 and includes but is not limited to preparing the soil bed, placing, rolling and watering as necessary until the vegetative cover is accepted.

28. Work Crew (DCA). This item has been included for special projects identified by the Authority and work outside of the above items. This item is not in addition to the above units of work. The minimum size work crew shall consist of five (5) people: one (1) working foreman with service truck, one operator and backhoe or other excavator, one operator and dump truck, one (2) laborers; miscellaneous equipment, hand and power tools incidental to road, curb, gutter and sidewalk work. Work shall include, but not limited to, minor repairs, relocation and/or removal of objects.

V. WORK SCHEDULE

IAD:
The pavement repairs and marking services on the roadways shall be performed as directed by the COTR between the hours of 9:30 am to 3:30 pm. Pavement repairs and marking services on Saarinen Circle, including Arrivals and Departure Ramps, Dulles Access Highway, Autopilot Drive, and any two lane roads, shall be performed between the hours of 11:00 pm. to 5:30 am unless otherwise directed by the COTR. In some circumstances allowable work hours could include daytime work. Daytime
work would be for work areas or the use of materials such as asphalt that may not be available during the night shift hours. Any change in work hours would be at the approval of the COTR.

**DCA:**
It is the intention of this contract that a majority of the work be performed during night hours. Work shall be performed as directed by the COTR between the hours:

a. Day Hours of 6:00 a.m. to 10:00 p.m. Monday - Friday.

b. Night Hours of 10:00 p.m. to 6:00 a.m. Sunday - Thursday.

c. Overtime must be approved in advance by the COTR and is that work which is performed in excess of 8 hours in a 24 hour period and/or work performed in excess of a 40-hour week, or performed on Saturday or Sunday.

**VI. TRAFFIC CONTROL**

The Contractor shall keep the portions of the road being used by the public free from irregularities and obstructions that could present a hazard or annoyance to traffic. Holes in hard surface pavements shall be filled with approved asphalt patching material.

1. **Detours:** Detours may be indicated on the plans or in the special provisions or used with the approval of the COTR. Detours over existing roads will be designated, marked, and maintained by the Contractor. The provision of detours and marking of alternate routes will not relieve the Contractor of the responsibility for ensuring the safety of the public or from complying with any requirements of these specifications affecting the rights of the public, including those concerning lights and barricades. Detours shall be placed as in accordance with the current MUTCD. Maintenance of all other detours shall be the responsibility of the Contractor.

2. **Attenuator Truck and Arrow board:** Attenuator trucks and arrow boards must be used for protection as directed in the current MUTCD.

3. **Maintenance of Traffic during suspension of work:** During any suspension of work, the Contractor shall temporarily open to traffic such portions of the project and temporary roadways as may be agreed on by the Contractor and COTR.

4. **Flagging Traffic:** Certified flaggers shall be provided in sufficient number and locations as necessary for control and protection of vehicular and pedestrian traffic in accordance with the requirements of the MUTCD. Flaggers shall use sign paddles to regulate traffic in accordance with the requirements of MUTCD.
5. Delays: Unless otherwise approved, two-way traffic shall be maintained at all times. The Contractor shall not stop traffic without permission. If one-way traffic is approved, the Contractor shall provide flaggers to direct the traffic.

6. Connections and Entrances: Connections with other roads and public and private entrances shall be kept in a reasonably smooth condition at all times. Connections or entrances shall not be disturbed by the Contractor until necessary. Once connections or entrances have been disturbed, they shall be maintained and completed as follows:

   A. Connections: Connections that had an original paved surface shall be brought to final grade through the intersection. At least two lanes shall be paved as soon as possible after connections are disturbed. Other connections shall be brought to final grade through the intersection, and the required material or a temporary aggregate stabilization course shall be placed as soon as possible after connections are disturbed. Contractor must provide smooth transitions between unpaved and paved surfaces.

   B. If there are delays in prosecution of work for connections, connections that were originally paved shall have at least two lanes maintained with a temporary paved surface. Those that were not originally paved shall be maintained with a temporary aggregate stabilization course.

   C. Entrances: Entrances shall be graded concurrently with the roadway with which they intersect. Once an entrance has been disturbed, it shall be completed as soon as is practicable, including placing the required base and surface course or stabilization. If the entrance must be constructed in stages, such as when there is a substantial change in the elevation of the roadway with which it intersects, the surface shall be covered with a temporary aggregate stabilization course or other salvaged material until the entrance can be completed and the required base and surface or stabilization course can be placed.

VII. WORK EXECUTION

CONCRETE SAW CUTTING AND DEMOLITION

All operations shall be controlled to prevent damage to the concrete pavement and to the underlying material to remain in place. All saw cuts shall be made perpendicular to the slab surface. Saw cut depths in PCC shall be determined based on the depth of the repair, but typically they are no less than four inches (to a maximum of ten inches-DCA) for hot mixed asphalt (HMA). The Contractor shall be responsible for supplying the necessary water where an airport connection is not available. To limit the amount of airborne dust, all repair areas and surrounding
surfaces must be swept out thoroughly after demolition by use of a heavy duty house broom prior to using compressed air.

PARTIAL DEPTH PORTLAND CEMENT CONCRETE (PCC) REPAIRS

Saw cut or milled depths in PCC repairs shall be determined based on the depth of the repair and the repair material. Saw cut and milled depths for a partial depth PCC pavement repair shall be a minimum of four inches for repair material such as asphalt or cold patch. The loose material shall be removed to sound concrete using a milling machine or jackhammer or other methods, approved by the COTR. Saw cutting, milling, and/or jack hammering costs associated with PCC pavement partial depth repairs shall be considered incidental costs, and shall be paid for in the partial depth PCC pavement repair item. Hauling and dumping of PCC spoil material shall be in accordance with Section 16 in this SOW. Hauling and dumping fees shall be included in the partial depth PCC demolition item.

BITUMINOUS CONCRETE REPAIRS

The area to be repaired shall extend a minimum of three inches past the area of distress. Saw cutting costs associated with bituminous concrete repairs shall be considered incidental costs, and shall be paid for in the bituminous concrete repair item. Excavate the flexible pavement using appropriate excavation equipment. Appropriate excavation equipment includes milling machines, shovels, hand tools, jackhammers, backhoes, and front-end loaders. Removal of the granular and/or subgrade shall be as directed by the COTR. For bituminous concrete pavement repairs see Exhibit HMA-1 Hot Mix Asphalt.

BITUMINOUS CONCRETE MILLING AND OVERLAY

Pavement milling shall be accomplished by mechanical means specifically designed for pavement milling operations. Spoil material generated from the pavement milling operations shall be removed from the airport daily. Milling depth and pavement overlays of the bituminous concrete surface (wearing) course shall be two inches thick unless otherwise directed by the COTR and shall be VDOT Superpave Type SM12.5D or mix equivalent unless otherwise instructed by the COTR.

PCC JOINT REPAIRS

Joint filling materials and services provided under this contract shall be performed in accordance with Joint sealing filler shall conform to Section 212-Joint Materials in the current version and supplements of the VDOT Road and Bridge Specifications and figures 1.1a, b, and c in this document.

FULL DEPTH RECELAMATION (FDR)

The Contractor shall furnish all labor, materials and equipment required for completing the work. The Contractor shall select the final mix design and
construction methods to meet the performance requirements specified herein. Contractor sampling and testing shall be performed to control the processes and ensure material compliance with the requirements of the Contract.

CORE SAMPLING (FDR)

Samples of the existing pavement must be obtained to fully understand the composition of the failed section that will incorporated into the FDR layer. The samples should not only identify the thickness of the existing asphalt but should also include the underlying subbase and subgrade materials within the proposed depth of reclamation. Each core should be measured to the nearest ¼-in. the core samples should be obtained at a min 4” in diameter and to a depth of 6 in. below the anticipated bottom of the FDR layer at each sample location, as the FDR thickness may be adjusted based on the material gradation.

SOIL STABILIZATION

Soil stabilization is a process of injecting weak soils with polymer expanding foam which strengthens loose soil strata and restores the soils load bearing capacity. The steps of the process include coring strategically placed injection holes along a pavement. Foam is then injected at each location, filling the voids and stabilizing the soil.

VIII. CONTRACTOR FURNISHED EQUIPMENT AND MATERIALS

The Contractor shall provide all hand and power tools necessary to perform repair work. The Contractor shall provide additional tools and equipment as needed. The Contractor shall be responsible for providing, transporting, and maintaining all tools and equipment while in use during the designated contract period. The Contractor shall keep all tools and equipment in good working order, and repairs, when required, shall be in a timely manner such as to insure availability. At a minimum, the tool and equipment shall consist of the following items.

EQUIPMENT

The contractor shall provide the complete set of equipment with operator as stated in their proposal to accomplish all the necessary works. The equipment must be at all times, ready, capable and in satisfactory condition to perform the tasks. The contractor shall provide minimum number of equipment listed below and must be available.

Two (2) Unit Light Tower

One (1) Unit Engine Driver Concrete Saw (Gas or Pneumatic)
Two (2) Unit Pneumatic Jack Hammer (60 lb. rated) with 100 ft. of Air Supply Hose

One (1) Unit Air Compressor

Two (2) Unit Plate Tamper

One (1) Unit Service Truck

One (1) Unit Utility Vehicle

One (1) Unit Dump Truck

One (1) Unit Sweeper Vacuum Truck

One (1) Unit Contractor Grade Hand Pump Metal or Stainless Sprayer

LIGHT TOWER

The Contractor shall provide sufficient lighting equipment to adequately illuminate all work areas. In general, a minimum of two (2) lighting units per crew with a rating capacity of at least 4000 watts each are required during repair activities. Lighting equipment positions shall be coordinated with the Airport Operations Department so as not to interfere with aircraft operations. The Contractor shall be responsible for providing, transporting, and maintaining all lighting equipment. The Contractor shall make all repairs to lighting equipment in a timely manor.

CONCRETE SAW

The Contractor shall provide engine driven (gas or pneumatic) 14-inch diameter walk-behind concrete saw with one spare blade.

PNEUMATIC JACKHAMMER

The Contractor shall provide a 60 lb rated pneumatic jackhammer, pointed bit, spade bit, and 100 feet of air supply hose.

AIR COMPRESSOR

The Contractor shall provide an engine driven air compressor suitable to supply all pneumatic tools used. Sweeping and vacuuming must be performed prior to using compressed air to blow out the hole.

PLATE TAMPER

The Contractor shall provide an engine driven plate tamper suitable for compacting sub grade, granular fill and hot and cold asphalt paving materials.
SERVICE/CREW TRUCK

The Contractor shall provide 2½ ton rated crew/service truck suitable for transporting a crew, minimum tool set, and 500 lbs of patching materials. Historically a stake body style with a crew cab is most suitable for this application. The vehicle must have a lift gate or truck bed crane for lifting heavy materials.

DUMP TRUCK

The Contractor shall provide a two yard (minimum) single axle dump truck, suitable for removing debris associated with pavement repairs and delivery of repair material (asphalt and/or granular fill).

SWEEPER/VACUUM TRUCK

The Contractor shall provide street sweeper/vacuum truck suitable for sweeping paved work areas prior to returning them to service.

MATERIALS

The materials needed to accomplish all the necessary work shall be available at all times.

- Cold Patch
- Bituminous Concrete
- PCC – Portland Cement Concrete
- Asphalt Crack Sealant
- PCC Joint and Crack Sealant

IX. AIRPORTS AUTHORITY’S QUALITY ASSURANCE SURVEILLANCE PROGRAM (QASP)

A. Each phase of the maintenance services rendered under this Contract is subject to Airports Authority inspections, both during and after completion of work. The Airports Authority’s QASP is NOT a substitute for adequate and consistent quality control by the Contractor.

B. The Airports Authority has the right, at all times, to inspect services performed, Contractor’s workmanship and materials furnished/utilized in the performance of such services to the extent practicable. The Airports Authority shall perform inspections, as it deems necessary, throughout the term of the Contract.
However, inspections and/or walk-throughs shall be conducted in a manner that will not unduly interrupt/delay the Contractor’s work.

C. The Airports Authority has the right to arrange for a third party to conduct a condition assessment on the Maintained Pavement, to identify and analyze pavement failures.

D. If any of the services do not conform to Contract requirements, the Airports Authority may require the Contractor to perform the services again in conformity with Contract requirements, at no increase in Contract amount. When defects in service cannot be corrected by performing the service again, the Airports Authority may:

   1. Require the Contractor to take the necessary action to ensure that future performance conforms to Contract.

   2. Reduce the monthly payment to reflect the reduced value of the services performed. The Contracting Officers shall make a determination as to an appropriate sum of money that will approximately equate to the reduced service.

E. If, after having been directed by the Airports Authority to correct a Contract deficiency, the Contractor fails to promptly perform the services again or fails to take the necessary action to ensure future performance is in conformity with Contract requirements, the Airports Authority may:

   1. Perform the services (by Contract or otherwise) and charge the Contractor any cost incurred by the Airports Authority directly related to the performance of such service.

   2. Terminate the Contract for default.

F. Typical Airports Authority QASP methods.


   2. Random COTR inspections of the Services.

   3. CMMS Queries for status of open CM & PM work orders.

X. SAFETY

The Contractor, its subcontractors, and all its employees shall perform the maintenance and services in a manner that will provide safe working conditions throughout each work assignment. Respirators, dust masks, gloves, hearing and eye protection must be utilized at the appropriate times. Safety vests must be worn at all times. The Contractor shall comply with the applicable provisions of the
Occupational Safety and Health Administration (OSHA), Airports Authority Rules and Practices, including directives issued by the Airport Manager, Airport Operations, MWAA Police, TSA, Fire Departments, Federal Aviation Administration (FAA), Electrical Safety Program, and the Commonwealth of Virginia construction safety regulations. If the Airports Authority determines that the Contractor is failing to perform the services of this contract in a safe manner, the COTR may issue a stop work order until the Contractor takes corrective action.

The contractor shall provide and ensure that all its personnel at the job site properly wear all applicable safety devices and apparel (PPE). Safety devices and apparel shall be provided by the Contractor at no cost to the Airports Authority.

2. Hearing Protection
3. Safety Shoes
4. Hard Hats
5. Reflective Vests
6. Safety Harnesses
7. Other safety devices/apparel as conditions warrant

The Airports Authority reserves the right to inspect all areas for safety violations at its discretion, direct the Contractor to make immediate improvement of necessary conditions and/or procedures, and/or stop the work if other hazards are deemed to exist.

In the event that the Airports Authority should elect to stop work because of any type of existing safety hazards after the Contractor has been notified and provided ample time to correct, the Contractor shall bear all costs for eliminating the hazard(s) and shall not be granted compensation for the work stoppage. The Contractor shall pay all additional expenses.

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall take all necessary precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to persons, properties, equipment and vehicles.

Damage caused by the Contractor to any properties shall be repaired and have any needed replacements made to the satisfaction of the Airports Authority at the expense of the Contractor. The Airports Authority, at its sole direction, may elect to
repair or replace the damaged property, and deduct such costs from monies due to the Contractor.

The Contractor shall, within fifteen (15) days of Contract award, submit its own detailed safety and protection plan/program that shall comply with all safety, environmental protection, property protection and health provisions of the Contract.

Prior to the use of any products or materials, The Contractor shall provide as requested the following submittals for review and approval by the COTR.

1. Manufacturer’s product data and literature
2. Manufacturer’s installation recommendations
3. Samples, if required by the COTR
4. Safety Data Sheets (SDS)

XI. CONTRACTOR KEY PERSONNEL

The Contractor shall identify and provide the COTR with a list of names and telephone numbers of its key personnel who shall be responsible for fulfilling all the requirements of this Statement of Work. Contractor’s Key Personnel List shall be provided to the COTR fifteen (15) business days prior to the Contract start date and shall be updated when changes are made.

The Contractor shall provide to the COTR resumes for all key personnel (i.e., Contract Manager, and on-site personnel such as Supervisors) for the Airports Authority’s approval. These resumes shall be provided to the COTR no later than fifteen (15) business days prior to employee’s intended start date.

Key personnel who will be working on this contract, these individuals are considered to be Key to the work being performed hereunder. Prior to diverting any of the specified individuals to other contracts, The Contractor shall notify the CO & COTR reasonably in advance and shall submit justification, including proposed substitutions, in sufficient detail to permit evaluation of the impact on the contract. No diversion of key personnel shall be made by The Contractor without the written consent of the CO & COTR. The listing of key personnel may be amended from time to time during the course of The Contract to either add or delete personnel or positions, as appropriate, subject to prior approval of the CO & COTR.
XII. SPECIAL REQUIREMENTS

REPORTS

The Contractor shall submit a daily work report to the COTR at the conclusion of each workday. The daily work report shall include the date, weather conditions, road surface temperature, resources used, application thickness measurements, location of work, and pay quantities. Entries shall be made in ink, shall be legible, and shall be signed by The Contractor.

The Contractor must submit detailed daily and monthly accomplishment report with plan and photographs of the work accomplished to the COTR.

COMMUNICATION DEVICES

The Contractor shall provide, at its own expense, mobile phones to its personnel performing services at Dulles. The Contractor shall also provide facsimile and telephone numbers by which the Airports Authority can contact individuals who have the responsibility and authority for implementing all the requirements of the contract.

MEETINGS

The Contractor’s representatives shall attend meetings as required by the Airports Authority to coordinate, evaluate and discuss issues and performance of the work under this contract.

SECURITY REQUIREMENTS

The Contractor, its subcontractors, and all their employees shall be subject to, and shall at all times conform with, any and all rules, regulations, policies and procedures pertaining to security at Dulles. Any violations or disregard of the rules, regulations, policies and procedures may be cause for immediate termination.

QUALITY CONTROL REQUIREMENTS

The Contractor shall provide material and quality control (QC) testing for the services performed in accordance with the VDOT specifications. Services which fail to meet the material and QC testing requirements shall be removed and replaced at the Contractor’s expense.

PERMITS AND RESPONSIBILITIES

The Contractor shall, without additional expense to the Airports Authority, be responsible for obtaining all necessary licenses and permits. The Contractor shall also be responsible for all damages to persons or property that occur as a result of The Contractor’s negligence and shall take proper safety and health precautions to protect the work, the workers, the public and the property of others. In addition, The
Contractor shall be responsible for all materials delivered and work performed until completion and acceptance of the entire work.

The Contractor shall comply with all applicable revisions, additions, changes and/or upgrades to any Federal, state, and municipal laws, codes, and regulations which are in effect on the date of The Contract start and which affect the performance of the work. The Contractor shall also obtain and pay the costs of any royalties and licenses for any patented or copyrighted items used in the performance of the work.

It shall be the responsibility of The Contractor to promptly notify the COTR if an official in charge of compliance with the Occupational Safety and Health Act visits the work site.

REGULATION REQUIREMENTS

The Contractor shall comply with all applicable Federal, state, local, Airports Authority and the Airports regulatory, code and procedural requirements. This shall include but not be limited to The Contractor complying with the following Airports Authority requirements:

1. The Airports Authority’s:
   b. Orders and Instructions
   c. Design Manual

2. The Airport’s:
   a. Advisories
   b. Orders and Instructions
   c. Security, Traffic and Parking Requirements
   d. Safety Procedures including Lockout/Tagout, Confined Space Entry, Hazardous Materials, Safety Data Sheets and the like.

The Contractor shall report all incidents and accidents immediately to the Airports Authority in accordance with Federal and State laws and regulations and Airports Authority Orders and Regulations.

WARRANTY OF CONSTRUCTION

The Contractor warrants that worked performed under this contract conforms to The Contract requirements and is free of any defect in equipment, material, design, or workmanship furnished or performed by The Contractor or any Subcontractor.
The Contractor shall remedy, at The Contractor’s expense, any defects and any failure to conform to contract requirements. In addition, the contractor shall remedy at The Contractor’s expense any damage to Authority-owned or controlled real or personal property, when that damage is the result of:

1. The Contractor’s failure to conform to contract requirements; or
2. Any defect of equipment, material, workmanship, or design furnished.

The Contractor shall provide a warranty of work for a period of one (1) year after the final acceptance of the work by COTR.

WEATHER LIMITATIONS

Scheduled work under this Contract may be subject to early shutdown or cancellation due to adverse weather. In addition, any conditions on the landside, which in combination with the presence of construction activities would in the opinion of the COTR and/or Airport Operations Duty Officer.

The Contractor may cancel the scheduled work if necessary and inform the COTR and/or the Airports Operations Duty Officer by telephonic and email. The Airport Operations Hotline is (703) 572-2730 (IAD) or (703) 417-8050 (DCA).

HAZARDOUS/CARCINOGENIC MATERIALS

The Contractor shall not bring, produce, use, or store on the job site any hazardous or carcinogenic products without prior written approval by the Airports Authority. All hazardous and/or carcinogenic waste transported or generated on-site at the Airport by The Contractor must be properly disposed of off the Airport site by The Contractor as required by law and at no additional cost to the Airports Authority.

The Contractor shall provide the Airports Authority with complete, legible copies of all regulatory notices, violations, citations and the like received by The Contractor that pertain directly or indirectly to the fulfillment of this Statement of Work.

VOLATILE ORGANIC CHEMICAL REQUIREMENTS

The Contractor shall use on the job site only chemicals and cleaning products that do not exceed the national Volatile Organic Chemical (VOC) limitations rule(s) published by the U.S. Environmental Protection Agency (EPA).

HAZARDOUS WASTE

The Contractor shall initiate a Hazardous Waste Management training program for its employees and subcontractors on the proper disposal of hazardous materials.
The Contractor shall ensure employees are aware that the domestic drains, and storm drains shall not be used to dispose of gasoline, paint, thinners, oils, solvents, concentrated cleaning agents and other toxic material.

The Contractor is responsible for collecting, accumulating, recycling, and/or off-site disposal of its hazardous and toxic waste off the Airport in compliance with Federal, state and local laws governing hazardous waste storage and disposal.

The Contractor shall provide the Contracting Officer and the COTR with documentation of hazardous materials or wastes that are accumulated, handled, generated, or disposed of by The Contractor’s operations. The documentation shall demonstrate the adequacy of the handling and disposal operations used by The Contractor and will demonstrate that the Contractor activities will not result in contamination of the Airports Authority property. The Airports Authority shall provide this documentation upon request during periodic environmental inspections of The Contractor’s premises. The Airports Authority shall be copied on all correspondence with regulatory agencies concerning the Contractors compliance with environmental regulations.

If The Contractor generates hazardous waste in an amount that makes it subject to state and EPA hazardous waste requirements, The Contractor shall apply for a Hazardous Waste Generator Identification Number. Hazardous waste shall be shipped off the Airport using The Contractor’s Hazardous Waste Generator Identification Number documented on a complete and properly signed Uniform Hazardous Waste Manifest. The Contractor shall be required to submit an Annual Hazardous Waste Report to the State of Virginia Department of Environmental Quality.

The Contractor shall be responsible for developing a Resource and Conservation Act Contingent (RCRA) Plan if the amount of hazardous waste generated places it into a category that requires a plan.

The Contractor shall be responsible for notification and reporting required under SARA, Title III regulations.

The Contractor shall, at start of Contract, implement a written hazardous waste spill contingent plan listing materials used, spill prevention procedures, containment equipment and procedures to be used in the event of spill, personnel protective equipment requirements, notification procedures, in accordance with the Resource Conservation and Recovery Act (RCRA) and the Occupational Safety and Health Administration (OSHA) regulations.

In the event of a spill, The Contractor shall notify the Airport Fire Department at Washington Dulles International Airport (703) 572-2980 or Public Safety Communications Center at (703) 417-2400 (DCA). The Contractor shall be
responsible for all cleanups, site remediation and disposal costs including hazardous waste response teams that may be required at the site. All procedures shall be in accordance with applicable Federal, state and local environmental and OSHA regulations. The Contractor shall remove all hazardous waste materials from the Airport at the end of each workday. Hazardous materials that are temporarily stored at the job site shall be placed in containment devices that are capable of containing 110 percent of the volume of the substance in the event of a spill.

CONDUCT

The Contractor’s employees shall at all times while on the job site, conduct themselves in a professional, orderly and safe manner. Rudeness, fighting, being under the influence of alcohol and/or drugs or bringing and/or consuming alcohol and/or drugs, gambling, soliciting, stealing, taking pictures or bringing cameras or other photographic devices anywhere on Airports Authority property (unless fulfilling the requirements of this Contract), and any immoral or otherwise undesirable conduct shall not be permitted on the job site and shall result in immediate and permanent removal from the job site of any employee engaging in such conduct. Denial of a badge is sufficient grounds for termination or removal.

The Contractor agrees to promptly remove from the Airport any employee that the Airports Authority through written notice from the COTR advises is not satisfactory and to replace such personnel with an employee satisfactory to the Airports Authority; but in no event shall the Airports Authority be responsible for monitoring or assessing the suitability of any employee or agent of the Contractor.

CONTRACTOR’S LIABILITY

The Contractor shall be held liable and responsible for any injuries to persons or damage to property that occurs as a result of The Contractor’s negligence or willful misconduct while within the premises of the Airports Authority. The Contractor shall take proper safety and health precautions to protect the work, the workers, the public and the property of others.

The Contractor shall not remove damaged or failed parts from the airport, until approved by the COTR.

ATTIRE

All employees, including supervisors and sub-contractors of The Contractor, shall be dressed in distinctive company-provided uniforms with the company’s name clearly visible. The Contractor’s employees shall conduct themselves in an orderly and safe manner at all times while on the job site, whether on or off duty.

Contractor employees shall, at all times while on the job site, be attired in a distinctive company uniform that is acceptable to the Airports Authority.
Employees shall wear uniforms consisting of shirts with sleeves and full-length trousers or coveralls. Shorts, cut-offs and the like are not acceptable. The uniform shall have the Contractor’s name easily identifiable, affixed thereon in a permanent or semi-permanent manner such as a badge or monogram. Any color combination, as appropriate, may be used for the uniforms as long as they are distinct from that used by the Airports Authority.

All Contractor employees shall wear safety shoes, safety vest, and other Personnel Protective Equipment (PPE) to perform the work activity. At times, employees will be required to wear hard hats.

The Contractor shall supply and maintain the required employee attire at no additional cost to the Airports Authority.

SMOKE FREE ENVIRONMENT

The Airports Authority facilities and AOA are smoke free. The Contractor and its employees shall adhere to all applicable rules and regulations regarding maintenance of a smoke free environment on the job sites. Individuals observed smoking on the AOA are subject to fines and/or removal from the airport.

XIII. DAMAGE TO PROPERTY

The Contractor shall be responsible for any airport property damaged by Contractor equipment or employees. The damaged property shall be repaired and/or replaced by The Contractor at no cost to the Airports Authority. The Contractor shall be responsible for all damage or injury to property of any kind resulting from an accident, the execution of work, omission, or neglectful acts. If private property is damaged, The Contractor shall be required to supply the Contracting Officer (CO) and Contracting Officer Technical Representative (COTR) with a letter from the property owner involved stating that all damage has been satisfactorily repaired and/or replaced before final acceptance will be made. Note: All backhoes and similar equipment which use outriggers are required to have shoe pads.

XIV. METHOD OF MEASUREMENT AND PAYMENT

Costs for all work under this contract shall be included in the unit prices as bid on in the contract cost schedule. The prices shall be fully loaded for furnishing all materials, for all preparation, mobilization and demobilization, mixing, and placing of materials, and for all labor, equipment with operator, tools, disposal of excavated debris, and incidentals necessary to complete the items in accordance with the contract documents. The Contractor may not invoice the Airports Authority for items not included on the Price Schedule.
All deficiencies found shall be corrected by The Contractor prior to the submission of Invoice. If deficiencies have not been corrected by The Contractor within five (5) business days upon receipt of notice, then the Airports Authority will have the repairs performed by another contractor and the cost to perform the repairs shall be withheld from The Contractor’s payment. Airports Authority shall have the authority to deduct such amount from the contractor’s invoice.

The Contract unit prices shall include all equipment, profit, overhead, supervision, and all incidental expenses necessary to fulfill the requirements of the contract documents. Payment shall be made for actual quantities of service performed and may not exceed the specified rate defined in the Price Schedule.

The Contractor shall submit an invoice for work accomplished complete with all the necessary document to support the work accomplished like signed and dated call order, invoice attachment form, photograph and daily accomplishment report. Such invoice shall be verified and certified by the COTR. Incomplete invoice may send back to the contractor and may cause delay on payment process. The quantity or area of works to be paid for shall be the actual quantity accomplished in accordance with the specified SOW and accepted by the COTR.

The Airports Authority shall have the right to deduct from The Contractor’s invoice such amount as may be necessary to cover third party liabilities, as well as uncorrected discovered defects in the project.

(DCA): The work crew shall be paid in crew hours. The cost shall include all wages, overheads, profits, transportation, etc., associated with the work crew when engaged in incidental work ordered by the COTR supplemental to the units of work aforementioned.

Payment shall be made for actual quantities of service performed and may not exceed the specified rate defined in the Price Schedule.
1.0 GENERAL

This item shall consist of constructing one or more courses of bituminous (asphalt) concrete, including asphalt patching, on the prepared foundation in accordance with these specifications and drawings 1.1 or as established by the Contracting Officer's Technical Representative (COTR).

2.0 MATERIAL AND PERFORMANCE REQUIREMENTS

Asphalt patching material shall conform to Virginia Department of Transportation (VDOT) Road and Bridge Specifications, Division II, Section 211, Superpave Type SM 9.5, IM-19.0 or other relatively fine graded mix approved by the COTR. Fine Aggregate: Sharp edged natural sand or sand prepared from stone, gravel or combination thereof, complying with AASHTO M6. Soundness loss shall be a maximum of 15% per AASHTO T103 or 25% per AASHTO T104. Premixed packaged cold patch material may be used as directed by the COTR.

A. PREPARATION OF THE UNDERLYING SURFACE. Immediately before placing the bituminous mixture, the underlying course shall be cleaned of all dust, debris, and standing water using hot compressed air. A tack coat or prime coat shall be applied as directed by the COTR.

B. TRANSPORTING, PLACING AND FINISHING. The bituminous mixture shall be transported from the mixing plant to the site in trucks with tight, clean, and smooth metal beds. Adequate artificial lighting shall be provided for night placement. The mix shall be placed and compacted at a temperature suitable for obtaining surface smoothness and other specified requirements. After placing the mixture, the mixture shall be thoroughly and uniformly compacted.

C. PLACEMENT LIMITATIONS. Bituminous concrete mixtures shall not be placed when weather or surface conditions would prevent proper handling, finishing, or compacting of the mixture. Bituminous mixture shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than 45°F for thickness up to three inches and 40°F for thickness greater than three inches.

D. QUALITY ASSURANCE. Meet requirements of the referenced standards except to the extent more detailed or stringent requirements are indicated by the Contract Documents.
E. SUBMITTALS. Furnish manufacturers data test reports and materials certifications as required in the reference section including:

1. Bituminous Concrete Job Mix Formulas
2. Plant tickets
3. Packaged Cold Patch Material

3.0 MEASUREMENT AND PAYMENT

Accepted bituminous pavement repairs shall be measured on a square foot basis of pavement repaired. The contract unit prices shall include all equipment, profit, overhead, supervision, and all incidental expenses necessary to fulfill the requirements of the contract documents. There will be four line items for bituminous pavement repairs.
EXHIBIT CS-1 CRACK SEALING FOR BITUMINOUS CONCRETE PAVEMENTS

1.0 GENERAL

This work shall consist of crack sealing existing bituminous concrete pavement cracks in accordance with these specifications.

2.0 MATERIAL AND PERFORMANCE REQUIREMENTS

A. Material for sealing cracks should meet ASTM standards for the type of pavement and service for which the sealant is intended.

   1. ASTM D6690 Standard Specifications for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt pavements.

The crack sealing repair procedures shall generally occur according to the following sequence. The Contractor shall be responsible for removing and disposing of the old sealant prior to sealing the crack.

B. Do not begin crack repair during inclement weather. The pavement temperature should be 45°F and rising or meet the manufacturer’s recommendations at the time of application of the sealing material.

C. Rout the crack to the sealant manufacture’s specifications for width and depth ratio. The crack must be free of moisture, dust, loose aggregate, and other contaminants. The Contractor shall clean the crack using high-pressure air or hot air blasting, as directed by the COTR. Hot air blasting shall be done using a hot compressed-air (HCA) lance, or heat lance, connected to an air compressor. The crack shall be thoroughly cleaned to the satisfaction of the COTR.

D. Immediately before applying the sealant, The Contractor inspects the crack to ensure the crack(s) are clean, dry, and free of contaminants. If the cracks are left unsealed for more than 12 hours, the Contractor shall re-clean the crack using compressed air to the satisfaction of the COTR.

E. The Contractor shall apply the sealant from the bottom to the top of the crack to prevent air bubbles from forming and creating a weak spot in the sealant. The Contractor shall use a sealant kettle that has an injection wand to accomplish the sealant placement. The Contractor shall use a squeegee to remove any excess
sealant on the pavement surface. The sealant shall be allowed to cure in accordance with the manufacturer's requirements prior to opening to traffic. The Contractor shall immediately clean any sealant that is tracked during the crack sealant operation. The Contractor at no additional cost to the Authority shall repair any crack sealing areas damaged due to Contractor negligence.

3.0 MEASUREMENT AND PAYMENT

Accepted crack sealing repairs shall be measured on a linear foot basis of pavement repaired. There will be one bid item for crack sealing for bituminous concrete pavement sealing. Cracks are to be a maximum of 1-1/2 inches wide. Width’s greater than that shall be repaired as spalls.

Payment shall be full compensation for all labor, materials, tools, equipment, cleaning, traffic control (barricading), and incidentals required to complete the repair work as specified herein. Backer rod material and installation shall be paid for as a separate line item.
EXHIBIT CS-2  JOINT AND CRACK SEALING FOR PORTLAND CEMENT CONCRETE PAVEMENTS

1.0 GENERAL

This work shall consist of joint and crack sealing existing portland cement concrete (PCC) pavements in accordance with these specifications.

2.0 MATERIAL AND PERFORMANCE REQUIREMENTS

A. Material for sealing cracks should meet ASTM standards for the type of pavement and service for which the sealant is intended.

1. ASTM D6690 Standard Specifications for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt pavements.


The crack sealing repair procedures shall generally occur according to the following sequence. The Contractor shall be responsible for removing and disposing of the old sealant prior to sealing the crack.

B. Cracks less than 1/8 inch in width with minor spalling shall be blown out and sealed.

C. Joints/Cracks 1/8 inch to 1/2 inch in width shall be sawed, cleaned and sealed. If there is minor spalling present, refer to specification section PCC-1 Portland Cement Concrete Pavement Partial Depth Repair. The saw cutting equipment shall be approved by the COTR prior to its use. As a general guide, The Contractor shall saw cracks to 1/8 inch greater than the average width of the crack for cracks that are 1/8 to 1/2 inches wide. Saw cutting is to provide a good sealant reservoir and reduces raveling potential.

D. Joints/Cracks greater than 1/2 inch in width shall be sawn, cleaned and sealed, the Contractor using a backer rod to conserve sealant as directed by the COTR. If there is major spalling, repair in accordance with specification section PCC-1 Portland Cement Concrete Pavement Partial Depth Repair.

E. The Contractor shall saw the crack with the appropriate equipment then clean the joint/crack using sandblasting techniques. The joint/cracks shall be blown
cleaned prior to being sealed. The Contractor shall follow the sealant manufacturer's specifications for width to depth ratio.

F. Check them for depth: A backer rod shall be installed to conserve sealant for all saw cut operations. The backer rod shall conform to specification ASTM D5249 Standard Specifications. The backer rod shall be 1/8 inch larger than the crack so as not to slip or float out after installing the sealant.

G. Immediately before applying the sealant, The Contractor shall inspect the joint/crack to ensure the joints/cracks are clean, dry, and any backer rod material is correctly installed. If the joints/cracks are left unsealed for more than 12 hours, the Contractor shall re-clean the crack using compressed air to the satisfaction of the COTR.

H. The Contractor shall apply the sealant from the bottom to the top of the crack to prevent air bubbles from forming and creating a weak spot in the sealant. The sealant shall be allowed to cure in accordance with the manufacturer's requirements prior to opening to traffic. Any sealant that is tracked during the crack sealant operation shall be immediately cleaned by The Contractor. The Contractor, at no additional cost to the Authority, shall repair any crack sealing areas damaged due to Contractor negligence.

3.0 MEASUREMENT AND PAYMENT

Accepted crack sealing repairs shall be measured on a linear foot basis of pavement repaired. Payment shall be made on a linear foot basis for sawed crack sealing and non-sawed crack sealing. There will be one bid items for crack sealing for PCC pavement repairs.

Cracks are to be a maximum of 1-1/2 inches wide. Width’s greater than that shall be repaired as spalls. Payment shall be full compensation for all labor, materials, tools, equipment, cleaning, traffic control (barricading), and incidentals required to complete the repair work as specified herein.
EXHIBIT PCC-1 PORTLAND CEMENT CONCRETE PAVEMENT
PARTIAL AND FULL DEPTH REPAIR

1.0 GENERAL

This work shall consist of repairs to pavement composed of Portland Cement Concrete (PCC). Repair materials shall be applied on a prepared base course in accordance with these specifications, Figures 1.1 and 1.2 (Partial and Full Depth PCC Repair Detail); and shall conform to the existing lines, grades, and thickness in the field or as directed by the COTR.

2.0 MATERIAL AND PERFORMANCE REQUIREMENTS

The partial depth PCC repairs shall generally occur according to the following sequence:

A. Saw cutting, demolition, and removal of deteriorated PCC shall be in accordance with the attached Statement of Work.

B. The depth of the repairs shall be a minimum of 4 inches and depth shall be into visibly sound concrete.

C. Repair details provided in Figure 1.3 Portland Cement Concrete Pavement Partial Depth Repair. Repair area limits shall be identified and marked in the field by an Authority representative. The prepared repair area shall have straight smooth vertical saw cuts. As an alternative repair material, The Contractor may submit other mixes to the COTR for approval. The bottom and the sides of the repair area shall be prepared according to the manufacturer's recommendations as required by the manufacturer. The repair material shall be placed in the repair area, spread out, thoroughly consolidated, and then struck off and finished. Finishing shall include floating, edging, jointing, toweling, and brooming or brushing for texture.

D. Joints are to be re-established and sealed as specified in applicable sections of the current version and supplements of the VDOT Road and Bridge Specifications.

E. Backer rod or expansion material shall be used as required and directed by the COTR. Curing shall be as specified in the manufacturer's recommendations for preparation and placement. The surrounding grades shall be tied into and matched, unless otherwise directed by the COTR. The Contractor shall clean the repair area of all construction debris. The Contractor shall repaint, if necessary, the existing pavement markings after approximately three days of curing or as directed by the COTR.
F. For Emergency Repairs, HMA or cold applied asphalt patch material may be used up to 6 inches in depth as directed by COTR. Repair area shall be minimum of 2 square feet. The Contractor is not required to furnish a vacuum truck, but may hand broom clean the area of all construction debris.

G. Other materials, approved for use by the COTR, shall meet the manufacturer's recommendations for preparation and placement.

H. As directed by the COTR, The Contractor may use approved plant-produced bituminous patching mixture as fill material for pothole repairs in accordance with Exhibit HMA-1. Cold patch materials may be used as directed by the COTR. This item shall include priming/tacking the repair area as required; and supplying, placing, and compacting the bituminous concrete once the partial depth PCC demolition phase has been completed.

I. Repair details provided in Figure 1.2 Portland Cement Concrete Pavement Full Depth Repair. Repair area limits shall be identified and marked in the field by an approved by an Authority representative. The prepared repair area shall have straight, smooth vertical cuts.

As directed by the COTR, the Contractor may use an approved bituminous concrete in accordance with Specification Section HMA-1. Removal and replacement of the existing subbase and/or subgrade material shall be as directed by the COTR. The Contractor shall remove the unsuitable subbase and/or subgrade material to the depth indicated by the COTR. The Contractor shall place VDOT type 21A or #3 stone as backfill material to the finished subbase elevation. Material shall be placed in maximum 6-inch lifts and compacted to 95% maximum theoretical density. The Contractor shall remove excavated spoil material from the airport. This item shall include priming/tacking the repair area; and supplying, placing, and compacting the bituminous concrete once the PCC demolition phase has been completed. The Contractor shall clean the repair area of all construction debris. The Contractor shall repaint, if necessary, the existing pavement markings after the specified curing time or as directed by the COTR.

3.0 MEASUREMENT AND PAYMENT

Accepted PCC repairs shall be measured on a square footage basis of pavement repaired at the indicated repair depth. Payment shall be made on a square foot basis at the depths indicated below. Therefore, there will be five bid items for partial depth PCC repairs.

Payment shall be full compensation for all labor including initial saw cutting, joint reconstruction (saw cutting and joint installation to re-establish the construction, contraction, or expansion joints after repair) materials, tools, equipment, traffic control (barricading), curing compound and incidentals required to complete the
repair work as specified herein. Excavation (undercutting) & embankment (backfill), listed in section 1.1 above, shall be paid for as a separate line item.
EXHIBIT JS-1 JOINT SEALANT FILLER

1.0 GENERAL

This item shall consist of providing and installing a resilient and adhesive joint sealing filler capable of effectively sealing joints and cracks in pavements.

2.0 MATERIAL AND PERFORMANCE REQUIREMENTS

A. Joint sealing materials shall conform to Figure 1.1 (Sawed Joint and Sealing Filler Detail) and Section 212 of the current version and supplements of the VDOT Road and Bridge Specifications.

B. The joint between asphalt and concrete shall be sealed with the silicone joint sealant appropriate for bonding to both PCC and asphalt pavements.

C. Each lot or batch of joint sealer (preformed, silicone, or hot pour) shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, and the safe heating temperature (if applicable) and shall be accompanied by the manufacturer's certification stating that the compound meets the requirements of this specification.

D. As directed by the COTR, The Contractor may also use hot applied asphalt for joint sealing. Joint sealing material for all construction joints, contraction joints, and expansion joints at structures shall conform to ASTM D-3405 hot applied asphalt. Backer rod shall be installed at the construction joints and contraction joints. Backer rod shall not be installed at expansion joints.

E. PRIMER FOR SILICONE SEALANT. An air-drying prime coat, meeting the recommendations of the manufacturer of the silicone joint sealant, shall be applied to the joint prior to applying the joint sealant material.

F. BACKER ROD MATERIAL. A backer rod in the bottom of the joint to be filled shall be used to control the depth of the sealant, to achieve the desired shape factor, and to support the sealant against indentation and sag. Backer materials shall be compatible with the sealant, should not adhere to the sealant, should be compressible without extruding the sealant and should recover to maintain contact with the joint faces when the joint is open. Backer rod material shall meet the requirements of ASTM D 5249.

3.0 CONSTRUCTION METHODS

Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. The pavement temperature shall be above 40°F at the time of installation of the preformed joint seal and above 50°F at the time of installation of the poured joint.
sealing material. If the pavement must be opened to traffic prior to placement of the sealant, the Contractor shall re-clean the joint before sealing.

A. PREPARATION OF JOINTS. All existing joint sealer and backer rod shall be removed. Immediately before sealing, the joints shall be thoroughly cleaned of all laitance, curing compound, and other foreign material. Cleaning shall be accomplished by sandblasting and wire brushing. Upon completion of cleaning, the joints shall be blown out with compressed air. The joint faces shall be surface dry when the seal is applied.

B. APPLICATION OF PRIME COAT. When required, apply prime coat to clean, dry surfaces by dipping, brushing or spraying. The coverage rate shall meet the recommendations of the manufacturer. Allow the primer to completely dry until all the solvent evaporates. This time will vary depending on the humidity conditions and the porosity of the surface being primed.

C. INSTALLATION OF SEALANTS. Joints shall be inspected for proper width, depth, alignment, and preparation, before sealing is continued. Sealants shall be installed in accordance with the following requirements:

1. Silicone Sealants. The joint sealant shall be applied uniformly solid from bottom to top and shall be filled without formation of entrapped air or voids. A backing material shall be placed as shown on the plans and shall be non-adhesive to the concrete or the sealant material. Sealants shall be applied to pavement joints by use of appropriate types of pressure fed application systems. Sealant supplied in caulking tubes may be applied using hand or pneumatic types of caulking guns. Sealant supplied in pails or drums shall be applied using a pneumatic pumping system that feeds the sealant through an application hose and wand with a nozzle that is placed in the joint. Any sealant spilled on the surface of the pavement shall be removed immediately. Sealant, which does not bond to the prepared concrete surface of the joint walls, contains voids, or fails to set to a tack-free condition, will be rejected and replaced by the Contractor at no additional cost to the Authority.

2. Before sealing the joints, The Contractor shall demonstrate that the equipment and procedures for preparing and placing the sealant will produce a satisfactory joint seal.

3. Hot Applied Sealants. The joint sealant shall be applied uniformly solid from bottom to top and shall be filled without formation of entrapped air or voids. A backing material shall be placed as shown on the plans. Sealants shall be applied to pavement joints by use of appropriate types of pressure fed application systems. Sealant supplied in caulking tubes may be applied using hand or pneumatic types of caulking guns. Sealant supplied in pails or drums shall be applied using a pneumatic pumping system that feeds the sealant through an application hose and wand with a nozzle that is placed in the joint.
Any sealant spilled on the surface of the pavement shall be removed immediately. Sealant, which does not bond to the prepared concrete surface of the joint walls, contains voids, or fails to set to a tack-free condition, will be rejected and replaced by The Contractor at no additional cost to the Authority. Before sealing the joints, The Contractor shall demonstrate that the equipment and procedures for preparing and placing the sealant will produce a satisfactory joint seal.

E. STORAGE OF SEALANTS. Sealant materials shall be stored in the original, unopened containers supplied by the manufacturer prior to use. Containers shall be opened for only the minimum amount of time practical prior to application. The sealant shall be stored in accordance with the recommendations provided by the manufacturer to maintain storage stability.

4.0 MEASUREMENT AND PAYMENT

Joint sealing for purposes of re-establishing joints during partial and full depth pavement repairs shall be considered an incidental.

Joint sealing planned areas as directed by the COTR shall be measured by the linear foot. Payment for accepted joint sealing shall be made at the unit price per linear foot per material. Backer rod and widening of joints will be separate line items.
EXHIBIT SC-1 ASPHALT SEAL COAT

1.0 GENERAL

This item shall consist of the application of an emulsified asphalt surface treatment composed of an emulsion of natural and refined asphalt materials, water and, if specified, a polymer additive.

2.0 MATERIAL AND PERFORMANCE REQUIREMENTS

Emulsified asphalt seal coat shall conform to the Section 312 in the Special Provisions of the VDOT Road and Bridge Specifications.

3.0 CONTRUCTION METHODS

A. WORKER SAFETY. The seal coat product shall be handled with caution. The Contractor shall obtain a Material Safety Data Sheet (MSDS) for both the asphalt emulsion product and sand and require workmen to follow the manufacturer’s recommended safety precautions.

B. WEATHER LIMITATIONS. The asphalt emulsion shall be applied only when the existing pavement surface is dry and when the weather is not foggy, rainy, or when the wind velocity will prevent the uniform application of the material. No material shall be applied when dust or sand is blowing or when rain is anticipated within eight (8) hours of application completion. The atmospheric temperature and the pavement surface temperature shall both be above 60°F (16°C) and rising.

C. EQUIPMENT AND TOOLS. The Contractor shall furnish all equipment, tools, and machinery necessary for the performance of the work.

D. PRESSURE DISTRIBUTOR. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spreader bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Test the equipment under pressure for leaks and to ensure it is in good working order before use.

E. PREPARATION OF ASPHALT SURFACES. Clean pavement surface immediately prior to placing the seal coat by sweeping, flushing well with water leaving no standing water, or a combination of both, so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease that has not penetrated the asphalt pavement by scraping or by scrubbing with a detergent, then wash thoroughly with clean water. After cleaning, treat these areas with the oil spot primer.
4.0 MEASUREMENT AND PAYMENT

Asphalt Seal shall be measured by the square yard of material placed in accordance with the specifications and accepted by the COTR. This price shall be fully loaded for furnishing all materials, preparing, mixing, and applying these materials, including labor, equipment, and tools. Crack Sealing is a separate line item and not included in the price of the asphalt seal.
EXHIBIT CSR-1 CURB, GUTTER, AND SIDEWALK REPAIR

1.0 GENERAL

This item shall consist of the removal and replacement of existing sidewalk, curb and gutter, and other miscellaneous items.

2.0 MATERIAL AND PERFORMANCE REQUIREMENTS

Asphalt and Portland cement concrete paving, walks, and curbs: The existing material to be removed shall be freed from the adjacent material to remain. Saw through the full depth of the material to be removed including any load transfer devices. The equipment shall not cause damage to the adjacent materials to remain in place.

Meet the requirements of the reference VDOT standards, Division V, Incidental Construction Section 508 (Demolition of Pavement and Obscuring Roadway).

Comply with all Local, State, and Federal laws, rules and regulations applicable to this section and to the demolition work to be done.

3.0 MEASUREMENT AND PAYMENT

Curb, gutter and sidewalk repairs shall be measured as follows:

Repairs:
PCC Sidewalk, 4 Inches Thick SY
VDOT CG-2, Demolition and Replacement LF
VDOT CG-6, Demolition and Replacement LF
VDOT CG-12, Demolition and Replacement EA

New:
PCC Sidewalk, 4 Inches Thick SY
VDOT CG-2, Excavate and Install LF
VDOT CG-6, Excavate and Install LF
VDOT CG-12, Excavate and Install EA
EXHIBIT PAVM PAVEMENT MARKINGS

The Contractor shall furnish and install paint and stencils including thermoplastic painted lines and symbols, paint type A, permanent tapes, temporary or construction preformed tape and snow-plowable pavement reflective markers all in accordance with the Virginia Department of Transportation (VDOT) Road and Bridge Specifications manual.

1. Requirements: The pavement marking services shall include, but not be limited to, establishing the location of pavement markings, application of pavement markings with reflective material, eradication of existing markings, repair and replacement of snow-plowable pavement markers, and all incidental expenses necessary to fulfill the requirements of the contract documents.

2. Manuals: Unless modified herein, pavement-marking services shall be performed in accordance with the current editions of the VDOT Road and Bridge Specifications, the MUTCD, and the Airports Authority’s Design Manual. The VDOT Road and Bridge Specifications include, but are not limited to:

   A. Section 234 - Glass Beads for Reflectorizing Traffic Markings.
   B. Section 235 - Retroreflectors.
   C. Section 246 - Pavement Marking.
   D. Section 512 - Maintaining Traffic.
   E. Section 704 - Pavement Markings and Markers.

MATERIAL CONFORMATION REQUIREMENTS

1. Paint Type A - as specified in Section 246 of the current edition of the VDOT Road and Bridge Specifications manual. All paint material shall be lead free.

2. Thermoplastic - Type B, Class 1, as specified in Section 246 of the current edition of the VDOT Road and Bridge Specifications manual.

3. Permanent Preformed Tapes - Type B, Class VI, as specified in Section 246 of the current edition of the VDOT Road and Bridge Specifications manual. Pavement line markings shall be solid color tape or contrast tape. Contrast tape markings shall be yellow on black or white on black as specified in the contract documents.

4. Temporary or Construction Preformed Tapes - Type D, as specified in Section 246 of the current edition of the VDOT Road and Bridge Specifications manual. All removable tape material shall be lead free.

5. Reflectorized Material - Glass Beads as specified in Section 234 of the current edition of the VDOT Road and Bridge Specifications manual.
6. **Primer/Adhesive** – Primer/adhesive shall be the type recommended by the manufacturer of the pavement marking material. The primer/adhesive shall be void of solvent and water prior to the application of the pavement marking material.

7. **Pavement Markings** - Pavement markings shall be white or yellow as required by the MUTCD for specified locations or as directed by the COTR.


9. **Installation** - Unless recommended by the manufacturer and approved by the COTR, pavement markings shall be installed in accordance with VDOT specifications and as follows:
   
   A. Thermoplastic marking shall be used only on asphalt concrete surfaces, and shall be applied by screed extrude method only.
   
   B. Thermoplastic shall not be applied over existing pavement marking of other materials unless the marking is 90% removed as determined by the COTR. Thermoplastic may be applied over existing thermoplastic markings.
   
   C. Permanent tapes shall be used as directed by the manufacturer after application of primer/adhesive. Permanent tapes shall not be applied over existing pavement marking unless the marking is 90% removed as determined by the COTR. The Contractor must be trained and approved by the manufacturer in the use of the product.
   
   D. Paint pavement marking material shall be applied on concrete pavements unless directed otherwise by the COTR.
   
   E. Temporary or Construction Preformed Tapes, shall be installed as directed by the COTR. All removable tape material shall be lead free.
   
   F. Markings shall be installed in accordance with Table VII - I, Pavement Markings, of the VDOT Specification Section 704.

1. **Marking Varieties** - Pavement line markings shall consist of stop bars; solid and/or skip lines used for, but not limited to, dividing lanes, marking edges, channelizing, outlining and safety zoning around objects, forming islands, and parking lot stalls. Pavement message markings shall consist of elongated arrows and word messages.

2. **Crosswalks** - Crosswalk markings shall be installed in accordance to the Airports Authority Design Manual, No. 1-5-5 Parking Lot Crossings and Drawing No.1-5-4 Roadway Crossings.
3. **Stop Bars** - Stop bar markings shall be 24-inch wide solid white lines, extending across all approach lanes.

4. **Eradication** - Eradication of pavement markings shall conform to the following requirements:

   A. Eradication of markings shall be performed by grinding. The Contractor shall collect the eradication residue during or immediately after the eradication operation. Dust shall be collected during the entire operation. The Contractor shall not store the eradication residue on-site. All eradication residues shall be removed from the Airport Property.

   B. All eradicated markings are to be stored and tested for hazardous waste by-products by the Contractor. The Contractor shall have an independent testing agency test the eradication residue using the Toxicity Characteristics Leaching Procedure (TCLP) test method for the eight Resource Conservation and Recovery Act (RCRA) metals to determine if it is a hazardous or non-hazardous waste. Residue drums shall be grouped in threes for composite sampling. If the eradication residue tests positive as hazardous waste, the total concentrations of metals that exceed the TCLP limit shall be tested.

   C. Based on the analytical test results, the eradication residue shall be disposed of as either hazardous or non-hazardous solid waste. If the test results indicate that the eradication residue is non-hazardous, the Contractor shall be responsible for disposal off airport property to an approved disposal facility. The Contractor shall be responsible for the disposal of the eradication residue determined to be hazardous waste.

   D. Hazardous and non-hazardous eradication residue from the removal of any pavement marking shall be properly manifested and disposed of in a permitted waste disposal facility in accordance with all Federal, State and local laws and regulations. A copy of the shipping manifest shall be submitted to the COTR within two (2) days after disposal of the eradication residue.

   E. When markings are required to be removed permanently, 100% of the markings shall be removed.

5. **Post Eradication** - Pavement marking installation on roads shall be completed within 12 hours after eradication of the existing markings. The Contractor shall be allowed exception to the time limit specified only for weather restrictions. If the permanent pavement markings are not installed within the time limits specified, the Contractor shall install Type D construction preformed tape within a 12-hour time period after eradication. The Contractor shall maintain the Type D construction preformed tape until the permanent pavement markings can be installed. The cost of installing, maintaining, and removing the Type D construction pavement markings shall be the responsibility of the Contractor.
6. Parking Lots - Pavement marking services for the employee and public parking lots shall be performed in segments to minimize disruption to the airport employees and customers. The number of parking spaces, locations and limits of each segment of the parking lot shall be as scheduled and determined by the COTR. The Contractor shall perform and complete the eradication of existing pavement markings and/or the installation of new pavement markings at the end of each workday.

7. Reflective Pavement Markers - Snow-plowable pavement markers shall be repaired, replaced, or installed as new per the direction of the COTR and as follows:

   A. Where previously installed snow-plowable pavement markers have been damaged or removed, The Contractor shall remove damaged units and/or fill potholes with epoxy and aggregate. The Contractor shall then replace and install new snow-plowable pavement markers at adjacent locations.

   B. The Contractor shall remove existing reflectors that are badly damaged, missing, scarred, and do not reflect properly. The Contractor shall clean the castings, apply bonding glue, and install new reflectors in existing castings.

   C. The Contractor shall install snow-plowable pavement markers in roadways where new asphalt pavement was installed as directed by the COTR.

8. Pavement markings shall be paid as follows (DCA):

   a. Pavement Markings 4" Width (Night Hours) LF

   b. Pavement Markings 4" Width (Day Hours) LF

   c. Pavement Markings 12" Width (Night Hours) LF

   Payment is for complete, in place painting including all labor, materials, traffic control, etc.

EXHIBIT FDR FULL DEPTH RECLAMATION
1.0 GENERAL

Full-depth reclamation (FDR) is defined as those processes in which all of the asphalt pavement layers and some portion of the underlying bound and unbound layers are pulverized, stabilized, and compacted in place. This is most commonly performed using hydraulic cement, lime, foamed asphalt or asphalt emulsion as the primary stabilizing additives.

The Contractor shall furnish all labor, materials, and equipment required for completing the work. The Contractor shall select the final mix design (job mix formula- JMF) and construction methods to meet the performance requirements specified herein and VDOT's Special Provision for Full Depth Reclamation.

The Contractor is required to have a technical representative on the site at all times during the mixing and placement operations. At a minimum, this person must have 2 years minimum experience with the FDR process and have experience in developing FDR mix designs.

2.0 MATERIALS

A. STABILIZING AGENTS. The amount of stabilizing agent(s) to be used shall be determined by a mixture design process. Hydraulic cement shall conform to the requirements of Section 214. Lime shall conform to the requirements of Section 240. Fly ash shall conform to the requirements of Section 241. All liquid asphalts used for stabilizing agents shall be on the VDOT approved list for emulsions and PG binders, Approved List 50 and 50.1. Liquid asphalts not currently on the approved list shall be submitted to VDOT for approval. Asphalt emulsions shall conform to the requirements of Section 210; liquid asphalts shall meet the requirements of Section 211.02 (a).

B. WATER. Any water used for mixing shall meet the requirements of Section 216 of VDOT's Road and Bridge Specifications.

C. FDR. The FDR material shall have 100% of all particles passing the 2.0 inch (50mm) size and 55% of all particles passing the 3/8inch (9.5mm) size prior to the addition of any stabilizing agents.

D. OTHER ADDITIVES. If necessary, additional additives may be used to meet the requirements in Table 3. In the case where an additional additive is used, the type and dosage must be described in the JMF(s) submitted to the Department. For FDR using asphalt emulsion, hydrated lime shall be added according to the requirements in Section 211.02(i).

Addition of Crushed Reclaimed Asphalt Pavement (RAP) Material – RAP material may be added by the Contractor and shall meet the requirements of Section 211.02(j) and Table 1.
TABLE 1 – ADDITIONAL CRUSHED RAP

<table>
<thead>
<tr>
<th>Tests</th>
<th>Method</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deleterious Materials: Clay</td>
<td>AASHTO T112</td>
<td>0.2% maximum</td>
</tr>
<tr>
<td>Lumps and Friable Particles in Aggregate</td>
<td>AASHTO T127</td>
<td>2.0 inches (50 mm)</td>
</tr>
</tbody>
</table>

Additional aggregate – Based on the results of the mixture design or other requirements, the Contractor shall determine if additional aggregate is required. Any additional aggregate shall meet Section 203 and the requirements in Table 2, and it shall be graded to produce a product which meets the specification given in Table 3.

TABLE 2 – ADDITIONAL AGGREGATE

<table>
<thead>
<tr>
<th>Tests</th>
<th>Method</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles Abrasion Value</td>
<td>AASHTO T96</td>
<td>45% maximum loss</td>
</tr>
<tr>
<td>b. Sand Equivalent</td>
<td>AASHTO T176</td>
<td>60% minimum</td>
</tr>
<tr>
<td>Maximum size, 100% Passing, Sieve Size</td>
<td>AASHTO T27</td>
<td>2.0 inches (50 mm)</td>
</tr>
<tr>
<td>Water Absorption</td>
<td>AASHTO T85</td>
<td>3% maximum</td>
</tr>
</tbody>
</table>

Handling and Storage – Store cement to prevent moisture degradation and partial hydration. Do not use cement that has become hard, caked or lumpy. Store aggregates and RAP so that segregation and inclusion of foreign materials are prevented. Do not use the bottom six (6) inches of aggregate or RAP piles in contact with the ground.

3.0 JOB MIX FORMULA

A. MIXTURE DESIGNS. FDR mix design(s) in the form of a job-mix formula (JMF) shall be submitted to the COTR for approval, The gradation of each JMF shall have a minimum 100% passing the 2.0-inch (50 mm) sieve with a minimum 55% passing the 3/8-inch (9.5 mm) sieve.

B. The Contractor shall obtain sufficient samples of the material to be reclaimed
Samples shall be to the proposed total recycling depth with a minimum of six (6) locations for each mix design. Additional locations may be selected based on pavement conditions and variability.

**TABLE 3 – FULL-DEPTH RECLAMATION MIX DESIGN REQUIREMENTS**

<table>
<thead>
<tr>
<th>Test</th>
<th>Test Method</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid Limit, Plastic Limit, and Plasticity Index of soil</td>
<td>VTM-7</td>
<td>Report</td>
</tr>
<tr>
<td>Dry Preparation and Mechanical Analysis of Soils, Select Material, Subbase and Aggregate Bases</td>
<td>VTM-25</td>
<td>Report</td>
</tr>
<tr>
<td>Classification of Soils</td>
<td>AASHTO M 145</td>
<td>Report</td>
</tr>
<tr>
<td>Moisture-Density Relations of Soil-Cement Mixtures</td>
<td>AASHTO T 134</td>
<td>Report</td>
</tr>
<tr>
<td>Moisture Density Relations for Bituminous Stabilizing Agents</td>
<td>AASHTO T 180</td>
<td>Report</td>
</tr>
<tr>
<td>Compressive Strength of Soil-Cement Cylinders</td>
<td>ASTM D 1633</td>
<td>Min. 250 psi (Max. 450 psi) at seven (7) days</td>
</tr>
<tr>
<td>Determining the Strength of Soil-Lime Mixtures</td>
<td>VTM-11</td>
<td>Min. 150 psi</td>
</tr>
<tr>
<td>Dry Indirect Tensile Strength (ITS) for Foamed Asphalt Stabilizing Agent</td>
<td>AASHTO T 283 Section 11*</td>
<td>45 psi minimum</td>
</tr>
<tr>
<td>Marshall Stability Test for Asphalt Emulsion Stabilizing Agent</td>
<td>ASTM 5581 (6 inch specimens), AASHTO T 245 (4 inch specimens)**</td>
<td>2500 lbs minimum (6 inch (150mm) diameter specimen), or 1250 lbs (4 inch (100mm) diameter specimen)</td>
</tr>
</tbody>
</table>

* Three (3) specimens shall be produced using 75 blows per side (or 30 gyrations per AASHTO T 312) compacted at or below OMC and cured as follows: 4 inch (100 mm) diameter specimens, oven dry at 40°C for 72 hrs and cool to ambient for 24 hrs; 6 inch (150 mm) diameter specimens, air dried for 24 hours, then an additional 48 hours at 40°C in sealed plastic bag, cool to ambient temperature for 24 hrs.

** Three (3) specimens shall be produced at 75 blows per side (or 30 gyrations per AASHTO T 312) and cured at 60°C to constant mass, Hold specimens at 40°C for 2 hours in a forced draft oven immediately prior to testing.

**4.0 EQUIPMENT**
A. PULVERIZING. The equipment used to reclaim existing pavements shall be capable of pulverizing existing pavement, as well as any additional materials, to meet the gradation provided in the approved mix design, for the widths provided in the Plans, to the depth specified in the approved pavement design.

B. STABILIZING. The equipment used to stabilize the pulverized materials shall be capable of incorporating the stabilizing agent(s) at the rate provided in the approved mix design, automatically metering dosage and mixing the full depth and width of pulverized material to a homogenous mixture.

C. GRADING. The equipment used to grade the stabilized material shall be capable of working within the constraints of the excavation and of grading the full width of stabilized material in conformity with the lines and grades provided in the Plans.

D. COMPACTING. The equipment used to compact the stabilized material shall be capable of working within the constraints of the excavation and of compacting the stabilized material in conformity with the lines and grades provided in the Plans, as well as in conformity with the density requirements provided in the approved mix design.

5.0 CONSTRUCTION METHODS

A. CORE SAMPLES. Coring can be used to obtain an indication of surface layer thicknesses and variability within the project limits. Cores should be a minimum of 4 inches in diameter, locations will be determined by the COTR. Standard materials tests will be used to characterize the existing pavement structure and subgrade to determine the viability of FDR as a project strategy. The Contractor shall be responsible for coring and evaluation of the core sample. All core holes shall be back filled.

B. GRASS AND OTHER VEGETATION. All grass and other vegetation shall be removed from the edge of the existing pavement to prevent contamination of the pulverized bituminous material during the milling operation.

C. FDR. Recycling shall be performed to the depth provided in the approved mix design while simultaneously incorporating stabilizing agent(s), mineral filler, additional aggregate and water. Mixing shall continue until, and the speed of the recycling unit adjusted to ensure, a homogenous mixture of the above materials and pulverized materials is achieved. The application rate of all stabilizing agents shall be continuously monitored using calibrated, automatic meters. The application rate shall be within 0.20 percentage points of the optimal stabilizing agent(s) content provided in the approved mix design. If the measured application rate falls outside the above tolerance, then the recycling operations shall be stopped and corrected before proceeding. The water content of the stabilized material shall be monitored closely to ensure conformance with the
approved mix design and to ensure proper compaction. Longitudinal joints between adjacent stabilization passes shall be overlapped at least four (4) inches. Transverse joints created by the recycling process shall be sawcut, if necessary, to provide a vertical, clean face to ensure proper compaction.

D. GRADING AND COMPACTING. The grading and compacting shall be performed within the constraints of the excavation and the stabilized material shall be compacted in conformity with the lines and grades provided in the Plans. Compaction shall progress across the full width of the stabilized area until maximum density under this roller is achieved. Once the entire working width (full lane width plus affected shoulder width) has been stabilized and only after primary compaction has been completed, the entire working width shall be graded to the required profile and cross-slope. Disturbance to the stabilized and primarily compacted material shall be kept to a minimum during this grading and shaping operation. Any additional water required to achieve maximum density shall be applied by spraying the surface of the stabilized material with light applications. Care shall be taken not to over-apply additional water to any areas of stabilized material.

E. SURFACING. The surface of the compacted material shall be kept moist until covered with an asphalt-based layer in the case of cement stabilized materials. For bituminous stabilized materials, the FDR shall be allowed to cure until the moisture of the material is a maximum of 50% the optimum moisture content or until approval of the Engineer is received. Subsequent asphalt-based layers can be placed any time after finishing, as long as the FDR is sufficiently able to support the required construction equipment without marring or permanent distortion of the surface.

6.0 ACCEPTANCE TESTING

A. FIELD COMPACATION. Density shall be determined with a nuclear gauge operating in direct transmission mode conforming to the requirements of VTM-10 to the full depth of the FDR layer. The Contractor shall have had the gauge calibrated within the previous 12 months by approved calibration service.

Areas identified by the COTR shall be tested for density by taking a nuclear density reading from two stratified-random test sites. Test sites shall not be located within 18 inches of any longitudinal joint. The average of the area’s density measurements will be compared to the maximum density from the approved mix design to determine the acceptability of the lot. If two consecutive sublots produce density results less than 97.0 percent of the target density, The Contractor shall immediately notify the COTR and institute corrective action.

B. DEPTH CHECK. Depth checks will be performed by The Contractor twice per area, following VTM-38B, after compaction and prior to the placement of the next pavement layer. Acceptance of FDR for depth will be based on the mean result of measurements of samples taken from each lot of material placed. A lot will be
considered acceptable for depth if the mean result of the tests is within the
tolerance of the plan depth for the number of tests taken as shown in Table 4.

**Table 4 – Process Tolerance for Depth Checks**

<table>
<thead>
<tr>
<th>Plan Depth, inches</th>
<th>Tolerance, inches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Test</td>
</tr>
<tr>
<td>&gt;6 ≤ 8</td>
<td>0.9</td>
</tr>
<tr>
<td>&gt;8 ≤ 12</td>
<td>1</td>
</tr>
<tr>
<td>&gt;12</td>
<td>1.2</td>
</tr>
</tbody>
</table>

C. GRADATION– The contractor will check the unstabilized gradation twice per
day.

D. STABILIZING AGENT DOSAGE RATE. The Contractor shall verify the dosage
rate ten times per area. The dosage rate shall be within 0.20 percentage points
of the approved mix design. If the dosage rate is beyond this tolerance, then
paving shall stop and The Contractor shall take corrective measures.

7.0 MEASUREMENT AND PAYMENT

FDR shall be measured by the square yard of areas repaired in accordance with the
specifications and accepted by the COTR. This price shall be fully loaded for
furnishing all materials, preparing, mixing, and applying these materials, including
labor, equipment, stabilizing agents, additives and tools. Core holes are a separate
line item and not included in the price of the FDR.

Full Depth Recycling (FDR) will be measured by the square yard of the completed
sections for the depth specified for the project and paid for at The Contract unit price
per square yard of depth. This price shall be full compensation for removal and
processing of the existing pavement; for preparing, hauling, and placing and
compacting all materials; furnishing additives (not including stabilizing agents); for all
freight involved; for all manipulations, including removal of grass and other
vegetation; rolling and brooming; testing and documentation; stabilizing agent
supplier services; and for all labor, tools, equipment and incidentals necessary to
complete the work. Stabilizing agents will be paid as follows:

**Liquid Asphalt (Emulsion)** will be paid for at The Contract unit price per ton. This
price shall be full compensation for furnishing and incorporating the emulsion into
the mixture. An emulsion content of 3.0% by weight of the reclaimed material shall
be used for bidding purposes prior to the completed design. The actual emulsion
content will be adjusted based on the quantity necessary to meet the design requirements in Table 3.

**Liquid Asphalt (foamed)** will be paid for at The Contract unit price per ton. This price shall be full compensation for furnishing and incorporating the foamed asphalt into the mixture. A foamed asphalt content of 2.5% by weight of the reclaimed material shall be used for bidding purposes prior to the completed mix design. The actual foamed asphalt content will be adjusted based on the quantity necessary to meet the design requirements in Table 3.

**Hydraulic Cement** will be paid for at The Contract unit price per ton. This price shall be full compensation for furnishing and incorporating the hydraulic cement into the mixture. A cement content of 5.0% by weight of the reclaimed material shall be used for bidding purposes prior to the completed design. The actual cement content will be adjusted based on the quantity necessary to meet the design requirements in Table 3.

**Lime** will be paid for at The Contract unit price per ton. This price shall be full compensation for furnishing and incorporating the lime into the mixture. A lime content of 5.0% by weight of the reclaimed material shall be used for bidding purposes prior to the completed design. The actual lime content will be adjusted based on the quantity necessary to meet the design requirements in Table 3.

**Other Cementitious Material** will be paid for at The Contract unit price per ton. This price shall be full compensation for furnishing and incorporating the cementitious into the mixture. A cementitious content of 5.0% by weight of the reclaimed material shall be used for bidding purposes prior to the completed design. The actual cementitious content will be adjusted based on the quantity necessary to meet the design requirements in Table 3.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-Depth Reclamation (Depth)</td>
<td>Square Yard</td>
</tr>
<tr>
<td>Liquid Asphalt (Emulsion)</td>
<td>Ton</td>
</tr>
<tr>
<td>Liquid Asphalt (Foamed)</td>
<td>Ton</td>
</tr>
<tr>
<td>Hydraulic Cement</td>
<td>Ton</td>
</tr>
<tr>
<td>Lime</td>
<td>Ton</td>
</tr>
<tr>
<td>Other Stabilizing Materials</td>
<td>Ton</td>
</tr>
<tr>
<td>Additional Aggregate</td>
<td>Ton</td>
</tr>
</tbody>
</table>
SJ-1 FOAM INJECTION SLAB LEVELING

1.0 DESCRIPTION

This work shall consist of soil densification to strengthen base and sub-base soils under flexible asphalt, concrete, or composite pavement, and structures such as bridge approaches with sleeper slabs, by furnishing and injecting expansive polyurethane material into the foundation soils beneath the pavement through holes or injection tubes inserted into drilled holes at locations and depths, as shown on the plans or as directed by the COTR, while monitoring for movement at the surface. If necessary, injection of material shall continue as needed to lift the pavement to grade.

A. The material shall be a two-part, one-to-one ratio by volume, closed cell, hydro-insensitive, high density polyurethane system.

B. The material shall reach 90% compressive strength in 30 minutes such that traffic may be returned to roadway within 30 minutes after last injection of material.

C. The material shall be a polyurethane-forming mixture, having a water insoluble diluent, which permits the formation of polyurethanes in excess water with improved dimensional stability.

D. These characteristics must be certified by the manufacturer.

2.0 MATERIAL REQUIREMENTS

High Density Polyurethane Material. Shall conform to the following requirements for property test results:

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density, lbs./cu. ft. (min.)</td>
<td>ASTM D-1622</td>
<td>4.0</td>
</tr>
<tr>
<td>Compressive Strength, psi (min.)</td>
<td>ASTM D-1621</td>
<td>60</td>
</tr>
<tr>
<td>Flexural Strength, psi (min.)</td>
<td>ASTM D-790</td>
<td>90</td>
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<tr>
<td>Shear Strength, psi (min.)</td>
<td>ASTM C-273</td>
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<tr>
<td>Tensile Strength, psi (min.)</td>
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<td>90</td>
</tr>
<tr>
<td>Closed Cell content (%)</td>
<td>ASTM D-6226</td>
<td>&gt;85</td>
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</table>

Non-shrink grout to patch drill holes. Supplied by an approved manufacturer and used within the shelf life and temperature limitation set by the manufacturer.
3.0 EQUIPMENT REQUIREMENTS

The Contractor shall provide at a minimum, the following:

A. The pumping units shall be capable of controlling the rate of flow of material as required to densify soils and prevent pavement blowouts. The units shall all be equipped with a certified flow meter to measure flow of the A component and the B component separately. The two measurements will be combined to measure the amount of high-density polyurethane injected at each location. The certified flow meters shall have a digital output to show both pounds and gallons of each component material.

B. Pressure and temperature control devices capable of maintaining proper temperature and proportionate mixing of the polyurethane component materials.

C. Pneumatic or electric drills capable of efficiently drilling 5/8” to 2” diameter injection holes through the pavement without damaging the structural integrity of the existing pavement.

D. Laser levels or dial indicator devices capable of monitoring movement at the surface of the pavement to verify that the injected base and sub-base soils have been properly densified.

E. Portable Dynamic Cone Penetrometer (DCP). Provide a portable DCP for on-site soils investigation to assist in location and depth of weak foundation soils and determination of correct injection pattern and injection elevations through tubes to densify weak soils. Dynamic cone penetrometer testing may be required as directed by the COTR to confirm existing sub-grade soil conditions.
4.0 CONSTRUCTION

A. HOLES AND INSTALLATION OF INJECTION TUBES. Drill 5/8" to 2" diameter holes, vertical and round, and to a depth indicated on the approved field QC plan. Install injection tubes to the prescribed injection depth or depths.

B. MIXING. Using the flow meters, a quality check shall be performed on the ratio of the two-part chemical system. The part A (Resin) to the part B (ISO) ratio by volume should be 1:1. Prior to performing the work each day, The Contractor shall reset the flow meters on the pumping units to zero. The Contractor shall perform a test shot of material from 1 injection gun at a time with a minimum of 0.5 gallons of each material, comparing the digital output in gallons of resin to the gallons of ISO to determine the injected ratio. If the ratio is less than 0.95 or greater than 1.05, the system is to be checked for problems, adjusted, and the ratio rechecked until a proper ratio is assured. The Contractor shall repeat the quality check for all the injection guns to be used on the project. The Contractor shall submit with other bid documents the most recent calibration documents for the flow meters.

C. PAVEMENT FOUNDATION SOIL STABILIZATION. Inject the high-density polyurethane material through holes, via injection tubes when needed, into the foundation soils beneath the pavement to the prescribed depth or depths. Control the stabilization of the foundation soils by regulating the rate of injection of the material. Continuously monitor for movement of the pavement. Foundations soils are sufficiently stabilized when movement of the pavement is detected. Injection may continue into the soils as needed to lift the pavement to grade, returning the pavement system to original construction: pavement on top of base on top of a stiffened subbase or subgrade.

D. HOLE PATCHING. Push down or drill out injection tubing down 2" below the pavement surface and install a rapid set, non-shrink patching material into the drilled-out hole. Strike patches flush with the surface of the surrounding pavement.

E. OPENING TO TRAFFIC. Injected pavement may be opened to traffic within 30 minutes of final injection of polyurethane material as material is at a minimum 90% strength within 30 minutes. Pavement shall be free of debris and swept clean prior to opening to traffic.

F. DAMAGE. The Contractor will be responsible for any pavement blowouts, excessive pavement lifting or pavement damage that may occur as a result of The Contractor’s work. The Contractor shall repair any subject areas to the satisfaction of the engineer at The Contractor’s expense.
5.0 TESTING REQUIREMENTS

Dynamic Cone Penetrometer (DCP) Testing – At the request of the Engineer and paid for by the client, The Contractor shall provide pre-injection and post-injection DCP testing in various locations as determined by the Engineer. Any areas that require re-injection shall be done so and paid for at the unit cost for injection.

6.0 WARRANTY

A two-year unconditional warranty against settlement of more than 1/4" of the pavement. If settlement of more than 1/4" in the injected areas occurs, The Contractor shall return to inject the affected area to lift to proper grade at no additional charge to The Owner. One exception to warranty – if the DCP tests reveal deeper problems and the owner does not authorize payment to address these issues, warranty will not be valid.

7.0 MEASUREMENT AND PAYMENT

Foam injection shall be measured by the pounds repaired in accordance with the specifications and accepted by the COTR. This price shall be fully loaded for furnishing all materials, preparing, measuring, monitoring and applying these materials, including labor, equipment, and tools.
APPENDIX A

Contract Service Call Order

METROPOLITAN WASHINGTON AIRPORTS AUTHORITY

Contract Services, IAD

SERVICE CALL ORDER

Prepared: __________________________ Date Prepared: __________

Type of Work: __________________________ Requested By: __________

Contractor: __________________________ Contract No.: __________

Address: __________________________ Contractor POC: __________

Schedule of Completion __________________________ Office Phone: __________

Location and Description of Work: __________________________ Emergency Phone: __________

Contractor Fax: __________

WORK ITEM QUANTITY UNIT OF MEASURE UNIT COST AMOUNT

TOTAL ESTIMATED COST

NOTE: Services of Work shall be performed in accordance with the terms and conditions of the contract documents.

COST: __________________________ Notes: __________________________

APPROVALS / ACCEPTANCE OF SERVICE CALL ORDER

NOTE: By signing this Service Call Order, the Contractor acknowledges that he/she will only perform the work described herein after this Service Call Order is approved in writing up to $10,000 by the COTR. Service Call Orders exceeding $10,000 require both the COTR and CO’s signatures. Furthermore, the cost to the Authority for this work shall not exceed the Call Order amount.

Call Order #: __________________________

COTR: __________________________ Start Date: __________

Contractor: __________________________ Date: __________ Date Completed: __________

CO: __________________________ Invoice Amount: __________

Remarks: __________________________
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<th>Item No.</th>
<th>Date</th>
<th>Bituminous Concrete Repairs</th>
<th>RCC Repairs</th>
<th>Crack Sealing, Bituminous Concrete, Emulsified Asphalt</th>
<th>Crack Sealing, RCC, Emulsified Asphalt</th>
<th>Joint Sealing, RCC Pavers</th>
<th>Mill and Overlay Bituminous Pavements</th>
<th>Curb, Gutter and Sidewalk Repairs</th>
<th>Curb, Barrier Island, New Install</th>
<th>Stone Shoulder</th>
<th>Swale Humps</th>
<th>Asphalt Sealing</th>
<th>Type I Class I, Thermoplastic</th>
<th>Type I Paint</th>
<th>Type 2 Class II</th>
<th>Temporary Type</th>
<th>Marking</th>
<th>Pavement Markers</th>
<th>Roadway Markers</th>
<th>Reinforced Concrete with Reinforcement Steel</th>
<th>Full Depth Restoration</th>
<th>Foam Injection</th>
<th>Location Pavement Repair</th>
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APPENDIX B

Foam Injection Applications

Asphaltic Concrete Pavement – Stabilization and Lifting (if required)

1. Inject polyurethane material through tubes into the foundation soils to stiffen weak foundation soils beneath asphaltic concrete pavement that have caused (or may cause in the future) premature cracking, rutting or settlement of the pavement. Representative may determine need for polyurethane injection from visual inspection and/or other testing such as FWD, borings, or DCP testing.

2. Typical injection depth is -4’ to -5’. DCP test(s) shall be performed at each location to determine optimum injection depth or depths. Due to the flexible nature of asphaltic concrete pavement, sufficient depth is required to minimize blistering of the flexible pavement reducing ride quality.

3. While lifting of the asphaltic concrete may be performed when necessary, Representative shall evaluate the economics whether to lift with continued injection of polyurethane or to install an asphalt patch or overlay of the pavement.

4. Standard injection pattern is 4’ on center; however, a thinner asphalt pavement may require a tighter injection pattern of 3’ on center. The Contractor may adjust the injection pattern following approval by Representative.

5. Polyurethane material may travel through cracks and fissures in the foundation soils to the bottom of the asphaltic concrete pavement causing blistering or uneven lifting of the pavement. Minor milling/filling may be required. The Contractor is not responsible to correct ride quality; however, Representative may direct The Contractor to cease injection.

6. When wet foundation soils are suspected, or found to exist, vent holes shall be in place to allow water to escape from under the pavement system, and/or injection shall be performed in such a manner as to move the water out from under the pavement system.

Composite Pavement – Stabilization at Joints and Cracks Prior to Mill and Overlay

1. Inject polyurethane material through tubes into the foundation soils on approach and leave side of the joints and cracks in the concrete beneath the asphaltic concrete to mitigate reflective cracking caused by insufficient foundation support. Unsupported, the constant movement in the concrete pavement at the cracks and joints is one of the causes of reflective cracking of the asphaltic concrete overlay. The Representative may determine need for polyurethane injection from visual inspection of existing reflective cracking and/or other testing such as FWD, borings, or DCP testing.
2. The Representative shall direct the Contractor to inject on either side of the joints, on either side of the joints and cracks, or beneath the entire pavement system depending on previous testing and budget.

3. Typical injection depth is 3’; however, this depth will vary based upon the pavement structure profile. Polymer must be injected at sufficient depth to prevent delamination of the asphaltic concrete from the concrete by eliminating the possibility of travel of the polymer up through the joints and cracks to the interface of the concrete and asphaltic concrete overlay.

4. Injection at the cracks and joints may temporarily worsen the ride quality. If the planned overlay is not scheduled within a few days of the injection process, an intermediate grinding of the rough areas may be required and paid for under separate pay item.

5. When wet foundation soils are suspected, or found to exist, vent holes shall be in place to allow water to escape from under the pavement system, and/or injection shall be performed in such a manner as to move the water out from under the pavement system.

Full Depth Pavement Patch – Stabilization of Foundation Soils Prior to Removal and Replacement

1. Inject polyurethane material through tubes into the foundation soils beneath the pavement prior to full depth removal and replacement of the pavement to eliminate the need for additional cutout of poor foundation soils beneath the failed pavement section. The Representative may determine need for polyurethane injection from visual inspection and evidence of wet, weak foundation soil support, previous history of repeated patch failures, and/or other testing such as FWD, borings or DCP testing.

2. Injection of polyurethane material must be done prior to removal of pavement as the polymer requires the reaction mass of the pavement and containment to allow injection of sufficient quantity of material.

3. Injection of polyurethane material shall be performed one row in front and one row in back of the failed section.

4. Injection pattern is typically 4’ on center and 3’ to 4’ in depth.

5. When wet foundation soils are suspected, or found to exist, vent holes shall be in place to allow water to escape from under the pavement system, and/or injection shall be performed in such a manner as to move the water out from under the pavement system.
Concrete Pavement – Stabilization of Foundation Soils and Lifting of Dips and Faulted Longitudinal and Transverse Joints

1. Inject polyurethane material through tubes into the foundation soils to stabilize continuously reinforced concrete or jointed concrete slabs that have settled due to weak or compromised foundation soils. The Representative may determine need for polyurethane injection from visual inspection and evidence of wet, weak foundation soil support, and/or other testing such as FWD, borings or DCP testing.

2. DCP testing shall be performed to determine if one level of injection is sufficient to correct the cause of the settlement. The Contractor shall review the DCP data and if warranted, The Contractor shall make recommendation to the Representative for additional levels of injection. Additional levels shall only be injected following Representative’s approval.

3. If the base course is rigid, such as CTB or soil cement base, injection directly beneath the concrete will be necessary to fill the voids that may have been caused by the pumping out of the fines in the base course.

4. Lifting of the concrete to correct the grade or correct the faulting shall be accomplished by continued injection into the soils. This returns the pavement system to original construction, concrete on base on stiffened sub-base or subgrade.

5. In correcting the faulted jointed pavement, The Contractor shall use both the laser level and the differential fault meter to ensure the high side of the joint is not over-lifted causing poor ride quality.

6. If the faulted joint experiences aggregate lock prior to completing the lift, the Representative may direct The Contractor to perform full depth saw-cut of the joint. Saw-cutting will be paid for separately on a separate pay item. The Representative may also direct The Contractor to cease joint matching operation and opt to reschedule the joint matching in cooler months or at night which may reduce the aggregate lock. The Representative may direct The Contractor to cease injection and choose to direct the diamond grinding of the faulted joint. Diamond grinding shall be paid for as a separate pay item.

7. When wet foundation soils are suspected, or found to exist, vent holes shall be in place to allow water to escape from under the pavement system, and/or injection shall be performed in such a manner as to move the water out from under the pavement system.

Drainage Systems – Repair of Leaking Joints and Compaction of Weak Foundation Soils

1. Inject polyurethane material through tubes into the foundation soils beneath the pavement over a drainage structure, into the soils beneath the drainage structure to support the drainage structure and/or around the drainage structure to seal leaking joints in the drainage structure. The weak soils may be due to poor
compaction during construction of the drainage system or due to leaking joints in the drainage structure causing removal of the pavement foundation soils or drainage foundation soils as water travels through the leaking joints. The Representative may determine need for polyurethane injection from visual inspection of the drainage system, settlement of the pavement over the drainage structure, sinkholes in the area, and/or other testing such as FWD, borings or DCP testing.

2. Injection pattern and elevations are determined by the depth of the drainage structure, the size of the drainage structure, the DCP tests, the size of the settled area of the roadway and the looseness of the soils found when drilling and installing injection tubes. The Representative shall approve the scope of the injection area, pattern and depth prior to injection of polyurethane material.

3. During injection of polyurethane material above or around drainage structures, a constant visual of the inside of the drainage structure must be maintained by the Contractor. Excessive material wasted inside the drainage structure will not be paid. Cleanout of the drainage structure is the responsibility of The Contractor and considered incidental to the work.

4. If the drainage structure is not structurally sound such as rusted out CMP, polyurethane material may be injected to stabilize the pavement foundation soils; however, care must be taken not to collapse the weak drainage structure.

5. When wet foundation soils are suspected, or found to exist, vent holes shall be in place to allow water to escape from under the pavement system, and/or injection shall be performed in such a manner as to move the water out from under the pavement system.

Bridge Approach/Departure Slabs – Stabilization and Lifting of Sleeper Slab and Associated Pavement

1. Inject polyurethane material through tubes into the foundation soils beneath the sleeper slab, approach/departure slab and associated pavement at a bridge suffering from poor transition from pavement system to the bridge. The weak soils may be due to poor compaction during construction, the heavy weight of the sleeper slab and/or the water infiltration beneath the approach slab causing sinkholes and carrying the foundation soils out from under the abutment wall or wing walls. The Representative may determine need for polyurethane injection from visual inspection of the approach slab settlement, sinkholes, and/or cracking, drawings from original construction or knowledge from similar construction, and/or other testing such as FWD, borings or DCP testing.

2. DCP testing shall be performed near the abutment wall, where the pavement has maximum settlement and at the sleeper slab. The Contractor shall review the DCP data and make recommendation of area, injection pattern and depths to the Representative to ensure a long-lasting smooth transition from the pavement to the bridge. The Representative shall approve the scope of the injection area, pattern and depth prior to injection of polyurethane material.
3. Bridge approach slabs that have sleeper support slabs shall have all drill holes fully sleeved by tubes into the base soils to prevent any injection of material between the sleeper slab and the pavement. To stabilize the sleeper slab, injection tubes shall be inserted to a minimum depth of 5’ (minimum of 2’ below the bottom of the sleeper slab) and then at a second elevation approximately 10’ below the pavement surface. Material shall be injected in each tube until the soils are stabilized as evident when movement of the pavement is detected. After the soil is stabilized beneath the sleeper slab, injection may be continued to lift the sleeper slab and pavement to original grade.

4. If there is any concern over loss of soil beneath the abutment wall, a row of injection tubes shall be inserted to the proper depth and material injected to stabilize the soils and close off any pathways for water to travel, carrying soils out from under the abutment wall.

5. The Contractor shall continuously monitor for movement of the approach slab at the bridge deck end utilizing a differential fault meter. If the approach slab begins to lift off the abutment wall, The Contractor shall cease injection and move injection to holes further away from the abutment wall.

6. MSE walls will be monitored for any movement and injection will be ceased from a hole where movement of the MSE wall is detected.

Concrete Pavement with Drainable Base – Stabilization and Lifting without Filling Drainable Base

1. Inject polyurethane material through tubes into the foundation soils on a 4’ grid pattern at a typical depth of 12” to 24” below the bottom of the drainable base to repair foundation soils beneath the drainable base that have caused (or may cause in the future) premature cracking, spalling or corner breaks, settlement at joints or dips in the pavement. This process will stabilize the foundation soils, compress the drainable base back up against the bottom of the pavement, without filling the drainable base with polyurethane material. The Representative may determine need for polyurethane injection from visual inspection, knowledge of the pavement structure profile, and/or other testing such as FWD, borings, or DCP testing.

2. If pavement requires lifting, injection of polyurethane material shall continue into the foundation soils until pavement is lifted to grade without fouling the drainable base with polyurethane material.

3. DCP testing shall be performed prior to injection to confirm that only one level of injection is required to achieve sufficient stabilization.
Figure 1.1

APPENDIX C
Drawings

General Notes

⇒ Make vertical saw cut approx 6" from the edge of the distressed area.

⇒ Bituminous concrete placement shall be in accordance with the specification BC-1, Bituminous Concrete Pavement.
Figure 1.2

PCC Pavement
Partial Depth Repair

General Notes

⇒ Details for use with low and medium severity pop-outs, scaling, map cracking, joint spalls and corner spalls.
⇒ Make vertical saw cut approx 3" from the edge of the distressed area, min 2" for Thermacrete (or hot applied polymer material) and 4" for all other repair materials.
⇒ Remove all concrete and loose materials as necessary to expose sound concrete within the repair area.
⇒ Apply specified primer coating to the bottom and sides of the repair area prior to placement of the repair material.
⇒ Repair material used shall be in accordance with the specification section PCC-1 Portland Cement Concrete Pavement Partial Depth.
⇒ Re-establish Longitudinal joints in accordance with the specification requirements and the appropriate Sawed Joint Reconstruction and Sealing Filler Details.
⇒ If the depth of repair exceeds half of the pavement thickness minus one inch, then a full depth repair shall be performed in accordance with the specification section PCC-2 Portland Cement Concrete Pavement Full Depth Repair.
Appendix D
Airport Map

IAD:
Appendix E
Construction Safety Manual