

# **Appendix C**

## **Summary of Mitigation Program**

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## MITIGATION MEASURES FOR THE PREFERRED ALTERNATIVE

The following describes in detail the mitigation program for the Preferred Alternative that shall be committed to and implemented by the Metropolitan Washington Airports Authority (MWAA) to mitigate impacts resulting from the Preferred Alternative. This mitigation program consists of measures and programs that will be implemented by MWAA to reduce impacts in the following environmental categories:

- Noise,
- Water Quality,
- Cultural Resources,
- Wetlands,
- Floodplains, and
- Construction.

The mitigation program was developed to comply with pertinent laws and regulations, after consideration of public comments, and through coordination with affected parties and applicable agencies. The mitigation program outlines specific mitigation program elements for each environmental impact category for which mitigation is warranted. The elements of MWAA's program are provided in **Table C-1** and discussed in detail in the following paragraphs. Several of the mitigation measures assume the opening of the runway as a scheduling benchmark for implementation. For purposes of this mitigation program, the opening of the project is considered to be the first day that the runway is used for air carrier service.

**TABLE C-1  
SUMMARY OF MITIGATION PLAN - PREFERRED ALTERNATIVE**

<b>Element</b>	<b>Environmental Impact Category</b>	<b>Element #</b>	<b>Recommended Mitigation Elements</b>	<b>Estimated Schedule</b>	<b>FEIS Section</b>
1	Noise	1.1	Acquisition of two residences south of IAD.	Concurrent with construction of Runway 12R/30L.	6.3.1
2	Water Quality	2.1	Create airport-compatible stormwater detention areas for attenuation of stormwater runoff.	Concurrent with construction of new impervious areas.	6.3.2
		2.2	Install oil/water separators.	Concurrent with construction of new impervious areas.	6.3.2
		2.3	Glycol deicing treatment.	Concurrent with construction of new impervious areas.	6.3.2
		2.4	Erosion and sediment control.	Concurrent with all construction activities	6.3.2
3	Cultural Resources	3.1	Project MOA.	Executed prior to FAA's issuance of the Record of Decision (ROD).	6.3.3
		3.2	Phase III Data Recovery and/or Preservation-in-Place of NRHP eligible archaeological resources.	Prior to construction phase of the airport expansion.	6.3.3
4	Wetlands	4.1	Wetland and stream mitigation program.	Initiate upon Section 404/401 permit approvals.	6.3.4
5	Floodplains	5.1	Limit fill within floodplain areas.	Concurrent with airport expansion.	6.3.5
		5.2	Provide airport-compatible stormwater detention areas for peak discharge attenuation and floodplain storage compensation.	Concurrent with airport expansion.	6.3.5
6	Construction Impacts	6.1	Construction and environmental control provisions (BMPs).	Develop concurrently with plans and specifications for each airport development project.	6.3.6

Source: URS Corporation, 2005.

The primary responsibility for implementation of the mitigation program element lies with MWAA. Where appropriate, approval and concurrence from agencies having jurisdiction will be obtained. These agencies include:

- Army Corps of Engineers (USACE),
- Virginia Department of Environment Quality (VDEQ), and
- Environmental Protection Agency (EPA).

The Federal Aviation Administration (FAA) will oversee MWAA's implementation of the mitigation program and will put conditions in the grant agreement as necessary upon completion of the mitigation program elements by MWAA. It should be noted that MWAA is in the process of designing the proposed project at Washington Dulles International Airport (IAD). Since the design is in the preliminary stage, sufficient data is not available to identify and fully describe all mitigation measures that will be implemented by MWAA, particularly with regard to water quality, wetlands, and floodplains. Since the construction of the proposed project will include the requirement for MWAA to obtain multiple Federal, state and local permits, the details of the specific mitigation measures including their quantity, location, and performance characteristics will not be finalized until the actual permits are granted. The following are the mitigation measures that MWAA is currently in the process of designing.

***ELEMENT 1: NOISE***

**Element 1.1 - Acquisition of Two Residences South of IAD**

MWAA has committed to appropriate mitigation, in terms of acquisition, of the two residential parcels significantly impacted by noise due to the Preferred Alternative according to the year 2025 noise analysis. The residences are located south of IAD along Vance Road. MWAA is committed to this mitigation program as long as these properties remain in residential use when Runway 12R/30L is constructed.

## ***ELEMENT 2: WATER QUALITY***

Water quality mitigation measures are contained in their entirety in the Stormwater Management Plan and permitting documents prepared by MWAA for the Preferred Alternative. These mitigation measures, summarized in the following section of this Final Environmental Impact Statement (FEIS), include the following:

### **Element 2.1: Create Stormwater Detention Areas for Attenuation and Treatment of Stormwater Runoff (This element of the mitigation program will be implemented during the construction phase and maintained during the operational phase of the Preferred Alternative)**

Based on the stormwater management design plans, which are currently being developed by MWAA, the stormwater management system will include the stormwater collection system, stormwater BMPs, which comprise drainage channels, or water quality swales, and stormwater treatment wetlands, referred to as BTUs. The purpose of the water quality swales and the BTUs is to treat deicing fluid in stormwater runoff not otherwise contained at centralized deicing pads, and to remove total phosphorus from stormwater, as required by VDEQ.

Design criteria include constraints on facility location and type due to safety criteria established by FAA and due to potential environmental impacts to wetlands, and constraints related to facility sizing for both stormwater quantity and quality control established by VDEQ, the Virginia Department of Conservation and Recreation (VDCR), and the Virginia Department of Transportation (VDOT).

Low Impact Development (LID) concepts are being developed to meet VDEQ water quality requirements. The principles of LID require that runoff be minimized by promoting infiltration and treatment as near as possible to where runoff is generated. To apply this principle, several measures have been incorporated into the drainage design to the extent possible:

- Increase the time of travel over vegetated surfaces in infield areas by limiting the number of inlets per infield area.

- Minimize slopes in infield areas to the minimum (1.5 percent) allowed by FAA Advisory Circular (AC) 150/5300-13 *Airport Design*; to maximize the time of concentration and maximize infiltration while keeping these areas dry. Provide underdrains in localized areas that may be subject to ponding such as near inlets to eliminate standing water that could interfere with maintenance and to reduce wildlife attractiveness.
- Allow ponding in infield areas, as allowed by FAA AC 150/5320-5B Airport Drainage, for large events; storms of 10-year return frequency are allowed to pond for up to 1 hour.
- Use vegetated channels or water quality swales to convey runoff from the runway/taxiway complex to the BTUs.
- Consistent with the Virginia Stormwater Management Handbook Minimum Standard 3.13, use minimum slopes in the water quality swales, to slow discharge and promote infiltration; and provide underdrains to promote infiltration and to keep them dry for the purpose of routine mowing. For control of sediment and debris, low check dams would be provided at selected locations upstream of BTUs and discharge to receiving streams.
- Use BTUs, which in effect are large-scale bioretention facilities, to treat stormwater discharges for deicing fluid and total phosphorus.

Based on MWAA's preliminary design, six different drainage systems are being developed, each comprising drainage inlets in the infield areas between runway and taxiway, drain pipes carrying flows under the runway or taxiway, followed by a water quality treatment system. The BTUs are located offline from the water quality swales, with diversion provided by a weir in the channel and connecting pipe. The water quality swales discharge to the nearest existing stream.

The water quality swales and associated diversion weirs are being sized to fully contain the runoff generated by the first half inch of rainfall from impervious surfaces as required by the Virginia Stormwater Handbook, but for several swales and BTU diversion systems it fully contains up to the 1-inch storm. The locations of the BTUs and associated water quality swales were driven by the need to provide adequate vertical drop from the drainpipe from infield areas to the ultimate outfall, assuming a target minimum slope of 0.5 percent in the water quality swale, and a preferred slope of 1 percent. It is recognized that 0.5 percent slopes are not ideal to maintain positive flow in the vegetated channels, so the water quality swales may be provided with underdrains in localized areas to avoid standing water that might hinder efficient mowing operations or pose a hazardous wildlife attractant.

In addition to the water quality swale and BTU systems providing water quality capture and treatment of runoff from half-inch rainfall, water quantity control is being evaluated for the 1- and 10-year storm events, per the Virginia Stormwater Management Handbook, through two regional dry detention ponds. A requirement for the detention facility is that it must be sited on IAD property. The detention facility will be split into two separate facilities in order to support this requirement. The westernmost of the two facilities receives flow from three of the BTUs. It is located at the southern edge of the airport property at the headwaters of an unnamed tributary to Cub Run.

For the western detention facility, the 1-year storage volume is 5.11 acre-feet and the 10-year storage volume is 15.71 acre-feet. For the eastern detention facility, the 1-year storage volume is 13.43 acre-feet and the 10-year storage volume is 38.52 acre-feet.

**Element 2.2: Oil/Water Separators (This element of the mitigation program will be implemented during the operational phase of the Preferred Alternative.)**

Runoff from maintenance areas is anticipated to be the largest potential source of oil and grease contamination of area surface waters. MWAA's drainage design contains provisions for the location and installation of oil/water separators that will serve to minimize, if not virtually eliminate, the potential for oil and grease contamination to enter receiving surface waters.

**Element 2.3: Deicing Runoff (This element of the mitigation program will be implemented during the operational phase of the Preferred Alternative.)**

As described in detail in the *Comprehensive Deicing Concepts for Washington Dulles International Airport* (MWAA, 2002c), MWAA is developing a centralized deicing area at IAD that will increase the capture of spent aircraft deicing fluid (ADF) and increase the glycol concentration of the recovered ADF so that more of it will be suitable for recycling. This system will be designed concurrently with the design of the runway and taxiway areas. Currently, there are no regulations in effect that are specific to the treatment of glycol that is released into the environment. In the event that regulations are established, MWAA is committed to fully complying with the requirements established in the regulations.

**Element 2.4: Erosion and Sediment Control (This element of the mitigation program will be implemented during the construction phase of the Preferred Alternative.)**

MWAA's design documents incorporate the Virginia requirements for erosion and sediment control as specified in the *State of Virginia Sediment and Erosion Control Handbook*. The design will ensure that properties and waterways downstream from the proposed project will be protected from erosion due to increases in the volume, velocity, and peak flow rate of stormwater runoff.

Prior to construction activities, MWAA will submit a permit application for coverage under a Virginia Pollutant Discharge Elimination System (VPDES) Construction Permit to VDEQ. The permit will include the site's construction plans and specifications and will provide minimum requirements for stormwater management and sediment and erosion control during construction activities. Erosion and sediment controls such as silt fences, bank stabilization, and stormwater runoff control will be included in the construction plans and specifications.

**ELEMENT 3: CULTURAL RESOURCES**

**Element 3.1: Project Memorandum of Agreement (This element of the mitigation program was completed prior to the issuance of FAA's ROD.)**

FAA and MWAA have entered into a Memorandum of Agreement (MOA) with the Virginia State Historic Preservation Officer (SHPO) for the Preferred Alternative. This document specifies the process for continued consultation regarding the planned Tier 3 Concourse Improvements and measures to mitigate adverse effects to archaeological resources due to the construction and operation of the FAA's Preferred Alternative. A copy of the executed MOA is contained in Appendix B of this ROD.

**Element 3.2: Archaeological Resources Phase III Data Recovery and/or Preservation-in-Place of NRHP Eligible Archaeological Resources (This element of the mitigation program will be implemented prior to the construction phase of the Preferred Alternative.)**

Fourteen archaeological sites in the Area of Potential Effect (APE) were evaluated for their eligibility for listing in the NRHP. Prior to the publication of the FEIS, one site (44FX2840) had been determined to be eligible for listing in the NRHP and concurrence had been received from the Virginia SHPO. Three additional sites (44LD538; 44LD539 and 44LD1042) were determined by FAA and MWAA to be eligible for listing in the National Register of Historic Places (NRHP). Since the publication of the FEIS, the SHPO has concurred that site 44FX2840, as well as sites 44LD538 (Historic Component), 44LD539 (Historic Component), and 44LD1042 (Historic Component) are eligible for listing in the National Register. In consultation with the SHPO it has been determined that the Prehistoric Component of site 44LD539 was ineligible for listing in the National Register. The remaining 10 sites have been determined to be ineligible for listing in the NRHP. For each of the effected sites, Phase III Data Recovery and/or Preservation-in-Place will be undertaken in accordance with stipulations outlined in the MOA. A copy of the Final MOA is contained in Appendix B of this ROD. The Phase III Data Recovery efforts will mitigate the adverse effects of the proposed action by extraction of the data from the sites.

***ELEMENT 4: WETLANDS***

**Element 4.1: Create, Restore, Enhance, and Preserve Wetlands and Streams (This element of the mitigation program will be implemented during the construction phase and maintained during the operational phase of the Preferred Alternative.)**

As discussed in Section 6.2.4 of the FEIS, to comply with the Clean Water Act (CWA) Section 401/404 compensatory mitigation requirements for unavoidable wetland and stream impacts, MWAA has purchased credits from mitigation banks whose service area includes the airport property and is located in accordance with FAA AC 150/5200-33A. The use of mitigation banking is an appropriate approach that is encouraged by FAA AC 150/5200-33A, and is consistent with USACE, EPA, and VDEQ regulations and policies. In anticipation that the intended use of the IAD property would eventually be fulfilled by expanding the airport operations to accommodate the projected demand for aviation services, MWAA proactively submitted a request for proposal (RFP) for the development of mitigation bank credits. Subsequently, MWAA purchased 200 wetland acre-credits from two mitigation banks, whose service areas include IAD: Cedar Run Wetlands Mitigation Bank and Licking Run Mitigation Bank (see Figure 6.4-1 in the FEIS).

### **Cedar Run Wetlands Mitigation Bank**

The Cedar Run Wetlands Mitigation Bank is located in Prince William County, Virginia, and its service area includes regional drainage areas defined by Hydrologic Unit Codes (HUCs) 02070008, 02070010, and portions of 02070011. Since IAD is located within HUCs 02070008 and 02070010, it is located within the mitigation bank's service area. The banking instrument for the mitigation site was signed by representatives of the USACE, EPA, U.S. Fish and Wildlife Service (USFWS), and VDEQ, all of whom participated on the Mitigation Bank Review Team (MBRT) (see Appendix I-4 of the FEIS). Actual use of these credits will be part of the permit decision. The Cedar Run Wetlands Mitigation Bank has proven to be successful and is currently contributing wetland functions and values within its service area, which includes IAD. MWAA currently holds a bill of sale for 112 wetland acre-credits from this bank (see Appendix I-4 of the FEIS).

### **Licking Run Mitigation Bank**

The Licking Run Mitigation Bank is located in Fauquier County, Virginia, and its service area includes HUCs 02070008, 02070010, and portions of 02070011. Since IAD is located within HUCs 02070008 and 02070010, it is located within the mitigation bank's service area. The banking instrument for the mitigation site was signed by representatives of the USACE, EPA, and VDEQ, all of whom participated on the MBRT (see Appendix I-4 of the FEIS). Actual use of these credits will be part of the permit decision. The Licking Run Mitigation Bank has proven to be successful and is currently contributing wetland functions and values within their service area, which includes IAD. MWAA currently holds a bill of sale for 88 wetland acre-credits from this bank (see Appendix I-4 of the FIES).

As discussed in Section 6.2.4 of the FEIS, 273.0 wetland acre-credits and 60,858 stream linear feet-credits would be required to offset the unavoidable wetlands and stream loss and wetlands conversion from the Preferred Alternative. The Preferred Alternative construction activities will be developed in phases in the following order: north-south Runway 1W/19W, Tier 3 Terminal Concourse, east-west Runway 12R/30L. Prior to construction of a given phase, a detailed mitigation plan will be prepared specifying the number of mitigation credits to be applied to mitigate the wetland impacts, and the bank or banks from which these credits are being applied. Based on the projected required

compensation, MWAA can immediately fully compensate the Runway 1W/19W wetland impacts with its existing purchased mitigation credits. MWAA is required to obtain the additional wetland acre-credits to mitigate the wetland impacts associated with the Tier 3 Terminal Concourse and east-west Runway 12R/230L phases. MWAA will initiate a similar process to obtain the additional required wetland acre-credits that was successfully employed with the Cedar Run and Licking Run mitigation banks. As with these previous projects, participation by representatives of the USACE, EPA, USFWS, and VDEQ will be accomplished to establish appropriate locations for additional wetland and stream mitigation sites. Similarly, MWAA is committed to issuing a RFP to develop stream linear feet bank credits to mitigate for stream impacts associated with the Preferred Alternative. In addition, FAA and MWAA will consider recommendations by Loudoun and Fairfax counties to locate mitigation sites, to the extent possible, within the same watersheds that wetlands impacts would occur. The final locations of mitigation sites and the required compensatory mitigation credits will be determined through the CWA Section 401/404 permitting process.

#### **MWAA Mitigation Commitment**

MWAA believes the Wetland and Stream Mitigation Plan summarized above is consistent with USACE, EPA, and VDEQ regulations and policies. Further, the proposed mitigation meets VDEQ recommended compensation ratios as outlined in their permit guidance documents. Off-site location of wetland and stream replacement, restoration and enhancement within Cedar Run and Licking Run represents the MWAA's intent to fully address Section 404 and 401 requirements. The USACE/VDEQ Section 404 Joint Permit Application (JPA) was submitted to the respective agencies by MWAA on April 20, 2005. A revised JPA package was submitted on August 30, 2005 containing additional information requested by the reviewing agencies. Submittal of the JPA documents to the jurisdictional agencies represents full commitment by MWAA that the proposed Wetland and Stream Mitigation Plan will be implemented. The final mitigation plan is being developed in consultation with the USACE, EPA, VDEQ, USFWS, and FAA. The final locations of the mitigation sites and the required compensatory mitigation credits will be determined through the CWA Section 401/404 permitting process.

## ***ELEMENT 5: 100-YEAR FLOODPLAINS***

**Element 5.1: Limit Fill Within Floodplain Areas and Element 5.2: Provide Stormwater Detention Areas for Peak Discharge Attenuation and Floodplain Storage Compensation (This element of the mitigation program will be implemented during the construction phase and maintained during the operational phase of the Preferred Alternative.)**

As part of this mitigation measure, MWAA has committed to undertake a detailed hydraulic analysis of the pre- and post-development conditions to ensure flood stages and flows will be maintained as required by applicable regulations. This analysis will be conducted during the design stage for the proposed project and its associated drainage system. The proposed stormwater management system described in Section 6.3.2 of the FEIS will be effective in maintaining peak flow rates below existing rates and making up for some of the floodplain storage volume lost in the on-site floodplain.

The Preferred Alternative is anticipated to result in impacts to approximately 39 acres of 100-year floodplain. Although every effort will be made during the final design stage to avoid and minimize floodplain impacts, floodplain volume lost from the Preferred Alternative may have to be recovered in order to prevent flooding areas downstream and upstream of IAD. MWAA's stormwater management design includes the overall drainage concepts described in Section 6.3.2 of the FEIS that include design elements to reduce the likelihood of downstream flooding as a result of the Preferred Alternative. These flood control elements include the stormwater collection system, stormwater BMPs, and stormwater treatment facilities. The facilities will be located on IAD property in accordance with FAA AC 15-5370-2C. MWAA's preliminary design calculations show that the 100-year peak discharge will increase from 6,224 cubic feet per second (cfs) for existing conditions to 6,586 cfs for the Preferred Alternative (a net increase of 362 cfs). For the western detention facility, the 1-year storage volume is approximately 5.11 acre-feet and the 10-year storage volume is approximately 15.71 acre-feet. For the eastern detention facility, the 1-year storage volume is approximately 13.43 acre-feet and the 10-year storage volume is approximately 38.52 acre-feet.

As stated previously, the stormwater management design analyses are not yet completed. The proposed floodplain mitigation measures will be designed so that the 100-year water surface elevations do not increase by more than is allowable under applicable regulations. The exact design will be determined after detailed hydraulic analysis and through the permitting process, which is still underway.

## ***ELEMENT 6: CONSTRUCTION IMPACTS***

### **Element 6.1: Construction and Environmental Control Provisions (BMPs) (This element of the mitigation program will be implemented during the design and construction phase of the Preferred Alternative.)**

Mitigation measures included in this element, which will be used by MWAA to minimize impacts during construction, include BMPs such as erosion control and stormwater runoff control and drainage and crossing structures. To compensate for unavoidable impacts to wetlands, mitigation through creation, restoration, enhancement, and preservation have been proposed. Wetland mitigation measures, coordinated with the USACE and VDEQ, are discussed in Section 6.3.4 of the FEIS.

In terms of construction-related air quality and noise mitigation, all on-airport construction activities will adhere to FAA AC 150/5370-10, *Standards for Specifying Construction of Airports* and *Virginia Department of Transportation Standard Specifications for Roads and Structures*. Several control measures to mitigate construction impacts are available should construction activities warrant mitigation:

- Exposing the minimum area of erodable earth,
- Temporary mulch with or without seeding,
- Water trucks or other means of using moisture for dust control,
- Covered haul trucks on public roadways,
- Dust stabilizers or penetration asphalt on haul roads,
- Plastic sheet coverings,
- Routing truck traffic to avoid residential areas,
- Schedule the timing of truck traffic to not disturb heavy traffic flows,
- Maintaining construction vehicles and using reduced speeds,
- Suspending certain activities during high-wind conditions, and
- Limiting work hours to avoid sleep disturbance impacts to residential land uses in proximity to construction activities.