UNCLASSIFIED

United States Department of the Army
Arlington National Cemetery

Environmental Assessment for the Southern Expansion and Associated Roadway Realignment

FINAL

Arlington County, Virginia

Prepared by:

U.S. Army Corps of Engineers, Norfolk District

August 2019

UPDATE NOTICE

Following the August 16, 2018 release of the Draft Environmental Assessment (EA) for the Arlington National Cemetery Southern Expansion (ANCSE), several comments were received that require clarification and/or additional information. These changes, and any others required in response to comments received during the public comment period, are reflected in this Final EA prior to a decision to be made under the National Environmental Policy Act of 1969 (NEPA).

1. The future Pentagon Memorial Visitor Education Center (VEC) design effort is on hold while the Pentagon Memorial Fund (PMF) – a non-governmental organization – conducts market research to inform the size and scope of the future facility. The VEC is a separate land use action sponsored by private interests, subject to site plan approval and traffic impact analysis, as necessary, by regulatory agencies. Although this future project is listed in the EA under Section 3.18 Indirect and Cumulative Effects as a "Reasonably Foreseeable Future Actions", there is no current plan of development upon which to assess further cumulative impacts. FHWA-EFLHD will review potential impacts, and potential mitigations, as appropriate, based on use assumptions during its traffic modeling for an Interchange Modification Report (IMR) update. The IMR update will be issued with FHWA's decision document, e.g. Finding of No Significant Impact (FONSI) containing a summary of the findings and recommended design changes.

2. A follow-up traffic study as mentioned in Section 3.10 Transportation and Traffic was completed in April 2019 and finalized in August 2019. The Traffic Technical Memorandum analyzed and documented the potential traffic impacts from the change in the land use proposed by ANC. The study: a) served as validation for the IMR to ensure the planned improvements are still valid with the anticipated land use changes (Operations Complex, garage and parking from Southgate Road, and Air Force Memorial (AFM)); b) evaluated new access points, and c) determined if additional improvements were needed.

   The objective of the study was to evaluate the traffic operational impacts resulting from the proposed ANCSE project's changes to land use, and to identify if any additional improvements beyond the IMR-proposed configuration were necessary. In addition to the trip generation and traffic analysis, a parking analysis based on an employee survey concluded a total of 244 spaces would be needed for the new Operations Complex parking garage. The following elements were also analyzed:

   a. New trips generated from the ANC Southern Expansion; and,
   b. Diversion of traffic to and from:
      i. AFM;
      ii. Existing ANC Service Complex;
      iii. Closure of Southgate Road; and,
      iv. New Operations Complex.

   The following is a summary of the ANCSE Traffic Technical Memorandum:

- A traffic signal is warranted for the intersections along Columbia Pike at Nash Street and the Route 27 ramps for the Baseline Conditions and both Build Scenarios.

- The traffic operations at the new Operations Complex driveways perform at a better Level of Service (LOS) in Build Scenario 1 than in Build Scenario 2. As a result, Build Scenario 1 is recommended.
- The mitigation scenarios for the Baseline Conditions and both Build Scenarios include an additional southbound right-turn lane (dual right turn lanes) with turn bay length of over 400 feet at intersection of Columbia Pike and the Route 27 ramps. The additional lane reduced queuing on the ramp from over 700 feet to under 400 feet.
- The pedestrian signal warrant analysis for the crosswalk at Columbia Pike and the AFM established the need of a "pedestrian hybrid beacon" signal to improve safety and to better serve pedestrians crossing to and from the new Operations Complex. Pedestrians would be provided a 7-second walk interval and a 14-second flash-don't-walk interval followed by clearance interval to cross four lanes of traffic.
- The new Operations Complex has the capacity to process vehicles through the inspection points with at most 10 percent of the vehicles flagged for further inspection during the AM peak hour. The capacity is based on the processing times and the number of lanes for the gate. A higher percentage of vehicles flagged could result in queue spillback onto South Joyce Street.

3. The participation of the Federal Highway Administration, Eastern Federal Lands Highway (FHWA-EFLHD) in this project has included assistance with this EA as a cooperating agency. In addition, FHWA-EFLHD will be designing the roadways that would be relocated as a result of the ANC expansion. Recently, FHWA-EFLHD, at the request of the County and VDOT, agreed to further traffic studies to further analyze the modified access to Route 27 (Washington Boulevard) with Columbia Pike. FHWA-EFLHD has indicated to ANC that all decision-making to-date concerning this EA is agreeable to them, and that FHWA-EFLHD intends to adopt the ANC's EA and issue its own FONSI, if appropriate, after completion of the additional traffic study and IMR update.

4. Numerous comments/suggestions regarding bicycle and pedestrian infrastructure along the Columbia Pike corridor were received during the public comment period. ANC is sensitive to the public's concerns, however, the conceptual realigned roadway and trail corridor width is not unlimited. The conceptual roadway design presented in the Draft EA is a generic depiction. It is in keeping with state and local policies for "complete streets," and will preserve the bicycle and pedestrian trail link between Southgate Road and South Joyce Street via the proposed South Nash Street and Columbia Pike. Based on comments received, separate the bicycle and pedestrian trails, which would connect with Arlington County's existing trails to the Pentagon, are proposed. Specific design suggestions have been passed along to the design team; the roadway and trails are under design at this time. The final design, including actual widths of the Columbia Pike realignment and trails, is outside the scope of this EA. It will include the appropriate level of bike/pedestrian infrastructure that is consistent with Virginia Department of Transportation/American Association of State Highway Transportation Officials/National Association of City Transportation Officials (VDOT/AASHTO/NACTO) standards and Arlington County's Columbia Pike design standard. Please see Section 3.10 for additional information.

5. FHWA-EFLHD has determined that Section 4(f), which applies only to Federal Transit Administration and other Department of Transportation (USDOT) agencies, is not applicable to this action. Section 3.15 *Section 4(f) Resources* and Figures 3-13 and 3-14 contained in the Draft

EA have been removed from the Final EA. If the FHWA-EFLHD determination changes, Section 4(f) will be addressed in the FHWA-EFLHD decision document.

6. The John S. McCain National Defense Authorization Act for 2019, Public Law 115-232, published on August 13, 2018, directed the Secretary of the Army to grant to Arlington County a permanent easement of no less than 0.1 acre of land within the right-of-way of Southgate Road to the south and west of Hobson Drive and west of the planned joint base access road that is also continuous with Foxcroft Heights Park for the purpose of commemorating Freedman's Village. This proposed action would be developed by Arlington County at a later date. Although this was previously mentioned in the Draft EA under Section 3.18 Indirect and Cumulative Effects as a "Reasonably Foreseeable Future Actions", there is no current plan of development upon which to assess further cumulative impacts.

COVER SHEET

Proposed Action: Arlington National Cemetery proposes to establish a single, contiguous parcel of land south of the cemetery by closing, relocating, and realigning local roadways and develop the parcel to increase interment capacity and create an opportunity to increase multimodal transportation capacity on a portion of Columbia Pike.

Type of Document: Environmental Assessment

Lead Agency: Arlington National Cemetery, a Direct Reporting Unit of Headquarters, Department of the Army

For Further Information:
Cara Sydnor, PMP
Southern Expansion Program Manager
U.S. Army Corps of Engineers, Norfolk District
Norfolk, VA
SouthernExpansion@usace.army.mil

Abstract:

Arlington National Cemetery (ANC) proposes to establish a single, contiguous parcel of land south of the cemetery by closing, relocating, and realigning local roadways and develop the parcel to increase interment capacity. This document simultaneously addresses the establishment and development components of this action with the Federal Highway Administration (FHWA), Virginia Department of Transportation (VDOT), and Arlington County as cooperating agencies. The realignment of Columbia Pike is integral to a successful ANC expansion. This EA assesses the potential impacts of the realignment to ensure that the cumulative effects of the collective federal actions – roadways and cemetery expansion – are considered.

The 2013 ANC Real Property Master Plan (RPMP) and its 2014 Programmatic Environmental Assessment (RPMP PEA) discussed the elements of the proposed action. The Southern Expansion site – bounded by Washington Boulevard, I-395, the VDOT Maintenance Complex, Foxcroft Heights, and ANC – involves approximately 70 acres among three landowners – ANC, Arlington County, and VDOT. This document describes potential impacts to the existing environment and resources associated with the Proposed Action. The anticipated construction could begin as early as 2020, pending environmental review and design, with completion as early as 2025.

ANC needs additional burial capacity to meet future demand; Arlington County, the owner of Columbia Pike, needs to increase its capacity for multimodal transportation. The Proposed Action presents an opportunity for VDOT, the owner of the Washington Boulevard interchange and ramps, to reconfigure the interchange within a smaller footprint, thereby providing increased safety and operational efficiency. The purpose of the Proposed Action is to increase burial capacity and extend the operational life of the cemetery and to provide an opportunity to increase multimodal capacity on this portion of Columbia Pike. The Preferred Alternative would accomplish the Proposed Action's purpose and need.

ANC evaluated various roadway realignment alternatives that would maximize the potential burial space and create an opportunity to increase multimodal capacity while upgrading safety and capacity levels. The RPMP PEA included discussions with ANC and cooperating agencies on roadway realignment options.

Cooperating agencies are FHWA, United States Environmental Protection Agency, National Capital Planning Commission, VDOT, and the Board of Arlington County, Virginia.

Organization

This document is organized as follows: The Executive Summary provides a brief overview including a summary table of the potential impacts for each resource category. Chapter 1 describes the Purpose and Need for action and provides background information. Chapter 2 defines the Proposed Action and discusses the alternatives considered and why they are either dismissed or carried forward for detailed environmental analysis. Chapter 3 describes the existing conditions of the site, including potentially impacted environmental resources, and identifies the potential environmental consequences, both positive and negative. Chapter 4 is a list of persons and/or agencies consulted. Chapter 5 lists the document preparers and their experience.

Acronyms and Abbreviations

AADT	average annual daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ACM	Asbestos Containing Materials
AFM	Air Force Memorial
AMSL	above mean sea level
ANC	Arlington National Cemetery
APE	Area of Potential Effects
AR	Army Regulation
AST	Aboveground Storage Tank
BMP	Best Management Practices
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CESQG	Conditionally-Exempt Small Quantity Generator
CFA	U.S. Commission of Fine Arts
CFR	Code of Federal Regulations
CLRP	Constrained Long Range Transportation Plan
CO	Carbon monoxide
CWA	Clean Water Act
CBPA	Chesapeake Bay Preservation Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
DA	Department of Army
DAR	Defense Access Roads Program
dBA	decibels (A-range)
DEA	Draft Environmental Assessment
DERP	Defense Environmental Restoration Program
DoD	U.S. Department of Defense
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act
EA	Environmental Assessment
EFLHD	Eastern Federal Lands Highway Division (branch of FHWA)

EISA	Energy Independence and Security Act
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FEA	Final Environmental Assessment
FHWA-EFLHD	Federal Highway Administration-Eastern Federal Lands Highway Division
FONSI	Finding of No Significant Impact
FTA	Federal Transit Administration
FWCA	Fish and Wildlife Coordination Act
HQDA	Headquarters, Department of the Army
HVAC	Heating, Ventilation, and Air Conditioning
ISWMP	Integrated Solid Waste Management Plan
JBMHH	Joint Base Myer-Henderson Hall
LBP	Lead-Based Paint
LID	Low Impact Development
LOS	Level of Service
LQG	Large Quantity Generator
MOA	Memorandum of Agreement
MPH	miles per hour
MWAQC	Metropolitan Washington Air Quality Committee
MS4	Municipal Separate Storm Sewer System
NAAQS	National Ambient Air Quality Standards
NCPC	National Capital Planning Commission
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NEX	Navy Exchange
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NO_x	Nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NPDES	National Pollutant Discharge Elimination System
NVTA	Northern Virginia Transportation Authority
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls

$PM_{2.5}$	Particulate matter (< 2.5 microns)
PM_{10}	Particulate matter (< 10 microns)
PMF	Pentagon Memorial Fund
PMVEC	9/11 Pentagon Memorial Visitor Education Center
POL	Petroleum, Oils, and Lubricants
RCRA	Resource Conservation and Recovery Act
RPMP PEA	Real Property Master Plan Programmatic Environmental Assessment
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Act: A Legacy for Users
SDD	Sustainable Design and Development
SHPO	State Historic Preservation Office
SO_2	Sulfur dioxide
SQG	Small Quantity Generator
SVOC	Semi-Volatile Organic Compounds
TDP	Transit Development Plan (Arlington County, Virginia)
tpy	tons per year
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tanks
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VOC	volatile organic compounds
WHS	Washington Headquarters Services

Table of Contents

Page

List of Tables

Page

List of Figures

On or Following Page

Appendices

Executive Summary

ES-1 Type of Report

This Environmental Assessment (EA) evaluates the potential environmental impacts associated with Arlington National Cemetery's (ANC) Proposed Action to establish a single contiguous parcel of land south of the cemetery to increase interment capacity. ANC would meet its objectives by closing, relocating, and realigning local roadways, thereby creating an opportunity to increase the capacity for multimodal transportation while upgrading safety and capacity levels on this portion of Columbia Pike – a connected action. This document simultaneously addresses the establishment and development components of this action with the FHWA, VDOT, and Arlington County as cooperating agencies. The closure and removal of Southgate Road, construction of a new access road for traffic to/from Joint Base Myer-Henderson Hall (JBMHH), realignment of Columbia Pike, and modification of Route 27 (Washington Boulevard) at Columbia Pike are integral to a successful ANC expansion. This EA assesses the potential impacts of those changes to ensure that the cumulative effects of the collective federal actions – roadways and cemetery expansion – are considered.

This EA follows regulatory guidance of the National Environmental Policy Act (NEPA) of 1969; the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508); and Environmental Analysis of Army Actions (32 CFR 651). Arlington National Cemetery, a Direct Report Unit of the Headquarters, Department of the Army (HQDA) is the lead agency for the Proposed Action. Cooperating agencies are Federal Highway Administration Eastern Federal Lands Highway Division (FHWA-EFLHD), U.S. Environmental Protection Agency (EPA), National Capital Planning Commission (NCPC), Virginia Department of Transportation (VDOT), and the Arlington County Board.

This EA is tiered[1] from the 2014 ANC Real Property Master Plan Programmatic Environmental Assessment (RPMP PEA) and contains references to and summaries of that document. The earlier document contained development alternatives of the Southern Expansion site including Alternative 4 – Southern Expansion Site with Realigned Roadways. This EA contains a robust analysis of Alternative 4.

ES-2 Purpose of and Need for Action

The Proposed Action is needed to meet the forecasted interment/inurnment demands of eligible veterans, to preserve ANC as an active military cemetery, and to create an opportunity to increase multimodal capacity on this portion of Columbia Pike. The related actions involving land acquisition and jurisdictional transfers and the realignment of roadways will allow several noncontiguous parcels to merge into a single contiguous parcel that permits the cemetery expansion. The purpose of the Proposed Action is to extend the operational life of the cemetery. The objectives of the Proposed Action are to increase burial capacity, upgrade safety and capacity levels on affected roadways, and create an opportunity to increase multimodal capacity for personal vehicles, transit, pedestrians and bicyclists on this portion of Columbia Pike.

[1] Agencies are encouraged to tier their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review. (40 CFR §1502.20 *Tiering*.)

ES-3 Description of the Proposed Action

The Proposed Action is to establish a single, contiguous parcel of land south of the cemetery. by closing, relocating, and realigning local roadways and develop the parcel to increase interment capacity and create an opportunity to increase multimodal capacity and upgrade safety and capacity levels on this portion of Columbia Pike. Land acquisition and jurisdictional transfers and roadway realignments are a necessary component of the cemetery expansion to create a single contiguous parcel for maximizing burial capacity.

The Proposed Action includes: the closure and removal of Southgate Road; the construction of a new access road for traffic to/from Joint Base Myer-Henderson Hall; the realignment of Columbia Pike; the modification of the Route 27 interchange at Columbia Pike; and the development of the space for cemetery use, including the integration of the Air Force Memorial (AFM). The new access road would include traffic control – signage, speed limits, etc. – to meet Arlington County and VDOT design standards. The undertaking also involves land acquisitions to accomplish the project.

Cemetery development would include supporting infrastructure such as water fountains, waterlines, sanitary sewer, storm drainage, underground electrical and communications/information systems, landscaping, retaining walls, perimeter fencing, vehicle and pedestrian access roads and walks, and security systems. The number of burial spaces would balance the Cemetery's expected usage trends for above- and below-ground interment and inurnment spaces. The cemetery expansion could include a mixture of columbaria, niche walls and in-ground burial spaces. The design would balance character, function and use, mirroring the aesthetic character, traditional image, and experience of ANC. The Proposed Action would enable ANC to increase its burial capacity by approximately 40,000-60,000 first interment opportunities.[2]

ES-4 Alternatives

This EA evaluates four alternatives: three action alternatives and the No Action Alternative. The Preferred Alternative is the Relocate Operations Complex Alternative.

The Preferred Alternative, Relocate Operations Complex Alternative, would create a 49-acre contiguous parcel available for cemetery development by relocating the Operations Complex to the noncontiguous parcel south of Columbia Pike. This alternative proposes to construct an underpass below Columbia Pike to connect the Operations Complex with the cemetery interment area thereby providing a direct path of travel for ANC maintenance vehicles. This alternative would create an opportunity to increase the regional multimodal transportation capacity on this portion of Columbia Pike, and would provide for safe and efficient transportation movements on the realigned roadway network. The AFM would be integrated with the cemetery design.

The Maintain Operations Complex with Underpass Alternative would create a 38-acre contiguous parcel available for interments/inurnments and would leave the Operations Complex in its current location. Other cemetery support services – such as spoils stockpiling and contractor equipment – would be located on the noncontiguous parcel south of Columbia Pike. The noncontiguous parcel would be connected by an underpass below Columbia Pike similar to the Preferred Alternative to provide a direct path of travel for ANC maintenance vehicles. This alternative would create an opportunity to increase the multimodal

[2] ANC burial spaces can have multiple interments, i.e. first, second, etc. ANC uses preplaced underground crypts to maximize burial capacity.

transportation capacity on this portion of Columbia Pike, and provide for safe and efficient transportation movements on the realigned roadway network. The AFM would be integrated with the cemetery design.

The Maintain Operations Complex without Underpass Alternative proposes to use the area south of Columbia Pike for landscape contractor and laydown area. The alternative would create a 38-acre contiguous parcel available for interments/inurnments and leave the Operations Complex in its current location. This alternative would not provide an underpass below Columbia Pike to connect with the noncontiguous parcel; work vehicles would be required to travel on public roadways to access ANC via the current Operations Complex entrance. This alternative would create an opportunity to increase the multimodal transportation capacity on this portion of Columbia Pike and provide for safe and efficient traffic movements on the realigned roadway network. The AFM would be integrated with the cemetery design.

The No Action Alternative is defined as no comprehensive development of the Southern Expansion site – no contiguous expansion of the cemetery, no land acquisition and jurisdictional transfers, no changes to the roadway alignments, and no increase in burial capacity to extend the operational life of the cemetery. The Southern Expansion site under the No Action Alternative would be used for cemetery support services such as spoil stockpiling or landscape contractor laydown.

Other alternatives were discussed in the RPMP PEA; these alternatives were summarized, considered, and eliminated from detailed analysis in Section 2.6, *Alternatives Considered and Eliminated*.

ES-5 Summary of Potential Environmental Impacts

This document describes potential environmental impacts on land use and sustainability; air quality; noise; topography, soils, and geology; water resources; biological resources; cultural resources; visitor use and experience; socioeconomics, environmental justice, and protection of children's health risks and safety risks; traffic and transportation; utilities; solid waste; hazardous materials and waste; visual and aesthetic resources; and Section 4(f) resources. A summary of the environmental consequences by impact category is provided in **Table ES-1**.

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
Land Use & Sustainability				
Short Term	The impacts in the short term would be the transition from unimproved condition to improved. The expansion site and surrounding area would experience a large construction project – noise, heavy equipment, earth moving, etc.	Short-term impacts would be similar to those under the Preferred Alternative.	Short-term impacts would be similar to those under the Preferred Alternative.	There would be no comprehensive development of the Southern Expansion site and as many as 60,000 burial sites would be lost. However, the site would be used for cemetery support services such as spoil stockpiling or landscape contractor laydown. The No Action Alternative would conflict with Congressional legislation to redevelop the site for ANC burial space and would not support Arlington County's plans for improving the multimodal capacity of the Columbia Pike corridor.
Long Term	Redevelopment would improve the character of the site; improvements would be compatible with surrounding land uses. The Preferred Alternative would reduce the amount of impervious surface and increase the amount of open space when compared to the 2006 conditions which included the Navy Annex facilities.	Long-term impacts would be similar to those under the Preferred Alternative.	Long-term impacts would be similar to those under the Preferred Alternative.	

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
Air Quality				
Short Term	Temporary impacts would result from construction vehicle air emissions and fugitive dust. The short-term impact would not have local or regional significance. Emissions associated with construction were compared to the Clean Air Act (CAA) *de minimis* values with respect to General Conformity. The estimated emissions were below these values; therefore, the Proposed Action is presumed to conform to the State Implementation Plan. The use of Best Management Practices (BMPs) during construction would minimize impacts from fugitive dust.	Short-term impacts would be similar to those under the Preferred Alternative.	Short-term impacts would be similar to those under the Preferred Alternative.	There would be no modifications to Columbia Pike and the Southern Expansion site would remain undeveloped. Air emissions for criteria pollutants would remain consistent with estimates for the National Capital Region.
Long Term	The Preferred Alternative would not change employment or traffic estimates included in the 2015 CLRP Air Quality Conformity Analysis. Future emissions, therefore, would not exceed the NAAQS and the Preferred Alternative would conform to the State Implementation Plan. Additionally, a multimodal transportation corridor could help reduce vehicular traffic thereby reducing air emissions.	Long-term impacts would be similar to those under the Preferred Alternative.	Long-term impacts would be similar to those under the Preferred Alternative.	There would be no long-term benefit to air quality because there would be no increased capacity from a multimodal transportation corridor.

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
Noise				
Short Term	Temporary impacts from construction noise, primarily heavy equipment, would occur.	Short-term impacts would be similar to those under the Preferred Alternative.	Short-term impacts would be similar to those under the Preferred Alternative.	There would be no development and no changes to the current urban noise environment. In the long term, assuming ANC uses the site of the FOB2 for support services, heavy equipment or maintenance vehicles may create chronic elevated noise impacts to Foxcroft Heights residential area.
Long Term	There would be an increase in noise impacts to Foxcroft Heights from rifle salutes, but the audible impact would be negligible or minor. Potential noise from vehicular traffic on the proposed Southgate connector road would not exceed VDOT's noise abatement criteria or its substantial noise increase criteria. Maintenance and cemetery operational noise would be minor. Potential noise emanating from the relocated Operations Complex would be similar to the neighboring VDOT maintenance complex. The proposed design elevation of the Operations Complex would be lower than Columbia Pike which would act as a buffer to further reduce potential noise impacts.	Impacts to the noise environment would be similar to those under the Preferred Alternative.	Impacts to the noise environment would be similar to those under the Preferred Alternative.	

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
Topography, Soils, & Geology				
Short Term	The final cemetery and roadway designs would be based on geotechnical investigations. Potential impacts would be minor, and effects would be mitigated by adherence to stormwater management plans and use of BMPs.	The potential impacts and benefits to topography, soils, and geology resulting from this alternative would be similar to those under the Preferred Alternative.	Short- and long-term impacts would be similar to those under the Preferred Alternative.	There would be no changes to soil, geology, or topography from current conditions. The slide on the east side of AFM would continue to be monitored and remedied, as needed.
Long Term	Large quantities of soil would be moved to shape the landform to create the traditional characteristics of ANC and to create a new roadbed for Columbia Pike. The topography of the cemetery expansion would have a positive impact as it would reflect the image and character of ANC. The cemetery design would eliminate the need for slope stabilization for the slide on the east side of the AFM.			
Water Resources				
Short Term	Potential temporary stormwater impacts during construction would be avoided or minimized by the use of BMPs and following the requirements of VDEQ for preparing an erosion and sedimentation control plan.	Impacts would be similar to those under the Preferred Alternative.	Impacts would be similar to those under the Preferred Alternative.	There would be no improvements to the land and no modifications to the roadway network, there would be no direct impacts to water resources.

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
Long Term	Coastal zone – All development would be planned and designed to avoid sensitive areas and would be consistent with the CZMP to the maximum extent practicable. There would be no direct impacts to surface water bodies, groundwater, floodplains, or wetlands. There would be a substantial reduction in impervious surfaces from the 2006 condition, resulting in a reduction of stormwater runoff and pollutant loads.	Impacts would be similar to those under the Preferred Alternative.	Impacts would be similar to those under the Preferred Alternative.	Future stockpiling for laydown or spoils would meet VDEQ Minimum Standards for Erosion & Sediment Control, including silt fence, etc. to prevent silt-laden runoff, as necessary.
Biological Resources				
Short Term	There would be no impact on any federally or state-listed threatened or endangered species. The site was disturbed previously and does not contain natural habitat. Regardless, there would be a temporary disruption to wildlife inhabiting the Southern Expansion site. Upon the start of construction, wildlife species instinctively would move to adjacent areas.	Impacts would be similar to those under the Preferred Alternative.	Impacts would be similar to those under the Preferred Alternative.	There would be no changes to the existing vegetation or wildlife habitat at the Southern Expansion site, except that stockpiling may occur in open grassy fields.

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
Long Term	All woody vegetation likely would be cleared during construction. However, the temporary impact would be offset at the project completion by providing permanent positive impacts with new landscaping including turf, trees, shrubs, and other plant material in planting beds that will be native to and compatible with the geographic region. There would be a net increase in vegetation as native wildlife species re-inhabit the site upon completion.	Impacts would be similar to those under the Preferred Alternative.	Impacts would be similar to those under the Preferred Alternative.	
Cultural Resources/Section 106				
	There would be impacts from the removal of the boundary wall along Southgate Road, and relocation of the Operations Complex. There would be potential impacts to the AFM. Patton Drive also is proposed to be converted to a pedestrian trail. These impacts would be mitigated through the Section 106 consultation process.	There would be impacts from the removal of the boundary wall and the conversion of part of Patton Drive to a pedestrian trail. There would be potential impacts to the AFM. The potential impacts would be mitigated through the Section 106 consultation process.	There would be impacts from the removal of the boundary wall and the conversion of part of Patton Drive to a pedestrian trail. There would be potential impacts to the AFM. These impacts would be mitigated through the Section 106 consultation process.	There would be no comprehensive development of the site and, therefore, no change to cultural resources.

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
Visitor Use and Experience				
Short Term	Temporary impacts from dust and noise may be experienced due to increased construction traffic and other activities during the project's construction. Any impacts would cease upon completion of the construction activities. These impacts would be isolated to visitors and/or families with loved ones directly adjacent to the construction area. Construction activities would not preclude any family member from visiting a gravesite.	Short-term impacts would be similar to those under the Preferred Alternative.	Short-term impacts would be similar to those under the Preferred Alternative.	There would be no new burial capacity and visitor use would be limited to the existing ANC. Over the long term, burial space would be reduced to a point when it would no longer be available. The Cemetery would eventually transition from an active cemetery to a national memorial.
Long Term	There would be beneficial impacts provided by new amenities including pedestrian gate(s) along the new boundary wall, thereby enhancing access to the AFM, ANC, and the 9/11 Pentagon Memorial Visitor's Education Center; and, a multi-use trail to accommodate pedestrians and bicycles, among others. Current parking at the AFM would be eliminated and vehicular access would be limited; however, a larger parking lot would be provided across the street from AFM. The final design would comply with	The effects would be similar except that this alternative would have less acreage for interments than the Preferred Alternative; the cemetery would reach maximum capacity sooner than under the Preferred Alternative. The Operations Complex would remain at its current location within the cemetery viewshed.	The effects would be similar except that this alternative would have less acreage for interments than the Preferred Alternative; the cemetery would reach maximum capacity sooner than under the Preferred Alternative.	

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
	the Americans with Disabilities Act. The positive impacts would include expanding the footprint of the Cemetery to allow additional area for visitors to experience the history, heritage, honor, and sacrifice of our military service members. Visitors would benefit from efficient movement between the AFM and interment areas. The new Operations Complex would be on the edge of the cemetery and outside of the viewshed.			
Socioeconomics/EJ				
Short Term Long Term	There would be no disproportionately high or adverse impacts to minority or low-income populations. The project would not require the relocation or displacement of any residences or businesses. The project would not induce growth on a local or regional level; the area is already highly developed. The beneficial impacts include providing a visually attractive land use and creating an opportunity to increase multimodal transportation capacity to the general population.	Short- and long-term impacts would be similar to those under the Preferred Alternative.	Short- and long-term impacts would be similar to those under the Preferred Alternative.	There would be no changes to the socioeconomic characteristics of the area from current conditions.

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
Traffic & Transportation				
Short Term	There would be short term traffic delays due to construction activities. Construction contractors would be responsible for minimizing delays by following an approved traffic control plan.	Short-term traffic delays similar to those under the Preferred Alternative.	Short-term traffic delays similar to those under the Preferred Alternative.	There would be no short-term traffic impacts.
Long Term	The proposed redevelopment, including the realigned roadways, would maintain or extend routes for pedestrian and bicycle movements and would not sever any existing routes for these modes of transportation. No impacts to traffic or transportation are anticipated. A fmicro-scale traffic study was conducted to determine proper design for ingress/egress of the parking area, safe pedestrian crossing of Columbia Pike, location of curb cuts, additional signals and timing, etc. There would be a positive effect on transportation by creating an opportunity to increase the multimodal capacity on this portion of Columbia Pike as well as upgraded safety and level of service at the new tight diamond interchange and the Joyce Street/ Columbia Pike intersection. All	Long-term impacts would be similar to those under the Preferred Alternative.	The roadway alignment would be identical to the Preferred Alternative. Not having an underpass would mean trucks and heavy equipment would have to use Columbia Pike and the current entrance near the Operations Complex to access the interment/ inurnment area. This alternative would have a negative impact on highway safety in this area	There would be no changes to the levels of service for vehicular traffic as there would be no redevelopment of the site. The Columbia Pike/Joyce Street/ Southgate Road intersection would continue to perform at an unacceptable level of service during the PM peak period.

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
	roadways and trails will be constructed in accordance with AASHTO, VDOT, and NACTO standards.			
Utilities				
Short Term	There would be potential short-term interruptions to utility service during construction. Utility providers would inform customers of extended interruptions or any change in current utility line locations.	Short-term impacts would be similar to those under the Preferred Alternative.	Short-term impacts would be similar to those under the Preferred Alternative.	There would be no changes to utility service demand because the site would remain undeveloped.
Long Term	The current or future land use would not create a new burden on consumption of local or regional utility services, nor would the alternative eliminate or scale back existing utilities. There would be no long-term disruptions to local utility customers after construction. Although concern has been expressed about potential constraint of the underpass on the utility corridor along the proposed realignment of Columbia Pike, it will be buried to a depth sufficient to accommodate the utility corridor. In addition, because water-, sanitary-sewer- and stormwater-related utilities would otherwise require the most space in the corridor, those utilities would remain	The benefits and impacts would be similar to those under the Preferred Alternative. Although there would be less utility design required – because there would be no Operations Complex relocation – there would still be utility construction to realign utility corridors.	Long-term impacts would be similar to those under the Maintain Operations Complex with Underpass, except that there would be no potential utility limitation due to the tunnel	

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
	within the Cemetery avoiding the possibility of constraining the corridor. There would be no significant cumulative impacts with future private development in Arlington County. A positive long-term effect would be realized by the upgrading of aging utility infrastructure.			
Solid Waste				
Short Term	Construction activities would generate solid waste. The contractors would be responsible for following acceptable protocol for avoiding or minimizing impacts from generating solid waste at the site.	Short-term impacts would be similar to those under the Preferred Alternative.	Short-term impacts would be similar to those under the Preferred Alternative.	There would be no changes to the diversion rate of ANC's nonhazardous solid waste.
Long Term	There would be no noticeable increase in the amount of solid waste produced from daily operations and no changes to ANC's diversion rate or its adherence to the Integrated Solid Waste Management Plan (ISWMP).	Long-term impacts would be similar to those under the Preferred Alternative.	Long-term impacts would be similar to those under the Preferred Alternative.	
Hazardous Waste & Materials				
Short-Term and Long-Term				

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
	This alternative would not cause a significant increase in the amount of hazardous waste generated at ANC in either the short- or long term. The incremental increase in the Cemetery's area and the maintenance required would not increase generation of hazardous waste. Earth disturbance during construction may create a risk of exposure to Asbestos Containing Material (ACM), residue from the FOB2 demolition and clean-up. Designing to avoid ACM-contaminated soil and developing a construction-phase pollution prevention plan would minimize the risk. Documentation of a recent investigation would follow the Defense Environmental Restoration Program (DERP)[3] requirements for achieving "No Further Action" status with VDEQ and USEPA. Therefore, there would be no significant effect.	Short- and long-term impacts would be similar to those under the Preferred Alternative. Although the Operations Complex would remain in its current location, the potential for migration of contaminated groundwater would need long term monitoring.	Short- and long-term impacts would be similar to those under Maintain Operations Complex with Underpass.	There would be no increase in the generation of hazardous waste. Activities occurring on the site of the former FOB2 may be subject to risk of exposure to ACM.

[3] DERP was formally established by Congress in 1986 and provides for the cleanup of Department of Defense sites under the jurisdiction of the Secretary of Defense. Eligible sites include those contaminated by past defense activities that require clean-up under CERCLA and certain corrective actions required by RCRA.

Table ES-1:

Summary of Environmental Consequences

Impact Category	Relocate Operations Complex Alternative (Preferred)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
Visual & Aesthetic Resources				
Short Term	There would be temporary impacts during construction due to presence of heavy equipment and construction activities for both utility and road relocation.	Short-term impacts would be similar to those under the Preferred Alternative.	Short-term impacts would be similar to those under the Preferred Alternative.	There would be no short-term impacts. There would be no changes to visual or aesthetic resources.
Long Term	The redevelopment of the site would provide a visual improvement to the land. The relocation of the Operations Complex to an area on the edge of the proposed expansion area would benefit the viewshed, making the expansion seamless. The centrally located AFM, coupled with proposed landscaping and earth moving, would act as visual barriers to shield the relocated Operations Complex from most of the Southern Expansion site. Integrating the AFM into the cemetery design would not compromise the visual integrity of the memorial; its prominence would endure. There would be a long-term positive impact on the viewsheds.	Long-term impacts would be similar to those under the Preferred Alternative.	Long-term impacts would be similar to those under the Preferred Alternative.	The site would be adversely affected due to the absence of a planned addition to the cemetery. The area could be used for cemetery support services such as spoil stockpiling or landscape contractor laydown area, which would be less aesthetically pleasing than all three action alternatives.

ES-6 Public Involvement

Early agency coordination was accomplished in accordance with the NEPA process through invitations to five agencies – FHWA-EFLHD, USEPA, NCPC, VDOT, and Arlington County, VA – with legal interest and/or jurisdiction over the project to become cooperating agencies. All five agencies accepted and participated as such. A cooperating agency kick-off meeting was held on 9 March 2016, and coordination was conducted at key points in the process.

Further outreach efforts included 42 invitations to a variety of organizations including governmental agencies, non-governmental organizations, and federally-recognized Native American tribes. They all received invitations to consult on the project.

A Notice of Intent to prepare an EA was published in the Federal Register on 20 April 2016. ANC issued a press release, and public notices were also published in the Washington Post, the Washington Times and the El Tiempo Latino newspapers, and on ANC's and the U. S. Army Corps of Engineers' (USACE) websites. Brochures regarding the project were mailed to approximately 250 property owners, agencies, and civic leagues located near the project site and Columbia Pike. ANC and USACE also posted information on its websites for the expansion project during the NEPA process.

On 27 April 2016, a press conference and an open-house-style NEPA public scoping meeting were held at the Sheraton Pentagon City, Arlington, Virginia. Storyboards describing the project and the NEPA process were displayed. USACE, ANC, representatives from all five cooperating agencies, and consultant's staff, as well as a Spanish-language interpreter were available to answer questions and obtain comments. Project brochures were also available. More than 75 people attended the scoping meeting. The public had an opportunity to provide written comments during the meeting, as well as throughout the comment period from 20 April through 31 May 2016.

The Draft EA was released on 16 August 2018 for public review, and a public meeting was held on 22 August 2018. Fifty-one people attended the public meeting. The public had an opportunity to provide written comments during the meeting, as well as throughout the comment period from 16 August through 22 September 2018. Approximately 157 comments were submitted. Approximately 90% of the comments related to the dimensions, design, and safety of the bicycle and pedestrian trails.

Public comments and responses from both public meetings are in **Appendix A**.

1 INTRODUCTION: PURPOSE OF AND NEED FOR ACTION

1.1 Action Summary

Arlington National Cemetery (ANC) proposes to establish a single contiguous parcel of land south of the cemetery by closing, relocating, and realigning local roadways and developing the parcel to increase interment capacity. The Proposed Action also creates an opportunity to increase multimodal capacity while upgrading safety and capacity levels on a portion of Columbia Pike. This document simultaneously addresses the establishment and development components of this action with the Federal Highway Administration, Eastern Federal Lands Highway Division (FHWA-EFLHD), Virginia Department of Transportation (VDOT), and Arlington County as cooperating agencies. The realignment of Columbia Pike is integral to a successful ANC expansion; this EA assesses the potential impacts of the realignment to ensure that the cumulative effects of the collective federal actions – roadways and cemetery expansion – are considered.

Arlington National Cemetery
(U.S. Army/ANC public release)

ANC's iconic landscape is a symbol of patriotism, freedom, and service. Since 1864, the cemetery has been the final resting place for over 400,000 active duty service members, veterans, and eligible family members. Veterans and their families are honored with lasting tributes that commemorate the sacrifice and service they have provided to the nation.

ANC is more than a national cemetery; it is a shrine and national monument for visitors to explore. It has a distinctive public outreach mission within the DoD, serving as one of the most visited tourist sites in the Washington, D.C. area. ANC welcomes over 3 million visitors annually.

ANC is in Arlington County, Virginia west of Washington D.C. as illustrated in **Figure 1-1**. The Southern Expansion site, illustrated in **Figure 1-2,** consists of approximately 70 acres[4] among three landowners – Department of Army (DA), Arlington County, and the Virginia Department of Transportation (VDOT). The land includes open fields, roadways, the existing Operations Complex, and the existing Air Force Memorial (AFM). The AFM is located within the Southern Expansion site through a lease on DA land and will be integrated with the cemetery design. The Southern Expansion site is bounded on the south by Interstate 395 (I-395), on the north by ANC, on the west by the Foxcroft Heights residential neighborhood and a VDOT maintenance facility, and on the east by the ramps connecting Columbia Pike to Route 27.

The anticipated construction could begin as early as 2020, pending environmental review and design, with completion as early as 2025.

[4] Includes roadways and vacant parcels.

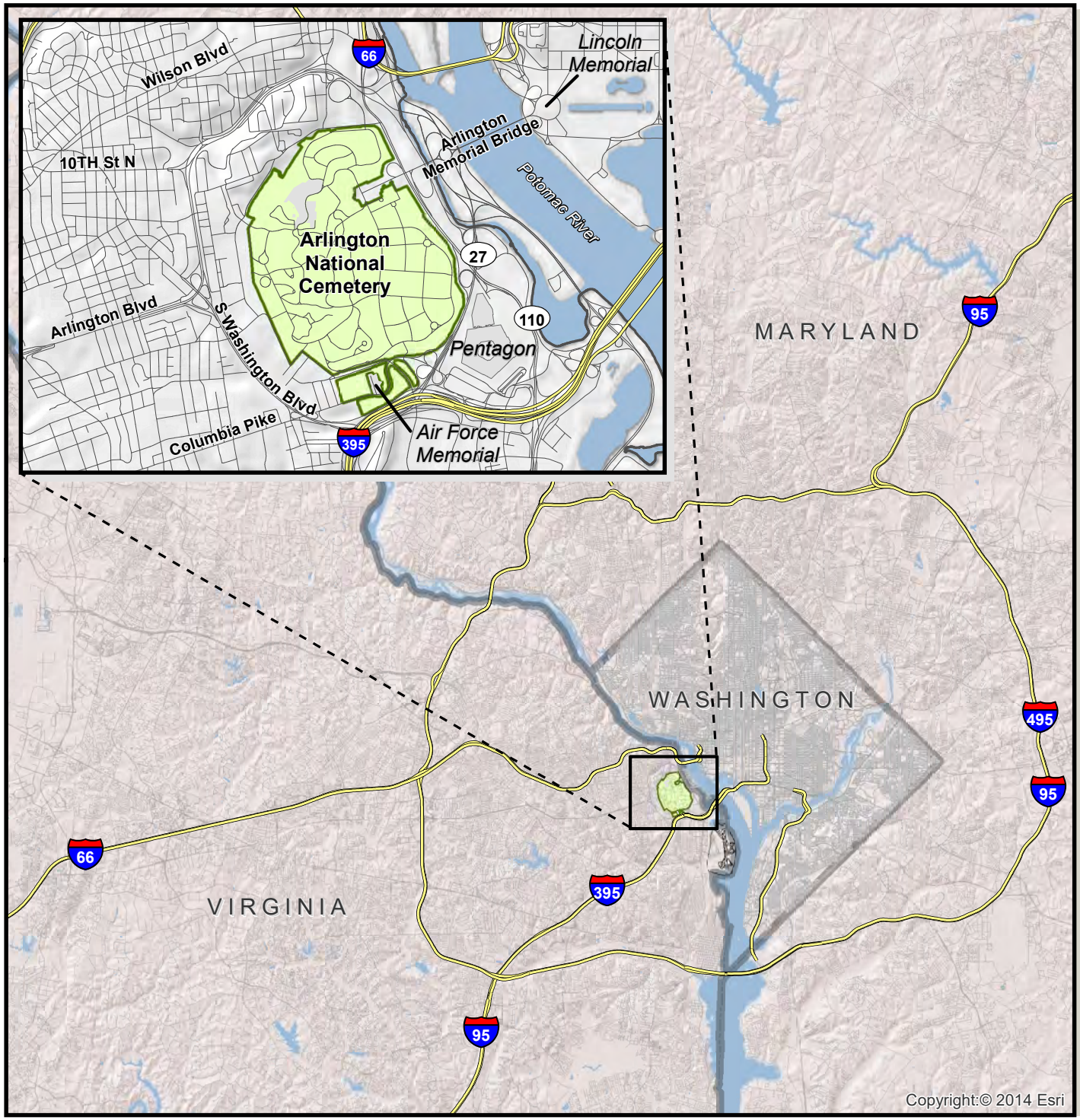


Figure 1-1
Vicinity and Location

LEGEND

- Arlington National Cemetery
- Interstate
- State Boundary

Arlington National Cemetery
Southern Expansion

Environmental Assessment

0 1 2 4 Miles

N

Source: ANC GIS Data, ESRI

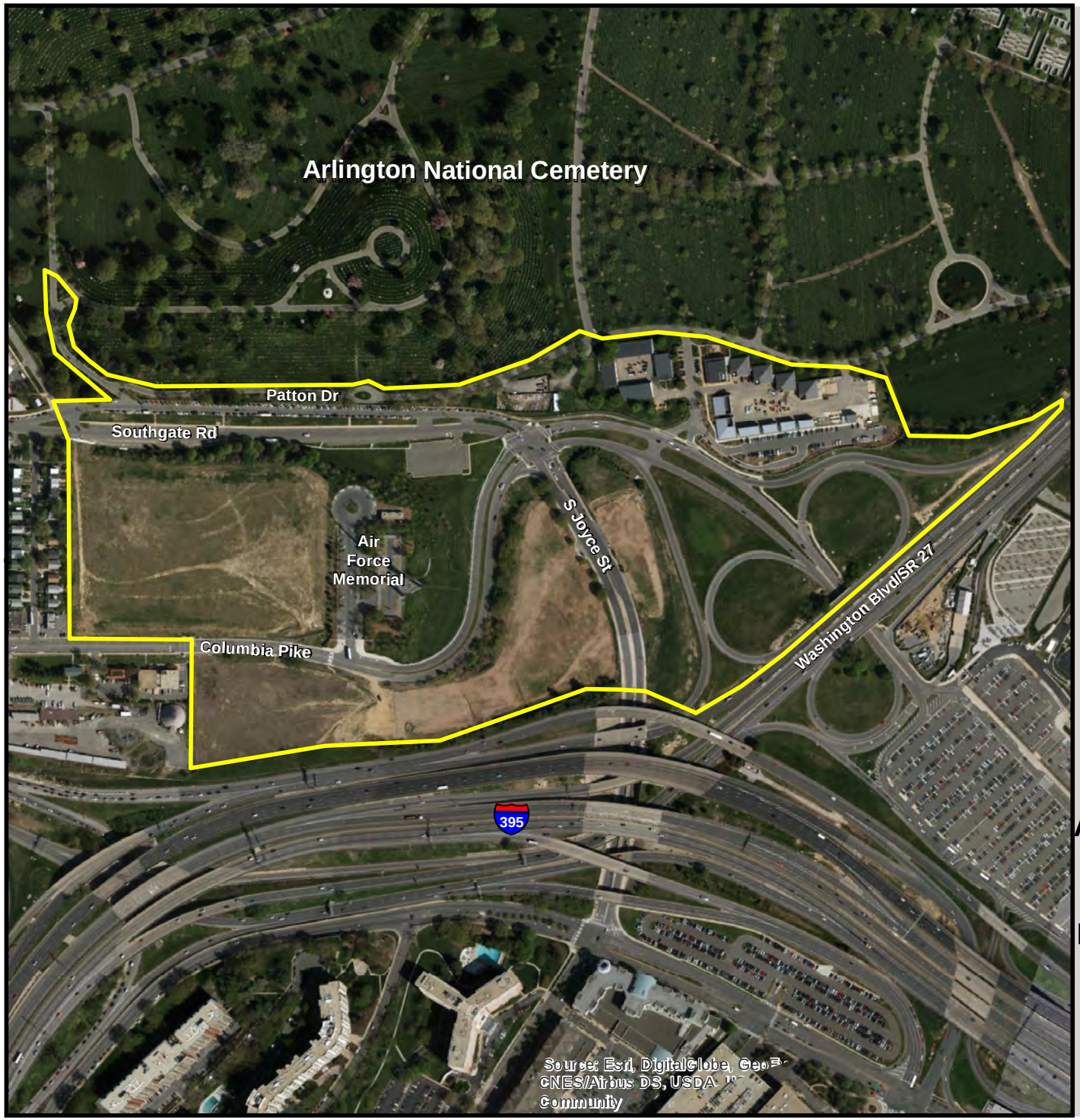


Figure 1-2
Southern Expansion Project Site

LEGEND

Project Boundary

Arlington National Cemetery Southern Expansion

Environmental Assessment

N

0 300 600 1,200 Feet

This Environmental Assessment (EA) describes potential impacts to the "human environment"[5] associated with implementing the Proposed Action. The document conforms with the regulatory guidance of the National Environmental Policy Act of 1969, as amended, (NEPA; 42 United States Code [U.S.C] 4321 et seq.), the Council on Environmental Quality (CEQ) Regulations Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500 -1508), and the Environmental Analysis of Army Actions (32 CFR 651). ANC is the lead agency for the Proposed Action. Cooperating agencies for development of the EA are FHWA-EFLHD, United States Environmental Protection Agency (EPA), National Capital Planning Commission (NCPC), VDOT, and Arlington County.

1.2 Need for the Proposed Action

The Proposed Action is needed to meet the forecasted interment/inurnment demands of eligible veterans and to preserve ANC as an active military cemetery.

Current space at ANC is limited and is reduced every day; the future demand for interment outweighs its capacity. Each day at ANC, an average of 27-30 burials occur, over 7,000 annually. Without additional burial space to increase capacity, the space for *first interments* is expected to reach maximum capacity by the early 2040s.[6] If no action is taken, many or most veterans from the recent wars in Iraq, Afghanistan, and the War on Terrorism will not have the opportunity to be buried at ANC.

One of the factors affecting the capacity of ANC is its physical footprint or acreage, constrained by its surrounding land uses. The Proposed Action would add contiguous acreage for conversion to cemetery use; it would include the three noncontiguous parcels of the former Navy Annex property and the VDOT-owned property (**Figure 1-3**). Contiguous land is needed to create an uninterrupted cemetery landscape that affords the families of loved ones the sense of belonging.

The Proposed Action would also create an opportunity to increase multimodal capacity; help reduce traffic congestion by encouraging alternative modes of travel; support future growth and development within the Columbia Pike corridor; improve the transportation system to connect with existing population and employment centers; upgrade traffic safety and level of service for all modes of travel; potentially decrease vehicle emissions by decreasing vehicle miles traveled; and support the economy and quality of life.

Definitions

"*Interment*" is the ritual of placing a casket into a grave.

"*Inurnment*" is the ritual of placing an urn containing cremated remains into a grave or columbarium.

"*Columbarium*" is an above-ground structure designed for cremated remains only, with recesses (known as "*niches*") in the walls to hold the inurned cremated remains.

"*First interment/inurnment*" refers to the first member of the family laid to rest, which could be the veteran or his or her spouse/dependent. At ANC, the veteran and his or her spouse and/or qualifying dependents are laid to rest in the same gravesite or niche. In consideration, burial plots and niches are purposely designed to accommodate multiple decedents. Therefore, when evaluating the cemetery's space and capacity, the number of first interments/ inurnments is the most appropriate factor to consider. "*First interment/ inurnment": The Future of Arlington National Cemetery: Report on the Cemetery's Interment and Inurnment Capacity*, Report to Congress, February 2017. Other definitions: Merriam-Webster dictionary.

[5] The "human environment" refers to the natural and physical environment and the relationship of people with that environment. CEQ §1508.14.

[6] Arlington National Cemetery, February 2017. *The Future of Arlington National Cemetery: Report on the Cemetery's Interment and Inurnment Capacity*, Report to Congress, Public Law 114-158 Page 7.

Figure 1-3
Southern Expansion
Noncontiguous Parcels

LEGEND

- Former Navy Annex Property (Department of Army Ownership)
- VDOT Ownership

Arlington National Cemetery
Southern Expansion

Environmental Assessment

0 112.5 225 450 Feet

N

Source: Google Earth, USDA

1.3 Purpose of the Proposed Action

The purpose of the Proposed Action is to extend the operational life of the cemetery.

The objectives of the Proposed Action are to:

- Increase burial capacity;
- Upgrade safety and capacity levels of service for roadways within the Action Area.
- Create an opportunity to increase multimodal transportation along this portion of Columbia Pike.

1.3.1 Increase Burial Capacity

Extending the operational life of the cemetery by providing sufficient capacity would enable ANC to serve projected demand of eligible veterans and active-duty service members and their families. The cemetery is currently experiencing a heavy demand for burials. The Army, as custodian of this hallowed site, is committed to the cemetery's iconic nature and its long-term legacy. The Southern Expansion site's noncontiguous parcels contain underutilized land which could be made contiguous with the cemetery by closing, relocating, and realigning roadways. The public roadways within the Southern Expansion site bisect Department of the Army (DA) property and impede contiguous expansion of ANC.

1.3.2 Upgrade Safety and Capacity Levels of Service for Roadways within the Action Area

Rapid growth in northern Virginia, particularly in Arlington County, has necessitated improvements to transportation safety and security, traffic and transit operations, and pedestrian and bicycle access along Columbia Pike through the Washington Boulevard interchange near the Pentagon. Current roadway geometric and sight distance limitations on this portion of Columbia Pike creates operational issues and potential safety concerns.

1.3.3 Create an Opportunity to Increase Multimodal Capacity Along this Portion of Columbia Pike

A 1999 study by the Northern Virginia Transportation Coordinating Council (replaced by the Northern Virginia Transportation Authority ("NVTA")) recommended investments in multimodal system expansion, including Columbia Pike, to avoid further increases in roadway congestion. NVTA's 2006 transportation plan update, TransAction 2030 Long-Range Plan, had many goals, among them to provide an integrated multimodal transportation system for the region. The 2006 regional Council of Governments' forecasts showed increases of 650,000 new jobs and nearly a million new residents by 2030 in the Northern Virginia region. Realigning and relocating Columbia Pike and other the roadways near the Southern Expansion site affords the opportunity to simultaneously address this purpose jointly with the FHWA, VDOT, and Arlington County. Examples of corridor improvements to increase multimodal transportation capacity may include providing a standardized street cross-section (two travel lanes in each direction with a center median or left-turn lane; upgrading utility infrastructure (including utility undergrounding); incorporating roadway geometry to accommodate mass transit options; accommodations for bicycles; wider sidewalks; enhanced pedestrian crossings; and enhanced streetscapes.

1.4 Laws or Previous Actions Influencing the Proposed Action

The following describes recently passed legislation, legal actions, and earlier planning documents pertaining to the Proposed Action.

1.4.1 Land Transfer of the Former Navy Annex Property

The current cemetery expansion under consideration includes the former Navy Annex property, now owned by DA. The Land Transfer Plan, prepared by Washington Headquarters Services (WHS), identified the property consisting of three *noncontiguous* parcels, collectively referred to as the Navy Annex property, totaling approximately 40 acres. This property was first identified in the 1998 ANC Master Plan as suitable interment space due to its location adjacent to the ANC boundary and existing Department of Defense (DoD) ownership. Public Law 106-65, the National Defense Authorization Act (NDAA) of 2000 (Subtitle F §2881 "Expansion of Arlington National Cemetery, Transfer from Navy Annex") validated its suitability and required the Secretary of Defense to transfer the Navy Annex property to the Secretary of the Army and "incorporate the Navy Annex property transferred under [this section] into Arlington National Cemetery." The NDAA of 2000, and subsequent amendments, provided for the transfer of property, and required DoD to remove all improvements from the Navy Annex property to facilitate an expansion.

WHS, the federal agency owner of the Navy Annex property at the time, prepared an EA to evaluate the land transfer and removal of improvements, and a FONSI was signed in December 2011. The entire Navy Annex property, including the AFM site, was transferred to the DA on 1 January 2012, and all former Navy improvements (buildings, parking lots, etc.) were demolished/deconstructed. **Figures 1-4 and 1-5** show the Navy Annex property before (2004) and after (2015) the demolition, respectively. The potential cumulative impacts of this action are considered in Section 3.18, *Indirect and Cumulative Effects*.

The NDAA of 2000[7] also required the Secretary of Defense to provide for the AFM on the Navy Annex property. The DA granted by permit to the Department of the Air Force the use of approximately three acres of land for the operation and maintenance of the AFM. The permit is granted for a term of 50 years beginning 1 January 2012 and expiring 31 December 2061.[8]

The NDAA of 2017[9] authorized the acquisition of land in Arlington County, Virginia as follows:

> "The Secretary of the Army may acquire by purchase, exchange, donation, or by other means, including condemnation, which the Secretary determines is sufficient for the expansion of [ANC] for purposes of ensuring maximization of interment sites and compatible use of adjacent properties, including any appropriate cemetery or memorial parking…*** The Memorandum of Understanding between the Department of the Army and Arlington County signed in January 2013 shall be used as a guide in determining the properties to be acquired under this section to expand [ANC] to the maximum extent practicable. *** …the Secretary shall seek to remove existing barriers to the expansion of [ANC] north of Columbia Pike through the realignment of Southgate Road to the western boundary of the former Navy Annex site; and to support the realignment and straightening of Columbia Pike and redesign of the Washington Boulevard-Columbia Pike interchange."

[7] United States Government Printing Office, Public Law 106-65, 106th Congress, Section 2881, 5 October 1999. Page 369. https://www.gpo.gov/fdsys/pkg/PLAW-106publ65/pdf/PLAW-106publ65.pdf
[8] Department of the Army Permit to the Department of the Air Force to Use Property Located on Joint Base Myer-Henderson Hall, Arlington County, Virginia. 2012.
[9] United States Government Printing Office, Public Law 114-328, 114th Congress, Section 2829A, 23 December 2016. Page 730 (abridged). https://www.congress.gov/114/plaws/publ328/PLAW-114publ328.pdf

Figure 1-4. Navy Annex Property, 2004 (*Source: Google Earth*)

Figure 1-5. Navy Annex Property, 2015 (*Source: Google Earth*)

1.4.2 ANC Real Property Master Plan and Programmatic EA

Goals of the ANC 2013 Real Property Master Plan (RPMP) were to enhance cemetery visitor experiences and to provide new interment capacity. The 2014 ANC RPMP Programmatic EA (PEA) addressed the overall needs of ANC including the proposed Southern Expansion. The present EA is tiered[10] from that document and contains references to and summaries of its text. The earlier document addressed the broad issues and impacts associated with multiple alternatives for development of the Southern Expansion including realigned roadways. The current roadway alignment impedes contiguous expansion of ANC to increase its burial capacity; it does not support efficient use of land for interments or for transportation.

The PEA carried forward cemetery expansion alternatives that included: 1) expansion utilizing the current roadway configuration; 2) expansion with the closure of Southgate Road, and 3) expansion with the closure of Southgate Road as well as the realignment of Columbia Pike and connecting roadways, to create a single large contiguous parcel. See Section 2.4, Alternatives Considered and Eliminated. The current roadway network is a limiting factor to increasing the contiguous acreage to allow the maximum burial space for ANC. The RPMP PEA included development of the Southern Expansion and focused on the need for land acquisition and jurisdictional transfers, realigning roadways, abandoning surplus road rights-of-way, and consolidation of land parcels. The ANC Master Plan focused on reasonable development concepts on land that had been appropriated through Congressional legislation for the express purpose of cemetery expansion.. As described earlier, the NDAA 2000 and 2017 specifically mandated that the subject property would be transferred to the Army for this project. The development concepts in both the current EA and the PEA were constrained by available land and by the authorizations under the NDAA.

The RPMP PEA's decision document indicated that future tiering of subsequent environmental analyses would be expected as more site-specific details become known.[11]

1.4.3 Arlington County Improvements for Regional Multimodal Transportation

Beginning with the 2001 Columbia Pike Initiative, Arlington County has engaged in efforts to strengthen the community by: providing increased housing options; providing opportunities for mixed use development; improving safety for pedestrians, bicyclists, transit riders, and motorists; and implementing high-capacity multimodal transportation investments to achieve greater mobility and accessibility.

The ANC Southern Expansion was discussed in the Arlington County 2005 Columbia Pike Initiative Update.[12] The plan called for Columbia Pike to be straightened and widened at its eastern end, adjacent to ANC, to accommodate the proposed cemetery expansion. The County proposed additional planning and evaluation for a comprehensive redevelopment of this eastern gateway of Columbia Pike to complement the cemetery expansion and to begin implementing some of the proposed improvements mentioned in the previous paragraph.

Arlington County has planned, designed, and constructed improvements along three miles of the existing Columbia Pike corridor between the Fairfax County line and Washington Boulevard near the Pentagon since 2005. Improvements to date include: providing a standardized street cross-section (two travel lanes in each direction with a center median or left-turn lane west of Washington Boulevard and two lanes in

[10] Agencies are encouraged to tier their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review. 40 CFR §1502.20 *Tiering*.
[11] Programmatic Environmental Assessment for the Arlington National Cemetery Real Property Master Plan, 2014. Page 1. http://www.nao.usace.army.mil/Missions/Military-Construction/ANCSouthernExpansion/
[12] Arlington County, Department of Community Planning, Housing, and Development, 2005. *Columbia Pike Initiative – A Revitalization Plan Update*. Page 16. www.arlingtonva.us

each direction with no median between the two Washington Boulevard intersections); upgrading utility infrastructure (including utility undergrounding); bicycle accommodations; wider sidewalks; enhanced pedestrian crossings; and enhanced streetscape, where practicable. These improvements were discussed in a Categorical Exclusion document ("Columbia Pike Multimodal Street Improvements project") and approved by FHWA in 2010. The goals of these comprehensive projects are "to design for all modes of transportation, and to enable safe, attractive, and comfortable access and travel for all users, including pedestrians, bicyclists, transit riders, and motorists"[13]. VDOT reconstructed the western interchange of Washington Boulevard and Columbia Pike with the same goals in mind. In addition, FHWA's Eastern Federal Land Highway Division (EFLHD), in partnership with Arlington County, funded, designed, and constructed multimodal improvements to South Joyce Street (connecting Columbia Pike with Pentagon City). Cumulatively these improvements have enhanced safety and provided operational improvements for pedestrian and vehicular uses as well as rehabilitation of community assets in this corridor.

Additional planning efforts were contained in the 2012 Columbia Pike Multimodal Street Improvements Transportation Study[14] with the goal of making Columbia Pike a safer, more accessible route for all users. The County's plan was to transform this main thoroughfare into a *complete street* that would balance all modes of travel and support high-quality, high-frequency transit service. The project included the replacement of aging and leak-prone water and sewer pipes and burying existing overhead utilities along the Columbia Pike corridor.

The Columbia Pike utility undergrounding and other streetscape improvements from South Wakefield Street to Four Mile Run Drive were completed in 2015. Streetscape improvements included wider sidewalks, new street lights, upgraded traffic signals, and new bus shelters. A new Washington Boulevard bridge over Columbia Pike (just west of the Southern Expansion site) was completed in September 2015. The bridge and associated improvements included new turn lanes, a raised median, a wider sidewalk, a 10-foot shared-use path on Columbia Pike, and increased bridge clearance. Several ramps were reconfigured to improve access, traffic flow and increase capacity.

Arlington County took further steps toward increasing the multimodal capacity of Columbia Pike with the 2017-2026 Transit Development Plan (TDP). Today, Columbia Pike has the most frequent bus service in Virginia, with service every 2-3 minutes during the peak period and carrying almost 2,700 people during the peak hour and over 17,000 per weekday. Weekday peak hour ridership could grow to 4,600 and weekday ridership to 24,600 by 2026. The goal of the TDP was to identify a transit concept for Columbia Pike that would increase capacity to meet the 10-year demand; invest in transit that supports economic development; improve connectivity to key activity centers; and offer premium transit service that is fast, reliable, and easy to use. This new service concept is known as the Premium Transit Network. The TDP and Premium Transit Network were adopted by the County Board in July 2016. The new service is anticipated to begin in Summer 2018, followed by passenger amenities such as off-board fare collection and high-quality transit stations in 2019-2021.

Arlington County, through the FHWA, prepared categorical exclusion documentation for the Columbia Pike Multimodal Street Improvements project to support increased multimodal capacity on Columbia Pike.

[13] Arlington County, 2015. Columbia Pike Multimodal Street Improvements. https://projects.arlingtonva.us/projects/columbia-pike-multimodal-street-improvements/.
[14] Kimley-Horn and Associates, June 2012. Columbia Pike Multimodal Street Improvements – Transportation Study, prepared for Arlington County, VA. Department of Environmental Services, Transportation Planning Bureau.

1.4.4 Public Law 114-158

Public Law 114-158 – H.R. 4336, 20 May 2016 – required ANC to submit a report on the interment/inurnment capacity of the cemetery including the estimated date the cemetery would reach maximum interment and inurnment capacity, and legislative and non-legislative options necessary to extend the operational life of the cemetery. ANC's report to Congress, *The Future of Arlington National Cemetery: Report on the Cemetery's Interment and Inurnment Capacity*, February 2017, provided various timelines for reaching capacity and a framework and criteria to evaluate options to extend the operational life of ANC.

1.5 Decision-Making Process

ANC, as a federal agency, is required to incorporate environmental analysis into its decision-making process for the actions it proposes to undertake. The decision to be made is whether to implement the Proposed Action.

The purpose of this EA in the decision-making process is to:

- Inform federal decision makers and the public of the potential environmental effects of the Proposed Action and its considered alternatives, as well as methods to reduce these effects;
- Provide sufficient information for determining whether to prepare a FONSI or an EIS;
- Document the NEPA process; and
- Allow for federal, state, and local agency, Tribal government, and public input into the decision-making process.

Through this decision-making process, actions are identified that the federal government commits to undertake to minimize or mitigate adverse effects, as required under the NEPA, CEQ regulations, and 32 CFR 651. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences and take actions that protect, restore, and enhance the environment.[15]

This document provides an analysis of resource topics that may be affected by the Proposed Action including: aesthetics; air quality; geology, topography, and soils; cultural resources; hazardous, toxic, and radioactive material; noise; water resources; wildlife and habitat; special status species; socioeconomics, environmental justice, and protection of children from environmental health risks and safety risks; noise; traffic and transportation; utilities; visitor experience; Section 4(f) of the Department of Transportation Act; and cumulative environmental effects. Finally, federal actions are considered "connected" and must be reviewed under the same NEPA document, if they "(i) Automatically trigger other actions which may require NEPA documents, (ii) cannot or will not proceed unless other actions are taken previously or simultaneously, or (iii) are interdependent parts of a larger action and depend on the larger action for their justification." Construction of the required relocation and realignment of Southgate Road, Columbia Pike, South Joyce Street, and the Washington Boulevard (Route 27) Interchange, and associated utility relocation, will be funded as a separate but related project under the Defense Access Roads (DAR) Program. Therefore, the impacts associated with the DAR project are considered within this NEPA document, which may be adopted by FHWA as its compliance with NEPA for the DAR project.

[15] CEQ regulations, 40 CFR §1500.1(c).

1.6 Scoping and Public Involvement

Early agency coordination was accomplished in accordance with the NEPA process through cooperating agency invitations to five agencies with legal interest and/or jurisdiction over the Proposed Action – FHWA-EFLHD, EPA, NCPC, VDOT, and Arlington County. All five agencies accepted and participated as such. A cooperating agency kick-off meeting was held on 9 March 2016, and coordination was conducted at key points in the process.

A Notice of Intent to prepare an EA was published in the *Federal Register* on 20 April 2016. ANC issued a press release, and public notices were also published in the *Washington Post*, the *Washington Times* and the *El Tiempo Latino* newspapers, and on ANC's and the U. S. Army Corps of Engineers' (USACE) websites. Brochures regarding the Proposed Action were mailed to approximately 250 property owners, agencies, and civic leagues located near the project site and Columbia Pike. ANC and USACE also posted information on their respective websites for the expansion project during the NEPA process.

On 27 April 2016, a press conference and an open-house-style NEPA public scoping meeting were held at the Sheraton Pentagon City, Arlington, Virginia.[16] Storyboards describing the Proposed Action and the NEPA process were displayed. Representatives from USACE, ANC, and the five cooperating agencies, and consultant's staff, as well as a Spanish-language interpreter were available to answer questions and obtain comments. Project brochures were also available. More than 75 people attended the scoping meeting. The public had an opportunity to provide written comments during the meeting, as well as throughout the comment period from 20 April through 31 May 2016.

Defense Access Roads Program (DAR)

Since 1919 the Department of Defense (DOD) and predecessors of the Federal Highway Administration (FHWA) have cooperated in insuring the needs of the military are considered in the Nations Federal-aid Highway Program.

The Defense Access Roads Program (DAR) provides a means for the military services to pay their share of the cost of public highway improvements necessary to mitigate an unusual impact of a defense activity. An unusual impact could be a significant increase in personnel at a military installation, relocation of an access gate, or the deployment of an oversized or overweight military vehicle or transporter unit.

The DAR program is jointly administered by DoD and FHWA. FHWA evaluates a proposed project on whether it meets the eligibility criteria for the DAR program. Upon project approval, the DAR funding is transferred to FHWA for project execution. FHWA typically distributes the funds to a State, county, or local transportation authority for completing the project. Upon completion, the long-term maintenance of the improvement becomes the responsibility of the owning highway authority.

Source: Federal Highway Administration, Office of Federal Lands Highway, January 2017. https://flh.fhwa.dot.gov/programs/dar/

In accordance with Section 106 of the National Historic Preservation Act (NHPA), ANC also used the NEPA scoping process to notify 50 potentially interested agencies (including State Historic Preservation Office), organizations (including Native American Tribes), and individuals of the scoping meeting, and to invite them to be consulting parties with respect to cultural and historic properties. Six responded affirmatively: National Park Service (NPS) – George Washington Memorial Parkway; VDOT Northern Virginia District; Arlington County; Catawba Indian Nation; Arlington Historical Society; and the PMF. The Section 106 process is described in further detail in Section 3.7, *Cultural Resources*.

[16] https://www.federalregister.gov/documents/2016/04/20/2016-09053/arlington-national-cemetery-southern-expansion-project-and-associated-roadway-realignment-nepa

ANC received scoping comments from 43 citizens and agencies from its public outreach efforts including the public open-house meeting and invitations to provide comments. The comments and concerns expressed were:

- Overall support for the project, and desire for an aesthetically-pleasing expansion to the cemetery.
- Traffic concerns associated with the closure of Southgate Road and rerouting of traffic onto Columbia Pike via the new proposed access road.
- Potential increase of traffic through Foxcroft Heights and other nearby residential areas.
- Safety concerns with respect to relocated pedestrian and bicycle access along Columbia Pike.
- A desire for parking for the AFM and parking to replace the Southgate Road spaces that will be eliminated.
- A desire for pedestrian access to ANC.
- A desire to keep the historic boundary wall in place.

On 16 August 2018, the Draft EA was released, and the public had an opportunity to provide written comments during the meeting, as well as throughout the comment period from 16 August through 22 September 2018. A public meeting was also held on 22 August 2018.

ANC received 157 comments from citizens and agencies. The majority of the comments expressed pertained to the proposed shared use and walking trails along Columbia Pike. The comments and concerns expressed were:

- The Shared Use path is too narrow for use by both bicycles and pedestrians. Widen one or both paths.
- The bicycle traffic should be separated from the pedestrian traffic.
- Have one bicycle lane in each direction, and a separation between the two.
- Incorporate additional bicycle lane into the travel lanes, with a separation.
- Have only three lanes of vehicle traffic along Columbia Pike so that there can be more space for bicycles.
- Conceptual depictions for bicycle trails, signage, path markings, and designs were submitted.

ANC also received a response letter from Arlington County. Their comments and concerns expressed were:

- It is incorrect to state that the multi-modal improvements along Columbia Pike are part of the purpose and need of the project.
- The EA does not adequately distinguish the impacts among the alternatives.
- The proposed underpass might restrict future utility operations and maintenance along Columbia Pike.
- The new roadway configuration will force more traffic onto Columbia Pike, constraining traffic flow.
- Foxcroft Heights should be considered an Environmental Justice community.
- The proposed shared use path concept along Columbia Pike is too narrow and should be widened.

Documentation of all agency and public involvement efforts, including scoping correspondence letters and a matrix including all received comments and responses, are included in **Appendix A.** They are also addressed as appropriate in this EA.

1.7 Required Regulatory Review and Consultations

The Proposed Action requires compliance with federal and state regulations including:

- NEPA – ANC is the lead agency responsible for evaluating potential environmental impacts resulting from its actions. The preparation of an EA has two potential outcomes: a FONSI or the requirement to prepare an EIS in the event of significant impacts.
- Clean Air Act (CAA) of 1970 – The EPA is the agency responsible for enforcing air quality standards. An air quality conformity determination is necessary to comply with the General Conformity Rule.
- Clean Water Act of 1977 (CWA) – The CWA forms the basis of efforts to control pollution of the nation's surface waters, including wetlands. Under the CWA, discharges of pollutants into navigable or surface waters, either directly or indirectly, are permitted through the National Pollutant Discharge Elimination System (NPDES).
- NHPA of 1966 – The Advisory Council on Historic Preservation (ACHP) and the Virginia Department of Historic Resources are the agencies responsible for promoting the preservation of archaeological and historic sites. Under this Act, eligible or listed National Register of Historic Places sites are evaluated for possible impacts from federal actions. ANC is the lead agency responsible for compliance with Section 106 of the act, requiring the avoidance or mitigation of adverse effects to historic properties.
- Resource Conservation and Recovery Act of 1976 (RCRA) – This federal law requires identification of hazardous waste, standards for management, and the provision of guidelines and financial aid to establish state waste management programs.
- Virginia Coastal Zone Management Program – The Virginia Department of Environmental Quality (VDEQ) is the agency responsible for protecting and managing coastal zone resources. A Coastal Zone Management Act (CZMA) Consistency Determination is required by federal and state agencies whose actions may affect coastal resources in Virginia. Arlington County is in Virginia's coastal zone.
- Virginia Stormwater Management Act – The VDEQ is the state agency responsible for approving the Construction General Permit for activities equal to or larger than one acre. The expanded section of the cemetery would fall under ANC's existing Municipal Separate Storm Sewer System (MS4) permit and the proposed County rights-of-way would fall under Arlington County's MS4 permit.
- Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations – The EO directs federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law.
- EO 13045, Protection of Children from Environmental Health Risks – The EO directs federal agencies to ensure that its policies, programs, activities, and standards address disproportionate environmental health and safety risks to children, to the extent permitted by law.

- EO 13693 – Planning for Federal Sustainability in the Next Decade – requires federal agencies to maintain leadership in sustainability and greenhouse gas emission reductions and support preparations for the impacts of climate change.

In addition, the following agreements or consultations were/will be needed:

- Land acquisition/disposal agreements and jurisdictional transfers;
- A finalized Memorandum of Agreement among ANC, FHWA-EFLHD, VDOT, and Arlington County for execution of the DAR project (partial funding has already been secured);
- A finalized Memorandum of Agreement between DA and VDHR for Section 106 compliance and mitigation.
- An evaluation of and determination of eligibility for the AFM.
- A traffic analysis to supplement the previous Interchange Modification Report by Arlington County. The traffic analysis will be used to determine proper design for ingress/egress of the parking area, safe pedestrian crossing of Columbia Pike, location of curb cuts, additional signals and timing, etc.;
- Agreements with utility companies (gas, communications, electric) and Arlington County (water, wastewater, storm sewer) to relocate existing lines;
- Agreements with WHS to relocate utilities, if necessary (water, steam, and storm sewer);
- Approval of the cemetery design by the Commission of Fine Arts (CFA) and from NCPC, in accordance with Section 5 of the National Capital Planning Act, and Army Regulation (AR) 210-20;
- Consultation with the U.S. Fish and Wildlife Service as per Section 7 of the Endangered Species Act (ESA) for any protected species identified; and
- A Land Use Permit from VDOT to modify/reconstruct VDOT maintained roadways and interchange ramps.
- Arlington County Public Right-of-Way Permit for working in the county right-of-way; blocking traffic requires a Transportation Right-of-Way Permit.
- Other state or local permits/consultations, as needed.

2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

This chapter describes the alternatives considered and eliminated, the alternatives considered in detail (potential actions), and their achievement of the objectives in Section 1.4, *Objectives of the Proposed Action*. The No Action Alternative is also considered per CEQ Regulations.

2.2 Proposed Action

The Proposed Action is to establish a single contiguous parcel of land south of the cemetery by closing, relocating, and realigning local roadways and develop the parcel to increase interment capacity. Absent the roadway relocation/realignment, creating a contiguous parcel would not be possible. The Proposed Action would increase ANC's burial capacity by 40,000-60,000 spaces for first interments. The Southern Expansion site currently is the only available land that is suitable for a comprehensive development opportunity.

A Vision for Development

Staff from ANC, USACE, and design consultants gathered in May 2016 to collaborate on a vision for the proposed development. The participants established planning principals – character, function, and use – for future development of the proposed expansion. Although maximizing burial space was a primary concern for the expansion, ANC leadership decided the cemetery development must balance the number of interment spaces with preserving the tradition, character, and experience of Arlington National Cemetery for a successful design. A key concept for design was to transition into the expansion area seamlessly, so veterans and their families would have a sense the new interment sites are fully a part of ANC. The graveside experience should be a primary consideration in the future design; the proposed expansion must maintain an atmosphere of peaceful reflection for the families of our Nation's service members.

Photograph by Rachel Larue; ANC public release.

2.3 Planning Elements

The proposed comprehensive development of the Southern Expansion site would include the following planning elements:

2.3.1 Roadway Realignment

The Proposed Action incorporates the roadway alignment that was developed by a working group consisting of ANC, USACE, Arlington County, VDOT, and FHWA-EFLHD. It would remove the existing Southgate Road and realign Columbia Pike from the AFM east to Washington Boulevard to allow for a single large parcel contiguous with the cemetery. Contiguous land is essential not only for safe and efficient cemetery operations, but for the family members' experience of a sense of belonging to the ANC "community". According to ANC's 2013 RPMP Implementation Guide, "crossing a public right-of-way during an interment processional jeopardizes the dignity and honor of ANC and is a safety concern".[17]

In its current configuration as previously illustrated in Figure 1-3, the Southern Expansion site consists of three *noncontiguous* parcels owned by the federal government, under ANC jurisdiction, and the land

[17] U.S. Army Corps of Engineers, Norfolk District, Implementation Guide 2013, Arlington National Cemetery, U.S. Soldiers' and Airmen's Home National Cemetery. Intra-agency Memorandum. Prepared by HNTB Corporation. Page 2.

surrounding the roadways of the Washington Boulevard interchange owned by VDOT. The parcels are divided by public roadways, two of them owned by Arlington County (Southgate Road and Columbia Pike) and one owned by VDOT (Washington Boulevard/ Columbia Pike interchange). The Proposed Action is to make the Southern Expansion contiguous with the cemetery and maximize its interment/inurnment capacity. It would create a single contiguous parcel to increase burial capacity while providing for adequate access, operational capacity, and safety for roadways and ramps affected by the Proposed Action. The Proposed Action creates an opportunity to increase multimodal capacity on this portion of Columbia Pike.

A new access road on an approximate 55-foot-wide right-of-way[18] at the western edge of the former Navy Annex site is proposed to replace Southgate Road and its traffic to and from JBMHH Gate 1. The addition of the base access road is supported by Arlington County; it will provide direct access to the JBMHH Gate 1 from Columbia Pike. This would help reduce cut-through traffic on Oak and Ode Streets in the Foxcroft Heights neighborhood. The new access road – "South Nash Street" – includes an area for a proposed public park to memorialize Freedman's Village. Second, the Proposed Action would realign Columbia Pike. Third, the action would change the cloverleaf design of the Columbia Pike/Washington Boulevard interchange to a tight diamond design. During the final design process, the location of the semi-diamond interchange would be adjusted, as necessary, to meet the minimum geometric criteria and VDOT standards, and to maximize the contiguous burial space. The proposed roadway realignment creates the largest contiguous parcel for maximizing burial space and the necessary highway geometry for increasing the multimodal capacity on this section of Columbia Pike. **Figure 2-1** shows the proposed roadway realignment.

As stated in Section 1.5, *Decision-Making Process*, construction of the required closure, relocation, and realignment of Southgate Road, Columbia Pike, South Joyce Street, and the Washington Boulevard/Columbia Pike interchange and associated utility relocations will be funded as a separate but related project under the DAR program. **Figures 2-2 and 2-3** illustrate conceptual roadway cross-sections for the proposed South Nash Street and Columbia Pike.

Multiple alternatives for redesigning the interchange, as described in Section 2.4, *Alternatives Considered and Eliminated,* were considered by the participating agencies, including VDOT, to further maximize the land contiguous to the existing cemetery for increased burial capacity. The alternatives were evaluated for the ability to maintain the regional transportation network by providing adequate capacity and safety for motorists, transit, bicyclists, and pedestrians. The semi-diamond interchange was selected as the best option for maximizing contiguous land for burial capacity. The potential impacts to traffic movements at the semi-diamond interchange intersection with Columbia Pike are evaluated and disclosed in Section 3.10, *Traffic and Transportation*. The reconstruction/redevelopment effort is a joint effort between DA, FHWA-EFLHD, VDOT, and Arlington County. These agencies are negotiating a Memorandum of Agreement for execution of the roadway realignment, interchange modification, and land conveyances.

[18] The roadway dimensions are preliminary; final design specifications to be determined.

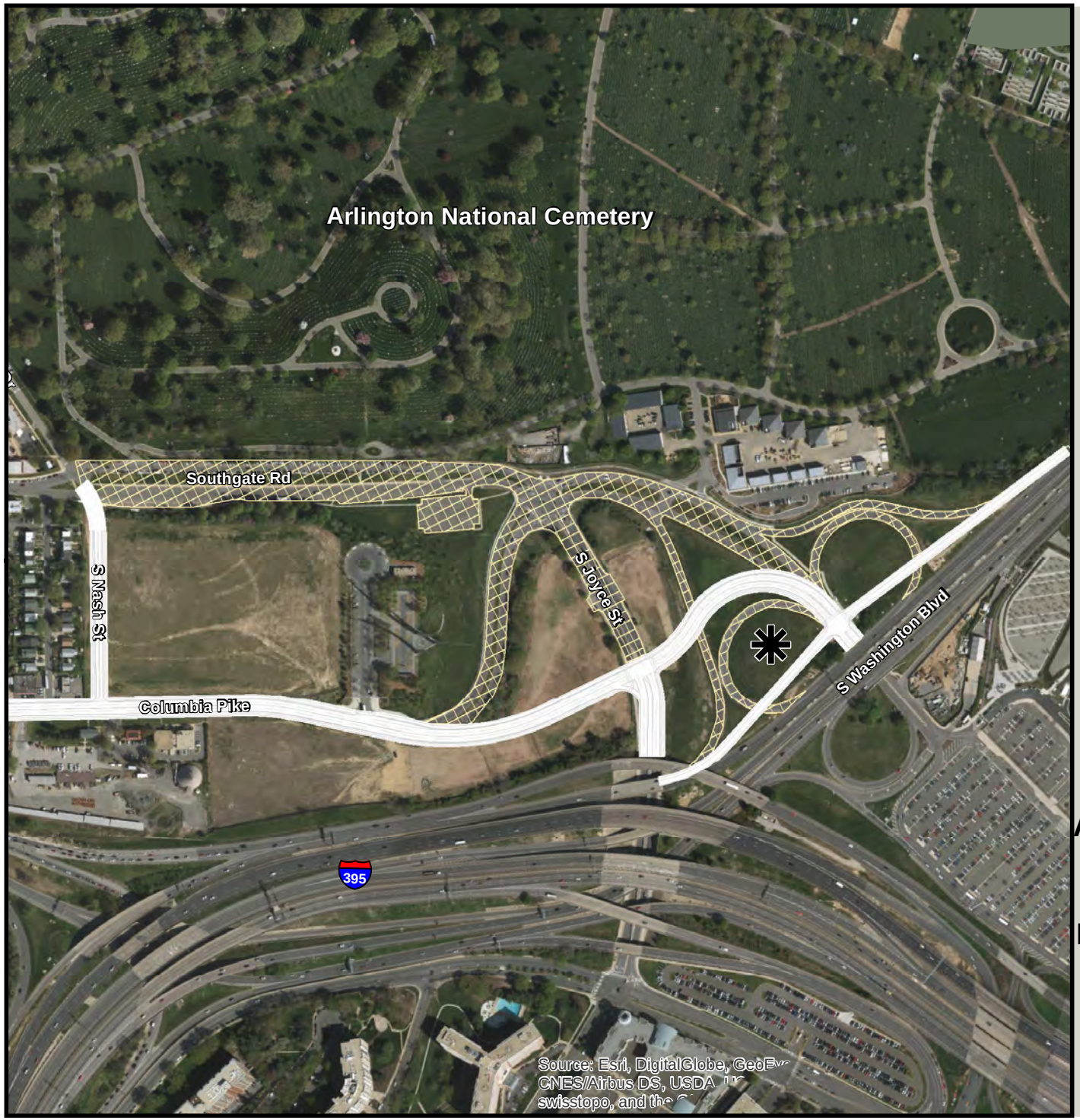


Figure 2-1
Proposed Roadway Alignment

LEGEND

- Proposed Roadway Alignment
- Proposed Roadway Demolition
- PMVEC
  Future 9/11 Pentagon
  Visitor Education Center

Arlington National Cemetery Southern Expansion

Environmental Assessment

N

0 125 250 500 Feet

Source: Google Earth, USDA

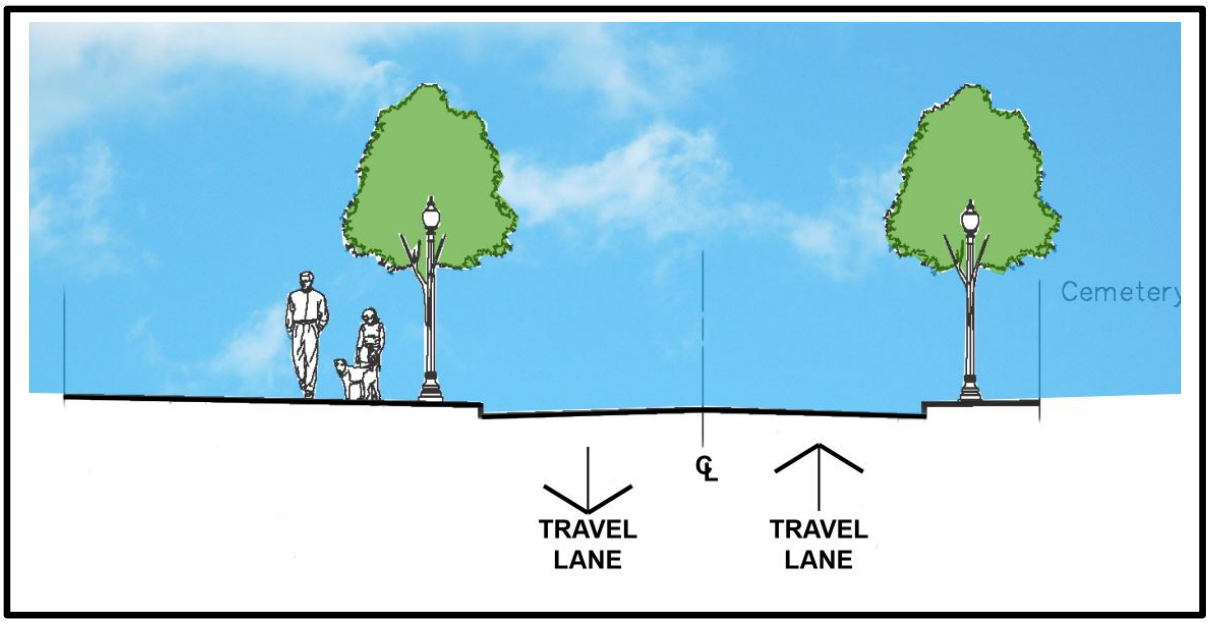


Figure 2-2: Conceptual South Nash Street Cross-Section (subject to change).

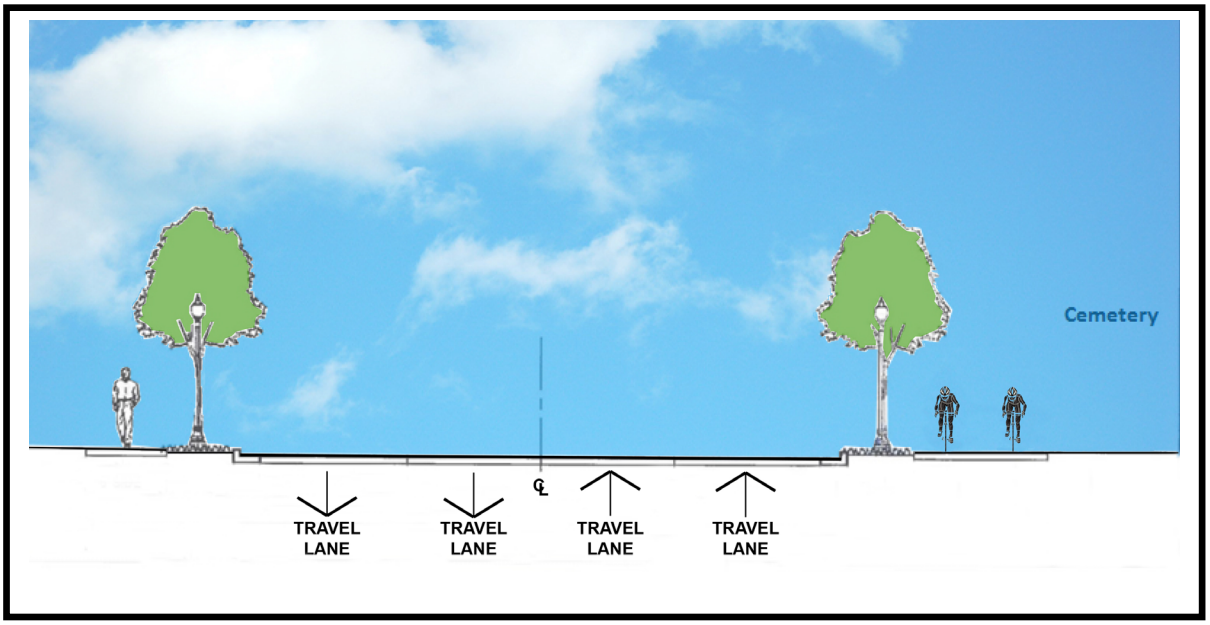


Figure 2-3. Conceptual Columbia Pike Cross-Section (subject to change).

The realignment is integral to a successful ANC expansion. This EA assesses the potential impacts of the realignment to ensure that the cumulative effects of the collective federal actions are considered.

The Proposed Action includes land acquisition and jurisdictional transfers for the realignment of roadways and ramps to support the expansion. The combined roadway realignments would create a single contiguous parcel of land to increase burial capacity and create an opportunity to increase multimodal transportation capacity on this portion of Columbia Pike.

2.3.2 Land Acquisitions/Transfers

The properties under consideration for acquisition or jurisdictional transfer and key objectives are described generally as follows: The DA plans to acquire the Southgate Road ROW from Arlington County. The Southern Expansion project would include an approximate 55-foot wide easement – for utility and maintenance purposes (South Nash Street) – along the western-most boundary of the former Navy Annex property to be used for a new access road from Columbia Pike to Southgate Road to serve JBMHH and other local traffic. It would be a minor arterial road with no curb cuts.

VDOT would convey any of its remaining land north of the realigned Columbia Pike (within the current Washington Boulevard/ Columbia Pike interchange) to ANC. VDOT would receive new ramp connections for Washington Boulevard. The land east of South Joyce Street to Columbia Pike would remain in DA ownership. The proposed land acquisitions/jurisdictional transfers are shown in **Figure 2-4**.

The land for the proposed PMVEC was previously transferred to WHS from VDOT for purposes of building an interpretive center and museum associated with the Pentagon Memorial. The land is now under ANC ownership. This project is in the early stages of development and is not part of the Proposed Action. Planning for the PMVEC project would include coordination for service access to the site. The exact acreage and legal bounds of the PMVEC site would be determined by land survey at a future date.

Pentagon Memorial Fund Visitor Education Center

Through a donation from VDOT, the Pentagon Memorial Fund (PMF) – a non-profit organization created in 2003 by the families of the 9/11 attack on the Pentagon – was afforded a parcel of land necessary to construct a future 9/11 Pentagon Memorial Visitor's Education Center (PMVEC) on a parcel on the north side of Columbia Pike within the footprint of the Washington Boulevard interchange.

Due to existing development constraints, and at the request of ANC, the PMF agreed to relocate the future center to an area south of Columbia Pike. The future PMVEC would be located on DA land under a long-term lease agreement.

Although this parcel is within the Southern Expansion site, the future PMVEC is an independent and unrelated project not included in the Proposed Action. The exact acreage and legal bounds of this project would be determined by survey at a future date upon achieving the necessary funding; the PMF is currently soliciting funds for the building design. If the project progresses, then a separate environmental assessment would be necessary. The engineering design e.g. building, parking, utilities, etc. would be the responsibility of the owner. The future project would comply with all applicable regulations and building permit requirements at that time.

Source:
http://pentagonmemorial.org/visitor-education-center-0/project-information

The AFM is located on land owned by the DA; the Air Force has a 50-year permit to use the land.

2.3.3 Air Force Memorial (AFM)

The site of the AFM was authorized by Congressional legislation in the NDAA of 2000. The 3-acre AFM site was constructed in 2005-2006 and required demolition of Wing 8 of the Navy Annex. When the

Figure 2-4
Proposed Acquisitions and Substitute Facilities

LEGEND

- Arlington National Cemetery
- Subject Property
- Potential Substitute Facilities

Arlington National Cemetery Southern Expansion

Environmental Assessment

0 65 130 260 Feet

Source: ANC Master Plan

original AFM design was presented to the CFA in 2003[19], the architect consulted the ANC Master Plan and an effort was made to include the memorial into the Master Plan.

The Proposed Action would integrate the AFM into the expanded cemetery design; however, conceptually, vehicular access would be limited. A larger parking facility is proposed on the opposite side of Columbia Pike. There would be no alteration of the monument. Concepts for integrating the AFM into the ANC Southern Expansion are being explored. **Figure 2-5** identifies the area to be maintained for the AFM and the area that will be enhanced in concert with the expansion of ANC. All design elements would comply with the Americans with Disabilities Act (ADA). The Air Force has had a long-standing relationship with ANC interment ceremonies; the ceremonial honor guard has always included Air Force personnel.

The AFM has recently been determined to be eligible for the National Register of Historic Places and is addressed later in this document. It is a landmark along the Columbia Pike corridor and would be a noteworthy addition to the national memorials at ANC. Its integration with the cemetery expansion would provide a useful connection between the two sites and would add to a visitors' experience.

2.3.4 Highest and Best Use

The Proposed Action seeks to achieve and balance the highest and best use of the Southern Expansion site, while preserving the tradition, character, and experience of ANC. The RPMP guidance from 2013 was for "…the Southern Expansion site to be developed in a manner that represents the best use of the land with consideration of mission requirements…"[20]

The land making up the Southern Expansion has varying levels of importance for the cemetery's ability to make the best use of it: contiguous, connected, and adjacent.

> *Contiguous* land has the most value and importance for increasing burial capacity. It is the model for essential operations and cemetery image – ease of access, safety, security, and for a sense of belonging to the ANC "community" for families of loved ones. Contiguous land is preferred for cemetery operations.
>
> *Connected* (noncontiguous) land ("operational connectivity"), while not ideal, has value in its ability to provide flexibility for development. Although this type of land would not be used for interments, its operational connectivity would make it valuable for cemetery support services.
>
> *Adjacent* (noncontiguous) land is least desirable since crossing a public roadway would make it unsuitable for interments and create safety concerns for cemetery maintenance operations. As such, it would provide less flexibility to accommodate some cemetery support services.

The proposed contiguous parcel footprint – utilizing the closure, relocation, and realignment of roadways – would be used for increasing burial capacity. Although noncontiguous, connecting the eight-acre parcel south of Columbia Pike would make it more valuable for cemetery use and give ANC greater flexibility for its development. The highest and best use of the Southern Expansion would be for burials on the contiguous acreage and for support services on the noncontiguous acreage.

[19] United States Commission of Fine Arts, Minutes for CFA Meeting, 20 March 2003. https://www.cfa.gov/records-research/record-cfa-actions/2003/03/cfa-meeting/minutes

[20] U.S. Army Corps of Engineers, Norfolk District, Real Property Master Plan, Arlington National Cemetery, 2013. Prepared by HNTB Corporation. Page 88.

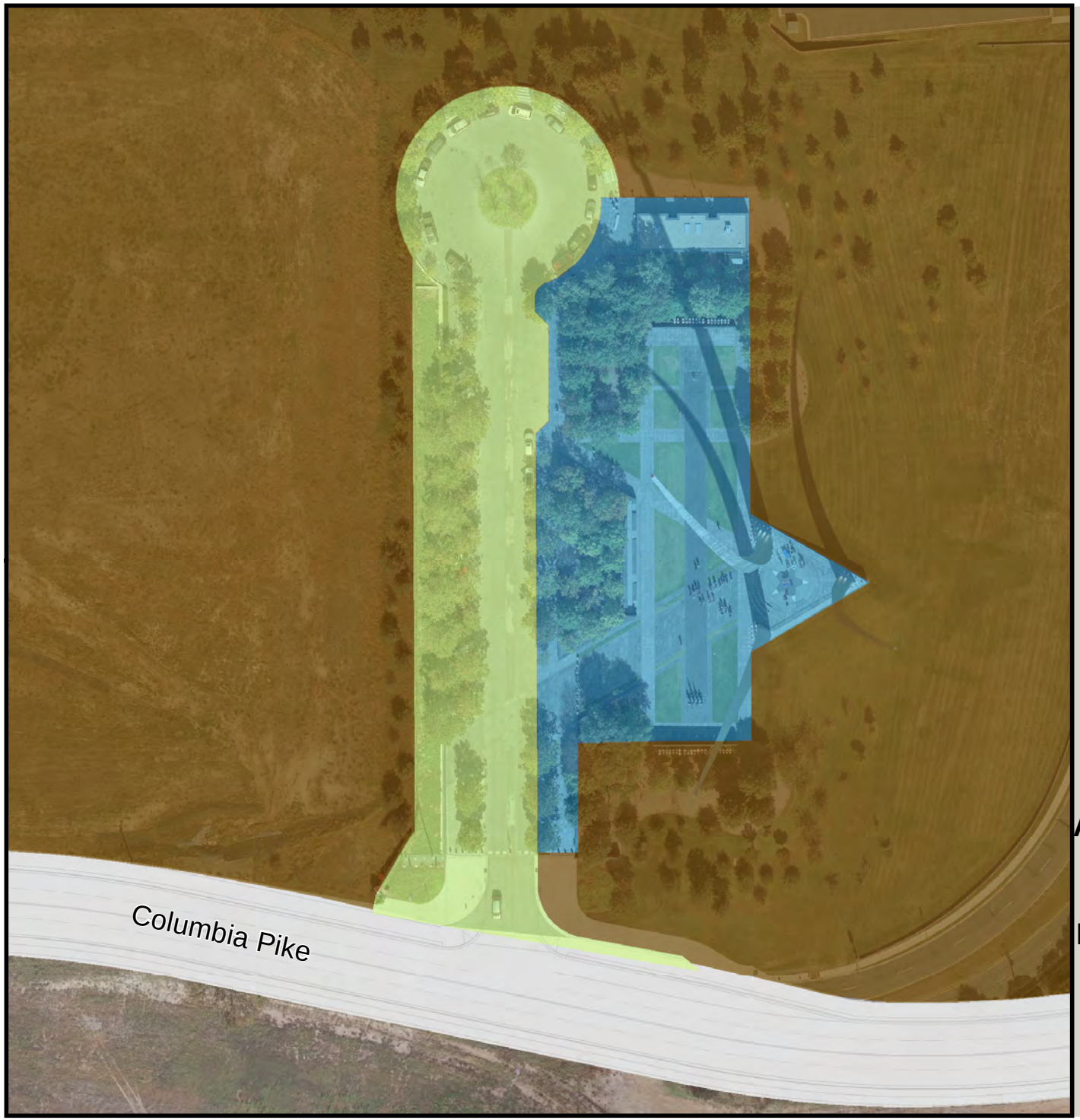


Figure 2-5
Air Force Memorial
Integrated within ANC

LEGEND

- New Interment Area
- Air Force Memorial (Monument to Remain)
- Air Force Memorial Integrated Enhancement Area

Arlington National Cemetery
Southern Expansion

Environmental Assessment

0 20 40 80 Feet

N

The eight-acre parcel south of Columbia Pike – across from the AFM – would be available for cemetery support services/functions such as an Operations Complex, contractor laydown area, spoils stockpiling, etc. It would not be appropriate for burials.

Although not part of the Proposed Action, each alternative has a 4-acre space reserved for a proposed Pentagon 9/11 Memorial Visitor Education Center. This potential future project is currently soliciting funds for planning and design. It is a separate action requiring its own NEPA analysis and applicable federal-state-local permits.

2.3.5 Southern Boundary Wall and Patton Drive

Currently, the southern boundary of the cemetery contains a contributing element of the National Register-listed ANC Historic District – the boundary wall. A portion of the boundary wall dates to 1897, but shows more recent modifications. This portion may be affected by the Southern Expansion. The eastern half of the affected boundary wall was constructed more recently, between the 1970s and the 2000s, however are also considered to contribute to the historic district.

The Proposed Action would expand cemetery operations beyond the current boundary wall. In keeping with the planning elements of preserving the tradition, character, and experience of ANC, the expansion would deconstruct and remove the boundary wall to have a seamless transition and be uniform with the current look and feel that is unique to ANC.

Photo 1: Looking south from ANC toward Southern Expansion. AFM (L) and Navy Annex (R) in background, southern boundary wall is in center of photo (ca. 2012). (*HNTB photo)*

Family members of loved ones want to feel like they are part of a community with a sense of belonging. This experience is one that families expect and deserve as they visit a loved one's grave. The South Gate/Clayton Gate and a small portion of the wall would remain for historical context of the Cemetery boundary. The entire boundary wall left in place would contradict the desired outcome; it would not be conducive to the continuity and contiguousness of the cemetery and would give the appearance of the expansion being an ANC "annex".

The reasons for deconstructing/removing the boundary wall:

- It is consistent with past cemetery practice.
- It is necessary for grieving families to have a sense of inclusion and feeling of being part of the ANC community.
- It removes a physical barrier that would impede pedestrian movements or maintenance vehicles through the cemetery.

ANC considered the boundary wall removal as the best way to make a seamless transition from the existing cemetery to the new expansion area. The vision for this development is to provide the identical graveside experience and sense of inclusion that families expect of ANC, a primary consideration for the future design.

The Proposed Action includes converting a portion of Patton Drive – from the South Gate to Eisenhower Drive – to a pedestrian-only pathway. New roadway circulation routes for vehicles will be included in the new expansion area.

2.3.6 Support Services and Infrastructure

The Proposed Action includes areas designated for cemetery support services such as grounds maintenance and interment spoils. Cemetery maintenance requires storage of materials, such as mulch, topsoil, and plants, and maintenance equipment used in daily grounds and landscaping maintenance operations. The excavation of interment sites for in-ground interments and inurnments generates surplus soils that require storage.

The Proposed Action also includes supporting infrastructure such as water fountains, waterlines, sanitary sewer, storm drainage, underground electrical and communications/information systems, landscaping, retaining walls, perimeter fencing, vehicle and pedestrian access roads and walks, and security systems. The number of burial spaces would balance the cemetery's expected usage trends for above- and below-ground interment and inurnment spaces. The cemetery expansion would include a mixture of columbaria, niche walls and in-ground burial spaces. The design of the cemetery expansion would balance character, function and use, mirroring the traditional image and visitor experience of ANC.

Internal roadway circulation and access to the proposed relocated service complex or other support services via an underpass would be determined during the design phase. To conservatively analyze potential environmental effects within the cemetery expansion, the entire cemetery expansion area would be assumed cleared. Site grading may include retaining walls to allow for earthwork balancing while targeting a 5% preferred graded slope requirement.

2.3.7 Sustainability Measures

The Proposed Action would include sustainability measures from the Veterans Affairs' Sustainable Design Manual. The Proposed Action achieves two major sustainability features from the Sustainable Design Manual: 1) Reuse of a previously developed site; and, 2) Use of a location that provides multimodal transportation options.[21]

[21] U.S. Department of Veterans Affairs, Office of Construction and Facilities Management, Sustainable Design Manual, 2014. https://www.cfm.va.gov/til/sustain/dmSustain201405.pdf

Other examples of sustainable design include water efficient landscaping, low pollutant-emitting materials, and reducing stormwater runoff. Sustainability is discussed further in Chapter 3.

2.4 Alternatives Considered and Eliminated

The RPMP PEA, completed for the entire cemetery in 2014, first evaluated alternatives for future interment zones, including the noncontiguous parcels, and the concept of contiguous parcels contained in the Southern Expansion site. The objective from the RPMP PEA was to maximize burial space.

2.4.1 Alternatives Noncontiguous to Existing Cemetery Considered and Eliminated

Alternatives utilizing the noncontiguous parcels of the Southern Expansion site were previously studied and eliminated. All parcels are owned by the DA. Although none had significant environmental impacts, they did not meet the purpose and need for the Proposed Action of creating a contiguous boundary to increase burial capacity. For illustrative purposes, the noncontiguous parcels are divided into four parcels, "A-D" for the following alternatives:

- RPMP PEA Alternative 1 – Southern Expansion Site – Under this alternative, illustrated in **Figure 2-6**, there were no land exchanges or roadway alignment changes to increase burial space. All roadways and ramps would have remained in their current configurations. Although parcel "A" was assigned as an area for interments, all the parcels would have remained noncontiguous to ANC. Burial ceremonies would have had to cross a public street which was considered not desirable for safe and efficient cemetery operations. Furthermore, requiring grieving families to cross the street would trigger a feeling of separation – not inclusiveness – from the rest of the cemetery. This alternative also did not address improvements to Columbia Pike for multimodal uses. Although the analysis found no significant impacts associated with it, the alternative did not create a single contiguous parcel and, therefore, did not maximize burial space.

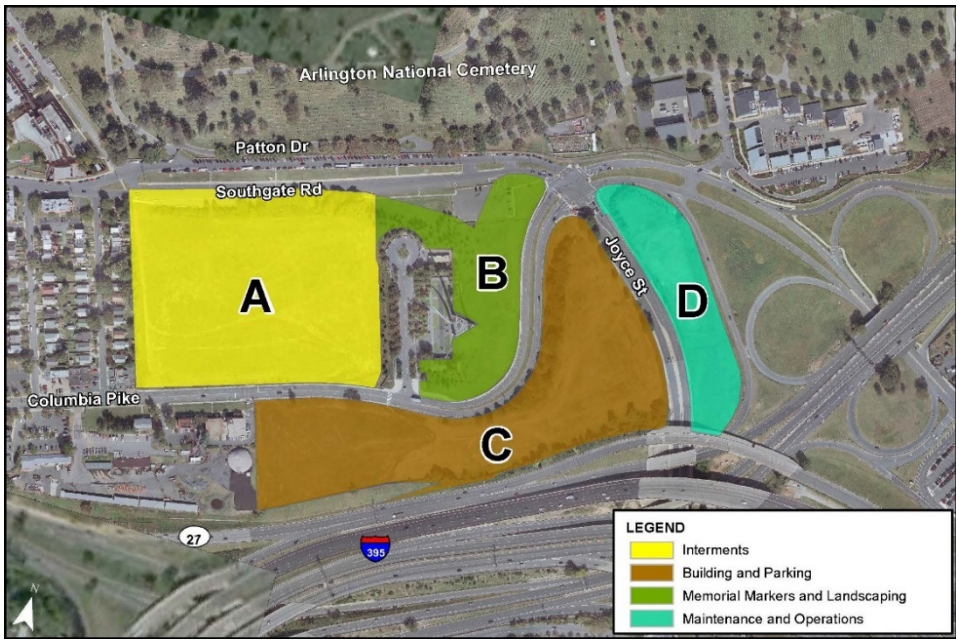


Figure 2-6. RPMP PEA Alternative 1 – Southern Expansion Site

- RPMP PEA Alternative 2 – Southern Expansion Site with Southgate Road – This alternative, as illustrated in **Figure 2-7**, included the closure of Southgate Road to make parcel "A" contiguous with ANC. Other roads would have remained in the same configuration. Although this alternative would have provided for an increase in burial space, it did not utilize the other available parcels for maximizing potential burial space. In addition, closing Southgate Road without providing an alternative access road to JBMHH would have created the potential for adverse traffic impacts in the adjacent Foxcroft Heights neighborhood.

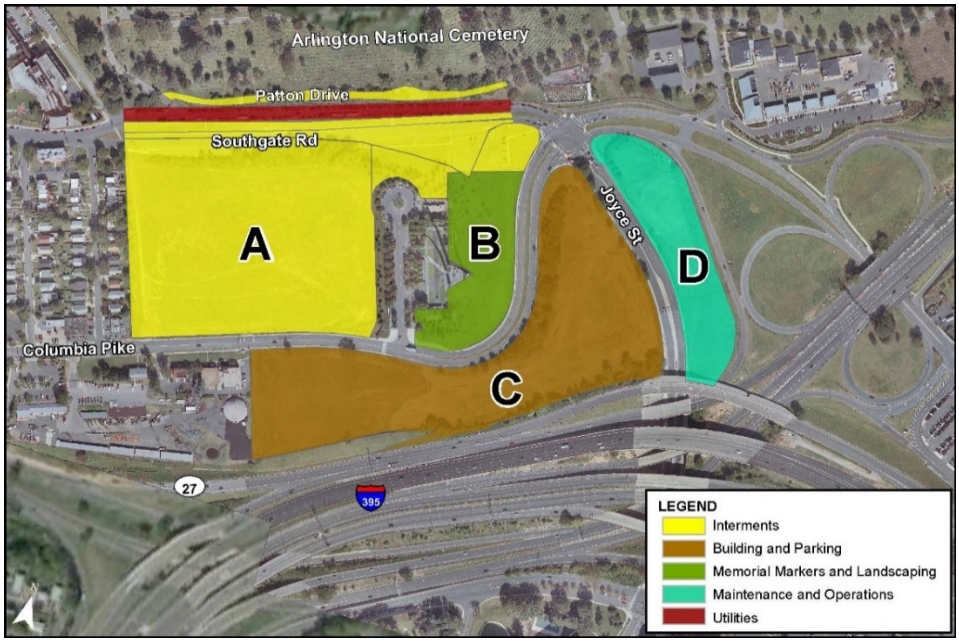


Figure 2-7. RPMP PEA Alternative 2 – Southern Expansion Site with Southgate Road

- RPMP PEA Alternative 3 – Southern Expansion Site with new Access Road – This alternative, as illustrated in **Figure 2-8**, is identical to Alternative 2, except that it includes a new access road from Columbia Pike to JBMHH to replace the closure of Southgate Road. Other roadways remained in the same configuration; the amount of cemetery interment space was less than as in Alternative 2. As with Alternative 2, this alternative did not maximize potential burial capacity by utilizing parcels B, C, or D.

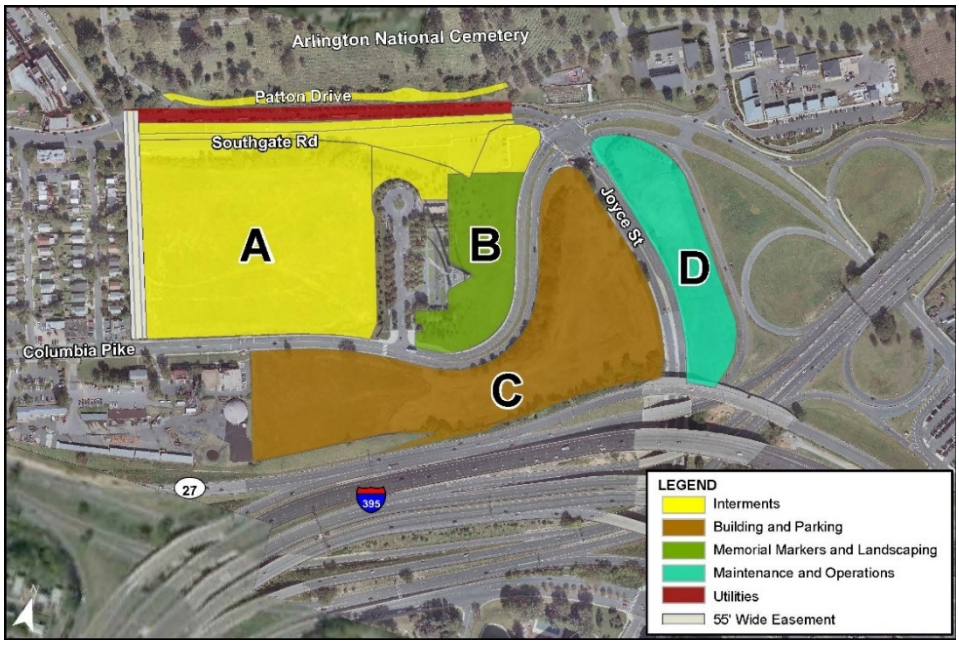


Figure 2-8. RPMP PEA Alternative 3 – Southern Expansion Site with New Access Road

2.4.2 Roadway Realignment Alternatives to Create a Single Contiguous Parcel Considered and Eliminated

RPMP PEA Alternative 4, Southern Expansion Site with Realigned Roadways as illustrated in **Figure 2-9,** considered developing the cemetery with the potential for roadway realignments, but did not identify a specific configuration. The RPMP PEA FONSI indicated further NEPA analysis was needed to determine potential impacts associated with a precise realignment alternative. Alternative 4 was carried forward by ANC for further analysis because it had the potential to provide a larger single contiguous parcel with connection to the existing ANC cemetery than if the roads remained in the current configuration. It also had the potential to provide the needed improvements to Columbia Pike to accommodate multimodal use.

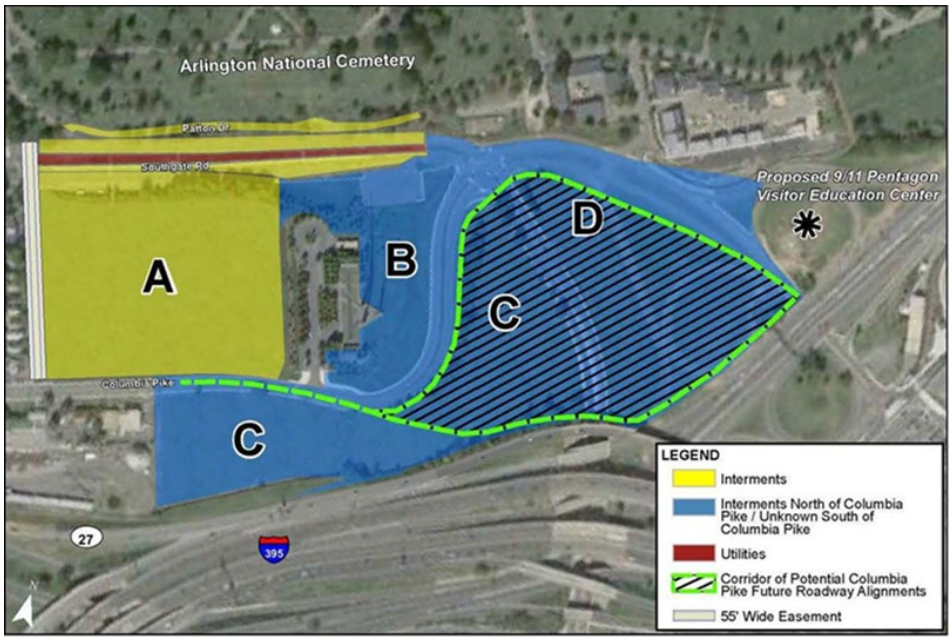


Figure 2-9. RPMP PEA Alternative 4 – Southern Expansion Site with Realigned Roadways

A working group with representatives from ANC, USACE, Arlington County, VDOT, and FHWA-EFLHD explored practical roadway realignment options for Columbia Pike, Southgate Road, South Joyce Street (S. Joyce Street), and the Washington Boulevard/Columbia Pike interchange. The goal of the working group was to develop reasonable alternatives to meet the purpose and need and to address level of service for the Washington Boulevard/ Columbia Pike interchange.

All alternatives developed include: closure and elimination of Southgate Road; construction of a new South Nash Street; various alignments of Columbia Pike; and various ramp alignments for the Washington Boulevard/ Columbia Pike interchange.

The working group developed and considered five sub-alternatives of Alternative 4 through an extensive screening process. A comprehensive list of criteria was developed, identifying alternatives that best meet the Purpose and Need. Each alternative was evaluated using these criteria, as provided in **Appendix B.** The following provides the results for each alternative. The sub-alternatives shown in Figures 2-10 through 2-14 identify differences in the roadway designs. The integration of the AFM in the Proposed Action had not yet been considered as part of the cemetery design elements during this early evaluation.

- Sub-Alternative 4a. This alternative, illustrated in **Figure 2-10**, maximized contiguous burial space with the existing cemetery by providing approximately 39.4 acres for expansion**.** The interchange configuration would have resulted in a discontinuity of driver expectations with an intersection at Columbia Pike and S. Joyce Street that appears to be, but is not quite, a full 4-way intersection. It could result in drivers trying to access Washington Boulevard using the off ramp instead of making a left. This alternative would have resulted in an additional signal phase at Columbia Pike and S. Joyce Street. This is the only alternative to add a fourth leg to the intersection of Columbia Pike and S. Joyce Street. The fourth leg would have required an additional signal phase which would be detrimental to traffic queues in the evenings with the high number of vehicles turning from northbound S. Joyce Street to westbound Columbia Pike. This interchange alternative would have resulted in higher construction and maintenance costs, as well as a longer schedule, due to the

Figure 2-10
Sub-Alternative 4a

LEGEND

- Internal Vehicle Movement
- External Vehicle Movement
- Boundary Wall
- Potential Access for Pedestrians
- Cemetery Expansion

Note: Cemetery development could include a combination of columbaria, niche walls and in-ground burial. Internal roadway circulation will be defined during the design phase of the project.

Arlington National Cemetery
Southern Expansion

Environmental Assessment

Not to Scale

N

structures required to make the braided ramp possible. This alternative did not provide for a high capacity regional multimodal transportation network. It was eliminated from further consideration.

- Sub-Alternative 4b. This alternative, illustrated in **Figure 2-11**, maximized burial space contiguous with the existing cemetery by providing approximately 40.2 acres for expansion. This alternative featured a short exit ramp off Washington Boulevard ending at a signalized intersection with Columbia Pike. The length of the ramp would be inadequate for safe queuing of traffic volume exiting from Washington Boulevard, which could also result in traffic queues on Washington Boulevard that impede traffic flow. Additionally, the curvature of the exit ramp would be difficult for trucks to navigate. This interchange would require a design exception for the elevation transitions to make the ramps a viable alternative. This alternative did not provide the necessary geometry for a high capacity regional multimodal transportation corridor, therefore did not meet the purpose and need for the Proposed Action and was eliminated from further consideration.

Highway Geometry

The geometric aspects of a highway include features that affect or relate to its operational quality and safety. These features, which are visible to the driver and affect driving performance, include elements of the roadways, ramps, and roadside. Roadways have features related to: roadway curvature (horizontal and vertical alignment); intersections and interchanges; number of lanes and lane width, presence of shoulders and curbs; medians; and other miscellaneous elements (e.g., driveways, bridges). Physical features of the roadside include: barriers (e.g., guide rails); obstacles (e.g., noise barriers, trees, signs); and other miscellaneous features (embankment slopes, ditches, etc.).

National Transportation Library,
ntl.bts.gov/DOCS/97095/ch02/ch02_01.html

- Sub-Alternative 4c. This alternative, illustrated in **Figure 2-12**, maximized burial space contiguous with the existing cemetery by providing approximately 43.3 acres for expansion. The alternative eliminated the Washington Boulevard/ Columbia Pike interchange, diverting more traffic to adjacent interchanges. This would have an adverse effect on operations in a high-capacity regional multimodal transportation corridor. Eliminating the western half of the Washington Boulevard interchange would be contrary to the Pentagon Master Plan, which envisions the Washington Boulevard interchange retaining all current movements. This alternative did not meet the purpose and need for the Proposed Action and was eliminated from further consideration.

- Sub-Alternative 4d. This alternative, illustrated in **Figure 2-13**, maximized burial space contiguous with the existing cemetery by providing approximately 43.9 acres for expansion. However, this alternative did not provide the necessary geometry for a high capacity regional multimodal transportation corridor. The geometry of this alternative did not meet the combined grade and turning movement requirements for high capacity transit. The combination of the steep grade and shorter distances between the Columbia Pike and S. Joyce Street intersections did not allow for high-capacity transit vehicles to traverse the horizontal and vertical grade changes between Columbia Pike and S. Joyce Street. In addition, shortening S. Joyce Street limited the queuing capacity for left turns onto Columbia Pike. Reduced queuing capacity would have a negative impact on the S. Joyce Street/Army Navy Drive intersection in the evenings. This alternative did not provide the necessary geometry for a high capacity regional multimodal transportation network. It was eliminated from further consideration.

- Sub-Alternative 4e. This alternative, illustrated in **Figure 2-14**, did not maximize burial space contiguous with the existing cemetery and provided only 35.7 acres for expansion. This alternative

South Gate Remains

Deconstruct Boundary Wall

ANC Service Complex

Air Force Memorial

VDOT Maintenance Facility

Columbia Pike

E Joyce St

Washington Blvd/SR 27

395

Figure 2-11
Sub-Alternative 4b

LEGEND

- Internal Vehicle Movement
- External Vehicle Movement
- Boundary Wall
- Potential Access for Pedestrians
- Cemetery Expansion

Note: Cemetery development could include a combination of columbaria, niche walls and in-ground burial. Internal roadway circulation will be defined during the design phase of the project.

Arlington National Cemetery Southern Expansion

Environmental Assessment

Not to Scale

N

Figure 2-12
Sub-Alternative 4c

LEGEND

- Internal Vehicle Movement
- External Vehicle Movement
- Boundary Wall
- Potential Access for Pedestrians
- Cemetery Expansion

Note: Cemetery development could include a combination of columbaria, niche walls and in-ground burial. Internal roadway circulation will be defined during the design phase of the project.

Arlington National Cemetery
Southern Expansion

Environmental Assessment

N

Not to Scale

Figure 2-13
Sub-Alternative 4d

LEGEND

- Internal Vehicle Movement
- External Vehicle Movement
- Boundary Wall
- Potential Access for Pedestrians
- Cemetery Expansion

Note: Cemetery development could include a combination of columbaria, niche walls and in-ground burial. Internal roadway circulation will be defined during the design phase of the project.

Arlington National Cemetery
Southern Expansion

Environmental Assessment

N

Not to Scale

South Gate Remains

Deconstruct Boundary Wall

ANC Service Complex

Air Force Memorial

E Joyce St

Washington Blvd/SR 27

Columbia Pike

VDOT Maintenance Facility

395

Figure 2-14
Sub-Alternative 4e

LEGEND

- Internal Vehicle Movement
- External Vehicle Movement
- Boundary Wall
- Potential Access for Pedestrians
- Cemetery Expansion

Note: Cemetery development could include a combination of columbaria, niche walls and in-ground burial. Internal roadway circulation will be defined during the design phase of the project.

Arlington National Cemetery Southern Expansion

Environmental Assessment

N

Not to Scale

provided the necessary geometry for a high capacity regional multimodal transportation corridor. While this alternative maintained the level of service at the Washington Boulevard/ Columbia Pike intersection, it did not meet the purpose and need for the Proposed Action. It was eliminated from further consideration.

2.5 Alternatives Considered in Detail

Three "action" alternatives were considered for this EA. The three action alternatives included the planning elements discussed at the beginning of this chapter. All three action alternatives would:

- utilize the identical proposed roadway realignment creating an opportunity to increase multimodal transportation capacity;
- provide acquisitions and jurisdictional transfers of land to accommodate the roadway realignment;
- integrate the AFM enhancement area with the cemetery design (Figure 2-5);
- provide adequate screening and/or landscaping on both sides of Columbia Pike that would complement the overall design and development of the site;
- plan and design for the highest and best use of the land to maximize burial capacity;
- remove the southern boundary wall, leaving intact the original South Gate (ca. 1897) for historical context;
- include the conversion of Patton Drive into a pedestrian trail;
- include the necessary supporting infrastructure; and,
- adhere to the Department of Veterans Affairs, National Cemetery Administration's Sustainable Design Manual.

The three action alternatives are: (1) Relocate Operations Complex Alternative (Preferred); (2) Maintain Operations Complex with Underpass Alternative; and, (3) Maintain Operations Complex without Underpass Alternative. The No-Action Alternative is no comprehensive development, no realigned roadway network, and no additional contiguous land available for burials.

2.5.1 Relocate Operations Complex Alternative (Preferred)

This alternative follows the guidance provided in the RPMP – develop in a manner that represents the best use of the land. This alternative proposes the best land use opportunity to support the ANC mission by relocating the Operations Complex from its current location to the area south of Columbia Pike. This alternative would provide the maximum contiguous area for increasing burial capacity of all the alternatives, approximately 49 acres. The Operations Complex includes offices, maintenance vehicle garages, equipment and material storage areas, and vehicle service bays to support cemetery operations. The Preferred Alternative is shown in **Figure 2-15**. The preferred location for the Operations Complex is the area abutting the VDOT Management Center facility, which is a land use that is compatible with the ANC Operations Complex. Further, the relocated ANC Operations Complex would be removed from the cemetery viewshed.

In order to use the eight-acre noncontiguous parcel south of Columbia Pike to achieve its highest and best use, several options were considered for accommodating the movement of cemetery vehicles, personnel, and material between the Operations Complex and the contiguous cemetery site. The amount of planning

Figure 2-15
Action Alternative 1
Relocate Operations Complex
(Preferred Alternative)

LEGEND

- Proposed New Interment Area
- Proposed Parking
- Relocated Operations Complex
- Proposed Tunnel
- Future Visitor Education Center (by others)
- Proposed Roadway Alignment
- Air Force Memorial (Monument to Remain)
- Air Force Memorial Integrated Enhancement Area
- Conversion to Pedestrian Path

Arlington National Cemetery Southern Expansion

Environmental Assessment

N

0 115 230 460 Feet

Source: Google Earth, USDA

that occurs each day – from grave opening to grave closing – for nearly 30 burials per day requires maximum flexibility to account for multiple factors including current day weather, prior day weather, interment type, interment location, and interment schedule. Considerations for connecting the noncontiguous parcel with the cemetery's interment area included impacts and benefits to traffic operations, public safety, utility relocation, security requirements, signalization, access points, roadway maintenance, cemetery interment yield, cemetery operations, viewshed impacts, and water quality.

2.5.1.1 Design Option #1 – Bridge Connection

The first option was to construct a bridge carrying the cemetery service road over Columbia Pike; it was considered but was determined unfeasible. A bridge connection would require a workable crossing point that fits with the topography and provides the necessary connection with the Operations Complex. Multiple bridge location concepts were considered, all of which were situated east of the AFM. Locations west of the AFM would not fit the topography and would reduce the area for developing the Operations Complex.

Due to the additional land needed for constructing the bridge approaches, this design option would reduce the amount of burial space available, would reduce the amount of land south of Columbia Pike available for associated services such as parking, would have the potential to impact utility relocation, and would have a negative effect on the viewshed from the AFM promenade. A bridge would create a visual impact that is incompatible with the cemetery setting and overall design approach. This option was eliminated from further consideration.

2.5.1.2 Design Option #2 – At-grade Crossing

A second design option to cross Columbia Pike was an at-grade crossing. This option was considered and determined unfeasible due to safety, security, reduced burial capacity, adverse impacts to transit operations, and environmental factors.

This type of crossing would require manned entry security gates on both sides of Columbia Pike and other security measures to meet DoD anti-terrorism force protection mandates. The requirements for vehicles entering a secure area – identification and vehicle search area, vehicle rejection area, guard houses, gate areas, and gate response zones, among others – would result in a substantial reduction of area available for burial space, contrary to the purpose and need for the Proposed Action.

An at-grade crossing would require additional curb cuts and another traffic signal within 350 feet of the proposed South Nash Street intersection. It could potentially increase queues at intersections leading to disruptions in traffic flow and an unacceptable level of service, including that for Arlington County's premium bus transit service[22] in the Columbia Pike corridor. The number of trips by maintenance and other official vehicles potentially traveling between the Operations Complex and the cemetery during an average weekday – and thereby disrupting traffic on Columbia Pike – is approximately 558 total trips. This includes personal (staff) vehicles, government-owned vehicles, contractor-owned vehicles, non-roadable vehicles, and other large trucks such as trash trucks, fuel trucks, etc. This number of trips does not include trips for lawn mowing equipment. Almost half of the total trips on an average weekday (245 or 43%) are from non-roadable vehicles such as excavators, loaders, tractors, among others. Approximately 315 trips (56%) of the total occur during peak travel times, 6:00 AM – 9:00 AM and 3:00 PM – 5:00 PM.[23] An at-grade

[22] Premium bus service is service that is faster, more frequent, more reliable, and easier to use. Columbia Pike currently has 600 bus trips carrying more than 17,000 passengers each weekday. Arlington County, Virginia, January 26, 2016. *County Planning Premium Bus Service for Columbia Pike*. https://newsroom.arlingtonva.us/release/county-planning-premium-bus-service-for-columbia-pike/

[23] Colonel Michael Peloquin, Chief Engineer, Arlington National Cemetery, Personal communication, 20 July 2018.

crossing would result in less flexibility for cemetery operations to respond to changes in its daily schedule, would have the potential to create traffic bottlenecks on Columbia Pike, and would require additional security space thereby reducing interment capacity.

The non-roadable vehicles performing grounds maintenance and construction activities have the potential to track soil, mulch, grass clippings, and other biomass material onto Columbia Pike through repeated at-grade crossing maneuvers. In addition to creating a traffic hazard, this material would have the potential to affect Arlington County's storm drainage system and possibly degrade water quality in downstream receiving water bodies.

During development of this EA, Arlington County provided input on the Relocate Operations Complex alternative. Arlington County suggested that modifying the schedule of burials and/or operating remote staging areas through the cemetery to accommodate decentralized service operations could reduce or eliminate the need for ANC vehicle traffic to cross Columbia Pike. ANC operations officials addressed these suggestions as follows:

- Revised Operations Scheduling – The suggestion was to schedule cemetery operations during non-peak traffic times on Columbia Pike. ANC performs approximately 30 burials per day. The daily schedule permits as many as five burials occurring simultaneously each hour during six one-hour periods. The locations must be carefully planned; interments must be staggered to avoid overlap in location and/or time. Graves cannot be excavated prior to the day of interment because open graves constitute a significant hazard for cemetery visitors, staff, and vendors. Further, interment cannot occur when open graves have accumulated standing water, in the event of an overnight rainfall.

  All maintenance activities near an active burial ceremony must cease immediately before, during, and immediately following the interment. This is an operational requirement for ANC that preserves the dignity and sanctity of the ceremony.

  From a scheduling standpoint, it is not feasible to revise cemetery operations to reduce or avoid conflicts between cemetery operations traffic and public traffic on Columbia Pike.

- Decentralized Operations – The suggestion involved developing satellite service areas at multiple locations throughout the contiguous cemetery site to accommodate maintenance and operations vehicles.

  Development of multiple service areas is inefficient from a space utilization standpoint. Each area would be required to be surrounded by a visual screen barrier, and to have its own access driveway, building shelter, electric, water, and sanitary utility service, and landscape buffer. Each of these features would require setbacks to the interment areas. Combining all service functions into a single site (as proposed) is more efficient. This is especially true if the service area is located on land situated south of Columbia Pike that cannot be used for interment purposes.

  Operation of the satellite service areas would pose logistical challenges for interment activities. Since maintenance and service activities near interment ceremonies must cease during the ceremony, it is likely that a given satellite service area (and all the equipment it contains) would be inaccessible prior to, during, and immediately following a ceremony.

  Many areas of the cemetery are fully developed, with no space available to retrofit satellite service areas. Placement of a satellite service center in these areas – even if space were

available – would have a significant negative impact on established viewsheds, historic resources resident to those areas, and a visitor's experience.

For the logistical reasons and the potential environmental impacts stated above, it is not feasible to decentralize cemetery maintenance and operations vehicles.

Other options for realigning Columbia Pike to keep the proposed relocated Operations Complex contiguous with the cemetery and avoid an at-grade crossing were not feasible and would not have met the purpose and need due to:

- Use of non-standard roadway geometry;
- Inefficient use of land for cemetery expansion;
- Inability to accommodate an opportunity to increase multimodal capacity; and,
- Inability to provide for safe and efficient traffic operations.

Based on the potential impacts to safety and security, traffic/transit operations, cemetery operations, the natural environment, and a reduction in burial capacity, the at-grade crossing option was eliminated from further consideration.

2.5.1.3 Design Option #3 – Underpass Connection

The third design option to create a connected parcel would construct a structure carrying Columbia Pike over a below-grade cemetery access roadway. It would provide a direct, uninterrupted, safe, and secure passage to the cemetery grounds for ANC maintenance and operations vehicles; it would be used for cemetery operations only. This option would allow ANC maintenance vehicles to avoid daily public traffic on Columbia Pike, thereby reducing potential conflicts with vehicles and pedestrians, and allowing uninterrupted flow of traffic on both Columbia Pike and the proposed service roadway.

The benefits of relocating the Operations Complex with an underpass are: 1) it would allow the maximum acreage for interments of all the alternatives, 2) it would move the Operations Complex to the edge of the proposed cemetery expansion, thereby keeping it out of the viewshed, 3) it would provide operational connectivity for cemetery maintenance vehicles, 4) it would replace the obsolete service complex facility, and 5) it would permit traffic on Columbia Pike to flow without constant interruption by operations personnel and equipment crossings, especially during peak travel times. The underpass crossing of Columbia Pike provides the best integration for cemetery operations, is consistent with the character of the cemetery, and provides less intrusions for visitors.

The final design elements of the roadway, e.g. location of curb cuts, width of sidewalks, turn lanes, pedestrian safety features, etc. would be analyzed and determined by a supplemental traffic study to ensure compliance with acceptable highway geometric and safety standards. The final design would include a suitable utility corridor that would not preclude future expansion by Arlington County.

The area south of Columbia Pike would include employee parking and controlled public parking for cemetery and AFM visitors in addition to the relocated Operations Complex.

2.5.2 Maintain Operations Complex with Underpass Alternative

This alternative is shown in **Figure 2-16**; it would keep the Operations Complex in its current location, but utilize the area south of Columbia Pike for other contractor support services such as spoils stockpiling. This alternative would create a contiguous area of approximately 38 acres for increasing burial capacity.

Figure 2-16
Action Alternative 2
Maintain Operations Complex with Tunnel Alternative

LEGEND

- Proposed New Interment Area
- Proposed Parking
- Existing Operations Complex
- Proposed Tunnel
- Future Visitor Education Center (by others)
- Proposed Landscape Contractor
- Proposed Spoils Area and Contractor Laydown
- Proposed Roadway Alignment
- Air Force Memorial (Monument to Remain)
- Air Force Memorial Integrated Enhancement Area
- Conversion to Pedestrian Path

Arlington National Cemetery Southern Expansion

Environmental Assessment

0 115 230 460 Feet

N

Source: Google Earth, USDA

Although contiguous land, the area between the existing Operations Complex and Washington Boulevard has access constraints for interments and would be better suited to support services.

The area south of Columbia Pike would connect with the cemetery by an underpass and utilized for other cemetery support services with vehicles unable to travel on Columbia Pike including spoils transport and other contractor vehicles. Visitor parking and a bus turnaround is another planned improvement next to cemetery support services.

This alternative would provide an increase in burial space, albeit approximately 14,000 fewer burial spaces than the Preferred Alternative. It also would create an opportunity to provide the necessary geometry for increasing multimodal capacity and to upgrade safety and level of service, thereby meeting the purpose and need for the Proposed Action.

2.5.3 Maintain Operations Complex without Underpass Alternative

The Maintain Operations Complex without Underpass Alternative, shown in **Figure 2-17**, would create a contiguous parcel of approximately 38 acres for increasing burial capacity and utilize the area south of Columbia Pike for cemetery support services. This alternative would not provide an underpass below Columbia Pike as with the previous two alternatives. Visitor parking and a bus turnabout is a proposed improvement in the area south of Columbia Pike.

This alternative would relocate support services/functions to the area between the existing Operations Complex and Washington Boulevard and to the area south of Columbia Pike. There would be no underpass constructed below Columbia Pike; support services relocated south of Columbia Pike would be limited to the landscaping contractor and laydown area (material and machinery). Without an underpass, contractors' trucks and heavy machinery would travel on Columbia Pike to enter the cemetery at the existing Operations Complex entrance.

This Alternative would provide additional contiguous land for increasing burial capacity although the capacity would be less than the Preferred Alternative. It would create an opportunity to provide the necessary geometry for increasing multimodal capacity and upgrading safety and level of service, thereby meeting the purpose and need for the Proposed Action.

2.5.4 No Action Alternative

The No Action Alternative is defined as no comprehensive development, including no realigned roadway network, and no additional contiguous land available for burials. Choosing no action would result in the loss of 40,000-60,000 potential interment opportunities and not extending the life of the cemetery. The failure to realign the roadways would require ANC maintenance crews to routinely cross Southgate Road, Columbia Pike, and South Joyce Street to perform activities, resulting in traffic safety concerns along these highly traveled streets that serve the Pentagon and JBMHH. ANC likely would develop or use the noncontiguous parcels of the former Navy Annex for operational support functions, but the space would not be used for interments/inurnments since crossing a public road would be required. The No Action Alternative would not increase burial capacity.

Under the No Action Alternative, the site would not meet the purpose and need of the Proposed Action and thereby not achieve its intended goal of increasing burial capacity to extend the life of the cemetery nor would it create an opportunity to increase multimodal capacity along this portion of Columbia Pike. Further, the No Action Alternative would not meet the intent of Congressional authorization to expand by using the Southern Expansion site.

Figure 2-17
Action Alternative 3
Maintain Operations Complex without Tunnel Alternative

LEGEND

- Proposed New Interment Area
- Proposed Parking
- Existing Operations Complex
- Future Visitor Education Center (by others)
- Proposed Landscape Contractor and Laydown
- Proposed Spoils Area
- Proposed Roadway Alignment
- Air Force Memorial (Monument to Remain)
- Air Force Memorial Integrated Enhancement Area
- Conversion to Pedestrian Path

Arlington National Cemetery Southern Expansion

Environmental Assessment

N

0 115 230 460 Feet

Source: Google Earth, USDA

Table 2.1 provides a summary of the alternatives.

Table 2.1

Comparison of Alternatives Considered in Detail

	Relocate Operations Complex (Preferred Alternative)	Maintain Operations Complex with Underpass Alternative	Maintain Operations Complex without Underpass Alternative	No Action Alternative
Meets Purpose & Need	Yes	Yes	Yes	No
Contiguous Acreage	49	38	38	0
Maintenance Vehicles off Public Roads	Yes	Yes	No	No
Highest and Best Use of Land: Contiguous, Connected, Adjacent	Yes. Contiguous w/ Navy Annex property; connected w/ land south of Columbia Pike	Yes. Contiguous w/ Navy Annex property; connected w/ land south of Columbia Pike	No. Contiguous w/ Navy Annex property; adjacent, not connected w/ land south of Columbia Pike	No. Adjacent w/ all Navy Annex property; no connected or contiguous parcels

2.6 Preferred Alternative

The Preferred Alternative is the Relocate Operations Complex Alternative with the underpass connection (Figure 2-15).

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment of each relevant environmental resource to provide the public and agency decision-makers with a meaningful point from which to compare potential future environmental, social, and economic effects of the alternatives carried forward for detailed review. This is followed by a discussion of the potential environmental consequences of the alternatives and concludes with a discussion of other NEPA considerations and potential cumulative impacts.

Several terms are used to describe effects, also referred to as impacts in this document. The effect may be described as positive or negative. "Positive" meaning the alternative would have a beneficial effect on the subject resource. The level of adverse or negative effect is described relative to the established threshold of significance. Adverse or negative impacts described as negligible or minor would have little effect on the resource and, therefore, would not exceed the applicable threshold of significance. Impacts can be *direct* or *indirect*:

- *Direct impacts*: Effects caused by the alternatives at the same time and in the same place as the action.
- *Indirect impacts*: Effects caused by the alternatives that occur later in time or farther from the action, but are still reasonably foreseeable.

The *action area* refers to the area directly or indirectly affected by the Proposed Action. This area would vary depending on the resource being discussed. For example, a Proposed Action would impact soils or topography only within the limits of disturbance, the footprint. A Proposed Action could have potential impacts to water resources – quality or quantity – both on-site or downstream, outside of the footprint.

The threshold of significance is resource specific and established by considering context and intensity. Context is the setting in which the Proposed Action would occur, and analyzed on different levels – local, regional, national. Intensity is the severity of the potential impact which may involve one or more of the following factors: effects on public health or safety; effects on unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas; degree of controversy; degree of highly unknown effects or risks; cumulative effects; adverse effects on threatened or endangered species or critical habitat; or violations of federal-state-local environmental laws.[24]

Both context and intensity are considered because the level of intensity deemed significant may differ based on context. For instance, the threshold of significance for noise impacts would likely be different in a large city compared to a remote national park.

Much of the information contained in this chapter was detailed in the RPMP PEA and is summarized and/or referenced in this discussion in accordance with CEQ §1502.20 – Tiering.

[24] CEQ Guidance defining "significantly", 40 CFR 1508.27

3.1 Land Use and Sustainability

3.1.1 Affected Environment

3.1.1.1 Land Use and Land Cover

The entire Southern Expansion site is approximately 70 acres including all roadways, the Navy Annex property parcels, ANC's Operations Complex, the AFM, and the VDOT interchange area. The action area is in Arlington County, Virginia (part of the Washington-Arlington-Alexandria, DC, VA, MD, WV metropolitan statistical area – the 6th largest metropolitan area in the U.S.). Arlington County is the smallest county with one of the highest population densities in the Commonwealth of Virginia. The Southern Expansion site consists of several vacant, noncontiguous parcels owned by ANC and VDOT and divided by the local roadway network owned by Arlington County and VDOT. Adjacent land uses include transportation (Interstate 395 and Washington Boulevard), residential (Foxcroft Heights), commercial properties including a Sheraton Hotel, government installations (JBMHH and the Pentagon), and ANC. The Foxcroft Heights neighborhood is part of a Special Revitalization District which encourages mixed use development and enhanced multimodal circulation. The AFM is a prominent landmark in the middle of the site. The ANC Operations Complex is situated within the current ANC boundary, but could be relocated to improve the viewshed for the expansion and to increase burial capacity. Arlington County and VDOT have ownership of the road rights-of-way. Roadways (and functional classification[25]) include Columbia Pike (principal arterial), Southgate Road (urban collector), and South Joyce Street (minor arterial). There are surface and subsurface utility corridors paralleling Southgate Road, Columbia Pike, and South Joyce Street.

The former Navy Annex building, surface parking lots, and the Navy Exchange service station once occupied a portion of the Southern Expansion site. The Navy Annex was constructed in 1940 and was commonly used as swing space for employees temporarily displaced from the Pentagon or other federal facilities.[26] The Navy Annex structures were demolished, and the land transferred to the DA in April 2012 for cemetery use in accordance with the FY2000 NDAA. The AFM, constructed in 2005, is situated on Army property with interest transferred to the Air Force through a 50-year permit; the Department of the Air Force is responsible for maintaining the property.

Foxcroft Heights is a low-density residential neighborhood consisting of primarily row houses and single-family detached dwelling units bordering the Southern Expansion site to the west.

The area surrounding the Southern Expansion site is developed. A full discussion of surrounding land uses and land use plans of Arlington County were included in the 2014 RPMP PEA[27]. **Figure 3-1** depicts the land use around ANC and the Southern Expansion site.

There are two land cover types – impervious and green area/open space. Impervious areas include roadways, the former Navy Annex property parcels, and the Operations Complex.

[25] Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. Basic to this process is the recognition that individual roads and streets do not serve travel independently in any major way. Rather, most travel involves movement through a network of roads. http://www.fhwa.dot.gov/planning/processes/statewide/related/functional_classification/fc02.cfm

[26] U.S. Department of Defense, Washington Headquarters Services, August 2011. Navy Annex/FOB2 Property Transfer – Land Transfer Plan. Prepared by U.S. Army Corps of Engineers, Baltimore District.

[27] U.S. Army Corps of Engineers, Norfolk District. USACE, Norfolk District, 2014. Programmatic Environmental Assessment for the Arlington National Cemetery Real Property Master Plan, pages 3-2, *et.seq*. Prepared by HNTB Corporation.

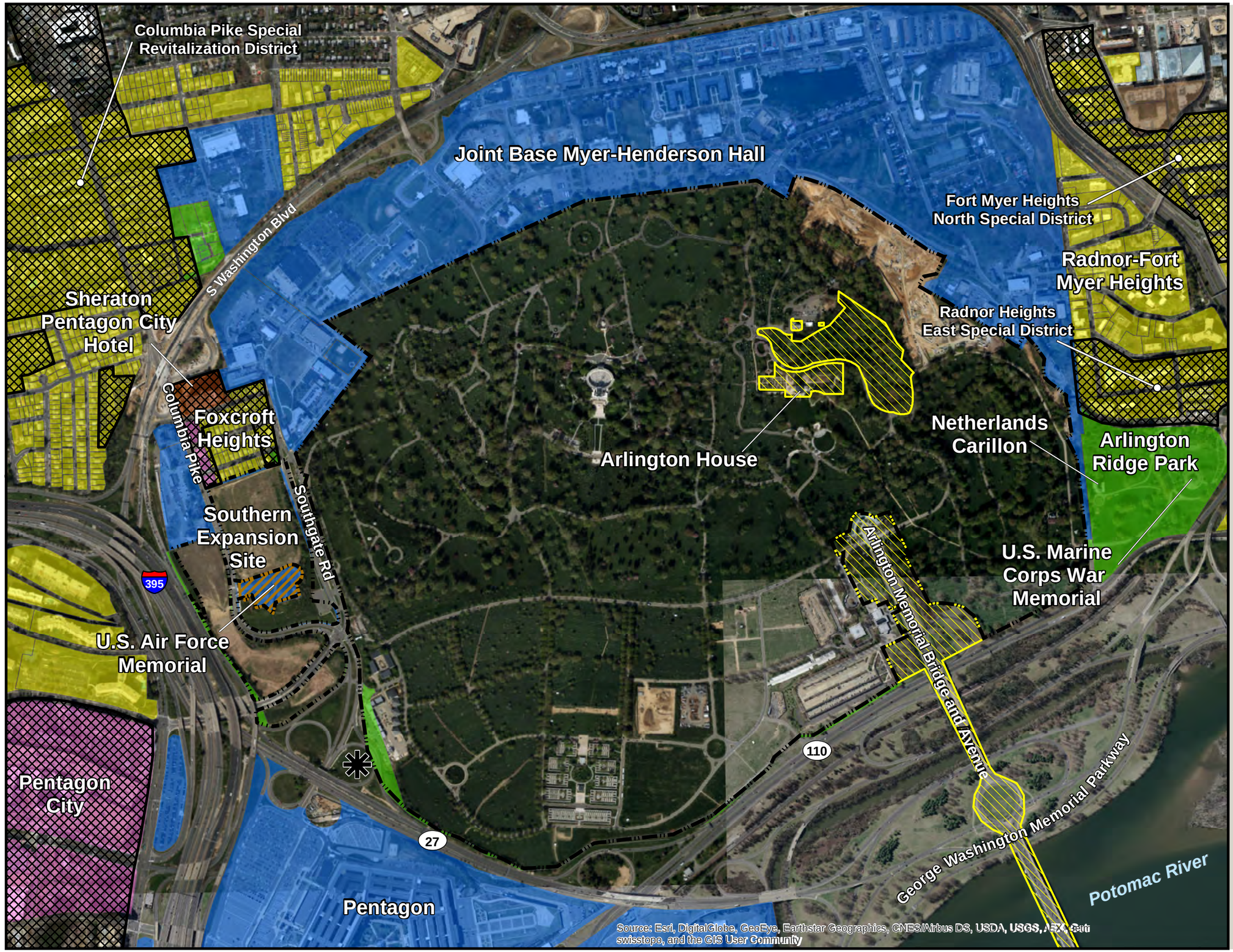


Figure 3-1
Local Land Use in the Vicinity of ANC

LEGEND

Land Use

- Arlington National Cemetery
- Residential
- Commercial
- Government/Community Facility
- Hotel
- Mixed Use - Residential
- Office
- Park / Open Space
- Area Under NPS Jurisdiction

- Arlington County Special Planning Areas
- U.S. Air Force Memorial
- Future 9/11 Pentagon Visitor Education Center

Arlington National Cemetery Southern Expansion

Environmental Assessment

0 195 390 780 Feet

N

Sources:
National Park Service (NPS), USDA

3.1.1.2 Sustainability

Sustainability or sustainable development, as defined by the 1987 United Nation's Brundtland Commission's report is "development which meets the needs of current generations without compromising the ability of future generations to meet their own needs." The concept of sustainable development stresses the need to protect natural resources and the environment and to account for development impacts on the opportunities for future generations. Sustainable design is an integrated approach to planning, designing, building, operating, and maintaining facilities in a collaborative and holistic manner among all stakeholders.[28] Decisions on sustainable design elements emphasize achieving the greatest long-term benefits of each action and recognizing the interrelationship of actions with the natural environment.[29]

The federal government has advocated implementing sustainable practices through legislative and executive actions since 1987, including:

- Energy Policy Act of 2005 (EPAct)
- Energy Independence and Security Act of 2007 (EISA)
- EO 13423 – Strengthening Federal Environmental, Energy, and Transportation Management (revoked and replaced by EO 13693)
- EO 13514 – Federal Leadership in Environmental, Energy, and Economic Performance (revoked and replaced by EO 13693)
- EO 13693 – Planning for Federal Sustainability in the Next Decade (revoked and replaced with EO 13834, which directs agencies to reduce waste, optimize energy and environmental performance, and cut costs.)

Photo 2: Example of bioretention/bio-swale

The Army, under its Sustainable Design and Development Policy (SDD), is tasked with incorporating sustainable design into their design standards for site planning, buildings, vehicular and pedestrian circulation, landscaping, site elements (e.g. signage, utilities), and force protection. Sustainability requires the built environment to be designed and constructed to preserve and enhance the natural environment. The SDD policy includes incorporating site design and planning techniques to mimic the natural, infiltration-based hydrology systems, e.g. bio-swales or bio-retention shown in **Photo 2,** to efficiently and cost-effectively manage stormwater runoff.

Stormwater best management practices (BMPs) such as grass channels, compost soil amendments, wet and dry swales, and bioretention, may be considered to meet SDD policy and, if necessary, to satisfy VDEQ stormwater requirements.

[28] *Ibid*., page 3-7.
[29] United Nations Commission on Sustainable Development, April 2007. Framing Sustainable Development; The Brundtland Report – 20 Years On. http://www.un.org/esa/sustdev/csd/csd15/media/backgrounder_brundtland.pdf

3.1.2 Threshold of Significance

The threshold of significance for land use impacts would be exceeded if the alternative would result in an alteration that would substantially conflict with the existing and proposed surrounding land use. A significant impact in terms of sustainability would occur if the alternative were not consistent with the requirements outlined in the previously listed legislative and executive actions.

3.1.3 Environmental Consequences

3.1.3.1 Relocate Operations Complex Alternative (Preferred)

The comprehensive development of the Southern Expansion site under the Preferred Alternative would be compatible with the surrounding land uses. The closest potential land use conflicts would be Foxcroft Heights residential neighborhood and the VDOT highway maintenance facility. The proposed relocation of the Operations Complex to the area abutting the VDOT facility would be compatible with the highway maintenance and management activities and with the I-395 highway corridor. The area closest to Foxcroft Heights would be used for interments, compatible with residential use.

Other proposed facilities south of Columbia Pike, e.g. parking, would be compatible with tourism. Vehicular access into the AFM from Columbia Pike would be limited. A new larger parking lot is proposed for the south side of Columbia Pike. The proposed underpass would be used by maintenance vehicles that are not appropriate for traveling public roadways.

The AFM and ANC are complementary land uses. Once joined, they would provide an interconnection of the two sites and improve the visitor experience. The final design integrating the AFM would preserve the tradition, character, and experience of ANC. The AFM would be pedestrian-accessible from ANC and from Columbia Pike. The memorial honoring Air Force servicemembers would continue to provide the sweeping view of the DC landscape and entrance to the Memorial Avenue Corridor.

A new Operations Complex facility would be designed and constructed in accordance with the Army's SDD guidelines and government policy. It would provide long-term budget saving measures such as reducing water and electricity usage and update the obsolete, 40-year-old service bays at the current facility.

The development of new cemetery land would enhance the area by improving the current condition – vacant land – and the realignment of roadways would create an opportunity for increasing the multimodal capacity along this portion of Columbia Pike benefitting residents and visitors alike. The cemetery expansion project would be a seamless extension of ANC; it would mirror the character, traditional image, and experience. Cemetery development and the roadway realignment would not stimulate additional development given the character and constraints of the area. The potential for negative impacts to land use would be negligible.

The Preferred Alternative supports the Army's sustainability policies by: reducing the amount of impervious surface and increasing the amount of open space when compared to the 2006 conditions, which included the Navy Annex facilities; reusing previously developed land; using best management practices during construction; and, using a location that provides multi-modal transportation options. **Table 3.1** shows a comparison of the estimated acreage of land cover types, pre- and post-construction.

All cemetery development would be designed in accordance with the National Cemetery Administration and ANC Design Guides which include sustainability goals to guide the design and construction of the project.[30]

Minor negative impacts to sustainability would occur from increasing the total area of ANC for maintenance since additional pesticides, herbicides, and fertilizer would necessarily be applied to a larger general area. The cemetery would continue to follow its operational procedures for solid waste management and recycling, reducing energy and water consumption, and other federal agency requirements for sustainable operations.

Table 3.1
Estimated Acreage of Land Cover Types

Land Cover	Existing Conditions	Preferred Alternative
Impervious/Paved	33	24*
Managed Turf/Green Areas/Open Space	26	39*
Operations Complex	8	5*
AFM	3	2*
Total	**70**	**70**

Note: * Based on preliminary design. Values may change. The existing condition for VDEQ stormwater calculations includes all roadways, the Navy Annex building and associated facilities, and the Operations Complex.

3.1.3.2 Maintain Operations Complex with Underpass Alternative

This alternative similarly would be consistent with the surrounding land uses. The use of the land south of Columbia Pike for cemetery support services would be compatible with the neighboring VDOT facility. The area nearest to Foxcroft Heights would be used for interments, compatible with residential use.

The proposed underpass below Columbia Pike would provide connectivity for flexible development of the noncontiguous parcel south of Columbia Pike. This alternative would develop this area for support services other than the Operations Complex such as spoils stockpiling, contractor laydown area, and/or visitor parking. The underpass would be used by landscaping/maintenance vehicles only; there would be no public access via the underpass.

Developing all available property and creating an opportunity to increase the multimodal capacity along this portion of Columbia Pike would be an enhancement to the current vacant land. The cemetery development would follow the same design guidelines and sustainability goals as discussed in the Preferred Alternative. The potential for negative impacts to land use would be negligible. The estimated acreage of land cover types would be similar to the Preferred Alternative.

3.1.3.3 Maintain Operations Complex without Underpass Alternative

This alternative would yield similar land use compatibility benefits but would not have the benefit of an underpass for keeping maintenance vehicles off public roadways. Without an underpass connecting the interment/inurnment area with the noncontiguous parcel south of Columbia Pike, there would be less

[30] U.S. Army Corps of Engineers, Norfolk District. USACE, Norfolk District, 2014. Programmatic Environmental Assessment for the Arlington National Cemetery Real Property Master Plan, page 3-8. Prepared by HNTB Corporation

flexibility for developing that parcel. Land uses compatible with this scenario would be landscape contractor, contractor laydown, and parking. The improvements, nonetheless, would be an enhancement to the current vacant land and the potential for negative impacts to land use would be negligible. The estimated acreage of land cover types would be similar to the Preferred Alternative.

3.1.3.4 No Action Alternative

Under No Action, there would be no comprehensive development of the Southern Expansion site. This alternative would not preserve the open space that resulted from the Navy Annex demolition intended for interments/inurnments. This Alternative would conflict with DA plans to redevelop the site to increase burial capacity, would be inconsistent with ANC's need for expansion, and would not support Arlington County's plans for improving the multimodal capacity of the Columbia Pike corridor.

Although the noncontiguous parcels could be utilized, the No Action Alternative would not realize the highest and best use for the land, and would not achieve its intended purpose of extending the life of the cemetery.

There would be no change to the land cover distribution or roadway configuration; however, the land could still be used for other cemetery support functions such as spoil piles or contractor laydown areas.

3.2 Air Quality

3.2.1 Affected Environment

Air quality is governed by the Federal Clean Air Act of 1970 (CAA). In accordance with the CAA, the U.S. EPA established National Ambient Air Quality Standards (NAAQS) to define outdoor levels of air pollutants that are considered safe for public health, welfare, and the environment. The EPA established NAAQS for outdoor concentrations of "criteria" pollutants including: carbon monoxide (CO), nitrogen dioxide (NO_2), Ozone (O_3), sulfur dioxide (SO_2), lead (Pb), and particulate matter (PM) with diameters of 2.5 or 10 microns[31] and less ($PM_{2.5/10}$).

Arlington County, Virginia is in the Metro Washington Air Quality Committee (MWAQC) Region – designated as "in attainment" with NAAQS for the criteria pollutants NO_2, SO_2, Pb, PM_{10}, and $PM_{2.5}$. The region is designated as marginal "nonattainment" for O_3 and classified as a "maintenance area" for CO. Information on these non-attainment and maintenance pollutants is discussed in detail in the earlier RPMP PEA.[32]

3.2.2 Threshold of Significance

The threshold of significance for air quality impacts would be exceeded if the alternative would result in any of the following:

- Emissions that exceed the NAAQS; or
- Increases in the emissions such that the federal major source thresholds would be exceeded. The major source thresholds for Arlington County which is in the Ozone Transport Region are 100 tons per year (tpy) of NO_x or 50 tpy of volatile organic compounds (VOC).

[31] A *micron* is a unit of length equal to one thousandth (10^{-3}) of a millimeter or one millionth (10^{-6}) of a meter. Also called *micrometer*.

[32] U.S. Army Corps of Engineers, Norfolk District. USACE, Norfolk District, 2014. Programmatic Environmental Assessment for the Arlington National Cemetery Real Property Master Plan, page 3-11. Prepared by HNTB Corporation

3.2.3 Environmental Consequences

3.2.3.1 Relocate Operations Complex Alternative (Preferred)

The Preferred Alternative would create an opportunity to increase multimodal capacity along this portion of Columbia Pike that would serve to potentially reduce vehicular traffic along the corridor thereby reducing air emissions associated with vehicular traffic. Realignment of Columbia Pike would not cause increased congestion on any of the intersections along Columbia Pike as detailed in Section 3.10.3.1 and thus air emissions are not expected to increase. Vehicular traffic volumes modeled with the Air Quality Conformity Analysis for the 2015 Constrained Long Range Transportation Plan (CLRP) for the National Capital Region would not be increased by the proposed development of the Southern Expansion site. The Preferred Alternative would not change employment or traffic estimates included in the 2015 CLRP Air Quality Conformity Analysis. Future emissions, therefore, would not exceed the NAAQS and the Proposed Action will conform to the State Implementation Plan.

Landscaping and lawn maintenance at ANC would increase slightly due to the increased acreage. The added area is a relatively small addition when compared to the total area of the cemetery; therefore, the changes in air emissions due to landscaping and lawn maintenance would be minor. There would be no new stationary sources under the Preferred Alternative.[33] Stationary sources are defined as any fixed building or facility that emits air pollutants. New stationary sources could increase emissions of VOCs and NO_x (precursors of Ozone), $PM_{2.5}$, and CO.[34]

Finally, air quality impacts during construction would be short-term and minor due to the nature of the development. To estimate the impact of emissions associated with the Southern Expansion, the maximum grading in conformance with ANC guidelines was used. All excavated soils were presumed to be removed from the site and all necessary embankment materials were presumed to be trucked to the site. The quantity of earthwork was combined with a conservative construction timeline of two years for the roadway improvements and two years for site grading on the cemetery interment area. The estimated maximum construction emissions are 11.2 tons per year (tpy) of NO_X and 4.4 tpy of VOC, which would be below the major source thresholds for Arlington County and therefore a general conformity determination is not required for the action alternatives. Additional practical measures to reduce air emissions during construction may include the use of energy efficient machinery and equipment and incorporating anti-idling procedures. **Appendix C** provides the analysis of construction emissions associated with development of the cemetery expansion included in the Proposed Action.

3.2.3.2 Maintain Operations Complex with Underpass Alternative

The potential impacts under this alternative would be similar to the Preferred Alternative; the proposed roadway relocation/realignment would be identical. Construction emissions would be similar. There would be no demolition and relocation of the Operations Complex, therefore less construction emissions than the Preferred Alternative.

3.2.3.3 Maintain Operations Complex without Underpass Alternative

The potential impacts under this alternative would be similar to the previous two alternatives; the proposed roadway relocation/realignment would be identical. Construction emissions would be similar.

[33] A back-up emergency generator located at the existing operations complex would be replicated at the new location.
[34] U.S. Army Corps of Engineers, Norfolk District. USACE, Norfolk District, 2014. Programmatic Environmental Assessment for the Arlington National Cemetery Real Property Master Plan, pages 3-13, *et.seq*. Prepared by HNTB Corporation.

There would be no underpass construction or demolition and relocation of the Operations Complex, therefore less construction emissions than the previous alternatives.

3.2.3.4 No Action Alternative

Under the No Action Alternative, there would be no comprehensive development of the Southern Expansion site. Air emissions for criteria pollutants would be expected to remain consistent with Metropolitan Washington Council of Government (MWCOG) estimates for the area included within the 2015 CLRP for the National Capital Region. There would be no benefits to air quality as would be expected by development of a multimodal transportation corridor.

3.3 Noise

Inadequately controlled noise presents a growing danger to the health and welfare of the Nation's population, particularly in urban areas. The major sources of noise include transportation vehicles and equipment, machinery, appliances, and other products in commerce. The Noise Control Act of 1972 established a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. The Act also serves to (1) establish a means for effective coordination of federal research and activities in noise control; (2) authorize the establishment of federal noise emission standards for products distributed in commerce; and (3) provide information to the public respecting the noise emission and noise reduction characteristics of such products.[35] In addition, the Noise Control Ordinance of Arlington County, Virginia established a noise control program for the purpose of promoting the health, safety, and welfare and to foster the comfort of its inhabitants. The local regulation limits construction noise levels to 90 decibels (dBA) for certain land uses during daytime hours. Adherence to this ordinance is part of ANC's management policies.

3.3.1 Affected Environment

Typical noise sources from within the cemetery would include maintenance operations such as lawn mowers and other maintenance vehicles, and intermittent noises from committal services such as honor salutes, bugles, and military bands. Cemeteries are intended to provide a peaceful and serene setting for quiet reflection and privacy from outside activities. Regardless, the Southern Expansion site is in a busy urban environment with many outside noise sources. Outside noises encroaching on the cemetery would include vehicular traffic on nearby roadways, and aircraft traffic – both civilian and military – associated with Ronald Reagan-Washington National Airport, the Pentagon, and other nearby military installations. Another existing minor noise source is the weekly band concert at the AFM. The concerts occur on Saturday evenings during the summer months. The evening hours do not conflict with daytime interment ceremonies.

Noise decreases over distance depending on several factors, including buildings, topography, trees and foliage, and ground cover. Noise can be mitigated through the physical blocking of sounds such as a wall, creating hills or berms, or planting grass and trees between the noise source and the receptor. Noise is also affected by meteorological conditions; wind, air temperature, humidity, and cloud cover can affect the intensity of noise.

Table 3.2 lists the common noise sources at and near the Southern Expansion site.

[35] U.S. Environmental Protection Agency, 2016. https://www.epa.gov/laws-regulations/summary-noise-control-act

3.3.1.1 Honor Salutes

One specific noise currently associated with ANC is the honor salute. There are two types of military honor salutes, small arms and battery cannon. The small arms salute is part of the standard and full military honors for eligible veterans. The battery cannon salute, when available, is offered to Generals/Admirals from all services. The small arms salute is offered to most enlisted members of the Armed Forces and is a unique component of the ANC experience. The type of military funeral honors received depends on the rank of the deceased.

Table 3.2

Noise Sources at Southern Expansion Site

Noise	Sensitive Receptors	Origination
Traffic (existing and new)	Cemetery, residences	I-395, Columbia Pike, proposed South Nash Street
Air traffic (existing) (commercial and military)	Cemetery, residences	Fly-overs (Reagan National Airport, to/from Pentagon)
Military band (existing) (Interment ceremonies, summer concerts)	Cemetery, residences	ANC and AFM
Small arms (rifle) salutes (existing and new)	Cemetery, residences	ANC (new to Southern Expansion site)
Battery cannon salutes (existing)	Cemetery, residences	ANC

Small arms salutes during interment ceremonies consist of three volleys of 0.30-caliber blank rounds from seven simultaneous firings. The salutes occur on average at 15-18 graveside services per day[36], out of a daily total of approximately 27 services, throughout the entire cemetery. Firing the three rounds takes approximately ten seconds. Small arms salutes are characterized as impulsive noise that is associated with a higher level of annoyance as compared to more continuous noise sources such as traffic. Impulsive noise is of short duration – typically less than one second – and high intensity. It has an abrupt onset and rapid decay.[37] The rifle salute is not a chronic noise source; it is short-term, infrequent, and non-repetitive, and would occur only on weekdays between 9 AM and 4 PM. The location of the rifle salute would vary based on the burial site, and the direction of fire is not limited to a single direction.

Battery cannon salutes during interment ceremonies are infrequent – average two per month – and presently occur at only three designated locations. The number of cannon salutes depends on the rank of the deceased.[38] Future interment ceremonies on the Southern Expansion may include battery cannon salutes but would be limited to the area east of the AFM. The battery cannon noise is a recognizable component of the affected environment; the Presidential Salute Battery of the U.S. 3rd Infantry Regiment at JBMHH conducts training exercises monthly.

[36] Based on ANC historical data for period October 2015 through September 2016.
[37] Blue Ridge Research and Consulting, Technical Memorandum, October 2016.
[38] General/flag officers of the Army, Marine Corps, Navy, Air Force and Coast Guard may receive a cannon salute (17 guns for a four-star general, 15 for a three-star, 13 for a two-star, 11 for a one-star), if available. Minute Guns may be used for general officers/flag officers of the Navy, Coast Guard and Marine Corps. The President of the United States is entitled to a 21-gun salute during ceremonial visits to the cemetery.

3.3.1.2 Aircraft and Roadway Traffic Noise

Aircraft noise in this area is also common. Ronald Reagan Washington National Airport is located approximately one mile southeast of the site and the Pentagon helipad is less than 400 feet from the ANC boundary wall and approximately 600 feet from active burial sites. Reagan National Airport services nearly 400 each of arrivals and departures daily between 6AM and 11PM.[39] Due to prohibited airspace, aircraft are required to operate over the Potomac River, within one mile of ANC. The Pentagon's predominant operation orientation is to take-off and land from the east, approaching or departing over the north Pentagon parking lot. Pentagon take-offs or landing approaches over ANC are infrequent and limited to minimize disturbance to cemetery operations or visitors.[40] Noise due to helicopter traffic is common along the Interstate Highway 395 (I-395) corridor, adjacent to and within ANC and the Southern Expansion site. Military helicopter flyovers as part of interment services are infrequent and a minimal component to the existing noise environment.

The Equivalent Sound Level (abbreviated **Leq**), is a measure of the exposure resulting from the accumulation of A-weighted sound levels over a particular period of interest, in this case over a 24-hour period. Conceptually, Leq may be thought of as a constant sound level over the period of interest that contains as much sound energy as the actual time-varying sound level with its normal "peaks" and "valleys". Leq does not represent the sound level heard at any particular time, but rather represents the total sound exposure for the period of interest. Also, it should be noted that the "average" sound level suggested by Leq is not an arithmetic value, but a logarithmic, or "energy-averaged," sound level. Thus, loud events tend to dominate the noise environment described by the Leq metric.

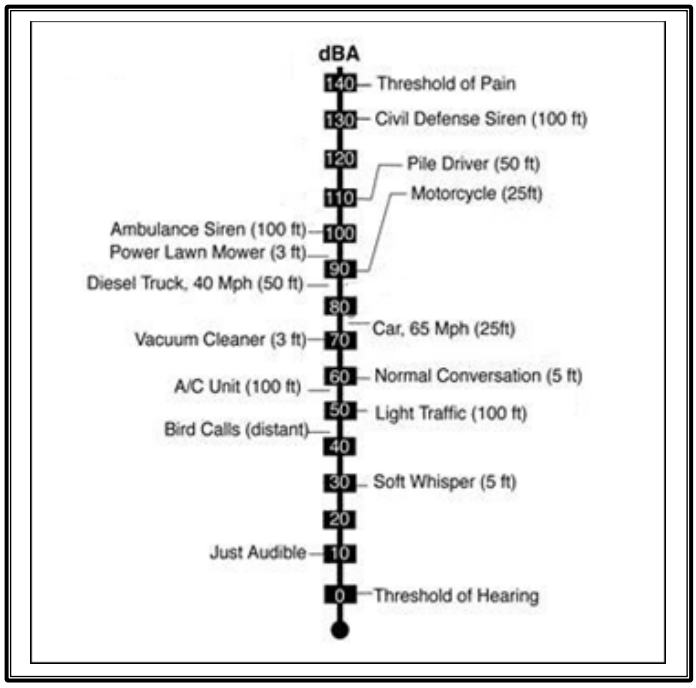
Roadway noise is typical of any dense urban environment. The roadway noise environment in the area is influenced by traffic noise from I-395, Washington Boulevard (Route 27), and Columbia Pike. A Noise Analysis Technical Report for the recently released Interstate 395 Express Lanes Northern Extension Project Environmental Assessment[41] was reviewed to determine if an existing noise level could be developed for the proposed South Nash Street project action area. The Noise Analysis Technical Report modeled a design year 66 A-weighted decibel (dBA) Equivalent sound level (Leq) contour line about 150' south of the Columbia Pike center line perpendicular to the proposed South Nash Street and design Leq noise levels around the AFM ranging from 61 to 64 dBA Leq. Using these noise levels and a 6 dBA per doubling of distance drop-off rate, the residences east of Oak Street would have ambient noise levels ranging from 64 dBA Leq along Columbia Pike to 58 dBA Leq along Southgate Road. The graphic below illustrates sounds levels (in dBA) for typical noise sources.

The Federal Transit Authority's (FTA) Transit Noise and Vibration Impact Assessment guidance manual provides a method to estimate existing noise levels based on population density (people per square mile). The population density of Arlington falls within the 3,000 to 10,000 range in FTA's guidance manual, resulting in an estimated existing daytime Leq noise level of 55 dBA. Since the FTA's estimated noise level is more conservative than the levels presented in the previous paragraph, the 55 dBA Leq noise was deemed appropriate as the existing noise level for the backyards of the residences on the east side Oak Street which would border the proposed South Nash Street.

[39] Metropolitan Washington Airports Authority, 2015 Annual Aircraft Noise Report, Ronald Reagan Washington National Airport. http://www.flyreagan.com/sites/default/files/2015_mwaa_annual_aircraft_noise_report_final.pdf
[40] U.S. Department of Defense, Washington Headquarters Services, Pentagon Reservation Master Plan Update. Prepared by AECOM and Timmons Group. October 2014.
[41] Virginia Department of Transportation, 2016. I-395 Express Lanes Northern Extension Environmental Assessment. http://virginiadot.org/projects/northernvirginia/395_express.asp

3.3.2 Threshold of Significance

An increase in noise would be considered significant if the alternative would create a new source or increased level of noise that would substantially affect a noise-sensitive land use such as a residence or school.



3.3.3 Environmental Consequences

3.3.3.1 Relocate Operations Complex Alternative (Preferred)

Under the Preferred Alternative, the expansion would create new edge conditions for ANC, i.e. the contrast of the peacefulness experienced inside the cemetery boundary to the outside proximity of everyday noise of a busy urban environment, specifically noise associated with I-395. The cemetery expansion would be designed to screen-out edge effects to the extent possible by using boundary wall and landscaping options.

Noise produced within the cemetery would be minimal and non-disruptive to sensitive land uses proximate to ANC. Residential land use is considered a sensitive land use and is generally a compatible land use near a cemetery.

Noise produced from the Operations Complex relocated to the area south of Columbia Pike would resemble the type of noise produced at the VDOT complex immediately adjacent. The preliminary design concept would attempt to minimize noise impacts by lowering the ground-floor elevation of the new Operations Complex below the elevation of Columbia Pike.

Honor Salutes

The honor salutes are not new to the cemetery interment protocol but would be new to this area. Once operational, the Southern Expansion would experience this military honor that distinguishes interment ceremonies at ANC from other military cemeteries. Due to the number of daily interment ceremonies, logistics require staggered ceremonies at various sections throughout ANC. The Southern Expansion would have approximately five rifle salutes per day between 9 AM and 4 PM on weekdays only. Future interment ceremonies on the Southern Expansion may include battery cannon salutes but would be limited to the area east of the AFM.

Potential noise impacts are a function of the distance between the rifle salutes and the residential neighborhood, Foxcroft Heights. The further away from Foxcroft Heights, the less likely the rifle salutes would be heard above the high level of traffic noise and aircraft/helicopter noise in this area. Project design features, e.g. proposed landscaping and walls, would lessen the impact of the rifle noise. Future battery cannon salutes would continue from their current locations. If it became necessary to have battery cannon salutes in the Southern Expansion, then they would occur at an area east of the AFM, approximately 1500 feet from the residential area. Intervening topography and vegetation would reduce some of the noise.

Honor salutes on the Southern Expansion, although infrequent, would be a change to the current daytime noise environment of the Foxcroft Heights residential neighborhood, but would not be a substantial change.

Aircraft and Roadway Traffic Noise

The cemetery and its vicinity already experience encroachments from typical urban noises especially aircraft traffic from multiple airfields in the area including numerous helicopter flights – military, commercial, and EMS/police. Helicopter flights are common and unavoidable, given the proximity to the Pentagon, the White House, and other military installations, and the size of the urban area. Aircraft activity in to and out of Ronald Reagan Washington National Airport contributes extensively to the ambient noise conditions within and in proximity to ANC. As with helicopter noise, these activities are unavoidable given the proximity to Ronald Reagan Washington National Airport.

The proposed South Nash Street at the western edge of the Southern Expansion site would create a new noise source for the Foxcroft Heights neighborhood which justified a noise impact analysis. The potential noise impact from the proposed South Nash Street project was assessed by developing existing noise levels from published data, modeling future traffic noise levels with FHWA's Traffic Noise Model (TNM® version 2.5), and comparing the results to the VDOT traffic noise impact criteria as presented in the department's most recent *Highway Traffic Noise Impact Analysis Guidance Manual*. The 2040 design year Leq noise levels for the residences abutting the proposed South Nash Street were developed with TNM®2.5. The model included traffic on Columbia Pike, the proposed South Nash Street and Southgate Road gate (Gate 1) to JBMHH. Eight receivers were chosen for the model, representing the convenience store on the corner of Columbia Pike and Oak Street, several of the 15 residences on the east side of Oak Street and the Foxcroft Heights Park on the corner of Southgate Road and Oak Street. Noise levels were modeled for the AM and PM peak hour using the traffic data shown in Table 3.4 in Section 3.10, *Transportation and Traffic*. Posted speeds of 25 and 30 mph were used for Columbia Pike and Southgate Road. A speed of 25 mph was used on the proposed South Nash Street. Traffic volumes were 100% light duty vehicles. Heavy duty delivery vehicles to JBMHH are not allowed to use Gate 1; delivery vehicles are required to use the Hatfield Gate on the west side of JBMHH.

The AM peak hour noise levels ranged from 60 dBA Leq at the convenience store to 57 dBA Leq at Foxcroft Heights Park, resulting in an increase of 2 to 5 decibels. The PM peak hour noise levels ranged from 63 to 59 dBA Leq, resulting in an increase of 4 to 8 decibels. The noise model results did not consider sound reduction measures such as walls, vegetation, etc.

None of the noise levels approached or exceeded VDOT's noise abatement criteria of 67 dBA Leq for residences and parks, or the 72 dBA Leq criteria for restaurants/convenience stores. The increases also do not exceed VDOT's substantial noise increase criteria of 10 dB(A). Therefore, the proposed access road would not create a traffic noise increase that requires abatement as defined by VDOT criteria.

Construction and Cemetery Operations

The project construction and cemetery operations would also create some noises and bring them closer to "outside" noise-sensitive receptors, such as residences, not accustomed to cemetery operational noise.[42] Construction activity may cause temporary, intermittent fluctuations in noise levels. No substantial long-term construction noise impact is anticipated. During the construction phase of the project, reasonable measures would be taken to minimize noise impacts and disturbance from construction-related activities. The project would adhere to VDOT's Road and Bridges Specifications construction noise limits and

[42] A noise receptor is generally a person being affected, but noise-sensitive locations or land uses such as cemeteries, libraries, hospitals, day care centers, etc. are also included in a noise analysis.

Arlington County's local noise ordinance.[43] Noise created from cemetery operations would include preparation for burials and general grounds maintenance, e.g. lawn mowing. These types of noise would be minor when compared to other noise sources in the area (e.g., aircraft/helicopter and vehicular traffic). Potential noise impacts from the area immediately adjacent to the VDOT Facility – either the relocated Operations Complex or contractor laydown/landscape contractor/spoils stockpiling – would be minor and characteristic of noises from the VDOT facility. Specialized vehicles found at the relocated Operations Complex would include maintenance and/or operating equipment such as mowers, off-road utility vehicles, backhoe loaders, mini off-road dump trucks, etc. for daily operations.

3.3.3.2 Maintain Operations Complex with Underpass Alternative

The potential noise impacts resulting from this alternative would be similar as those under the Preferred Alternative. The maintenance vehicles for landscaping and/or spoils stockpiling would be similar to those discussed previously.

3.3.3.3 Maintain Operations Complex without Underpass Alternative

The potential noise impacts resulting from this alternative would be similar as those under the Preferred Alternative. The maintenance vehicles for landscaping and/or spoils stockpiling would be similar to those discussed previously. This alternative may result in increased traffic on the South Nash Street.

3.3.3.4 No Action Alternative

Under the No Action Alternative, there would be no comprehensive development of Southern Expansion. Regardless, the cemetery could use the area immediately adjacent to Foxcroft Heights for support services. Any activities on this parcel would occur only during daylight hours and would comply with the Arlington County noise ordinance. The use of this area for support services such as contractor materials storage/laydown may produce a long-term noise source and be incompatible with the adjacent residential properties.

3.4 Topography, Soils, and Geology

3.4.1 Affected Environment

3.4.1.1 Topography

The topography at the Southern Expansion slopes down from west to east, as illustrated in **Figure 3-2**. The highest point, approximately 150-200 feet above mean sea level (AMSL), is the western edge of the former Navy Annex site. The lowest point, approximately 15-50 feet AMSL, is the area near the Washington Boulevard/Columbia Pike interchange.

3.4.1.2 Soils

The soil type identified at the Southern Expansion site is classified as Urban Land – Udorthents complex with 2 to 15% slopes, according to the *Soil Survey of Arlington County, VA* published by the Natural Resources Conservation Service (NRCS). A soil *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps.[44]

[43] U.S. Army Corps of Engineers, Norfolk District, 2014. Programmatic Environmental Assessment for the Arlington National Cemetery Real Property Master Plan. Page 3-16. Prepared by HNTB Corporation.
[44] U.S. Natural Resources Conservation Service, Web Soil Survey, 2016. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

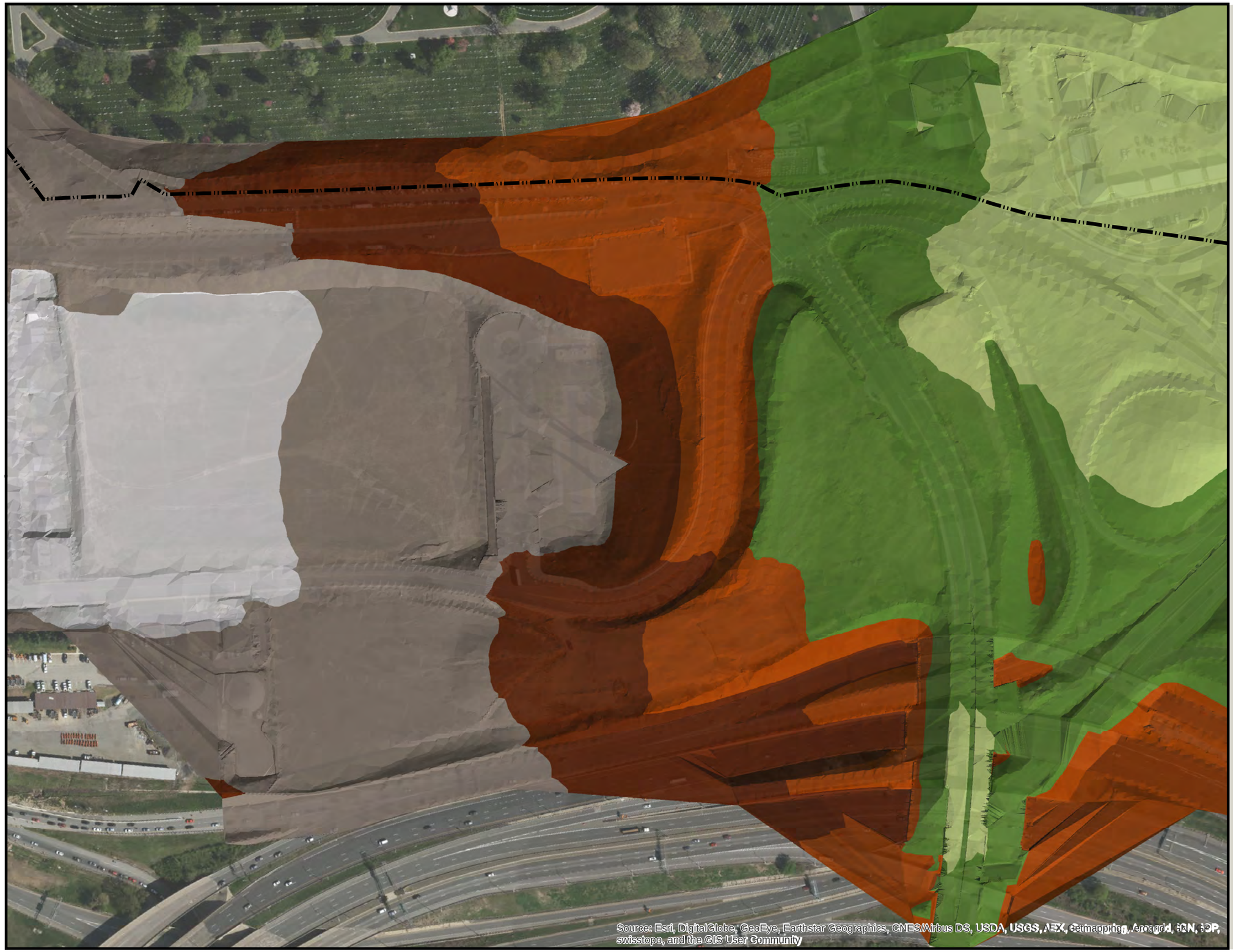


Figure 3-2
Topography

LEGEND

Arlington National Cemetery

Major Contour Intervals

- 150 - 175 Feet
- 125 - 150 Feet
- 100 - 125 Feet
- 75 -100 Feet
- 50 - 75 Feet
- 25 - 50 Feet
- 0 - 25 Feet

Arlington National Cemetery
Southern Expansion

Environmental Assessment

0 50 100 200 Feet

N

Source: ANC Master Plan

The Urban Land soil type consists of areas where more than 85% of the surface is covered by buildings, asphalt, concrete, or other impervious materials. There are no sensitive soils or soils classified as Prime or Unique Farmland present in the proposed project area.

Based on soil boring logs from the 2005 AFM project, the subsurface soil stratum consisted of the following three layers in descending order from the surface: 1) existing fill layer, 2) marine clay layer, and 3) sand layer. Similar layers are anticipated for the remaining Southern Expansion site. There is an approximately 30-feet elevation difference between the Navy Annex main parcel and the adjacent landscaped area immediately east of the AFM. The fill layer was not encountered in the borings on the landscaped area. The existing fill layer was approximately 28-feet thick and consisted of a mix of sand and clay with roots and asphalt fragments. Naturally occurring marine clay underlies the existing fill layer. Based on the boring logs, the marine clay layer is approximately 30-feet deep and is expected to be immediately below the existing grade at the landscaped area.

Groundwater was encountered during a field investigation based on visual observations of saturated soil samples.[45] The clay soils can cause perched groundwater conditions resulting in groundwater being found close to the ground surface. The depth to groundwater, especially perched groundwater, is expected to fluctuate with the season, variations of rainfall, and/or adjacent construction activities such as dewatering and pumping.[46]

3.4.1.3 Regional Geology

The site is located within the Atlantic Coastal Plain Physiographic Province of Virginia, which consists of a series of relatively consolidated sand and clay deposits. The crystalline rock of the Piedmont Physiographic Province exists approximately 250 feet below this Coastal Plain.

The Potomac Formation is the primary formation underlying the Southern Expansion site. The Potomac Formation consists of pebbly sand and clay from marine and riverine deposits dating to the Cretaceous Period.

3.4.2 Threshold of Significance

The threshold of significance would be exceeded if the alternative would result in a geologic hazard. A change in topography that is out of character with the cemetery would result in a significant effect. An alternative that would not comply with the Virginia Erosion and Sediment Control regulations would also result in a significant effect.

3.4.3 Environmental Consequences

3.4.3.1 Relocate Operations Complex Alternative (Preferred)

During roadway and cemetery construction, large quantities of soil would be moved to shape the landform of the Southern Expansion project to create the traditional characteristics of ANC and to create a new roadbed for Columbia Pike. The entirety of the Southern Expansion area will be regraded. A preliminary estimate of the amount of earth moving is approximately 950,000 cubic yards of cut and fill. The actual amounts may vary based on final roadway and cemetery designs.

[45] HANA Engineers & Consultants, April 2017. *FINAL Preliminary Geotechnical Engineering Investigation – Findings & Engineering Evaluation Report, Arlington National Cemetery Southern Expansion*. Prepared for HNTB Corporation. Page 16.
[46] *Ibid*. Page 17.

The design for the Preferred Alternative would eliminate the need for slope stabilization for the open-field slide on the east side of the AFM. This area would receive select fill material to provide slopes and topography that can safely accommodate maintenance activities and maintain positive surface drainage. The structural integrity of the AFM would not be jeopardized. Each spire is supported by a 53-inch diameter by 84-feet deep caisson with a 10-feet diameter bell at the bottom according to the recommendations in the geotechnical report at the time of construction.[47] The existing slide is believed to be caused by a perched water condition developed between the soil layers and is not related to the AFM structure.

Maximum grades would not exceed 10%; varying grades between 2% and 7% would be preferred. A varying thickness of fill material is anticipated within this area to raise the existing grades to support rolling topography within the allowable slope gradients while preserving the east facing wall of the AFM. The addition of fill would also increase the amount of land available for interments by reducing the existing slope. Additional borings and site exploration would be completed to facilitate the design of prefabricated vertical drains to ensure the consolidation of underlying soft clay soils and eliminate the slide.[48]

The Preferred Alternative would create a new roadway alignment; the design would adhere to guidelines and standards of VDOT and the American Association of State Highway and Transportation Officials (AASHTO). This alternative may alter the topography between the AFM and the existing cemetery boundary. The topography in this area would no longer be constrained by the alignment of Columbia Pike and the grade would be reduced to allow for interments/inurnments. Appropriate landscaping would be incorporated. The final cemetery and roadway designs and construction would be based on geotechnical investigations and would include erosion and sediment control best management practices (BMPs). The relocation of the Operations Complex would entail demolition and removal of all structures and pavement at the existing site. Both the existing and the proposed sites would adhere to strict erosion and sediment control BMPs.

The existing fill and the marine clay layers are the most likely to present challenges in planning, designing, and constructing the project. Designers would need additional soil sampling and laboratory testing information to understand the soil properties and behaviors to achieve a successful project completion. Off-site engineered fill material[49] would be transported in when needed and used to provide an appropriate elevation and slope of the roadway surface based on engineering final design.

Potential impacts from development would be from erosion and sedimentation; this would be mitigated by adherence to erosion and sedimentation control plans, stormwater management plans, and the use of BMPs. Soils that are not suitable for re-use, including both contaminated soils and plastic clay soils, would be trucked off-site to approved locations[50] for such material. Remediating the soils onsite would not be possible due to existing space constraints. The soils in the Southern Expansion are predominantly previously disturbed soils. The topography of the cemetery expansion would produce positive impacts as it would reflect the image and character of ANC. No direct or indirect impacts to the site's geology are anticipated.

[47] Arlington National Cemetery, Southern Expansion Project, Air Force Memorial Grade Transition Study, January 2018. Inter-agency memorandum. Unpublished.
[48] HNTB, January 2018. Arlington National Cemetery, Southern Expansion Project Air Force Memorial Grade Transition Study. Interagency Memorandum.
[49] Engineered fill material is purposely selected fill that meets the required properties for compaction and soil behavior.
[50] Unusable clay soils (with no contamination) can be transported to the Prince William County landfill, approximately 25 miles south of the site. Contaminated debris/fill would be transported to landfills in either Brandywine, MD or Upper Marlboro, MD, both within 25 miles.

3.4.3.2 Maintain Operations Complex with Underpass Alternative

The potential impacts and benefits to topography, soils, and geology resulting from this alternative would be similar to those under the Preferred Alternative, except that there would be no demolition or land disturbance at the existing Operations Complex.

3.4.3.3 Maintain Operations Complex without Underpass Alternative

The potential impacts and benefits to topography, soils, and geology resulting from this alternative would be similar to those under the Preferred Alternative, except that there would be no demolition or land disturbance at the existing Operations Complex.

3.4.3.4 No Action Alternative

There would be no comprehensive development of the area under the No Action Alternative. The Southern Expansion property, however, could be used for support services such as spoils stockpiling or landscape contractor laydown, which could cause temporary and varying changes to the site's topography.

The slide on the east side of the AFM would continue to be monitored for further movement. Although the likelihood of the slide further impacting the sidewalk or Columbia Pike is low, a temporary repair would be considered under this alternative to avoid progressive failures and the potential encroachment of Columbia Pike.

3.5 Water Resources

3.5.1 Affected Environment

3.5.1.1 Wetlands, Surface Waters, and Waters of the U.S.

Wetlands and surface waters are regulated under Sections 401 and 404 of the Clean Water Act (33 U.S.C 1251 *et seq*). In addition, Executive Order 11990, Protection of Wetlands, requires federal agencies to minimize the destruction, loss, or degradation of wetlands resulting from their actions. Wetlands are defined by Clean Water Act regulations as, "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." (40 CFR Part 230). "Waters of the U.S." are defined by USACE Regulations 33 CFR 328, and generally include most surface waters that have a downstream connection to interstate waters and/or a nexus to interstate commerce.

The site was investigated for the presence of jurisdictional waters and wetlands using the three criteria espoused by the USACE – hydric soils, vegetation, and hydrology. The U.S. Fish and Wildlife Service's National Wetland Inventory (NWI) mapping showed no wetlands present. The Soil Survey of Arlington County, VA maps showed soils that were indicative of urban areas and/or past disturbance, but were not considered hydric and are not on the National Hydric Soils list. A representative of the planning staff of USACE Norfolk District conducted a site visit and found no evidence of wetlands or surface waters.

3.5.1.2 Groundwater

According to the Groundwater Atlas of the U.S., Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, and West Virginia (HA 730-L), the Arlington, Virginia region is underlain by the Potomac aquifer, which is part of the Northern Atlantic Coastal Plain aquifer system. The Potomac aquifer in Virginia consists of the middle and lower Potomac aquifers.[51]

The maximum thickness of the Potomac aquifer in Virginia is about 4,600 feet, and the average thickness is 800 feet. General groundwater flow in this region is toward the southeast, and groundwater recharge occurs from precipitation or from downward movement through confining beds.[52]

According to a geotechnical document for the Southern Expansion,[53] groundwater was observed at the project site. Due to the soil conditions, specifically the dense clay layer, there are perched groundwater conditions resulting in groundwater being found close to the ground surface, as shallow as 4-8 feet below ground surface (bgs) in some locations. The depth to the lower groundwater table, based on the soil samples, ranged from approximately 16-56 feet bgs. The report indicated the depth of groundwater, especially perched groundwater, is expected to fluctuate with season, variations of rainfall, and/or adjacent construction activities such as dewatering and pumping.

3.5.1.3 Drinking Water and Water Supply

The RPMP PEA indicated that the Virginia Department of Health (VDH) reviewed the project area for public drinking water sources proximate to the action area. This included groundwater wells, springs, and surface water intakes. VDH found the following:

- There are no groundwater wells within a one-mile radius of the action area.
- There are no surface water intakes within a five-mile radius of the action area.
- There are no public surface water intakes within over five miles of the action area.

The RPMP PEA also indicated that the District of Columbia Water and Sewer Authority (DC Water) supplies water to ANC, as well as Arlington County, Washington DC, and portions of Fairfax County, through existing waterline infrastructure. The aqueduct is owned and operated by USACE, Baltimore District. Groundwater is not used for water supply.

3.5.1.4 Floodplains

Floodplains Executive Order 11988 (Floodplain Management), requires federal agencies to avoid adverse impacts to floodplains, and to minimize the impacts of floods on human safety, health, and welfare. The Federal Emergency Management Agency (FEMA) has designated 100- and 500-year flood zones.

The action area is located on FEMA Flood Insurance Rate Map (FIRM), Panel 77 of 100, Map Number 51013C0077C. According to these maps, the area formerly occupied by the Navy Annex building and parking lot are zoned "D" for "Areas in which flood hazards are undetermined, but possible." The northeastern and eastern corners of the site near the existing intersection of Columbia Pike and Southgate Road are zoned "X", meaning, "Areas determined to be outside of the 0.2% annual chance floodplain (or

[51] Trapp, Jr., Henry and Marilee Horn, 1997. *Groundwater Atlas of the United States: Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, West Virginia*. Document No. HA 730-L. Published by U.S. Geological Survey.
[52] *Ibid*.
[53] HANA Engineers and Consultants, LLC, April 2017. FINAL Preliminary Geotechnical & Engineering Investigation – Findings & Engineering Evaluation Report, Arlington National Cemetery Southern Expansion. Prepared for HNTB Corporation.

the 500-year floodplain)." Therefore, there are no FEMA-designated 100-year or 500-year floodplains within the action area.

3.5.1.5 Stormwater Management and Water Quality

As described previously in Section 3.1, *Land Use and Sustainability*, EISA and EO 13514 (replaced by EO 13693) guided federal agencies in the management of stormwater. Section 438 of EISA requires the property pre-development hydrology be maintained or restored for federal facilities larger than 5,000 square feet in size. E.O. 13514 required EPA to issue guidance on how to implement Section 438 of EISA.[54]

In addition to the EISA requirement, the Commonwealth of Virginia has established a Stormwater Management Program (VSMP).[55] The VSMP involves several types of permits issued to municipal separate storm sewer systems (MS4s) and those developing land in Virginia. The individual and general permits issued for management of stormwater discharges from MS4s involve the implementation of several programs aimed at reducing the amount of pollutants discharged from storm sewer systems operated by regulated government entities.

Site investigations have determined the action area has three distinct subwatersheds based on existing topography, and three existing outfalls that receive their drainage. **Figure 3-3** shows the three existing drainage areas. Currently, there are no stormwater treatment facilities. Drainage consists of surface runoff, closed storm drains, and open ditches; surface runoff is conveyed and discharged into existing manmade storm drainage outfalls at the points shown in **Figure 3-4**. Much of this existing stormwater infrastructure dates from when the Navy Annex building and parking area were present. The action area at that time consisted of office buildings, parking lots, and a gas station, which totaled approximately 37 acres of impervious area as identified in Table 3.1. All structures and impervious surfaces were demolished in 2013, and currently, the site consists primarily of turf, with a few acres of tree canopy cover and the footprints of Columbia Pike, Southgate Road, and the ramps to and from VA-27. Stormwater currently flows eastward from the three outfalls into the Potomac River via the Boundary Channel.

The RPMP PEA noted the status of the Potomac River near ANC is classified as "impaired" because it does not meet water quality standards associated with its primary designated uses of recreation, navigation, and aquatic life harvesting, and secondary use of aesthetic enjoyment. Total Maximum Daily Loads (TMDLs) were developed under the National Pollutant Discharge Elimination System (NPDES) stormwater permitting system. The TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. States and EPA Regions have used a variety of methods to develop stormwater-source TMDLs. TMDLs applicable to this project are: Polychlorinated Biphenyls (PCBs) in the tidal portions of the Potomac and Anacostia River watershed of the District of Columbia, Maryland, and Virginia; and fecal coliform bacteria in the Upper, Middle, and Lower Potomac River, Battery Kemble Creek, Foundry Branch, and Dalecarlia tributary in the District of Columbia.

3.5.1.6 Coastal Zone Resources

Arlington County lies within Virginia's Coastal Zone, as defined by the Virginia Coastal Zone Management Plan (CZMP) which oversees and implements guidance and regulation in accordance with the Federal Coastal Zone Management Act (CZMA).[56]

[54] U.S. Army Corps of Engineers, Norfolk District, 2014. *Programmatic Environmental Assessment for the Arlington National Cemetery Real Property Master Plan*. Prepared by HNTB Corporation.
[55] 9*VAC*25-870-63, *et seq*
[56] CZMA 16 USC 1451 *et seq*.

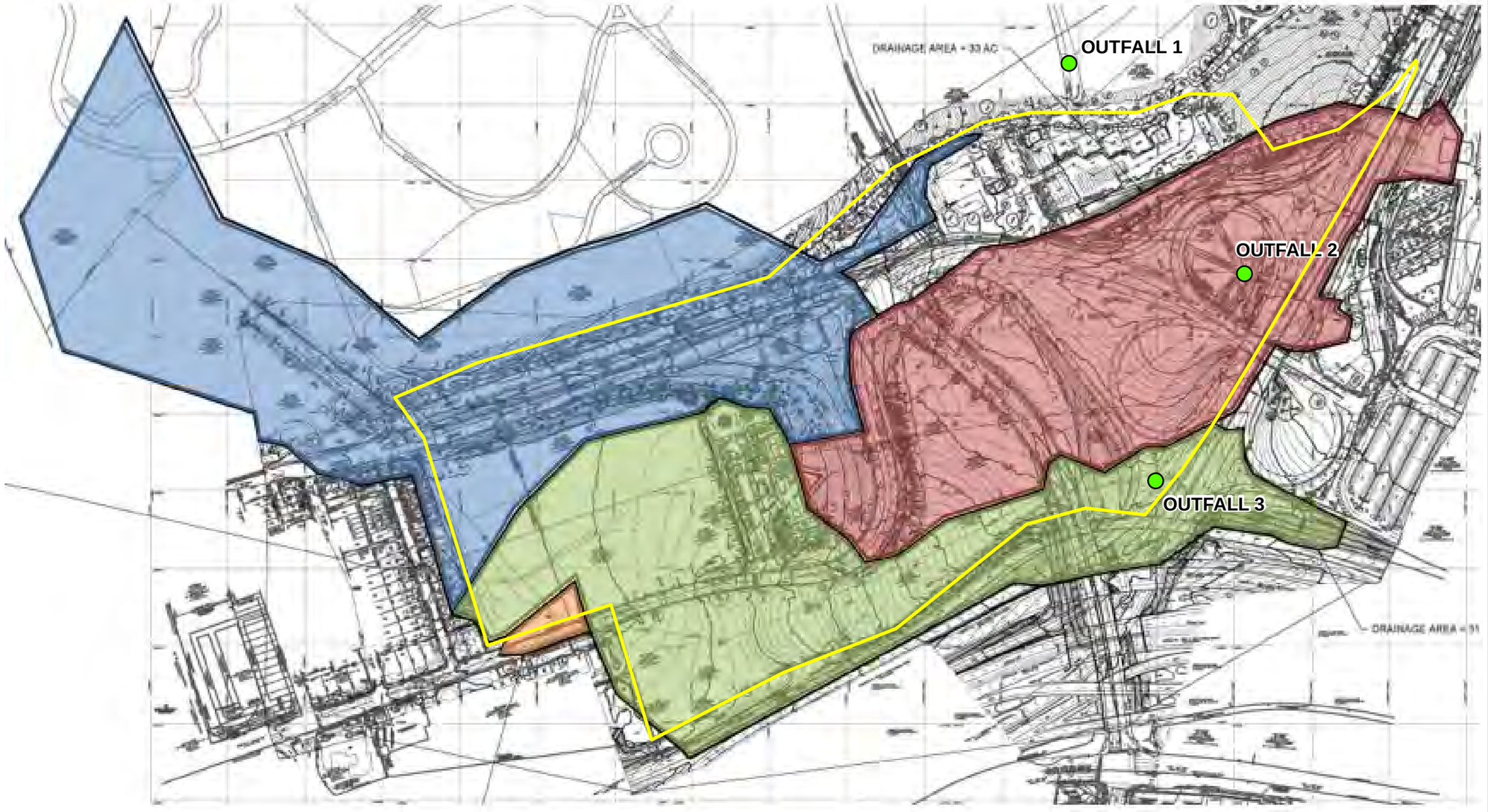


Figure 3-3
Drainage Areas

LEGEND

- Project Boundary
- 44 Acres
- 33 Acres
- 31 Acres
- .75 Acres
- Outfall

Arlington National Cemetery
Southern Expansion

Environmental Assessment

N

Not to Scale

Sources:
ANC Master Plan, National Park Service, Google Earth

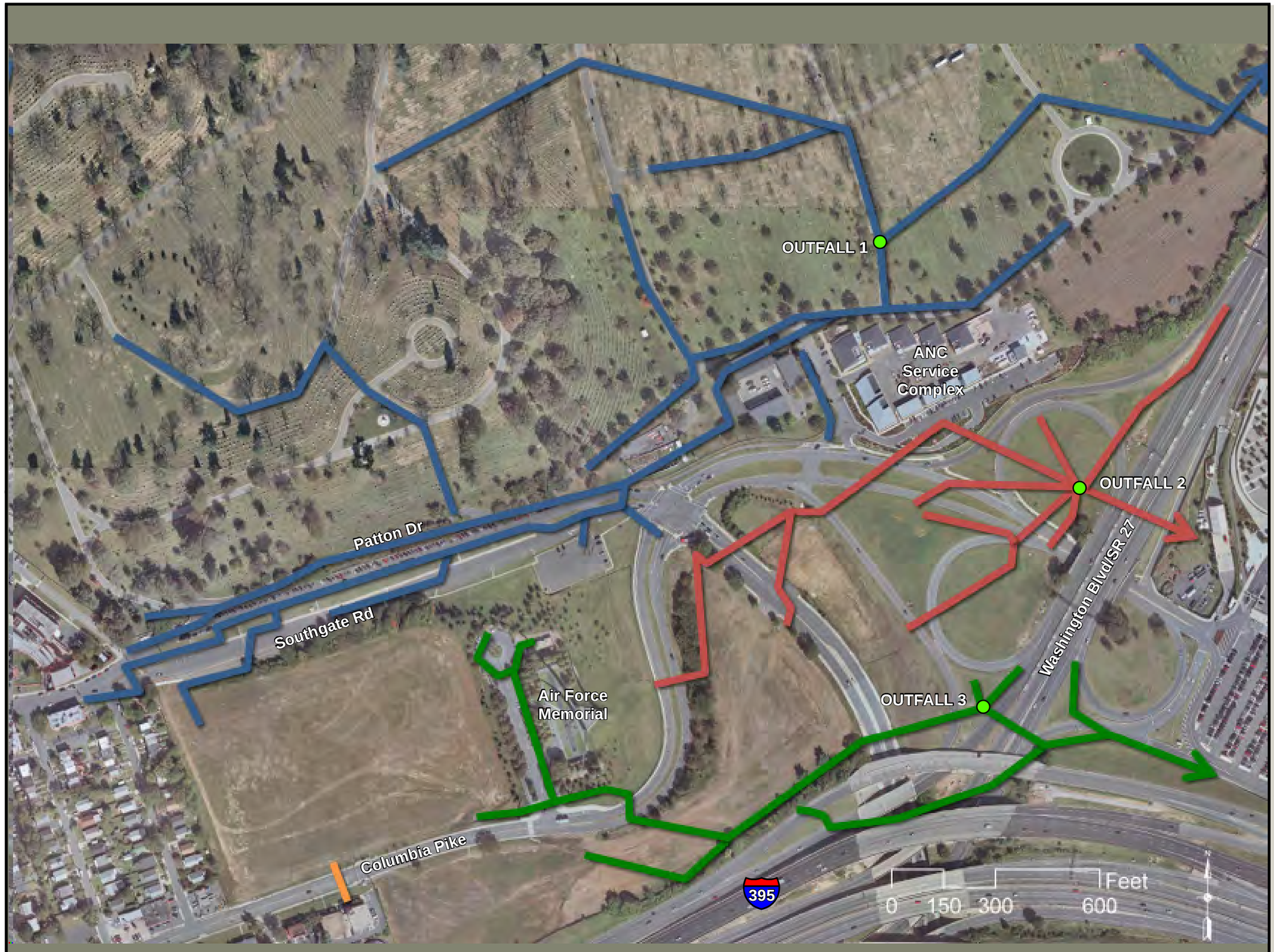


Figure 3-4
Existing Stormwater Infrastructure

LEGEND

- Outfall

Arlington National Cemetery Southern Expansion

Environmental Assessment

Sources:
ANC Master Plan, National Park Service, Google Earth

The CZMA statute preserves, protects, develops, and, where possible, restores or enhances, the resources of the Nation's coastal zone for future generations. The law also encourages and assists the states in exercising its responsibilities through the development and implementation of management programs. The legislation was written to achieve wise use of the land and water resources of the coastal zone, considering ecological, cultural, historic, and aesthetic values as well as to needs for compatible economic development.[57]

Federal activities that are likely to affect any land or water use, or natural resources of Virginia's designated coastal management area must be consistent with the enforceable policies of the Virginia CZM Program. The Virginia CZM Program is networked with several agencies administering the enforceable policies. The Chesapeake Bay Preservation Act (CBPA) is one of the enforceable policies of the Virginia CZM Program. The CBPA's purpose is to improve water quality in the Chesapeake Bay; it requires the use of conservation planning and pollution prevention practices when developing sensitive coastal lands. Within the Chesapeake Bay watershed, there are two types of resource areas: Resource Management Areas (RMAs) and Resource Protection Areas (RPAs). Based on existing and proposed mapping, there are no designated RPAs or RMAs within the action area.

Virginia also has several advisory policies which were established to serve as a discretionary guide during project planning. The Virginia Department of Environmental Quality (VDEQ), through its Office of Environmental Impact Review (OEIR) is responsible for administering the federal Coastal Zone Management Program (CZMP). The OEIR coordinates the Commonwealth's review of federal consistency determinations and certifications with cooperating agencies and responds to the appropriate federal agency or applicant.

At the federal level, the National Oceanic and Atmospheric Administration (NOAA), through its Office of Ocean and Coastal Resource Management (OCRM) oversees the review process to ensure compliance with the CZMP.[58] A Federal Coastal Consistency Determination for conformance with the enforceable policies under the state and federal programs is included as **Appendix D**.

3.5.2 Threshold of Significance.

The threshold of significance for water resources impacts would be exceeded if the alternative would result in any of the following:

- Substantial impacts on important wetland resources;
- A change in the regional groundwater patterns or depletion of groundwater supplies;
- An action that could not be permitted and/or mitigated under all applicable regulations;
- A violation of any water quality standards, laws, or regulations;
- Adverse effects on the drinking water supply or quality;
- Demand exceeding the capacity of the potable water system;
- Notable adverse impacts on natural and beneficial floodplain values or contribute to flooding or erosion.

[57] Coastal Zone Management Act of 1972 (16 USC 1452 §303 (1) (2), Congressional Declaration of Policy.
[58] Virginia Department of Environmental Quality Environmental review
http://www.deq.virginia.gov/Programs/EnvironmentalImpactReview/FederalConsistencyReviews.aspx

3.5.3 Environmental Consequences

3.5.3.1 Relocate Operations Complex Alternative (Preferred)

Under the Preferred Alternative, there would be no direct or indirect impacts to drinking water, surface water bodies, floodplains, or wetlands as none of these resources are present on the Southern Expansion site.

Groundwater

The potential for modern burial practices to impact groundwater is negligible. Based on standard modern burial practices, it is unlikely that embalming fluid or other decomposition products would be released into the soil and/or groundwater during operation of ANC. The standard National Cemetery Administration design (for full casket burials) would incorporate subsurface concrete crypts, all of which would be installed during site construction. Using this technique, the caskets are not buried directly in the soils, rather set in pre-placed concrete crypts. The process involves temporarily removing established turf and soils, removing the crypt lid, placing the casket, followed by the reverse process to complete. Additionally, modern embalming fluids are no longer arsenic-based. Finally, an anticipated increase in the number of interments of cremains would substantially reduce the potential for soil or groundwater contamination as no embalming fluid is used in cremation.

The proposed crypt fields would utilize an underdrainage system designed to keep water from reaching the inside of the lowest crypt. As a result, operation of crypt fields is not anticipated to encounter groundwater; therefore, no impact to groundwater quality is anticipated.

Stormwater Management and Water Quality

The VDEQ has determined that the 2006 land cover within the Southern Expansion's limits-of-disturbance (not including the AFM or the Operations Complex), may be used as the existing conditions to determine stormwater requirements for the project, see correspondence in **Appendix E.** Therefore, this alternative would reduce the amount of impervious surface (see Table 3.1) when compared to the 2006 land cover on the Southern Expansion – the former Navy Annex. A reduction in impervious surface would reduce the amount of stormwater moving off the site, which would lower the potential for sedimentation and contamination of nearby surface waters. However, the relocation of the Operations Complex would require additional stormwater management measures. The DAR project will coordinate with ANC to submit a plan for stormwater management approval to the VDEQ prior to construction.

ANC and Arlington County each have their own Municipal Separate Storm Sewer System (MS4) permits with VDEQ, with respect to the projects for which each is responsible. Point source discharges from municipal separate storm sewer systems are regulated under the Virginia Stormwater Management Act, the Virginia Stormwater Management Program (VSMP) Permit regulations, and the Clean Water Act. Under these permits, the MS4 owner/operator must implement a collective series of programs to reduce the discharge of pollutants from the given storm sewer system to the maximum extent practicable in a manner that protects the water quality of nearby streams, rivers, wetlands and bays.[59]

The final design would evaluate regional stormwater requirements in accordance with the Virginia Code, and propose potential BMPs and low-impact facilities – previously mentioned in Section 3.1.1.2. Integration of the regional stormwater management requirements would facilitate the site design for both

[59] Virginia Department of Environmental Quality, 2018. Municipal Separate Storm Sewer System (MS4) Permits, http://www.deq.virginia.gov/Programs/Water/StormwaterManagement/VSMPPermits/MS4Permits.aspx

the Southern Expansion and the Columbia Pike realignment and South Nash Street projects. Landholders involved in this project include ANC, Arlington County, and VDOT. The stormwater management conditions would be included in accordance with VDEQ and VSMP regulations.

The existing storm drains in the Southern Expansion and the multiple storm drain trunk lines along Patton Drive would be demolished and replaced with a new storm drain system. The existing drainage system around the AFM would remain. The Southern Expansion would have minimum 2% slopes to maintain positive surface drainage. Any required stormwater BMP facilities would be placed in the immediate vicinity of the site, preferably near an existing drainage structure so that runoff captured and treated at the BMP facility can be discharged to the existing outfalls. Proposed site drainage would be accomplished by a network of grass swale or stormwater sewer systems and outfall to the existing storm drain system. The three distinct existing drainage areas would be considered in site planning. The proposed storm drain system would be approximately sized to accommodate runoff generated from the 10-year storm event, per requirements from the VDOT Drainage Manual 2002, for principal arterial highways with a speed limit less than 50 mph.

Soil erosion and sedimentation control measures to control off-site runoff would be implemented during construction. An erosion and sediment control plan detailing construction BMPs would be prepared in accordance with the Virginia Erosion and Sediment Control Laws and Regulations and Virginia Stormwater Management Law and Regulations. All construction activities, including grubbing and grading, would adhere to the VDEQ Erosion and Sediment Control Program. Construction would be monitored to ensure erosion and stormwater management practices are adequate in preventing sediment and pollution migration into nearby surface water bodies.

In summary, the Preferred Alternative would result in a reduction in impervious area, stormwater runoff, and pollutant load, as compared to the 2006 condition. All construction activities would meet the requirements of VDEQ's minimum standards for erosion and sedimentation control and stormwater management. Underdrains are anticipated for in-ground crypts due to low infiltration rates.

Coastal Zone Resources

All activities would be subject to state and federal requirements for activities occurring in the coastal zone as defined by Virginia's CZMP. All development would be planned and designed to avoid sensitive areas and would be consistent with the CZMP to the maximum extent practicable. A Draft Coastal Consistency Determination was prepared and submitted to VDEQ along with the Draft EA; and VDEQ provided concurrence. These are included in **Appendix D**.

3.5.3.2 Maintain Operations Complex with Underpass Alternative

Potential impacts to water quality under this alternative would be similar to those under the Preferred Alternative.

3.5.3.3 Maintain Operations Complex without Underpass Alternative

Potential impacts to water quality under this alternative would be similar to those under the Preferred Alternative.

3.5.3.4 No Action Alternative

Under the No Action Alternative, there would be no improvements to the land and no modifications to the roadway network. Water resources would not be impacted.

3.6 Biological Resources

3.6.1 Affected Environment

The affected environment consists of approximately 70 acres of primarily unimproved grassy, open area; less than one acre of wooded area; paved roadways; the existing AFM; and, the Operations Complex.

3.6.1.1 Wildlife

Most of the Southern Expansion site is open, maintained grassy area, bisected by urban roadways. There are scattered forested uplands located on the east side of Columbia Pike and along the steep bank south of Southgate Road. The wildlife species common to this area would be animals that are adapted to urban sites such as white tail deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*), Virginia opossum (*Didelphis virginiana virginiana*), raccoon (*Procyon lotor lotor*), Eastern gray squirrel (*Sciurus carolinensis*), Eastern cottontail (*Sylvilagus floridanus*), small rodents, common snakes, and various bird species, such as starling (*Sturnus vulgaris*), American robin (*Turdus migratorius*), bluejay (*Cyanocitta cristata*), red-winged blackbird (*Agelaius phoeniceus*), Eastern bluebird (*Sialia sialis*), red-tailed hawk (*Buteo jamaicensis*), etc. Acorns provide a food source for a variety of wildlife including white-tailed deer and squirrels. Many of these same species would also utilize ANC's adjoining landscape. The entire Southern Expansion site would be considered low quality in terms of habitat diversity and species richness.

Federally Listed Threatened or Endangered Species

For purposes of the Endangered Species Act (ESA), the action area for this project consists of the areas within the Southern Expansion site, all roadway relocations and interchange configurations, and all land transfer areas. The action area is defined as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action."[60]

Animals and plants listed as endangered or threatened are protected under the ESA of 1973, as amended. According to the ESA, an "endangered species" is defined as any plant or animal species in danger of extinction throughout all or a substantial portion of its range. A "threatened species" is any species likely to become an endangered species in the foreseeable future throughout all or a substantial part of its range. "Proposed Species" are animal or plant species proposed in the Federal Register to be listed under Section 4 of the ESA. "Candidate species" are species for which the USFWS and NMFS have sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA. Critical habitat is designated per 50 CFR parts 17 or 226 and defines those habitats that are essential for the conservation of a federally threatened or endangered species and that may require special management and protection.

The following references were consulted for compilation of the threatened and endangered species list: the U.S. Fish and Wildlife's Information, Planning and Consultation System (IPaC) database search conducted within the action area (USFWS 2019a), Virginia Fish and Wildlife Information Service (VaFWIS) database search within a three-mile radius of the action area (VDGIF 2018), and the scoping response letter from Virginia Department of Conservation and Recreation, National Heritage Division (VDCR), dated May 24, 2016.

The results of the IPaC databases search revealed that there were no federally-listed threatened or endangered species within the action area. There was also no critical habitat for any federally-listed species.

[60] 50 CFR 402.02

A copy of the reports generated from the federal and state databases and the self-certification letter from the U.S. Fish and Wildlife Service is provided in **Appendix F**.

State Listed Threatened or Endangered Species

A scoping response letter from the Virginia Department of Conservation and Recreation (VDCR) dated May 24, 2016, indicated the wood turtle (*Glyptemys insculpta*) has documented occurrences in Four Mile Run, a stream located approximately 1.5 miles south of the action area, and may be present. **Table 3.3** identifies state-listed species which have the potential to occur within a three-mile radius of the action area. No additional comments were received in response to the Draft EA.

Table 3.3
State-Listed Species

Common Name	Scientific Name	State status
Birds		
Loggerhead shrike	*Lanius ludovicianus*	Threatened
Migrant loggerhead shrike	*Lanius ludovicianus migrans*	Threatened
Mussels		
Brook floater	*Alasmidonta varicosa*	Endangered
Insects		
Appalachian grizzled skipper	*Pyrgus wyandot*	Threatened
Mammals		
Little brown bat	*Myotis lucifugus lucifugus*	Endangered
Tri-colored bat	*Perimyotis subflavus*	Endangered
Reptiles		
Wood turtle	*Glyptemys insculpta*	Threatened

Source: Virginia Department of Game and Inland Fisheries. 2016. Virginia Fish and Wildlife Information Service. http://vafwis.org/fwis

Eagles

Once federally-listed as endangered, the bald eagle (*Haliaeetus leucocephalus*) has made a remarkable comeback. It is currently protected under the American Bald and Golden Eagle Act, and the Migratory Bird Treaty Act; and remains a state-listed threatened species. Bald eagles breed throughout much of Canada and Alaska, in addition to scattered sites across the lower 48 states, from California to the southeastern U.S. coast and Florida. Wintering habitat covers most of the contiguous U.S., with some year-round distribution in the northwest. Bald eagles typically breed and winter in forested areas adjacent to large bodies of water. However, such areas must have an adequate food base, perching areas, and nesting sites. Throughout its range, it selects large, super-canopy roost trees that are open and accessible. Northern birds return to breeding grounds as soon as weather and food availability permit, generally between January and March.[61]

[61] Virginia Department of Game and Inland Fisheries. 2016. Virginia Fish and Wildlife Information Service

According to the Center for Conservation Biology website, no documented nests are within the action area for this project. The closest bald eagle nest is over two miles northwest of the action area, and over one-mile northwest of northern boundary of ANC. Mapping showing this location is found in **Appendix F**.

Migratory Bird Treaty Act of 1918 and Executive Order 13186

The Migratory Bird Treaty Act (MBTA) and EO 13186 requires agencies to protect and conserve migratory birds and their habitats. Any activity that results in a "take" of migratory birds or eagles is prohibited unless authorized by the USFWS.

Migratory birds nest throughout North America, some as far north as the Arctic. In late summer and fall, they migrate south for the winter. Some winter in the southern United States, Mexico, the Caribbean or Central America while others go as far as South America. Then, each spring they return north to their breeding grounds. Many migratory songbirds, shorebirds, and raptors rest and refuel here during their spring and fall migrations. Others winter south and return to the Chesapeake Bay watershed each spring to breed.

The U.S. Fish and Wildlife Service's IPaC database yielded a listing of migratory birds that could occur within the vicinity of ANC or in the region, see **Appendix F** for full listing.

3.6.1.2 Vegetation

The action area includes maintained fields, manicured lawn, grassy highway right-of-way; the Columbia Pike/South Joyce Street/Southgate Road roadway system, parking areas, highway ramps to VA-27, the Operations Complex, and the AFM. Based on Google Earth aerial photography, there are scattered forested uplands, in the form of linear bands of trees lining the steep embankments along Southgate Road, Columbia Pike, and I-395. There are also scattered young trees along the slope of the AFM. Most of the existing trees in the action area are planted or are pioneer species,[62] rather than remnants of natural forests. **Photos 3 and 4** are views of the Southern Expansion site. In addition, numerous invasive species are present in the wooded areas.

Photo 3: Facing west along Southgate Road ***(****HNTB photo****)***

leucocephalus). Retrieved from: http://ecos.fws.gov/ecp0/profile/speciesProfile?sId=1626#lifeHistory.

[62] Pioneer species are tree species first to colonize a disturbed area.

Photo 4: Facing east at the former FOB building site *(HNTB photo)*

The tree canopy along Southgate Road is dominated by pin oak (*Quercus paulustris*), water oak (*Q. nigra*), willow oak (*Q. phellos*), black cherry (*Prunus serotina*), and mulberry (*Morus alba*). In the understory is privet (*Ligustrum spp*), *Wisteria* spp, Japanese honesuckle (*Lonicera japonica*), English ivy (*Hedera helix*), greenbriar (*Smilax rotundifolia*), grape vine (*Vitis spp*), and pokeweed (*Phytolacca spp*).

The slope along the AFM has planted tree species: white oak (*Q. alba*), loblolly pine (*Pinus taeda*), white pine (*P. strobus*), and black gum (*Nyssa sylvatica*).

Along Columbia Pike are tree species: black locust (*Robinia pseudoacacia*), Norway maple (*Acer platanoides*), pin oak, willow oak, red maple (Acer rubrum), Chinese privet (*Ligustrum sinense*), redbud (*Cercis canadensis*), tree of heaven (*Ailanthus altissima*), shrub form honeysuckle (*Lonicera spp*), azalea (*Rhododendron spp.*), English ivy, and thistle. Along the southern border of the property along I-395 are many of the same species.

The Operations Complex includes pavement and buildings and a few small landscaped areas.

ANC itself is home to more than 8,600 trees comprised of over 300 varieties and species. The ArbNet Arboretum Accreditation Program[63] and the Morton Arboretum awarded the cemetery with a Level II arboretum accreditation in 2015 for its achievements in meeting specific standards deemed important for arboreta and botanic gardens. The cemetery is now listed on the Morton Register of Arboreta, a worldwide registry. The Morton Register is a comprehensive list and database of named arboreta and other public gardens that have a substantial focus on woody plants. The Level II arboretum designation requires a minimum of 100 species, varieties, or cultivars[64] of trees or woody plants that have been planted and are growing in accordance with an arboretum plan. A Level III arboretum requires a minimum of 500 species, varieties, or cultivars.

Invasive Species

Executive Order 13112 requires federal agencies to prevent the introduction of invasive species, to provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species cause. EO 13112 defines "invasive species" as "any species, including its seeds, eggs, spores, or other biological material capable of propagating the species; is not native to that ecosystem; and whose

[63] ArbNet, in association with the Morton Arboretum, 2018. Lisle, IL. http://arbnet.org/morton-register/arlington-national-cemetery-memorial-arboretum
[64] Cultivar is a plant variety that has been produced in cultivation by selective breeding.

introduction does or is likely to cause economic or environmental harm, or harm to human health." Additionally, the arboretum plan previously mentioned must follow a code of conduct for botanic gardens and arboreta which restricts introducing invasive plants.

Invasive species currently exist within the Southern Expansion site, particularly within the wooded sections adjacent to the roadways. A few examples of invasive species on the site – though not a complete list – include Norway maple, tree of heaven, privet, honeysuckle, English ivy, and wisteria.

3.6.2 Threshold of Significance

The threshold of significance for biological resources would be exceeded if the alternative would:

- Jeopardize the continued existence of any federally-listed threatened or endangered species or result in the destruction of critical habitat;
- Decrease the available habitat for commonly found species to the extent that the species could no longer exist in the area; or
- Eliminate a sensitive habitat such as breeding areas, habitats of local significance, or rare or state-designated significant natural communities needed for the survival of a species.

3.6.3 Environmental Consequences

3.6.3.1 Relocate Operations Complex Alternative (Preferred)

Under the Preferred Alternative, there would be a temporary disruption to wildlife inhabiting the Southern Expansion. Wildlife species and any migratory birds in the area would move to adjacent areas upon the start of construction. The temporary impact would be offset at the project completion by providing permanent positive impacts through new landscaping including turf, trees, shrubs, and other plant material in planting beds. The plant species would be compatible with the geographic region and support the overall biological diversity of the cemetery and its qualification as an arboretum. The net increase in vegetation would positively impact biological resources by providing new habitat for native wildlife species. Both native and non-native species would be carefully chosen to support the design intent and character of ANC. ANC, including the Southern Expansion, will continue to follow the standards of the ArbNet Arboretum Accreditation Program and the Morton Arboretum to maintain its status as a Level II arboretum.

The bald eagle is known to or have the potential to occur in the action area. However, the nearest nest is over two miles away from the Southern Expansion and would not be affected by the Proposed Action.

BMPs would be used during construction to avoid or minimize introducing invasive species inadvertently. ANC's Invasive Species Management Plan – prepared by the ANC horticulturalist and master arborist – provides recommendations for the long-term management of invasive species.

Threatened or Endangered Species

There are no federally-listed threatened or endangered species or critical habitat within the action area.

During the scoping process, the VDCR indicated the state-listed threatened wood turtle (*Glyptemys insculpta*) has been observed in Four Mile Run, located approximately 1.5 miles south of the action area. The species is known to occur in the northern counties of Virginia and within the Potomac River watershed. Its habitat is clear streams with adjacent forested floodplains and nearby fields, wet meadows, and

farmlands. The primary habitat requirement is the presence of water. Since there are no surface water bodies present in the action area, the wood turtle is not expected to be present.

The Loggerhead shrike (*Lanius ludovicianus*), another state-listed threatened species, is a rare or uncommon species in Virginia. The species prefers open country with scattered trees and shrubs and closely grazed pastures. Fence posts are commonly used for perching and roosting. Red cedar and hawthorn are two tree species that are used frequently for nesting. The most recent records of the species in Virginia are from the Shenandoah Valley region.[65] Based on the habitat description, this species is not expected to occur in Arlington County.

The Appalachian grizzled skipper (*Pyrgus wyandot),* a butterfly, is also a state-listed species. According to the Natureserve.org website, typical habitat for the Appalachian grizzled skipper in Virginia is shale barrens, pastures, and powerlines on south to west facing shale slopes, always with much bare rock or soil. The habitat for this species requires plentiful food sources such as dwarf cinquefoil (*Potentilla canadensis)* and other nectar flowers, and also a source of moisture such as a streamlet. Therefore, there appears to be no suitable habitat for this species.[66]

The little brown bat and the tri-colored bat, both state-listed species, roost in caves, buildings, rock crevices, trees, under bridges, in mines, and in tunnels. The little brown bat is found throughout the state and is one of several insectivorous bats in Virginia. The population is in sharp decline; however, the species is neither state- nor federally-listed for protection. Both bats are found in all forested regions. Like many other bat species, most of the cause of population decline of both species is white nose syndrome, caused by the fungus *Pseudogymnoascus destructans*. Neither species are known to occur on or near the site. The limited tree canopy and the absence of other hibernacula on the site suggest that the site lacks good habitat for these species.[67]

3.6.3.2 Maintain Operations Complex with Underpass Alternative

Potential environmental consequences are similar to those discussed under the Preferred Alternative.

3.6.3.3 Maintain Operations Complex without Underpass Alternative

Potential environmental consequences are similar to those discussed under the Preferred Alternative.

3.6.3.4 No Action Alternative

Under the No Action Alternative, there would be no comprehensive development of the Southern Expansion site. No substantial changes or impacts to the existing vegetation or wildlife habitat resources would be anticipated.

3.7 Cultural Resources

Cultural resources include archaeological sites, structures, cultural landscapes, museum collections, and ethnographic resources. For the purposes of Section 106 of the National Historic Preservation Act (NHPA), significant cultural resources are identified as historic properties if they are either considered to be eligible for or

[65] Terwilliger, Karen, 1991. *Virginia's Endangered Species; Proceedings of a Symposium*. The McDonald and Woodward Publishing Company, Blacksburg, Virginia.
[66] NatureServe. 2016. Appalachian grizzled skipper. (*Pyrgus wyandot*). Accessed from: http://explorer.natureserve.org/servlet/NatureServe?searchSciOrCommonName=appalachian%20grizzled%20skipper
[67] Virginia Department of Game and Inland Fisheries. 2016. Virginia Department of Game and Inland Fisheries Guidance Document on Best Management Practices for Conservation of Little Brown Bats and Tri-Colored Bats. Accessed from: https://www.dgif.virginia.gov/wp_content/uploads/LBBA_TCBA_Guidance.pdf

listed in the National Register of Historic Places (NRHP). Section 106 of the NHPA mandates that federal agencies consider the impact of their undertakings on historic properties within the project's Area of Potential Effect (APE) illustrated in **Figure 3-5**. If adverse effects on historic properties are identified, then agencies must attempt to avoid, minimize, or mitigate these impacts to resources considered important in our nation's history.

3.7.1 Affected Environment

3.7.1.1 Historic Context

Native Americans were inhabiting the Chesapeake Bay area at least 12,000 years ago. The population slowly increased with the addition of fishing and agriculture to hunting and gathering, but there were still only a few scattered villages of a few hundred persons each along the Potomac when the first explorers led by Captain John Smith arrived in 1608. It would take another hundred years for European settlements to spread to northern Virginia. In the early 1700s, the Custis family was one of the wealthiest in Virginia. Events over the next one hundred and fifty years would yield Arlington House and Arlington Estate, and, eventually, Arlington National Cemetery.

In 1802, George Washington Parke Custis, the grandson of Martha Custis Washington and stepson of George Washington, began work on Arlington House, a home that was conceived as a memorial to his stepfather, the first President of the United States, who died in 1799. G.W.P. Custis referred to his home as "Arlington House" and to his estate as "Arlington" after the original Custis plantation on the eastern shore of Virginia.[68] The site was selected by Custis for its commanding vista over the Potomac River and into the federal city. Arlington House is cited as the earliest example of Greek Revival architecture in America, as well as the most impressive.[69]

G.W.P. Custis married and had one surviving child, Mary Anna Randolph Custis (b. 1808). In 1831, Mary Anna married Lieutenant Robert E. Lee, a childhood friend and a young Army engineer who had graduated from West Point. The couple would reside at Arlington House for the next thirty years. In 1857, G.W.P. Custis died and the role of executor fell to his son-in-law, Robert E. Lee. In his will, Custis left the Arlington estate to his daughter, Mary Anna Custis Lee, for her lifetime, and at her death the property was to pass to her son, George Washington Custis Lee.

Robert E. Lee, not a farmer by trade or reputation, attempted to improve the profitability of the Custis landholdings. Lee's efforts at Arlington, however, came to an abrupt halt in April 1861 with the onset of the Civil War.

On May 23, 1861, immediately following the referendum ratifying Virginia's secession, the Union Army crossed the Potomac and occupied Alexandria and Arlington Heights. Rosslyn and Arlington Heights provided a commanding view of approaches to Washington. Arlington House and grounds were commandeered by the Union Army under General Irwin McDowell. Union troops immediately began work on forts to hold the Aqueduct Bridge and Long Bridge; these were Forts Corcoran, Bennett, Haggerty, Jackson, and Albany. McDowell ordered that the house and the grounds of Arlington House were to be left alone.[70] Defeat at Manassas put urgency into the construction of already-ordered fortifications to fill

[68] Nelligan, Murray H. 2001, *Old Arlington: The Story of Arlington House, The Robert E. Lee Memorial.* Chatelaine Press, Burke, Virginia.
[69] Moeller, G.M. 2006, *AIA Guide to the Architecture of Washington, Part 3*. The Johns Hopkins Press, Baltimore.
[70] *New York Times*, "Views from the Capital," 23 September 1861

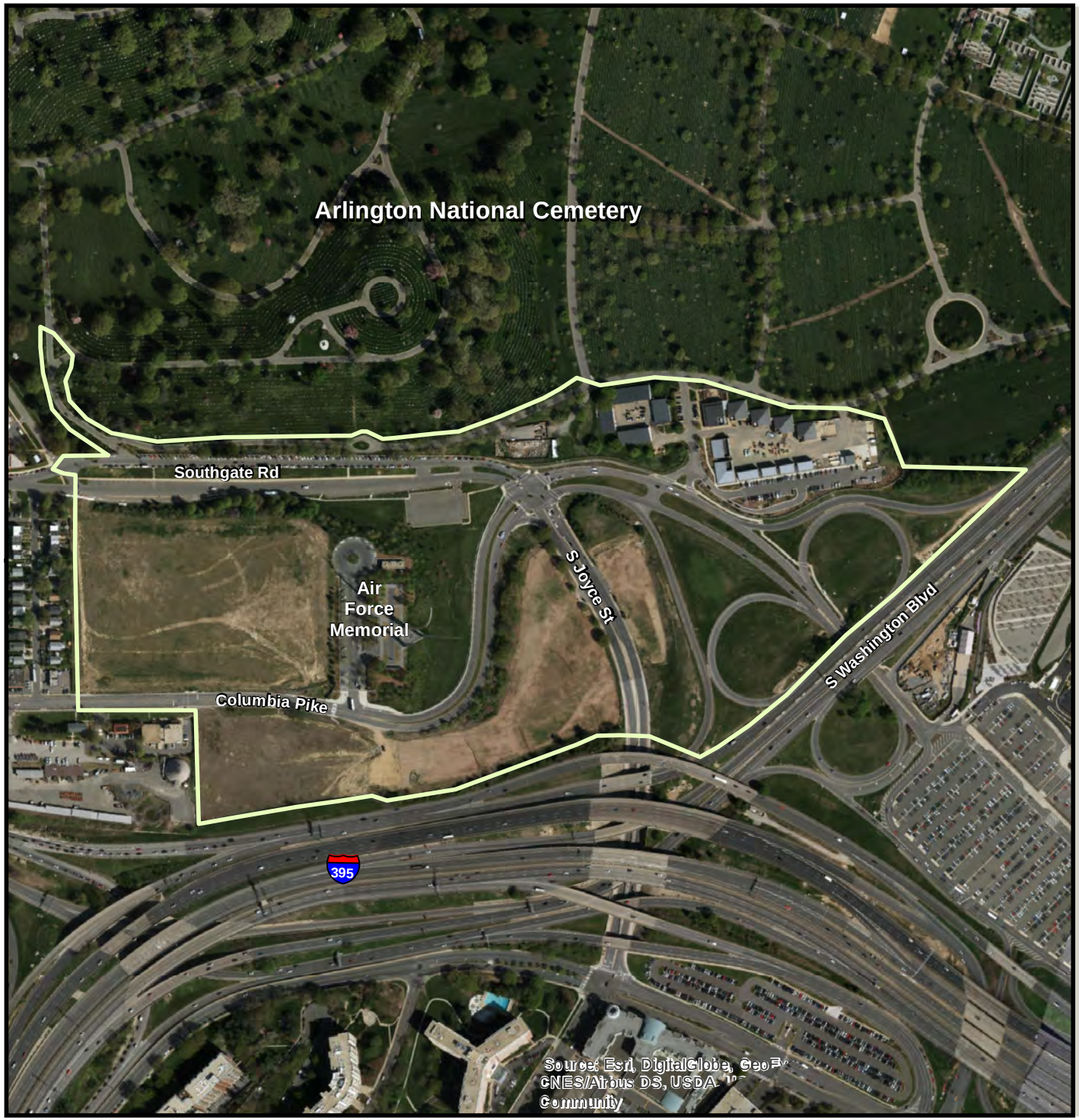


Figure 3-5
Area of Potential Effect (APE)

LEGEND

Area of Potential Effect (APE)

Arlington National Cemetery Southern Expansion

Environmental Assessment

N

0 125 250 500 Feet

in between the initial forts defending the approaches to Washington. A series of rifle pits and lunettes were erected, the lunettes closest to Arlington House were named Forts Woodbury, Cass, and Tillinghast.[71]

A major impetus for the development of Arlington National Cemetery was the Wilderness Campaign, fought in central Virginia between May 4 and June 12, 1864, during which approximately 60,000 Union soldiers were killed. Existing space at the Soldiers' Home National Cemetery in Washington, D.C., and the Alexandria National Cemetery, which was established in 1862, was filling quickly and new burial locations were needed immediately. By May 1864 there was a critical need for military burial space.[72] Secretary of War Edwin Stanton requested that Quartermaster Brig. Gen. Montgomery C. Meigs, who was charged with the federal administration of military cemeteries, locate a suitable property for the establishment of a new cemetery near Washington, D.C. On June 15, 1864, the War Department officially designated 200 acres of the Arlington plantation as a national cemetery, thus creating Arlington National Cemetery.

Throughout the Civil War large numbers of slaves escaped from the South and came to the District of Columbia seeking their freedom. By the summer of 1863, following the Emancipation Proclamation, it was becoming increasingly difficult to provide for the thousands of runaway slaves in the area. To ameliorate the problem, military authorities established the Freedman's Village[73] on the Arlington estate in June 1863, which was officially dedicated on December 4, 1863.[74] The village consisted of dwellings, a hospital, a school and chapel, and trade school shops.[75] The buildings were arranged along streets corresponding to the present Jessup Drive, Clayton Drive, and Grant Drive.

By 1888, increased demands for burial space prompted the Army to expand beyond the original 200 acres designated for the cemetery. The plan was to expand southward, taking land that was leased to Freedmen for small farms. At that time Freedman's Village remained in place as illustrated in **Figure 3-6**, but was designated by the Army for future cemetery use.

The cemetery expanded southward in 1897 to its present southern boundary (eliminating Freedman's Village), and as far east as Georgetown-Alexandria Pike, about where Eisenhower Drive is now. The red sandstone boundary wall was dismantled along the old southern boundary and rebuilt along the western boundary, extending from the old southern boundary, where Farragut Drive is now, to where the Argonne Cross was later erected, when the material ran out. Past that point, and along the new southern boundary, the new wall was built of a blue-grey igneous or metamorphic stone, ending at Georgetown-Alexandria Pike. The newly extended eastern boundary was also walled, according to maps dating to 1897[76], and seen in photos from the 1940's. The black and white photos leave it uncertain what material was used there, but it looks consistent in form and material to the 1897 wall.

[71] U.S. War Department 1881, *The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies*. Series 1 - Volume 5, Part 1.Govt. Printing Office, Washington: 678-685.
[72] Holt, Dean W. 1992 *American Military Cemeteries.* McFarland & Company, Inc., Jefferson, North Carolina.
[73] Various references to this use 'Freedman's' or 'Freedmen's' with the former being more common
[74] Schildt, R. 1984, Freedman's Village: Arlington, Virginia, 1863-1900. *The Arlington Historical Magazine* 7(4-October):11-21.
[75] New York Times, "Freedmen's Village, Virginia" 12 December 1863
[76] Depot Quartermaster's Office, 1897. Map of Arlington National Cemetery, Washington, D.C.

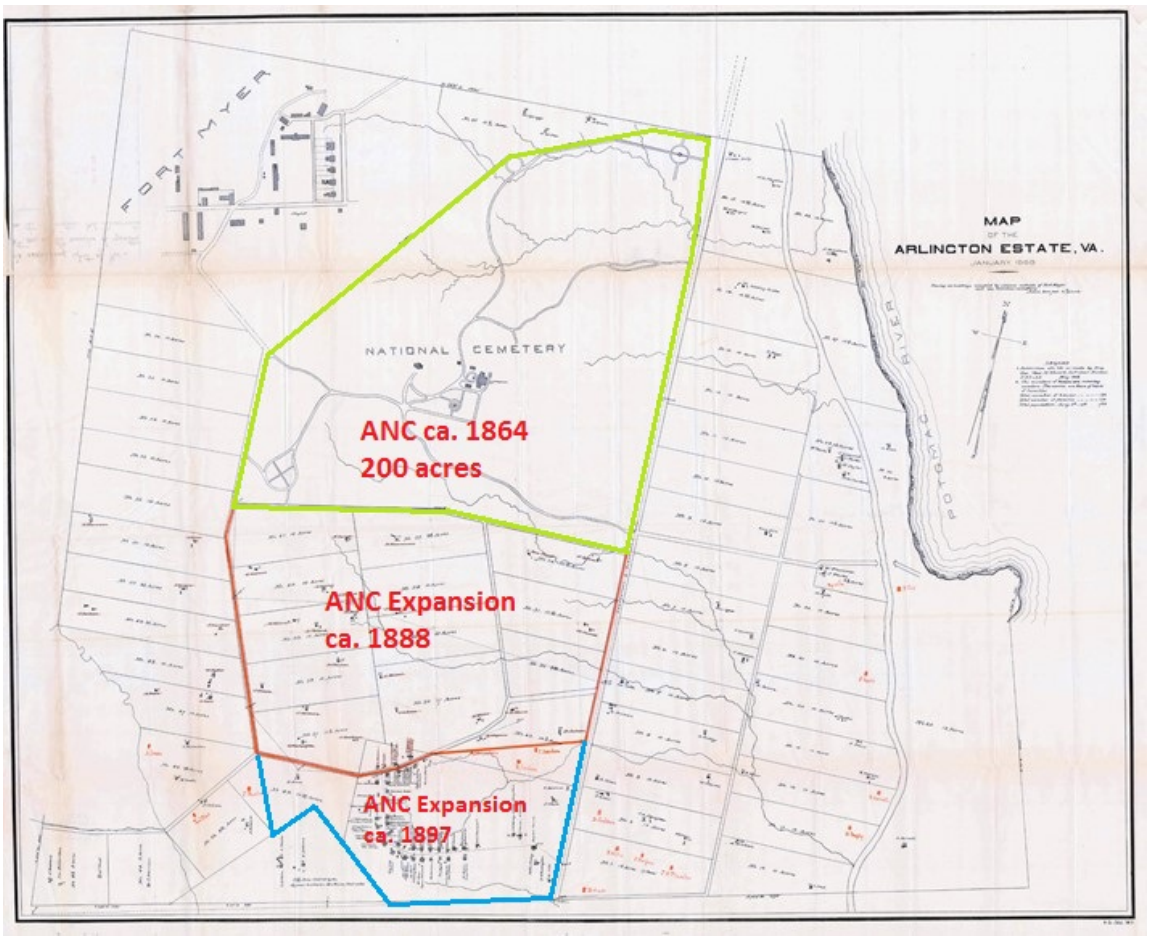


Figure 3-6: Map of Arlington Estate, ca. 1888[77]. Freedman's Village located in 1897 Expansion.

This new section of the cemetery was developed through the first half of the twentieth century, receiving the remains of veterans from the Civil War, Spanish American War, and World War I. Many of ANC's most notable monuments were erected there – the Confederate memorial, Mast of the Maine, Argonne Cross, and most notably the Memorial Amphitheatre and Tomb of the Unknown Soldier. The circulation system developed slowly, for example Patton Drive and Dewey Circle were added in the late 1940's and early 1950's respectively. The former may have resulted in a partial burial of the south boundary wall, which at present is about half the height of other portions, perhaps prompting the addition of the iron pike fence and supporting concrete cap.

The eastern side of the Arlington Estate, east of the Georgetown-Arlington Pike, was also held by the Army. Following the eviction of the Freedmen who had leased small farmsteads there, the US Department of Agriculture established an experimental farm there in 1905, with the stipulation that the land would be returned to the Army if ANC needed more space. It took up the area south of where Memorial Avenue would later be built. The northeast corner of the former Arlington Estate was used by Fort Myer for rifle ranges and gardens. The experimental farm lasted until 1941 when the Army needed housing for clerical workers at the Pentagon. This housing area was known as "South Post" of Fort Myer for military personnel and "Arlington Farms" for civilian workers, mostly female. South of the cemetery, flanking the Navy

[77] United States. Congress (50th, 1st session: 1887-1888). House. Map of the Arlington Estate, Va.: January 1888: showing all buildings occupied by citizens outside of Fort Myer and the National Cemetery. [Washington, D.C.: U.S. Congress, 1888]

Annex were barracks for WAVES, the women's naval reserve (Women Accepted for Volunteer Emergency Service), referred to as "Quarters K." A plan was made in 1966 to demolish South Post and finally expand ANC eastward, but escalation of the Vietnam War and the need for the South Post housing continued. Although Arlington Farms housing was demolished by 1968, South Post remained until 1971. It was probably sometime after 1971 that the boundary wall was extended to the east of its 1897 terminus at the former location of the Georgetown-Alexandria Pike. Quarters K was also demolished in 1971.

The ANC Southern Expansion project marks the first expansion of ANC outside the bounds of the Arlington Estate. The Navy Annex area had little development through 1900, save for a few small buildings shown on Civil War era maps at the intersection of Georgetown-Alexandria Pike and Columbia Pike, probably a toll house and associated out-buildings. Just east of the project area was the Alexandria Canal, which ran through the current site of the Pentagon. Fort Albany, one of the earthwork forts forming a defensive chain around Washington during the Civil War was south of the project area where Shirley Highway/I-395 is now. An early 20th century residential area – referred to as Queen City – developed near the area of what is now the ramps for the Columbia Pike/I-395 interchange. The neighborhood was demolished by the early 1940s for the Pentagon reservation development.

Formally designated Federal Office Building #2, the Navy Annex was originally intended as a warehouse when it was built in 1941. The Marine Corps' need for office space led to its conversion into Marine Corps Headquarters soon thereafter. The Navy Annex was later home to the Missile Defense Agency as well. A large, rather plain, and utilitarian building, it consisted of eight wings connected by a frontal wing in a sort of "E" configuration. **Photo 5** shows an aerial view of the Navy Annex building and the surrounding landscape. It was considered eligible for the NRHP due to the historical significance of its tenancy rather than architectural significance. In 2004 the eastern wing was demolished to make space for the Air Force Memorial (AFM); in 2013 the remaining building was demolished to provide space for the ANC Southern Expansion project.

A more detailed overview of the area's history is presented in a report titled *Archaeological and Historic Evaluations for the Arlington National Cemetery Southern Expansion, Arlington County, Virginia* **(Appendix G).**

3.7.1.2 Archaeological Resources

There are no archaeological resources recorded in the APE for direct physical disturbances. The areas south of the boundary wall have had repeated disturbances from cycles of construction and demolition, and as a result have a very low potential for intact archaeological sites. The history of the site, past land uses, and data from test borings, remote sensing, and excavation done for site evaluation were examined in an archaeological evaluation of the project area.[78] The Virginia Department of Historic Resources has concurred with the findings of that evaluation that intact archaeological deposits are unlikely within the APE, and no further survey is warranted.[79] The portion of the APE within the cemetery, the Boundary Wall along Patton Drive shows modifications; a stream running along much of the length of Patton Drive appeared on an 1897 map[80]. The stream must have been diverted into a culvert and filled. There is virtually no undisturbed ground in that part of the APE given the roadway, graves, and utilities filling the area. The likelihood of finding or identifying NRHP eligible archaeological resources would be small. If

[78] Haynes, J. H. 2016, Archaeological and Historical Evaluation for the Arlington National Cemetery Southern Expansion Project. U.S. Army Corps of Engineers Norfolk District, Norfolk, Virginia.
[79] Letter, Marc Holma, Virginia Department of Historic Resources to Rebecca Stevens, Arlington National Cemetery dated February 7, 2017 (DHR File No. 2014-1094)
[80] Depot Quartermaster's Office, 1897. Map of Arlington National Cemetery, Washington, D.C.

unanticipated cultural artifacts would be identified during construction activities, then the appropriate agencies, e.g. Virginia Department of Historic Resources (VDHR) would be notified and standard procedures would be followed to protect the artifacts and determine their significance.

3.7.1.3 Buildings, Structures, and Landscape

The Proposed Action would have visual effects on the ANC historic district and the Pentagon, both which are listed in the NRHP. The Foxcroft Heights neighborhood, bordering the project area to the west, was also surveyed and reviewed as a historic district. The VDHR concluded that buildings making up Foxcroft Heights did not retain sufficient historic character to be eligible for the NRHP. Due to its position on Arlington Ridge, the Southern Expansion site would also be within sight of more distant properties. These include monuments on the west end of the National Mall, and the Mall itself.

The visual APE for the project was established through a study by a consultant.[81] A model of areas potentially visible from the Southern Expansion project site was developed using LiDAR data to develop a digital elevation model. Historic properties within this visual APE were selected as vantage points to evaluate visual effects of the project.

Photo 5: View of Federal Office Building #2 ("Navy Annex"), circa 2006. Foxcroft Heights is visible in the lower left; VDOT facility at bottom; AFM, right; ANC, top half. (*U.S Air Force Master Sgt. Gary R. Coppage, public release photo*)

ANC evaluated the AFM for its eligibility for listing in the National Register of Historic Places (NRHP). In accordance with 36 CFR 60.4, commemorative properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register unless the property primarily commemorative in intent of design, age, tradition, or symbolic value has invested it with its own exceptional significance; or the property achieving significance within the past 50 years if it is of exceptional importance. ANC evaluated the AFM to determine if it embodies the distinctive characteristics of a type,

[81] Wanner, R. 2015, Arlington National Cemetery Southern Expansion Site – Viewshed Study. EAC/Archaeology, Inc.

period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Designer of the AFM, James Ingo Freed, a widely noted architect, designed a number of iconic buildings including the US Holocaust Memorial Museum. During the U.S. Commission of Fine Arts' review of the proposed AFM, they lauded this work as "majestic."[82] ANC sponsored research analyzing the AFM to evaluate qualifications for listing in the NRHP as the work of a master and/or possesses high artistic values was completed in February 2019.[83] The report recommended the AFM as NRHP eligible as a district, including all elements of the site as contributing.

Determination of eligibility process also included consultation with the Virginia State Historic Preservation Officer (SHPO) and consulting parties. After reviewing the report, on March 11, 2019 ANC and USACE met with the Air Force District of Washington (which manages the AFM), SHPO, and CFM to discuss the recommendations, potential effects to the AFM from this project, and mitigation measures if needed. The result was a determination of NRHP eligibility for the AFM, and a determination adverse effect.

3.7.2 Threshold of Significance

The threshold of significance would be exceeded if the project had an adverse effect on an NRHP listed or eligible historic property that could not be mitigated. An adverse effect to a historic property occurs when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR § 800.5[a][1]).

3.7.3 Environmental Consequences

3.7.3.1 Relocate Operations Complex Alternative (Preferred)

The Preferred Alternative would have direct physical effects to the AFM site and the NRHP-listed ANC historic district; the southern boundary wall and the Operations Complex are considered contributing elements. The 1897 portion of the boundary wall makes up much of the section affected by this project, but it was modified at a later date. NRHP guidance on National Cemeteries finds that all active elements contribute to the historic significance on a continuing basis, even recent additions. The relocation of the Operations Complex, although a lower level resource of importance, would be an adverse impact.

Field investigations were undertaken to evaluate the potential effects of Action Alternative #1 on the previously identified vantage points. Thirty vantage points were evaluated in the Impact Assessment. Seventeen vantage points were within ANC's present boundaries, with the remainder outside. Most of the vantage points outside of ANC were from NRHP listed or eligible properties, including the Pentagon, George Washington Memorial Parkway, the Lincoln Memorial, and Arlington Memorial Bridge, but also from Southgate Road and Foxcroft Heights. The study found that all the vantage points both inside and outside of ANC would have no line of sight impacts with the project site during leaf-on conditions. The project site would be visible from Foxcroft Heights, although Foxcroft Heights was determined to be not-

[82] Letter from David M. Childs, Chairman of the Commission of Fine Arts to Edward F. Grillo, Jr., President of the Air Force Memorial Foundation, dated 27 April 2004

[83] EAC/Archaeology, Inc., 2019, Air Force Memorial: Physical Description, Background Research, and Evaluation of Eligibility for the National Register of Historic Places.

eligible for the NRHP.[84] The Impact Assessment concluded that there would be no adverse visual effects to any NRHP listed or eligible properties resulting from the proposed Southern Expansion project, see **Appendix G**.

A detailed documentation and evaluation of the southern boundary wall was conducted along with the aforementioned documents.[85] This document examined in detail the wall's history and contribution to the significance of the ANC Historic District, and documents measures to resolve potential adverse effects. Adverse effects to the boundary wall of the ANC historic landscape would be mitigated through the reuse of the materials, or matching material, in the new boundary wall along the proposed South Nash Street and Columbia Pike and through documentation of the structure. The Action Alternatives would deconstruct it and incorporate materials into a wall around the expansion area.[86]

There would be an adverse effect by removing the southern boundary wall under Alternative #1. The rationale for removing it was discussed in Section 2.3 *Planning Elements*. The adverse effect would be mitigated through the Section 106 process – a Memorandum of Agreement with the VDHR.

Memorandum of Agreement

A determination has been made of an "undertaking",[87] and VDHR has been consulted to initiate the Section 106 process. The agency (Army-ANC) has found there are "adverse effects" and has consulted with ACHP and VDHR to seek ways to avoid or minimize the adverse effects. Adverse effects to the ANC NRHP listed historic district and AFM have been identified. In the ANC historic district these include the demolition of the Operations Complex and a section of the ANC Boundary Wall; and conversion of a section of Patton Drive into a pedestrian trail. At the AFM the effects include conversion of the access road and parking lot into pedestrian access and some burial space and enlarging the guard house. A Memorandum of Agreement (MOA) in which ANC that stipulates mitigation measures to resolve adverse effects is being finalized. See Appendix G for consultation letters and the draft MOA, entitled, "Memorandum of Agreement Among Arlington National Cemetery, The Virginia State Historic Preservation Officer, and The Air Force District of Washington Regarding the Southern Expansion Project, Arlington National Cemetery, Arlington, Virginia."

A typical measure for resolving adverse effects is documentation of architectural properties, which has already been completed for the ANC Boundary Wall. Other measures would depend on the extent of the adverse effect and the properties adversely affected. Past studies – Haynes 2016, Wanner 2015, EAC/Archaeology Inc. 2016 and 2019, and Bell Architects 2015 – identified and evaluated the historic resources. The studies are available to the ACHP and VDHR staff and other consulting parties, e.g. Arlington County, for review under the Section 106 process.

The criteria of adverse effect will be applied to the AFM within the proposed Southern Expansion undertaking in accordance with 36 CFR 800.5(a)(1). ANC will provide the SHPO and consulting parties

[84] According to the Virginia Cultural Resources Information Service file #000-4620, the VDHR Evaluation Committee determined the Foxcroft Heights Historic District to be not eligible on March 29, 2012. VCRIS files also noted the residents of Foxcroft Heights were opposed to the nomination.
[85] Bell Architects, PC 2015, Arlington National Cemetery Southern Expansion – Boundary Wall Evaluation. Prepared for HNTB Corporation, Arlington, Virginia
[86] EAC/Archaeology, Inc. 2016 Arlington National Cemetery Southern Expansion Site – Impact Assessment. Prepared for HNTB Corporation, Arlington, Virginia
[87] An undertaking is a type of activity that could affect historic properties. Historic properties are properties that are included in the National Register of Historic Places or that meet the criteria for the National Register.

with an opportunity for comments on the rendered determination. Upon the SHPO's concurrence with the determination, ANC will proceed with the Section 106 process.

Discovery of Human Remains

The unanticipated discovery of human remains or funerary objects – not associated with ANC – during construction would require construction and cemetery personnel to follow established policy and procedures in accordance with Section 106 of the NHPA and ACHP guidance.

The policies and procedures are guides for treating burial sites, human remains, and funerary objects in a respectful and sensitive manner while acknowledging public interest in the past. The policies are designed to guide federal agencies in making decisions about the identification and treatment of burial sites, human remains, and funerary objects encountered in the Section 106 process, in those instances where federal or state law does not prescribe a course of action.[88]

Equipment operators or inspectors would immediately stop excavation and flag off the area to protect and secure the site in the event of an unanticipated discovery of human remains. The construction supervisor would contact the Southern Expansion Project Manager or Project Archaeologist who would contact local law enforcement to investigate and identify the remains. Removal of the remains or associated grave goods would require a permit from the VDHR in accordance with the Virginia Antiquities Act [Code of Virginia §10.1-2305 (2016)].

All human remains would remain on-site until permitting and coordination processes were completed, including local law enforcement, the medical examiner, VDHR, and affected tribal organizations, as appropriate.

3.7.3.2 Maintain Operations Complex with Underpass Alternative

The potential impacts to the ANC Historic District and the AFM under this alternative would be similar to those listed under the Preferred Alternative, but the Operations Complex would remain in its current location. The same discussions on Memorandum of Agreement and Discovery of Human Remains would apply under this alternative.

3.7.3.3 Maintain Operations Complex without Underpass Alternative

The potential impacts to the ANC Historic District and the AFM under this alternative would be the same as those listed under the Preferred Alternative, except for the relocation of the Operations Complex. The same discussions on Memorandum of Agreement and Discovery of Human Remains would apply under this alternative.

3.7.3.4 No Action Alternative

The No Action Alternative would have no effects to cultural resources. There would be no comprehensive development of the Southern Expansion site; the southern boundary wall and existing Operations Complex would remain at their present locations, and there would be no effect to the AFM. However, the use of the Southern Expansion site for other cemetery support such as stockpiling or laydown areas could produce adverse visual effects on ANC's Historic District.

[88] Advisory Council on Historic Preservation, 2007. *Policy Statement Regarding Treatment of Burial Sites, Human Remains and Funerary Objects.* http://www.achp.gov/docs/hrpolicy0207.pdf

3.8 Visitor Use and Experience

3.8.1 Affected Environment

Part of the mission of ANC is to provide "…a place connecting visitors to the rich tapestry of the cemetery's living history." The cemetery receives over three million visitors annually. Some visitors are loved ones visiting family member's grave sites or attending funerals; many visitors are tourists, including students and organized tours, coming to experience some of the key destinations and learn about the rich history of the cemetery.

As the Southern Expansion site becomes operational, visitors to the new area would still typically enter the cemetery at the Memorial Avenue Welcome Center. The path from the National Mall, via the Lincoln Memorial, Memorial Bridge, and ultimately Memorial Avenue serves as the primary and historic route of arrival for most ANC visitors.

The AFM honors the service of the men and women of the United States Air Force and its heritage organizations. The AFM uses architectural design, inscriptions and sculpture to represent the Air Force heritage from early pioneers in flight to the advent of manned space-flight.[89]

Visitors to the DC area who visit the AFM come to remember, honor, and celebrate the Air Force and its servicemembers. The Air Force Band has weekly concerts during the summer months. The AFM also provides a unique view of the Washington D.C. landscape.

3.8.2 Threshold of Significance

The threshold of significance for visitor use and experience impacts for the long term would be exceeded if visitors could no longer visit family member's grave sites or if visitors could not experience the key destinations.

3.8.3 Environmental Consequences

3.8.3.1 Relocate Operations Complex Alternative (Preferred)

There would be beneficial impacts provided by the Preferred Alternative, based on preliminary design, due to proposed new and additional amenities including pedestrian gate(s) along the new boundary wall, a visitor parking area opposite the AFM south of Columbia Pike, and a Freedman's Village Park. The overall design would be a seamless extension of the current cemetery and provide the same iconic image captured by the ordered grid of headstones and landscaping that creates the sense of peace and beauty. Furthermore, positive impacts would include extending the longevity of the cemetery by adding additional burial space, and expanding the footprint to allow additional area for visitors to experience the history, heritage, honor, and sacrifice of our military service members.

The integration of the AFM into the cemetery boundaries would improve the visitor experience. The final design integrating the AFM would preserve the tradition, character, and experience of ANC. Pedestrian access would be enhanced from both Columbia Pike and ANC. The conversion of the existing Patton Drive into a pedestrian trail would alter vehicular circulation; but would still preserve a circulation and visitation route for visiting gravesides. New vehicular circulation routes will also be available in the expansion area. The design elements would be ADA compliant. A new parking facility is proposed on the south side of Columbia Pike and would accommodate visitors to the AFM. The summer band concerts would end once

[89] Air Force District Washington, 2018. https://www.afdw.af.mil/about/

integrated with the cemetery. The memorial honoring Air Force servicemembers would continue to provide the sweeping view of the DC landscape and entrance to the Memorial Avenue Corridor. Visitors' safety is a key design element; appropriate safety features for safe crossing of Columbia Pike would be part of the final design. ANC's security policy and procedures would apply to the integrated AFM.

Relocation of the Operations Complex would create additional burial space as well as improve aesthetics for burials in the Cemetery.

Temporary impacts from dust and noise may be experienced due to increased construction traffic and other activities during the project's construction. Any impacts would cease upon completion of construction activities. Gravesites located between Patton Drive and the boundary wall may require the temporary displacement of headstones to avoid the potential for damage. Tremendous care would be taken to avoid impacts to gravesites; there would be no disturbance to buried remains. Family members wishing to visit one of these gravesites would be provided either escorted or pre-arranged access, to minimize interruptions/intrusion of construction activities during the visit. The proposed construction would not preclude any family member from visiting a gravesite.

3.8.3.2 Maintain Operations Complex with Underpass Alternative

This alternative would provide similar benefits as discussed in the Preferred Alternative although there would be less acreage for interments; the cemetery would reach maximum capacity sooner than under the Preferred Alternative. At that time, the cemetery would remain a national shrine popular with visitors and a place of peaceful reflection for the families of interred loved ones.

3.8.3.3 Maintain Operations Complex without Underpass Alternative

This alternative would provide similar benefits and impacts as discussed under the previous alternative, but without an underpass for maintenance vehicles, visitors may experience an increase in traffic on Columbia Pike. Crossing Columbia Pike from the proposed visitor parking may be inconvenient due to the maintenance vehicles traveling into and out of the existing cemetery entrance, but the incremental inconvenience over normal traffic would be negligible.

3.8.3.4 No Action Alternative

Under the No Action Alternative, there would be no comprehensive development of the Southern Expansion site. There would be no new burial space; the visitor use and experience would be confined to the existing limits of ANC. Over the long term, burial space would be reduced to a point where it would no longer be available. This would greatly impact visitor use and experience as the cemetery would eventually transition from an active cemetery to a national memorial.

3.9 Socioeconomics, Environmental Justice, and Protection of Children from Environmental Health Risks and Safety Risks

Environmental justice (EJ) is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.[90] Economic and social elements, including demographic information and applicable Executive Orders (EO) protecting various segments of the population are required for the NEPA analysis. EO 12898 – *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and EO 13045 – *Protection of Children from Environmental*

[90] U.S. Environmental Protection Agency, 2018. https://www.epa.gov/environmentaljustice

Health Risks and Safety Risks directs federal agencies to identify and evaluate potential impacts and avoid or minimize to the greatest extent practicable and permitted by law. The environmental health risks and safety risks outlined in EO 13045 are risks attributable to products or substances, including air, water, and soil, that a child may encounter or ingest. Environmental Justice includes full and fair participation by all potentially affected communities in the transportation decision-making process.

3.9.1 Affected Environment

The baseline information documented in the RPMP PEA remains applicable to this current EA and provides a detailed discussion of census data (2010) and the EOs. Interim census data is available, but provides only estimates based on the 2010 U.S. Census and would not provide meaningful information for an updated analysis.

Demographic and economic data from the RPMP PEA described the action area consisting of Arlington County, JBMHH, and adjacent neighborhoods including Radnor-Fort Myer Heights and Foxcroft Heights. Radnor-Fort Myer Heights (Census tract 1017.03) is located at the north end of ANC and does not apply to the discussion of the Southern Expansion site. **Figure 3-7** shows the Census Tracts surrounding the Southern Expansion site. The demographic data presented in the RPMP PEA for Census Tract 1034.01 (JBMHH) indicated: a non-white population of 15%; no families or individuals below the poverty level; and a median household income of $112,563.

The data presented in the RPMP PEA for Census Tract 1025 (includes Foxcroft Heights) and Arlington County (for comparison) indicated:

- The minority (non-white) population is approximately 40%; Arlington County, 28%.
- The percent of families below the poverty level is 0%; Arlington County, 4.8%.
- The percent of individuals below the poverty level is 3.1%; Arlington County, 7%.
- The median household income is $83,300; Arlington County, $94,800.

Although the official Census Tract data showed a minority population less than 50%, the Arlington County demographic data for the Foxcroft Heights neighborhood[91] showed a minority population of approximately 68%. Neighborhood-level statistics for income were not available.

3.9.2 Threshold of Significance

The threshold of significance for this resource would be exceeded in the event the implementation of any of the alternatives or the NEPA process resulted in any of the following:

- A substantial change to location or distribution of population;
- A substantial change in income, employment, or tax base;
- High and adverse human health or environmental impacts that would disproportionately affect minority or low-income populations or children; or
- A lack of opportunities for full and fair participation in the decision-making process.

[91] Arlington County, VA, 2018. Civic Association Demographics, https://projects.arlingtonva.us/wp-content/uploads/sites/31/2014/03/Foxcroft-Heiights.pdf

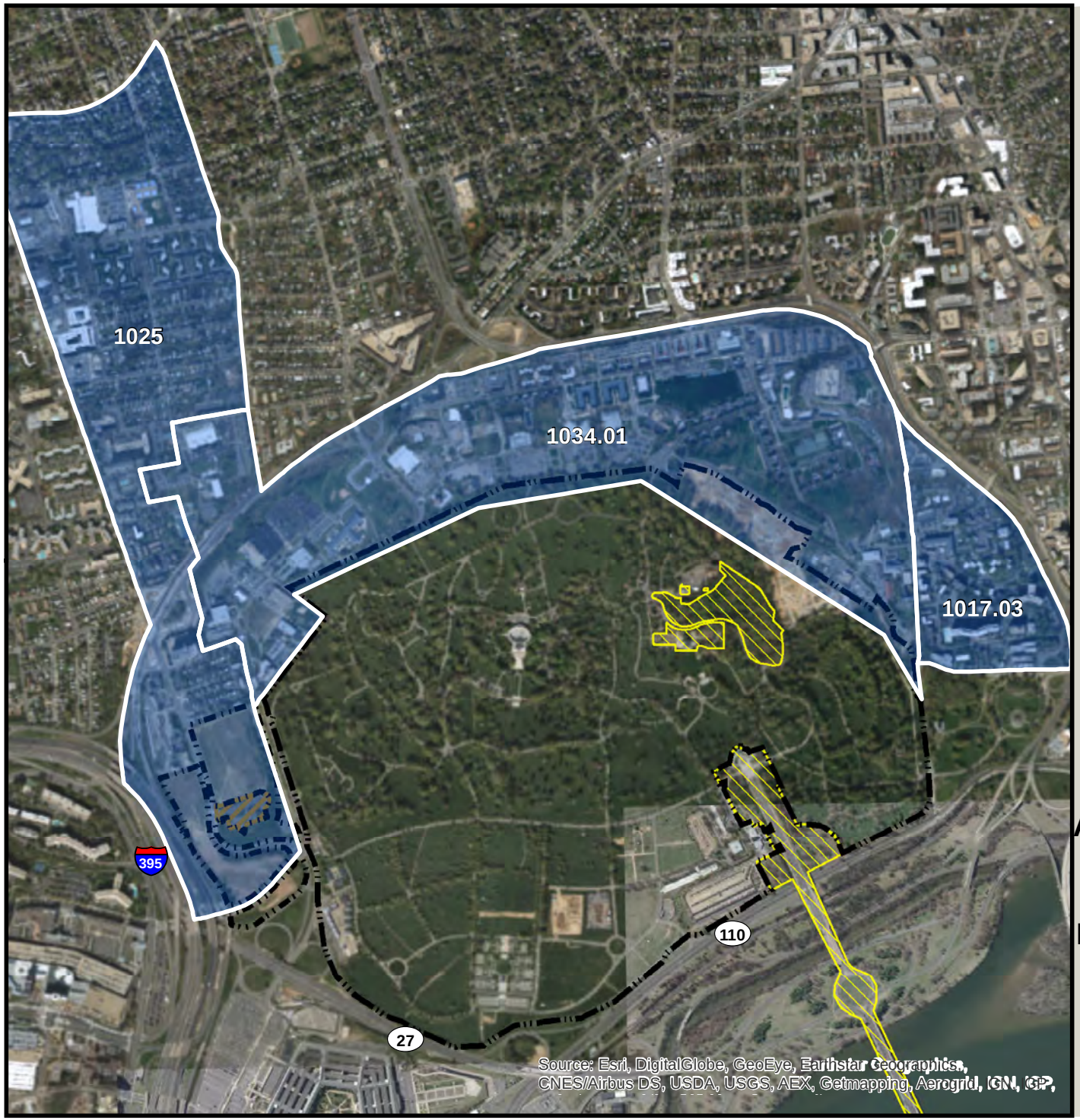


Figure 3-7
Census Tracts

LEGEND

- Arlington National Cemetery
- Census Tract
- Area Under NPS Jurisdiction
- U.S. Air Force Memorial

Arlington National Cemetery Southern Expansion

Environmental Assessment

0 375 750 1,500 Feet

N

Sources: U.S. Census Bureau, USDA, National Park Service (NPS)

3.9.3 Environmental Consequences

3.9.3.1 Relocate Operations Complex Alternative (Preferred)

Although the Foxcroft Heights community may be greater than 50% minority, the official 2010 Census Tract data indicated there would be no impacts that would create disproportionately high and adverse human health or environmental effects on minority or low-income populations or children resulting from this alternative. The median household incomes were greater than the 2010 poverty threshold of $22,113 for a family of four.[92]

Several public meetings allowed the residents of Foxcroft Heights and the surrounding community to make comments and voice concerns on the Proposed Action. A NEPA Scoping Meeting was held in April 2016 and was attended by residents of Foxcroft Heights and other communities. Representatives from ANC and USACE attended a bi-monthly civic association meeting in November 2017 to give a presentation of the Proposed Action and answer questions from the residents of Foxcroft Heights. An open-house meeting was held in August 2018 to allow attendees to ask questions and comment on the Draft EA. Many of the residents provided comments, and they are addressed in Appendix A.

The Preferred Alternative would not: destroy aesthetic values; disrupt community cohesion or a community's economic vitality; produce adverse employment effects; displace persons or businesses; affect local land use; add to or generate new hazardous materials or waste; affect water quality or other natural resources; or reduce the level of service on the realigned roadways, see Section 3.10, *Traffic and Transportation*. In addition:

- Improvements from the realignment of Columbia Pike will upgrade safety and traffic operations benefits to all users; and,
- ANC's Southern Expansion would improve the aesthetic characteristics of the site to local and regional traffic and to residents of Foxcroft Heights.

The potential benefits of the Preferred Alternative would be: providing a visually attractive land use; creating an opportunity to increase multimodal capacity on this section of Columbia Pike; reducing JBMHH staff's personal vehicles on Foxcroft Heights streets; improving ANC pedestrian access; and eliminating ANC delivery vehicle queues on Columbia Pike.

Temporary impacts during construction may include noise and fugitive dust. Unless alternative hours are required to maintain a functional roadway, the construction would adhere to a typical workday, during daylight hours only, to avoid or minimize noise intrusion on nearby residents or burial services. BMPs would be utilized to avoid or minimize impacts caused by fugitive dust, including perimeter fencing/barriers, applying water to disturbed soils or high traveled areas, and reseeding/revegetating disturbed areas.

The potential for health risks from ACM-contaminated soil and release is discussed in Section 3.13, *Hazardous Materials and Waste*.

[92] U.S. Census, 2016. http://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html

3.9.3.2 Maintain Operations Complex with Underpass Alternative

This alternative would provide similar benefits and impacts as discussed in the Preferred Alternative. There would be no disproportionately high and adverse impacts to minority or low-income populations or children.

3.9.3.3 Maintain Operations Complex without Underpass Alternative

This alternative would provide similar benefits and impacts as discussed in the Preferred Alternative. There would be no disproportionately high and adverse impacts to minority or low-income populations or children.

3.9.3.4 No Action Alternative

Under the No Action Alternative, there would be no changes to the socioeconomic conditions of the area from existing conditions.

3.10 Transportation and Traffic

3.10.1 Affected Environment

3.10.1.1 Transportation Network

The transportation network within and adjacent to the Southern Expansion site consists of roadways, on-street parking, bus stops, pedestrian walkways, and bikeways.

Roadways include I-395, Washington Boulevard (Route 27), and Columbia Pike (Route 244), which provide regional and local access to and from the Southern Expansion site area. South Joyce Street and Southgate Road are minor arterial streets. South Orme Street, South Ode Street, and South Oak Street are considered minor local streets with vehicular traffic destined for adjacent properties.[93] These key roadway segments are described in the following paragraphs and shown in **Figure 3-8**.

The main roadway, I-395, an urban interstate with high-occupancy vehicle (HOV) lanes, is a major commuter route running north-south through northern Virginia. It connects with I-695 and I-295 in Washington, D.C., and with I-495 and I-95 near Springfield, Virginia. The speed limit in this area is 55 miles per hour (MPH).

Washington Boulevard (Route 27) is a four-lane urban principal arterial with two lanes in each direction running east-west. It connects major travel routes in northern Virginia, such as the George Washington Memorial Parkway, Route 110, I-395, and US Route 50. The posted speed limit in the vicinity of the Southern Expansion site is 45 MPH.

Columbia Pike (Route 244) is a four-lane urban principal arterial that runs east-west from Washington Boulevard and South Joyce Street to Route 236 (Little River Turnpike) in Annandale, Virginia. Columbia Pike intersects major routes in northern Virginia such as Lincolnia Road, Route 7, George Mason Drive, and Glebe Road. Columbia Pike is also considered the principal street in South Arlington. The posted speed limit in the vicinity of the Southern Expansion site is 25 MPH.

[93] Arlington County, 2017. Master Transportation Plan – Streets Element. https://arlingtonva.s3.dualstack.us-east-1.amazonaws.com/wp-content/uploads/sites/31/2017/04/October-2016-Amended-Streets-Element.pdf, page 19.

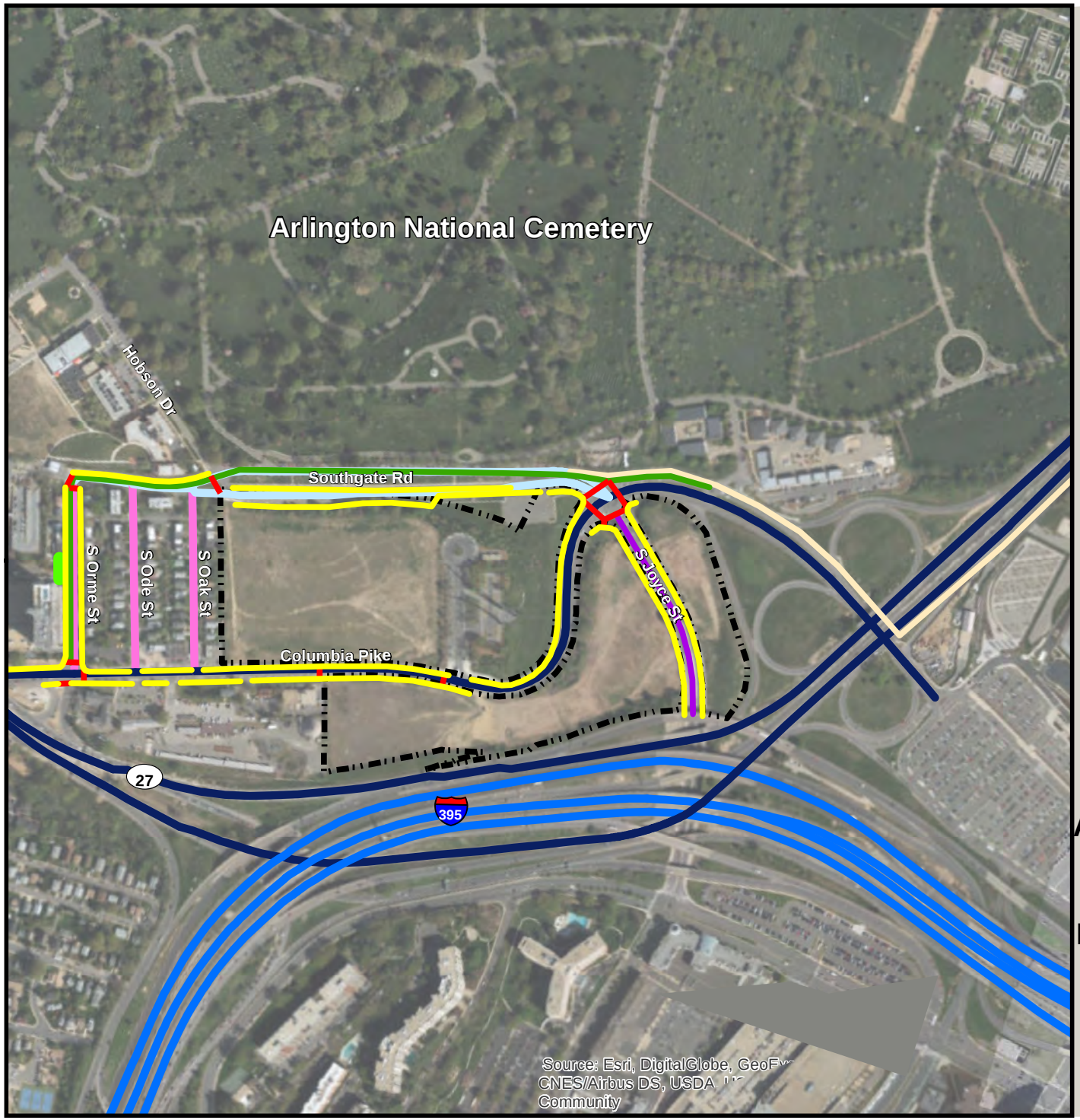


Figure 3-8
Transportation Network Within and Adjacent to the Southern Expansion Site

LEGEND

- Sidewalk
- Crosswalk
- Off-Road Path
- Signed Bicycle Route
- Capital Bikeshare Facility
- Residential Street
- Urban Interstate
- Urban Principal Arterial Route
- Local Access Road
- Minor Arterial

Arlington National Cemetery Southern Expansion

Environmental Assessment

N

0 150 300 600 Feet

Source: National Atlas, National Park Service, USDA

South Joyce Street is a two-lane minor arterial[94] route that connects the Southern Expansion site and Pentagon City underneath the I-395 overpass. The posted speed limit is 25 MPH.

Southgate Road is a county-owned, minor arterial primarily used by employees and service vehicles to JBMHH, but also provides vehicular circulation for the three residential streets – Orme, Ode, and Oak. The speed limit is 25 MPH. Parking is available on both sides of Southgate Road (See Section 3.10.1.5 Parking). There are two access points to JBMHH along Southgate Road. Gate 1 is located at the intersection of Southgate Road and South Orme Street and is open 24/7. The Marine Corps Exchange is located directly past Gate 1 and would be considered a traffic generator. The second access point, Gate 3, is located on Hobson Drive approximately 600 feet east of Gate 1. Gate 3 is typically closed; it would be used only when Gate 1 is not available.

Southgate Road also provides circulation for bus and private vehicles to the Sheraton Hotel and other commercial properties along Columbia Pike. Maintaining access for bus circulation to/from the hotel would be needed along Southgate Road, via the proposed South Nash Street to reduce transportation impacts on residential streets (Ode and Oak Streets, specifically).

South Orme Street is a residential street with one lane in each direction. South Ode Street and South Oak Street are residential streets with a single, one-way travel lane, southbound and northbound, respectively. The speed limit on all three roads is 25 MPH, and parking is available on both sides of all roads. Homes on the east side of South Oak Street utilize on-street parking (residential permit parking zone) or individual driveways. There are no vehicular entrances from the Navy Annex side of these properties.

3.10.1.2 Traffic Conditions

Traffic conditions around the Southern Expansion are influenced by several surrounding facilities that generate employee-, resident-, and tourism-related vehicular traffic. These facilities include: JBMHH, Pentagon, and related Department of Defense facilities; Pentagon City; ANC, Pentagon 9/11 Memorial, and the AFM; Foxcroft Heights residential community; the Sheraton Hotel; a VDOT facility; and a small retail shopping complex.

A traffic analysis of the existing conditions (and future No Action Alternative)[95] was conducted for the peak AM and PM hours at the signalized Southgate Road/S. Joyce Street/Columbia Pike intersection, shown in Table 3.4. The analysis showed the signalized intersection generally operated at an acceptable level of service (LOS)"C" during the AM peak hour but operated at an unacceptable LOS "E" during the PM peak. There were unacceptable delays for most of the turning movements during the PM peak leading to a LOS "F" rating.[96] The volume of traffic and limited sight distance further compound the poor performance during that time.

3.10.1.3 Safety

A safety analysis included the existing conditions at Columbia Pike/Washington Boulevard cloverleaf interchange and the Southgate Road/Columbia Pike/South Joyce Street four-way intersection. The problems identified included: merging and weaving movements on the ramps of Washington Boulevard; and, sight distance and turning movements, especially the left-turn movements at the four-way intersection.

[94] *Ibid*. Arterial streets are those that primarily provide for "through" travel rather than solely for access to adjacent properties.
[95] Arlington County, Virginia, Transportation Planning Bureau, August 2017. *Columbia Pike/Washington Boulevard Interchange Modification Report (Final)*. Prepared by Kimley-Horn Consultants. Unpublished report. The report evaluated four intersections for the existing and future no-build conditions and six intersections for the future build conditions. See appendices.
[96] Ibid. Page 111.

Level of Service (LOS)

Level of service (LOS) is a qualitative measure used to describe how well a transportation facility or service operates from the traveler's perspective. Factors influencing traveler's perceived quality of service include: travel time, speed, delay, convenience, safety, etc. The LOS is measured on a familiar "A" (best) to "F" (worst) scale.

The level-of-service of an intersection is determined by analyzing each approach individually. A computation is made of each approach during both the morning and afternoon peak hours.

Signalized intersection level of service is defined in terms of the average total vehicle delay of all movements through an intersection. Vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time. Specifically, LOS criteria are stated in terms of average delay per vehicle during a specified time period (for example, the PM peak hour). Vehicle delay is a complex measure based on many variables, including signal phasing (i.e. progression of movements through the intersection), signal cycle length, and traffic volumes with respect to intersection capacity. Automobile LOS criteria for signalized intersections are shown in the following table:

LOS	Average Control Delay (seconds/vehicle)	General Description (Signalized Intersections)
A	≤ 10	Free flow
B	>10 - 20	Stable flow (slight delays)
C	>20 - 35	Stable flow (acceptable delays)
D	>35 - 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 – 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

Source: Transportation Research Board, *Highway Capacity Manual*, 2010. Washington DC.

Westbound Washington Boulevard has a short-length merging and weaving area of 350 feet, between the entry and exit ramps, that is susceptible to higher crash rates.[97] Weaving areas less than 900 feet have crash rates 25% higher than longer length areas ≥ 1600 feet.[98] The existing yield-controlled merge area off-ramps onto Columbia Pike have a history of crashes. The Washington Boulevard westbound side on-ramp had a crash involving a pedestrian at an unsignalized crosswalk. Overall, there were 18 vehicle crashes at this interchange, several involving multiple vehicles between 2009 and 2013.[99]

[97] Arlington County, Virginia, Transportation Planning Bureau, August 2017. *Columbia Pike/Washington Boulevard Interchange Modification Report (Final)*. Prepared by Kimley-Horn Consultants. Unpublished report. Page 185-186.
[98] Ibid. Page 185.
[99] Ibid. Page 186

3.10.1.4 Interchange Ramps and Queuing

All movements on the west side of the Columbia Pike/Washington Boulevard interchange operated at LOS "C" or better during both AM and PM peak hours. Movements included:

- Washington Boulevard westbound off-ramp to westbound Columbia Pike;
- Washington Boulevard off-ramp to eastbound Columbia Pike (Pentagon);
- Columbia Pike westbound to Washington Boulevard westbound; and,
- Columbia Pike eastbound on-ramp to I-395 and Washington Boulevard westbound.[100]

3.10.1.5 Parking

Southgate Road currently provides approximately 370 (parallel and perpendicular) parking spaces. Westbound Southgate Road has approximately 140 unrestricted parking spaces. Parking space on the eastbound lane is in the Arlington County right-of-way; parking restrictions are regulated by JBMHH. Eastbound Southgate Road has 150 on-street spaces. There is a 78-space parking lot on the east end of Southgate Road originally constructed for overflow parking for the Navy Annex employees. This parking lot is owned partly by Arlington County and partly by JBMHH; it is currently used as overflow parking by the AFM with permission from JBMHH and Arlington County.

All parking spaces are generally occupied by 10 AM according to observations during the traffic counts of the RPMP PEA. Most of these vehicles entered from the intersection of Columbia Pike and South Joyce Street. In the evening, most of these vehicles make a U-turn prior to Hobson Drive to exit via the intersection of Columbia Pike and South Joyce Street.

3.10.1.6 Pedestrian and Bicycle Circulation

Pedestrian and bicycle facilities within and adjacent to the Southern Expansion are illustrated in Figure 3-8. Sidewalks within the action area provide connections with the Pentagon and Pentagon City. The sidewalks range in width from four feet along portions of the residential streets to twelve feet near the Sheraton Hotel. Crosswalks are present at many locations in the action area; however, striping is extremely faint at crosswalks along Southgate Road. Crosswalks with pedestrian-actuated signals are available at the intersections of Columbia Pike and South Orme Street, and Columbia Pike and South Joyce Street. There are three pedestrian islands at the intersection of South Joyce Street which provide higher safety to pedestrians. Many sidewalks and crosswalks in the action area are not compliant with the ADA.

According to the BikeArlington website[101], an on-street bicycle route from Columbia Pike along South Orme Street to Southgate Road, then eastward to South Joyce Street is described as "roads that have been determined to be bicycle-friendly or provide important connections to the bicycle network." This recommended route is part of the Arlington County bicycle routes and connects with trails leading to JBMHH, the Pentagon, ANC, Mount Vernon Trail, Arlington Memorial Bridge, and Rosslyn; many bicyclists and pedestrians report using it as a safer route than the current Columbia Pike corridor. There is no dedicated on-street bicycle infrastructure along Columbia Pike. Arlington County's Master

[100] Ibid. Page 108, 110.
[101] http://www.bikearlington.com/maps-and-routes/

Transportation Plan (MTP) map[102] identifies Columbia Pike from South Joyce Street to Rolfe Street as a future on-street "planned bike lane."

A "Wall Trail" located between ANC's east side boundary wall and the west side of Washington Boulevard/Route 110 to link the Foxcroft Heights area with Memorial Drive is part of the MTP. The trail appears to have severe space constraints due to aboveground utilities along the proposed route.

A Capital Bikeshare docking station is located on South Orme Street at the Sheraton Hotel. This station has 11 bike docks and allows riders to connect with over 300 docking stations in the National Capital Region.

3.10.2 Threshold of Significance

The threshold of significance for traffic and transportation impacts would be exceeded if the alternative would result in any of the following:

- A degradation of an intersection LOS to "E" or "F";
- Noncompliance with safety standards; or,
- Severing an existing connection for bicycles or pedestrians.

3.10.3 Environmental Consequences

3.10.3.1 Relocate Operations Complex Alternative (Preferred)

Transportation Network

Under the Preferred Alternative, Columbia Pike would be realigned; Southgate Road and the parking lot would be closed and redeveloped for cemetery use; a new access road ("South Nash Street") for JBMHH would be constructed; and the Route 27 ramps at the Columbia Pike interchange would be realigned.[103] Conceptual cross-sections of the proposed realigned Columbia Pike and the connector road are illustrated in Figures 2-2 and 2-3 in Chapter 2. The new realigned roadways, including the Route 27 ramps, would meet current VDOT and AASHTO highway design guidelines, including curve radii and maximum grade. Columbia Pike would be constructed as a four-lane principal arterial with a speed limit of 25 MPH, which also would be consistent with Arlington County's improvements for regional multimodal transportation (Section 1.4.3). Improvements would include standardized street cross-section including outside lane bus lanes, wider sidewalks, bicycle accommodations, enhanced streetscape, and underground electric utilities.

[102] Arlington County, VA. December 2017. https://arlingtonva.s3.dualstack.us-east-1.amazonaws.com/wp-content/uploads/sites/31/2018/04/MTP-Dec-2017.pdf

[103] Arlington County prepared an Interchange Modification Report (IMR) for the proposed reconfiguration. The IMR was developed in accordance with applicable VDOT and FHWA interchange modification criteria. The purpose and need statement for the proposed modification included: to improve safety; to allow for more contiguous land for Arlington National Cemetery Expansion; to improve traffic and transit operations at signalized intersections; to provide for more efficient pedestrian and bicycle access along Columbia Pike and through its interchange with Washington Boulevard; and, to improve multimodal access to regional destinations, and maintain consistency with the Arlington County Master Transportation Plan, the Columbia Pike Multimodal Street Improvements Project, ANC expansion plans, and Pentagon 9/11 Memorial plans. The report demonstrated the modifications would have no impacts to the mainline operations along Washington Boulevard and generally positive impacts to forecasted arterial operations. The responses to FHWA's 8-Point policy are summarized in the report located in the appendices. However, FHWA-EFLHD and ANC, at the request of the County and VDOT, agreed to further traffic studies to further analyze the modified access to Route 27 (Washington Boulevard) with Columbia Pike. FHWA-EFLHD has indicated to ANC that all decision-making to-date concerning this EA is agreeable to them, and that FHWA-EFLHD intends to adopt the ANC's EA and issue its own decision document following the updated traffic studies.

South Nash Street would be constructed as a two-lane minor arterial with a speed limit of 25 MPH; it would have street trees and a trail. The realigned Columbia Pike would have street trees on both sides along with separate bicycle and pedestrian facilities. The alignment for the future Columbia Pike creates an opportunity to increase the multimodal capacity as discussed in Chapter 2.

The proposed underpass below Columbia Pike connecting the relocated Operations Complex south of Columbia Pike with the cemetery's interment area is a design element to make the highest and best use of the available land. The underpass would be used by ANC vehicles only.

Southgate Road, a minor arterial roadway, would be replaced with a South Nash Street, also a minor arterial. The connector road's primary function would be identical to Southgate Road – to provide ingress/egress for JBMHH staff and visitors, and for Foxcroft Heights residents' vehicle circulation (South Ode and South Oak Streets provide for one-way traffic only). The highway construction projects would be completed in phases with provisions to maintain traffic during each phase.

The objective would be to reduce or minimize thru-traffic by non-residents on the residential streets – South Oak, South Ode, and South Orme. The proposed connector road is not intended to provide additional entrances to the rear of residential properties on the east side of South Oak Street. These homeowners have right-of-way access via South Oak Street; the Proposed Action would not give them greater access rights. Providing otherwise, the potential for 14 driveways, would create additional noise impacts affecting the interment area east of Foxcroft Heights.

Traffic Conditions

The Preferred Alternative would not create any new traffic generators. The Preferred Alternative would include two new signalized intersections (Columbia Pike at the proposed South Nash Street and Columbia Pike at Route 27) and one existing, but modified intersection (Columbia Pike at Joyce Street/Southgate Road). Arlington County completed an Interchange Modification Report (IMR) for this roadway and interchange realignment. The IMR traffic analysis using SYNCHRO and VISSIM traffic simulation computer software revealed the three intersections of the proposed realignment would operate at an LOS of "C" or better for all three action alternatives in the design year (2040) illustrated on **Figure 3-9**. In urban areas, LOS "D" or better is generally acceptable and LOS "E" or worse is considered degraded with undesirable vehicular delays. Two turning movements in the proposed reconfigured roadway had unacceptable LOS. The southbound left (SBL) turn at South Nash Street/Columbia Pike during the PM peak showed a LOS "E". The southbound left movement from the ramp at Columbia Pike also had a LOS "E". Future refinement of signalization timing during final design would result in improved LOS for these traffic movements.

The future No Action Alternative conditions of the South Joyce Street/Columbia Pike/Southgate Road intersection would operate at an LOS "C" during the AM peak and a LOS "E" during the PM peak hours as illustrated on **Figure 3-10**.

The intersection of Columbia Pike/South Joyce Street without the Southgate Road leg would operate at a LOS "C" (AM peak) and LOS "C" (PM peak)[104], an improvement over existing conditions. The other intersections for the 2040 action alternatives: Columbia Pike/new South Nash Street would operate at a LOS "A" (AM peak) and LOS "B" (PM peak); and Columbia Pike/Route 27 would operate at a LOS "A" (AM peak) and LOS "C" (PM peak). The results of modeling for the future 2040 No Action Alternative and the future 2040 Preferred Alternative at the three intersections are shown in **Table 3.4**. The table shows

[104] Arlington County, Virginia, Transportation Planning Bureau, August 2017. *Columbia Pike/Washington Boulevard Interchange Modification Report (Final)*. Prepared by Kimley-Horn Consultants. Unpublished report. Pages 185-186.

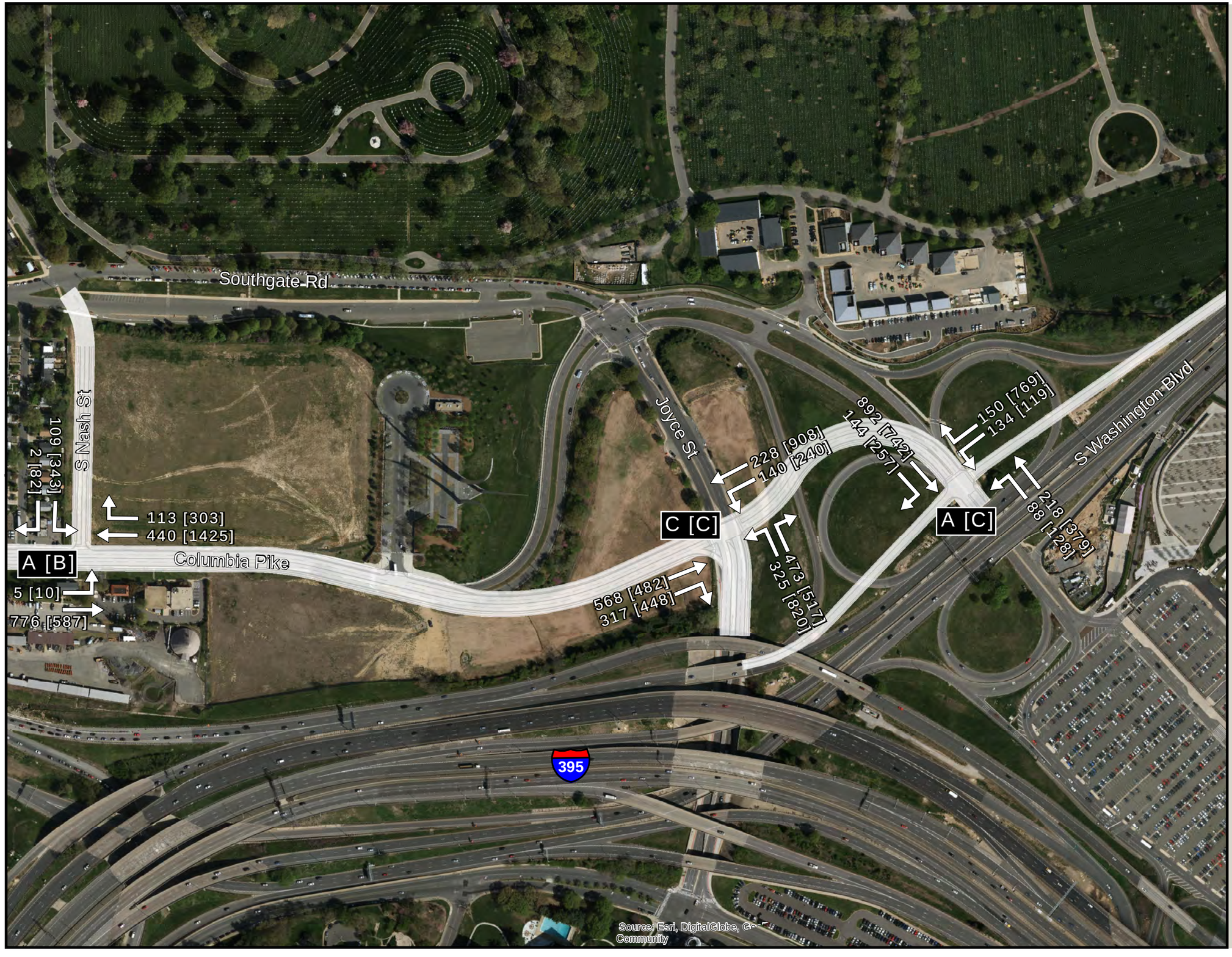


Figure 3-9
Preferred Alternative
Year 2040
Traffic Movements and Intersection Level of Service

LEGEND

X [X] Intersection LOS
AM Peak [PM Peak]

X [X] Traffic Volume
AM Peak [PM Peak]

Arlington National Cemetery
Southern Expansion

Environmental Assessment

0 65 130 260 Feet

N

Figure 3-10
No Action Alternative
Year 2040
Traffic Movements and Intersection Level of Service

LEGEND

X [X] Intersection LOS
AM Peak [PM Peak]

X [X] Traffic Volume
AM Peak [PM Peak]

Arlington National Cemetery
Southern Expansion

Environmental Assessment

N

0 65 130 260 Feet

peak traffic volumes, traffic turning movements at each intersection, the level of service for each turning movement, and the overall level of service for the intersection (labeled "Int."). The "2040 Preferred Alternative" shows certain turning movements do not exist due to the closure of Southgate Road. The 2040 Preferred Alternative movements and LOS would apply to all three alternatives; the proposed Southgate Road relocation, Columbia Pike realignment, and Washington Boulevard interchange modification is identical to all.

Safety

The Proposed Action would improve safety considerations by including:

- A proposed modification of the ramps at the Columbia Pike/Washington Boulevard interchange which would remove the short-length weaving area that is susceptible to higher crash rates.
- A signalized intersection which would eliminate the type of vehicle collisions that occurred when merging onto Columbia Pike from Washington Boulevard.
- A reduction in the number of intersection conflict points and improved sight distance at all approaches at the Columbia Pike/South Joyce Street intersection. According to studies, transforming a four-legged intersection to a three-legged "T-intersection" improves safety by reducing the potential conflict points between vehicles from 32 to 9.[105]

Interchange Ramps and Queuing

The future AM peak hour condition under the Preferred Alternative showed a minor increase in traffic density and reduction in speed on the ramp due to the proposed signal when exiting westbound Washington Boulevard to Columbia Pike. The analysis showed no significant operational impacts despite the signal; the ramps would continue to operate well with no vehicle queuing onto the mainline Washington Boulevard. Likewise, the future PM peak hour condition performed well considering traffic density and speed. While the 2040 No Action Alternative under the analysis forecasted spillback to Washington Boulevard westbound mainline during PM peak, the Preferred Alternative reduced queuing, increased ramp speed, and reduced ramp densities. The Preferred Alternative reduced potential impacts to the Washington Boulevard westbound mainline during the PM peak hour.[106]

The revised Limited Access Line for the Washington Boulevard (Route 27) limits for the inbound and exit ramps to and from Columbia Pike is shown in **Figure 3-11**.

Parking

All parking on Southgate Road and within the AFM would be eliminated under all action alternatives. New parking is proposed for a portion of the area south of Columbia Pike opposite the AFM, including employee and visitor parking for cemetery visitors.

Pedestrian and Bicycle Circulation

The Preferred Alternative, including the combination of proposed improvements to Columbia Pike and the closure of Southgate Road, would maintain existing connections with the pedestrian and bicycle trail network in this area. It would include the appropriate level of bicycle/pedestrian infrastructure consistent with VDOT standards and Arlington County's Columbia Pike multimodal design standard.

[105] Arlington County, Virginia, Transportation Planning Bureau, August 2017. *Columbia Pike/Washington Boulevard Interchange Modification Report (Final)*. Prepared by Kimley-Horn Consultants. Unpublished report.
[106] Ibid. Page 155-156.

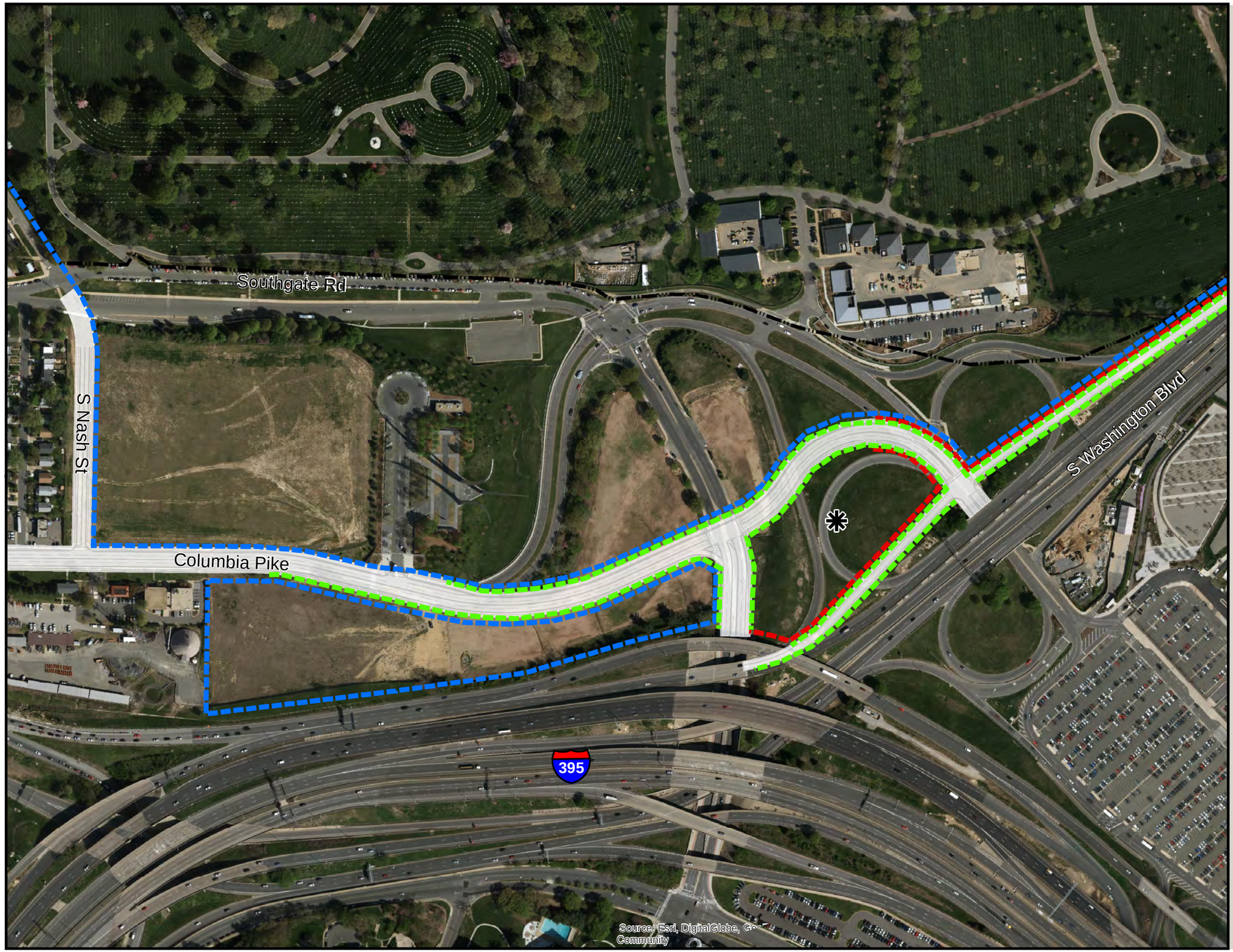


Figure 3-11
Limited Access Line

LEGEND

- Arlington National Cemetery (Existing)
- Limited Access Line (Proposed)
- ANC (Proposed)
- Right-of-Way (Proposed)
- Future 9/11 PMVEC

Arlington National Cemetery Southern Expansion

Environmental Assessment

0 65 130 260 Feet

N

At the time of the release of the Draft EA in August 2018, ANC received much feedback from the public concerning the proposed multi-use trail along Columbia Pike. Bicyclists and pedestrians indicated that they were used to using Southgate Road, which is currently a wide roadway with minimal traffic. They were concerned with this facility being closed and replaced and provided suggestions for cross sections, schematics, signage, and usage. Many preferred wider trails separated for bicycles and pedestrians rather than shared-use trails.

Arlington County and the Pedestrian Advisory Committee also expressed some concern. They recommended an additional five feet of design width for the shared-use trail. Arlington Public Schools indicated that it preferred separated trails for bicycles and pedestrians.

ANC has carefully considered these comments and concerns and must balance them against the purpose and need of maximizing burial space. It is acknowledged that Southgate Road is currently designated as a bicycle-friendly roadway by the County, and many members of the public would prefer it remained as such. It is also acknowledged that the proposed multi-use trail along Columbia Pike would not be of the same width and slope as Southgate Road.

At this time, the roadway design of the realigned Columbia Pike and South Nash Street is ongoing. The trails will be constructed in accordance with AASHTO and VDOT safety standards for pedestrians and bicyclists. The trails will be separate and will be similar to other recently-designed trails throughout the County. Specific suggestions for design provided by the citizens were passed along to the design team for consideration. Lighting and signalized cross-walks would help to ensure pedestrian safety along the route. Arlington County's "Wall Trail" was not considered because of construction feasibility issues and its unknown schedule.

There would be no long-term impacts to traffic or transportation from the Preferred Alternative because there would be no degradation of the LOS for each intersection and no bicycle or pedestrian route connections would be severed. Short term impacts due to traffic diversions, reduced travel lanes, etc., would occur during construction.

Underpass

The proposed underpass is a design element to make the most efficient use of available land. The underpass would allow maintenance vehicles originating from the new Operations Complex on the south side of Columbia Pike to access the interment area without encountering or contributing to traffic on public roadways. An overpass and at-grade crossing of Columbia Pike were considered but determined not feasible due to aesthetics, space constraints, potential traffic impacts, and a reduction in burial capacity. The underpass would be used solely for cemetery maintenance vehicles; there would be no public access, either vehicular or pedestrian. Finally, the proposed underpass would have no impact on future transit alternatives; it would be designed to accommodate standard highway and streetcar loading and utilities.

A traffic study also has been conducted to help determine the proper locations for ingress/egress of the proposed parking area, safe pedestrian crossing of Columbia Pike, curb cuts, additional signals and timing, etc. It is included in **Appendix H**. All design elements would comply with ADA requirements.

3.10.3.2 Maintain Operations Complex with Underpass Alternative

The roadway alignment would be identical to the Preferred Alternative; all benefits and impacts would be the same.

3.10.3.3 Maintain Operations Complex without Underpass Alternative

The roadway alignment would be identical to the Preferred Alternative; all benefits and impacts would be the same. Not having an underpass would mean trucks and heavy equipment utilizing the area south of Columbia Pike for support services/functions such as landscaping contractor and laydown area would have to use Columbia Pike and the current entrance near the existing Operations Complex to access the interment/inurnment area. This alternative would have a negative impact on highway safety in this area.

3.10.3.4 No Action Alternative

Under No Action Alternative, there would be no comprehensive development and no expectation of changes to levels of service for vehicular, bicycle, or pedestrian traffic around the Southern Expansion.

The future condition without improvements potentially would result in:

- An increase in crashes in the merging/weaving area from/to Washington Boulevard/Columbia Pike interchange;
- A poorly performing off-ramp from Washington Boulevard westbound to Columbia Pike westbound with decreased speeds and higher vehicle densities, resulting in queuing spillback onto the Washington Boulevard mainline; and,
- Worsening performance and crash rates at the South Joyce Street/Southgate Road/Columbia Pike intersection.

Table 3.4: Roadway Level of Service Analysis

		2040 No Action Alternative						2040 Preferred Alternative					
		AM			PM			AM			PM		
Columbia Pike and		Delay	Volume	LOS	Delay	Volume	LOS	Delay	Volume	LOS	Delay	Volume	LOS
South Nash Street	SBL	Does not exist.						47.4	109	D	57.2	343	E
	SBR							4.3	2	A	17.6	82	B
	EBL							6	5	A	45.6	10	D
	EBT							3.5	776	A	8.2	587	A
	WBT							8.1	440	A	13.3	1425	B
	WBR							11.4	113	B	19.4	303	B
	Intersection							8.8	-	A	18.4	-	B
Joyce Street/Southgate Road	NBL	45.5	227	D	79.7	549	E	47.8	325	D	48.6	820	D
	NBT	43.5	98	D	77.2	271	E	Does not exist.					
	NBR	19.8	473	B	42.4	577	D	16.5	473	B	18.1	517	B
	SBL	39.3	124	D	128.9	293	F	Does not exist.					
	SBT	36	40	D	128.9	222	F						
	SBR	29.3	2	C	116.4	82	F						
	EBL	53.1	5	D	57.7	10	E						
	EBT	26.3	444	C	52.5	189	D	36.4	568	D	24.3	482	C
	EBR	11.9	277	B	14.5	226	B	26.8	317	C	11.4	448	B
	WBL	36.5	140	D	117.6	240	F	10.8	140	B	36.3	240	D
	WBT	13.6	156	B	69.2	724	E	4.7	228	A	15.4	908	B
	WBR	7.9	72	A	60.4	184	E	Does not exist.					
	Intersection	25.8		C	74.5		E	26.9	-	C	25.7	-	C
Route 27	SBL	Not signalized.						46.6	134	D	57	119	E
	SBR							6.3	150	A	28.2	769	C
	EBT							4.8	892	A	10.2	742	B
	EBR							6.1	144	A	22.5	257	C
	WBL							10.1	88	B	38.3	128	D
	WBT							4.4	218	A	29.7	379	C
	Intersection							8.6	-	A	24.2	-	C

Key: SB = Southbound; EB = Eastbound; WB = Westbound; NB = Northbound; L = Left turn; R = Right turn; T = Through traffic; Delay in seconds.

Source: Arlington County, August 2017. Columbia Pike/Washington Boulevard Interchange Modification Report. Prepared by Kimley-Horn Consultants.

3.11 Utilities

3.11.1 Affected Environment

The former Navy Annex complex included a variety of active and abandoned utilities. According to the Navy Annex Land Transfer Plan, all structures, equipment, utilities, improvements, and parking areas on the Navy Annex site were deconstructed/demolished to 12 feet below ground surface. The site was filled or graded as needed to prepare it for ANC use. A description of all utilities within the project area is included in the RPMP PEA; extensive study and coordination with utility providers was completed to identify all utilities within the action area.

3.11.2 Threshold of Significance

The threshold of significance for utility impacts would be exceeded if the alternative would result in an increase in demand requiring substantial utility improvements. Long term disruption of utilities in the neighboring areas would also result in an impact and would exceed the threshold of significance.

3.11.3 Environmental Consequences

3.11.3.1 Relocate Operations Complex Alternative (Preferred)

The potential impact of the Preferred Alternative on utility services would be positive in the long term. All utilities would be updated and installed underground, providing dependable service into the future for AFM, Foxcroft Heights and ANC.

The Preferred Alternative would not spur future growth and development and would not create an undue burden on consumption of utility services. The cemetery's requirements for utility service are minimal. The underpass would be constructed below the existing Columbia Pike corridor. The future design – which would include input from Arlington County, VDOT, and FHWA – would provide suitable dimensions to accommodate a utility corridor within a reasonable ROW width that does not unduly impact the primary objective of increasing the Cemetery's burial capacity. In addition, because water-, sanitary sewer- and stormwater-related utilities would otherwise require the most space in the corridor, those utilities would remain within the Cemetery, or relocated at Army's expense, as appropriate, avoiding the possibility of constraining the utility corridor. Specific design dimensions and criteria are ongoing and outside the scope of this EA.

In the short term, temporary disruptions during construction may be needed. All efforts would be taken to prevent impacts to existing utilities during construction and relocation work. To the extent possible, the utility companies would provide notice of an interruption and its expected duration to all affected customers (AFM, Foxcroft Heights, etc.) prior to performing the work. The following is a list of utility providers that may be affected during the construction of the Southern Expansion:

- Natural Gas – Washington Gas
- Sanitary Sewer – Arlington County
- Water – Arlington County, U.S. Government
- Electric (overhead and underground) – Dominion Virginia Power
- Communications: Verizon, Jones, Pentagon, Fiberlite, Arlington County
- Steam: Pentagon, JBMHH

A utility corridor would be designed to place, to the extent possible, all utilities that would service ANC within a specific underground location. The corridor would incorporate a subsurface design and would provide the following benefits:

- Maximize interment space.
- Minimize interruptions to ceremonies.
- Minimize impacts on the day-to-day operations when maintenance or utility work is needed.
- Avoid or minimize impacts to visitor use and experience.

Standard utilities mentioned previously would be required for the Operations Complex relocation; no special utilities would be needed. If placing all utilities in a subsurface utility corridor is not practical, all efforts would be taken to minimize any additional land required. The utility design would be developed to incorporate the remaining utilities that could not fit within the corridor. All efforts would be taken to design a location that would ensure access for future maintenance and minimize disruption to ANC operations.

The current and future land use would not create a new burden on consumption of local or regional utility services, nor would the cemetery development have a cumulative effect when considering other private development projects occurring within Arlington County.

3.11.3.2 Maintain Operations Complex with Underpass Alternative

The benefits and impacts under this alternative would be similar to those under the Preferred Alternative. Although there would be less utility design required for this alternative – since there would be no Operations Complex relocation – there would still be utility construction to realign utility corridors.

3.11.3.3 Maintain Operations Complex without Underpass Alternative

The benefits and impacts under this alternative would be similar to those under the previous alternative.

3.11.3.4 No Action Alternative

Under the No Action Alternative, there would be no changes to utility service demand requiring substantial improvements because there would be no comprehensive development of the Southern Expansion site.

3.12 Solid Waste

Solid waste is regulated under federal, state, and local laws. The Resource Conservation and Recovery Act (RCRA) Subtitle D is the federal law that governs the collection, treatment, storage, and disposal of non-hazardous solid waste. The Commonwealth of Virginia has its own solid waste management regulations that establishes standards and procedures to protect the public health and safety, and the environment.

3.12.1 Affected Environment

ANC manages its waste under an Integrated Solid Waste Management Plan (ISWMP). The objectives of the plan are to reduce, reuse, or recycle solid waste to the maximum extent possible. The plan emphasizes source reduction and identifies opportunities for additional recycling such as composting leaves on site. Solid waste generators at ANC include the administrative facilities, maintenance activities, and visitors. Yard waste and floral debris make up most of ANC's waste.

ANC has a robust recycling program and submits annual recycling reports to Arlington County. Materials such as general office waste, yard waste, metals, used tires, and wood pallets are collected and recycled off-site by private contractors. In 2011, ANC recycled nearly 1,800 tons of materials including yard waste, scrap wood, cardboard, truck batteries, and oil filters. The current diversion rate, i.e. the percentage of nonhazardous solid waste that is diverted from entering a disposal facility (landfill), is approximately 75%.[107]

3.12.2 Threshold of Significance

The threshold of significance for solid waste impacts would be exceeded if the alternative would cause the diversion rate of ANC's nonhazardous solid waste to drop below 50%.

3.12.3 Environmental Consequences

3.12.3.1 Relocate Operations Complex Alternative (Preferred)

The Southern Expansion site, once operational, would be part of the same ISWMP. The number of burials per year essentially would remain unchanged even with the proposed increase in capacity. There would be no noticeable increase in the amount of solid waste produced from daily operations.

Construction activities would generate additional waste. In accordance with Army Regulation 420-1, construction contracts would include a performance requirement to divert a minimum of 50% of construction waste from landfill disposal. Contractors would also be required to submit a construction and demolition waste management plan.

Due to diversion and recycling requirements in Army and ANC policies, and the adherence to the ISWMP, the Preferred Alternative would not cause a reduction in the diversion rate to less than 50%.

3.12.3.2 Maintain Operations Complex with Underpass Alternative

Solid waste management for cemetery operations would be the same under this alternative. The ISWMP would apply to the cemetery expansion regardless of the amount of acreage and burial capacity. The cemetery would continue to follow the ISWMP to achieve its goals and objectives.

3.12.3.3 Maintain Operations Complex without Underpass Alternative

Solid waste management for cemetery operations would be the same under this alternative. The ISWMP would apply to the cemetery expansion regardless of the amount of acreage and burial capacity. The cemetery would continue to follow the ISWMP to achieve its goals and objectives.

3.12.3.4 No Action Alternative

Under the No Action Alternative, there would be no changes to the diversion rate of ANC's nonhazardous solid waste.

[107] U.S. Army Corps of Engineers, Norfolk District, 2014. Programmatic Environmental Assessment for the Arlington National Cemetery Real Property Master Plan. Prepared by HNTB Corporation.

3.13 Hazardous Materials and Waste

3.13.1 Affected Environment

3.13.1.1 Navy Annex Property/FOB2

The Navy Annex/FOB2 complex consisted of the Federal Office Building 2, surface parking lots, and the Navy Exchange (NEX) Service Station. The site contains potential environmental impacts due to its historical use, including potential releases related to underground storage tanks (UST), aboveground storage tanks (AST), transformers containing PCBs, lead-based paint (LBP), and asbestos-containing material (ACM). Previous studies and investigations have evaluated these potential releases. Various remedial activities have been undertaken to mitigate environmental impacts from known releases.[108]

The Navy Annex/FOB2 site first appeared on the federal facilities docket in 2000 as a reporting requirement under RCRA Subtitle C Section 3010 – Notice of Subtitle C activity[109] – and remains on the list as of October 2016.[110] The listing likely is related to waste generation processes that occurred during active operation of the FOB2 complex, in accordance with RCRA reporting requirements. A portion of FOB2 was demolished in 2005 to allow for the construction of the AFM. The remainder of the office building and all associated facilities, i.e. parking lots and NEX service station, were demolished in 2013.

A 2009-2011 pre-demolition hazardous materials survey of the Navy Annex property assessed the presence of hazardous materials related to the operation of an office complex and service station. An Environmental Baseline Survey (EBS) report was also prepared to assess existing conditions of the area and determine the potential for past and present contamination. The largest source of hazardous substances on the Navy Annex site was petroleum products associated with emergency backup electrical generators (fuels) and the NEX service station. Diesel, bio-diesel, E-85 ethanol blend, and gasoline were stored in above-ground and underground storage tanks (ASTs and USTs).

An EA for the Land Transfer Plan for the Navy Annex/FOB2 property was completed in 2011. The EA analyzed potential environmental impacts related to the property transfer from the Secretary of Defense to the Secretary of the Army for the proposed ANC expansion.

A Memorandum of Agreement (MOA) concerning the transfer of the Navy Annex property from WHS indicated that remediation activities for hazardous materials, pollutants, and contaminants including petroleum were to be completed by WHS. The transfer of the Navy Annex property was completed in 2012.

The demolition of the FOB2 complex was completed in 2013. Hazardous materials abatement was completed in conjunction with the demolition activities. All underground storage tanks (USTs) and impacted soils were also decommissioned, removed, and properly disposed in accordance with state and federal laws.

Following the 2013 demolition, WHS performed an assessment of building demolition debris in the soil. Debris areas with ACM were found on the South Parking and NEX parcels, as shown in **Figure 3-12**.

[108] HNTB Corporation, April 2017. Environmental Investigation Findings Report – Arlington National Cemetery Southern Expansion. Prepared by Hana Engineers and Consultants, LLC.
[109] Section 3010 of Subtitle C of the RCRA requires any person who generates, transports, or recycles regulated wastes or who owns or operates a facility for the treatment, storage, or disposal of regulated wastes to notify the U.S. Environmental Protection Agency of their activities, including the location and general description of the activities and the regulated wastes handled.
[110] Most recent date of the complete Federal Agency Hazardous Waste Compliance Docket listing.

Figure 3-12
Demolition Debris Sites

LEGEND

- Arlington National Cemetery
- Demolition Debris Sites
- Proposed Roadway Alignment
- Areas of Cut (preliminary)
- Areas of Fill (preliminary)

Arlington National Cemetery Southern Expansion

Environmental Assessment

N

0 125 250 500 Feet

Numerous excavations and test pits were installed to characterize the nature and extent of potential debris including suspected ACM.[111]

In 2014, WHS conducted limited soil remediation of ACM at the South Parking and NEX sites. The work was described as removal and disposal of asbestos and debris to a depth of 12 feet below grade and was executed as a partial removal of debris greater than one inch. Based on a review of available documentation, the remedial approach was a combination of excavation and sifting procedures. The project began in September 2014 and was completed in January 2015. According to project reports, waste streams included both non-friable and friable ACM.[112]

Additional soil sampling was performed in 2016 to further characterize hazardous constituents, including ACM, and check for potential environmental impacts that may affect the design and construction of the ANC Southern Expansion. The 2016 investigation indicated low levels of some chemical contaminants in the soil – arsenic, chromium, and polycyclic aromatic hydrocarbons (PAH) – but the potential risk posed to human receptors was determined to be low. The metals – arsenic and chromium – are naturally occurring in the soil at the levels identified at this site. PAHs are common in urban environments; they are found in asphalt, diesel fuel, and many other petroleum products.[113] In addition, the investigation found remnants of demolished structures and associated construction debris from the Navy Annex demolition, including ACM. The most common materials containing asbestos included floor tiles, roofing materials, window caulking and glazing, insulation materials, and siding.

3.13.1.2 Operations Complex

The Operations Complex facility uses and stores hazardous materials to conduct day-to-day operations.

- Hazardous materials associated with the existing buildings including: ACM; lead-based paint (LBP); polychlorinated biphenyls (PCB) caulking; fluorescent light fixtures; smoke alarms; electrical transformers; heating, ventilation, and air-conditioning (HVAC) units; hydraulic lifts; fire extinguishers; and, stored petroleum, oils, and lubricants (POL) and other chemicals.
- Contaminated soil is present within the Operations Complex and is thought to be associated with a former pump house, oil sheds, and garage. Soil samples collected from two locations indicated elevated detections of PCB and SVOCs. A Site Inspection (SI) report recommended No Further Action for soil contamination provided the Operations Complex remained in place, i.e. paved, and no future soil disturbance would occur.
- Additional groundwater investigation is planned in 2018. The groundwater investigation is being conducted in accordance with the SI process as a federal facility under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The results will be used to determine if additional investigation or remedial action is needed. The CERCLA process will be conducted in coordination with VDEQ and EPA.

[111] Asbestos is a mineral fiber that occurs in rock and soil. Asbestos fibers may be released into the air by the disturbance of asbestos-containing material during product use, demolition work, building or home maintenance, repair, and remodeling. In general, exposure may occur only when the asbestos-containing material is disturbed or damaged in some way to release particles and fibers into the air.

[112] Friable means that the material can be crumbled with hand pressure and is therefore likely to emit fibers. The fibrous fluffy sprayed-on materials used for fireproofing, insulation, or sound proofing are considered to be friable, and they readily release airborne fibers if disturbed. Materials such as vinyl-asbestos floor tile or roofing felt are considered non-friable if intact and generally do not emit airborne fibers unless subjected to sanding, sawing and other aggressive operations. Asbestos-cement pipe or sheet can emit airborne fibers if the materials are cut or sawed, or if they are broken. U.S. Department of Labor, Occupational Safety and Health Administration.
https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10870

[113] Zoeckler, Jeff, HANA Engineers and Consultants, May 2018. Personal communication.

- Other potential sources of hazardous substances include closed/removed USTs, aboveground storage tanks (ASTs), oil-water separators (OWS), and associated piping. A records review indicated no leakage from any of these potential sources.

Records indicated all ACM and LBP was previously abated at the older Operations Complex buildings, and there are no obvious signs of ACM or LBP. The recently constructed buildings on the eastern portion of the Operations Complex are not expected to contain ACM or LBP. Additional visual inspection and/or sampling, if needed, may be conducted during design to verify whether these substances are present.

3.13.2 Threshold of Significance

The threshold of significance for hazardous materials and waste impacts would be exceeded if the alternative resulted in a substantial increase in hazardous waste generation. A substantial increase would occur if the amount of hazardous waste generated would cause ANC to be reclassified from a very small quantity generator (formerly conditionally-exempt small quantity generator - CESQG) to a small quantity generator (SQG) or large quantity generator (LQG). The threshold of significance would also be exceeded if the proposed action resulted in violations under RCRA, CERCLA, or other applicable laws.

3.13.3 Environmental Consequences

3.13.3.1 Relocate Operations Complex Alternative (Preferred)

The Preferred Alternative would not cause a substantial increase in the amount of hazardous waste generated at ANC. The Operations Complex is the primary location for hazardous material storage and use including: aerosols, paint thinners, paints, batteries, fluorescent bulbs, oils/greases, mercury-containing equipment, asbestos, lead-based paint, anti-freeze, pesticides, and fuel. The storage and use of these materials would remain at the relocated Operations Complex. The quantity of hazardous materials used at the Operations Complex is not expected to increase due to the relocation. The expansion area would likely require the use of pesticides or herbicides as well as the use of maintenance vehicles, but maintenance on this area would be a small component, relative to the entire cemetery. A full inventory of hazardous materials would be completed prior to demolition of the Operations Complex. ANC's Hazardous Material and Hazardous Waste Management Plan would apply to the Southern Expansion site upon completion of the cemetery construction. ANC does not anticipate the incremental increase in the cemetery's area and the associated maintenance required to exceed the threshold and thereby require a reclassification from a CESQG to a SQG or LQG.

Navy Annex/FOB2

The Navy Annex/FOB2 portion of the Southern Expansion is listed on the federal facilities docket. Several previous site assessments were conducted including a 2016 soil investigation which evaluated risk to human health and the environment from property contamination. The results of past site investigations are being incorporated into a Site Inspection (SI) report in accordance with the Defense Environmental Restoration Program (DERP)[114] and CERCLA. Precautions and/or mitigation procedures may be required during construction activities, ensuring workers and the public are protected from hazardous substances, if encountered. The SI report, including any proposed mitigation procedures, will be reviewed by the VDEQ and EPA.

[114] DERP was formally established by Congress in 1986 and provides for the cleanup of Department of Defense sites under the jurisdiction of the Secretary of Defense. Eligible sites include those contaminated by past defense activities that require clean-up under CERCLA and certain corrective actions required by RCRA.

Following the DERP process would ensure the Proposed Action would not result in a violation under CERCLA.

A comprehensive development would require large-scale removal or disturbance of surface and subsurface soil, and groundcover under the Preferred Alternative. The potential for disturbance of ACM-contaminated soil remains at the locations shown on Figure 3-12 even though the fully executed MOA assumed the former Navy Annex site was free of all hazardous materials or contamination from the previous use. In addition, the areas currently occupied by Southgate Road and the portions of Columbia Pike to be relocated potentially contain ACM from steam pipe insulation.

The cemetery design would seek to avoid excavation in the areas with potential contamination in order to minimize the potential disturbance of ACM-contaminated soil. Much, if not all, of the buried ACM is found in areas where fill material is proposed as shown on Figure 3-12. If the buried debris and/or ACM-contaminated soil is disturbed during future construction or other land disturbing activities, e.g. utilities, special procedures would be warranted and a specific site safety and health plan would be required to specifically address asbestos hazards in accordance with applicable asbestos regulations, including National Emissions Standards for Hazardous Air Pollutants (NESHAP)(40 CFR Part 61, Subpart M)[115] and Occupational Safety and Health Administration (OSHA)(29CFR1910).[116] The plan would outline steps to be taken by construction or remediation contractors onsite to minimize exposure to asbestos, and control/reduce spread of asbestos fibers, list training requirements for all personnel onsite, and provide a description of air monitoring activities during soil disturbance work. Sampling of personnel and perimeter air samples would be performed during all soil disturbance activities in the South Parking and NEX Service Station parcels.[117] Any soil or sediment that is suspected of contamination, including petroleum contamination or wastes that are generated during construction-related activities, would be tested and disposed of in accordance with applicable federal, state, and local laws and regulations.

Operations Complex

The elevated levels of PCBs and SVOCs in soil samples from the Operations Complex could present a potential risk to humans, if exposed. Development of a work plan, health and safety plan, and environmental protection plan, and worksite inspections during construction, would minimize potential risk. Contaminated soil may prompt specific handling and disposal requirements if this material were encountered during demolition and grading. The specific soil handling requirements will be determined in the design phase, based on the results of the sampling. Special procedures during construction, if required, may include air monitoring, dust suppression, personal protective equipment, soil segregation, and off-site disposal of soil at a licensed facility.

3.13.3.2 Maintain Operations Complex with Underpass Alternative

The potential impacts from this alternative would be similar to those under the Preferred Alternative. There would be no relocation or disturbance of the Operations Complex, so any environmental concerns would be addressed under ANC's ongoing environmental programs.

[115] U.S. Environmental Protection Agency https://www.epa.gov/asbestos/asbestos-neshap
[116] Occupational Safety and Health Administration, accessed September 2016. https://www.osha.gov/SLTC/asbestos/standards.html
[117] HANA Engineers and Consultants, LLC. December 2016. Environmental Investigation Findings Report, Arlington National Cemetery Southern Expansion. Unpublished report.

3.13.3.3 Maintain Operations Complex without Underpass Alternative

The potential impacts from this alternative would be similar to those under the Preferred Alternative. There would be no relocation or disturbance of the Operations Complex, so any environmental concerns would be addressed under ANC's ongoing environmental programs.

3.13.3.4 No Action Alternative

Under the No Action Alternative, there would be no comprehensive development and no increase in the generation of hazardous waste and minimal or no potential for disturbing contaminated soil on the former Navy Annex property if the site is used for stockpiling and/or laydown areas. There would be no relocation or disturbance of the Operations Complex, so any environmental concerns would be addressed under ANC's ongoing environmental programs.

3.14 Visual and Aesthetic Resources

3.14.1 Affected Environment

The action area for Visual and Aesthetic Resources consists of all areas visible from the existing cemetery, and areas visually affected by the cemetery expansion, including roadway relocations, and residual land areas. It includes all areas of temporary and permanent impact, including construction staging areas, which would be located within the project site. As described previously, the affected environment consists of approximately 70 acres, most of which is open maintained field; however, it also includes existing roadways, the AFM, and the Operations Complex. The AFM, a prominent landmark approximately 3 acres in size that can be seen for miles, sits near the middle of the property overlooking an east-facing slope. The existing trees in the action area are either planted or pioneer species – not remnants of natural forests – that provided screening for the Navy Annex facilities. The section of Columbia Pike that passes through the action area is proposed to be one of the last in a series of multimodal street improvement projects.

A viewshed study was prepared to identify a preliminary visual APE, historic resources within that visual APE, and vantage points for analysis for the Preferred Alternative. Using a high-resolution Digital Elevation Model (DEM), the study identified specific vantage points from which the Southern Expansion site would be visible. **Photo #s 6-9** depict various views from the Southern Expansion site.

Photo 6: View to East from Foxcroft Heights Park to the former Navy Annex site.
(HNTB photo)

Photo 7: View from Columbia Pike (near ANC Service Complex) looking west toward AFM with vehicle on South Joyce Street. *(HNTB photo)*

Photo 8: View from Southgate Road, looking south toward former Navy Annex site. The visible antenna at top of photo is located on the VDOT Maintenance Complex. *(HNTB photo)*

Photo 9: View of Southgate Road looking east with the Pentagon in the background. *(HNTB photo)*

3.14.2 Threshold of Significance

The threshold of significance would be exceeded if the project would diminish the integrity of a historic resource or an individual contributing historic resource of the ANC Historic District, to the point where the cemetery would no longer qualify for NRHP listing. The threshold would also be exceeded if it would result in a substantial shift in the planned architectural or landscaping for the cemetery, or its viewshed became incompatible and out of context with the existing cemetery.

3.14.3 Environmental Consequences

3.14.3.1 Relocate Operations Complex Alternative (Preferred)

Maintaining the aesthetic and historical integrity of ANC is a key goal of the site design. Crafting the sightlines into and from ANC requires careful consideration. This section describes conceptual layout details, not a final design. The following descriptions, therefore, are intended as a general description of what the site may include, rather than an actual design.

Grading and Planting: Topography and plant material are the two key elements that would shape views. Generally, the target grades of the site would be a 2-7% slope, and maximum grades are not anticipated to exceed 10%. Once graded, the site would have no or few remaining trees. The entire site was assessed for "rescue and reuse" of trees that otherwise would be cleared during the land clearing operation. Select trees were located, studied, tagged, and mapped. Some trees will be candidates for reuse/transplanting during final planning and design; some may remain in place and protected during construction.

There would be a permanent change in the viewsheds along the hillsides south of Southgate Road, and along the southeastern roadsides of Columbia Pike, due to the necessary loss of trees and the changes in grading. However, the clearing would be temporary: a planting plan including a great number of trees, shrubs, and herbaceous vegetation, to include manicured lawns, would be established that balances the historical and aesthetic character of ANC with burial yields. The plan will be contained in the final design and will adhere to Level II arboretum standards.

AFM: The AFM, which is currently separated from the surrounding open fields by fences and steep topography, would be incorporated into the Cemetery design. The site's existing topography would be modified to enable the connection of pedestrian access to the AFM from the cemetery and Columbia Pike.

Operations Complex: The Operations Complex would be removed from its existing location – within the ANC boundary adjacent to burial grounds – to a location south of Columbia Pike and adjacent to the existing VDOT maintenance facility, which contains similar industrial use buildings.

Site features: When complete, the site would contain internal roadways for processional and other traffic circulation. The existing boundary wall would be removed except for the South Gate and a small portion of wall on either side. Loop roads are planned conceptually to provide vehicular and pedestrian access to the interior of the site, and to improve internal circulation. The existing Patton Drive between South Gate and Eisenhower Drive would be converted to a pedestrian path.

The cemetery expansion would include some combination of the following: columbaria and/or niche walls, in-ground pre-placed crypts, committal service shelters, service buildings, restrooms, sidewalks, stormwater treatment facilities, and other attendant features. **Photo #s 10-12** provide examples of some of these features:

Photo 10: View of Columbarium Court. *(HNTB photo)*

Photo 11: View of niche wall at cemetery perimeter. *(HNTB photo)*

Photo 12: View of committal service shelter. *(HNTB photo)*

Screening: The Southern Expansion site extends ANC into the community and creates new edge conditions. It would juxtapose the cemetery next to private dwellings, roadways, highways, and the VDOT maintenance facility. These land uses present conditions that could be disruptive to the graveside experience without careful planning. Currently, as the Southern Expansion site is very open, surrounding land uses are mostly visible from within the site. To address these widely varying edge conditions and activities outside of the project boundaries, robust screening and viewshed management would be needed. For both screening and security purposes, a new boundary wall would be required around the perimeter of the Southern Expansion site. Landscaping and shaping of the land for screening purposes would also be incorporated into the final design.

Proposed roadway realignments: The existing Southgate Road would be closed as a public street and redeveloped as part of the cemetery. The proposed improvements to Columbia Pike and the addition of the South Nash Street would be constructed in keeping with the previously upgraded sections of Columbia Pike, with sidewalks and tree planting alongside the road. Overhead utility lines along roadway corridors would be removed and placed underground. The Columbia Pike corridor would become a more attractive and modernized roadway. The South Nash Street would be a new two-lane road on a new alignment east of the Foxcroft Heights neighborhood and would be visible to its residents along South Oak Street. However, landscape buffering along the roadways and/or along the perimeter of ANC could be designed to present attractive views for the homeowners while establishing appropriate separation for interment and visitation privacy. The new South Nash Street would allow for efficient circulation of buses and other commercial vehicles servicing the Sheraton Hotel to minimize vehicular impacts on Foxcroft Heights streets.

Temporary effects: Construction activity would occur within the entire action area. Heavy equipment would be used for many features of the roadway construction and cemetery expansion. Construction materials would be staged onsite. All of this would represent a temporary impact to aesthetic and visual resources.

Permanent effects: The AFM and the slope that it sits upon serve as a visual wedge separating the eastern and western areas of the Southern Expansion Site. This works to an advantage to obscure the southwest quadrant from view (the area of the proposed Operations Complex in Preferred Alternative), and to visually interrupt the interment area within the Southern Expansion Site. This provides a future benefit whereby more than one interment would be able to occur simultaneously within the Southern Expansion.

Also, the removal of the Operations Complex from the current location in Preferred Alternative would provide an uninterrupted view of the existing ANC interment area to the north from the AFM and the southeast quadrant. This is important as it conforms to the character of the cemetery as an important feature of its historic district designation:

> Under Criterion C of the NRHP, the ANC historic district reflects "design characteristics associated with the picturesque/rural cemetery movements or the establishment of national cemeteries" and a picturesque landscape of gently rolling hills following natural contours in an important aspect of the design (Smith et al. 2014).

Based on this analysis, the Preferred Alternative would provide the most visual continuity between the Southern Expansion Site and the existing cemetery, mainly due to the removal of the Operations Complex from its current location. The proposed new location of the Operations Complex in Preferred Alternative would be partially obscured from view from most observation locations in the interment area.

The viewshed study concluded that no adverse effects are anticipated, either on the surrounding area or the historical views or vistas within or outside of the cemetery that contribute to its NRHP status. The viewshed as it relates to Section 106 was discussed in Section 3.7, *Cultural Resources* and would also be addressed through the Section 106 process.

All measures to preserve aesthetic quality would be carefully designed and maintained so that they are fully compatible with the project purpose and would not compromise the safety, integrity, or function of the project. The final conceptual plans would be subject to review and approval by the NCPC – the central federal planning agency whose mission is to preserve the important historical and natural features of the National Capital Region – and the CFA, which focuses on design details for public and private properties in the National Capital as they affect the federal interest and preserve the dignity of the nation's capital.

3.14.3.2 Maintain Operations Complex with Underpass Alternative

Under this alternative, the cemetery design would include the same visual features discussed under the Preferred Alternative. The Operations Complex would remain at its current location and partially obscure the view of the existing cemetery to the north from the Southern Expansion site.

The Maintain Operations Complex with Underpass Alternative would also include the benefit of the AFM and the sloping terrain serving as a visual wedge separating the eastern and western areas of the Southern Expansion Site. This visual interruption would allow more than one interment to occur simultaneously within the Southern Expansion.

3.14.3.3 Maintain Operations Complex without Underpass Alternative

Under the Maintain Operations Complex without Underpass Alternative, the impacts and benefits would be similar to those discussed under the previous alternative. The lack of an underpass would not add to or detract from the viewshed.

3.14.3.4 No Action Alternative

The No Action Alternative would not change the existing viewshed into and out of the cemetery. The location and design of the existing roadway system would remain.

3.15 Issues Considered but Eliminated from Detailed Discussion

Resources not present and, therefore, not relevant to the discussion and decision-making include: wetlands, wild and scenic rivers; fisheries; floodplains; unique ecosystems, biosphere reserves, or world heritage sites. The rationale for dismissing these impact categories follows.

- Wetlands – there were no jurisdictional wetlands observed within the Southern Expansion site.
- Wild and scenic rivers – there are no nationally-designated wild or scenic rivers in Virginia.
- Fisheries – The Fish and Wildlife Coordination Act, as amended, requires federal agencies to consult with the U.S. Fish and Wildlife Service and the fish and wildlife agencies of States where the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted . . . or otherwise controlled or modified" by any agency under a federal permit or license." Consultation is to be undertaken for "preventing loss of and damage to wildlife resources." However, since there are no wetlands or surface waters within the action area, none of these resources are present, and no coordination is necessary.

- Floodplains – there are no FEMA-designated 100-year floodplains on or within the Southern Expansion site.
- Unique ecosystems, biosphere reserves, world heritage sites – unique ecosystems and biosphere reserves are areas of terrestrial or coastal ecosystems which are internationally recognized. World heritage sites are unique cultural, natural, or mixed properties recognized by the World Heritage Committee as having outstanding universal value. There are no such sites in Virginia.

3.16 Other NEPA Considerations

3.16.1 Unavoidable Adverse Impacts

Implementing the Proposed Action would result in unavoidable temporary adverse environmental effects. Any construction would create temporary increases in noise, dust and vehicle emissions, sediment, potential loss of wildlife habitat, limited utility service interruptions, and changes to the visual landscape.

The project would be subject to the Fugitive Dust/Fugitive Emissions Rule (9 VAC 5-50-60, *et seq*) during construction. Any use of special incineration devices in the disposal of land clearing debris would be subject to the Open Burning Regulation (9 VAC 5-130-10, *et seq*). Asphalt paving using "cut-back" asphalt (liquified asphalt cement, blended with petroleum solvents) has time-of-year restrictions on its use. The project construction would comply with "cut-back" asphalt limitations under regulation 9VAC5-130 *et seq*.

The installation and use of ASTs (> 660 gallons) for temporary fuel storage (> 120 days) during construction would follow the requirements in 9 VAC 25-91-10 *et seq*. Any USTs uncovered during construction would be reported to VDEQ, as appropriate. Any petroleum releases during construction would be reported to VDEQ as required by 9 VAC 25-580-10 *et seq*. All structures being demolished or removed would be checked for ACM and LBP prior to demolition. Removal and disposal of these materials would follow federal waste-related regulations and state regulations 9 VAC 20-81-640 for ACM and 9 VAC 20-60-261 for LBP.

These temporary adverse effects would be localized and restricted to the construction site. The effects would be minimized or mitigated by adhering to federal-state-local regulations and by using BMPs. Some impacts, such as those related to construction, would cease at the completion of the project. While these impacts cannot entirely be eliminated, they can be minimized or mitigated to acceptable levels.

Noise encroachment from aircraft, especially helicopters, is an unavoidable condition of the existing environment, but is not a function of any part of the Proposed Action. In a separate action, the 2017 NDAA has directed the DoD, working with the FAA, to reevaluate air traffic control, air space design, airspace management, and the types of aircraft in operation, to address helicopter noise problems in the Washington D.C. metro area.

Typical noise levels for construction vehicles and equipment range from a 75 dBA to greater than 90 dBA according to a complete list of construction equipment noise emission levels included and discussed in the RPMP PEA.[118] Arlington County has a noise control ordinance and limits construction noise to 90 dBA for certain land uses during daytime hours; construction at the Southern Expansion would adhere to these limits. Furthermore, ANC policy mandates adherence to this regulation.[119]

[118] Programmatic Environmental Assessment for the ANC Real Property Master Plan, 2014. Page 3-17.
[119] *Ibid*.

3.16.2 Relationship of Short-Term Uses and Long-Term Productivity

The relationship between short-term uses of the human environment and enhancement of long-term productivity involves trade-offs and changes to environmental characteristics. Short-term uses generally occur on an annual basis, e.g. timber production or agricultural use, although these are not a priority for military planners. Either of these short-term uses would be lost to a developed setting. The loss of these short-term uses would yield long-term productivity for the regional economy, with increases in employment and continued opportunity to provide a unique and peaceful visitor experience.

The Proposed Action would create a temporary disturbance of transportation mobility during construction of the proposed roadways. The land in the Southern Expansion site available for development is currently vacant; there are no natural resource production activities nor are there any development plans other than cemetery use. Any development would be unlikely to occur here other than cemetery development due to the roadway configuration and parcel ownership. The long-term productivity of this site is best served by expanding the cemetery to provide a peaceful and beautiful final resting place for our fallen soldiers that is commensurate with their service for our Nation.

3.16.3 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (such as energy or minerals) that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored because of the action (such as the disturbance of a cultural resource site).

Most resource commitments under the Proposed Action are neither irreversible nor irretrievable. Most impacts are short-term and temporary, or longer lasting but negligible. Implementation of the Proposed Action would, however, require the use of energy to construct the roadways and cemetery facilities, and for natural resources management activities. This energy would be in the form of fossil fuels and would be used as these activities continue. The amount of energy consumed is not expected to be locally or regionally significant. The potential loss of wildlife habitat, as it presently exists, and the deconstruction of the historic boundary wall and integration of the AFM as part of the Proposed Action are irretrievable resource commitments. The impacts associated with the Proposed Action are not significant.

3.16.4 Climate Change and Greenhouse Gas (GHG) Emissions

In 1988, the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) to assess scientific research related to climate change. The IPCC provides policymakers of all countries with periodic evaluations regarding the scientific basis of climate change, its potential impacts and risks, and alternatives for minimizing and mitigating the impacts.

In the United States, the U.S. Global Change Research Program[120] defines "climate change" as:

> "Changes in average weather conditions that persist over multiple decades or longer. Climate change encompasses both increases and decreases in temperature, as well as shifts in precipitation, changing risk of certain types of severe weather events, and changes to other features of the climate system."[121]

Executive Order 13783 (2017) revoked previous executive actions and postponed regulatory initiatives to eliminate industry performance standards that would reduce manmade GHG emissions.

There is no established quantity of GHG emissions as a threshold of significance that would affect the quality of the human environment or that would place a greater emphasis on the effects of GHG emissions and climate change over other effects on the human environment.

For the Preferred Alternative, the *FHWA Infrastructure Carbon Estimator*[122] tool was used to quantify an estimate of annual GHG emissions from constructing a new roadway (South Nash Street) and realigning Columbia Pike. Assuming 2.25 lane-miles of road construction annualized over a 40-year period for construction and periodic maintenance, the roadway portion of this project would contribute approximately 30 metric tons of GHG emissions annually.[123] The estimated emissions include energy and fuel used in raw materials extraction and transportation; materials production and transportation to the site; fuel for construction equipment; and fuel used in routine maintenance (including equipment used for vegetation management and snow removal).

Under the Clean Air Act, the Federal government has recently enacted new regulatory initiatives to reduce carbon emissions affecting several sectors of the economy – municipal solid waste landfills, oil and natural gas industry, and transportation mobile sources. When compared to EPA's proposed reduction goals for these three sectors alone – millions of metric tons – the current action's estimate of producing 30 metric tons of CO_2 annually, although an increase, would be indiscernible on a regional or national level.

Sea level rise is another potential consequence of global climate change and GHG emissions. As the atmosphere warms, ocean water warms causing the ice caps to melt. Both the increase in water and the water temperature (warm water expands) could cause the sea level to rise.

The National Oceanic and Atmospheric Administration's (NOAA) Office of Coastal Management has developed an online geographic information planning tool – *Digital Coast* – for local coastal planners, managers, and decision-makers. The website has a do-it-yourself visualization tool[124] to view predicted flooding from potential sea level rise to six feet above the mean high water. Although the Southern Expansion site is located within a coastal zone community, it would not be at risk of inundation from rising sea levels.

3.16.5 Regulatory Compliance

Table 3.5 lists the environmental protection statutes and other environmental requirements and the level of review compliance in this document.

---

[120] The U.S. Global Change Research Program (USGCRP) was established by Presidential Initiative in 1989 and mandated by Congress in the Global Change Research Act (GCRA) of 1990 to "assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change."
[121] http://www.globalchange.gov/climate-change/glossary#Climate_change
[122] https://www.fhwa.dot.gov/environment/climate_change/mitigation/tools/
[123] A typical passenger vehicle in the U.S. emits 4.7 metric tons of CO2 annually.
[124] https://coast.noaa.gov/slr/

Table 3.5

Compliance with Federal Statutes

Federal Statutes	Level of Compliance
American Bald and Golden Eagle Act	Full Compliance
Anadromous Fish Conservation Act	N/A
Archeological and Historic Preservation Act	Full Compliance
Clean Air Act	Full Compliance
Clean Water Act	Full Compliance
Coastal Barrier Resources Act	N/A
Coastal Zone Management Act	Full Compliance
Comprehensive Environmental Response, Compensation, and Liability Act	Full Compliance
Endangered Species Act	Full Compliance
Estuary Protection Act	N/A
Federal Water Project Recreation Act	N/A
Fish and Wildlife Coordination Act	N/A
Flood Control Act	Full Compliance
Land and Water Conservation Fund Act	Full Compliance
Magnuson-Stevens Act	N/A
Marine Mammal Protection Act	N/A
Migratory Bird Treaty Act	Full Compliance
National Historic Preservation Act	In Process of Compliance
National Environmental Policy Act	Full Compliance
Noise Control Act	Full Compliance
Resource Conservation and Recovery Act	Full Compliance
Rivers and Harbors Act	Full Compliance
Safe Drinking Water Act	Full Compliance
Toxic Substances Control Act	Full Compliance
Watershed Protection and Flood Prevention Act	Full Compliance
Wild and Scenic Rivers Act	N/A
Protection and Enhancement of Cultural Environment (EO 11593)	Full Compliance
Floodplain Management (EO 11988)	Full Compliance
Federal Flood Risk Management Standards (EO 13690)	N/A (Revoked)
Invasive Species (EO 13112)	Full Compliance
Protection of Wetlands (EO 11990)	N/A
Prime and Unique Farmlands (Memorandum, Council on Environmental Quality, 11 August 1980	N/A
Environmental Justice in Minority and Low-Income Populations (EO 12989)	Full Compliance
Planning for Federal Sustainability in the Next Decade (EO 13693)	Full Compliance
Preparing the United States for Impacts of Climate Change (EO 13653)	N/A (Revoked)
Protection of Children from Health and Safety Risks (EO 13045)	Full Compliance
Protecting and Restoring the Chesapeake Bay Watershed (EO 13508)	Full Compliance
Responsibilities of Federal Agencies to Protect Migratory Birds (EO 13186)	Full Compliance
Energy Independence and Security Act, Section 438	Full Compliance

3.17 Indirect and Cumulative Effects

The CEQ defines indirect effects as "…effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."[125] These induced actions are those that may or may not occur without the implementation of the Proposed Action.

The CEQ defines cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what other agency (federal or non-federal) or person undertakes such other actions."[126] Cumulative impacts can result from individually minor but collectively significant actions by various agencies (federal, state, or local) or individuals that take place over time. Accordingly, a cumulative impacts analysis must identify and define the scope of other actions and their relationship to the proposed action or its alternatives if there is an overlap in space and time.

The following questions were considered in identifying the potential for cumulative impacts:

- Would the proposed action affect or interact with the same resources that have been or would be affected by recent past, present, or reasonably foreseeable actions?
- Would the proposed action affect or be affected by the impacts of the other action?
- If an interrelationship exists between the proposed action and other recent past, present, or reasonably foreseeable actions, are there any potential significant impacts not identified when the proposed action is considered alone?

For this analysis, public documents prepared by federal, state, and local agencies were the primary sources of information for identifying reasonably foreseeable actions. Agency personnel were contacted to obtain information on any projects that could pose cumulative impacts when considered with the proposed action. The timeframe for cumulative impacts would start in 2006 (recent past) and continue to 2023, which would encompass the anticipated construction start date of 2020 and the reasonably foreseeable future. The geographic range for cumulative impacts at ANC would encompass the cemetery as well as the surrounding community.

The following projects, due to their proximity to ANC and/or their similarities in scope including objectives or potential impacts, along with the Proposed Action were considered for the potential to result in indirect and cumulative impacts. Short- and long-term direct and indirect impacts are presented by resource area. If the proposed action would not result in direct or indirect impacts on a resource area, then no further analysis of potential cumulative effects to that resource area is necessary.

Resources analyzed in this section are Land Use and Sustainability; Traffic and Transportation; Socioeconomics; Visitor Use and Experience; Air Quality; Water Resources; Biological Resources; and Visual and Aesthetic Resources. Resources not analyzed in this section are Noise; Topography, Soils, and Geology; Utilities; Solid Waste; Hazardous Waste; and Section 4(f) resources. Temporary construction-related impacts on natural resources management would be minimized through adherence to federal-state-local regulations, policies, and guidelines concerning protection of these resources. The State regulations include complying with VPDES permit limits and requirements for stormwater management; adopting

[125] 40 CFR 1508(a)
[126] 40 CFR 1508.7

NRCS conservation practices; implementing soil erosion control plans; using BMPs; and following hazardous waste management procedures and plans. A spill prevention plan would be implemented during construction and operations to avoid or minimize impacts associated with discharges to surface waters. Therefore, there would be no adverse impacts on these resources. **Table 3.6** summarizes the cumulative effects to resources associated with the Proposed Action and past, present, and reasonably foreseeable future projects.

Projects or Actions with Potential Cumulative Impacts on Resources

Past Actions

- Navy Annex Demolition and Land Transfer – Identified in the 1998 ANC Master Plan as suitable interment areas due to the location adjacent to the ANC boundary and existing DoD ownership. This action, completed in 2012, was the impetus behind the Southern Expansion project. The NDAA of 2000, and subsequent amendments, provided for transfer of the property, and required DoD to remove all improvements from the Navy Annex property to facilitate an expansion.

  Potentially Affected Resources: Land Use and Sustainability; Socioeconomics; Hazardous Material and Waste; and Visual and Aesthetic Resources.

- Columbia Pike Initiative (2001) and Update (2005) – Arlington County's ongoing plan called for Columbia Pike to be straightened and widened at the eastern end to accommodate the proposed cemetery expansion. The County's plan also provided strategies to improve and strengthen its community by: increasing housing options; providing greater land use densities; improving safety for pedestrians, bicyclists, transit riders, and motorists; and implementing a high-capacity multimodal transportation corridor to achieve greater mobility and accessibility.

  Potentially Affected Resources: Land Use and Sustainability; Traffic and Transportation; Socioeconomics; Air Quality; Noise; and Stormwater and Water Quality.

- Air Force Memorial – Constructed in 2005-06, the site of the AFM was authorized by Congressional legislation in the NDAA of 2000. Construction on the 3-acre site required demolition of Wing 8 of the Navy Annex.

  Potentially Affected Resources: Land Use and Sustainability; Visitor Use and Experience; Visual and Aesthetic Resources.

- Columbarium Court 9 – ANC's 1998 Master Plan projected an increased demand for niche space in the existing Columbarium Complex in Section 63 and recommended to increase its capacity. An EA was completed and approved in May 2011; the construction was completed in 2013. The action added more than 20,000 niche spaces for inurnments.

  Potentially Affected Resources: Visitor Use and Experience; Visual and Aesthetic Resources; and Land Use and Sustainability.

- Columbia Pike Transit Initiative (Arlington County) – This 2012 plan identified future improvements to provide increased mobility and accessibility for the region. The purpose of the project was to implement high-quality and high-capacity transit service in the corridor to increase capacity, enhance access to the regional transit network, and support economic development along the corridor. Three transit alternatives were developed and considered: enhanced bus transit service; articulated bus transit service; and streetcar (light-rail) transit service.

Potentially Affected Resources: Traffic and Transportation; Noise; Socioeconomics; Air Quality; and Stormwater and Water Quality.

- Columbia Pike Multi-Modal Street Improvements Transportation Study (Arlington County) – This 2012 study recognized the Columbia Pike Corridor as an integral link in the regional transportation network. The study addressed the competing demands within the limited right-of-way, from pedestrian and bicyclists to the region's robust transit service. The new Freedman's Bridge interchange at Columbia Pike and VA Route 27 (near the Sheraton Hotel) was a recently completed (2015) project discussed in the study.

  Potentially Affected Resources: Traffic and Transportation; Noise; Socioeconomics; Air Quality.

Present or Reasonably Foreseeable Future Actions

- Millennium Expansion (ANC)(Current) – The Millennium Project, currently under construction, was implemented to extend the longevity of ANC. It provides additional interment space, a columbarium, committal shelters, pedestrian sidewalks, utility relocation, a storage area, and restrooms. The project also included a stream restoration and stormwater management improvements as beneficial impacts of the action.

  Potentially Affected Resources: Aquatic Resources; Visitor Use and Experience; Land Use and Sustainability; Stormwater and Water Quality; Vegetation; and Historic/Cultural Resources.

- Funeral Procession Queuing Area (ANC)(Current) – The ANC Funeral Procession Queuing Area Project, currently under construction, was initiated to address the lack of sufficient space for funeral coaches and families to queue for committal service processions. There are multiple committal service processions queueing several times daily. Currently, committal service participants are directed to queue their vehicles along existing roadways in vicinity of the Administration Building. The lack of a dedicated committal service procession queuing area creates internal traffic congestion in an area where traffic congestion is a pressing problem. The Queuing Area would improve the current condition by providing dedicated space and an efficient method for committal processions.

  Potentially Affected Resources: Visitor Use and Experience; and Land Use and Sustainability.

- Pentagon Reservation Master Plan Update (DoD)(Current) – The 2014 Master Plan Update included specific projects and plans to maintain, enhance, and optimize Pentagon operations, including land use, circulation, safety and quality of life for employees and visitors, and environmental sustainability. The improvements and projects outlined in the Master Plan Update were intended to be implemented over a 20-year timeframe and divided into short term (0-5 years) and long term (6-20 years) phases. Projects included: improving pedestrian and bicycle circulation; implementing low impact development (LID) strategies for improving stormwater management practices; and developing a transportation management plan (TMP) to promote more efficient commuting patterns.

  Potentially Affected Resources: Land Use and Sustainability; Traffic and Transportation; Air Quality; Historic/Cultural Resources; and Socioeconomics.

- Arlington Memorial Bridge Rehab (NPS)(Future) – Arlington Memorial Bridge is more than 80 years old and has never undergone a major rehabilitation. Several temporary repairs have kept it

operational to meet the needs of the traveling public. Like many older bridges, it needs comprehensive repairs to ensure its ability to provide adequate traffic service well into the future.

The proposed Memorial Bridge project is expected to be a multi-year effort possibly starting in early 2018. The environmental analysis anticipates adverse impacts to the historic bridge structure, but the repairs and rehab would be completed in accordance with the Secretary of the Interior's Standards for Rehabilitation. Several features of the structure may be rehabbed as mitigation for the project impacts. Although there would be temporary construction impacts to traffic, noise, and air quality, the result would be a renovated structure that is fully capable of its intended use providing benefits for decades to come.

Potentially Affected Resources: Visitor Use and Experience; Traffic and Transportation; Historic/Cultural Resources; and Air Quality.

- JBMHH Low Impact Development: Bioswales and Permeable Pavement (JBMHH)(Future) – For fiscal year 2017, JBMHH is proposing various LID bio-swales and pervious paving on southern portions of the installation. The implementation of these actions is to reduce stormwater runoff and improve water quality. In addition, bio-swales and pervious paving would reduce costs of construction and life-cycle maintenance.

  Potentially Affected Resources: Land Use and Sustainability; and Stormwater and Water Quality.

- I-395 Express Lanes (VDOT)(Future) – Virginia DOT and FHWA are proposing to extend the I-395 Express Lanes (High Occupancy Toll or HOT lanes) in the City of Alexandria and Arlington and Fairfax Counties, Virginia. The project would create a third lane within the existing footprint of the HOV lanes and keep the highway's overall footprint essentially the same. The needs identified for the project included reducing traffic congestion, providing additional travel choices, improving travel reliability, and improving roadway safety.

  Potentially Affected Resources: Traffic and Transportation; Socioeconomics; and Air Quality.

- PMVEC – The proposed PMVEC would educate visitors about the memorial and the events that took place on September 11, 2001. It would serve to complement the Pentagon 9/11 Memorial. The Pentagon Memorial Fund is currently raising funds for this project. Development plans are preliminary at this time. The proposed PMVEC project has secured a parcel of land within the Southern Expansion site as shown in Figure 2-1. Reasonably foreseeable impacts are based on an assumed construction footprint of a building and a parking lot; there are no specific plans or design at this time.

  Potentially Affected Resources: Land Use, Traffic and Transportation, Stormwater and Water Quality, Viewshed, Visitor Use & Experience, and Cultural/Historic Resources.

- Freedman's Village Memorial – Arlington County has been granted a permanent easement of not less than 0.1 acre through Congressional legislation – NDAA for 2019 – for commemorating Freedman's Village to be located next to Foxcroft Heights Park. Development plans are unknown at this time.

  Potentially Affected Resources: Land Use.

- Private development in Crystal City (Amazon) – The retailer's second headquarters is anticipating 400 new jobs for Crystal City along the Route 1 corridor in 2019 and an additional 25,000 jobs

over the next 12 years. This issue was discussed at the beginning of the document in the "Update Notice."

Potentially Affected Resources: Traffic and Transportation along the Route 1 corridor, utilities, affordable housing, and school overcrowding.

Table 3.6
Cumulative Effects to Resources

All Action Alternatives – Comprehensive Development	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Cumulative Effect
Land Use and Sustainability				
The redevelopment of the Southern Expansion site would have positive impacts to land use and sustainability. The Preferred Alternative would include opportunities for sustainable design elements. The land, through planning and legislation, is expected to be part of ANC and would provide an important asset to extend the cemetery's longevity for future generations. The Preferred Alternative would not stimulate additional development. The multimodal improvements and road realignment would enhance the travel experience and connectivity between the populous Columbia Pike corridor and Pentagon City.	Past actions have improved the current conditions by reducing impervious surface areas, increasing the efficiency of municipal services by providing greater land use densities, and increasing opportunities for sustainable design. The local planning actions have facilitated the proposed improvements (realignment/ relocation of roadways) for a high-capacity multimodal transit corridor. Past actions may have the potential for induced growth, but the potential impact is minor because growth would occur in this highly populated area regardless of the proposed actions.	Present actions have improved the current conditions by providing opportunities for sustainable design through low impact development, stream restoration, and stormwater management. Present actions would not induce growth or development in the area.	Future actions have the potential to provide sustainable design elements such as low impact development including bioswales and pervious paving to reduce stormwater runoff and improve the quality of nearby surface waters. Future actions may have the potential for induced growth, but the potential impact is minor because growth would occur in this highly populated area regardless of the proposed actions. The future PMVEC, an interpretation center, would be compatible with the surrounding land uses. A future Freedman's Village Memorial would be compatible with the surrounding land uses.	The Preferred Alternative would provide a peaceful and beautiful change to the present site characteristics. The potential cumulative impacts from all past, present, and future actions would be positive because of the increased opportunities for sustainable design elements. There would be no effects related to a lack of induced growth because the area is already highly developed.
Cultural/Historical				
There would be adverse effects from the removal of the boundary wall along Southgate Road and demolition of the Operations Complex. There would be adverse effects to the AFMand Patton Drive, , a NRHP eligible properties. However, these impacts are being coordinated and will be mitigated through the Section 106 process and the stipulations in the Memorandum of Agreement found in **Appendix G**.	Past actions have not resulted in adverse effects to cultural/historic properties. ANC continues to maintain very high historical integrity and function as a Historic District.	The Millennium Expansion project has had adverse effects on cultural resources, due to the removal of the historic boundary wall. However, the adverse effects were coordinated and mitigated through the Section 106 process.	The Memorial Bridge EA anticipates adverse impacts to the historic bridge structure in accordance with the NHPA Section 106 for evaluating effect of proposed actions. The proposed repairs and rehab would be done in accordance with the Secretary of the Interior's Standards for Rehabilitation. Several features of the structure may be rehabbed as mitigation for the project impacts. The PMVEC would have potential impacts to the ANC Historic District due to its proximity. Mitigation through Section 106 of the NHPA may be required.	All past, present, and reasonably foreseeable future actions would not be directly or indirectly affected by, or cause an effect on the Preferred Alternative. Although there are present and future adverse effects to cultural/historic properties, they are being mitigated. There would be no unmitigated or significant adverse cumulative impacts.

Table 3.6
Cumulative Effects to Resources

All Action Alternatives – Comprehensive Development	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Cumulative Effect
Visitor Use and Experience				
The Preferred Alternative would have beneficial impacts due to new and additional amenities including pedestrian gate(s). The overall design would be a seamless extension of the current cemetery and provide the same iconic image captured by the ordered grid of headstones and landscaping that creates a sense of peace and beauty. Patton Drive will be converted from roadway to a pedestrian path; alternate vehicular circulation within the Cemetery will be available in the expansion area. The AFM would be incorporated into the design and provide pedestrian access from both Columbia Pike and ANC. The AFM would be subject to the same security measures and operations as ANC. Bus and vehicle parking would be available across Columbia Pike.	Past actions have improved the current condition by providing an expansion area and additional niche space to meet the demand and to extend the longevity of the cemetery. Adding burial space and expanding the footprint is a positive impact that would allow additional area for visitors to experience the heritage and honor of ANC.	Present actions have improved the current condition. The improvements to ANC through additional burial capacity and the construction of a dedicated committal procession staging area reinforces the experience for grieving families and the respect from visitors.	Future actions have the potential to improve visitor use and experience of memorials and monuments near ANC. Improving the condition of the Memorial Bridge would result in the lifting of weight restrictions, thereby benefitting traffic circulation of vehicles and potentially increasing the number of visitors that can visit and experience not only ANC, but all sites in the Washington D.C. metro area. The PMVEC would be well-suited to this site and benefit visitor's experience given the proximity with ANC, AFM, and the Pentagon.	The Preferred Alternative would improve the visitor use and experience by increasing the burial capacity thereby ensuring ANC's longevity into the future. The potential cumulative impacts from the past, present, and reasonably foreseeable future actions would have a positive impact because of improvements to the cemetery and the ability of visitors to efficiently circulate among the many memorials and museums.
Traffic and Transportation				
Two traffic movements showed an unacceptable LOS under the Preferred Alternative. The southbound left (SBL) turn at South Nash street/ Columbia Pike during the PM peak showed a LOS "E". The southbound left movement from the ramp at Columbia Pike also had a LOS "E". Future refinement of signalization timing during final design would result in improved LOS for these traffic movements. All three intersections operated at a LOS "C" (acceptable) or better under future conditions. The proposed redevelopment, including the realigned roadways, would maintain or extend routes for pedestrian and bicycle movements and would not sever any existing routes for these modes of transportation. The Columbia Pike relocation and upgrade would be the last segment of the Columbia Pike Multi-modal Street Improvement Project. The bicycle and pedestrian trails would be constructed according to AASHTO and VDOT safety standards.	The past actions potentially affecting traffic and transportation are the Columbia Pike Initiative, the Transit Initiative, and the Multi-Modal Street Improvements Transportation Study. All three studies reviewed the potential impacts of implementing a high-capacity multimodal transportation corridor and enhance access to the regional transit network while addressing the importance of competing demands and traffic volumes within the Columbia Pike right-of-way. Improvements to the regional roadway and transit network would provide potentially beneficial impacts to the community and region. The 2012 Street Improvements Transportation Study showed levels of service at the Columbia Pike/Washington Blvd. interchange (Freedman's Bridge) to be acceptable (LOS D or better) during 2018 and 2038 peak hour traffic with or without street improvements.	The present actions would provide beneficial impacts to traffic and transportation through the Pentagon's development of a Transportation Management Plan, a daily destination of approximately 23,000 employees. The goal of the TMP is to promote more efficient commuting patterns, including efforts to reduce the number of vehicles traveling to the Pentagon by reducing the number of parking spaces offered. Beneficial impacts may include: fewer vehicles on the road thereby improving the roadway level of service; and reducing potential commuter travel times.	Future actions have the potential to benefit local and regional traffic and transportation by: improving the condition of the Memorial Bridge resulting in the lifting of weight restrictions, thereby benefitting traffic circulation of vehicles in and around ANC and other nearby memorials; reducing traffic congestion; providing additional travel choices; improving travel reliability; and, improving roadway safety. The future PMVEC would be required to prepare a traffic plan for vehicle ingress/egress and pedestrian movements along Columbia Pike.	All past, present and reasonably foreseeable future actions are unrelated to the alternatives and would not be directly or indirectly affected by, or cause an effect on the Preferred Alternative. Past, present, and future projects would have short term adverse impacts during construction and long term beneficial impacts to the traffic and transportation system.

Table 3.6
Cumulative Effects to Resources

All Action Alternatives – Comprehensive Development	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Cumulative Effect
Socioeconomics				
The Preferred Alternative would not induce growth or result in changes to the socioeconomic characteristics of the area, nor would there be effects from a lack of induced growth. There would be no changes to the community's economic vitality; no changes to employment metrics; no disruption to community cohesion; and, no displacements to businesses or effects on land use.	The area surrounding ANC is highly developed and populated. The potential impacts from past projects may be beneficial due to Arlington County's plan for increased land use densities, increased housing options, and the improved mobility and accessibility provided by a high-capacity, multimodal transportation corridor.	The present actions may indirectly and beneficially impact socioeconomic conditions from the development of a Transportation Management Plan by the Pentagon, a daily destination of approximately 23,000 employees. The goal of the TMP is to promote more efficient commuting patterns. Beneficial impacts may include fewer vehicles on the road thereby improving the roadway level of service.	Future projects to improve or upgrade the transportation system including efforts to minimize traffic congestion which may have minor positive impacts to socioeconomics.	All past, present, and reasonably foreseeable future actions would not be directly or indirectly affected by, or cause an effect to either of the Preferred Alternative and would have no adverse cumulative impacts on socioeconomics
Air Quality				
The Preferred Alternative would include a multimodal transportation corridor that would potentially serve to reduce vehicular traffic along the corridor and indirectly reduce air emissions. The realignment of Columbia Pike is not expected to cause congestion on Columbia Pike; therefore, air emissions would not be expected to increase. The Preferred Alternative would not change employment or traffic estimates included in the 2015 CLRP Air Quality Conformity Analysis and, therefore, it can be assumed that future emissions would not exceed the NAAQS. Emissions associated with operating the cemetery expansion and the construction of the Preferred Alternative would not exceed de minimis pollutant levels for NO_X, VOC or $PM_{2.5}$ therefore a general conformity determination is not required.	Past actions or plans potentially affecting air quality included the implementation of a high-capacity multimodal corridor that has yet to be executed. When implemented, the plan may have an indirect and beneficial impact on regional air quality.	Present actions or plans potentially affecting air quality include efforts to develop and implement a transportation management plan to promote more efficient commuting patterns. This activity may indirectly and beneficially impact air quality.	The future project potentially impacting air quality is the proposed extension of the express lanes on I-395. Meeting the objective of reducing traffic congestion may indirectly and beneficially affect air quality.	The potential cumulative impacts from all past, present, and future actions would be positive because of the increased opportunities for sustainable design elements and enhanced stormwater treatment. Little or no adverse effects on air quality related to future growth anticipated because the area is already highly developed.
Water Resources				
There are no impacts to wetlands, streams, or surface waters. The preferred alternative would meet all water quality laws. There is an opportunity for enhancements to water quality such as BMPs or LIDs on the project site.	Past actions such as the removal of the Navy Annex and parking area have greatly improved water quality through removal of approximately 45 acres of impervious area. Other recent projects also would be required by VDEQ to treat their stormwater. Overall effects would be positive.	Present actions contribute to improved water quality such as a stream restoration project on the Millennium site as well as adherence to water quality laws and regulations.	Future actions such as LIDs are planned for both the Pentagon and JBFMHH. Overall effects would be positive. There are no anticipated adverse effects. Any development would be required to adhere to all water quality laws and regulations. The future PMVEC would be required to calculate stormwater runoff based on impervious surface and design necessary collection facilities.	All past, present, and reasonably foreseeable future actions would not be directly or indirectly affected by, or cause an effect on the Preferred Alternative and would have no adverse cumulative effects.

Table 3.6
Cumulative Effects to Resources

All Action Alternatives – Comprehensive Development	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Cumulative Effect
Biological Resources				
There would be no impact on federally- or state-listed threatened or endangered species, essential fish habitat or other fisheries. There would be minimal impacts on wildlife and vegetation, and negligible impacts on migratory birds. The wooded areas contain many invasive plant species, so removal and appropriate handling of those would be a positive effect. Other trees and vegetation would be planted on the site following construction.	Past actions have had little effect on biological resources due to a lack of them in the area.	Present actions have had little effect on biological resources due to a lack of them in the area.	Future actions are expected to have little effect on biological resources due to a lack of them in the area.	All past, present, and reasonably foreseeable future actions would not be directly or indirectly affected by, or cause an effect on the Preferred Alternative and would have no adverse cumulative effects, because the biological resources in the vicinity are minimal.
Utilities				
The Preferred Alternative would not spur future growth and development and would not create an undue burden on consumption of utility services. The cemetery's requirements for utility service are minimal. The underpass would be buried under the existing Columbia Pike corridor, which we acknowledge is an existing utility corridor. Regardless, the future design – which would include input from Arlington County, VDOT, and FHWA – will provide suitable dimensions to accommodate a utility corridor within a reasonable ROW width that does not unduly impact the primary objective of increasing the Cemetery's burial capacity. Wet utilities will remain within ANC property, allowing for maintenance by the County. Specific design dimensions and criteria are outside the scope of this EA.	Past actions have served to establish a utility corridor within Southgate Road and Columbia Pike.	Present actions and surrounding development currently utilize the utilities in the corridor.	Additional development, in particular Amazon, is expected to be developed outside the corridor but nearby in the future. As such, this could increase the utility demand in the future.	All past, present, and reasonably foreseeable future actions would not be directly or indirectly affected by, or cause an effect on the Preferred Alternative and would have minor adverse cumulative effects on utilities, because ANC will work with the County and FHWA to resolve potential and specific constraints in the design phase.
Visual and Aesthetic				
There would be positive effects due to the landscaping and beautification of the cemetery and enhancements to the Columbia Pike corridor. There would also be visual and aesthetics screening of the edge conditions around the cemetery boundaries, due to varying land uses surrounding the cemetery. The integration of the AFM to the final design would have a positive effect on the visual resources by removing the barrier around the AFM.	Past actions such as the removal of the Navy Annex and parking area have had a positive effect on the existing cemetery. The AFM represents an important landmark that can be seen for miles. Other actions have had little or no effect on this project due to intervening distance.	Present actions are distant to this project site and, therefore, would have little or no effect.	Future actions would have no direct effects on the visual and aesthetic character of the area. The future PMVEC would be required to coordinate with the NCPC, ANC, CFA, and VDHR to determine potential impacts to the viewshed and mitigate, as needed.	All past, present, and reasonably foreseeable future actions would not be directly or indirectly affected by, or cause an effect on the Preferred Alternative and would have no adverse cumulative effects.

4 LIST OF AGENCIES AND PERSONS CONSULTED

This chapter identifies the agencies and individuals consulted in the preparation and review of this Environmental Assessment. The table below lists the agencies contacted and the individuals within those agencies.

Table 4.1
Agencies and/or Persons Consulted

Agency	Contacts
Advisory Council on Historic Preservation	
AFM/Air Force Association	Lt Col Ed Liberman Barbara Taylor Kristine Robbins
Arlington County	Dan Reinhard Greg Emanuel Dennis Leach Brian Stout Tim O'Hora Eric Balliet Rebeccah Ballo Leon Vignes
U.S. Commission of Fine Arts	Frederick Lindstrom Thomas Luebke
Joint Base Myer-Henderson Hall	Ian Frank Kristie Lalire
National Capital Planning Commission	Carlton Hart Michael Sherman
Pentagon Memorial Fund	Andrew Ammerman
U.S. Department of Transportation – Federal Highway Administration	Jack Van Dop Tom Shifflett (EFLHD) Kurt Dowden
U.S. Environmental Protection Agency	Barbara Rudnick Karen Delgrosso
Virginia Department of Conservation and Recreation	Alli Baird
Virginia Department of Environmental Quality	Bettina Sullivan Valerie Fulcher Katy Dacey Kotur Narasimhan Larry Gavin Daniel Moore Holly Sepety Daniel Burstein
Virginia Department of Historic Resources	Marc Holma
Virginia Department of Transportation	Robert Iosco Nick Roper Allison Richter

Table 4.1

Agencies and/or Persons Consulted

Agency	Contacts
	Lauren Mollerup Steve Bates John Muse
Virginia Marine Resources Commission	Tony Watkinson
Washington Headquarters Services/Pentagon Reservation	Martin Mamawal Elizabeth Lenyk

Table 4.2

Other Consultations – Native American Tribes and Non-Governmental Organizations

Native American Tribes
Absentee-Shawnee Tribe of Indians of Oklahoma
Cayuga Nation
Delaware Tribe of Indians
Eastern Shawnee Tribe of Oklahoma
Oneida Indian Nation, Oneida Tribe of Indians of Wisconsin
Onondaga Indian Nation, Saint Regis Mohawk Tribe
Seneca-Cayuga Tribe of Oklahoma
Seneca Nation of New York, Shawnee Tribe
Tonawanda Band of Seneca Indians of New York
Tuscarora Nation
Cherokee Nation
Eastern Band of Cherokee Indians
United Keetoowah Band of Cherokee Indians
Catawba Indian Tribe
Non-Governmental Organizations
National Trust for Historic Preservation
Preservation Virginia (formerly the Association for the Preservation of Virginia Antiquities)
Arlington Historical Society, Inc.
Historical Society of Washington DC

5 LIST OF PREPARERS

Table 5.1 below identifies the individuals assisting in the preparation and independent review of this EA along with each preparer's responsibilities.

Table 5.1

List of Preparers

Name	Education and Experience	Primary Responsibility
U.S. Army Corps of Engineers – Norfolk District		
Greg Hegge	B.S. Environmental Engineering/PE	ANC Program Manager
Kathy Perdue	B.S. Environmental Science	Biologist, NEPA Specialist
John Haynes	M.A. (ABD) Anthropology	Archaeologist, Cultural Resources Specialist
Susan Conner	M.A. Environmental Policy	Quality Control
Alicia Logalbo	M.S. Biology	Reviewer
Kimberly Koelsch	B.S. Urban Planning	Reviewer
HNTB Corporation		
Gregg Schwieterman	M.S. Architecture/AIA/ENVSP	Project Manager
Rob Bolich	M.S. Planning/AICP/ENVSP	NEPA Task Leader/Document Preparation
Kim Hughes	B.S. Civil Engineering/PE	Quality Control
Ryan Lombardi	B.S. Civil Engineering/PE	Alternatives Analysis
Kent Miller	GIS Analyst	GIS/Graphics
Rob Brander	B.S. Civil Engineering/PE	Traffic Analysis