Arlington National Cemetery Real Property Master Plan
Programmatic Environmental Assessment

September 2014

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Scoping Summary

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APPENDIX A
Scoping Summary

Scoping was conducted for the Arlington National Cemetery (ANC) Programmatic Environmental Assessment (EA). Although not required for an EA, scoping is recommended in Army National Environmental Policy Act (NEPA) guidance. "Scoping is an early and open process for determining the scope of issues to be addressed in an EA or EIS. It helps to identify significant issues related to a proposed action and its alternatives that are deserving of study, and to eliminate those issues, that are not significant, from further detailed consideration. Scoping can be external or internal, formal or informal, depending on the needs and desires of the proponents and analysts. If an EIS is required, scoping becomes a formal requirement, but some form of scoping can always prove useful, even at the EA stage of analysis." *(Environmental Impact Analysis Guide Us Army Environmental Center*, February 2004 p 3-5)

Various methods are used to conduct scoping. The method is tailored to the anticipated level of interest. One method is to send out requests for comments to a few parties. This method is appropriate if there is limited stakeholder interest. Another method is to conduct multiple stakeholder and public meetings. This approach is appropriate when there is extensive stakeholder interest. The ANC Master Plan is of interest to several stakeholders. Therefore, the scoping method included sending e-mails notices to a broad list of parties and conducting scoping meetings for the key stakeholders.

1 Scoping E-mail

Requests for scoping comments were sent via e-mail. The e-mail included an attachment that identified the proposed action and potential environmental impacts. Recipients were encouraged to provide comments. The key stakeholders were invited to the scoping meetings. Copies of the e-mails are included in ***Attachment 1***.

E-mail scoping information was sent to the following stakeholders:

- National Park Service - Arlington House, The Robert E. Lee Memorial, George Washington Memorial Parkway and National Capital Region*
- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers (Regulatory)
- U.S. Environmental Protection Agency
- U.S. Department of Agriculture- Natural Resource Conservation Service
- Advisory Council on Historic Preservation*
- Washington Headquarters Services*
- National Trust for Historic Preservation*
- Virginia Department of Environmental Quality*

- Virginia Department of Game &Inland Fisheries
- Virginia Department of Transportation*
- Virginia Department of Historic Resources *
- D.C. Commission on Fine Arts*
- National Capital Planning Commission*
- D.C. Historic Preservation Officer*
- Joint Base Meyer Henderson-Hall*
- Black Heritage Museum of Arlington/Freedman's Village Memorial*
- Association for the Study of African American Life and History*
- Air Force Memorial*
- Arlington County*
- Arlington Historical Society*

* key stakeholder invited to scoping meeting

2 Stakeholder Scoping Meetings

A scoping meeting and a design charrette were conducted on 25 July 2012. The scoping meeting included a brief presentation by the project team followed by a comment period. The ANC Real Property Master Plan project and anticipated environmental effects were discussed.

The design charrette focused on potential alternatives for the former Navy Annex site. NEPA requires evaluation of alternatives to the proposed action. Therefore, key stakeholder comments offered during the charrette were also considered scoping input.

Summaries of comments, as well as the attendance sheets and the presentations are included in ***Attachment 2***.

3 Written Scoping Responses

Written scoping responses were received from the following stakeholders:

- Virginia Department of Environmental Quality
- Virginia Department of Environmental Quality, Land Protection and Revitalization Program
- Virginia Department of Health Office of Drinking Water
- Commonwealth of Virginia Department of Game and Inland Fisheries Environmental Services Division
- U.S. Department of Agriculture, Natural Resources Conservation Service
- National Park Service, George Washington Memorial Parkway
- Arlington County Historical Society

Copies of the written responses are included in ***Attachment 3***.

Table 1 summarizes all written comments and scoping meeting comments received regarding the ANC Master Plan, Navy Annex Area Development, and potential environmental effects.

Table 1
Scoping Comment Summary

Topic/Comment	
Master Plan Development	
• It is recommend that the Master Plan identify areas reserved for future monuments, including a cultural row consisting of memorials and visitors centers. • There is an opportunity to have a corridor, which could include proposed sites for an Arlington History Museum, Pentagon Memorial/Museum, ANC, Air Force Memorial, and 9/11 interpretive center. • The Master Plan should keep in mind that the NW loop at 110 adjacent to the Navy Annex Site is proposed/was proposed earlier this year for a 9/11 interpretive center. • It would be useful for Master Plan to include how the proposed actions will extend burial space, and details on when full space availability of ANC property will be exhausted.	
Purpose and Need	
• There is a need for families to feel like they are part of ANC. It is important that sections of ANC do not feel separated. The success of the Annex Site will depend on the ability to stitch the Annex and existing cemetery together.	
Alternatives	
Roadways	• Consider taking the north loop off Memorial Drive (the 110 S access ramp) for use as an administrative center and work something else out to get people on 110 S.
Navy Annex Area Development	• There are concerns about the land transfer or lack thereof. Include alternatives incorporating the land swap, with the land on the south side of Columbia Pike being acceptable as a land swap option. • Acquisition of Southgate Road is important to the success of the Navy Annex Site, as well as consideration of a streetcar connection. • Consider concentrating non-burial related services to the Annex Site, such as administrative functions. Commission of Fine Arts (CFA) is uncomfortable with interments south of Columbia Pike. • Push for Parcels A, B and D to become contiguous land mass and consider a satellite EMS facility on Parcel D if there is an increase in population density. • Consider whether the Navy Annex site be gated once developed.
Air Force Memorial (AFM)	• There is concern for how the AFM will be incorporated into the ANC Master Plan. Visitors to the memorial want to subsequently visit ANC, but have difficulty getting there. A link between the two is supported by the AFM. • Stabilization of the Parcel B slope would be required to keep the memorial intact and views from the AFM must remain intact following Navy Annex development.

Table 1
Scoping Comment Summary

Topic/Comment	
Visitor/ Administrative Facilities	• There is a question as to whether separating funeral visitors, general visitors and administrative facilities is achievable or desirable. There is concern about moving the Visitors Center or administrative facilities away from Memorial Avenue (and to the Annex Site) and the ANC metro stop, and its impact on accessibility and visitor experience. • However, NPS supports removing traffic from Memorial Avenue and providing other ways for visitors and tour buses to enter/exit ANC. • Consider moving some administrative functions off site or separating administration and family services personnel into their own facilities.
Maintenance Area	• It was suggested to move the ANC maintenance yard to be adjacent to the VDOT maintenance yard, and also the possibility of removing the VDOT maintenance yard. It was also proposed to relocate the maintenance department south of Columbia Pike
Environmental Impacts	
Roadways	• Impacts due to changes in roadways, vehicular circulation and parking need to be addressed, including: roadways around the Navy Annex, bus circulation/access and parking for committal services and traffic affects for the Fox Croft Heights neighborhood. • Consider impacts to the vegetated buffer along the west edge of the Navy Annex Site if a potential access road is developed.
Accessibility/ Visitor Use and Experience	• The EA must include impacts to visitor use and experience in regards to moving facilities. There is concern over the impact to Arlington House visitation and to metro riders, if the Visitor Center is moved to the Navy Annex Site. Also, impacts to pedestrian connections to the surrounding attractions need to be considered.
Viewsheds	• Include a viewshed analysis to and from ANC. It was noted that parked tour buses sometimes line both sides of Memorial Avenue and the Master Plan may want to identify a solution to this undesirable viewshed.
Additionally, Programmatic EA should:	• Include Coastal Zone Federal Consistency Determination (FCD) with NEPA document. • Include effects of alternatives on vegetation. • Not overlook possibility that an EIS may be required for proposed projects. • Verify drinking water impacts with local utility.

Source: Scoping Meeting Comments and Written Responses (see Attachment 2 and 3 for detailed comments).

4 Summary

Table 2 provides a summary of the scoping interactions, including agencies and persons consulted, who was sent scoping material, who was invited to the scoping meeting and who attended, and who provided comments.

Table 2
Scoping Interactions Summary

Agency	Contacts	Sent Scoping Materials	Invited to Scoping Meeting	Attended Scoping Meeting	Scoping Letter Response
National Park Service - Arlington House, The Robert E. Lee Memorial, George Washington Memorial Parkway (GWMP) and National Capital Region (NCR)	Thomas Sheffer – GWMP		Agency Invited	X	X
	Ben Helwig – GWMP	X		X	
	Joel Gorder – NCR	X		X	
	Jon James	X			
	Gregory Anderson	X			
	Peter May	X			
	Brandon Bies - ARHO	X		X	
U.S. Fish and Wildlife Service		X			
U.S. Army Corps of Engineers (Regulatory)	Regena Bronson	X			
U.S. Environmental Protection Agency	Magie Gomez	X			
U.S. Department of Agriculture-Natural Resource Conservation Service	Andree DuVarney	X			X
Advisory Council on Historic Preservation	Katherine Kerr	X	Agency Invited		
Washington Headquarters Services	Michael Dangerfield	X	Agency Invited	X	
	Georgine Glatz	X			
	Martin Mamawal	X			
	Elizabeth Lenyk	X		X	
	Dares Charoenphol	X		X	
	Alton Cheaves	X		X	
	Todd Laroe	X			
	Lynn B. Mariano	X			
National Trust for Historic Preservation	Robert Nieweg	X	Agency Invited		
Virginia Department of Agriculture and Consumer Services	Keith Tignor	X			
Virginia Department of Conservation and Recreation	Sheila Barnett	X			
Virginia Department of Environmental Quality	Charles Ellis		Agency Invited	X	X
	Richard Doucette (Land Protection)	X			X
	David Hartshorn (Air Compliance)	X			
	Edward Stuart (Water)	X			
	Ellie Irons	X			X
Virginia Department of Game & Inland Fisheries	Gladys Cason	X			X
Virginia Department of Health, Office of Drinking Water	Diedre Forsgren				X
Virginia Department of Historic Resources	Marc Holma	X	Agency Invited		
Virginia Department of Transportation	Randy Hodgson		Agency Invited	X	
	John Muse	X			
D.C. Commission on Fine Arts	Frederick Linstrom	X	Agency	X	

Table 2
Scoping Interactions Summary

Agency	Contacts	Sent Scoping Materials	Invited to Scoping Meeting	Attended Scoping Meeting	Scoping Letter Response
	T. Simon		Invited	X	
	Kay. Fanning	X			
National Capital Planning Commission (NCPC)	Cheryl Kelly		Agency Invited	X	
	Christine Saum	X			
	Carlton Hart	X			
Joint Base Myer-Henderson Hall	Myrtle Bowen	X	Agency Invited		
	Ron Kaczmarck	X		X	
	Michael Khalamayzer	X			
	Kristie Lalire	X		X	
	Pete McGraw			X	
	Russell Miller			X	
Black Heritage Museum of Arlington/Freedman's Village Memorial	Dr. Talmadge T. Williams	X	Agency Invited	X	
Association for the Study of African American Life and History	Sylvia Cyrus	X	Agency Invited		
Air Force / Air Force Memorial	Gina Humble	X	Agency Invited		
	Susan Bench-Snow	X		X	
	Susci Kennedy	X			
	Daniel Nielsen			X	
	Pete Lindquist			X	
	Theron F. Lord			X	
Arlington County	Bill Roberts – DOT		Agency Invited	X	
	Leon Vignes – CPHD			X	
	Rebeccah Ballo– Historic Preservation/CPHD	X		X	
	Jeff Harn – Sustainability and Environmental Management			X	
	Michael Leventhal	X			
	Brian Stout	X			
	Tim McIntosh	X			
	Cynthea Liccese-Torres (Historic Preservation/CPHD)			X	
Arlington Historical Society	John Richardson	X	Agency Invited	X	X
	Ali Ganjian	X			

Attachment 1:

ANC Scoping Emails to Stakeholders

From:	Delahaye, Daniel B CIV (US)
To:	"regena.d.bronson.civ@mail.mil"; "gomez.magdalin@epa.gov"; "projectreview@dgif.virginia.gov"; "contact2@fws.gov"; "andree.duvarney@wdc.usda.gov"; "Richard.doucette@deq.virginia.gov"; "r.david.hartshorn@deq.virginia.gov"; "edward.stuart@deq.virginia.gov"; "ellie.irons@deq.virginia.gov"; "keith.tignor@vdacs.virginia.gov"
Subject:	Arlington National Cemetery Master Plan Environmental Assessment (UNCLASSIFIED)
Date:	Wednesday, July 18, 2012 5:00:00 PM
Attachments:	Agency_Informational_Document_ANC.docx

Classification: UNCLASSIFIED
Caveats: NONE

Greetings all,

The Army National Cemeteries Program (ANCP) is initiating preparation of a Programmatic Environmental Assessment (EA) to evaluate and disclose the potential environmental impacts associated with the elements of the new Master Plan for Arlington National Cemetery (ANC). Identification of potential issues through agency coordination is an important step in initiating the EA process. Therefore, ANCP is requesting that interested federal, state and local agencies and organizations review the attached scoping document and provide comments. The scoping document provides background information; presents the preliminary purpose and need, and alternatives; identifies the environmental impact categories most likely impacted; and provides a preliminary schedule.

Please submit your agency/organization's comments regarding the Programmatic EA to me and provide a copy to Ms. Kulvelis. Comments may be submitted in writing to the addresses listed below or via e-mail at daniel.b.delahaye.civ@mail.mil and bkulvelis@hntb.com. If you determine that the Proposed Action would not impact your area of jurisdiction or expertise, written verification would be appreciated. It is respectfully requested that all comments be submitted by August 10, 2012 in order to ensure their consideration early in the Programmatic EA process.

Sincerely,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

Barbara A. Kulvelis, CEP
Senior Environmental Planner
HNTB Corporation
2900 South Quincy Street
Arlington, VA 22206

Classification: UNCLASSIFIED
Caveats: NONE

From:	Delahaye, Daniel B CIV (US)
To:	"Carlton Hart"; "Christine.Saum@ncpc.gov"; "Frederick Lindstrom"; "kfanning@cfa.gov"; "Brandon_Bies@nps.gov"; "Jon_James/GWMP/NPS"; "ben_helwig@nps.gov"; "gregory_anderson@nps.gov"; "joel_gorder@nps.gov"; "peter_may@nps.gov"; "Dangerfield, Michael CIV WHS/FSD/PENREN"; "georgine.glatz@whs.mil"; "martin.mamawal@whs.mil"; "Lenyk, Elizabeth CIV WHS/FSD/ECM/EAD"; "dares.charoenphol@whs.mil"; Bowen, Myrtle CIV (US); Kaczmarek, Ronald E CIV (US); Khalamayzer, Michael V CIV (US); Lalire, Kristie S CIV (US); "gina.humble@afncr.af.mil"; "susan.bench-snow@pentagon.af.mil"; "susci.kennedy@pentagon.af.mil"; "Holma, Marc (DHR)"; "Katharine R. Kerr"; "Robert Nieweg (Robert_Nieweg@nthp.org)"; "Mr. Michael Leventhal (mleventhal@arlingtonva.us)"; "bstout@arlingtonva.us"; "tmcintosh@arlingtonva.com"; "ttwrec@aol.com"; "info@asalh.net"; "john.muse@vdot.virginia.gov"
Subject:	Arlington National Cemetery Master Plan Scoping Session (UNCLASSIFIED)
Date:	Wednesday, July 18, 2012 1:38:00 PM
Attachments:	Agency_Informational_Document_ANC.docx

Classification: UNCLASSIFIED
Caveats: NONE

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The ANCP will conduct an agency scoping meeting on July 25, 2012 from 10:30 am to noon in the basement of the Arlington National Cemetery Visitor's Center. Project team members will give a brief presentation on project information including a discussion of the proposed alternatives being investigated as part of the master planning process. Attendance is encouraged as this is an opportunity for agencies to learn more about the projects and indicate their issues and concerns regarding potential environmental impacts. Please feel free to forward this invitation to others within your organization who may wish to participate.

The ANCP welcomes comments regarding development of the Programmatic EA. In order to identify issues early in the EA process, it is requested that all comments be provided by August 10, 2012. Please submit your comments regarding the Programmatic EA to me and provide a copy to Ms. Kulvelis. Comments may be submitted at the scoping meetings, mailed to the addresses listed below or provided via e-mail to daniel.b.delahaye.civ@mail.mil and bkulvelis@hntb.com.

Sincerely,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

Classification: UNCLASSIFIED

Caveats: NONE

From:	Delahaye, Daniel B CIV (US)
To:	"johnjoyce2@verizon.net"; "aliganjian@gmail.com"
Subject:	Arlington National Cemetery Master Plan Scoping Session (UNCLASSIFIED)
Date:	Friday, July 20, 2012 11:25:00 AM
Attachments:	Agency_Informational_Document_ANC.docx

Classification: UNCLASSIFIED
Caveats: NONE

Greetings all,

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Sincerely,

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Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

Classification: UNCLASSIFIED
Caveats: NONE

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Caveats: NONE

From: Delahaye, Daniel B CIV (US)
To: "ellie.irons@deq.virginia.gov"
Subject: FW: Arlington National Cemetery Master Plan Scoping Session (UNCLASSIFIED)
Date: Wednesday, July 18, 2012 2:19:00 PM
Attachments: Agency_Informational_Document_ANC.docx

Classification: UNCLASSIFIED
Caveats: NONE

Ms Irons,

I understand you serve as NEPA clearinghouse for VA Departments save for DOT.

Please see below. Please also feel free to contact me with any questions or concerns you may have.

Respectfully,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

703-614-4306
daniel.b.delahaye.civ@mail.mil

-----Original Message-----
From: Delahaye, Daniel B CIV (US)
Sent: Wednesday, July 18, 2012 1:38 PM
To: 'Carlton Hart'; 'Christine.Saum@ncpc.gov'; 'Frederick Lindstrom'; 'kfanning@cfa.gov'; 'Brandon_Bies@nps.gov'; 'Jon James/GWMP/NPS'; 'ben_helwig@nps.gov'; 'gregory_anderson@nps.gov'; 'joel_gorder@nps.gov'; 'peter_may@nps.gov'; 'Dangerfield, Michael CIV WHS/FSD/PENREN'; 'georgine.glatz@whs.mil'; 'martin.mamawal@whs.mil'; 'Lenyk, Elizabeth CIV WHS/FSD/ECM/EAD'; 'dares.charoenphol@whs.mil'; Bowen, Myrtle CIV (US); Kaczmarek, Ronald E CIV (US); Khalamayzer, Michael V CIV (US); Lalire, Kristie S CIV (US); 'gina.humble@afncr.af.mil'; 'susan.bench-snow@pentagon.af.mil'; 'susci.kennedy@pentagon.af.mil'; 'Holma, Marc (DHR)'; 'Katharine R. Kerr'; 'Robert Nieweg (Robert_Nieweg@nthp.org)'; 'Mr. Michael Leventhal (mleventhal@arlingtonva.us)'; 'bstout@arlingtonva.us'; 'tmcintosh@arlingtonva.com'; 'ttwrec@aol.com'; 'info@asalh.net'; 'john.muse@vdot.virginia.gov'
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Sincerely,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From: Delahaye, Daniel B CIV (US)
To: "tmcintosh@arlingtonva.us"
Subject: FW: Arlington National Cemetery Master Plan Scoping Session (UNCLASSIFIED)
Date: Wednesday, July 18, 2012 4:30:00 PM
Attachments: Agency_Informational_Document_ANC.docx

Classification: UNCLASSIFIED
Caveats: NONE

Tim,

Per our conversation.

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

703-614-4306 (DSN 224)
daniel.b.delahaye.civ@mail.mil

-----Original Message-----
From: Delahaye, Daniel B CIV (US)
Sent: Wednesday, July 18, 2012 1:38 PM
To: 'Carlton Hart'; 'Christine.Saum@ncpc.gov'; 'Frederick Lindstrom'; 'kfanning@cfa.gov'; 'Brandon_Bies@nps.gov'; 'Jon James/GWMP/NPS'; 'ben_helwig@nps.gov'; 'gregory_anderson@nps.gov'; 'joel_gorder@nps.gov'; 'peter_may@nps.gov'; 'Dangerfield, Michael CIV WHS/FSD/PENREN'; 'georgine.glatz@whs.mil'; 'martin.mamawal@whs.mil'; 'Lenyk, Elizabeth CIV WHS/FSD/ECM/EAD'; 'dares.charoenphol@whs.mil'; Bowen, Myrtle CIV (US); Kaczmarek, Ronald E CIV (US); Khalamayzer, Michael V CIV (US); Lalire, Kristie S CIV (US); 'gina.humble@afncr.af.mil'; 'susan.bench-snow@pentagon.af.mil'; 'susci.kennedy@pentagon.af.mil'; 'Holma, Marc (DHR)'; 'Katharine R. Kerr'; 'Robert Nieweg (Robert_Nieweg@nthp.org)'; 'Mr. Michael Leventhal (mleventhal@arlingtonva.us)'; 'bstout@arlingtonva.us'; 'tmcintosh@arlingtonva.com'; 'ttwrec@aol.com'; 'info@asalh.net'; 'john.muse@vdot.virginia.gov'
Subject: Arlington National Cemetery Master Plan Scoping Session (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

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Sincerely,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From: Delahaye, Daniel B CIV (US)
To: "rballo@arlingtonva.us"
Subject: FW: Arlington National Cemetery Master Plan Scoping Session (UNCLASSIFIED)
Date: Thursday, July 19, 2012 4:35:00 PM
Attachments: Agency_Informational_Document_ANC.docx

Classification: UNCLASSIFIED
Caveats: NONE

Ms Ballo,

It was a pleasure to speak with you today. The information I forwarded to Mr. Leventhal follows.

V/r,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

703-614-4306 (DSN 224)
daniel.b.delahaye.civ@mail.mil

-----Original Message-----
From: Delahaye, Daniel B CIV (US)
Sent: Wednesday, July 18, 2012 1:38 PM
To: 'Carlton Hart'; 'Christine.Saum@ncpc.gov'; 'Frederick Lindstrom'; 'kfanning@cfa.gov'; 'Brandon_Bies@nps.gov'; 'Jon James/GWMP/NPS'; 'ben_helwig@nps.gov'; 'gregory_anderson@nps.gov'; 'joel_gorder@nps.gov'; 'peter_may@nps.gov'; 'Dangerfield, Michael CIV WHS/FSD/PENREN'; 'georgine.glatz@whs.mil'; 'martin.mamawal@whs.mil'; 'Lenyk, Elizabeth CIV WHS/FSD/ECM/EAD'; 'dares.charoenphol@whs.mil'; Bowen, Myrtle CIV (US); Kaczmarek, Ronald E CIV (US); Khalamayzer, Michael V CIV (US); Lalire, Kristie S CIV (US); 'gina.humble@afncr.af.mil'; 'susan.bench-snow@pentagon.af.mil'; 'susci.kennedy@pentagon.af.mil'; 'Holma, Marc (DHR)'; 'Katharine R. Kerr'; 'Robert Nieweg (Robert_Nieweg@nthp.org)'; 'Mr. Michael Leventhal (mleventhal@arlingtonva.us)'; 'bstout@arlingtonva.us'; 'tmcintosh@arlingtonva.com'; 'ttwrec@aol.com'; 'info@asalh.net'; 'john.muse@vdot.virginia.gov'
Subject: Arlington National Cemetery Master Plan Scoping Session (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Greetings all,

The Army National Cemeteries Program (ANCP) is initiating preparation of a Programmatic Environmental Assessment (EA) to evaluate and disclose the potential environmental impacts associated with the elements of the new Master
Plan for Arlington National Cemetery. Identification of potential issues through agency coordination is an important step in initiating the EA process.

To facilitate meaningful participation in the scoping process, the ANCP is

providing a Scoping Informational Document and conducting a scoping meeting for interested federal, state and local agencies and organizations. The scoping document is attached for your review and includes background information; presents the preliminary purpose and need, and alternatives; identifies the environmental impact categories most likely impacted; and provides a preliminary schedule.

The ANCP will conduct an agency scoping meeting on July 25, 2012 from 10:30 am
to noon in the basement of the Arlington National Cemetery Visitor's Center.

Project team members will give a brief presentation on project information including a discussion of the proposed alternatives being investigated as part
of the master planning process. Attendance is encouraged as this is an opportunity for agencies to learn more about the projects and indicate their

issues and concerns regarding potential environmental impacts. Please feel free to forward this invitation to others within your organization who may wish to participate.

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the Programmatic EA to me and provide a copy to Ms. Kulvelis. Comments may be
submitted at the scoping meetings, mailed to the addresses listed below or provided via e-mail to daniel.b.delahaye.civ@mail.mil and bkulvelis@hntb.com.

Sincerely,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From: Delahaye, Daniel B CIV (US)
To: "harriet.tregoning@dc.gov"
Subject: FW: Arlington National Cemetery Master Plan Scoping Session (UNCLASSIFIED)
Date: Monday, July 23, 2012 8:06:00 AM
Attachments: Agency_Informational_Document_ANC.docx

Classification: UNCLASSIFIED
Caveats: NONE

Ms Tregoning,

My apologies for the delayed delivery of this information. Your e-mail address has been corrected in our database so this will not happen again.

Thank you for your understanding.

Very respectfully,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

703-614-4306 (DSN 224)
daniel.b.delahaye.civ@mail.mil

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From: Delahaye, Daniel B CIV (US)
Sent: Wednesday, July 18, 2012 1:38 PM
To: 'Carlton Hart'; 'Christine.Saum@ncpc.gov'; 'Frederick Lindstrom'; 'kfanning@cfa.gov'; 'Brandon_Bies@nps.gov'; 'Jon James/GWMP/NPS'; 'ben_helwig@nps.gov'; 'gregory_anderson@nps.gov'; 'joel_gorder@nps.gov'; 'peter_may@nps.gov'; 'Dangerfield, Michael CIV WHS/FSD/PENREN'; 'georgine.glatz@whs.mil'; 'martin.mamawal@whs.mil'; 'Lenyk, Elizabeth CIV WHS/FSD/ECM/EAD'; 'dares.charoenphol@whs.mil'; Bowen, Myrtle CIV (US); Kaczmarek, Ronald E CIV (US); Khalamayzer, Michael V CIV (US); Lalire, Kristie S CIV (US); 'gina.humble@afncr.af.mil'; 'susan.bench-snow@pentagon.af.mil'; 'susci.kennedy@pentagon.af.mil'; 'Holma, Marc (DHR)'; 'Katharine R. Kerr'; 'Robert Nieweg (Robert_Nieweg@nthp.org)'; 'Mr. Michael Leventhal (mleventhal@arlingtonva.us)'; 'bstout@arlingtonva.us'; 'tmcintosh@arlingtonva.com'; 'ttwrec@aol.com'; 'info@asalh.net'; 'john.muse@vdot.virginia.gov'
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submitted at the scoping meetings, mailed to the addresses listed below or provided via e-mail to daniel.b.delahaye.civ@mail.mil and bkulvelis@hntb.com.

Sincerely,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From: Delahaye, Daniel B CIV (US)
To: "Lenyk, Elizabeth CIV WHS/FSD/ECM/EAD"; Mariano, Lynn B CIV (US)
Subject: RE: Arlington National Cemetery Master Plan Scoping Session (UNCLASSIFIED)
Date: Wednesday, July 18, 2012 6:15:00 PM

Classification: UNCLASSIFIED
Caveats: NONE

All,

I meant what I said in my note...feel free to send out this invitation. I do ask, however, I be provided with a feel of how many will be attending so as to ensure our preparedness.

V/r,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

703-614-4306 (DSN 224)
daniel.b.delahaye.civ@mail.mil

-----Original Message-----
From: Lenyk, Elizabeth CIV WHS/FSD/ECM/EAD [mailto:Elizabeth.Lenyk@whs.mil]
Sent: Wednesday, July 18, 2012 5:39 PM
To: Mariano, Lynn B CIV (US)
Cc: Delahaye, Daniel B CIV (US)
Subject: RE: Arlington National Cemetery Master Plan Scoping Session (UNCLASSIFIED)

Lynn,

There was no meeting maker, just the email. I have copied Daniel Delahaye if you would like to let him know how many from the Pentagon Force Protection Agency (PFPA) are planning on attending.

Daniel,

I plan on attending and thank you for the invite.

Regards, Elizabeth

Elizabeth H. Lenyk, AIA
Chief Master Planner, Pentagon Reservation
Office: 703-614-0125
Cell: 703-401-5168
Elizabeth.Lenyk@whs.mil

-----Original Message-----
From: Mariano, Lynn B., PFPA
Sent: Wednesday, July 18, 2012 2:23 PM
To: Lenyk, Elizabeth CIV WHS/FSD/ECM/EAD; Cheaves, Alton CIV WHS/EM; Laroe, Todd, PFPA
Cc: Charoenphol, Dares CIV WHS/FSD; Bakhshi, Ali CIV WHS/FSD/PENREN; Glatz, Georgine WHS/FSD; Mamawal, Martin C. CIV WHS/FSD

Subject: RE: Arlington National Cemetery Master Plan Scoping Session
(UNCLASSIFIED)

Elizabeth,
Thanks for the head's up. Could you please forward or add us to the meeting invite so we may forward it to other PFPA stakeholders.

Thanks,
Lynn

Lynn B. Mariano
Deputy Director, Project Integration Directorate
and Chief, Physical Security Implementation Division
Pentagon Force Protection Agency
(703) 681-0976 Ofc, 571-722-7196 BB
Lynn.Mariano@pfpa.mil

"Please let us know how we are doing by completing our Interactive Customer Evaluation (ICE) survey below."

http://www.pfpa.mil/PIDonICE.html

CAUTION: THIS EMAIL MAY CONTAIN SENSITIVE, FOUO, LES INFORMATION NOT INTENDED FOR RELEASE TO THE MEDIA, GENERAL PUBLIC, OR TO NON-LAW ENFORCEMENT OR SECURITY PERSONNEL WHO DO NOT HAVE A "NEED TO KNOW."
(If you received this message in error, please notify the sender by reply e-mail and delete all copies of this message.)
-----Original Message-----
From: Lenyk, Elizabeth CIV WHS/FSD/ECM/EAD [mailto:Elizabeth.Lenyk@whs.mil]
Sent: Wednesday, July 18, 2012 2:13 PM
To: Cheaves, Alton CIV WHS/EM; Laroe, Todd, PFPA; Mariano, Lynn B., PFPA
Cc: Charoenphol, Dares CIV WHS/FSD; Bakhshi, Ali CIV WHS/FSD/PENREN; Glatz, Georgine WHS/FSD; Mamawal, Martin C. CIV WHS/FSD
Subject: FW: Arlington National Cemetery Master Plan Scoping Session
(UNCLASSIFIED)

Alton, Todd, and Lynn,

FYI. See meeting invitation below from Arlington National Cemetery regarding Cemetery Master Plan. Master Plan Project team members will give a brief presentation on project information including a discussion of the proposed alternatives being investigated as part of the master planning process. Meeting is July 25, 2012 from 10:30 am to noon in the basement of the Arlington National Cemetery Visitor's Center.

Regards, Elizabeth

Elizabeth H. Lenyk, AIA
Chief Master Planner, Pentagon Reservation
Office: 703-614-0125
Cell: 703-401-5168
Elizabeth.Lenyk@whs.mil

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From: Delahaye, Daniel B CIV (US)
Sent: Wednesday, July 18, 2012 1:38 PM
To: Carlton Hart; Christine.Saum@ncpc.gov; 'Frederick Lindstrom'; 'kfanning@cfa.gov'; 'Brandon_Bies@nps.gov'; Jon James/GWMP/NPS;

ben_helwig@nps.gov; gregory_anderson@nps.gov; joel_gorder@nps.gov; peter_may@nps.gov; Dangerfield, Michael CIV WHS/FSD/PENREN; Glatz, Georgine WHS/FSD; Mamawal, Martin C. CIV WHS/FSD; Lenyk, Elizabeth CIV WHS/FSD/ECM/EAD; Charoenphol, Dares CIV WHS/FSD; Bowen, Myrtle CIV (US); Kaczmarek, Ronald E CIV (US); Khalamayzer, Michael V CIV (US); Lalire, Kristie S CIV (US); Humble, Gina C Col USAF 11OG/CC; Bench-Snow, Susan L CIV USAF SAF/AAO; Kennedy, Susci CIV USAF SAF/AAO; Holma, Marc (DHR); Katharine R. Kerr; Robert Nieweg (Robert_Nieweg@nthp.org); Mr. Michael Leventhal (mleventhal@arlingtonva.us); bstout@arlingtonva.us; tmcintosh@arlingtonva.com; ttwrec@aol.com; info@asalh.net; john.muse@vdot.virginia.gov
Subject: Arlington National Cemetery Master Plan Scoping Session (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

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The ANCP welcomes comments regarding development of the Programmatic EA. In order to identify issues early in the EA process, it is requested that all comments be provided by August 10, 2012. Please submit your comments regarding the Programmatic EA to me and provide a copy to Ms. Kulvelis. Comments may be submitted at the scoping meetings, mailed to the addresses listed below or provided via e-mail to daniel.b.delahaye.civ@mail.mil and bkulvelis@hntb.com.

Sincerely,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

Classification: UNCLASSIFIED
Caveats: NONE

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Caveats: NONE

Overview

The Army National Cemeteries Program (ANCP) is seeking federal, state and local agency input regarding a Programmatic Environmental Assessment (EA) for the development proposed in the new Master Plan for Arlington National Cemetery (or the cemetery). Army regulations require the preparation of National Environmental Policy Act (NEPA) documentation concurrent with the preparation of a master plan. Therefore, the EA is being completed to satisfy the requirements of both Army regulations and the NEPA.

This document provides preliminary information regarding the EA to facilitate agency review and comment. The document includes the following sections:

- Background
- Proposed Action
- Preliminary Purpose and Need
- Preliminary Alternatives
- Environmental Analysis
- Preliminary Schedule
- Comment Form

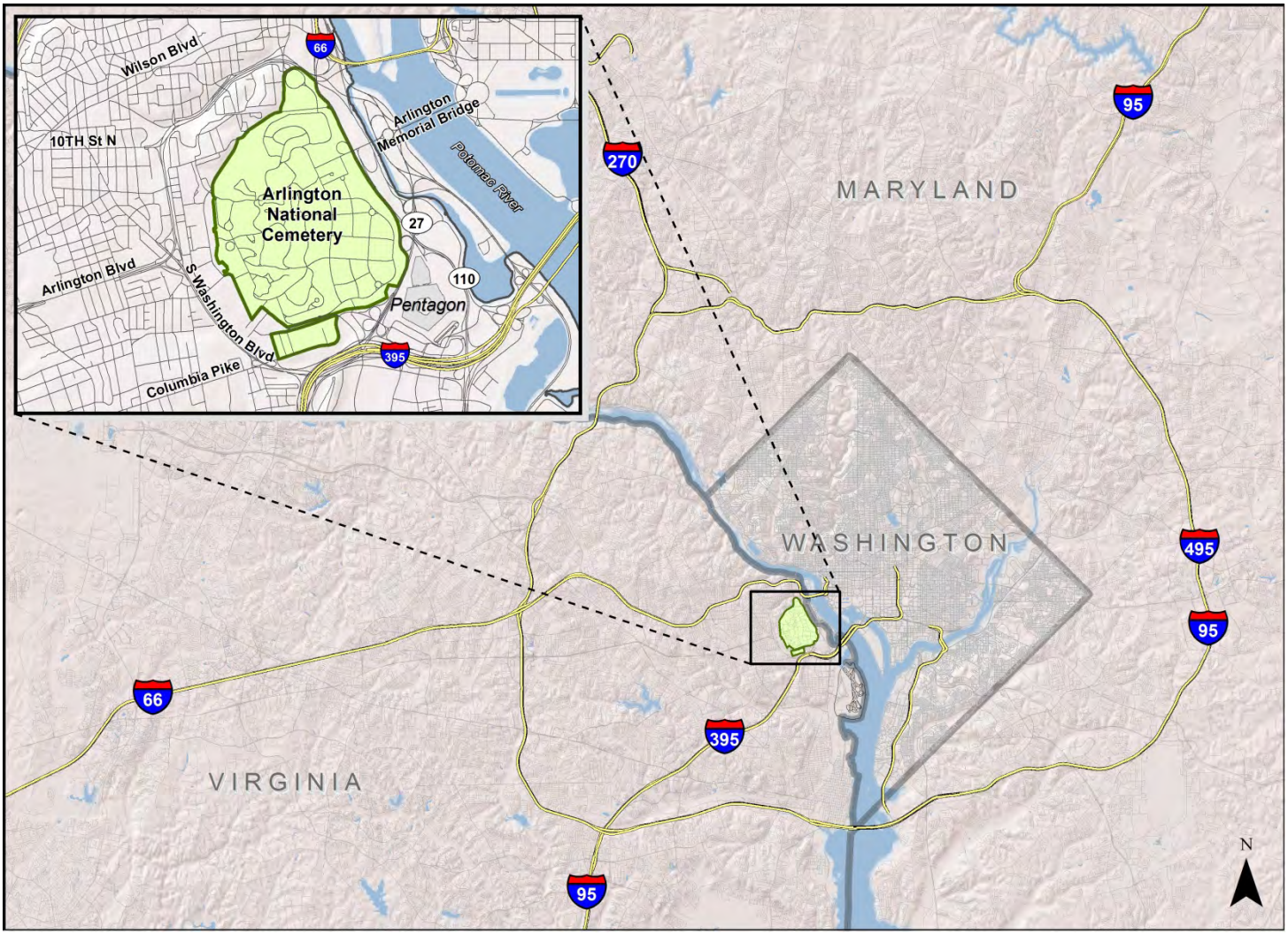
ANCP encourages each agency to review these materials and provide comments by August 10, 2012. Comments provided by this time will assist the ANCP in identifying issues early in the development of the EA. You are welcome to submit comments either by mail at the below addresses or by email to daniel.b.delahaye.civ@mail.mil and bkulvelis@hntb.com

Submit Written Comments To:
Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

Please Copy:
Barbara A. Kulvelis, CEP
Senior Environmental Planner
HNTB Corporation
2900 South Quincy Street
Arlington, VA 22206

Background

Arlington National Cemetery is an active military cemetery located in Arlington, Virginia, across the Potomac River from Washington D.C. Since 1864, over 400,000 people have been laid to rest at Arlington National Cemetery. The cemetery continues to honor the fallen through burial, on average, of 27-30 veterans and family members each day.



Arlington National Cemetery is the most hallowed burial ground of our nation's fallen. The cemetery memorializes history as it is the final resting place for the heroes and patriots who built, preserved and protected our nation from the Civil War to the most recent military activities in Afghanistan and Iraq. However, this cemetery represents more than just history. From the Soldiers of The Old Guard stepping in solemn vigilance before the Tomb of the Unknown Soldiers, to the gravesites of heroes and presidents, to the funerals for our veterans and families of ongoing conflicts and wars long over, the memorials and acres of neatly lined white markers serve as a vivid remembrance of the price so many have paid to keep our nation safe and free.

Arlington National Cemetery is also one of the most visited tourist sites in the Washington, D.C. area. Over four million people visit annually to honor, remember and explore. The memorials and the impressive landscape provide a sense of peace and beauty for the many guests.

Arlington National Cemetery is administered and operated under the ANCP. The mission of the ANCP is, "*On behalf of the American people, lay to rest those who have served our nation with dignity and honor, treating their families with respect and compassion, and connecting guests to the rich tapestry of the cemetery's living history, while maintaining these hallowed grounds befitting the sacrifice of all those who rest here in quiet repose."* ANCP's vision for Arlington National Cemetery is "*America's premier military cemetery - A national shrine - A living history of freedom - Where dignity and honor rest in solemn repose."*

To carry out their mission and achieve their vision, the ANCP developed the ANCP Campaign Plan. The ANCP Campaign Plan is a detailed roadmap to ensure that Arlington National Cemetery remains a place for every generation to honor, remember and explore the depths of the creation of this nation and the heroes who made incredible sacrifices for freedom. The roadmap identifies focused objectives with measurable standards that will ensure the ANCP reaches the desired outcomes of: honor, remember and explore.

One of the major objectives in the ANCP Campaign Plan is to update the Arlington National Cemetery Master Plan. Therefore, the ANCP recently initiated the development of a comprehensive Master Plan for Arlington National Cemetery. The overarching goal is to develop a plan that extends the useful operational life of the Cemetery to the maximum extent possible. The Master Plan will support and promote the ANCP's core mission to honor our Nation's fallen military heroes. Future protection, facility, equipment and environmental needs will be synchronized by developing more efficient, sustainable and energy-efficient solutions. The Master Plan will include an integrated series of documents that reflect optimized utilization of available space, identify future technology requirements and provide strategies to establish management priorities. A brief description of the content of the individual Master Plan documents follows:

Short Range Component (SRC) – key planning requirements and projects needed to address existing operational and mission requirements and deficiencies in the one to five year timeframe.

Long Range Component (LRC) – long range vision and future projects needed to address anticipated operational and mission requirements in the long term.

Capital Investment Strategy (CIS) - guide to prioritizing projects and asset allocation when considering available resources.

Installation Design Guide (IDG) – criteria for new facilities development, landscape improvements, signage and amenities.

Navy Annex Site Area Development Plan (ADP) - site-specific detailed area development plan for the Navy Annex site which was recently transferred to the Army for Arlington National Cemetery expansion.

Real Property Master Plan Digest (RPMG Digest) – executive summary outlining key recommendations of the various individual master plan documents and identifying the overall master plan direction and vision.

In order to implement the projects in the Master Plan, the ANCP must first comply with NEPA. NEPA requires the evaluation of the environmental impacts of proposed federal actions. Army regulations require the preparation of NEPA documentation concurrent with the preparation of a master plan. Therefore, the ANCP is preparing an EA in tandem with the Master Plan. The EA will be prepared in accordance with 32 CFR Part 651 [Army Regulation 200–2], *Environmental Analysis of Army Actions* and the NEPA Guidance Manual (U.S. Army Environmental Command May, 2007).

The ANCP has elected to prepare a Programmatic EA because the Master Plan will likely include phased and/or conceptual development. For these types of development projects, information needed to determine specific impacts may not yet be available. In this case, the development will be evaluated to the fullest extent possible in the Programmatic EA. When more information about these projects becomes available, required NEPA documentation can be “tiered” off of the Programmatic EA. In other words, the tiered document can refer to the Programmatic EA and redundant or duplicate analysis can be eliminated.

Proposed Action

The Proposed Action will be defined based on the Short and Long Range Components of the Master Plan as well as the Installation Design Guide and Navy Annex Site Area Development Plan. The Proposed Action could include projects ranging from installation of sidewalks to relocating the Visitor's Center to the Navy Annex Site.

It is noted that development of the Millennium Project site will not be include in the Proposed Action. This site was identified as a future growth area for Arlington National Cemetery in the previous Master Plan and is currently undergoing final design study and environmental assessment. However, the Millennium Project will be considered in the evaluation of cumulative impacts.

Preliminary Purpose and Need

The primary need for the Proposed Action is to expand the burial capacity at Arlington National Cemetery. The cemetery experiences continued demand for burial as the population of veterans age and the military adds new members to its ranks daily. In 2011, based on demand, approved cemetery land use plans and existing eligibility standards, ANCP predicted that available above ground and in ground burial spaces would be exhausted by 2016 and 2025, respectively. In response, the ANCP accelerated the construction of Columbarium Court #9, which will add more than 20,000 niches for inurnment services, extending above ground burial space availability to 2024. The burial capacity at Arlington National Cemetery must be extended in order to accommodate future burials and to allow the cemetery to continue to honor the fallen.

Other identified needs at the cemetery include the following:

Enhance the funeral and visitor experience – Arlington National Cemetery has the unique challenge of simultaneously providing active daily committal services as America's premier military cemetery, and accommodating visitors as a national shrine of living history and a worldwide tourist destination. While the cemetery site covers over 600 acres, its primary points of access, facilities, parking and key points of interest are highly concentrated within the site. This concentration of facilities sometimes brings mourners and tourists together. Obviously, neither the mourner nor the tourist is best served by this interaction. Therefore, improvements are needed to separate users based on their purpose for visiting Arlington National Cemetery.

There are additional needs related to enhancing the funeral and visitor experience:

- Additional space is needed to provide adequate parking for funeral attendees and accommodate the funeral queuing process. Also there is a need for a small intimate space where families can meet for funeral purposes.
- There is a general lack of comfort stations, drinking water facilities and seating at locations throughout the cemetery.
- The Memorial Amphitheatre and the Kennedy grave site are not handicap accessible.

Repair and modernize infrastructure - As is common with sites of historical significance that have developed over many years, Arlington National Cemetery has varied levels of deteriorating infrastructure. For instance, roadways are in poor shape, drainage is inadequate and the irrigation system is out of date.

Address deficient staff facilities – Some departments need additional space for offices and or various types of storage. For instance, the maintenance department is in need of a staging area and a spoils area. Also, adjacencies of the departments should be improved to facilitate efficiency and improved customer service. As an example, the chaplain's office and pastoral care offices should be located near the funeral attendee gathering area in the main administration building.

Accommodate new mission requirements – Facilities such as an interpretative center may be needed to accommodate new mission requirements.

Promote sustainability - Sustainable design and construction practices and operations is a key requirement for all federal agencies. The ANCP is committed to integrating environmental sustainability into all of its day-to-day operations, including expansion, operational planning, and environmental management efforts to reduce the environmental impact across the cemetery and reduce resource consumption providing operational cost savings.

Improve and maintain security – Add security features to provide a safe environment for visitors and employees as well as protect ANCP assets and events.

Preliminary Alternatives

A key to the NEPA process is the consideration of reasonable alternatives which would minimize adverse impacts. Potential alternatives will be considered based on their ability to meet the Purpose and Need for the Proposed Action. It is anticipated that the following alternatives will be considered:

No Action – Consideration of the No Action Alternative is required by NEPA per the Council on Environmental Quality (CEQ) Regulations. The No Action Alternative represents Arlington National Cemetery without the changes proposed in the Master Plan.

Proposed Action - The Proposed Action will be defined by the Master Plan.

Alternatives to the Proposed Action – Alternatives will likely center around the Navy Annex Site Area Development Plan. Alternatives related to the Navy Annex Site could include variations of the following:

- Move all existing administrative functions to the Navy Annex Site and convert the vacated land within the existing Arlington National Cemetery site to burial spaces and an interpretive center.
- Develop the entire Navy Annex Site into above and below ground burial spaces.

Environmental Analysis

The Programmatic EA will assess the environmental impacts of the Proposed Action and the reasonable alternatives. Impacts to valued environmental components (resources) will be analyzed according to the U.S. Army Environmental Center's (USAEC) NEPA Analysis Guidance Manual.

While all of the valued environmental components identified in the NEPA Analysis Guidance Manual will be addressed in the EA, the major emphasis is expected to be on those resources listed below. Preliminary review of the affected environment and available materials indicated that these resources may be impacted.

- Cultural Resources
- Water Resources Management
- Land Use
- Traffic and Transportation Systems

For the remainder of the valued environmental components, little or no analysis is expected to be necessary. The EA will provide succinct documentation as to why these resources would not be affected or only minimally impacted.

It is noted that the Millennium Project Site was identified as the other future growth area for Arlington National Cemetery in the previous Master Plan and is currently undergoing final design studies and environmental assessment evaluation. This site will be considered in the evaluation of cumulative impacts to the valued environmental components.

Preliminary Schedule

The preliminary schedule for the Programmatic EA is provided below. Note that there will be another opportunity to participate in the development of the Programmatic EA. It is anticipated that the Draft Programmatic EA will be available for agency and public review and comment in early 2013. Comments on the Programmatic Draft EA will be addressed as part of the preparation of the Final Programmatic EA.

Programmatic EA Steps	2012								2013			
	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Conduct Scoping												
Prepare Draft EA												
Publish Draft EA for Review												
Comment Period												
Prepare Final EA												
Issue Finding of No Significant Impact or Notification of Intent to prepare an Environmental Impact Statement												

Attachment 2:

Stakeholder Scoping Meeting Notes, Sign-In Sheets and Presentation

Arlington National Cemetery Master Plan
Agency Scoping Meeting Notes

25 July 2012 11:00 am to 12:00 pm

Attendees: See attached sign-in sheet

Purpose: The purpose of the meeting was to solicit agency input regarding the Arlington National Cemetery Master Plan and potential environmental effects.

Discussion:

The meeting began with a presentation by Ms. Kulvelis of HNTB Corporation. (Presentation attached)

Following the presentation, several agency representatives asked questions and provided comments. The questions and comments are summarized in the following bullets:

- An agency representative asked whether archaeology would fall under "Cultural Resources". ANC confirmed that archeological resources would be addressed as part of evaluating cultural resources.
- The National Park Service (NPS) questioned whether a programmatic environmental assessment (EA) was appropriate. In their experience, tiering is only done in the context of a programmatic environmental impact statement (EIS). It was explained that the Army encourages the development of programmatic documents whether it be an EA of an EIS. ANC has elected to prepare an EA because the types of projects being considered do not normally cause significant impacts. ANC chose to prepare a programmatic EA because the Master Plan includes phased and conceptual projects. For these types of projects, details necessary to evaluate impacts will not be available when the EA is prepared. Therefore, future environmental documentation will be "tiered" off of the programmatic EA as the necessary project details become available.
- The Virginia Department of Environmental Quality (VDEQ) asked what document/guidance/ regulations will be used to determine whether impacts are significant. This information was submitted to VDEQ via e-mail later.
- The National Capitol Planning Commission (NCPC) and the U.S. Commission of Fine Arts (CFA) recommended that the master plan identify areas to be reserved for future monuments.
- NCPC asked if there would be a public scoping meeting. ANC responded that none was planned.
- An agency representative asked about when pedestrian analysis would be completed. ANC explained that a Comprehensive Traffic Engineering Study that includes pedestrian considerations is underway.

- An agency representative advised that just because the Navy Annex is unoccupied does not mean that roadway impacts can be ignored, particularly if removing part of the roadway network.
- Agencies questioned whether separation of funeral participants from general visitors and administrative personnel would be achievable and desirable. In addition, the need for the administrative staff to be located within the cemetery was questioned.
- The NPS asked to be updated on proposed changes to vehicular circulation as the Master Plan evolves.
- NPS indicated that parked tour buses sometimes line both sides of Memorial Avenue. This is undesirable from a viewshed standpoint. Perhaps the Master Plan will identify a solution to this problem.
- The NPS stated that the EA should address the impacts of the proposed projects on Arlington House.
- NCPC requested that ANC explore the potential for offering a service other than the TourMobile for people with physical constraints. ANC responded that in order to provide this type of service Congress would first have to change ANC's authorization.
- Arlington County noted that stormwater from ANC flows into the Arlington County stormwater system. Therefore, conditions of their MS4 permit apply.
- ANC confirmed that the only document available for comment was the Informational Document provided as attachment to the scoping notification e-mail. As the scoping was being conducted early in the Master Plan/NEPA process, no other documents were available for review.
- Various agencies noted that the following should be included in the Programmatic EA:
    - Viewshed analysis to and from ANC - consider views from DC and the other side of I 395
    - Coastal Zone Federal Consistency Determination
    - Effects of the alternatives on vegetation

Finally, there was a brief discussion of the former Navy Annex site preferred style of architecture. Recent experience has shown that in some cases it is preferred that the architecture of new development does not mimic that of a related historic district. Apparently, the ability to distinguish between the actual historic district and the new development was important. No conclusion was reached on this issue.

Sign In Sheet – Master Plan Agency Coordination Meetings

Arlington National Cemetery Master Plan and Navy Annex Area Development Plan
25 July 2012

Name	Work Group	Phone	Email
Alice Pool	USACE Norfolk District	757-201-7346	alice.p.pool@usace.army.mil
Daniel Delahaye	ANC Master Planning	703-614-4306	daniel.delahaye@us.army.mil
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Chuck Smith	HNTB	703-824-5100	chasmith@hntb.com
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Master Plan Agency Coordination Meetings – 25 July 2012			
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[redacted]	[redacted]	[redacted]	[redacted]
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Kent Carson	ANC - ENVIR	703 614 0105	

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Agency Scoping Meeting

Arlington National Cemetery Master Plan
Programmatic Environmental Assessment

Barb Kulvelis, C.E.P.

HNTB Engineers Architects Planners

July 25, 2012

US Army Corps of Engineers
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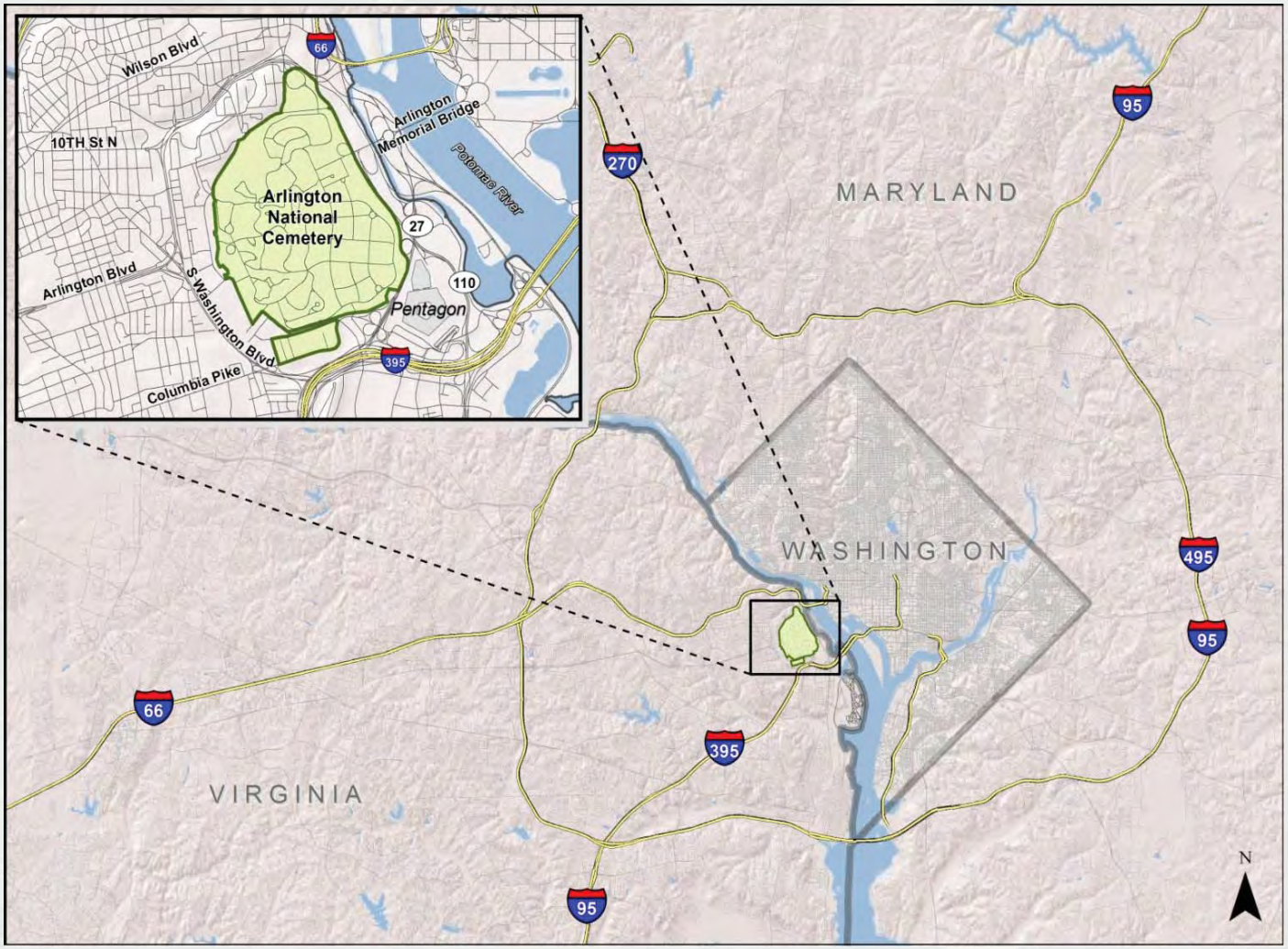
Presentation Overview

- Project Background
- Proposed Action
- Preliminary Purpose and Need
- Preliminary Alternatives
- Environmental Analysis
- Preliminary Schedule
- Comments and Discussion

Arlington National Cemetery



Arlington National Cemetery

Most hallowed burial ground of our nation's fallen.

- Memorializes history.
- Provides a vivid remembrance of the price so many have paid.
- Serves as a final resting place for over 400,000 people.
- Continues to honor the fallen through burial of 27-30 veterans and family members each day.
- One of most visited tourist sites in the area.

Arlington National Cemetery

Army National Cemeteries Program (ANCP) administers and operates ANC

ANCP develops Campaign Plan

Major objective is to update the **Master Plan**

Army regulations require concurrent preparation of **NEPA documentation**.

Master Plan

NEPA Document

Arlington National Cemetery Master Plan

Goal: Develop a plan that extends the useful operational life of the Cemetery to the maximum extent possible.

Documents:

- Short Range Component
- Long Range Component
- Capital Investment Strategy
- Installation Design Guide
- Navy Annex Site Area Development Plan
- Real Property Master Plan Digest

National Environmental Policy Act (NEPA)

- **Programmatic EA** – the Master Plan will likely include phased and/or conceptual development; information needed to determine specific impacts may not yet be available.
- Required NEPA documentation can be "tiered" off of Programmatic EA.

The EA will be prepared in accordance with 32 CFR Part 651 [Army Regulation 200–2], *Environmental Analysis of Army Actions* and the NEPA Guidance Manual (U.S. Army Environmental Command May, 2007).

Proposed Action

- Proposed Action will be based on:
  - Short and Long Range Components of the Master Plan
  - Installation Design Guide
  - Navy Annex Site Area Development Plan

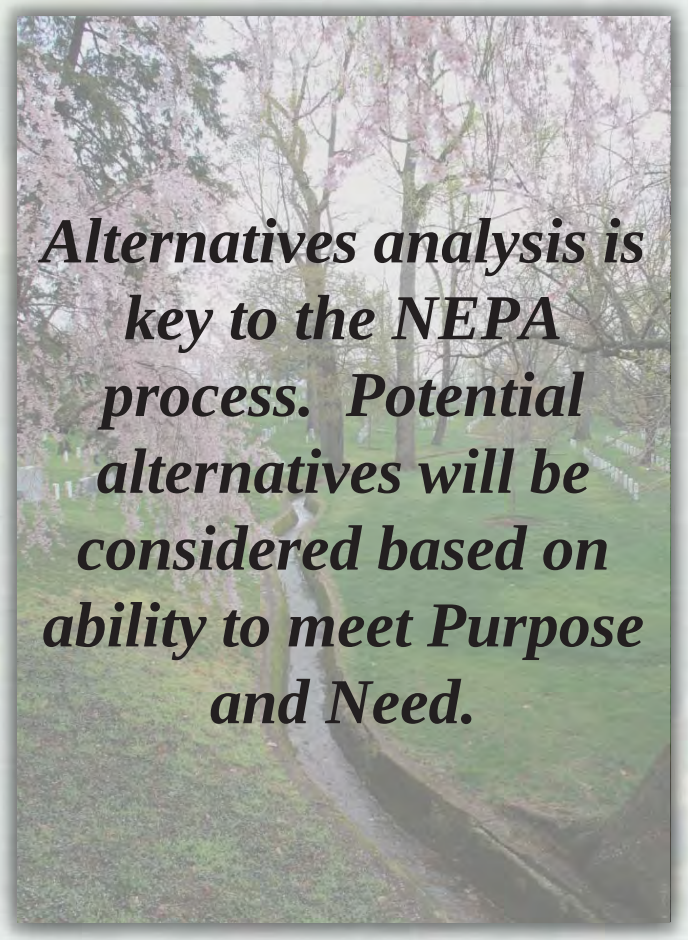
- Projects may range from installation of sidewalks to relocation of the administration building.

*Note that development of Millennium Project site will not be included in the Proposed Action.

Preliminary Purpose and Need

Expand burial capacity.
Enhance the funeral and visitor experience.
Repair and modernize infrastructure.
Address deficient staff facilities.
Accommodate new mission requirements.
Promote sustainability.
Improve and maintain security.

Preliminary Alternatives



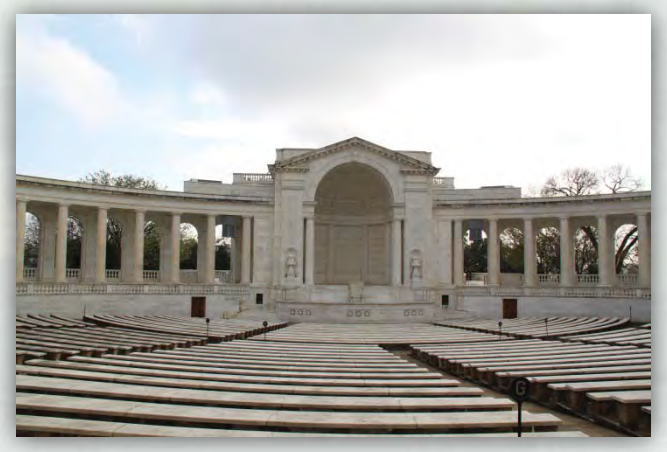
It is anticipated that the following alternatives will be considered:	
No Action	No changes to existing facilities.
Proposed Action	To be defined by the Master Plan.
Alternatives to the Proposed Action	Likely related to variations on the Navy Annex Site.

Environmental Analysis

Environmental impacts of the Proposed Action and reasonable alternatives will be evaluated.

Impacts to valued environmental resources will be analyzed according to the U.S. Army Environmental Center's (USAEC) NEPA Analysis Guidance Manual.

Environmental Analysis



All environmental components (resources) will be addressed.

Based on preliminary review of the affected environment, primary emphasis will be on the following:

- Cultural Resources
- Water Resources Management
- Land Use
- Traffic and Transportation Systems

Preliminary Schedule

Programmatic EA Steps	2012								2013			
	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Conduct Scoping												
Prepare Draft EA												
Publish Draft EA for Review												
Comment Period*												
Prepare Final EA												
Issue Finding of No Significant Impact or Notification of Intent to prepare an Environmental Impact Statement												

*** Next opportunity to participate in the development of the Programmatic EA:**

It is anticipated that the Draft will be available for agency and public review and comment in early 2013.

Comments

The ANCP encourages each agency to review the information and materials and provide comments by August 10, 2012.

Submit written comments to:
Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003
Daniel.b.delahaye.civ@mail.mil

Please Copy:
Barbara A. Kulvelis, CEP
Senior Environmental Planner
HNTB Corporation
2900 South Quincy Street
Arlington, VA 22206
bkulvelis@hntb.com

Arlington National Cemetery Master Plan
Navy Annex Area Development Plan Charrette
Agency Meeting Notes

25 July 2012 9:00 am to 10:30 am

Attendees: See attached sign-in sheet

Purpose: The purpose of the meeting was to solicit agency input regarding the proposed development of the former Navy Annex site.

Discussion:

The meeting began with introductions and a presentation by Mr. Pieplow of HNTB Corporation. (Presentation attached)

Following the presentation, each agency was afforded an opportunity to comment. The following is a summary of the comments provided:

Joint Base Myers-Henderson Hall

- Interested in whether the land swap would include Southgate and access road along the west edge of the Annex.
- Satellite EMS facility in parcel D (gas station site) for travel times if there is an increase in population density.

Pentagon Reservation Master Planner

- Favored land exchange.
- Suggested moving ANC maintenance area adjacent to the VDOT maintenance area.
- Consider a cultural row consisting of Pentagon 9/11 Memorial Visitor Center, Arlington History Museum, Air Force Memorial, and ANC Visitor Center.
- Pushing for A, B and D to become a contiguous land mass.

Commission on Fine Arts

- Remove VDOT maintenance yard.
- Transportation will play a key role in the success of the Annex Site. The streetcar connection needs to be considered.
- Acquisition of Southgate Rd will be mandatory to the success of the Annex Site. “Stitching” the annex and the existing cemetery seamlessly together.
- How will the Air Force Memorial be incorporated into the plan?
- Will the former Navy Annex site be gated once developed?
- How do you make the Navy Annex portion of ANC feel like it is not second-class?
- Uncomfortable with interments south of Columbia Pike.
- Columbia Pike is an evacuation route for Washington DC.

- Study moving some administrative functions off site or separating administration and family services personnel into their own facilities.
- Include the cemetery entry area in the ADP.
- (Fredrick Lindstrom) suggests taking the north loop off Memorial Drive (the 110 S access ramp) for use as an administrative center. He suggests there be something else worked out to get people on 110 S.
- Use bus access off 110 for the south side of the parking lot.

National Capital Planning Commission

- Would the vegetated buffer along the west edge of the annex site pose issues for a potential future access road?
- Would like to see a proposed site for the Arlington History Museum.
- Proposed the relocation of the maintenance department south of Columbia Pike.
- Concerned about the moving the administrative facilities. NCPC was informed the current facility is half the required size.
- Concerned about moving visitors center or administrative facilities away from Memorial Avenue and the Arlington National Cemetery metro stop.
- Recommended setting aside specific sites for monuments and memorials in advance of proposed placement.
- Consider impacts on views to and from the cemetery.

Washington Headquarters Services

- Reminded all the NW loop at 110 adjacent to the Navy Annex Site is proposed/was proposed earlier this year for a 9/11 interpretive center.

Air Force Memorial (AFM)

- The Air Force Memorial is not a 24-7 operation.
- The Air Force Memorial is on Army owned land and has a 50-year lease.
- It serves as a functional space hosting weddings, promotions, retirements and musical events.
- Stabilization of the Parcel B slope is required in order to keep the memorial intact.
- Many visitors to the memorial want to subsequently visit ANC, but have difficulty getting there. A link between the two is supported by AFM.
- There was the impression there would be fence to separate the AFM from ANC. Now that there has been talk of integration, there is a desire for further discussion between ANC and the AFM.
- Views form the Air Force Memorial must remain intact.

Honor Guard

- Families need to feel like they are part of ANC, do not separate sections.
- Bus circulation and parking for committal services needs to be addressed.

National Park Service

- The land for the visitors' center was transferred to the Army by the National Park Service. If the visitor center is moved, the impact on the agreement should be evaluated.
- The impact on metro riders needs to be considered in light of moving the visitors' center.
- Pedestrian connections to the surrounding attractions need to be considered.
- Great opportunity to have a corridor (Pentagon Memorial/Museum, ANC, AF Memorial, etc.)

Virginia Department of Transportation

- Noted reduction in traffic near the former Navy Annex site.

Virginia Department of Environmental Quality (DEQ)

- Explained state impact review requirements.

Arlington County

- Asked whether the Building 1 area of the former Navy Annex site would be transferred to Arlington County. ANC responded that negotiations are underway but that the law states that the transfer "may" take place.
- Discussion on location of Arlington History Museum
- The land on the south side of Columbia Pike would be acceptable as a land swap option.
- Arlington County will work with ANC to create a solution everyone will be proud of
- The land use and housing plan along the Columbia Pike Transportation Corridor was approved for greater density (5-6 stories)
- Continued concern about traffic affects particularly for the Fox Croft Heights neighborhood.
- They would like to see options incorporating the land swap

Chairman Board Freeman's Village

- Many concerns about the land transfer or lack thereof.
- Willing to work with other agencies.

Sign In Sheet – Master Plan Agency Coordination Meetings

Arlington National Cemetery Master Plan and Navy Annex Area Development Plan
25 July 2012

Name	Work Group	Phone	Email
Alice Pool	USACE Norfolk District	757-201-7346	alice.p.pool@usace.army.mil
Daniel Delahaye	ANC Master Planning	703-614-4306	daniel.delahaye@us.army.mil
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Joel Gordes	NPS NCR	2026197405	Joel_Gordes@nps.gov

Area Development Plan (ADP) Charrette

Navy Annex Site

Arlington National Cemetery
Soldiers' and Airmen's Home National Cemetery

Brian Pieplow, AICP, LEED AP BD+C

HNTB Engineers Architects Planners

25 July 2012

US Army Corps of Engineers
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Agenda

- Introductions
- Area Development Plan Description
- Understanding the Site
- Design Patterns
- Programming Options
- Key Goals
- Key Assumptions
- Initial Planning Charrette

Consultant Leadership Team

- **Brian Pieplow, AICP, LEED AP**
  - **Project Manager, Principal Planner**
- **Ryan Bricker, ASLA**
  - **Master Planner, Principal Landscape Architect**
- **Barb Kulvelis, CEP**
  - **Principal Environmental Planner**
- **Gregg Schwieterman, AIA, LEED AP**
  - **Principal Architect**
- **Charles L.T. Smith, AIA**
  - **Principal Architect**

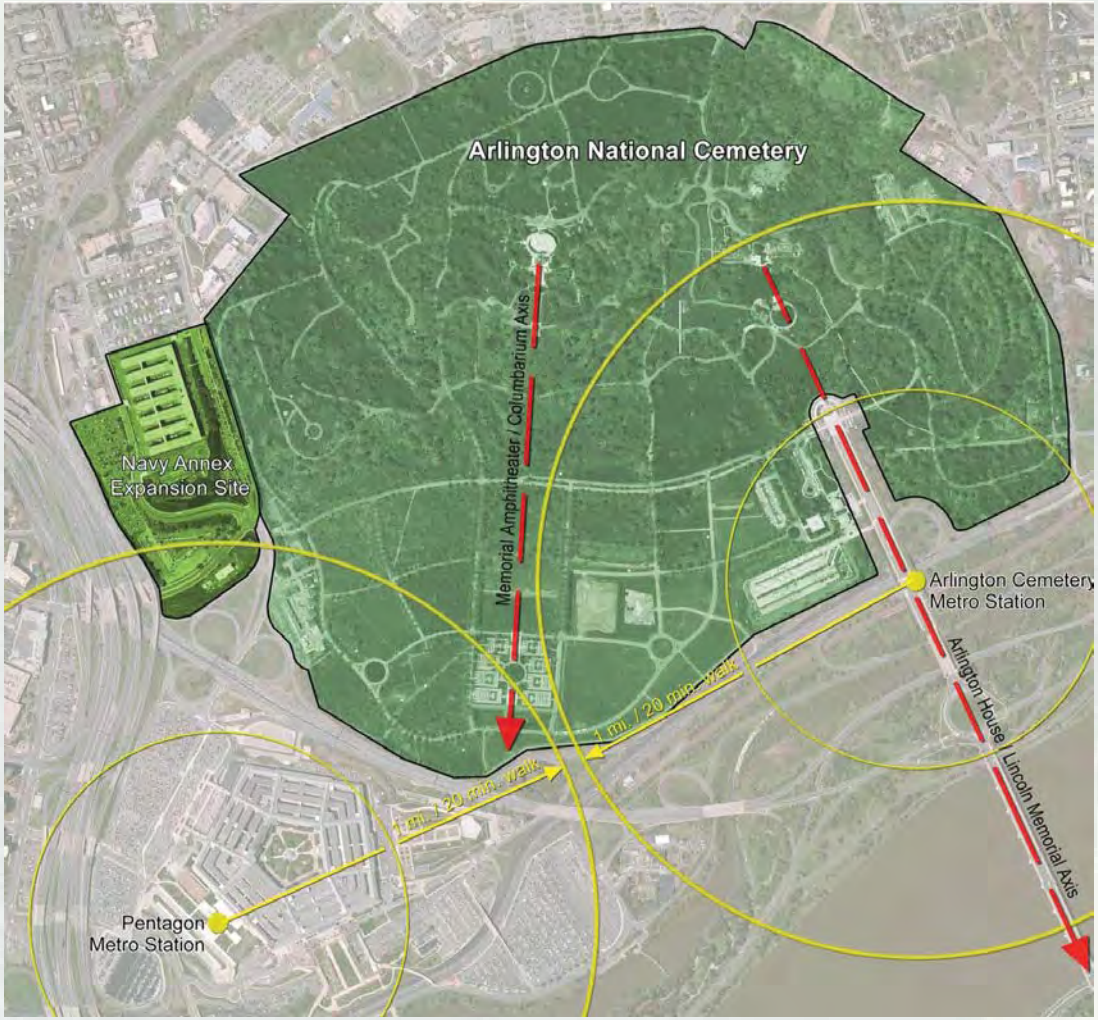
Area Development Plan Description

The Area Development Plan (ADP) for the Navy Annex Site is a component document of the Arlington National Cemetery (ANC) and the Soldiers' and Airmen's Home National Cemetery (SAHNC) Master Plan.

The Navy Annex Site Area Development Plan (ADP) is a site-specific detailed area development plan for the future growth of ANC to identify development concepts and options for this property. The report will include:

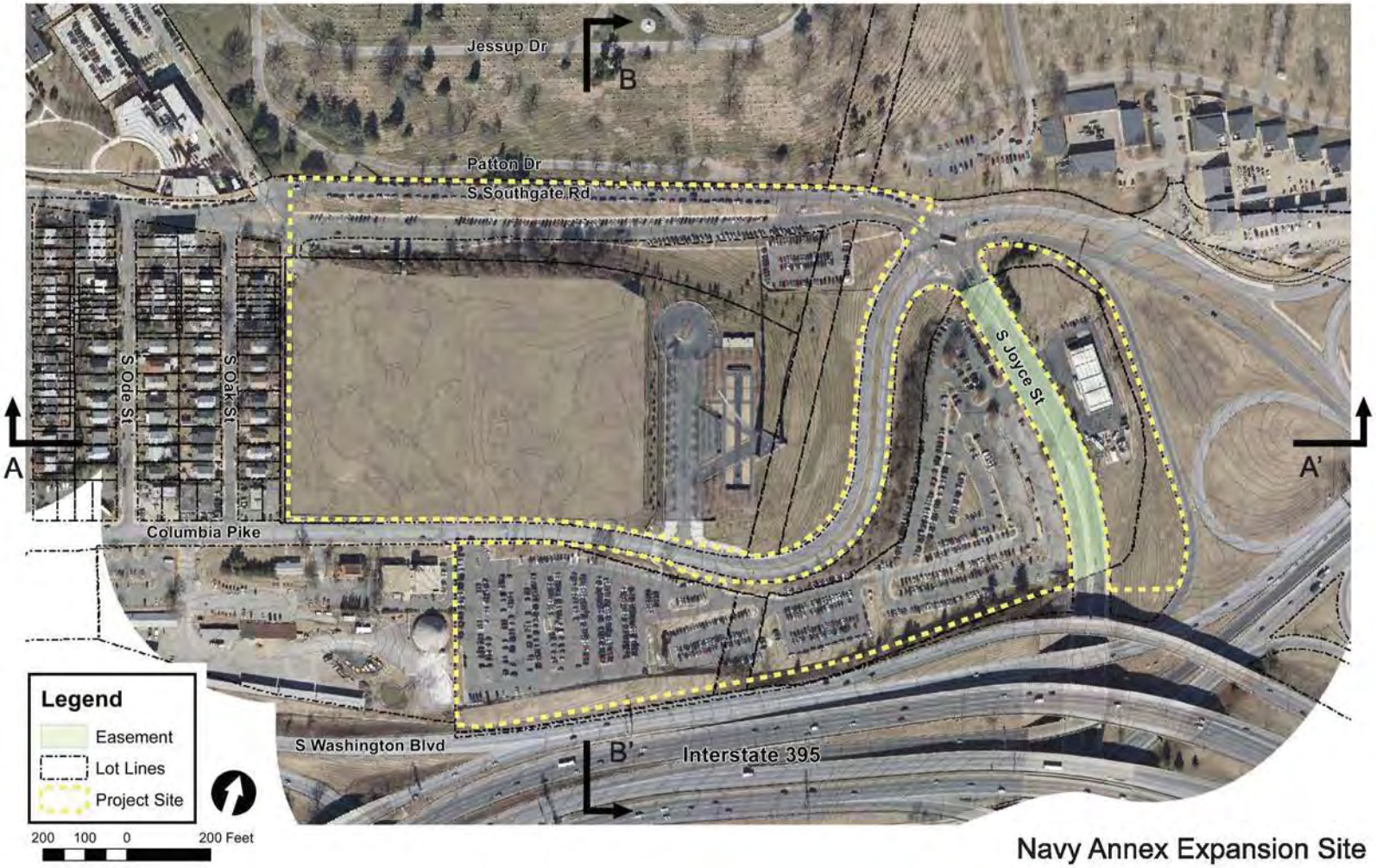
- Goals
- Design Patterns
- Design Principals
- Development Program
- Options
- Relative Cost
- Impact on Operations
- Impact on Environment

Understanding the Site



Overall Site Plan

Understanding the Site



Enlarged Site Plan

US Army Corps of Engineers – Norfolk District

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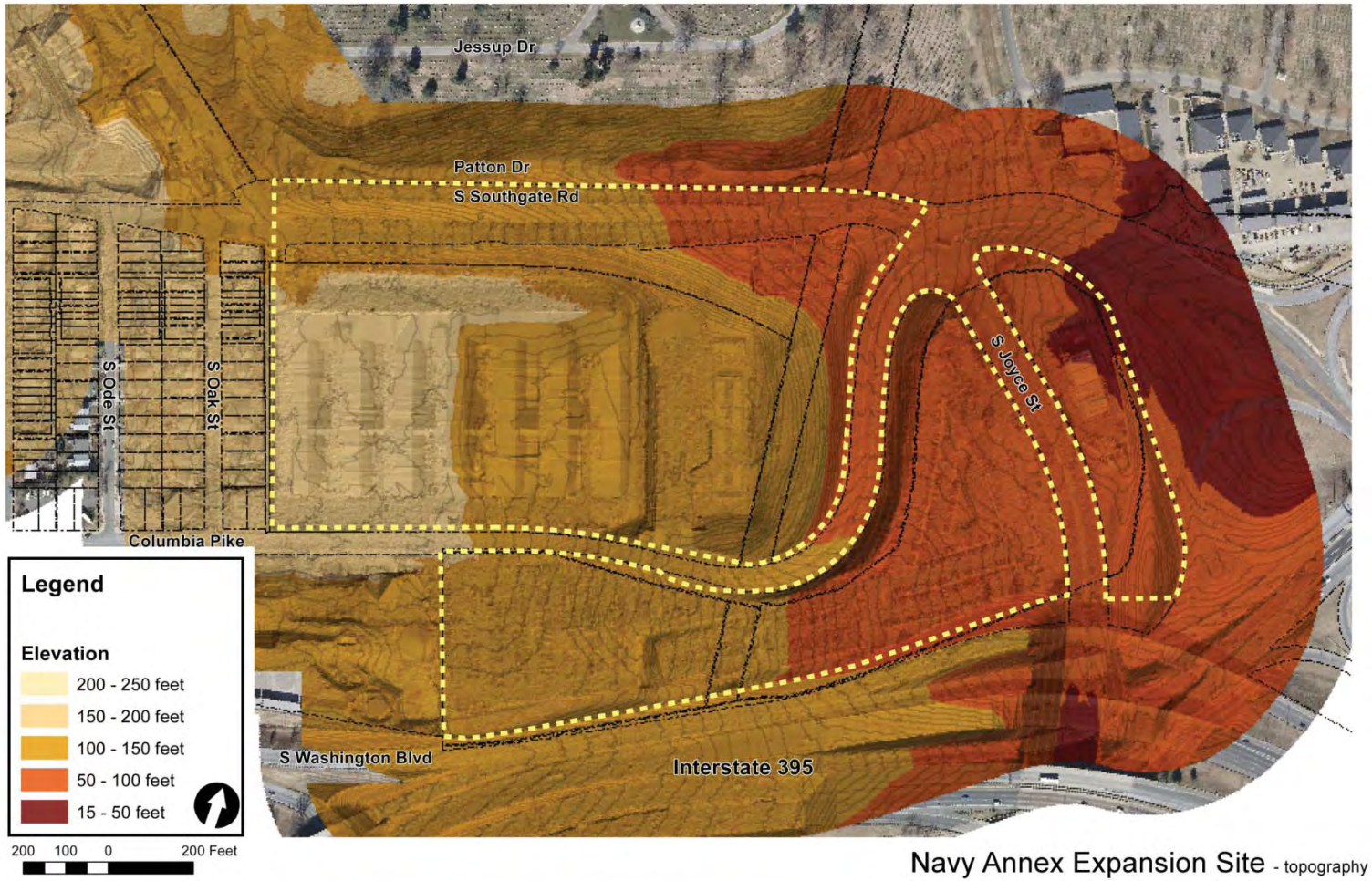
Understanding the Site



Enlarged Topographic Plan

US Army Corps of Engineers – Norfolk District

BUILDING STRONG®

Understanding the Site

Slope Analysis

US Army Corps of Engineers – Norfolk District

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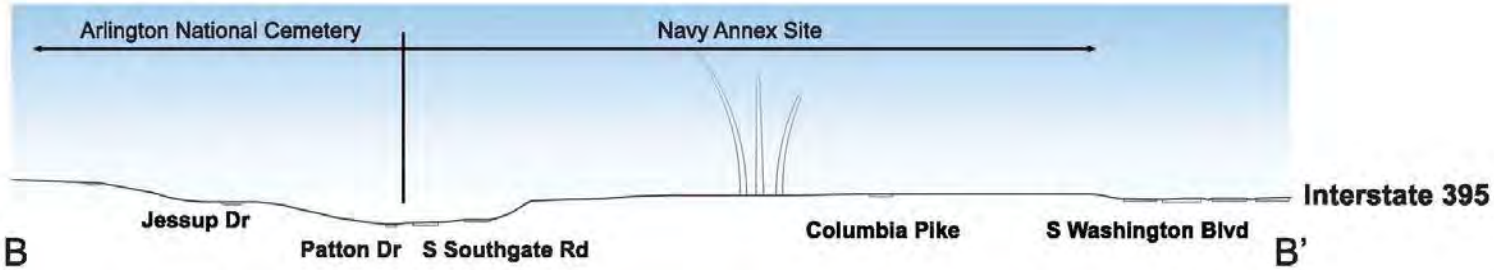
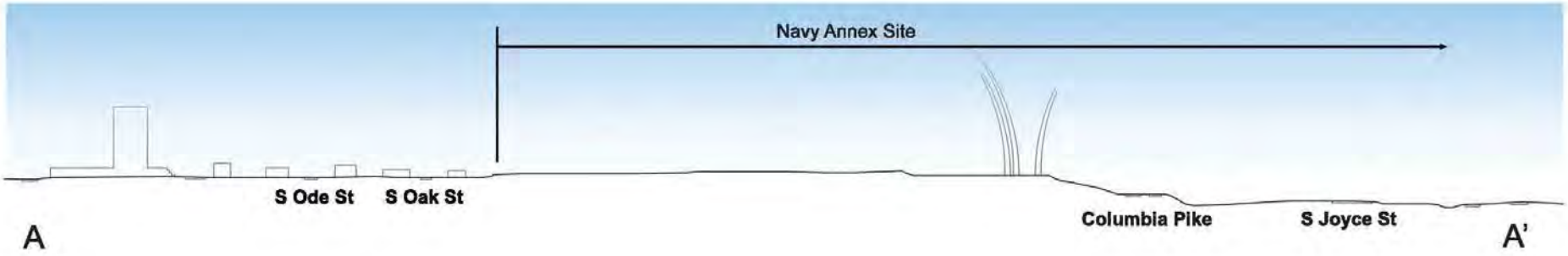
Understanding the Site





Site Sections

US Army Corps of Engineers – Norfolk District

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Understanding the Site

1

2

3

Site Constraints

1. Southgate Road and utilities easement to remain (looking west)
2. Columbia Pike divides the site (looking west)
3. Dramatic inclines will impact development (looking south)

Understanding the Site

1

2

3

Site Constraints

1. Adjacent to VDOT service area (looking west)
2. Adjacent to I-395 (looking south)
3. Adjacent to residential area (looking north)

Understanding the Site

1

2

3

Site Opportunities

1. Large flat site (looking east)
2. Large flat site (looking west)
3. Land contiguous to ANC (looking south)

Understanding the Site

1

2

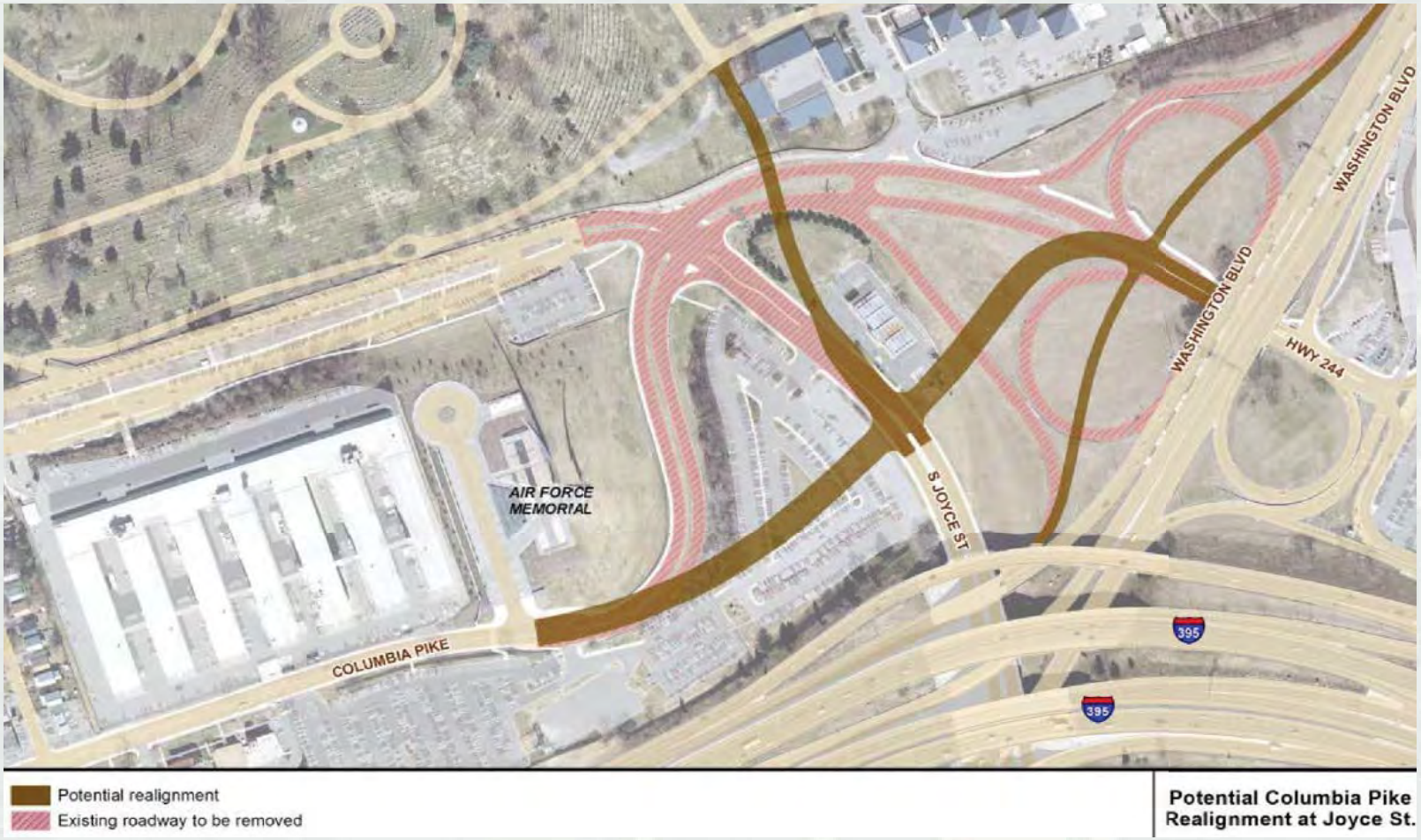
3

Site Opportunities

1. Scenic vistas over ANC (looking north)
2. Scenic vistas over Washington DC (looking east)
3. Air Force Memorial

Understanding the Site

1



Site Opportunities

1. Planned realignment of Columbia Pike as a new transit corridor

Design Patterns

1

2

3

1. In ground burials
2. Niche walls
3. Columbaria

Design Patterns

1

2

3

1. Memorials
2. Buildings
3. Mausolea (none currently at ANC)

Programming Options

Mausoleums

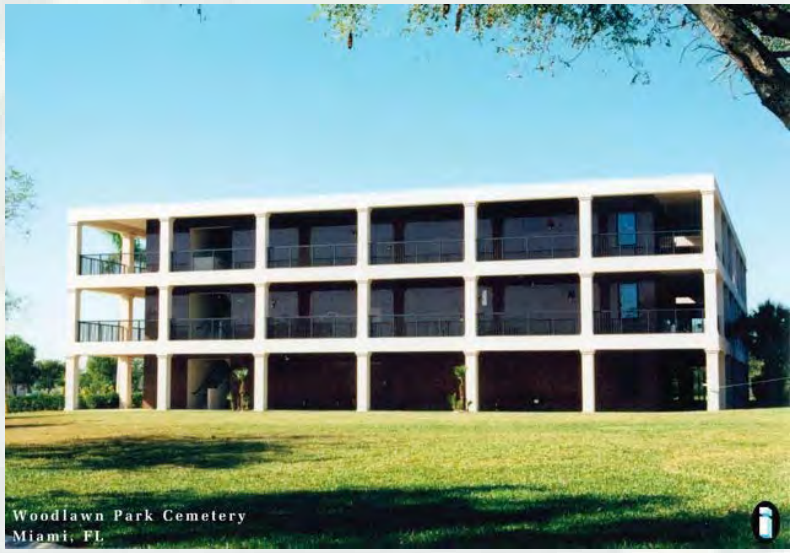
Both indoor and garden mausoleums are available, the latter being a less expensive alternative without the cost of conditioning the indoor facility.

Materials

Granite mausoleums have a lower construction cost. For more classical styling white marble mausoleum is appropriate, although *marble mausoleum* comes in grey, black, or various other colors. A Marble Mausoleum tends to be longer lasting, but is considerably more expensive than the more popular mausoleum granite.

Size

The crypt front opening is about 32" wide by 26" high by 8' long.



Programming Options

Mausoleums

Lakewood Cemetery Garden Mausoleum, Minneapolis, MN

US Army Corps of Engineers – Norfolk District

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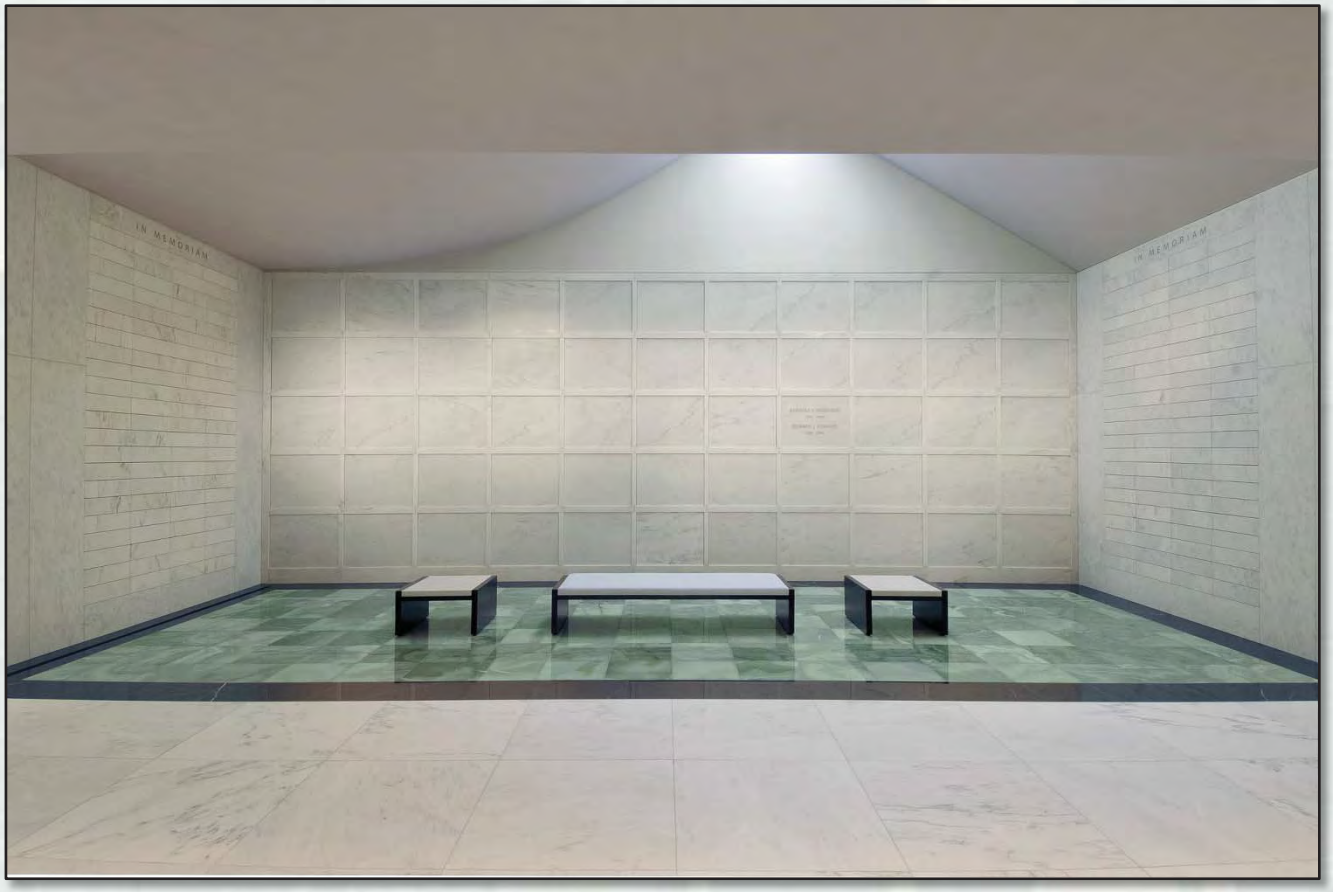
Programming Options

Mausoleums

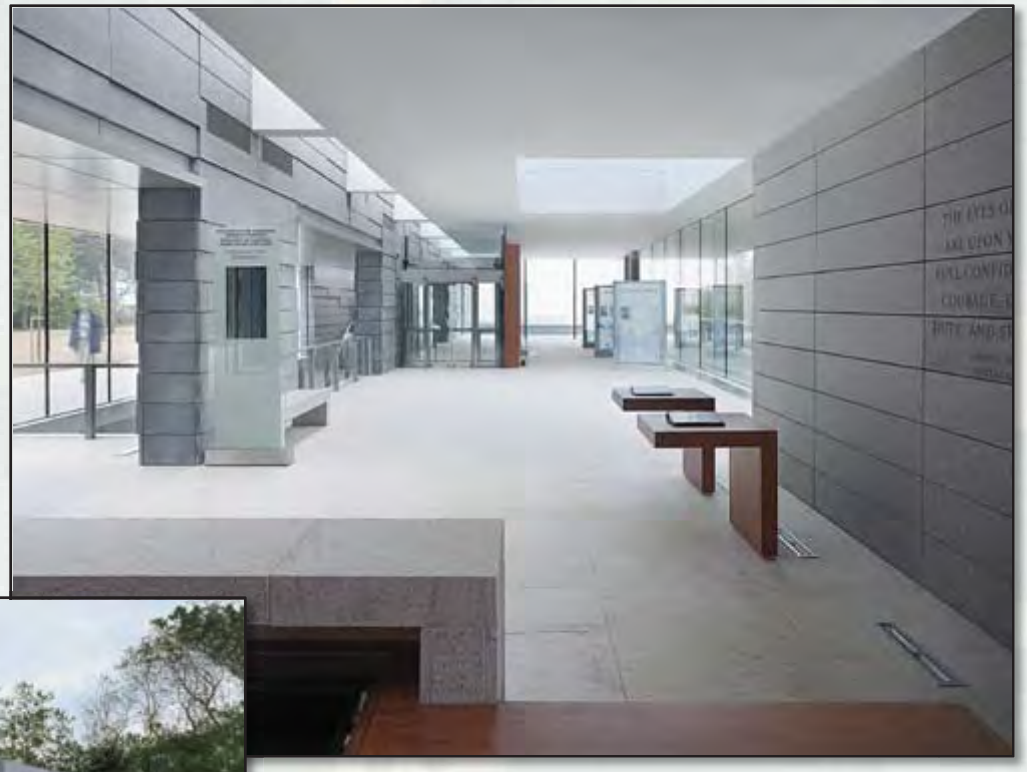


Lakewood Cemetery Garden Mausoleum, Minneapolis, MN

Programming Options

Visitors Center – Case Study

Normandy American Cemetery Visitors Center
Normandy, France
Gross square footage: 30,000 sq.ft.
Total construction cost: $30 million



Programming Options

Visitors Center – Case Study

Normandy American Cemetery Visitors Center
Normandy, France
Gross square footage: 30,000 sq.ft.
Total construction cost: $30 million

Programming Options

Memorial Walk

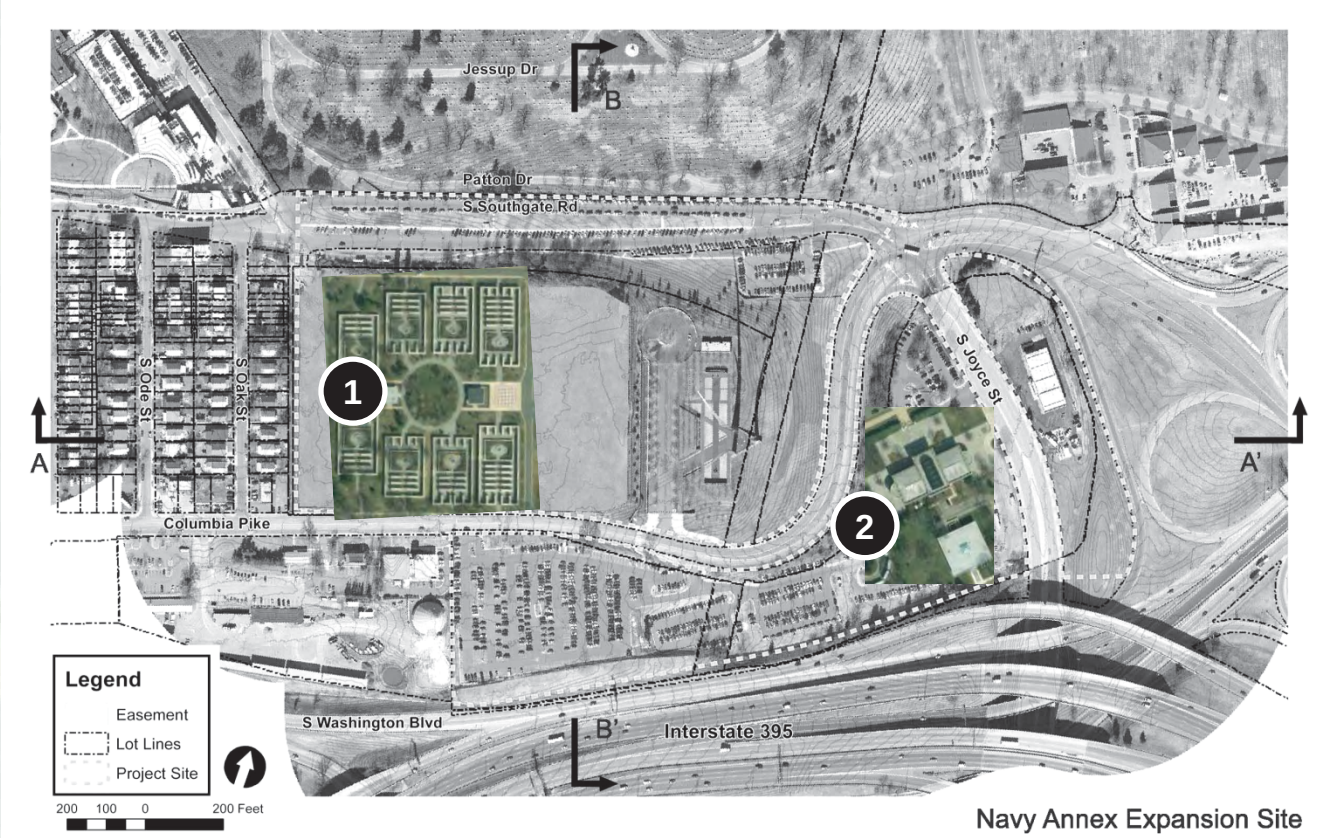
Semper Fidelis Memorial Park

Edward Kennedy Memorial

Programming Options

Scale

To provide a sense of scale the existing columbaria Courts (item 1) and visitor/ administration complex (item 2) have been arbitrarily placed on the annex site



Key Goals

- Maximize burial sites to extend the useful operational life of Arlington National Cemetery (ANC)
- Minimize conflicts between key user groups, organize traffic flows
- Preserve the serenity, beauty and tranquility of the site

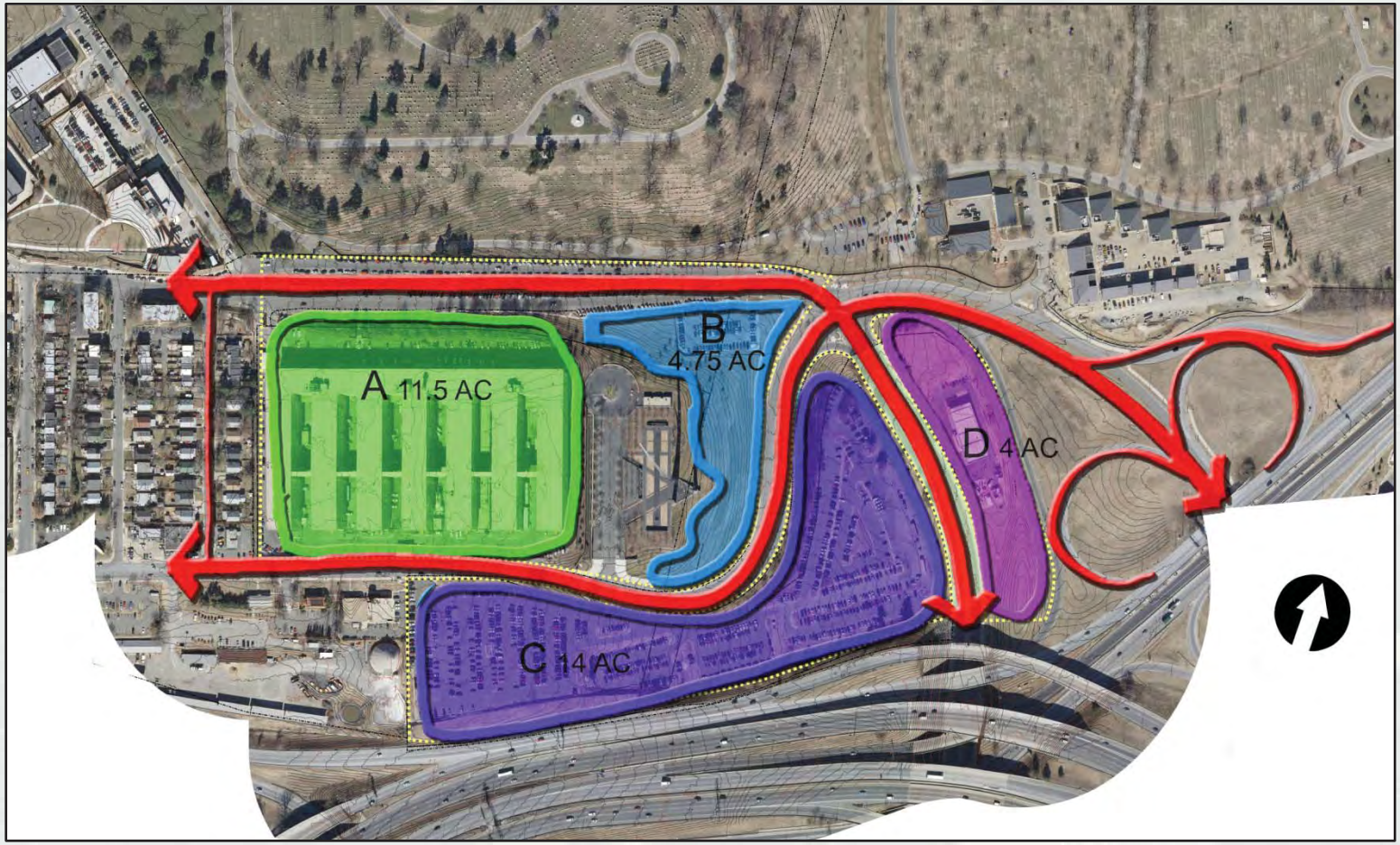
Key Assumptions

- There will be a separation between casual visitors and tourists from families who are attending funerals or visiting family members who are laid to rest in ANC.
- The administration/family functions are combined in one facility and could be relocated to the Navy Annex Site

Key Assumptions

- The "Federal Office Building #2" Site will be referred to as the "Navy Annex Site" (Parcel A)
- The Navy Annex Site will only be used for committals per the NDAA
- Mausoleums will be considered but shall be open air
- ANC end state will be battlefield monument and arboretum
- The Navy Annex options shall address the challenge of its urban surroundings
- Options are within the existing roadway network, but will not pre-empt future changes

Option 1 – Baseline Condition



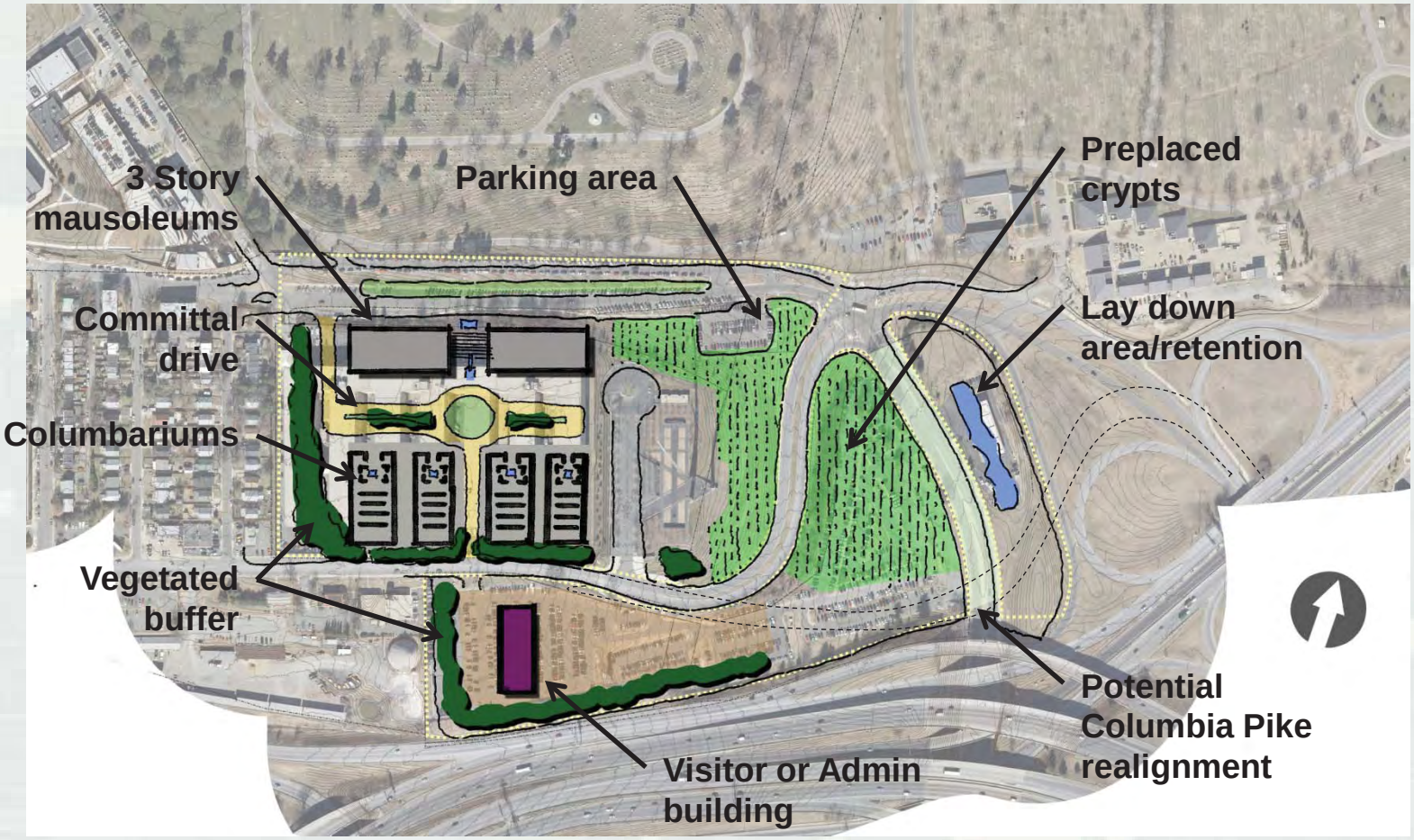
Initial Planning Charrette

- The minimum target capacity for this project is 60,000 plus committals
- The new committal option of mausoleums will require a new eligibility policy
- There will be no committals where there is potential for future road relocation
- The committal ceremony will need consideration with all designs (e.g. firing parties, caissons)
- Sustainable practices (bio-swales, stormwater storage)
- Phasing of work on parcels will be based on overall master plan

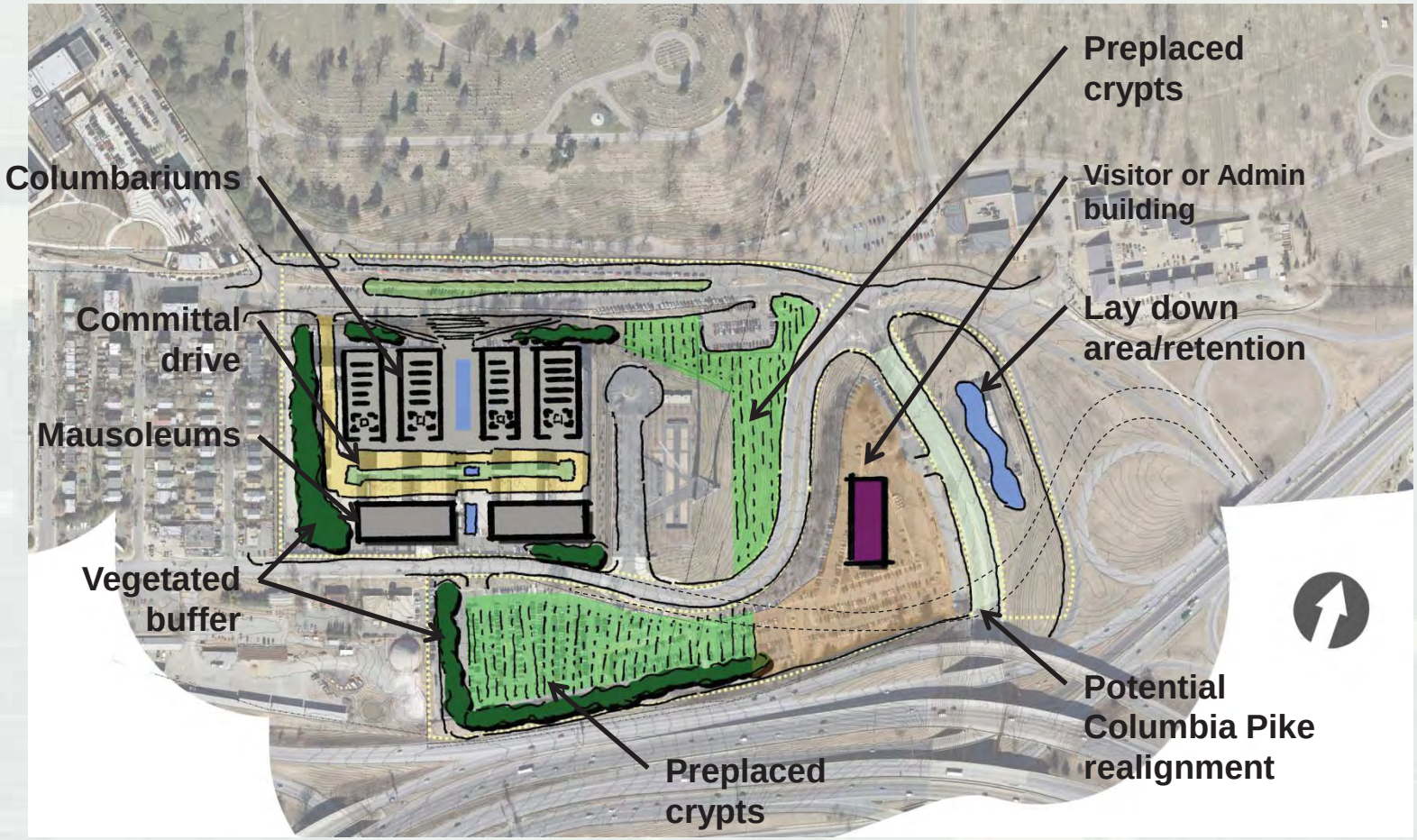
Key Considerations

- Human Scale
- Stand-off distances needed for the admin building
- Small existing parking area off Southgate Rd
- A vegetated buffers (I-395, residential area)
- ADA accessible walk with areas for rest (Edward Kennedy Memorial)
- Terraced options to blend with surroundings

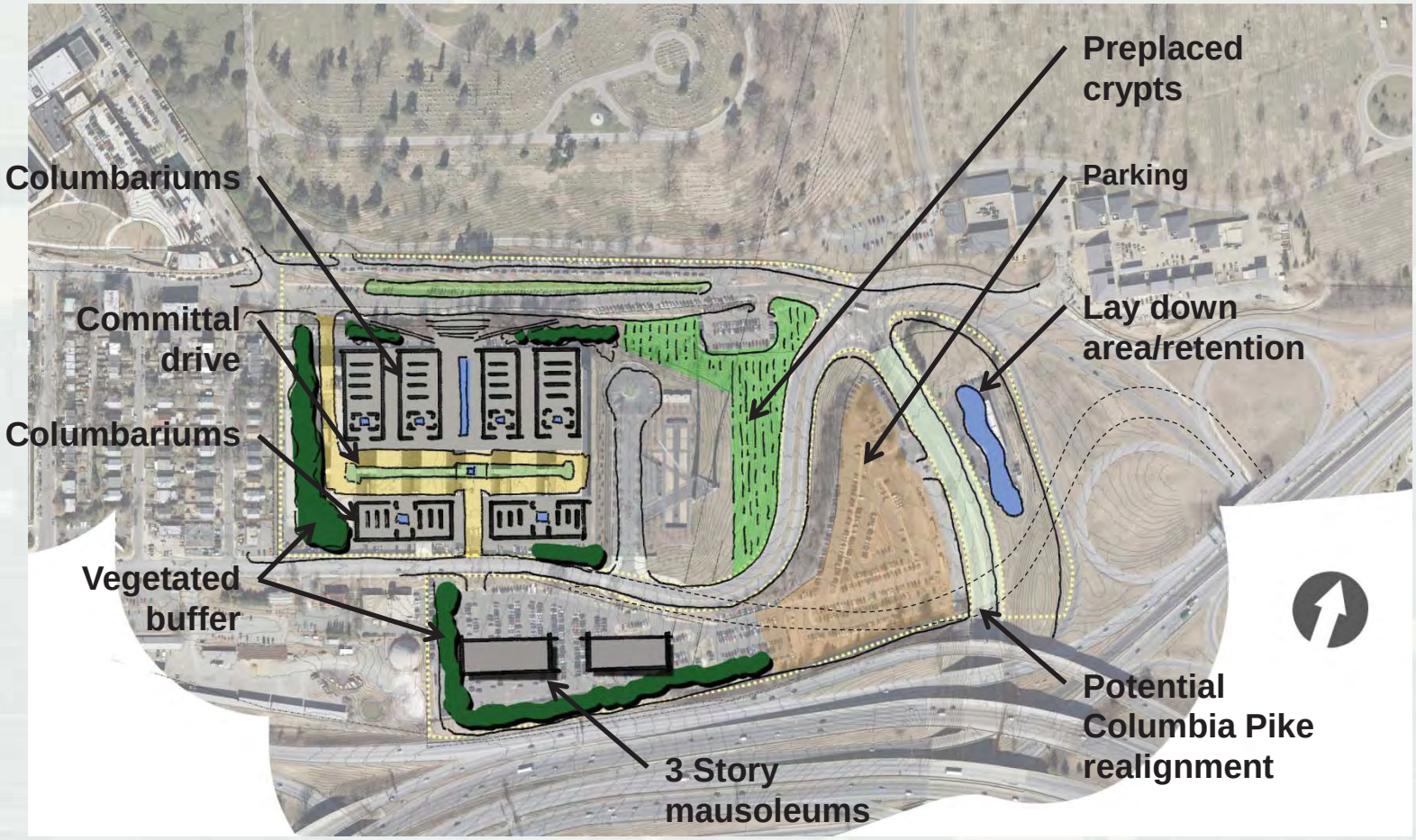
Option 1 – Scheme A



Option 1 – Scheme B



Option 1 – Scheme C



Thank you!

US Army Corps of Engineers – Norfolk District

BUILDING STRONG®

Attachment 3:

Written Scoping Responses

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
TDD (804) 698-4021
www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

July 23, 2012

Mr. Daniel Delahaye
Master Planner
Arlington National Cemeteries Program
1 Memorial Drive, AD Building
Arlington, Virginia 22211-5003

RE: Informational Document, Arlington National Cemetery Master Plan, Programmatic Environmental Assessment

Dear Mr. Delahaye:

Thank you for sending us the above-referenced Informational Document with (your July 18, 2012 e-mail) and soliciting comments on the Master Plan and the Programmatic Environmental Assessment (EA) that is being prepared for it.

DESCRIPTION OF PROPOSED ACTION

The Army National Cemeteries Program (ANCP) is updating the Arlington National Cemetery Master Plan to support and promote the Cemetery's core mission, which is to honor our Nation's fallen military heroes, and to extend the useful operational life of the Cemetery. The Master Plan will include several components:

- Short-range Component, addressing short-term (1 to 5 years) requirements;
- Long-range Component, addressing future projects and long-range vision for the Cemetery;
- Capital Investment Strategy, a guide to prioritizing projects and allocating assets;
- Installation Design Guide, presenting criteria for new facilities development, landscapes, signage, and amenities;
- Navy Annex Site Area Development Plan, which will guide development of the area recently transferred from the Navy to the Army for Cemetery expansion; and
- Real Property Master Plan Digest, an executive summary outlining key recommendations and identifying the overall vision.

(Informational Document, page 4.)

JUL 26 2012 PM 5:00

ENVIRONMENTAL REVIEW UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT

The roles of the Virginia Department of Environmental Quality (DEQ) in relation to the project are as follows. First, DEQ's Office of Environmental Impact Review (OEIR) will coordinate Virginia's review of the NEPA document and comment to the Army National Cemeteries Program on behalf of the Commonwealth. A similar review process will pertain to the Federal Consistency Determination (FCD) (next heading). If the FCD is provided as part of the environmental document, there can be a single review.

As you know, the National Environmental Policy Act (PL 91-190, 1969) (NEPA) and its implementing regulations (Title 40, *Code of Federal Regulations*, Parts 1500-1508) require draft and final Environmental Impact Statements (EISs) for federal or federally-licensed or -funded undertakings which will or may give rise to significant impacts upon the human environment. EISs carry more stringent public participation requirements than EAs and provide more time and detail for comments and public decision-making. The possibility that an EIS may be required for the operations and facilities contemplated in the proposed action should not be overlooked in your planning for it. Accordingly, we refer to "NEPA document" in this letter.

FEDERAL CONSISTENCY UNDER THE COASTAL ZONE MANAGEMENT ACT

Pursuant to the Coastal Zone Management Act of 1972, as amended, federal activities affecting Virginia's coastal resources or coastal uses must, to the maximum extent possible, be consistent with the Virginia Coastal Zone Management Program ("VCP") (see section 307(c)(1) of the Act and the *Federal Consistency Regulations*, 15 CFR Part 930, subpart C, sections 930.30 *et seq.*). The Army National Cemeteries Program must provide a consistency determination which includes an analysis of the proposed activities in light of the enforceable policies of the VCP (first enclosure) and a commitment to comply with the enforceable policies. In addition, we invite your attention to the advisory policies of the VCP (second enclosure). As indicated, the FCD may be provided as part of the NEPA document or independently, depending on your preference. We recommend, in the interests of an effective review, that the FCD be provided with the NEPA document and that 60 days be allowed for review, in keeping with the *Federal Consistency Regulations* (see section 930.41(a)). Section 930.39 of these *Regulations*, and Virginia's Federal Consistency Information Package give content requirements for the FCD. The Federal Consistency Information Package is available at http://www.deq.virginia.gov/Portals/0/DEQ/EnvironmentalImpactReview/FederalConsistencyManual.7.27.11.pdf.

PROJECT SCOPING AND AGENCY INVOLVEMENT

While this Office does not participate in scoping efforts beyond the advice given in this letter, other agencies are free to provide scoping comments concerning the preparation of the NEPA document. Accordingly, we are sharing our response to the

letter with selected state and local Virginia agencies which have responsibilities bearing on the proposed action. These are likely to include the following (note: starred (*) agencies administer one or more of the enforceable policies of the VCP):

Department of Environmental Quality:
- Office of Environmental Impact Review
- Northern Regional Office*
- Division of Air Program Coordination*
- Division of Land Protection and Revitalization (formerly Waste Division)
- Division of Wetlands and Stream Protection*

Department of Conservation and Recreation:
- Division of Stormwater Management*
- DSM –Local Implementation*
- Division of Planning and Recreation Resources

Department of Health (Division of Water Programs)*
Department of Game and Inland Fisheries*
Marine Resources Commission*
Department of Historic Resources
Department of Transportation
Northern Virginia Regional Commission
Arlington County.

In order to ensure an effective coordinated review of the NEPA document and FCD, we will require 19 copies of the NEPA document and FCD when they are published. The submission may include 4 hard copies and 15 CDs or 4 hard copies and an electronic copy available for download at a website, file transfer protocol (ftp) site or the VITAShare file transfer system (*https://vitashare.vita.virginia.gov*). The document should include a U.S. Geological Survey topographic map as part of its information. We recommend, as well, that project details unfamiliar to people outside the Army National Cemeteries Program be adequately described.

If you have questions about the environmental review process or the federal consistency review process, please feel free to call me at (804) 698-4325 or John Fisher at (804) 698-4339.

Sincerely,

Ellie Irons

Ellie L. Irons, Program Manager
Environmental Impact Review

ec: Dell Cheatham, DEQ-NRO
Kotur S. Narasimhan, DEQ-DAPC
G. Stephen Coe, DEQ-DLPR
Christopher Egghart, DEQ-DWWP
Roberta Rhur, DCR
Amy M. Ewing, DGIF
Tony Watkinson, VMRC
Barry Mathews, VDH
Roger W. Kirchen, DHR
G. Mark Gibb, NVRC
Barbara Donellan, Arlington, County

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
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Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

Attachment 1

Enforceable Regulatory Programs comprising Virginia's Coastal Zone Management Program (VCP)

a. Fisheries Management - The program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities. This program is administered by the Marine Resources Commission (VMRC); Virginia Code 28.2-200 to 28.2-713 and the Department of Game and Inland Fisheries (DGIF); Virginia Code 29.1-100 to 29.1-570.

The State Tributyltin (TBT) Regulatory Program has been added to the Fisheries Management program. The General Assembly amended the Virginia Pesticide Use and Application Act as it related to the possession, sale, or use of marine antifoulant paints containing TBT. The use of TBT in boat paint constitutes a serious threat to important marine animal species. The TBT program monitors boating activities and boat painting activities to ensure compliance with TBT regulations promulgated pursuant to the amendment. The VMRC, DGIF, and Virginia Department of Agriculture Consumer Services (VDACS) share enforcement responsibilities; Virginia Code 3.2-3904 and 3.2-3935 to 3.2-3937.

b. Subaqueous Lands Management - The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, tidal wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the Department of Environmental Quality (DEQ). The program is administered by the Marine Resources Commission; Virginia Code 28.2-1200 to 28.2-1213.

c. Wetlands Management - The purpose of the wetlands management program is to preserve wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation.

(1) The tidal wetlands program is administered by the Marine Resources Commission; Virginia Code 28.2-1301 through 28.2-1320.

(2) The Virginia Water Protection Permit program administered by DEQ includes protection of wetlands --both tidal and non-tidal; Virginia Code §62.1-44.15:5 and Water Quality Certification pursuant to Section 401 of the Clean Water Act.

d. Dunes Management - Dune protection is carried out pursuant to The Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes. This program is administered by the Marine Resources Commission; Virginia Code 28.2-1400 through 28.2-1420.

e. Non-point Source Pollution Control – (1) Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth. This program is administered by the Department of Conservation and Recreation; Virginia Code 10.1-560 et.seq.).

(2) Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater (see i) Virginia; Virginia Code §10.1-2100 –10.1-2114 and 9 VAC10-20 et seq.

f. Point Source Pollution Control - The point source program is administered by the State Water Control Board (DEQ) pursuant to Virginia Code 62.1-44.15. Point source pollution control is accomplished through the implementation of:

(1) the National Pollutant Discharge Elimination System (NPDES) permit program established pursuant to Section 402 of the federal Clean Water Act and administered in Virginia as the Virginia Pollutant Discharge Elimination System (VPDES) permit program.

(2) The Virginia Water Protection Permit (VWPP) program administered by DEQ; Virginia Code §62.1-44.15:5 and Water Quality Certification pursuant to Section 401 of the Clean Water Act.

g. Shoreline Sanitation - The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth. This program is administered by the Department of Health (Virginia Code 32.1-164 through 32.1-165).

h. Air Pollution Control - The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board (Virginia Code 10-1.1300 through §10.1-1320).

(i) Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater, Virginia established pursuant to the Chesapeake Bay Preservation Act; Virginia Code §10.1-2100 –10.1-2114 and Chesapeake Bay Preservation Area Designation and Management Regulations; Virginia Administrative Code 9 VAC10-20 et seq.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
TDD (804) 698-4021
www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

Attachment 2

Advisory Policies for Geographic Areas of Particular Concern

a. Coastal Natural Resource Areas - These areas are vital to estuarine and marine ecosystems and/or are of great importance to areas immediately inland of the shoreline. Such areas receive special attention from the Commonwealth because of their conservation, recreational, ecological, and aesthetic values. These areas are worthy of special consideration in any planning or resources management process and include the following resources:

a) Wetlands
b) Aquatic Spawning, Nursery, and Feeding Grounds
c) Coastal Primary Sand Dunes
d) Barrier Islands
e) Significant Wildlife Habitat Areas
f) Public Recreation Areas
g) Sand and Gravel Resources
h) Underwater Historic Sites.

b. Coastal Natural Hazard Areas - This policy covers areas vulnerable to continuing and severe erosion and areas susceptible to potential damage from wind, tidal, and storm related events including flooding. New buildings and other structures should be designed and sited to minimize the potential for property damage due to storms or shoreline erosion. The areas of concern are as follows:

i) Highly Erodible Areas
ii) Coastal High Hazard Areas, including flood plains.

c. Waterfront Development Areas - These areas are vital to the Commonwealth because of the limited number of areas suitable for waterfront activities. The areas of concern are as follows:

i) Commercial Ports
ii) Commercial Fishing Piers
iii) Community Waterfronts

Although the management of such areas is the responsibility of local government and some regional authorities, designation of these areas as Waterfront Development Areas of Particular Concern (APC) under the VCRMP is encouraged.

Designation will allow the use of federal CZMA funds to be used to assist planning for such areas and the implementation of such plans. The VCRMP recognizes two broad classes of priority uses for waterfront development APC:

i) water access dependent activities;
ii) activities significantly enhanced by the waterfront location and complementary to other existing and/or planned activities in a given waterfront area.

Advisory Policies for Shorefront Access Planning and Protection

a. Virginia Public Beaches - Approximately 25 miles of public beaches are located in the cities, counties, and towns of Virginia exclusive of public beaches on state and federal land. These public shoreline areas will be maintained to allow public access to recreational resources.

b. Virginia Outdoors Plan - Planning for coastal access is provided by the Department of Conservation and Recreation in cooperation with other state and local government agencies. The Virginia Outdoors Plan (VOP), which is published by the Department, identifies recreational facilities in the Commonwealth that provide recreational access. The VOP also serves to identify future needs of the Commonwealth in relation to the provision of recreational opportunities and shoreline access. Prior to initiating any project, consideration should be given to the proximity of the project site to recreational resources identified in the VOP.

c. Parks, Natural Areas, and Wildlife Management Areas - Parks, Wildlife Management Areas, and Natural Areas are provided for the recreational pleasure of the citizens of the Commonwealth and the nation by local, state, and federal agencies. The recreational values of these areas should be protected and maintained.

d. Waterfront Recreational Land Acquisition - It is the policy of the Commonwealth to protect areas, properties, lands, or any estate or interest therein, of scenic beauty, recreational utility, historical interest, or unusual features which may be acquired, preserved, and maintained for the citizens of the Commonwealth.

e. Waterfront Recreational Facilities - This policy applies to the provision of boat ramps, public landings, and bridges which provide water access to the citizens of the Commonwealth. These facilities shall be designed, constructed, and maintained to provide points of water access when and where practicable.

f. Waterfront Historic Properties - The Commonwealth has a long history of settlement and development, and much of that history has involved both shorelines and near-shore areas. The protection and preservation of historic shorefront properties is primarily the responsibility of the Department of Historic Resources. Buildings, structures, and sites of historical, architectural, and/or archaeological interest are significant resources for the citizens of the Commonwealth. It is the policy of the Commonwealth and the VCRMP to enhance the protection of buildings, structures, and sites of historical, architectural, and archaeological significance from damage or destruction when practicable.

From: Doucette, Richard (DEQ)
To: Delahaye, Daniel B CIV (US)
Subject: RE: Arlington National Cemetery Master Plan Environmental Assessment (UNCLASSIFIED)
Date: Wednesday, August 01, 2012 2:01:19 PM

I have reviewed the document submitted and because there are no direct section on solid or hazardous waste management I have no issues with the submittal.

Richard C. Doucette
Land Protection and Revitalization Program Manager
Northern Regional Office
Virginia Department of Environmental Quality
13901 Crown Court
Woodbridge, VA 22193
P: (703) 583-3813
F: (703) 583-3821
richard.doucette@deq.virginia.gov

This e-mail should not be considered a legal opinion or case decision as defined by the Administrative Process Act, Va. Code § 2.2-4000 et seq., and this e-mail does not constitute final agency action on behalf of the Department.

-----Original Message-----
From: Delahaye, Daniel B CIV (US) [mailto:daniel.b.delahaye.civ@mail.mil]
Sent: Wednesday, July 18, 2012 5:01 PM
To: regena.d.bronson.civ@mail.mil; gomez.magdalin@epa.gov; ProjectReview (DGIF); contact2@fws.gov; andree.duvarney@wdc.usda.gov; Doucette, Richard (DEQ); Hartshorn, David (DEQ); Stuart, Edward (DEQ); Irons, Ellie (DEQ); Tignor, Keith (VDACS)
Subject: Arlington National Cemetery Master Plan Environmental Assessment (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Greetings all,

The Army National Cemeteries Program (ANCP) is initiating preparation of a Programmatic Environmental Assessment (EA) to evaluate and disclose the potential environmental impacts associated with the elements of the new Master Plan for Arlington National Cemetery (ANC). Identification of potential issues through agency coordination is an important step in initiating the EA process. Therefore, ANCP is requesting that interested federal, state and local agencies and organizations review the attached scoping document and provide comments. The scoping document provides background information; presents the preliminary purpose and need, and alternatives; identifies the environmental impact categories most likely impacted; and provides a preliminary schedule.

Please submit your agency/organization's comments regarding the Programmatic EA to me and provide a copy to Ms. Kulvelis. Comments may be submitted in writing to the addresses listed below or via e-mail at daniel.b.delahaye.civ@mail.mil and bkulvelis@hntb.com. If you determine that the Proposed Action would not impact your area of jurisdiction or expertise, written verification would be appreciated. It is respectfully requested that all comments be submitted by August 10, 2012 in order to ensure their consideration early in the Programmatic EA process.

Sincerely,

Daniel Delahaye

Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

Barbara A. Kulvelis, CEP
Senior Environmental Planner
HNTB Corporation
2900 South Quincy Street
Arlington, VA 22206

Classification: UNCLASSIFIED
Caveats: NONE

From: Forsgren, Diedre (VDH)
To: daniel.b.delahaye.civ@mail.mil; Barbara Kulvelis
Cc: Ellis, Charles (DEQ)
Subject: Scoping: Arlington National Cemetery Master Plan
Date: Tuesday, August 07, 2012 4:33:36 PM

Name: Arlington National Cemetery Master Plan
Sponsor: Army National Cemeteries Program
Location: Arlington

VDH – Office of Drinking Water has reviewed information provided for the above project, and has no comments with respect to public drinking water sources.

Potential impacts to public water distribution systems or sanitary sewage collection systems must be verified by the local utility.

Diedre Forsgren
Office Services Specialist
VIRGINIA DEPARTMENT OF HEALTH
Office of Drinking Water, Room 622-A
109 Governor Street
Richmond, VA 23219
Phone: (804) 864-7241
email: diedre.forsgren@vdh.virginia.gov

From:	Cason, Gladys (DGIF)
To:	daniel.b.delahaye.civ@mail.mil
Cc:	Barbara Kulvelis
Subject:	Ref: National Cemetery Master Plan Environmental Assessment
Date:	Thursday, July 19, 2012 12:37:35 PM
Attachments:	doc02272820120719123840.pdf

Please see attachment.

Thank You and Kindest Regards,
Mrs. Gladys D. Cason
(804) 367-0909 - Permits Section
Gladys.cason@dgif.virginia.gov

COMMONWEALTH of VIRGINIA

Douglas W. Domenech
Secretary of Natural Resources

Department of Game and Inland Fisheries

Robert W. Duncan
Executive Director

July 19, 2012

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003
daniel.b.delahaye.civ@mail.mil

Re: Arlington National Cemetery Master Plan Environmental Assessment

Dear Mr. Delahaye:

We appreciate your interest in submitting your project(s) for review by VDGIF to ensure the protection of sensitive wildlife resources during project development. Unfortunately, due to staffing limitations, our Fish and Wildlife Information Services Section (FWIS) is unable to review or provide an assessment of any projects submitted to them for review.

No response from VDGIF does not constitute "no comment" nor does it imply support of the project or associated activities. It simply means VDGIF has not been able to respond.

If you should have further questions or need additional information, please visit:
http://www.dgif.virginia.gov/environmental-programs/

Please feel free to attach a copy of this letter/email with your project paper work.

Thank You and Kindest Regards,

Mrs. Gladys D. Cason

Mrs. Gladys D. Cason
Environmental Services Division
Phone: (804) 367-0909 Fax: (804) 367-2427
gladys.cason@dgif.virginia.gov

cc: Barbara A. Kulvelis
bkulvelis@hntb.com

4010 WEST BROAD STREET, P.O. BOX 11104, RICHMOND, VA 23230-1104
(804) 367-1000 (V/TDD) *Equal Opportunity Employment, Programs and Facilities* FAX (804) 367-9147

From:	Delahaye, Daniel B CIV (US)
To:	DuVarney, Andree - NRCS, Rosslyn, VA
Cc:	Barbara Kulvelis
Subject:	RE: Arlington National Cemetery Master Plan Environmental Assessment (UNCLASSIFIED)
Date:	Monday, July 23, 2012 7:11:42 AM

Classification: UNCLASSIFIED
Caveats: NONE

Andrée,

Thank you for taking the time to speak with me and for your prompt reply.

Your assistance with this matter is greatly appreciated.

V/r,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

703-614-4306 (DSN 224)
daniel.b.delahaye.civ@mail.mil

-----Original Message-----
From: DuVarney, Andree - NRCS, Rosslyn, VA
[mailto:Andree.DuVarney@wdc.usda.gov]
Sent: Thursday, July 19, 2012 11:07 AM
To: Delahaye, Daniel B CIV (US)
Cc: Erickson, Terrell - NRCS, Washington, DC
Subject: RE: Arlington National Cemetery Master Plan Environmental Assessment (UNCLASSIFIED)

Daniel,

Thank you for your call yesterday and for the invitation to participate in scoping and to provide comments on the Arlington National Cemetery Master Plan Programmatic Environmental Assessment.

I have reviewed the information you provided and determined that the Proposed Action would not raise any issues related to the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) area of jurisdiction or expertise. NRCS' jurisdiction includes providing comments on actions that would permanently convert farmland to other uses, but it does not appear that the proposed action would do that.

Again, thank you for reaching out to NRCS, and please don't hesitate to contact me if I may be of assistance as you move forward.

Andrée DuVarney
National Environmental Coordinator
Natural Resources Conservation Service
U.S. Department of Agriculture
703-235-8091

-----Original Message-----
From: Delahaye, Daniel B CIV (US) [mailto:daniel.b.delahaye.civ@mail.mil]
Sent: Wednesday, July 18, 2012 5:01 PM
To: regena.d.bronson.civ@mail.mil; gomez.magdalin@epa.gov; projectreview@dgif.virginia.gov; contact2@fws.gov; DuVarney, Andree - NRCS, Rosslyn, VA; Richard.doucette@deq.virginia.gov; r.david.hartshorn@deq.virginia.gov; edward.stuart@deq.virginia.gov; ellie.irons@deq.virginia.gov; keith.tignor@vdacs.virginia.gov
Subject: Arlington National Cemetery Master Plan Environmental Assessment (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Greetings all,

The Army National Cemeteries Program (ANCP) is initiating preparation of a Programmatic Environmental Assessment (EA) to evaluate and disclose the potential environmental impacts associated with the elements of the new Master Plan for Arlington National Cemetery (ANC). Identification of potential issues through agency coordination is an important step in initiating the EA process.
Therefore, ANCP is requesting that interested federal, state and local agencies and organizations review the attached scoping document and provide comments. The scoping document provides background information; presents the preliminary purpose and need, and alternatives; identifies the environmental impact categories most likely impacted; and provides a preliminary schedule.

Please submit your agency/organization's comments regarding the Programmatic EA to me and provide a copy to Ms. Kulvelis. Comments may be submitted in writing to the addresses listed below or via e-mail at daniel.b.delahaye.civ@mail.mil and bkulvelis@hntb.com. If you determine that the Proposed Action would not impact your area of jurisdiction or expertise, written verification would be appreciated. It is respectfully requested that all comments be submitted by August 10, 2012 in order to ensure their consideration early in the Programmatic EA process.

Sincerely,

Daniel Delahaye
Master Planner, Army National Cemeteries Program
1 Memorial Dr., AD Bldg.
Arlington, VA 22211-5003

Barbara A. Kulvelis, CEP
Senior Environmental Planner
HNTB Corporation
2900 South Quincy Street
Arlington, VA 22206

Classification: UNCLASSIFIED
Caveats: NONE

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Classification: UNCLASSIFIED
Caveats: NONE

From:	Thomas_Sheffer@nps.gov
To:	Delahaye, Daniel B CIV (US)
Cc:	Adam_Badowski@nps.gov; Ben_Helwig@nps.gov; Brandon_Bies@nps.gov; Brent_Steury@nps.gov; Erik_Oberg@nps.gov; Gregory_Anderson@nps.gov; Joel_Gorder@nps.gov; Jon_James@nps.gov; Kate_Barrett@nps.gov; Lee_Werst@nps.gov; Matthew_Virta@nps.gov; Peter_McCallum@nps.gov
Subject:	GWMP comments on ANC Master Plan Scoping
Date:	Friday, August 10, 2012 2:54:25 PM
Attachments:	GWMP Comments on ANC Master Plan Scoping 8.10.12.docx

---

Hi Daniel,

Please find attached preliminary scoping comments for the ANC Master Plan EA from George Washington Memorial Parkway staff. We look forward to further involvement in the planning process.

Thanks so much.

Thomas

Thomas Sheffer
Park Planner
George Washington Memorial Parkway
703.289.2512

(See attached file: GWMP Comments on ANC Master Plan Scoping 8.10.12.docx)

REVIEW COMMENTS:

DATE: 8/10/12

PROJECT: ANC Master Plan Programmatic EA Scoping

REVIEWER(s): Brandon Bies, GWMP Arlington House Site Manager; Kate Barrett, GWMP Landscape Architect; Ben Helwig, GWMP Chief of Lands and Planning; Thomas Sheffer, GWMP Park Planner; Matthew Virta, GWMP Cultural Resource Manager

NO.	Reviewer	PAGE # AND LINE	REVIEW COMMENTS	ACTION TAKEN ON COMMENTS
1	B. Bies, T. Sheffer	General, based on Navy Annex presentation	A general comment that proposed changes to the location/configuration of the ANC VC would require and NPS review re: the original land transfer agreement, the impacts on NPS resources (Martz shuttle and NPS cooperator bookstore). Significant transportation (traffic/transit access) studies would need to be undertaken as well as thorough analysis on impacts to visitor use and access to popular destinations.	
2	B. Bies	General	A general concern about impacts to moving any primary visitor facilities towards the Navy Annex Site and what impact that might have on visitation to Arlington House.	
3	M. Virta, T. Sheffer	General, p. 8	Concentrating non-burial related services away from Memorial Avenue is a concept that could be given consideration as part of the Navy Annex Site. Although the Navy Annex Site Plan/EA is a separate process, some components that include cumulative impacts affecting the entire Cemetery should also be covered in the Master Plan. Moving only administrative functions (and not interpretive ones) would be a step in this direction that NPS would likely support. Further details regarding plans for vacated space would be useful.	
4	B. Bies, B. Helwig	General	General NPS support towards removing as much traffic as feasible from Memorial Avenue and exploring other ways for tour buses/visitors to enter and exit the cemetery (i.e. Rt. 110 access).	
5	K. Barrett, T. Sheffer	P. 4	Some confusion by staff in the breakup of components of EA. Further clarity on how these components relate and how they are all covered under one EA would be useful.	
6	B. Bies	Page 6 Map and throughout	Just as you denote Memorial Ave as not being ANC property, likewise I would think Arlington House, Arlington Woods and other NPS lands within the project area should similarly be depicted.	
7	K. Barrett	Page 8	"Accommodate new mission requirements" indicates that has been a change. Is the mission stated on page 3 the "new mission statement" ? If not, what is the "new mission statement"?	

NO.	Reviewer	PAGE # AND LINE	REVIEW COMMENTS	ACTION TAKEN ON COMMENTS
8	K. Barrett	p. 9	The list of impact topics in the affected environment is limited and may not be comprehensive enough. For example it doesn't include Visitor Use and Experience which could have major impacts if the visitor center is moved or expanded. This is nearly always a required impact topic.	
9	T. Sheffer	p. 8	Preliminary alternatives and environmental analysis topics are very limited and broad in scope. The project will benefit from further opportunities to comment on proposed alternatives and environmental analysis before completion of EA. NPS would welcome opportunities for continued involvement in development of master plan.	
10	M. Virta, B. Helwig, T. Sheffer	p. 7/ General	Predictions of when burial spaces will be exhausted is useful information in understanding choices of densities of development and land use prioritization. It would be useful if the Master Plan process includes consideration of how proposed actions will extend the space availability and detail long-range strategies for when full space availability of ANC property is exhausted.	

NO.	Reviewer	PAGE # AND LINE	REVIEW COMMENTS	ACTION TAKEN ON COMMENTS

APPENDIX B

Coastal Zone Management Act Consistency Determination

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Appendix B: Coastal Zone Management Act Consistency Determination

The Arlington National Cemetery (ANC) Real Property Master Plan (RPMP) Programmatic Environmental Assessment (EA) dated August 2013 along with a Federal Consistency Determination (original) was submitted to the Virginia Department of Environmental Quality (DEQ) Office of Environmental Impact Review on August 13, 2013. Based on the review of the Federal Consistency Determination and the comments submitted by agencies administering the applicable enforceable policies of the Virginia Coastal Zone Management Program (VCP), DEQ concurred that the proposal is consistent with the VCP.

In addition to DEQ, interested agencies and members of the public were afforded an opportunity to review the August 2013 Programmatic EA and Draft Finding of No Significant Impact (FNSI) between August 19 and October 21, 2013. Several agencies submitted comments and after reviewing these comments, ANC decided to revise the Programmatic EA and Draft FNSI. As part of revising the Programmatic EA and Draft FNSI, ANC revised the Federal Consistency Determination and the U.S. Army Corps of Engineers (USACE) sent an explanation of the revisions to DEQ. DEQ replied in an e-mail dated September 16, 2014, "Based on the comments from agencies administering the enforceable policies of the Virginia Coastal Zone Management Program, there is no need to resubmit the federal consistency determination for Arlington National Cemetery Real Property Master Plan."

This appendix includes the revised Federal Consistency Determination (***Attachment 1***) and the original Federal Consistency Determination (***Attachment 2***).

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Attachment 1:

Federal Consistency Determination (*revised*)

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Coastal Zone Management Act (CZMA) Consistency Determination (Revised)

This document provides the Commonwealth of Virginia with Arlington National Cemetery's (ANC) Consistency Determination under CZMA section 307(c)(1) [or (2)] and 15 CFR Part 930, subpart C, for proposed development and improvements to Arlington National Cemetery (ANC). The information in this Consistency Determination is provided pursuant to 15 CFR §930.39. This activity includes:

Projects based on the ANC Real Property Master Plan (RPMP) and the Cemetery Design Guide (CDG).

The Proposed Action, grouped by area within the cemetery, would consist of:

- Arrival Area
  - Transportation Center
  - Reconfigured Administration Building and new Queuing Area
- Former Navy Annex Site Area
  - Interments
  - Landscaping and memorial markers
  - Building and parking
  - Maintenance and operations
- Cemetery Wide
  - Visitor amenities
  - Sustainability measures

The Proposed Action could be any of the four Action Alternatives evaluated in the RPMP Programmatic Environmental Assessment (EA). The four Action Alternatives are based on the nature of the development of the former Navy Annex site (referred to as the Southern Expansion Site) and nearby roadways. The Action Alternatives vary only in how the area in the vicinity of the Southern Expansion Site is developed.

Alternative 1 – ANC including the Southern Expansion Site is illustrated in Figure 2-15 of the RPMP Programmatic EA, Alternative 2 – ANC including the Southern Expansion Site and Southgate Road is illustrated in Figure 2-16 of the RPMP Programmatic EA. Alternative 3 – ANC including the Southern Expansion Site, Southgate Road and Easement is illustrated in Figure 2-17 of the RPMP Programmatic EA. Alternative 4 - ANC Including the Southern Expansion Site with Realigned Roadways is illustrated in Figure 2-18 of the RPMP Programmatic EA. Table 2.2 in the RPMP Programmatic EA provides a comparison of the No Action and four Action Alternatives.

ANC has determined that the Proposed Action affects the land or water uses or natural resources of Virginia in the following manner:

Refer to Chapter 3 of the EA for more details.

The Virginia Coastal Zone Management Program contains the following enforceable policies:

Fisheries Management - The program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities. The State Tributyltin (TBT) Regulatory Program has been added to the Fisheries Management program.

The Proposed Action would not impact finfish or shellfish resources nor would it involve marine antifoulant paints.

Subaqueous Lands Management – The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the Department of Environmental Quality, Water Division.

In Virginia, subaqueous lands generally include the beds of tidal and non-tidal water bodies that are channel-ward of mean low water (MLW). MLW is the average elevation of low water observed over a period of 19 years. There are no subaqueous lands within the boundaries of ANC and therefore, the Proposed Action would not directly impact subaqueous lands. All construction activities will take place outside of subaqueous lands.

Wetlands Management – The purpose of the wetlands management program is to preserve tidal wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation.

There are no known wetlands in the areas that would be disturbed by the Proposed Action.

Dunes Management - Dune protection is carried out pursuant to the Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes.

The Proposed Action is located inland and as such would not result in the destruction or alternative of primary dunes.

Non-point Source Pollution Control – Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth.

Soils would be disturbed during construction as part of the Proposed Action.

Negative impacts to water quality may result with the Proposed Action because of the increase in area that would require ground maintenance. The Proposed Action results in an up to approximately nine percent larger cemetery area to maintain. Additional pesticides, herbicides, and fertilizer will likely be applied to maintain the added grounds.

Point Source Pollution Control – Point source pollution control is accomplished through the implementation of the National Pollutant Discharge Elimination System (NPDES) permit program established pursuant to §402 of the federal Clean Water Act and administered in Virginia as the Virginia Pollutant Discharge Elimination System (VPDES) permit program. The Water Quality Certification requirements of §401 of the Clean Water Act of 1972 is administered under the Virginia Water Protection Permit program.

A VPDES permit is not required for the Proposed Action.

Shoreline Sanitation - The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth.

No septic tanks will be installed as part of the Proposed Action.

Air Pollution Control – The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards.

ANC is within the Metropolitan Washington Air Quality Committee (MWAQC) Region and is currently in attainment for NO_2, SO_2, Pb and PM_{10}. The region is designated as non-attainment for ground-level O_3 and $PM_{2.5}$, and is a maintenance area for CO. Therefore, the Proposed Action must conform to the State Implementation Plans (SIP) for O_3, $PM_{2.5}$ and CO.

Coastal Lands Management – The purpose of this program is to protect the Chesapeake Bay by implementing the Chesapeake Bay Preservation Act (Virginia Code §§ 10.1-2100 through 10.1-2114)) through the Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC10-20-10 et seq.).

Arlington County, including ANC lies within the Virginia coastal zone, as defined by the Virginia Coastal Zone Management Program and Arlington County is designated as a Chesapeake Bay Preservation Area (CBPA).

Based upon the following information, data, and analysis, the U.S. Army Corps of Engineers Norfolk District, on behalf of Arlington National Cemetery, finds that the Proposed Action is consistent to the maximum extent practicable with the enforceable policies of the Virginia Coastal Zone Management Program.

Three of the nine enforceable policies of the Virginia Coastal Zone Management (CZM) Program, Fisheries Management, Dunes Management, and Shoreline Sanitation are not applicable to the Proposed Action. The Proposed Action would not affect subaqueous lands or wetlands.

Non-point Source Pollution Control – Soils would be disturbed during construction as part of the Proposed Action. Due to the size of the area that may be disturbed by construction, ANC will apply for coverage under the Virginia Department of Environmental Quality (VDEQ) General Permit for Discharges of Storm Water from Construction Activities prior to initiating any land-disturbing activities. To comply with the General Permit, a SWPPP for construction activities will be prepared and implemented. Best management practices (BMPs) will be included in the

SWPPP to minimize the level of temporary water quality impacts from the construction. Potential BMPs could include the use of siltation screens and hay bales to trap construction sediment.

Negative impacts to water quality may result with the Proposed Action because of the increase in area that would require ground maintenance. The Proposed Action would result in an up to approximately nine percent larger cemetery area to maintain. Additional pesticides, herbicides, and fertilizer would likely be applied to maintain the added grounds. However, because the extent of these impacts is minor in proportion to the entire cemetery operations, the impacts are not anticipated to approach the level of significance. Nonetheless, the cemetery will strive to minimize the anticipated potential impacts through a number of methods. For example, the RPMP includes recommendations for reducing runoff from new development areas. Stormwater infiltration techniques such as pervious pavement and rain gardens are among the strategies recommended to achieve the goal of no net stormwater run-off from the redeveloped former Navy Annex site. Minimization could also include reducing the need for pesticides and herbicides through the ANC Integrated Pest Management (IPM) program. "IPM is a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks."[1] "The IPM objective is to identify operational procedures that use the least toxic method to control pest populations in a cost-effective, environmentally sound manner." [2] Effects could also be minimized by using best practices for fertilizer application including applying fertilizer on an as needed basis in lieu of a calendar approach and using low phosphorus fertilizers.

This project is intended to be consistent with the regulations and requirements of the Arlington County Stormwater Detention Ordinance, enacted to maintain a peak runoff rate close to predevelopment levels. This project would also follow guidance set forth in the Northern Virginia Regional Commission BMP Handbook.

Therefore, the Proposed Action would be consistent with the Non-Point Source Pollution Control Program.

Point Source Pollution Control – No VPDES permit is required for the Proposed Action. Therefore, the Proposed Action would be compliant with point source pollution control requirements.

Air Pollution Control – Minor changes in vehicle activity and emissions would be expected with all of the Action Alternatives. Also, landscape and lawn maintenance activities and emissions would increase due to the expansion of ANC. The changes in emissions would be minor as compared to those produced by existing activities and daily traffic in the local area. Construction would result in short-term, minor impacts on air quality due to fugitive dust and equipment emissions. New stationary sources would be reviewed to determine whether stationary source permits are required. All projects would be undertaken in compliance with applicable state and federal standards for air quality. BMPs would be used to minimize emissions and fugitive dust; vehicles would be operated using low emission construction

[1] Arlington National Cemetery, *Integrated Pest Management Plan, FY 2012,* August 8, 2011, p. 2.

[2] Arlington National Cemetery, *Integrated Pest Management Plan*, FY 2012, August 8, 2011, p. 3.

techniques to offset total emissions. Therefore, the Proposed Action would be consistent with the Air Pollution Control Program.

Coastal Lands Management – ANC is in a CBPA. None of the proposed projects would impact an RPA. Prior to constructing any of the proposed development, ANC will prepare a Landscape Conservation Plan, Stormwater Management Plan, and Erosion and Sediment Control Plan in accordance with the Arlington County Chesapeake Bay Preservation Ordinance.

The ANC RPMP Programmatic EA dated August 2013 along with a Federal Consistency Determination (original) was submitted to the Virginia Department of Environmental Quality (DEQ) Office of Environmental Impact Review on August 13, 2013. Based on the review of the Federal Consistency Determination and the comments submitted by agencies administering the applicable enforceable policies of the Virginia Coastal Zone Management Program (VCP), DEQ concurred that the proposal is consistent with the VCP.

In addition to DEQ, interested agencies and members of the public were afforded an opportunity to review the August 2013 Programmatic EA and Draft Finding of No Significant Impact (FNSI) between August 19 and October 21, 2013. Several agencies submitted comments and after reviewing these comments, ANC decided to revise the Programmatic EA and Draft FNSI. As part of revising the Programmatic EA and Draft FNSI, ANC revised the Federal Consistency Determination and the U.S. Army Corps of Engineers (USACE) sent an explanation of the revisions to DEQ. DEQ replied in an e-mail dated September 16, 2014, "Based on the comments from agencies administering the enforceable policies of the Virginia Coastal Zone Management Program, there is no need to resubmit the federal consistency determination for Arlington National Cemetery Real Property Master Plan." The following documents are attached as reference:

- ***Attachment 1A:*** Letter from DEQ to ANC dated October 16, 2013 stating that the Commonwealth of Virginia completed its review of the August 2013 Programmatic EA and Draft FNSI which includes the federal consistency determination. On page 12, DEQ indicates that they concur that the proposal is consistent with the VCP.
- ***Attachment 1B:*** E-mail (and attachment) from USACE to DEQ dated September 04, 2014 explaining the revisions to the Programmatic EA and proposing that another VCP review is not necessary.
- ***Attachment 1C:*** E-mail from DEQ to USACE dated September 16, 2014 stating that there is no need to resubmit the Federal Consistency Determination for the ANC RPMP.

Rebecca L. Stevens, AIA
Arlington National Cemetery
1 Memorial Avenue, WC Building
Arlington, VA 22211-5003

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COMMONWEALTH of VIRGINIA

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October 16, 2013

Mr. Daniel Delahaye
Master Planner
Arlington National Cemetery
1 Memorial Avenue, WC Building
Arlington, Virginia 22211-5003

RE: Programmatic Environmental Assessment and Draft Finding of No Significant Impact, Arlington National Cemetery Real Property Master Plan; DEQ 13-155F

Dear Mr. Delahaye:

The Commonwealth of Virginia has completed its review of the above-referenced document, which includes a related federal consistency determination (FCD). The Department of Environmental Quality (DEQ) is responsible for coordinating Virginia's review of federal environmental documents submitted pursuant to the National Environmental Policy Act (NEPA) as well as the review of federal consistency determinations submitted pursuant to the Coastal Zone Management Act (CZMA) and the Virginia Coastal Zone Management Program (VCP). The following state agencies joined in this review:

Department of Environmental Quality
Department of Game and Inland Fisheries
Department of Conservation and Recreation
Department of Health
Department of Historic Resources
Department of Forestry
Virginia Marine Resources Commission

In addition, the Department of Agriculture and Consumer Services, the Northern Virginia Regional Commission, and Arlington County were invited to comment.

DESCRIPTION OF PROPOSED ACTION

The Arlington National Cemetery, which is administered by the U.S. Army, has prepared a Real Property Master Plan (RPMP). The RPMP includes a number of projects and outlines how the Cemetery will address future development and operational needs. The Programmatic Environmental Assessment (Programmatic EA) is a broad-scale analysis of the RPMP recommendations, which include phased projects and projects in the conceptual stage. The Army commits to preparing project-specific NEPA documentation before implementing these specific projects.

Components of the Proposed Action, which is based on the RPMP, include adding burial capacity, facilitating future Cemetery operations, enhancing family experiences during burial services, enhancing visitor experiences, and promoting sustainability. Developments proposed are grouped by area and include:

- *Arrival area:* transportation, center, re-configured administrative building, and new queuing area;
- *Former Navy Annex site area:* parcels A (interments), B (landscaping and memorial markers), C (building and parking), and D (maintenance and operations).
- *East of Eisenhower area:* maintenance and operations.
- *Cemetery-wide:* visitor amenities and sustainability.

The Proposed Action could be any of the three Action Alternatives, which vary primarily in how the area in the vicinity of the former Navy Annex is developed. These combinations are listed in the Executive Summary, Table ES-1 (page ES-3 of the on-line Programmatic EA; see also FCD, page B-1) and depicted in Figures 2-12, 2-13, and 2-14 of the Programmatic EA. In brief:

- Alternative 1 includes projects in the Cemetery including the former Navy Annex site;
- Alternative 2 is the same as Alternative 1, but includes additional projects in the Southgate Road Area of the Cemetery; and
- Alternative 3 is the same as Alternative 1, but includes the former Navy Annex site with realigned roads.

ENVIRONMENTAL IMPACTS AND MITIGATION

1. Erosion and Sediment Control and Stormwater Management Plans.

1(a) Agency Jurisdiction. The Department of Environmental Quality (DEQ) administers the Virginia Erosion and Sediment Control Law (Virginia Code sections 62.1-44.15:51 *et seq.*) and *Regulations*, the Virginia Stormwater Management Law (Virginia Code sections 62.1-44-15:24 *et seq.*), and the *Virginia Stormwater Management Regulations* (4 VAC 50 *et seq.*) Please note that Virginia's erosion control and stormwater management program administration was transferred from the

Department of Conservation and Recreation to DEQ's Water Quality Division effective July 1, 2013.

1(b) Erosion and Sediment Control Plans; Stormwater Management Plans. The Army and its authorized agents, conducting regulated land-disturbing activities on private and public lands in Virginia, must comply with the Virginia Stormwater Management Law and *Regulations* as well as the Virginia Erosion and Sediment Control Law and *Regulations* (see "Federal Consistency...," "Analysis of Enforceable Policies," item 1, below). This compliance relates to coverage under the General Permit for Stormwater Discharge from Construction Activities (see item 1(c), below) and other applicable federal non-point source pollution mandates (e.g., the federal Clean Water Act, section 313 and federal consistency under the CZMA; see "Federal Consistency...," below). Activities which result in a total land disturbance of 10,000 or more square feet (2,500 or more square feet in Chesapeake Bay Preservation Areas; see "Federal Consistency...," "Analysis of Enforceable Policies," item 3, below) are regulated under the Erosion and Sediment Control Law. These activities include:

- Clearing and grading activities;
- Installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, and soil stockpiles; and
- Related land-disturbing activities.

The Army must prepare and implement an Erosion and Sediment Control (ESC) Plan to ensure compliance with state law and regulations. The ESC Plan must be submitted to DEQ's Northern Regional Office for review and compliance; see "Regulatory and Coordination Needs," item 1, below. The Army is ultimately responsible for achieving project compliance through oversight of on-site contractors, regular field inspections, prompt action against non-compliant sites, and other mechanisms consistent with agency policy.

1(c) General Permit for Stormwater Discharge from Construction Activities. The Virginia Stormwater General Permit (VSGP) requirement applies to the following types of construction activities [reference: Virginia Code sections 62-1-44.15:34 (formerly Virginia Code section 10.1-603.8)]. See "Regulatory and Coordination Needs, item 1, below.

1(c)(i) Land Disturbance Equal to or Greater than 1 Acre. Operators of construction activities resulting in land disturbance that is equal to or greater than 1 acre must apply for the VSGP.

1(c)(ii) Land Disturbance in Chesapeake Bay Preservation Areas. Operators of construction activities resulting in land disturbance less than 1 acre and greater than 2,500 square feet in areas designated as Chesapeake Bay Preservation Areas must apply for the VSGP.

1(c)(iii) Land Disturbance for Construction in a Common Plan. Operators of construction activities resulting in land disturbance less than 1 acre, where the activities are part of a larger common plan of development or sale that ultimately disturbs 1 or more acres, must apply for the VSGP. See item 1(d), next.

1(d) Common Plan: Definition and Example.

1(d)(i) Definition. A larger common plan of development or sale is a contiguous area where separate and distinct construction may be taking place at different times on different schedules. A permit is required if 1 or more acres, or 2,500 square feet or more in all areas designated as subject to the Chesapeake Bay Preservation Act, will be disturbed, regardless of the size of the individually-owned or -developed sites.

A larger common plan of development or sale applies to various types of land development, including but not limited to residential, commercial, or industrial use.

1(d)(ii) Example. For example, if a developer buys a 20-acre lot and builds roads with the intention of building houses or other structures in the future, or if the land is parceled off or sold, and construction occurs on plots that are less than an acre by separate, independent builders, these activities would be subject to stormwater permitting requirements.

2. Natural Heritage Resources. The Programmatic EA indicates that Alternative 1 would result in reduced vegetation because of an enlarged committal services queuing area; this would be offset by development of the former Navy Annex and addition of new turf, trees, and other vegetation there. Alternative 2 would involve additional landscaping for Southgate Road and Patton Drive areas, with impacts similar to those of Alternative 1. Similar impacts would pertain to Alternative 3, which would involve additional grass and landscaping vegetation in the area between the cemetery boundary and Columbia Pike (Programmatic EA, pages 3-28 and 3-29, sections 3.6.2.2 through 3.6.2.4).

2(a) Agency Jurisdictions.

2(a)(1) Department of Conservation and Recreation: Division of Natural Heritage. The DCR-Natural Heritage Program's (DCR-DNH) mission is conserving Virginia's biodiversity through inventory, protection, and stewardship. The Virginia Natural Area Preserves Act, Virginia Code sections 10.1-209 through 10.1-217, codifies DCR's powers and duties related to statewide biological inventory: maintaining a statewide database for conservation planning and project review, land protection for the conservation of biodiversity, and the protection and ecological management of natural heritage resources. "Natural heritage resources" are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geological formations.

2(a)(2) Department of Agriculture and Consumer Services. The Endangered Plant and Insect Species Act of 1979, Virginia Code Chapter 39, sections 3.1-102 through 3.1-1030, as amended, authorizes the Virginia Department of Agriculture and Consumer Services (VDACS) to conserve, protect and manage endangered species of plants and insects. VDACS Virginia Endangered Plant and Insect Species Program personnel cooperate with the U.S. Fish and Wildlife Service, DCR-DNH and other agencies and organizations on the recovery, protection or conservation of listed threatened or endangered species and designated plant and insect species that are rare throughout their worldwide ranges. In those instances where recovery plans, developed by the U.S. Fish and Wildlife Service, are available, adherence to the order and tasks outlines in the plans are followed to the extent possible.

2(b) Findings. DCR-DNH has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined in the maps of the Draft Plan/EIS (see map of Manassas NBP, page 67). According to the information in DCR-DNH files, natural heritage resources are documented in the project area. However, due to the scope of proposed activities and the distance to the resources, DCR does not anticipate that the RPMP will adversely affect natural heritage resources.

Under a Memorandum of Agreement established between DCR and VDACS, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The proposed activities will not affect any documented state-listed plants or insects.

2(c) Natural Area Preserves. According to DCR, there are no state Natural Area Preserves under DCR's jurisdiction in the project vicinity.

2(d) Additional Information. DCR's Biotics Data System is continually updated with new information. Accordingly, DCR should be contacted if a significant amount of time elapses before the foregoing information is used.

See "Regulatory and Coordination Needs," item 5, below for additional information and guidance.

3. Solid and Hazardous Waste Management. With regard to solid wastes, the Programmatic EA indicates that construction contracts will require that at least 50% of solid wastes are to be diverted away from landfill disposal, and that yard waste is to be recycled to the maximum extent practicable, for all alternatives (Programmatic EA, pages 3-60 to 3-61, sections 3.12.3.2 through 3.12.3.4). With regard to hazardous wastes, the Programmatic EA indicates that an Abbreviated Preliminary Assessment completed in 2011 identified areas of concern, including Former South Post Fort Myer Facilities, Salvage Metal Yard, and Old Warehouse Area. The conclusion of the assessment was that these sites pose "low potential threat to human health and the environment" (Programmatic EA, page 3-62, section 3.13.1.1). Additional discussion indicates that any of the alternatives may, because of cemetery activity expansion,

result in greater use of hazardous materials, but none to a significant extent (pages 3-62 through 3-65, sections 3.13.1.1. through 3.13.3.4).

3(a) Agency Jurisdiction. Solid and hazardous wastes in Virginia are regulated by the Virginia Department of Environmental Quality, the Virginia Waste Management Board (VWMB), and the U.S. Environmental Protection Agency. DEQ administers programs created by the federal Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response Compensation and Liability Act (CERCLA, commonly called Superfund), and the Virginia Waste Management Act (Virginia Code sections 10.1-1400 *et seq.*). DEQ administers regulations established by the VWMB and reviews permit applications for completeness and conformance with facility standards and financial assurance requirements. All Virginia localities are required, under the *Solid Waste Management Planning Regulations*, to identify the strategies they will follow on the management of their solid wastes to include items such as facility siting, long-term (20-year) use, and alternative programs such as materials recycling and composting.

3(b) Findings. DEQ's Division of Land Protection and Revitalization (DEQ-DLPR) has conducted a cursory search of its databases (see item 3(c), below) and made the following findings relative to waste sites within 500 feet of the project area or in the 22211 zip code.

3(b)(i) Solid Waste Sites. No solid waste sites were found.

3(b)(ii) VRP (Voluntary Remediation Program) Sites. No VRP sites were found.

3(b)(iii) Petroleum Release Sites. Multiple petroleum contamination (PC) events were identified on the ANC property and nearby Fort Myer. The proximity of the PC sites to the project work was not determined, but should be reviewed by the project engineer(s) for possible impacts on the project.

1) ID# 19921775 – Arlington National Cemetery, Building 103. Event Date: 3/5/2007. Status: Closed.
2) ID# 19940580 – Arlington National Cemetery, Building 107. Event Date: 3/5/2007. Status: Closed.
3) ID# 1990437 – Arlington National Cemetery, Building 102. Event Date: 3/20/2006. Status: Closed.
4) ID# 19940579 – Arlington National Cemetery, Building 113. Event Date: 3/20/2006. Status: Closed.
5) ID# 20073119 – Arlington National Cemetery, Columbarium Site. Event Date: 6/1/2007. Status: Closed.
6) ID# 19930065 – Fort Myer, Building 305, Tank 24, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed.

7) ID# 19920578 – Fort Myer, Building 323, Tank 30, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed.
8) ID# 19930673 – Fort Myer, Building 305, Tank 24, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed.

DEQ-DLPR notes that DEQ's PC case files with the PC Case Numbers, within a defined radius of the proposed project(s), can be identified. These petroleum releases should be evaluated by the project engineer or manager to establish:

- the exact location of the release;
- the nature and extent of the petroleum release; and
- the potential to affect the proposed project.

The facility representative should contact DEQ's Northern Virginia Regional Office (Tanks Program) for further information and the administrative records of the PC cases which are in close proximity to any proposed projects. See "Regulatory and Coordination Needs," item 6, below.

3(b)(iv) FUD (Formerly Used Defense) Sites. No FUD sites were found.

3(b)(v) CERCLA/FFR (Comprehensive Environmental Response, Compensation, and Liability Act/Federal Facilities Restoration) Sites. One site was found:

VA8210020626 – Fort Myer, 204 Lee Avenue, Fort Myer, VA 22211. Status: Not NPL.

3(b)(vi) RCRA/HW (Resource Conservation and Recovery Act/Hazardous Waste) Sites. Three RCRA/HW sites were identified in zip code 22211. The report author or project engineer should access this information on the DEQ website at

http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/ReportsPublications/OriginalReports.aspx, and click on the Hazardous Waste Facilities link. Search by zip code 22211.

1) VA8210020626 – Department of the Army HQ, Joint Base Myer-Henderson Hall, Lee Avenue, Fort Myer, VA 22211. Contact: James Stratton at 703-696-2013.
2) VAR000000786 – DOD Federal Office Bldg #2, Columbia Pike & Old Ridge, Arlington, VA 22211. Contact: Stephen P. Best at 703-692-4114.
3) VA6210020032 – U.S. Arlington National Cemetery, Arlington, VA 22211. Contact: Joseph Bunton at 703-697-4915.

3(c) Additional Information. DEQ's Virginia Geographical Information Systems (VEGIS) database can be accessed at the following web address:

http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx. Through VEGIS's search options, one can identify, by address or zip code, the Solid Waste sites, VRP sites, and Petroleum Release sites in the area of the proposed project.

3(d) General Guidance on Waste Management. Any soil that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations (see "Regulatory and Coordination Needs," item 6(b), below).

3(d)(i) Demolition of Older Structures. If an older structure will be demolished as part of the project, the structure should be checked for asbestos-containing materials (ACM) and lead-based paints (LBP). Additional rules apply if ACM or LBP are found; see "Regulatory and Coordination Needs," item 6, below.

3(d)(ii) Pollution Prevention. DEQ encourages the Army to implement pollution prevention principles in its construction activities. These include reduction of wastes at the source, re-use of materials, and recycling of all solid wastes generated. Hazardous wastes should be minimized.

3(e) Additional Comment. DEQ's Northern Regional Office indicates that any of the three action alternatives will result in slight increases in waste amounts generated by the Cemetery.

4. Historic Structures and Archaeological Resources. The Programmatic EA lists a number of archaeological sites, and sites potentially eligible for listing on the National Register, on pages 3-30 through 3-32 (section 3.7.2). It does the same for structures (pages 3-33 to 3-34, sections 3.7.3.1 to 3.7.33), and analyzes impacts of the alternatives (pages 3-35 to 3-37, section 3.7.6.2).

4(a) Agency Jurisdiction. The Department of Historic Resources (DHR) conducts reviews of projects to determine their effect on historic structures or cultural resources under its jurisdiction. DHR, as the designated State's Historic Preservation Office, ensures that federal actions comply with Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, and its implementing regulation at 36 CFR Part 800. The NHPA requires federal agencies to consider the effects of federal projects on properties that are listed or eligible for listing on the National Register of Historic Places. Section 106 also applies if there are any federal involvements, such as licenses, permits, approvals or funding.

4(b) Comments. DHR has been in consultation with the Army concerning this project. DHR asks that the Army continue to consult directly with DHR as necessary, pursuant to section 106 of the NHPA and its implementing regulations (cited above, item 4(a)). See "Regulatory and Coordination Needs," item 2, below.

5. Forest Resources. According to the Programmatic EA, the Arlington Cemetery occupies 624 acres of landscaped, developed land, including 562 acres of turf around

the memorials and headstones. The Cemetery has approximately 8,400 trees, some of which are at least 200 years old; there are 300 varieties, including three state champion trees (largest specimens of their respective species in Virginia): the pin oak, the empress, and the yellowwood (Programmatic EA, page 3-26, section 3.6.1). All of the alternatives would follow the Cemetery Design Guide and reduce impervious surfaces as compared with the no-action alternative (Programmatic EA, page 3-7, sections 3.1.3.2 through 3.1.3.4).

5(a) Agency Jurisdiction. The mission of the Department of Forestry (DOF) is to protect and develop healthy, sustainable forest resources for Virginians. DOF was established in 1914 to prevent and suppress forest fires and re-forest bare lands. Since the Department's inception, it has grown and evolved to encompass other protection and management duties including: protecting Virginia's forests from wildfire, protecting Virginia's waters, managing and conserving Virginia's forests, managing state-owned lands and nurseries, and managing regulated incentive programs for forest landowners.

5(b) Comments: Alternative 3. The Department of Forestry notes that Alternative 3 requires realignment of Virginia roads; however, due to its urban nature, the project area is not heavily forested. DOF recommends, however, that any tree removal affecting the Foxcroft Heights Park be mitigated as much as possible.

5(c) Comments: No-Action Alternative. The No-action alternative would require removal of most of the trees in the future Millennium Project site. It appears from the project narrative that this would not be the case under any of the "Build" alternatives; accordingly, DOF would prefer any of the "Build" alternatives to no action.

5(d) Retaining Old Trees. DOF supports the Army's plan to place a priority on retaining the old trees (more than 200 years old) on the site. In particular, DOF requests that special attention be given to protecting the root structure or any other environmental variable that could jeopardize the health of the three state champion trees that are present in the Cemetery. These are the pin oak, the empress, and the yellowwood.

6. Drinking Water. The Programmatic EA does not appear to address drinking water as such. However, it indicates that the Potomac River is considered to have impaired water quality for fishing; the River is considered good for navigation, and not assessed for recreation (page 3-21, section 3.6.1.4).

6(a) Agency Jurisdiction. The Virginia Department of Health (VDH), Office of Drinking Water (ODW) reviews projects for the potential to impact public drinking water sources (groundwater wells and surface water intakes).

6(b) Findings. VDH reviewed the RPMP for proximity of its activities to public drinking water sources (groundwater wells, springs, and surface water intakes). VDH found the following:

- There are no groundwater wells within a 1-mile radius of the project site.
- No surface water intakes are located within a 5-mile radius of the project site.
- The project is not within Zone 1 (up to 5 miles into the watershed) or Zone 2 (greater than 5 miles into the watershed) of any public surface water source.

6(c) Conclusion. The project is not likely to give rise to impacts to public drinking water, according to VDH.

6(d) Requirement. Potential impacts to public water distribution systems or sanitary sewage collection systems must be verified by the local utility.

7. Wildlife Resources. According to the Programmatic EA, wildlife species in and around the Cemetery consist of animals adapted to an urban environment, including squirrels, chipmunks, rabbits, raccoons, garter snakes, and songbirds. Bald eagles, listed by the Commonwealth as threatened, may pass over the Cemetery. However, the Cemetery is outside the Potomac River Bald Eagle Summer and Winter Concentration Areas (Programmatic EA, page 3-27, section 3.6.1.2). Alternative 1 would reduce vegetation because of construction of the committal service queuing area, but new compatible plantings would result in a net increase in vegetation, and new habitat for native wildlife. Alternative 2 would result in increased landscaping and vegetation in the Southgate Road and Patton Drive areas. Alternative 3 would add grass cover in the areas between the existing Cemetery boundary and the realigned Columbia Pike (Programmatic EA, pages 3-28 and 3-29, sections 3.6.3.2 through 3.6.3.4).

7(a) Agency Jurisdiction. The Department of Game and Inland Fisheries (DGIF), as the Commonwealth's wildlife and freshwater fish management agency, exercises enforcement and regulatory jurisdiction over wildlife and freshwater fish, including state- or federally-listed endangered or threatened species, but excluding listed insects (Virginia Code Title 29.1). DGIF is a consulting agency under the U.S. Fish and Wildlife Coordination Act (16 U.S.C. sections 661 *et seq.*) and provides environmental analysis of projects or permit applications coordinated through DEQ and several other state and federal agencies. DGIF determines likely impacts upon fish and wildlife resources and habitat, and recommends appropriate measures to avoid, reduce, or compensate for those impacts. For more information, see the DGIF website at *www.dgif.virginia.gov*.

7(b) Findings. DGIF records indicate that bald eagles and the Potomac River Anadromous Fish Use Area have been documented in the project area. DGIF has not identified any project in the plan that appears likely to result in adverse impacts upon bald eagles or anadromous fish resources. The project area is located within two miles of a documented occurrence of a listed natural heritage resource species, i.e., one that is listed by the state or federal government as threatened or endangered (see "Regulatory and Coordination Needs," item 5, below).

7(c) Recommendations by DGIF.

7(c)(i) Minimizing Impacts from Development Activities. To minimize overall impacts to wildlife and natural resources, DGIF recommends that the Army do the following:

- Avoid impacts, or minimize them as much as possible, to undisturbed forest, wetlands, and streams. This may include relocating stream channels as opposed to filling or channelizing; using, and incorporating in the development plan, a natural stream channel design and wooded buffers.
- Maintain undisturbed, naturally vegetated buffers of at least 100 feet in width around all on-site wetlands and on both sides of all perennial and intermittent streams.
- Maintain wooded lots to the fullest extent possible.

DGIF does **not** support the following:

- Proposals to mitigate wetland impacts through the construction of stormwater management ponds;
- Creation of in-stream stormwater management ponds.

See item 7(d), below.

7(c)(ii)Designing Stormwater Controls. DGIF recommends that stormwater controls be designed to replicate and maintain the hydrographic condition of the site prior to the change in landscape. This should include, but not be limited to, utilizing bio-retention areas and minimizing the use of curb and gutter in favor of grassed swales. Bio-retention areas (also called rain gardens) and grassed swales are components of "Low-Impact Development" (LID). They are designed to capture stormwater runoff as close to the source as possible, and allow it to slowly infiltrate into the surrounding soil. Rain gardens benefit natural resources by filtering pollutants and reducing downstream runoff volumes.

7(c)(iii) Time-of-Year Restriction on Tree Clearing and Ground Clearing. All tree removal and ground clearing should adhere to a time-of-year restriction protective of resident and migratory songbird nesting from March 15 through August 15 of any year. That is, these activities should **not** take place during that time period.

7(d) Assistance and Coordination. DGIF is willing to assist the Army in developing a plan that includes open space, wildlife habitat, and natural stream channels which retain their wooded buffers (see item 7(c)(i), above). See "Regulatory and Coordination Needs," item 5(b), below.

7(e) Additional Information. The Virginia Department of Game and Inland Fisheries **(DGIF) maintains a database of wildlife locations, including threatened and endangered** species, trout streams, and anadromous fish waters that may contain

information not documented in this letter. The DGIF database may be accessed from http://vafwis.org/fwis/.

8. Regional and Local Comments.

8(a) Jurisdiction: Planning District Commissions. In accordance with Virginia Code section 15.2-4207, planning district commissions encourage and facilitate local government cooperation and state-local cooperation in addressing, on a regional basis, problems of greater than local significance. This cooperation is intended to facilitate the recognition and analysis of regional opportunities and take account of regional influences in planning and implementing public policies and services. Planning district commissions promote the orderly and efficient development of the physical, social, and economic elements of the districts by planning, and encouraging and assisting localities to plan, for the future.

8(b) Northern Virginia Regional Commission. The Northern Virginia Regional Commission did not respond to DEQ's request for comments on the proposed action.

FEDERAL CONSISTENCY UNDER THE COASTAL ZONE MANAGEMENT ACT

Pursuant to the Coastal Zone Management Act of 1972, as amended, federal activities located inside or outside of Virginia's designated coastal management area that can have reasonably foreseeable effects on coastal resources or coastal uses must, to the maximum extent practicable, be implemented in a manner consistent with the Virginia Coastal Zone Management Program (VCP). The VCP consists of a network of programs administered by several state agencies. In order to be consistent with the VCP, the project activities must be consistent with the enforceable policies of the VCP and all the applicable permits and approvals listed under the enforceable policies of the VCP must be obtained prior to commencing the project. DEQ coordinates the review of FCDs with agencies administering the enforceable and advisory policies of the VCP.

Public Participation

In accordance with 15 CFR §930.2, a public notice of this proposed action was published on the DEQ website from August 20, 2013 to September 25, 2013. No public comments were received in response to the notice.

Federal Consistency Concurrence

Based on our review of the federal consistency determination and the comments submitted by agencies administering the applicable enforceable policies of the VCP, DEQ concurs that the proposal is consistent with the VCP, provided any applicable permits and approvals are obtained as described below. However, other state approvals which may apply to this project are not included in this consistency concurrence. Therefore, the Coast Guard must ensure that this event is conducted in accordance with all applicable federal, state, and local laws and regulations.

Analysis of Enforceable Policies

The state agencies responsible for the administration of the enforceable policies of the VCP that may apply to the proposed event generally agree with the Army's determination that the actions contemplated in the RPMP will not affect enforceable policies of the VCP (FCD, page B-3). The Army must ensure that the activities contemplated in the RPMP are consistent with the enforceable policies.

The FCD (appendix B of the EA/RPMP document) indicates that the following enforceable policies are not affected by, and do not affect, the activities contemplated in the RPMP (page B-3):

- Fisheries Management,
- Dunes Management, and
- Shoreline Sanitation.

The analysis which follows responds to the discussion in the FCD of the enforceable policies of the VCP that apply, or may apply, to the proposed action.

1. Subaqueous Lands Management. According to the FCD, there are no subaqueous lands within the boundaries of the Cemetery, and therefore construction activities would not directly affect such lands (page B-2).

1(a) Agency Jurisdiction. The Virginia Marine Resources Commission (VMRC) has jurisdiction over any encroachments in, on, or over the beds of the bays, ocean, rivers, streams, or creeks which are the property of the Commonwealth (Virginia Code sections 28.2-1200 *et seq.*). Accordingly, if any part of the activities contemplated in the RPMP involve any encroachment channelward of ordinary high water along natural rivers and streams above the fall line, or mean low water below the fall line, a permit may be required from VMRC. VMRC generally requires permits along non-tidal waterways if the drainage area is greater than 5 square miles. See "Regulatory and Coordination Needs," item 2, below.

The VMRC serves as the clearinghouse for the Joint Permit Application (JPA) used by the:

- VMRC for encroachments on or over state-owned subaqueous beds as well as tidal wetlands;
- U.S. Army Corps of Engineers (Corps) for issuing permits pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act;
- DEQ for issuance of a Virginia Water Protection Permit; and
- Local wetlands board for impacts to wetlands.

1(b) Findings. According to VMRC, no jurisdictional waterways will be affected by the activities contemplated in the RPMP, and no authorization will be required from the Commission.

1(c) Conclusion. VMRC did not disagree with the statement in the FCD that the proposed action (RPMP implementation) would not directly affect subaqueous lands.

2. Air Pollution Control. According to the FCD, the Washington region, home of the Cemetery, is a non-attainment area for ground-level ozone (O_3) and particulate matter ($PM_{2.5}$) and is a maintenance area for carbon monoxide (CO). Accordingly, the proposed action must conform to the State Implementation Plans for ozone, particulate matter, and carbon monoxide.

2(a) Agency Jurisdiction. DEQ is charged with carrying out mandates of the State Air Pollution Control Law (Virginia Code sections 10.1-1300 *et seq.*) and the *Regulations for the Control and Abatement of Air Pollution* as well as Virginia's obligations under the federal Clean Air Act, as amended in 1990. The objective is to protect and enhance public health and quality of life through control and mitigation of air pollution. DEQ's Division of Air Program Coordination and its Regional Offices ensure the safety and quality of air in Virginia by monitoring and analyzing air quality data, regulating sources of air pollution, and working with local, state and federal agencies to plan and implement strategies to protect Virginia's air quality. DEQ's Northern Regional Office is directly responsible for the issuance of necessary permits to construct and operate all stationary sources, as well as monitoring emissions from these sources for compliance, in the Northern Virginia region (which includes Arlington).

2(b) Findings. According to DEQ's Division of Air Program Coordination (DEQ-DAPC), the Cemetery is in an ozone non-attainment and emission control area for oxides of nitrogen (NO_x) and volatile organic compounds (VOCs).

2(c) Comments. DEQ-DAPC recommends that all precautions are necessary to restrict the emissions of VOCs and NO_x) in carrying out the proposed action.

2(d) Requirements. One or more of the following requirements may apply to activities contemplated in the RPMP. Questions regarding these requirements may be directed to DEQ's Northern Regional Office (see "Regulatory and Coordination Needs," item 4, below).

(i) Fugitive Dust

During construction, fugitive dust must be kept to a minimum by using control methods outlined in 9 VAC 5-50-60 *et seq.* of the *Regulations for the Control and Abatement of Air Pollution*. These precautions include, but are not limited to, the following:

- Use, where possible, of water or chemicals for dust control;

- Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
- Covering of open equipment for conveying materials; and
- Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion.

(ii) Open Burning

If project activities include the open burning or use of special incineration devices for the disposal of demolition material, this activity must meet the requirements of 9 VAC 5-130 of the *Regulations* for open burning, and it may require a permit. The *Regulations* provide for, but do not require, the local adoption of a model ordinance concerning open burning. Norfolk and Portsmouth officials should be contacted to determine what local requirements, if any, exist.

(iii) Fuel-Burning Equipment

The installation of fuel burning equipment (e.g., boilers, generators, compressors, or any other air pollution emitting equipment), may require permitting from DEQ prior to beginning construction of the facility (9 VAC 5-80, Article 6, Permits for New and Modified Sources). The project proponent should contact DEQ-NRO for guidance on whether this provision applies.

(iv) Asphalt Paving

In accordance with 9 VAC 5-40-5490, there are limitations on the use of "cut-back" (liquefied asphalt cement, blended with petroleum solvents) that may apply to paving activities associated with the project. The asphalt must be "emulsified" (predominantly cement and water with a small amount of emulsifying agent) except when specified circumstances apply. Moreover, there are time-of-year restrictions on its use during the months of April through October in VOC emission control areas.

2(e) Conclusions. DEQ-DAPC did not disagree with the Army's statements in the FCD.

3. Non-point Source Pollution Control. According to the FCD, soils would be disturbed during construction activities contemplated in the RPMP (proposed action), and the proposed action would result in as much as an 8% increase in the size of the cemetery requiring maintenance (pages B-2, B-3).

3(a) Agency Jurisdiction. The Department of Environmental Quality (DEQ) administers the Virginia Erosion and Sediment Control Law (Virginia Code sections 62.1-44.15:51 *et seq.*), the *Virginia Erosion and Sediment Control Regulations*, the Virginia Stormwater Management Law (Virginia Code sections 62.1-44.15:24 *et seq.*), and the *Virginia Stormwater Management Regulations*.

3(b) Erosion and Sediment Control Plans; Stormwater Management Plans. The Army and its authorized agents conducting regulated land-disturbing activities on private and public lands in the state must comply with the above Erosion and Sediment Control Law and Regulations and the Stormwater Management Regulations, including coverage under the general permit for stormwater discharge from construction activities (see item 3(c), next), and other applicable federal non-point source pollution mandates (e.g., section 313 of the federal Clean Water Act and federal consistency under the Coastal Zone Management Act). Clearing and grading activities, installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, soil stockpiles, and related land-disturbing activities that result in the total land disturbance of equal to or greater than 10,000 square feet (2,500 square feet in Chesapeake Bay Preservation Areas) are regulated under the Erosion and Sediment Control Law and Regulations. Accordingly, the Army must prepare and implement an erosion and sediment control (ESC) plan to ensure compliance with state law and regulations. The ESC plan is submitted to DEQ's Northern Regional Office for review for compliance (see "Regulatory and Coordination Needs," item 1, below). The Army is ultimately responsible for achieving project compliance through oversight of on-site contractors, regular field inspection, prompt action against non-compliant sites, and other mechanisms consistent with agency policy.

3(c) General Permit for Stormwater Discharges from Construction Activities. DEQ is responsible for the issuance, denial, revocation, termination, and enforcement of the Virginia Stormwater Management Program (VSMP) General Permit for Stormwater Discharges from Construction Activities related to municipal separate storm sewer systems (MS4s) and construction activities for the control of stormwater discharges from MS4s and land disturbing activities under the Virginia Stormwater Management Program. The owner or operator of projects involving land-disturbing activities of equal to or greater than 1 acre (2,500 square feet or more in a Chesapeake Bay Preservation Area) is required to register for coverage under the General Permit for Discharges of Stormwater from Construction Activities and develop a project-specific Stormwater Pollution Prevention Plan (SWPPP). Construction activities requiring registration also include land disturbance of less than one acre of total land area that is part of a larger common plan of development or sale if the larger common plan of development will collectively disturb equal to or greater than one acre (or 2,500 square feet or more in a Chesapeake Bay Preservation Area). The SWPPP must be prepared prior to submission of the registration statement for coverage under the general permit; it must address water quality and quantity in accordance with the *VSMP Permit Regulations* (4 VAC 50 *et seq.* General information and registration forms for the General Permit are available at:
http://www.deq.virginia.gov/Programs/Water/StormwaterManagement/VSMPPermits/ConstructionGeneralPermit.aspx.

3(d) Conclusions. DEQ's Water Division did not disagree with the findings in the FCD relative to non-point source pollution control.

4. Coastal Lands Management. According to the Programmatic EA (page 3-24, section 3.5.1.11) and FCD (page B-3 of the Programmatic EA), Arlington County is designated as a Chesapeake Bay Protection Area. The County has designated Resource Protection Areas (RPAs) in its Chesapeake Bay Preservation Ordinance, section 61-5 (see item 4(c), below). The Programmatic EA lists these and indicates that based on County mapping, there are no designated RPAs within the Cemetery boundaries (page 3-24).

4(a) Agency Jurisdiction. The Department of Environmental Quality administers the Chesapeake Bay Preservation Act (Virginia Code sections 62.1-44.15:67 *et seq.*) and the *Chesapeake Bay Preservation Area Designation and Management Regulations* (4 VAC 50-90-10 *et seq.*).

4(b) Applicability. Based on information provided in of the Programmatic EA (page 3-24), the project area includes lands analogous to locally-designated Chesapeake Bay Preservation Area (CBPA) lands, but does not include any locally-designated RPA lands. The proposed project must adhere to the general performance criteria, 4 VAC 50-90-130 of the *Regulations*, especially with respect to minimizing land disturbance, retaining indigenous vegetation, and minimizing impervious surfaces. Land-disturbing activities that exceed an area of 2,500 square feet must comply with the requirements of the local erosion and sediment control ordinance.

4(c) Local Implementation. In Arlington County, the areas protected by the Chesapeake Bay Preservation Act, as locally implemented, require conformance with performance criteria. These areas include Resource Protection Areas (RPAs) and Resource Management Areas (RMAs) as designated by the local government. RPAs include tidal wetlands, certain non-tidal wetlands and tidal shores. RPAs also include a 100-foot vegetated buffer area located adjacent to and landward of these features and along both sides of any water body with perennial flow. RMAs, which require less stringent performance criteria, include those areas of the County not included in the RPAs.

4(d) Chesapeake Ecosystem Unified Plan; Chesapeake 2000 Agreement.

4(d)(i) Chesapeake Ecosystem Unified Plan. The 1998 *Federal Agencies' Chesapeake Ecosystem Unified Plan* requires the signatories to fully cooperate with local and state governments in carrying out voluntary and mandatory actions to comply with the management of stormwater. The signatories also committed to encouraging construction design that minimizes natural area loss on new and rehabilitated federal facilities, adopts low impact development and best management technologies for stormwater and erosion and sediment control, and reduces impervious surfaces.

4(d)(ii) Chesapeake 2000 Agreement. The *Chesapeake 2000 Agreement* committed the government agencies to a number of sound land use and stormwater quality controls. The signatories additionally committed the agencies to lead by example with respect to controlling nutrient, sediment and chemical contaminant runoff from

government properties. In December 2001, the Executive Council of the Chesapeake Bay Program issued *Directive No. 01-1: Managing Storm Water on State, Federal and District-owned Lands and Facilities*, which includes specific commitments for the signatories to lead by example with respect to stormwater control.

4(c) Conclusions. Provided that the project is implemented in a manner that is consistent with the Chesapeake Bay Preservation Act and its implementing regulations, DEQ's Water Division finds that the proposed action would be consistent with the Coastal Lands Management enforceable policy of the VCP.

5. Wetlands Management. According to the FCD, there are no known wetlands in areas that would be affected by the proposed action (page B-2).

5(a) Agency Jurisdiction. The State Water Control Board (SWCB) promulgates Virginia's water regulations, covering a variety of permits to include Virginia Pollutant Discharge Elimination System Permit, Virginia Pollution Abatement Permit, Surface and Groundwater Withdrawal Permit, and the Virginia Water Protection Permit (VWPP). The VWPP is a state permit which governs wetlands, surface water, and surface water withdrawals/impoundments. It also serves as § 401 certification of the federal *Clean Water Act* § 404 permits for dredge and fill activities in waters of the U.S. The VWPP Program is administered by the Office of Wetlands and Stream Protection (OWSP), within the DEQ Division of Water Quality Programs.

5(b) Comments. DEQ's Northern Regional Office (DEQ-NRO) states that the most recent assessment of the project site showed wetlands to be present. Any activities in wetlands will require a Joint Permit Application (JPA) and review by appropriate agencies including DEQ-NRO. See item 1(a), above and "Regulatory and Coordination Needs," item 7, below.

5(c) Conclusion. DEQ-NRO indicates that wetlands are present in the project area.

6. Point Source Pollution Control. The FCD indicates that a Virginia Pollutant Discharge Elimination System (VPDES) permit is not required for the proposed action (page B-2).

6(a) Agency Jurisdiction. See item 5(a), above.

6(b) Comments. DEQ-NRO states that the project manager should follow all applicable regulations.

6(c) Conclusions. DEQ-NRO did not disagree with the statement in the FCD that a VPDES permit is not required for the proposed action (FCD, page B-3).

7. Local and Regional Comments.

7(a) Federal Consistency Jurisdiction. In accordance with 15 CFR 930, Sub-part A, § 930.6(b) of the *Federal Consistency Regulations*, DEQ, on behalf of the state, is responsible for securing necessary review and comment from other state agencies, the public, regional government agencies, and local government agencies, in determining the Commonwealth's concurrence or objection to a federal consistency determination or certification.

7(b) Northern Virginia Regional Commission. The Northern Virginia Regional Commission did not respond to DEQ's request for comments on the proposed action.

7(c) Arlington County. Arlington County did not respond to DEQ's request for comments on the proposed action.

REGULATORY AND COORDINATION NEEDS

1. Non-point Source Pollution Control Enforceable Policy.

1(a) Coordination. For assistance with regard to erosion and sediment control plans, stormwater management plans, or stormwater management general permits for construction activities, the Army may contact the following:

- Erosion and Sediment Control Plans: DEQ's Water Division (Larry Gavan, telephone (804) 698-4040 or e-mail larry.gavan@deq.virginia.gov);
- Stormwater Management Plans: DEQ's Water Division (Holly Sepety, telephone (804) 698-4039 or e-mail holly.sepety@deq.virginia.gov);
- Stormwater General Permit for Construction Activities: (Holly Sepety, telephone (804) 698-4039 or e-mail holly.sepety@deq.virginia.gov).

1(b) Authorities. Legal and regulatory authorities for the above programs include, but are not limited to, the following:

- Erosion and sediment control: Virginia Code sections 62.1-44.15:51 *et seq.* and
- Stormwater management: Virginia Code sections 62.1-44.15:24 *et seq.*

2. Subaqueous Lands Management.

2(a) Coordination. Questions about the permitting requirements of the Virginia Marine Resources Commission may be directed to the Commission (Jordan Creed, telephone (757) 247-2200). Copies of the Joint Permit Application may be obtained from the Commission (telephone (757) 247-2200).

2(b) Authorities. As indicated above ("Federal Consistency..," "Analysis of Enforceable Policies," item 1(a)), the subaqueous lands permitting requirement stems from Virginia Code sections 28.2-1200 *et seq.*

3. Historic Structures and Archaeological Resources.

3(a) Coordination. As indicated above ("Environmental Impacts and Mitigation," item 4(b)), the Department of Historic Resources requests that the Army continue the consultation begun with the Department concerning the RPMP.

3(b) Authorities. Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations at 36 CFR Part 800, require federal agencies to consult with appropriate State Historic Preservation Offices regarding the impacts of their undertakings on historic resources.

4. Air Pollution Control Enforceable Policy.

4(a) Coordination. As indicated above ("Federal Consistency...," "Analysis of Enforceable Policies," item 2(d)), the Army should consult with DEQ's Northern Regional Office (James LaFratta, telephone (703) 583-3928) in regard to the applicability of air pollution control permits or other matters pertaining to regulation of air pollution.

4(b) Authorities. Provisions of the *Regulations for the Control and Abatement of Air Pollution* which may apply to activities contemplated in the RPMP include, but are not limited to, the following:

- Open burning: 9 VAC 5-130 *et seq.*
- Fugitive dust control: 9 VAC 5-50-60 *et seq.*
- Asphalt paving: 9 VAC 5-40-5490
- Permitting of fuel-burning equipment: 9 VAC 5-80-1100 *et seq.*

5. Natural Heritage and Wildlife Resources.

5(a) Coordination. The Army should contact the Department of Conservation and Recreation's Division of Natural Heritage (Rene' Hypes, telephone (804) 371-2708) if a significant amount of time passes before the natural heritage information presented above ("Environmental Impacts and Mitigation," item 2(d)) is used.

In the event any project under the RPMP appears likely to affect either bald eagle habitat or the Potomac River and its tributaries, the Army should coordinate with the Department of Game and Inland Fisheries (begin with Amy Ewing, telephone (804) 367-2211 or e-mail amy.ewing@dgif.virginia.gov) and the U.S. Fish and Wildlife Service's Virginia field office (begin with Cindy Schultz, telephone (804) 693-6694).

5(b) Additional Information and Guidance. For additional information on DGIF's database of wildlife locations and related information contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov).

Updated information on natural heritage resources should be requested from DCR's Division of Natural Heritage (Rene' Hypes, telephone (804) 371-2708) if a significant amount of time elapses before the natural heritage information above ("Environmental Impacts and Mitigation," item 2) is used.

As indicated above ("Environmental Impacts and Mitigation," item 7(d)), DGIF is willing to assist the Army in developing a plan that includes open space, wildlife habitat, and natural stream channels which retain their wooded buffers. To pursue this assistance, please feel free to contact DGIF (begin with Amy Ewing, telephone (804) 367-2211 or e-mail amy.ewing@dgif.virginia.gov).

5(c) Authorities. DCR's responsibility for natural heritage resources stems from Virginia Code sections 10.1-209 through 10.1-217.

DGIF's regulatory authority for protection and management of endangered and threatened species stems from Virginia Code sections 29.1-563 through 29.1-570.

6. Solid and Hazardous Waste Management.

6(a) Coordination.

6(a)(i) Petroleum Contamination. For additional information and the administrative records of petroleum contamination cases which are in close proximity to proposed projects, the Army may contact DEQ's Northern Regional Office (DEQ-NRO) (Tanks Program, telephone (703) 583-3800.

6(a)(ii) Asbestos-Containing Materials; Lead-based Paints. Questions on these topics may be directed to DEQ-NRO (Kathryn Persyzk, telephone (703) 583-3856 or e-mail kathryn.persyzk@deq.virginia.gov).

6(a)(iii) General Questions. General questions concerning waste management may be directed to DEQ's Division of Land Protection and Revitalization (Steve Coe, telephone (804) 698-4029 or e-mail steve.coe@deq.virginia.gov).

6(b) Authorities. Legal and regulatory authorities for waste management include, but are not limited to, the following:

Virginia:

- Virginia Waste Management Act, Virginia Code sections 10.1-1400 *et seq.*;
- *Virginia Hazardous Waste Management Regulations*, 9 VAC 20-60;
    - See 9 VAC 20-60-261 for rules on lead-based paints
- *Virginia Solid Waste Management Regulations*, 9 VAC 20-81;
    - See 9 VAC 20-81-620 for asbestos-containing materials
- *Virginia Regulations for the Transportation of Hazardous Materials*, 9 VAC 20-110.

Federal:

- Resource Conservation and Recovery Act, 42 U.S.C. sections 6901 *et seq.*
- Applicable provisions in Title 40, *Code of Federal Regulations*
- U.S. Department of Transportation *Rules for Transportation of Hazardous Materials*, 49 CFR Part 107.

7. Wetlands Management Enforceable Policy; Water Resources.

7(a) Coordination. Questions relating to water resource permitting may be directed to DEQ's Northern Regional Office (Bryant Thomas, telephone (703) 583-3843).

7(b) Authorities. The Virginia Water Protection Permit is required by Virginia Code sections 62.1-44.15:5D, which is implemented by regulations found in 9 VAC 25-210-10.

Thank you for the opportunity to comment. If you have questions, please feel free to contact me (telephone (804) 698-4325 or e-mail ellie.irons@deq.virginia.gov) or Charles Ellis of this Office (telephone (804) 698-4195 or e-mail charles.ellis@deq.virginia.gov).

Sincerely,

Ellie L. Irons, Program Manager
Environmental Impact Review

ec: Amy M. Ewing, DGIF
Robbie D. Rhur, DCR
Keith R. Tignor, VDACS
Ezekiel Dufore, VDH-ODW
G. Stephen Coe, DEQ-DLPR
Kotur S. Narasimhan, DEQ-DAPC
Larry Gavan, DEQ-E&S
Daniel Moore, DEQ-CB
Daniel Burstein, DEQ-NRO
Roger W. Kirchen, DHR
Gregory Evans, DOF
Jordan Creed, VMRC
G. Mark Gibb, NVRC
Barbara Donnellan, Arlington County

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR PROGRAM COORDINATION

ENVIRONMENTAL REVIEW COMMENTS APPLICABLE TO AIR QUALITY

TO: Charles H. Ellis III **DEQ - OEIA PROJECT NUMBER: 13 – 155F**

PROJECT TYPE: ☐ STATE EA / EIR **X FEDERAL EA / EIS** ☐ SCC

X CONSISTENCY DETERMINATION

PROJECT TITLE: ARLINGTON NATIONAL CEMETERY REAL PROPERTY MASTER PLAN

PROJECT SPONSOR: DOD: ARMY: ARLINGTON NATIONAL CEMETERY

PROJECT LOCATION: **X OZONE NON ATTAINMENT AND EMISSION CONTROL AREA FOR NOX & VOC**

REGULATORY REQUIREMENTSMAY BE APPLICABLE TO: ☐ CONSTRUCTION ☐ OPERATION

STATE AIR POLLUTION CONTROL BOARD REGULATIONS THAT MAY APPLY:

1. ☐ 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 E – STAGE I
2. ☐ 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 F – STAGE II Vapor Recovery
3. **X 9 VAC 5-40-5490 et seq. – Asphalt Paving operations**
4. **X 9 VAC 5-130 et seq. – Open Burning**
5. **X 9 VAC 5-50-60 et seq. Fugitive Dust Emissions**
6. ☐ 9 VAC 5-50-130 et seq. - Odorous Emissions; Applicable to_____
7. ☐ 9 VAC 5-50-160 et seq. – Standards of Performance for Toxic Pollutants
8. ☐ 9 VAC 5-50-400 Subpart_____, Standards of Performance for New Stationary Sources, designates standards of performance for the_____
9. ☐ 9 VAC 5-80-1100 et seq. of the regulations – Permits for Stationary Sources
10. ☐ 9 VAC 5-80-1700 et seq. Of the regulations – Major or Modified Sources located in PSD areas. This rule may be applicable to the _____
11. ☐ 9 VAC 5-80-2000 et seq. of the regulations – New and modified sources located in non-attainment areas
12. ☐ 9 VAC 5-80-800 et seq. Of the regulations – Operating Permits and exemptions. This rule may be applicable to _____

COMMENTS SPECIFIC TO THE PROJECT:

All precautions are necessary to restrict the emissions of volatile organic compounds (VOC) and oxides of nitrogen (NO_X).

K. S. Narasimhan

(Kotur S. Narasimhan)
Office of Air Data Analysis **DATE: August 23, 2013**

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

MEMORANDUM

TO: Charles Ellis, Environmental Program Planner

FROM: Steve Coe, Division of Land Protection & Revitalization Review Coordinator

DATE: September 24, 2013

COPIES: Sanjay Thirunagari, Division of Land Protection & Revitalization Review Manager; EIR file

SUBJECT: Environmental Impact Statement: Project #13-155F. Arlington National Cemetery Real Property Master Plan, Arlington, VA 22211. DOD/Army

The Division of Land Protection & Revitalization (DLPR) has completed its review of the Environmental Review Request for the Arlington National Cemetery (ANC) Real Property Master Plan, Arlington, VA 22211.

The project scope: planned development to increase burial space at the ANC. The project would include new construction and reconfiguration of an existing structure at ANC, as well as development of the former Navy Annex site.

Solid and hazardous waste issues were generally addressed in the submittal. DLPR staff has reviewed the submittal, conducted a cursory search of its waste databases, and has the following comments concerning possible waste issues associated with this proposed program:

DEQ's Virginia Geographical Information Systems (VEGIS) database can be accessed at the following web address: http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx. Through VEGIS's search options, you can identify by address or zip code the Solid Waste sites, VRP sites, and Petroleum Release sites in the area of the proposed project. Within the 22211 zip code or within 500 feet of the project site(s):

Solid waste sites – none

VRP sites – none

Petroleum release sites – Multiple petroleum contamination (PC) events were identified on the ANC property and nearby Fort Myer. The proximity of the PC sites to the project work was not determined, but should be reviewed by the project engineer(s) for possible impacts on the project.

1) ID# 19921775 – Arlington National Cemetery, Building 103. Event Date: 3/5/2007. Status: Closed.
2) ID# 19940580 – Arlington National Cemetery, Building107. Event Date: 3/5/2007. Status: Closed.
3) ID# 1990437 – Arlington National Cemetery, Building 102. Event Date: 3/20/2006. Status: Closed.
4) ID# 19940579 – Arlington National Cemetery, Building 113. Event Date: 3/20/2006. Status: Closed.
5) ID# 20073119 – Arlington National Cemetery, Columbarium Site. Event Date: 6/1/2007. Status: Closed.
6) ID# 19930065 – Fort Myer, Building 305, Tank 24, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed.
7) ID# 19920578 – Fort Myer, Building 323, Tank 30, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed.
8) ID# 19930673 – Fort Myer, Building 305, Tank 24, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed.

Please note that the DEQ's PC case files with the PC Case Nos., within a defined radius of the proposed project(s), can be identified and these petroleum releases should be evaluated by the project engineer or manager to establish the exact location of the release and the nature and extent of the petroleum release and the potential to impact the proposed project. The facility representative should contact the DEQ's Northern Virginia Regional Office (Tanks Program) for further information and the administrative records of the PC cases which are in close proximity to any proposed projects.

FUD sites – none

CERCLA/FFR sites – one

VA8210020626 – Fort Myer, 204 Lee Avenue, Fort Myer, VA 22211. Status: Not NPL.

RCRA/HW sites – 3 identified in zip code 22211. The report author or project engineer should access this information on the DEQ website at http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/ReportsPublications/OriginalReports.aspx, and clicking on the Hazardous Waste Facilities link. Search by zip code 22211.

1) VA8210020626 – Department of the Army HQ, Joint Base Myer-Henderson Hall, Lee Avenue, Fort Myer, VA 22211. Contact: James Stratton at 703-696-2013.
2) VAR000000786 – DOD Federal Office Bldg #2, Columbia Pike & Old Ridge, Arlington, VA 22211. Contact: Stephen P. Best at 703-692-4114.
3) VA6210020032 – U.S. Arlington National Cemetery, Arlington, VA 22211. Contact: Joseph Bunton at 703-697-4915.

With any demolition or construction project, it is anticipated that there will be a waste stream that must be managed properly. Waste management guidance is provided in the General Comments section below.

GENERAL COMMENTS

Any soil that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable Federal, State, and local laws and regulations. Some of the applicable state laws and regulations are: Virginia Waste Management Act, Code of Virginia Section 10.1-1400 et seq.;

Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20-60); Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-81); and Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110). Some of the applicable Federal laws and regulations are: the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901 et seq., the applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U.S. Department of Transportation Rules for Transportation of Hazardous materials, 49 CFR Parts 107.

Also, if an older structure will be demolished as part of this project, the structure should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP). If they are found, in addition to the federal waste-related regulations mentioned above, State regulations 9VAC 20-81-620 for ACM and 9VAC 20-60-261 for LBP must be followed. Questions may be directed to Kathryn Persyzk at DEQ's Northern Virginia office at 703-583-3856.

Finally, DEQ encourages all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All hazardous wastes should be minimized.

If you have any questions or need further information, please contact Steve Coe at (804) 698-4029.

From: Burstein, Daniel (DEQ)
Sent: Wednesday, September 25, 2013 1:34 PM
To: Ellis, Charles (DEQ)
Subject: Re: Army: Arlington National Cemetery Real Property Master Plan, Arlington County, DEQ #13-155F - REVIEW

NRO comments regarding the Environmental Assessment and Consistency Determination for DOD/Army: Arlington National Cemetery Real Property Master Plan, located in Arlington County are as follows:

Land Protection Division - All but the no action alternative will result in slight increase in the amount of waste generated by Arlington National Cemetery. The facility should follow applicable federal, state, and county regulations for the disposal of any solid or hazardous waste is generated/encountered during development and operations.

Air Compliance/Permitting - The project manager is reminded that during the construction phases that occur with this project; the project is subject to the Fugitive Dust/Fugitive Emissions Rule 9 VAC 5-50-60 through 9 VAC 5-50-120. In addition, should the project install fuel burning equipment (Boilers, Generators, Compressors, etc...), or any other air pollution emitting equipment, the project may be subject to 9 VAC 5-80, Article 6, Permits for New and Modified sources and as such the project manager should contact the Air Permit Manager DEQ-NRO prior to installation or construction, and operation, of fuel burning or other air pollution emitting equipment for a permitting determination. Lastly, should any open burning or use of special incineration devices be employed in the disposal of land clearing debris during demolition and construction, the operation would be subject to the Open Burning Regulation 9 VAC 5-130-10 through 9 VAC 5-130-60 and 9 VAC 5-130-100.

Virginia Water Protection Permit (VWPP) Program – The most recent assessment of the site showed wetlands on the site and any activities in those wetlands will require a Joint Permit Application (JPA) and review. Upon receipt of a JPA for the proposed surface water impacts, DEQ VWP Permit staff will review the proposed project in accordance with the VWP permit program regulations and current VWP permit program guidance.

Water Permitting/VPDES Program/Stormwater: The project manager is reminded to follow all applicable regulations.

Daniel Burstein
Regional Enforcement Specialist, Sr.
Virginia Department of Environmental Quality
Northern Virginia Regional Office
13901 Crown Court
Woodbridge, VA 22193
Phone: (703) 583-3904
Fax: (703) 583-3821
daniel.burstein@deq.virginia.gov

From: Gavan, Larry (DEQ)
Sent: Wednesday, September 11, 2013 10:31 AM
To: Ellis, Charles (DEQ)
Subject: RE: NEW PROJECT Army 13-155F

Hi Charlie,
Pls. see the comments below.
Thx
L

(a) Agency Jurisdiction. The Department of Environmental Quality (DEQ) administers the *Virginia Erosion and Sediment Control Law and Regulations* (*VESCL&R*) and *Virginia Stormwater Management Law and Regulations* (*VSWML&R*).

(b) Erosion and Sediment Control and Stormwater Management Plans. The Applicant and its authorized agents conducting regulated land-disturbing activities on private and public lands in the state must comply with *VESCL&R* and *VSWML&R*, including coverage under the general permit for stormwater discharge from construction activities, and other applicable federal nonpoint source pollution mandates (e.g. Clean Water Act-Section 313, federal consistency under the Coastal Zone Management Act). Clearing and grading activities, installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, soil stockpiles, and related land-disturbing activities that result in the total land disturbance of equal to or greater than 10,000 square feet (2,500 square feet in Chesapeake Bay Preservation Area) would be regulated by *VESCL&R*. Accordingly, the Applicant must prepare and implement an erosion and sediment control (ESC) plan to ensure compliance with state law and regulations. The ESC plan is submitted to the DEQ Regional Office that serves the area where the project is located for review for compliance. The Applicant is ultimately responsible for achieving project compliance through oversight of on-site contractors, regular field inspection, prompt action against non-compliant sites, and other mechanisms consistent with agency policy. [Reference: VESCL 62.1-44.15 et seq.]

From: Fulcher, Valerie (DEQ)
Sent: Tuesday, August 20, 2013 3:29 PM
To: dgif-ESS Projects (DGIF); Tignor, Keith (VDACS); Rhur, Robbie (DCR); odwreview (VDH); Coe, Stephen (DEQ); Narasimhan, Kotur (DEQ); Gavan, Larry (DEQ); Moore, Daniel (DEQ); Sepety, Holly (DEQ); Nicholson, Shantelle (DEQ); Burstein, Daniel (DEQ); Kirchen, Roger (DHR); Kline, Everette (DOF); Evans, Gregory (DOF); Watkinson, Tony (MRC); gmg@novaregion.org; Aimee Vosper; countymanager@arlingtonva.us
Cc: Ellis, Charles (DEQ)
Subject: NEW PROJECT Army 13-155F

Good afternoon - attached is a new EIR review request/project:

Army: Arlington National Cemetery Real Property
Master Plan, Arlington County, DEQ #13-155F

You can access the documents at the following link:

http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx
The due date for comments is SEPTEMBER 25, 2013. You can send your comments either directly to Charlie by email (Charles.Ellis@deq.virginia.gov), or you can send your comments by regular interagency/U.S. mail to the Department of Environmental Quality, Office of Environmental Impact Review, 629 E. Main St., 6th Floor, Richmond, VA 23219. If you have any questions, please email Charlie.

Thanks!

Valerie

Valerie A. Fulcher, CAP-OM, Executive Secretary Sr.
Department of Environmental Quality
Environmental Enhancement - Office of Environmental Impact Review
629 E. Main St., 6th Floor
Richmond, VA 23219
804/698-4330
804/698-4319 (Fax)
email: Valerie.Fulcher@deq.virginia.gov
www.deq.virginia.gov

From: Gavan, Larry (DEQ)
Sent: Monday, September 23, 2013 1:24 PM
To: Sepety, Holly (DEQ); Ellis, Charles (DEQ)
Cc: Fisher, John (DEQ)
Subject: RE: checking on citations for stormwater regs-- Arlington Cemetery master plan review, 13-155F

Kelly Vanover would be the DEQ NRO SWM Manager contact at (540) 347-6420.
Thx
L

From: Sepety, Holly (DEQ)
Sent: Monday, September 23, 2013 11:51 AM
To: Gavan, Larry (DEQ); Ellis, Charles (DEQ)
Cc: Fisher, John (DEQ)
Subject: RE: checking on citations for stormwater regs-- Arlington Cemetery master plan review, 13-155F

Charles,

The exemption code can be found at: 62.1-44.15:34 [10.1-603.8] Regulated activities; submission and approval of a permit
application; security for performance; exemptions.

This is from our website, regarding who must apply:

Who Must Apply for Construction General Permit Coverage

- Operators of construction activities resulting in land disturbance equal to or greater than one acre.
- Operators of construction activities resulting in land disturbance equal to or greater than 2,500 square feet and less than one acre within areas designated as subject to the Chesapeake Bay Preservation Act.
- Operators of construction activities resulting in land disturbance less than one acre that are part of a larger common plan of development or sale that ultimately disturbs one or more acres. A larger common plan of development or sale is a contiguous area where separate and distinct construction may be taking place at different times on different schedules. A permit is required if one or more acres, or 2,500 square feet or more in all areas designated as subject to the Chesapeake Bay Preservation Act, of land will be disturbed, regardless of the size of the individually owned or developed sites. For example, if a developer buys a 20-acre lot and builds roads with the intention of building homes or other structures in the future, or if the land is parceled off or sold, and construction occurs on plots that are less than an acre by separate, independent builders, these activities would still be subject to stormwater permitting requirements. A larger common plan of development or sale applies to various types of land development including but not limited to residential, commercial or industrial use.

Let me know if you have questions.

Regards,
Holly

Holly C. Sepety
Stormwater Permit Specialist
Dept. of Environmental Quality
Phone: (804) 698-4039

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
Fax: 804-698-4019 - TDD (804) 698-4021
www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4020
1-800-592-5482

MEMORANDUM

TO: Charles Ellis, DEQ Environmental Impact Review Coordinator

FROM: Daniel Moore, DEQ Principal Environmental Planner

DATE: September 12, 2013

SUBJECT: DEQ 13-155F, DOD: Army – Arlington National Cemetery Master Plan, Arlington County Virginia

We have reviewed the Consistency Determination (CD) for the proposed Real Property Master Plan for Arlington National Cemetery in Arlington County and offer the following comments regarding consistency with the provisions of the *Chesapeake Bay Preservation Area Designation and Management Regulations* (Regulations):

In Arlington County, the areas protected by the Chesapeake Bay Preservation Act, as locally implemented, require conformance with performance criteria. These areas include Resource Protection Areas (RPAs) and Resource Management Areas (RMAs) as designated by the local government. RPAs include tidal wetlands, certain non-tidal wetlands and tidal shores. RPAs also include a 100-foot vegetated buffer area located adjacent to and landward of these features and along both sides of any water body with perennial flow. RMAs, which require less stringent performance criteria, include those areas of the County not included in the RPAs.

Pursuant to the *Coastal Zone Management Act* (the Management Act) of 1972, as amended, Federal activities affecting Virginia's coastal resources or coastal uses must be consistent with the Virginia Coastal Zone Management Program (Section 307(c)(1) of the Management Act and 15 CFR Part 930, sub-part C of the *Federal Consistency Regulations*).

The Chesapeake Bay Preservation Act and Regulations are incorporated in the Virginia Coastal Zone Management Program. Federal Consistency regulations implementing the Coastal Zone Management Act require that federal actions, and/or projects requiring federal approvals or assistance that may impact natural resources in a coastal zone, must be conducted in a manner consistent to the maximum extent practicable with the enforceable policies of a coastal state's federally approved coastal management program.

The 1998 *Federal Agencies' Chesapeake Ecosystem Unified Plan* requires the signatories to fully cooperate with local and state governments in carrying out voluntary and mandatory actions to comply with the management of stormwater. The signatories also committed to encouraging construction design that minimizes natural area loss on new and rehabilitated federal facilities, adopts low impact development and best management technologies for stormwater and erosion and sediment control, and reduces impervious surfaces. In addition, the *Chesapeake 2000* agreement committed the government agencies to a number of sound land use and stormwater quality controls. The signatories additionally committed the agencies to lead by example with respect to controlling nutrient, sediment and chemical contaminant runoff from government properties. In December 2001, the Executive Council of the Chesapeake Bay Program issued *Directive No. 01-1: Managing Storm Water on State, Federal and District-owned Lands and Facilities*, which includes specific commitments for the signatories to lead by example with respect to stormwater control.

Based on information provided in Section 3.5.1.11 of the Programmatic Environmental Assessment, the project area includes lands analogous to locally-designated Chesapeake Bay Preservation Area (CBPA) lands, but does not include any locally-designated RPA lands. The proposed project must adhere to the general performance criteria, 4 VAC 50-90-130 of the Regulations, especially with respect to minimizing land disturbance, retaining indigenous vegetation and minimizing impervious surfaces. Land disturbing activities that exceed an area of 2,500 square feet shall comply with the requirements of the local erosion and sediment control ordinance.

Provided adherence to the above requirements the proposed activity would be consistent with the Regulations and the *Chesapeake Bay Preservation Act.*

From: Gavan, Larry (DEQ)
Sent: Monday, September 23, 2013 11:09 AM
To: Ellis, Charles (DEQ); Sepety, Holly (DEQ)
Cc: Fisher, John (DEQ)
Subject: RE: checking on citations for stormwater regs-- Arlington Cemetery master plan review, 13-155F

Hi Charlie,
These questions relate to the VSMP Permit Program so I'll forward it on to Ms. Holly Sepety.
I'll stay on the e-mail discussion thread and be available to assist.
Thanks and Regards
L

Hi Holly,
I've not seen your comments for this project but I suspect that it might take care of some/all of Charlie's queries below.
Thanks and Regards
L

From: Ellis, Charles (DEQ)
Sent: Monday, September 23, 2013 10:55 AM
To: Gavan, Larry (DEQ)
Cc: Fisher, John (DEQ)
Subject: checking on citations for stormwater regs-- Arlington Cemetery master plan review, 13-155F

Larry – I'm starting to write the response on the Army's Environmental Assessment/federal consistency determination on the Real Property Master Plan, and I got your September 11 e-mailed comments last week.

In your paragraph (b) on E&S and Stormwater, you cited the Erosion and Sediment Control Law as being Virginia Code sections 62.1-44.15 *et seq.* – which means that the E&S law got moved into the Water Law, if memory serves. I have recently seen a "crosswalk" (on the web) saying that the E&S provisions are extensions of that Code section, specifically 62.1-44.15:24 and following.

First, did you intend to provide guidance on stormwater management plans as well?

Second, do the DEQ regional offices now handle E&S Plan review and Stormwater Plan review? Do you have a suggested contact in DEQ's Northern Regional Office for that purpose?

Third, does stormwater management (1 acre or more, right?) apply to projects that might take place in the Cemetery under the master plan? If so, what are the legal and regulatory citations?

Thanks for anything you can tell me.

Charlie

Charles H. Ellis III, Environmental Review Coordinator
Department of Environmental Quality
629 East Main Street
Richmond, Virginia 23219
(804) 698-4195
charles.ellis@deq.virginia.gov

www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION
600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804) 786-6124

MEMORANDUM

DATE: September 24, 2013

TO: Charlie Ellis, DEQ

FROM: Roberta Rhur, Environmental Impact Review Coordinator

SUBJECT: DEQ 13-155F, Arlington National Cemetery Master Plan

Division of Natural Heritage

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Biotics documents the presence of natural heritage resources in the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov). This project is located within 2 miles of documented occurrences of state listed animals. Therefore, DCR recommends coordination with VDGIF, Virginia's regulatory authority for the management and protection of these species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.

Cc: Amy Ewing, VDGIF

From: Ewing, Amy (DGIF)
Sent: Thursday, September 26, 2013 1:32 PM
To: Ellis, Charles (DEQ)
Cc: Cason, Gladys (DGIF); nhreview (DCR)
Subject: RE: ESSLog# 34117_13-155F_ANC Master Plan

And...

Assuming adherence to erosion and sediment controls, we find this project consistent with the Fisheries Management Section of the CZMA.

Thanks,
Amy Ewing

Environmental Services Biologist | VA Dept. of Game and Inland Fisheries | 4010 West Broad St. Richmond, VA 23230 | 804-367-2211 | www.dgif.virginia.gov

---

From: Ewing, Amy (DGIF)
Sent: Thursday, September 26, 2013 1:32 PM
To: Ellis, Charles (DEQ)
Cc: Cason, Gladys (DGIF); nhreview (DCR)
Subject: ESSLog# 34117_13-155F_ANC Master Plan

We have reviewed the master plan for Arlington National Cemetery.

According to our records, bald eagles and the Potomac River Anadromous Fish Use Area have been documented from the project area. At this time, we have not identified any project in the plan that appears likely to result in adverse impacts upon bald eagles or anadromous fish resources. However, we recommend that any projects requiring either impacts upon bald eagle habitats or impacts upon the Potomac River and/or its tributaries be coordinated with us, and the USFWS, so that we may make protective recommendations for these resources.

This project is located within 2 miles of a documented occurrence of a state or federal threatened or endangered plant or insect species and/or other Natural Heritage coordination species. Therefore, we recommend coordination with VDCR-DNH regarding the protection of these resources.

To minimize overall impacts to wildlife and our natural resources, we offer the following comments about development activities: We recommend that the applicant avoid and minimize impacts to undisturbed forest, wetlands, and streams to the fullest extent practicable. Avoidance and minimization of impact may include relocating stream channels as opposed to filling or channelizing as well as using, and incorporating into the development plan, a natural stream channel design and wooded buffers. We recommend maintaining undisturbed naturally vegetated buffers of at least 100 feet in width around all on-site wetlands and on both sides of all perennial and intermittent streams. We recommend maintaining wooded lots to the fullest extent possible. We generally do not support proposals to mitigate wetland impacts through the construction of stormwater management ponds, nor do we support the creation of in-stream stormwater management ponds. We are willing to assist the applicant in developing a plan that includes open-space, wildlife habitat, and natural stream channels which retain their wooded buffers.

We recommend that the stormwater controls for this project be designed to replicate and maintain the hydrographic condition of the site prior to the change in landscape. This should include, but not be limited to, utilizing bioretention areas, and minimizing the use of curb and gutter in favor of grassed swales. Bioretention areas (also called rain gardens) and grass swales are components of Low Impact Development (LID). They are designed to capture stormwater runoff as close to the source as possible and allow it to slowly infiltrate into the surrounding soil. They benefit natural resources by filtering pollutants and decreasing downstream runoff volumes.

We recommend that all tree removal and ground clearing adhere to a time of year restriction protective of resident and migratory songbird nesting from March 15 through August 15 of any year.

We recommend adherence to erosion and sediment controls during ground disturbance.

Thanks,
Amy Ewing

Environmental Services Biologist | VA Dept. of Game and Inland Fisheries | 4010 West Broad St.
Richmond, VA 23230 | 804-367-2211 | www.dgif.virginia.gov

From: Dufore, Ezekiel (VDH)
Sent: Friday, August 30, 2013 4:29 PM
To: Ellis, Charles (DEQ)
Cc: Matthews, Barry (VDH); Albrecht, Edward (VDH)
Subject: 13-155F Arlington National Cemetery Real Property Master Plan

Arlington National Cemetery Real Property Master Plan
Project #: 13-155F
Location: Arlington

VDH – Office of Drinking Water has reviewed the above project. Below are our comments as they relate to proximity to **public drinking water sources** (groundwater wells, springs and surface water intakes). Potential impacts to public water distribution systems or sanitary sewage collection systems must be verified by the local utility.

No groundwater wells are within a 1 mile radius of the project site.

No surface water intakes are located within a 5 mile radius of the project site.

The project is not within Zone 1 (up to 5 miles into the watershed) or Zone 2 (greater than 5 miles into the watershed) of any public surface water sources.

There are no apparent impacts to public drinking water sources due to this project.

Ezekiel Dufore
Office of Drinking Water
Virginia Department of Health
James Madison Building
109 Governor Street
Richmond, VA 23219
(w) 804-864-7201
ezekiel.dufore@vdh.virginia.gov

COMMONWEALTH of VIRGINIA

Marine Resources Commission
2600 Washington Avenue
Third Floor
Newport News, Virginia 23607

Douglas W. Domenech
Secretary of Natural Resources

Jack G. Travelstead
Commissioner

August 21, 2013

Mr. Charles H. Ellis III
Department of Environmental Quality
Office of Environmental Impact Review
629 East Main Street, 6th Floor
Richmond, Virginia 23219

Re: ANC Real Property Master Plan
Project # 13-155F
Arlington, Virginia

Dear Mr. Ellis:

We have reviewed the above-referenced consistency determination documentation for the Arlington National Cemetery Real Property Master Plan. Based on the information provided, no jurisdictional waterways will be impacted, and therefore, no authorization will be required from the Marine Resources Commission.

Please be advised that the Commission, under Section 28.2-1200 et. seq. of the Code of Virginia, has jurisdiction over any encroachments in, on, or over the beds of the bays, ocean, rivers, streams, or creeks which are the property of the Commonwealth. Accordingly, if any portion of the subject project involves any encroachments channelward of ordinary high water along natural rivers and streams above the fall line or mean low water below the fall line, a permit may be required from our agency. For your information, we generally only require permits along nontidal waterways if the drainage area is greater than five square miles.

Thank you for the opportunity to comment on this project. If we may be of further assistance, please do not hesitate to contact us.

Sincerely,

JMCreed

Jordan Creed
Environmental Engineer

COMMENT FORM

Programmatic Environmental Assessment and Draft Finding of No Significant Impact
for the U.S. Soldiers' and Airmen's Home National Cemetery
Real Property Master Plan

Agency/Organization Name: Virginia Department of Forestry (VDOF) **Date:** 9/19/13
Name and E-mail of Commenter: Greg Evans, gregory.evans@dof.virginia.gov

Instructions: Please fill out the information above and provide comments in the following table. Insert rows as necessary and e-mail completed comment forms to arlingtoncemetery.masterplan@mail.mil by 30 September 2013.

Report Section	Page Number	Agency Comment
3.6 Biological Resources	3-26	VDOF is commenting on this PEA as a participating agency in the Virginia DEQ environmental impact review process and specifically to determine federal consistency. VDOF's responsibility is to assess the impact of the project on the forest resources of Virginia. VDOF notes that Alternative 3 requires realignment of Virginia roadways but due to the urban nature of the project area, it is not heavily forested. It recommends however that any tree removal impacting the Foxcroft Heights Park be mitigated as much as possible VDOF further notes that the No Action alternative would require removal of most of the trees in the future Millenium project site. It appears from the project narrative that this would not be the case under any of the Build scenarios so those would be preferable to VDOF. Finally, VDOF supports ANC's plan to place a priority on retaining the old trees (200 years+) on the site and in particular requests that special attention be given to not disturbing the root structure or any other environmental variable that could jeopardize the health of the three state champion trees that are present in ANC.

From: Kirchen, Roger (DHR)
Sent: Wednesday, September 18, 2013 3:51 PM
To: Ellis, Charles (DEQ)
Subject: Arlington National Cemetery (DEQ #13-155F; DHR File No. 2012-0965)

DHR has been in consultation with the Army regarding this project. We request that the Army continue to consult directly with DHR, as necessary, pursuant to Section 106 of the National Historic Preservation Act (as amended) and its implementing regulations codified at 36 CFR Part 800 which require Federal agencies to consider the effects of their undertakings on historic properties.

Roger

Roger W. Kirchen, Manager
Office of Review and Compliance
Division of Resource Services and Review
Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221
phone: 804-482-6091 (NEW!)
fax: 804-367-2391
roger.kirchen@dhr.virginia.gov

Barbara Bottiger

From: Conner, Susan L. NAO <Susan.L.Conner@usace.army.mil>
Sent: Thursday, September 04, 2014 5:28 PM
To: 'Irons, Ellie (DEQ)'; 'Ellis, Charles (DEQ)'
Cc: Pool, Alice P NAO; Barbara Bottiger
Subject: CZMA Determination for Arlington National Cemetery Real Property Master Plan EA (UNCLASSIFIED)
Attachments: ARMY-ARLINGTON-MASTER-PLAN-13-155F.PDF; Summary_of_EA_changes_for_VDEQ.DOCX

Classification: UNCLASSIFIED
Caveats: NONE

Good Afternoon Ellie and Charlie-

I am writing to discuss revisions to the Arlington National Cemetery Real Property Master Plan EA for which a CZM determination was submitted in 2013 and a concurrence received (per attached letter) on 16 October 2013. Subsequent to that review, an internal decision was made to revise the EA and re-release for another public review period. That second public review period will begin in the next month or so.

The revisions to the EA are described in the attached "summary of changes." The EA was revised primarily to respond to Arlington County's concerns regarding a proposed land transfer and the alignment of Columbia Pike shown in the EA. The primary revisions were that the alternatives were modified and a detailed traffic analysis was performed.

We are proposing to you that another CZM review is not necessary. Based on the character of the revisions, there is not a reason that the CZM determination or concurrence would change significantly.

As discussed in the attached concurrence, Department of Army or its representatives will obtain all applicable permits and approvals as needed as the plan is implemented.

Please let us know if you concur with this path forward or if you have additional questions and wish to discuss further.

Very respectfully - Susan Conner

Susan L. Conner
Chief, Environmental Analysis Section
Planning & Policy Branch, Water Resources Division U.S. Army Corps of Engineers, Norfolk District
803 Front Street
Norfolk, VA 23510

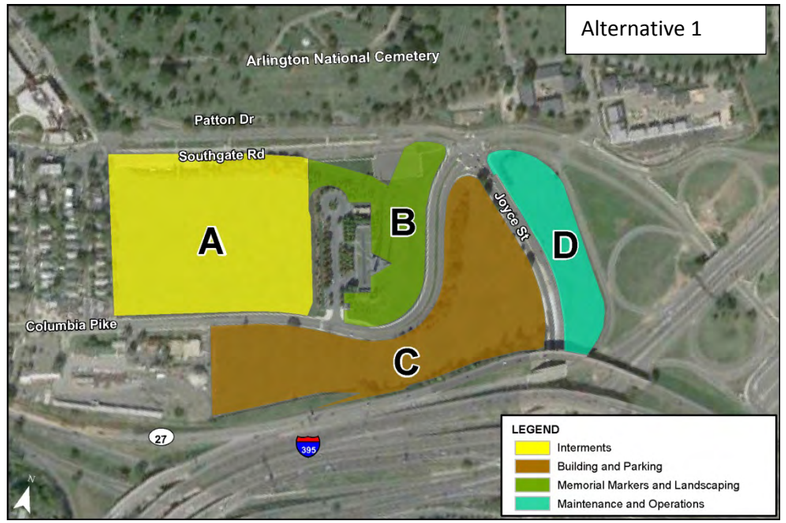
757-201-7390 office
757-419-8057 cell

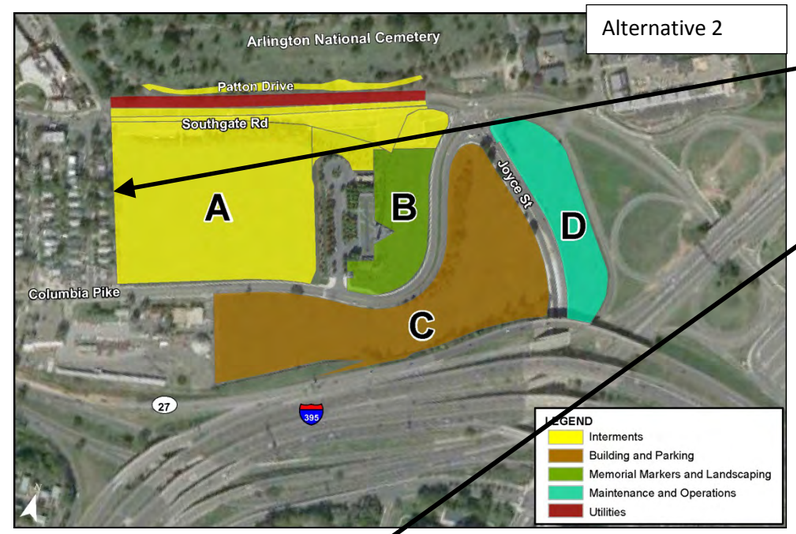
Classification: UNCLASSIFIED
Caveats: NONE

Why was the EA Revised? Primarily to respond to Arlington County's concerns regarding a proposed land transfer and the alignment of Columbia Pike shown in the EA.

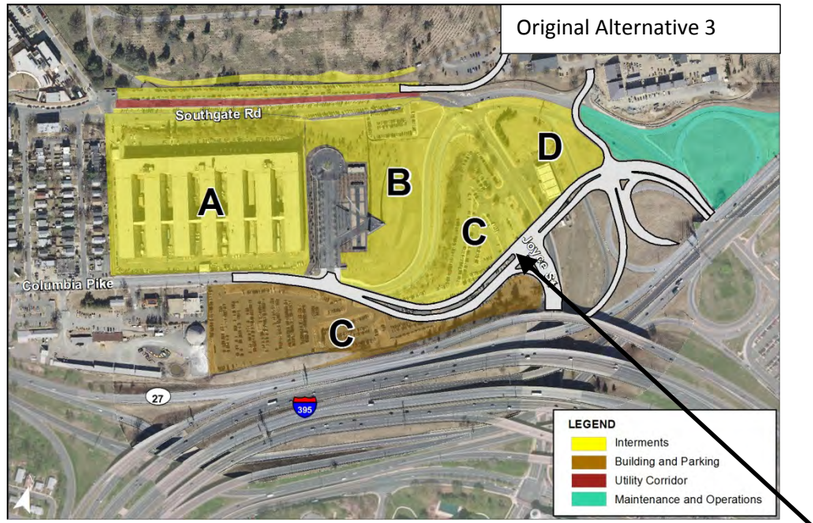
What were the primary revisions? The Alternatives were modified and a detailed traffic analysis was performed.

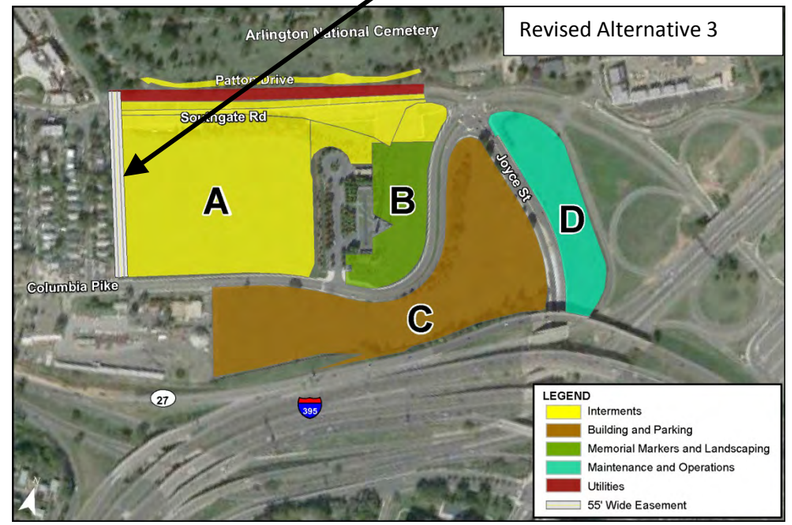
Alternatives: Alternatives 1 and 2 remained the same. Alternative 3 was changed and Alternative 4 was added.

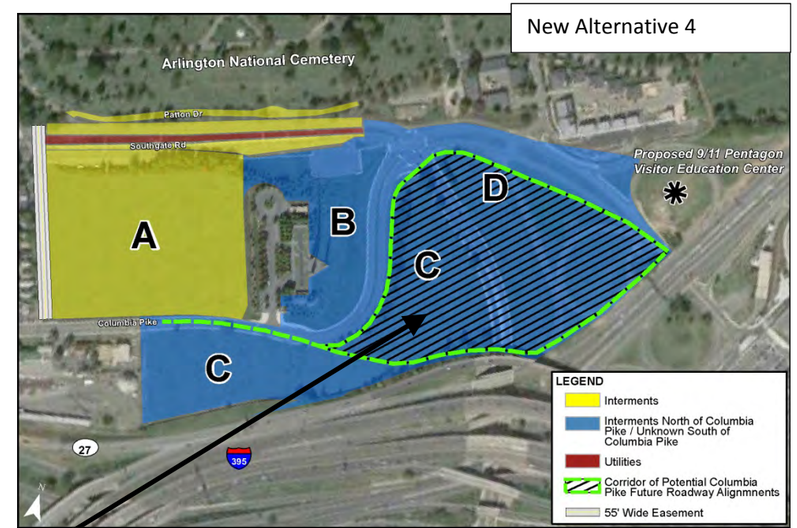




Arlington County wants to construct a road here . Therefore, the Revised Alternative 3 includes a road in this location.







Arlington County did not like the re-alignment of Columbia Pike shown in the Original Alternative 3.

Therefore, the New Alternative 4 shows a potential corridor of alignments.

Traffic Analysis

A detailed traffic analysis was completed for the streets in the adjacent neighborhood. The analysis verified that the change in intersection level of service would not be significant.

Coastal Zone Consistency Determination -

Only minor changes to:

- Reflect the revised alternatives.
- Acknowledge that the Proposed Action could result in an up to approximately nine percent larger cemetery area to maintain instead of eight percent.
- Discuss relatively small changes in air quality.

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Barbara Bottiger

Subject: FW: [EXTERNAL] RE: CZMA Determination for Arlington National Cemetery Real Property Master Plan EA (UNCLASSIFIED)

From: Irons, Ellie (DEQ) <Ellie.Irons@deq.virginia.gov>
Sent: Tuesday, September 16, 2014 2:22 PM
To: Conner, Susan L. NAO
Cc: Ellis, Charles (DEQ)
Subject: [EXTERNAL] RE: CZMA Determination for Arlington National Cemetery Real Property Master Plan EA (UNCLASSIFIED)

Susan:
Based on the comments from agencies administering the enforceable policies of the Virginia Coastal Zone Management Program, there is no need to resubmit the federal consistency determination for Arlington National Cemetery Real Property Master Plan. Thanks

Ellie Irons
Program Manager
Office of Environmental Impact Review
629 East Main Street, Room 631
Richmond, VA 23219
Telephone: (804) 698-4325
Fax; (804) 698-4319
email address: Ellie.Irons@deq.virginia.gov http://www.deq.virginia.gov

-----Original Message-----
From: Conner, Susan L. NAO [mailto:Susan.L.Conner@usace.army.mil]
Sent: Monday, September 15, 2014 9:39 AM
To: Irons, Ellie (DEQ)
Cc: Ellis, Charles (DEQ)
Subject: RE: CZMA Determination for Arlington National Cemetery Real Property Master Plan EA (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Thanks Ellie, I appreciate the update.

Happy Monday!
Susan

Susan L. Conner
Chief, Environmental Analysis Section
Planning & Policy Branch, Water Resources Division U.S. Army Corps of Engineers, Norfolk District
803 Front Street
Norfolk, VA 23510

757-201-7390 office
757-419-8057 cell

-----Original Message-----
From: Irons, Ellie (DEQ) [mailto:Ellie.Irons@deq.virginia.gov]
Sent: Monday, September 15, 2014 7:39 AM
To: Conner, Susan L. NAO
Cc: Ellis, Charles (DEQ)
Subject: [EXTERNAL] FW: CZMA Determination for Arlington National Cemetery Real Property Master Plan EA (UNCLASSIFIED)

Susan: FYI, we are still waiting on 3 reviewers to respond. We will let you know ASAP.

-----Original Message-----
From: Ellis, Charles (DEQ)
Sent: Friday, September 12, 2014 5:19 PM
To: Irons, Ellie (DEQ)
Cc: Burstein, Daniel (DEQ); Gavan, Larry (DEQ); Ewing, Amy (DGIF)
Subject: RE: CZMA Determination for Arlington National Cemetery Real Property Master Plan EA (UNCLASSIFIED)

Ellie - Here is the tally so far on asking reviewers for the upcoming revised EA whether they want a new or revised FCD:

The following said no need for FCD, or no change in earlier comments:

DEQ-Bay DEQ-Air MRC DCR

The following owe me a response (I'm copying them here):

DEQ-NRO DGIF DEQ-E&S

I didn't ask the NVRC or Arlington County, since they didn't send comments the first time around.

And we owe the Cemetery person, Susan Conner, a response.

Charlie

Charles H. Ellis III, Environmental Review Coordinator Department of Environmental Quality
629 East Main Street
Richmond, Virginia 23219
(804) 698-4195
charles.ellis@deq.virginia.gov
www.deq.virginia.gov

-----Original Message-----
From: Irons, Ellie (DEQ)
Sent: Friday, September 05, 2014 10:21 AM
To: Ellis, Charles (DEQ)
Subject: FW: CZMA Determination for Arlington National Cemetery Real Property Master Plan EA (UNCLASSIFIED)

Please send to the reviewers and see if they agree. Thanks

-----Original Message-----
From: Conner, Susan L. NAO [mailto:Susan.L.Conner@usace.army.mil]
Sent: Thursday, September 04, 2014 5:28 PM
To: Irons, Ellie (DEQ); Ellis, Charles (DEQ)
Cc: Pool, Alice P NAO; Barbara Bottiger
Subject: CZMA Determination for Arlington National Cemetery Real Property Master Plan EA (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Good Afternoon Ellie and Charlie-

I am writing to discuss revisions to the Arlington National Cemetery Real Property Master Plan EA for which a CZM determination was submitted in 2013 and a concurrence received (per attached letter) on 16 October 2013. Subsequent to that review, an internal decision was made to revise the EA and re-release for another public review period. That second public review period will begin in the next month or so.

The revisions to the EA are described in the attached "summary of changes." The EA was revised primarily to respond to Arlington County's concerns regarding a proposed land transfer and the alignment of Columbia Pike shown in the EA. The primary revisions were that the alternatives were modified and a detailed traffic analysis was performed.

We are proposing to you that another CZM review is not necessary. Based on the character of the revisions, there is not a reason that the CZM determination or concurrence would change significantly.

As discussed in the attached concurrence, Department of Army or its representatives will obtain all applicable permits and approvals as needed as the plan is implemented.

Please let us know if you concur with this path forward or if you have additional questions and wish to discuss further.

Very respectfully - Susan Conner

Susan L. Conner
Chief, Environmental Analysis Section
Planning & Policy Branch, Water Resources Division U.S. Army Corps of Engineers, Norfolk District
803 Front Street
Norfolk, VA 23510

757-201-7390 office
757-419-8057 cell

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

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Attachment 2:

Federal Consistency Determination (*original*)

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Coastal Zone Management Act (CZMA) Consistency Determination (Original)

This document provides the Commonwealth of Virginia with Arlington National Cemetery's (ANC) Consistency Determination under CZMA section 307(c)(1) [or (2)] and 15 CFR Part 930, subpart C, for proposed development and improvements to Arlington National Cemetery (ANC). The information in this Consistency Determination is provided pursuant to 15 CFR §930.39. This activity includes:

Projects based on the ANC Real Property Master Plan (RPMP) and the Cemetery Design Guide (CDG).

The Proposed Action, grouped by area within the cemetery, would consist of:

- Arrival Area
  - Transportation Center
  - Reconfigured Administration Building and new Queuing Area
- Former Navy Annex Site Area
  - Interments
  - Landscaping and memorial markers
  - Building and parking
  - Maintenance and operations
- East of Eisenhower Area
  - Landscaping
- Cemetery Wide
  - Visitor amenities
  - Sustainability measures

The Proposed Action could be any of the three Action Alternatives evaluated in the RPMP Programmatic Environmental Assessment (EA). The three Action Alternatives are based on the nature of the development of the former Navy Annex site and nearby roadways. The Action Alternatives vary only in how the area in the vicinity of the former Navy Annex site is developed.

Alternative 1 – ANC including the Former Navy Annex Site is illustrated in Figure 2-12 of the RPMP Programmatic EA, Alternative 2 – ANC including the Former Navy Annex Site and Southgate Road is illustrated in Figure 2-13 of the RPMP Programmatic EA. Alternative 3 – ANC including the Former Navy Annex Site with Realigned Roadways is illustrated in Figure 2-14. Of the Figure 2-13 of the RPMP Programmatic EA. Table 2.2 in the RPMP Programmatic EA provides a comparison of the No Action and three Action Alternatives.

ANC has determined that the Proposed Action affects the land or water uses or natural resources of Virginia in the following manner:

Refer to Chapter 3 of the EA for more details.

The Virginia Coastal Zone Management Program contains the following enforceable policies:

Fisheries Management - The program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities. The State Tributyltin (TBT) Regulatory Program has been added to the Fisheries Management program.

The Proposed Action would not impact finfish or shellfish resources nor would it involve marine antifoulant paints.

Subaqueous Lands Management – The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the Department of Environmental Quality, Water Division.

In Virginia, subaqueous lands generally include the beds of tidal and non-tidal water bodies that are channel-ward of mean low water (MLW). MLW is the average elevation of low water observed over a period of 19 years. There are no subaqueous lands within the boundaries of ANC and therefore, the Proposed Action would not directly impact subaqueous lands. All construction activities will take place outside of subaqueous lands.

Wetlands Management – The purpose of the wetlands management program is to preserve tidal wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation.

There are no known wetlands in the areas that would be disturbed by the Proposed Action.

Dunes Management - Dune protection is carried out pursuant to the Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes.

The Proposed Action is located inland and as such would not result in the destruction or alternative of primary dunes.

Non-point Source Pollution Control – Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth.

Soils would be disturbed during construction as part of the Proposed Action.

Negative impacts to water quality may result with the Proposed Action because of the increase in area that would require ground maintenance. The Proposed Action results in an up to approximately eight percent larger cemetery area to maintain. Additional pesticides, herbicides, and fertilizer will likely be applied to maintain the added grounds.

Point Source Pollution Control – Point source pollution control is accomplished through the implementation of the National Pollutant Discharge Elimination System (NPDES) permit program established pursuant to §402 of the federal Clean Water Act and administered in Virginia as the Virginia Pollutant Discharge Elimination System (VPDES) permit program. The Water Quality Certification requirements of §401 of the Clean Water Act of 1972 is administered under the Virginia Water Protection Permit program.

A VPDES permit is not required for the Proposed Action.

Shoreline Sanitation - The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth.

No septic tanks will be installed as part of the Proposed Action.

Air Pollution Control – The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards.

ANC is within the Metropolitan Washington Air Quality Committee (MWAQC) Region and is currently in attainment for NO_2, SO_2, Pb and PM_{10}. The region is designated as non-attainment for ground-level O_3 and $PM_{2.5}$, and is a maintenance area for CO. Therefore, the Proposed Action must conform to the State Implementation Plans (SIP) for O_3, $PM_{2.5}$ and CO.

Coastal Lands Management – The purpose of this program is to protect the Chesapeake Bay by implementing the Chesapeake Bay Preservation Act (Virginia Code §§ 10.1-2100 through 10.1-2114)) through the Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC10-20-10 et seq.).

Arlington County, including ANC lies within the Virginia coastal zone, as defined by the Virginia Coastal Zone Management Program and Arlington County is designated as a Chesapeake Bay Preservation Area (CBPA).

Based upon the following information, data, and analysis, the U.S. Army Corps of Engineers Norfolk District, on behalf of Arlington National Cemetery, finds that the Proposed Action is consistent to the maximum extent practicable with the enforceable policies of the Virginia Coastal Zone Management Program.

Three of the nine enforceable policies of the Virginia Coastal Zone Management (CZM) Program, Fisheries Management, Dunes Management, and Shoreline Sanitation are not applicable to the Proposed Action. The Proposed Action would not affect subaqueous lands or wetlands.

Non-point Source Pollution Control – Soils would be disturbed during construction as part of the Proposed Action. Due to the size of the area that may be disturbed by construction, ANC will apply for coverage under the Virginia Department of Environmental Quality (VDEQ) General Permit for Discharges of Storm Water from Construction Activities prior to initiating any land-disturbing activities. To comply with the General Permit, a SWPPP for construction activities will be prepared and implemented. Best management practices (BMPs) will be included in the

SWPPP to minimize the level of temporary water quality impacts from the construction. Potential BMPs could include the use of siltation screens and hay bales to trap construction sediment.

Negative impacts to water quality may result with the Proposed Action because of the increase in area that would require ground maintenance. The Proposed Action would result in an up to approximately eight percent larger cemetery area to maintain. Additional pesticides, herbicides, and fertilizer would likely be applied to maintain the added grounds. However, because the extent of these impacts is minor in proportion to the entire cemetery operations, the impacts are not anticipated to approach the level of significance. Nonetheless, the cemetery will strive to minimize the anticipated potential impacts through a number of methods. For example, the RPMP includes recommendations for reducing runoff from new development areas. Stormwater infiltration techniques such as pervious pavement and rain gardens are among the strategies recommended to achieve the goal of no net stormwater run-off from the redeveloped former Navy Annex site. Minimization could also include reducing the need for pesticides and herbicides through the ANC Integrated Pest Management (IPM) program. "IPM is a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks."[1] "The IPM objective is to identify operational procedures that use the least toxic method to control pest populations in a cost-effective, environmentally sound manner." [2] Effects could also be minimized by using best practices for fertilizer application including applying fertilizer on an as needed basis in lieu of a calendar approach and using low phosphorus fertilizers.

This project is intended to be consistent with the regulations and requirements of the Arlington County Stormwater Detention Ordinance, enacted to maintain a peak runoff rate close to predevelopment levels. This project would also follow guidance set forth in the Northern Virginia Regional Commission BMP Handbook.

Therefore, the Proposed Action would be consistent with the Non-Point Source Pollution Control Program.

Point Source Pollution Control – No VPDES permit is required for the Proposed Action. Therefore, the Proposed Action would be compliant with point source pollution control requirements.

Air Pollution Control – Proposed roadway improvements would likely decrease emissions of VOCs and NO_x (precursors for O_3), $PM_{2.5}$ and CO. Construction would result in short-term, minor impacts on air quality due to fugitive dust and equipment emissions. New stationary sources would be reviewed to determine whether stationary source permits are required. All projects would be undertaken in compliance with applicable state and federal standards for air quality. BMPs would be used to minimize emissions and fugitive dust; vehicles would be operated using low emission construction techniques to offset total emissions. Therefore, the Proposed Action would be consistent with the Air Pollution Control Program.

---

[1] Arlington National Cemetery, *Integrated Pest Management Plan, FY 2012,* August 8, 2011, p. 2.

[2] Arlington National Cemetery, Integrated Pest Management Plan, FY 2012, August 8, 2011, p. 3.

Coastal Lands Management – ANC is in a CBPA. None of the proposed projects would impact an RPA. Prior to constructing any of the proposed development, ANC will prepare a Landscape Conservation Plan, Stormwater Management Plan, and Erosion and Sediment Control Plan in accordance with the Arlington County Chesapeake Bay Preservation Ordinance.

Pursuant to 15 CFR Section 930.41, the Virginia Coastal Zone Management Program has 60 days from the receipt of this letter in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR section 930.41(b). Virginia's concurrence will be presumed if its response is not received by ANC on the 60th day from receipt of this determination. The State's response should be sent to:

Daniel Delahaye
Master Planner, Arlington National Cemetery
1 Memorial Ave., AD Bldg.
Arlington, VA 22211-5003

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APPENDIX C

USGS Topographic Maps

APPENDIX C
USGS Topographic Maps

Figures C-1 through C-4 illustrate the Action Alternatives using U.S. Geological Survey (USGS) Topographic Maps as the base maps.

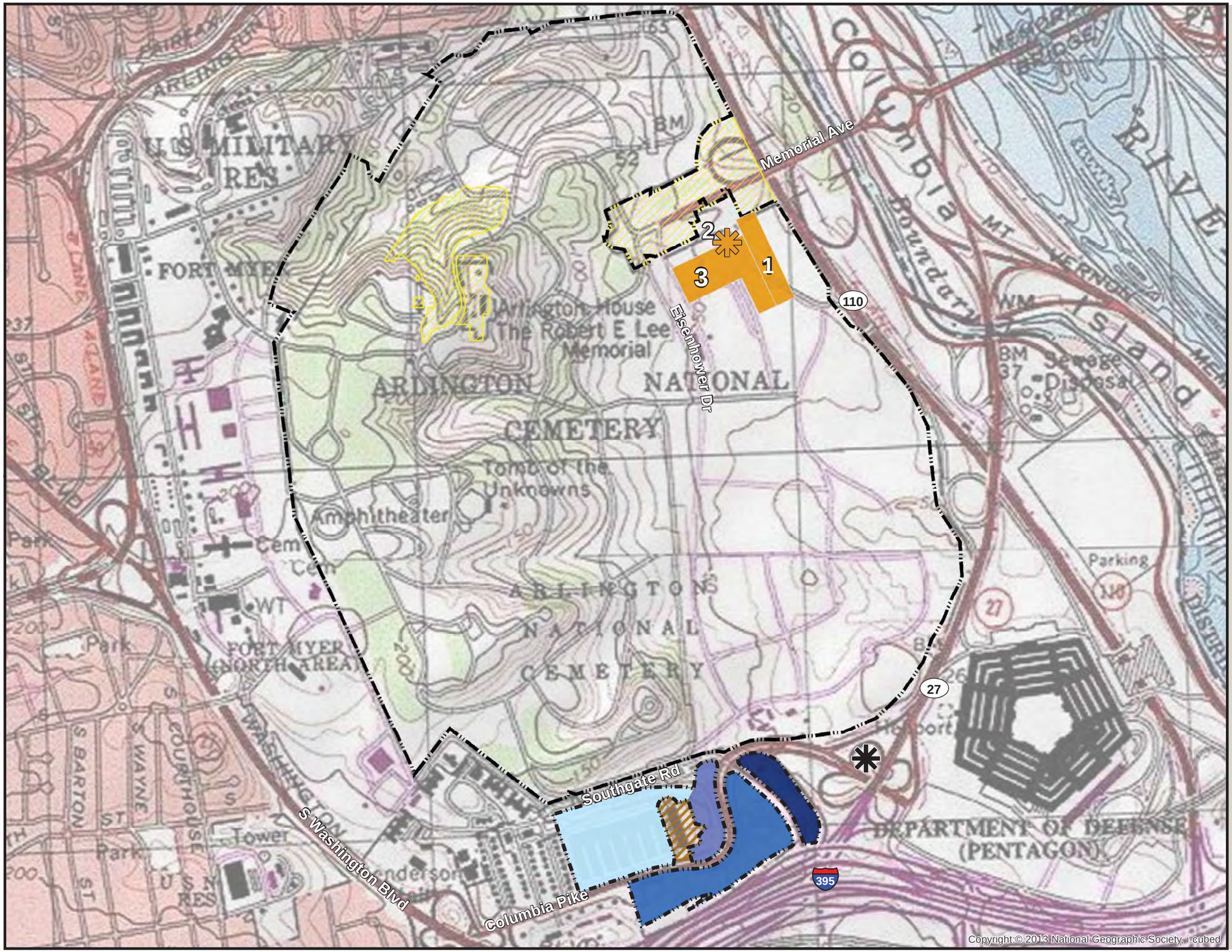

Figure C-1
Alternative 1 - ANC Including the Southern Expansion Site

LEGEND

Arrival Area

1. Transportation Center
2. Reconfigured Administration Building
3. New Queuing Area

Southern Expansion Site Area

- Interments
- Landscaping and Memorial Markers
- Building and Parking
- Maintenance and Operations

- Arlington National Cemetery
- Area within ANC Under NPS Jurisdiction
- U.S. Air Force Memorial
- Future 9/11 Pentagon Visitor Education Center

Arlington National Cemetery Real Property Master Plan

Programmatic Environmental Assessment

0 175 350 700 Feet

N

Sources:
ANC Master Plan, National Park Service, Google Earth, 2013 National Geographic Society

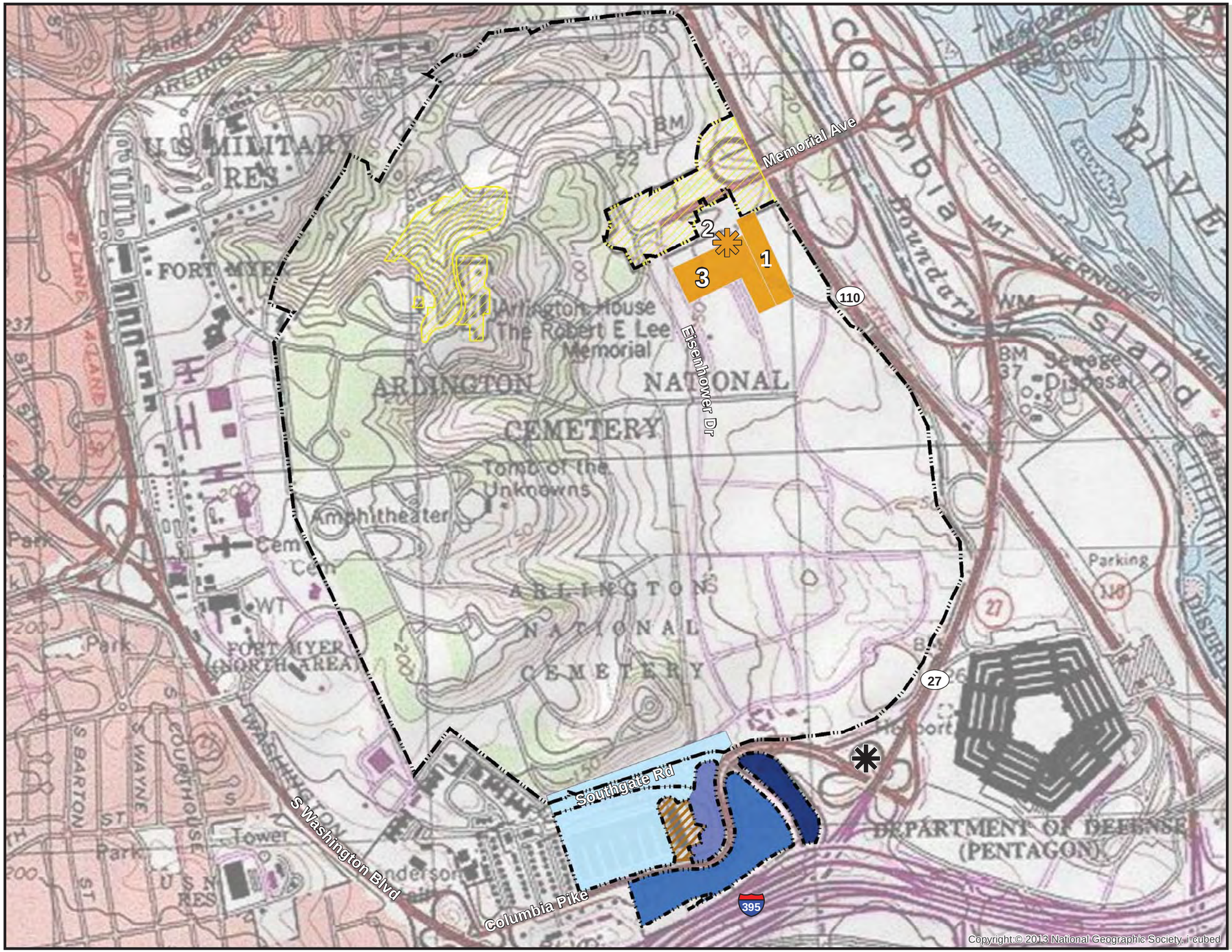

Figure C-2
Alternative 2 - ANC Including the Southern Expansion Site and Southgate Road

LEGEND

Arrival Area

1. Transportation Center
2. Reconfigured Administration Building
3. New Queuing Area

Southern Expansion Site Area

- Interments
- Landscaping and Memorial Markers
- Building and Parking
- Maintenance and Operations

- Arlington National Cemetery
- Area within ANC Under NPS Jurisdiction
- U.S. Air Force Memorial
- Future 9/11 Pentagon Visitor Education Center

Arlington National Cemetery Real Property Master Plan

Programmatic Environmental Assessment

0 175 350 700 Feet

N

Sources:
ANC Master Plan, National Park Service, 2013 National Geographic Society

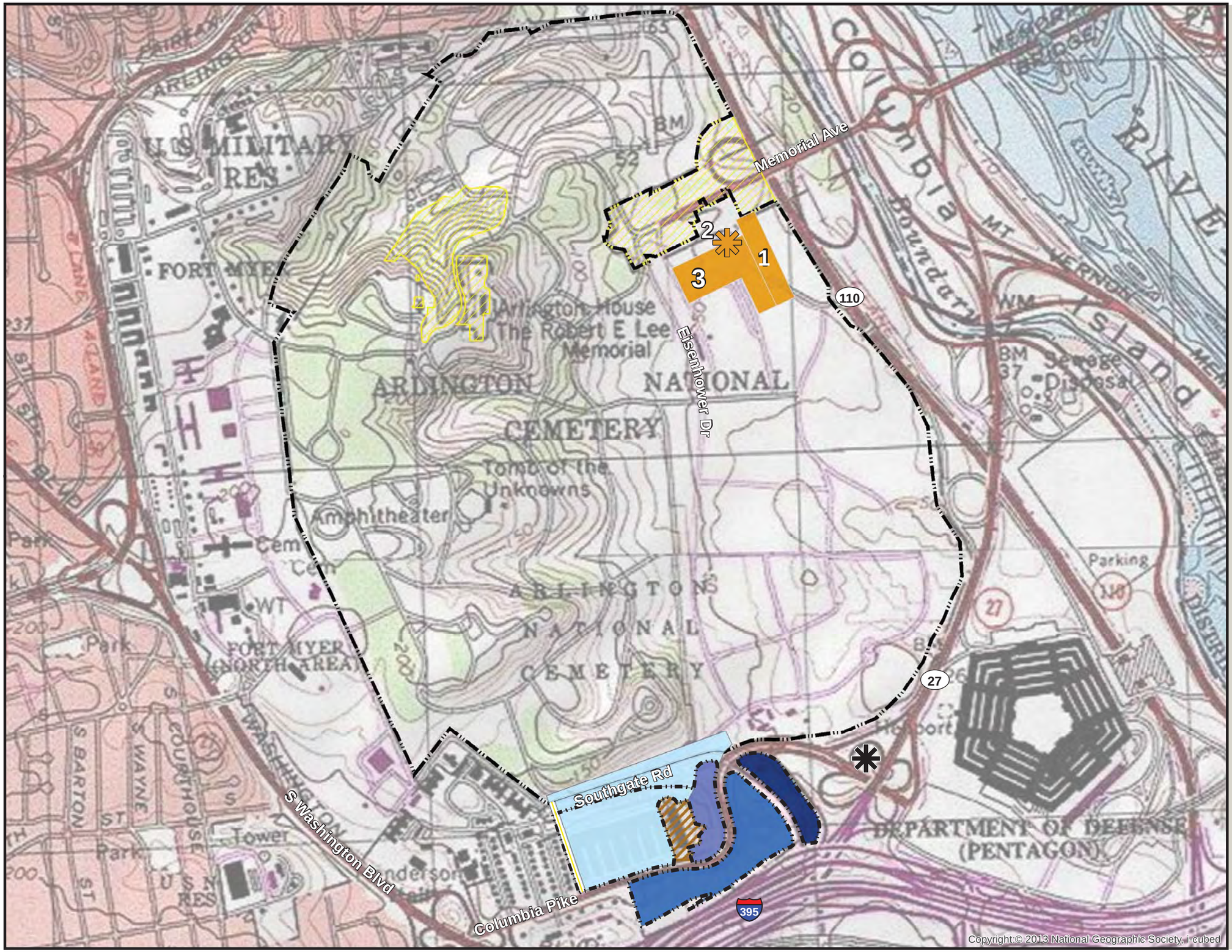

Figure C-3
Alternative 3 - ANC Including the Southern Expansion Site, Southgate Road and Easement

LEGEND

Arrival Area

1. Transportation Center
2. Reconfigured Administration Building
3. New Queuing Area

Southern Expansion Site Area

- Interments
- Landscaping and Memorial Markers
- Building and Parking
- Maintenance and Operations
- 55' Wide Easement

- Arlington National Cemetery
- Area within ANC Under NPS Jurisdiction
- U.S. Air Force Memorial
- Future 9/11 Pentagon Visitor Education Center

Arlington National Cemetery Real Property Master Plan

Programmatic Environmental Assessment

0 200 400 800 Feet

N

Sources:
ANC Master Plan, National Park Service, 2013 National Geographic Society

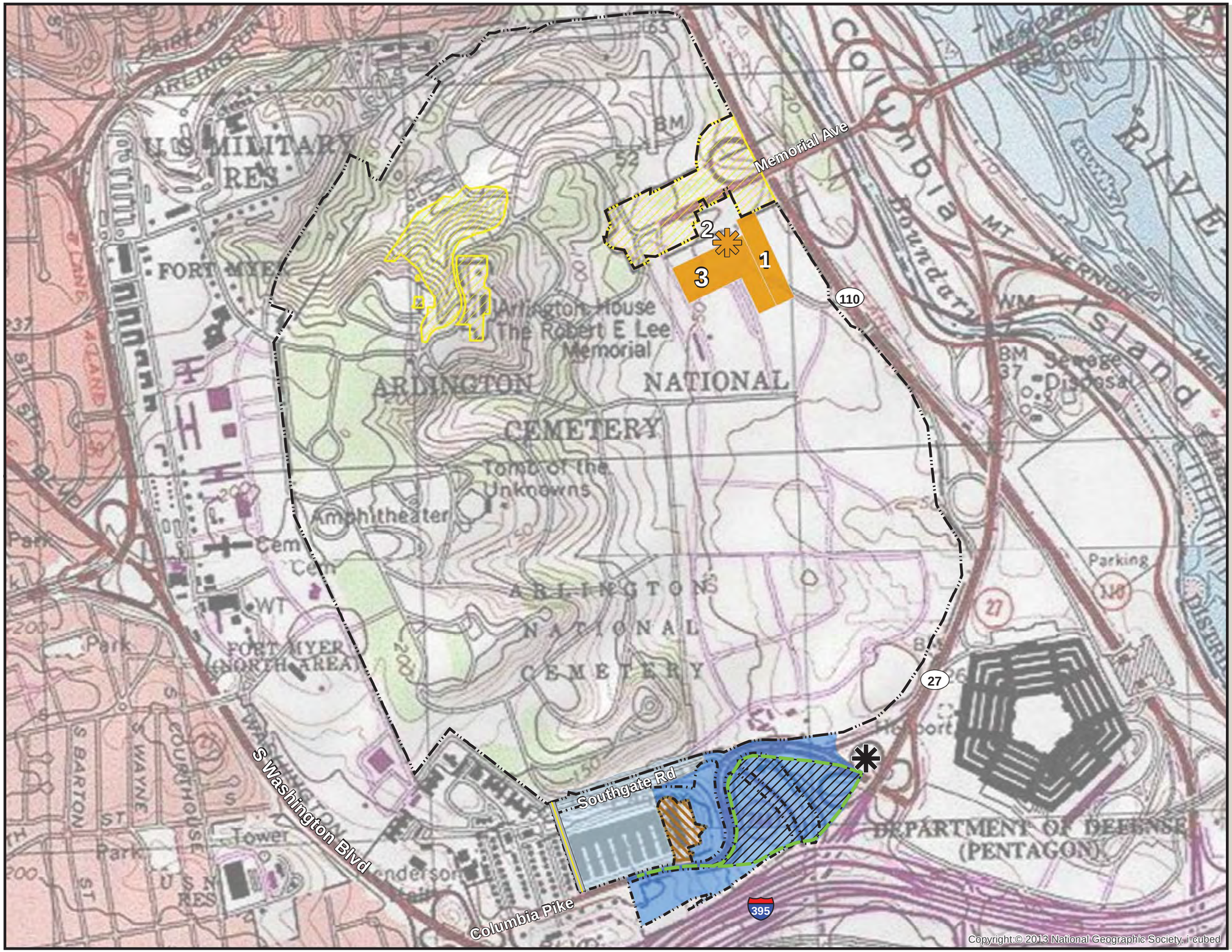

Figure C-4
Alternative 4 - ANC Including the Southern Expansion Site with Realigned Roadways

LEGEND

Arrival Area

1. Transportation Center
2. Reconfigured Administration Building
3. New Queuing Area

Southern Expansion Site Area

- Interments
- Interments North of Columbia Pike / Unknown South of Columbia Pike
- 55' Wide Easement
- Envelope of Potential Columbia Pike Future Roadway Alignmnents
- Arlington National Cemetery
- Area within ANC Under NPS Jurisdiction
- U.S. Air Force Memorial
- Future 9/11 Pentagon Visitor Education Center

Arlington National Cemetery Real Property Master Plan

Programmatic Environmental Assessment

0 175 350 700 Feet

N

Sources:
ANC Master Plan, National Park Service, 2013 National Geographic Society

APPENDIX D

Public/Agency Review Summary

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LIST OF TABLES

Page

Table D.1 ANC Programmatic EA and Draft FNSI Public/Agency Distribution List..... 1

LIST OF ATTACHMENTS

Attachment 1: Letters to Agencies and Public Libraries

Attachment 2: Comment Form

Attachment 3: E-mails

Attachment 4: Affidavit of Publication of Notice of Availability

Attachment 5: Web Site Documentation

Attachment 6: Comments and Responses

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APPENDIX D
Public/Agency Review Summary

The Arlington National Cemetery (ANC) Programmatic Environmental Assessment (EA) and Draft Finding of No Significant Impact (FNSI) were made available for public and agency review for a period of 60 days, from August 19th, 2013 through October 21st, 2013. Letters and/or e-mails were sent to agencies to advise them of the availability of the Programmatic EA and Draft FNSI and to request comments. Letters were also sent to three libraries to request that they make the Programmatic EA and Draft FNSI available for public review. Letters and emails were distributed to the agencies and public libraries, as listed in **Table D.1**.

Table D.1

ANC Programmatic EA and Draft FNSI Public/Agency Distribution List

Agency/Library	Contact	Hard Copy	CD	E-Mail Notice
Advisory Council on Historic Preservation	Katherine Kerr			X
Air Force Memorial	COL Gina Humble Susci Kennedy Daniel Neilsen Pete Lindquist Theron F. Lord David Sumner David K Humphreys			X
Arlington County	Rebecca Ballo Leon Vignes Bill Roberts Jeff Harn Sarah Carlton Brian Stout			X
Arlington Historical Society	John Richardson Ali Ganjian			X
Armed Forces Retirement Home-Washington	Sheila Abarr Jim Theros Steven McManus			X
Association for the Study of African American Life and History	Sylvia Cyrus	1	1	X
Black Heritage Museum of Arlington/Freedman's Village Memorial	Dr. Talmadge T. Williams	1	1	X
Foxcroft Heights Neighborhood Association	John Moran			X
Joint Base Myer-Henderson Hall	Myrtle Bowen Ron Kaczmarek			X

Table D.1

ANC Programmatic EA and Draft FNSI Public/Agency Distribution List

Agency/Library	Contact	Hard Copy	CD	E-Mail Notice
	Kristie Lalire Pete McGraw Russell Miller Suzanne Hren			
Metropolitan Washington Council of Governments	Sherry Hill Joan Rohlfs			
National Capital Planning Commission	Carlton Hart Chrisine Saum Cheryl Kelly	2	1	X
National Park Service	Thomas Sheffer Brandon Bies			X
National Trust for Historic Preservation	Robert Nieweg			X
Northern Virginia Regional Commission	Aimee Vosper			X
Northern Virginia Transportation Commission	Kala Quintana			x
US Army Corps of Engineers (Regulatory)	Regena Bronson			X
US Commission of Fine Arts	Frederick J. Lindstrom Kay Fanning Tony Simon	1	1	X
US Department of Agriculture – Natural Resources Conservation Service	Andree Duvarney			X
US Fish and Wildlife Service				X
Virginia Department of Environmental Quality - Office of Environmental Impact Review	Ellie Irons	4	1	X
Virginia Department of Historic Resources	Marc Holma Roger Kirchen		1	X
Washington Headquarters Services	Michael Dangerfield Georgine Glatz Martin Mamawal Elizabeth Lenyk Dares Charoenphol Alton Cheaves Todd Laroe Lynn B. Mariano James Ballard Woody Kusse			X
Washington Metropolitan Area Transit Authority	Tom Harrington James Hamre			X

Table D.1

ANC Programmatic EA and Draft FNSI Public/Agency Distribution List

Agency/Library	Contact	Hard Copy	CD	E-Mail Notice
Women in Military Service for America Memorial Foundation, Inc.	Danna Houle			X
Arlington County Central Library		1		
Columbia Pike Branch Library		1		
Aurora Hills Branch Library		1		

Source: HNTB, 2013.

Public availability of the documents was announced in the Arlington Connection and on the ANC Web site at http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx. A Notice of Availability was published in the Arlington Connection on August 21st, 2013 and was posted on the ANC Web site. The Notice summarized the NEPA evaluation and notified the public that the Programmatic EA and Draft FNSI were available for public review and comment on the ANC Web site and at the three public libraries. The comment form was also made available on the ANC Web site for the public to submit comments.

Comments were received from the following entities:

- Arlington County
- Arlington Historical Society
- National Capital Planning Commission
- National Park Service
- Virginia Department of Environmental Quality - Office of Environmental Impact Review

All comments were considered and addressed. Comment letters/e-mails/forms and associated responses are provided in Attachment 6. For comments provided in letter or e-mail format, individual comments are demarcated and numbered. A response for each numbered comment is provided in the table following the subject letter or e-mail. For comments submitted using the comment form, responses are provided to the right of the comment in the comment form.

The following public and agency review documents are attached:

1. Letters to Agencies and Public Libraries
2. Comment Form
3. E-mails
4. Affidavit of Publication of Notice of Availability
5. Web Site Documentation
6. Comments and Responses

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Attachment 1:

Letters to Agencies and Libraries

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DEPARTMENT OF THE ARMY
ARMY NATIONAL MILITARY CEMETERIES
ARLINGTON NATIONAL CEMETERY
ARLINGTON, VIRGINIA 22211-5003

August 13, 2013

Office of the Chief Engineer

Mr. Marc Holma
Architectural Historian
Office of Review and Compliance
Virginia Department of Historic Resources
DHR Headquarters, Richmond Central Office
2801 Kensington Avenue
Richmond, VA 23221

Dear Mr. Holma:

The Department of the Army, Arlington National Cemetery has prepared a Programmatic Environmental Assessment (EA) to evaluate the environmental effects of proposed improvements included in the Arlington National Cemetery (ANC) Real Property Master Plan (RPMP). Environmental impact analysis was conducted in accordance with the National Environmental Policy Act (NEPA) requirements, as well as the Department of the Army NEPA procedures. As a result of the analysis, it was determined that the Proposed Action would not result in significant impacts. The Programmatic EA and Draft Finding of No Significant Impact (FNSI) are enclosed for your review on a single CD.

Development of the Millennium Project site is not included in the evaluation of the environmental effects of the RPMP. The Millennium Project site was identified as a future growth area for ANC in the previous Master Plan and is independent from the development included in the RPMP. As such, the Millennium Project was the subject of a separate, already completed EA. However, in accordance with the Council on Environmental Quality Regulations for implementing NEPA, the Millennium Project was considered in the context of cumulative impacts.

Copies of the Programmatic EA and Draft FNSI are being sent to stakeholders for review and comment. The Programmatic EA and Draft FNSI are also available for public review on the following Web site http://www.arlingtoncemetery.mil/News/Default.aspx and at the following libraries:

Arlington County Central Library
1015 N Quincy St
Arlington, VA 22201

Columbia Pike Branch
816 South Walter Reed Dr
Arlington, VA 22204

Aurora Hills Branch
735 South 18th St
Arlington, VA 22202

If you have questions or comments, please communicate them in writing to:

Daniel Delahaye
Master Planner, Arlington National Cemetery
1 Memorial Ave., WC Bldg.
Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Please provide comments by completing the comment form provided on the enclosed CD. If you have no comments or concerns, written verification would also be appreciated. I respectfully request that you submit your response by October 21, 2013.

Sincerely,

MJ Stewart

Michelle J. Stewart
Colonel, U.S. Army

Enclosure

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

Summary: The Department of the Army, Arlington National Cemetery (ANC) prepared a Real Property Master Plan (RPMP) for ANC. The RPMP outlines how the cemetery will accommodate future development and operational needs. The recommended projects add burial capacity, facilitate future cemetery operations, enhance family experiences during committal services, enhance visitor experiences, and promote sustainability.

In order to implement the projects in the RPMP, ANC must first comply with the National Environmental Policy Act of 1969 (NEPA). NEPA requires the evaluation and consideration of the environmental impacts prior to taking federal actions. Therefore, pursuant to the provisions of NEPA, Council on Environmental Quality (CEQ) Regulations [40 CFR Parts 1500-1508], and Environmental Analysis of Army Actions (32 CFR 651), ANC has prepared an Environmental Assessment (EA) to identify the potential environmental consequences of projects recommended in the ANC RPMP.

The EA is referred to as a Programmatic EA because it is a broad scale analysis of the RPMP recommendations. The RPMP recommendations included phased and conceptual projects. Limited information about these projects was available during the preparation of the EA. In some cases the information needed to determine specific effects was not available. Therefore, recommended projects were evaluated to the fullest extent possible in the Programmatic EA and ANC committed to prepare project-specific NEPA documentation as required prior to implementing the specific projects.

Environmental impacts were evaluated to prepare the Programmatic EA. It was determined that the projects would not result in significant impacts. Therefore, a Draft Finding of No Significant Impact (FNSI) was also prepared.

Development of the Millennium Project site was not included in the evaluation of the environmental effects of the RPMP. The Millennium Project site was identified as a future growth area for ANC in the previous Master Plan and is independent from the development included in the RPMP. As such, the Millennium Project was the subject of a separate, already completed EA. However, in accordance with the Council on Environmental Quality Regulations for implementing NEPA, the Millennium Project was considered in the context of cumulative impacts.

The Programmatic EA and Draft FNSI are now available for public review on the ANC Web site at http://www.arlingtoncemetery.mil/News/Default.aspx and at the following locations:

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Arlington, VA 22204

Aurora Hills Branch
735 South 18th St
Arlington, VA 22202

Comments: Comments, if any, are requested on the form provided. Comments submitted by the close of the comment period on October 21, 2013 will be considered prior to signing the Final FNSI. Please submit written comments by October 21, 2013 to:

Daniel Delahaye
Master Planner, Arlington National Cemetery
1 Memorial Ave., WC Bldg.
Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

DEPARTMENT OF THE ARMY
ARMY NATIONAL MILITARY CEMETERIES
ARLINGTON NATIONAL CEMETERY
ARLINGTON, VIRGINIA 22211-5003

August 13, 2013

Office of the Chief Engineer

Mr. Carlton E. Hart, AICP
Urban Planner
National Capital Planning Commission
401 9th Street, NW, North Lobby, Suite 500
Washington, DC 20004

Dear Mr. Hart:

The Department of the Army, Arlington National Cemetery has prepared a Programmatic Environmental Assessment (EA) to evaluate the environmental effects of proposed improvements included in the Arlington National Cemetery (ANC) Real Property Master Plan (RPMP). Environmental impact analysis was conducted in accordance with the National Environmental Policy Act (NEPA) requirements, as well as the Department of the Army NEPA procedures. As a result of the analysis, it was determined that the Proposed Action would not result in significant impacts. The Programmatic EA and Draft Finding of No Significant Impact (FNSI) (two hard copies and one CD) are enclosed for your review.

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Please provide comments by completing the comment form provided on the enclosed CD. If you have no comments or concerns, written verification would also be appreciated. I respectfully request that you submit your response by October 21, 2013.

Sincerely,

Michelle J. Stewart
Colonel, U.S. Army

Enclosures

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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Comments: Comments, if any, are requested on the form provided. Comments submitted by the close of the comment period on October 21, 2013 will be considered prior to signing the Final FNSI. Please submit written comments by October 21, 2013 to:

Daniel Delahaye
Master Planner, Arlington National Cemetery
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usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

DEPARTMENT OF THE ARMY
ARMY NATIONAL MILITARY CEMETERIES
ARLINGTON NATIONAL CEMETERY
ARLINGTON, VIRGINIA 22211-5003

August 13, 2013

Office of the Chief Engineer

Ms. Ellie Irons
Program Manager
Office of Environmental Impact Review
629 E Main Street
Richmond, VA 23219

Dear Ms. Irons:

The Department of the Army, Arlington National Cemetery has prepared a Programmatic Environmental Assessment (EA) to evaluate the environmental effects of proposed improvements included in the Arlington National Cemetery (ANC) Real Property Master Plan (RPMP). Environmental impact analysis was conducted in accordance with the National Environmental Policy Act (NEPA) requirements, as well as the Department of the Army NEPA procedures. As a result of the analysis, it was determined that the Proposed Action would not result in significant impacts. The Programmatic EA and Draft Finding of No Significant Impact (FNSI) (four hard copies and one CD) are enclosed for your review.

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Sincerely,

Michelle J. Stewart
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Enclosures

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DEPARTMENT OF THE ARMY
ARMY NATIONAL MILITARY CEMETERIES
ARLINGTON NATIONAL CEMETERY
ARLINGTON, VIRGINIA 22211-5003

August 13, 2013

Office of the Chief Engineer

Mr. Frederick J. Lindstrom
Assistant Secretary
U. S. Commission of Fine Arts
401 F Street NW, Suite 312
Washington, DC 20001-2728

Dear Mr. Lindstrom:

The Department of the Army, Arlington National Cemetery has prepared a Programmatic Environmental Assessment (EA) to evaluate the environmental effects of proposed improvements included in the Arlington National Cemetery (ANC) Real Property Master Plan (RPMP). Environmental impact analysis was conducted in accordance with the National Environmental Policy Act (NEPA) requirements, as well as the Department of the Army NEPA procedures. As a result of the analysis, it was determined that the Proposed Action would not result in significant impacts. The Programmatic EA and Draft Finding of No Significant Impact (FNSI) (one hard copy and one CD) are enclosed for your review.

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Sincerely,

Michelle J. Stewart
Colonel, U.S. Army

Enclosures

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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DEPARTMENT OF THE ARMY
ARMY NATIONAL MILITARY CEMETERIES
ARLINGTON NATIONAL CEMETERY
ARLINGTON, VIRGINIA 22211-5003

August 13, 2013

Office of the Chief Engineer

Dr. Talmadge T. Williams
Black Heritage Museum of Arlington/Freedman's Village Memorial
3108 Columbia Pike
Mezzanine Level
Arlington, Virginia 22204

Dear Dr. Williams:

The Department of the Army, Arlington National Cemetery has prepared a Programmatic Environmental Assessment (EA) to evaluate the environmental effects of proposed improvements included in the Arlington National Cemetery (ANC) Real Property Master Plan (RPMP). Environmental impact analysis was conducted in accordance with the National Environmental Policy Act (NEPA) requirements, as well as the Department of the Army NEPA procedures. As a result of the analysis, it was determined that the Proposed Action would not result in significant impacts. The Programmatic EA and Draft Finding of No Significant Impact (FNSI) (one hard copy and one CD) are enclosed for your review.

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Agency: Department of the Army, Arlington National Cemetery

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DEPARTMENT OF THE ARMY
ARMY NATIONAL MILITARY CEMETERIES
ARLINGTON NATIONAL CEMETERY
ARLINGTON, VIRGINIA 22211-5003

August 13, 2013

Office of the Chief Engineer

Ms. Sylvia Cyrus,
Executive Director
The Association for the Study of African American Life and History (ASALH)
Howard Center
2225 Georgia Avenue, NW
Suite 331
Washington, DC 20059

Dear Ms. Cyrus:

The Department of the Army, Arlington National Cemetery has prepared a Programmatic Environmental Assessment (EA) to evaluate the environmental effects of proposed improvements included in the Arlington National Cemetery (ANC) Real Property Master Plan (RPMP). Environmental impact analysis was conducted in accordance with the National Environmental Policy Act (NEPA) requirements, as well as the Department of the Army NEPA procedures. As a result of the analysis, it was determined that the Proposed Action would not result in significant impacts. The Programmatic EA and Draft Finding of No Significant Impact (FNSI) (one hard copy and one CD) are enclosed for your review.

Development of the Millennium Project site is not included in the evaluation of the environmental effects of the RPMP. The Millennium Project site was identified as a future growth area for ANC in the previous Master Plan and is independent from the development included in the RPMP. As such, the Millennium Project was the subject of a separate, already completed EA. However, in accordance with the Council on Environmental Quality Regulations for implementing NEPA, the Millennium Project was considered in the context of cumulative impacts.

Copies of the Programmatic EA and Draft FNSI are being sent to stakeholders for review and comment. The Programmatic EA and Draft FNSI are also available for public review on the following Web site http://www.arlingtoncemetery.mil/News/Default.aspx and at the following libraries:

Arlington County Central Library
1015 N Quincy St
Arlington, VA 22201

Columbia Pike Branch
816 South Walter Reed Dr
Arlington, VA 22204

Aurora Hills Branch
735 South 18th St
Arlington, VA 22202

If you have questions or comments, please communicate them in writing to:

Daniel Delahaye
Master Planner, Arlington National Cemetery
1 Memorial Ave., WC Bldg.
Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Please provide comments by completing the comment form provided on the enclosed CD. If you have no comments or concerns, written verification would also be appreciated. I respectfully request that you submit your response by October 21, 2013.

Sincerely,

Michelle J. Stewart
Colonel, U.S. Army

Enclosures

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

Summary: The Department of the Army, Arlington National Cemetery (ANC) prepared a Real Property Master Plan (RPMP) for ANC. The RPMP outlines how the cemetery will accommodate future development and operational needs. The recommended projects add burial capacity, facilitate future cemetery operations, enhance family experiences during committal services, enhance visitor experiences, and promote sustainability.

In order to implement the projects in the RPMP, ANC must first comply with the National Environmental Policy Act of 1969 (NEPA). NEPA requires the evaluation and consideration of the environmental impacts prior to taking federal actions. Therefore, pursuant to the provisions of NEPA, Council on Environmental Quality (CEQ) Regulations [40 CFR Parts 1500-1508], and Environmental Analysis of Army Actions (32 CFR 651), ANC has prepared an Environmental Assessment (EA) to identify the potential environmental consequences of projects recommended in the ANC RPMP.

The EA is referred to as a Programmatic EA because it is a broad scale analysis of the RPMP recommendations. The RPMP recommendations included phased and conceptual projects. Limited information about these projects was available during the preparation of the EA. In some cases the information needed to determine specific effects was not available. Therefore, recommended projects were evaluated to the fullest extent possible in the Programmatic EA and ANC committed to prepare project-specific NEPA documentation as required prior to implementing the specific projects.

Environmental impacts were evaluated to prepare the Programmatic EA. It was determined that the projects would not result in significant impacts. Therefore, a Draft Finding of No Significant Impact (FNSI) was also prepared.

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The Programmatic EA and Draft FNSI are now available for public review on the ANC Web site at http://www.arlingtoncemetery.mil/News/Default.aspx and at the following locations:

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usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

HNTB Corporation
The HNTB Companies
Engineers. Architects. Planners.

2900 South Quincy Street
Suite 200
Arlington, VA 22206

Telephone (703) 824-5100
Facsimile (703) 671-6210
www.hntb.com

HNTB

August 14, 2013

Ms. Margaret Brown
Branch Manager
Arlington County Central Library
1015 N Quincy St
Arlington, VA 22201

Dear Ms. Brown:

The Arlington National Cemetery Real Property Master Plan Programmatic Environmental Assessment including the Draft Finding of No Significant Impact is enclosed. Please make this document accessible to the public from August 19 through October 21, 2013. The document should be available for review at your library and not circulated. The public availability of the document will be announced in the Arlington Connection and at the following Web site address:

http://www.arlingtoncemetery.mil/News/Default.aspx

Thank you for your assistance in facilitating the public review and comment process. If you have any questions, please contact me via telephone at 703-253-5867, via email at bbottiger@hntb.com, or in writing at the address listed above.

Sincerely,

Barbara A. Bottiger
Senior Environmental Planner

Enclosure: Programmatic Environmental Assessment including the Draft Finding of No Significant Impact (one document)

cc: Daniel Delahaye, Master Planner, Arlington National Cemetery

HNTB Corporation
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Arlington, VA 22206

Telephone (703) 824-5100
Facsimile (703) 671-6210
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HNTB

August 14, 2013

Mr. Rob Spencer
Branch Manager
Columbia Pike Branch Library
816 South Walter Reed Dr
Arlington, VA 22204

Dear Mr. Spencer:

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cc: Daniel Delahaye, Master Planner, Arlington National Cemetery

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www.hntb.com

HNTB

August 14, 2013

Ms. Sarah Daviau
Branch Manager
Aurora Hills Branch Library
735 South 18th St
Arlington, VA 22202

Dear Ms. Daviau:

The Arlington National Cemetery Real Property Master Plan Programmatic Environmental Assessment including the Draft Finding of No Significant Impact is enclosed. Please make this document accessible to the public from August 19 through October 21, 2013. The document should be available for review at your library and not circulated. The public availability of the document will be announced in the Arlington Connection and at the following Web site address:

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Senior Environmental Planner

Enclosure: Programmatic Environmental Assessment including the Draft Finding of No Significant Impact (one document)

cc: Daniel Delahaye, Master Planner, Arlington National Cemetery

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Attachment 2:

Comment Form

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COMMENT FORM

Programmatic Environmental Assessment for the Arlington National Cemetery Real Property Master Plan and the Draft Finding of No Significant Impact

Agency/Organization Name: **Date:**
Name and E-mail of Commenter:

Instructions: Please fill out the information above and provide comments in the following table. Insert rows as necessary and e-mail completed comment forms to usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil by 21 October 2013.

Report Section	Page Number	Agency Comment

Report Section	Page Number	Agency Comment

Attachment 3:

E-mails to Agencies

[This page is left blank intentionally.]

From: Delahaye, Daniel B CIV USARMY HQDA (US)
To: JOHNMORANX@aol.com; Dangerfield, Michael A CIV WHS FSD (US)
Subject: RE: Foxcroft Heights Civic Association (UNCLASSIFIED)
Date: Monday, August 19, 2013 10:37:57 AM

Classification: UNCLASSIFIED
Caveats: NONE

Mr. Dangerfield: Thank you for Mr. Moran's contact information.

Mr. Moran: The Navy Annex will soon become part of Arlington National Cemetery. ANC will begin to develop plans for its southern expansion as soon as possible thereafter. Your participation in the environmental review process focused upon development of the former Navy Annex site will no doubt be a big part of that. It is very early in the process, but initial communication is currently anticipated late 2013.

Thank you both for this opportunity.

V/r,

Daniel Delahaye
Master Planner, Arlington National Cemetery
1 Memorial Ave., WC Bldg.
Arlington, VA 22211-5003

703-614-4306 (DSN 224)
daniel.b.delahaye.civ@mail.mil

-----Original Message-----
From: JOHNMORANX@aol.com [mailto:JOHNMORANX@aol.com]
Sent: Monday, August 19, 2013 9:52 AM
To: Dangerfield, Michael A CIV WHS FSD (US); Delahaye, Daniel B CIV USARMY HQDA (US)
Subject: Re: Foxcroft Heights Civic Association

thank you so much. Just for the record we have many members of our association that are not home owners - hence the difference - J

John Moran
806 South Orme Street
Arlington, VA 22204
703.486-1345 (land&cell)
www.John-Moran.com <http://www.john-moran.com/> JM@John-Moran.com

In a message dated 8/19/2013 9:49:15 A.M. Eastern Daylight Time, michael.a.dangerfield2.civ@mail.mil writes:

> Data you requested:
>
> Foxcroft Heights Civic Association, President : John Moran
>
> Contact info:
> John Moran
> 806 South Orme Street
> Arlington, VA 22204
> 703.486-1345 (land&cell)

Email : JOHNMORANX@aol.com
www.John-Moran.com <http://www.john-moran.com/> JM@John-Moran.com

Regards,

MAD

Michael A. Dangerfield
Special Assistant to the Director
Program Manager for Navy Annex Demolition and Transformation
Facilities Services Directorate
Washington Headquarters Services
michael.a.dangerfield2.civ@mail.mil
703.692.1207 office
571.221.5890 office cell

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	avosper@novaregion.org
Subject:	FW: Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 12:09:44 PM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

Summary: The Department of the Army, Arlington National Cemetery (ANC) prepared a Real Property Master Plan (RPMP) for ANC. The RPMP outlines how the
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October 21, 2013 to:

Daniel Delahaye
Master Planner, Arlington National Cemetery
1 Memorial Ave., WC Bldg.
Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	gina.humble@afncr.af.mil; susci.kennedy@pentagon.af.mil; daniel.nielsen@afncr.af.mil; plindquist@airforcememorial.org; theron.lord@afncr.af.mil; david.sumner@afncr.af.mil; david.humphreys@afncr.af.mil
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 11:12:33 AM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

Summary: The Department of the Army, Arlington National Cemetery (ANC) prepared a Real Property Master Plan (RPMP) for ANC. The RPMP outlines how the cemetery will accommodate future development and operational needs. The recommended projects add burial capacity, facilitate future cemetery operations, enhance family experiences during committal services, enhance visitor experiences, and promote sustainability.

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Daniel Delahaye
Master Planner, Arlington National Cemetery
1 Memorial Ave., WC Bldg.
Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	Rebeccah Ballo; lvignes@arlingtonva.us; wroberts@arlingtonva.us; jharn@arlingtonva.us; scarlton@arlingtonva.us; bstout@arlingtonva.us
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 12:18:03 PM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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October 21, 2013 to:

Daniel Delahaye
Master Planner, Arlington National Cemetery
1 Memorial Ave., WC Bldg.
Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	johnjoyce2@verizon.net; aliganjian@gmail.com
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 12:38:23 PM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	info@asalh.net
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 12:36:29 PM

Classification: UNCLASSIFIED
Caveats: NONE

Dear Ms. Cyrus:

This e-mail follow-up to a hard-copy letter forwarded 14 August is to correct an erroneous hyperlink in that letter. The correct link is "http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx". Text of the corrected public notice follows.

V/r,
Daniel Delahaye

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	Frederick Lindstrom
Cc:	kfanning@cfa.gov; tsimon@cfa.gov
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 11:28:50 AM

Classification: UNCLASSIFIED
Caveats: NONE

Dear Mr. Lindstrom:

This e-mail follow-up to a hard-copy letter forwarded 14 August is to correct an erroneous hyperlink in that letter. The correct link is "http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx". Text of the corrected public notice follows.

V/r,
Daniel Delahaye

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Public Comment Period: August 19 to October 21, 2013

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October 21, 2013 to:

Daniel Delahaye
Master Planner, Arlington National Cemetery
1 Memorial Ave., WC Bldg.
Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	JOHNMORANX@aol.com
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 3:56:38 PM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

Summary: The Department of the Army, Arlington National Cemetery (ANC) prepared a Real Property Master Plan (RPMP) for ANC. The RPMP outlines how the
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usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	contact2@fws.gov
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 11:30:14 AM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

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Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	myrtle.bowen.civ@mail.mil; ronald.e.kaczmarek.civ@mail.mil; kristie.s.lalire.civ@mail.mil; pete.mcgraw1@us.army.mil; russell.w.miller.civ@mail.mil; suzanne.p.hren.civ@mail.mil
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 11:20:28 AM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

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Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	Robert Nieweg
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 12:29:03 PM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

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Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	Carlton Hart
Cc:	Christine.Saum@ncpc.gov; cheryl.kelly@ncpc.gov
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 11:42:51 AM

Classification: UNCLASSIFIED
Caveats: NONE

Dear Mr. Hart:

This e-mail follow-up to a hard-copy letter forwarded 14 August is to correct an erroneous hyperlink in that letter. The correct link is "http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx". Text of the corrected public notice follows.

V/r,
Daniel Delahaye

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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1 Memorial Ave., WC Bldg.
Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	kala@nvtdc.org
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 12:08:11 PM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	Sheffer, Thomas
Cc:	Brandon_Bies@nps.gov
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 11:47:59 AM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

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Agency: Department of the Army, Arlington National Cemetery

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Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	regena.d.bronson@us.army.mil
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 11:21:53 AM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

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Agency: Department of the Army, Arlington National Cemetery

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Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	andree.duvarney@wdc.usda.gov
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 11:31:04 AM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

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816 South Walter Reed Dr
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735 South 18th St
Arlington, VA 22202

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October 21, 2013 to:

Daniel Delahaye
Master Planner, Arlington National Cemetery
1 Memorial Ave., WC Bldg.
Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	ellie.irons@deq.virginia.gov
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 11:59:39 AM

Classification: UNCLASSIFIED
Caveats: NONE

Dear Ms. Irons:

This e-mail follow-up to a hard-copy letter forwarded 14 August is to correct an erroneous hyperlink in that letter. The correct link is "http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx". Text of the corrected public notice follows.

V/r,
Daniel Delahaye

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

Summary: The Department of the Army, Arlington National Cemetery (ANC) prepared a Real Property Master Plan (RPMP) for ANC. The RPMP outlines how the
cemetery will accommodate future development and operational needs. The recommended projects add burial capacity, facilitate future cemetery operations, enhance family experiences during committal services, enhance visitor experiences, and promote sustainability.

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1 Memorial Ave., WC Bldg.
Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	Holma, Marc (DHR)
Cc:	Roger.Kirchen@dhr.virginia.gov
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 12:06:06 PM

Classification: UNCLASSIFIED
Caveats: NONE

Dear Mr. Holma:

This e-mail follow-up to a hard-copy letter forwarded 14 August is to correct an erroneous hyperlink in that letter. The correct link is "http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx". Text of the corrected public notice follows.

V/r,
Daniel Delahaye

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

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Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	Michael.Dangerfield@whs.mil; georgine.glatz@whs.mil; martin.mamawal@whs.mil; Elizabeth.Lenyk@whs.mil; dares.charoenphol@whs.mil; alton.cheaves@whs.mil; todd.laroe@pfpa.mil; lynn.mariano@pfpa.mil; james.ballard@pfpa.mil; woody.kusse@pfpa.mil; james.ballard@pfpa.mil
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 11:35:49 AM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	Tharrington@wmata.com; jhamre@wmata.com
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 12:24:19 PM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

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Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	memorial@womensmemorial.org
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 12:25:40 PM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	ttwrec@aol.com
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 12:33:24 PM

Classification: UNCLASSIFIED
Caveats: NONE

Dear Mr. Williams:

This e-mail follow-up to a hard-copy letter forwarded 14 August is to correct an erroneous hyperlink in that letter. The correct link is "http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx". Text of the corrected public notice follows.

V/r,
Daniel Delahaye

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	Katharine R. Kerr
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 10:50:46 AM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact
Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013
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Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	Sheila.Abarr@afrh.gov; james.theros@afrh.gov; steven.mcmanus@afrh.gov
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 12:49:53 PM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

From:	USARMY Pentagon HQDA ANC OSA Mailbox Environmental
To:	shill@mwcog.org; jrohlfs@mwcog.org
Subject:	Notice of Availability: Arlington National Cemetery Master Plan Programmatic Environmental Assessment (UNCLASSIFIED)
Date:	Monday, August 19, 2013 12:31:15 PM

Classification: UNCLASSIFIED
Caveats: NONE

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

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Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

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Environmental impacts were evaluated to prepare the Programmatic EA. It was determined that the projects would not result in significant impacts. Therefore, a Draft Finding of No Significant Impact (FNSI) was also prepared.

Development of the Millennium Project site was not included in the evaluation
of the environmental effects of the RPMP. The Millennium Project site was

identified as a future growth area for ANC in the previous Master Plan and is
independent from the development included in the RPMP. As such, the Millennium Project was the subject of a separate, already completed EA. However, in accordance with the Council on Environmental Quality Regulations

for implementing NEPA, the Millennium Project was considered in the context of
cumulative impacts.

The Programmatic EA and Draft FNSI are now available for public review on the
ANC Web site at
"http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx" and at the following locations:

Arlington County Central Library
1015 N Quincy St
Arlington, VA 22201

Columbia Pike Branch
816 South Walter Reed Dr
Arlington, VA 22204

Aurora Hills Branch
735 South 18th St
Arlington, VA 22202

Comments: Comments, if any, are requested on the form provided. Comments submitted by the close of the comment period on October 21, 2013 will be considered prior to signing the Final FNSI. Please submit written comments by
October 21, 2013 to:

Daniel Delahaye
Master Planner, Arlington National Cemetery
1 Memorial Ave., WC Bldg.
Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Classification: UNCLASSIFIED
Caveats: NONE

Attachment 4:

Affidavit of Publication

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AFFIDAVIT OF PUBLICATION

I, Deborah A. Funk, of The Arlington Connection, in Arlington, Virginia

Do hereby certify that from my own knowledge and a check of the files of this newspaper

that the notice of HNTB Corporation's Arlington National Cemetery Real Property

Master Plan was printed, as scheduled, in our newspaper

on: August 21, 2013.

Deborah A. Funk — Director, Corp Sales

Signature — Title

Subscribed and sworn to Before Me By: Deborah A. Funk

Notary Public or Witness: Andrea Smith

My Commission Expires: 9/30/2014

Today's Date: 8/21/2013

ANDREA L. SMITH
COMMONWEALTH OF VIRGINIA
REG. NO. 7324969
EXPIRES 09-30-2014
NOTARY PUBLIC

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Crime

The following incidents were reported the Arlington Police Department.

ARMED ROBBERY, 6000 block of Wilson Boulevard. At 11:20 p.m. on g. 11, a victim was approached by o unknown males brandishing fire-ns and wearing ski masks on the ewalk. The subjects took the victims l phone and bible and then fled the ene on foot into a wooded area. A lice K9 and helicopter search were tiated but were unsuccessful in locat-; the suspects.

ARMED ROBBERY, 6000 block of Wilson Boulevard. At 12:44 a.m. on g. 8, a victim was allegedly robbed at ifepoint of his iPhone 5 by three un-own suspects. The suspects were scribed as Hispanic males with black irts covering their faces.

DESTRUCTION OF PROPERTY ERIES), 1000 block of Quinn Street. tween 2:45 and 6:40 a.m. on Aug. 7, unknown subject(s) slashed the tires 10 vehicles. There is no suspect(s) scription.

ROBBERY, 5900 block of N. Wilson ulevard. At 4:07 a.m. on Aug. 5, a male victim was walking on the side-alk when she was allegedly struck in e head by a male subject from behind d robbed of her backpack. The back-ck contained numerous jewelry items. The suspect was described as a black male, approximately 5'7" tall with a skinny build.

ROBBERY, 2900 block of S. 16th Street. At 4:20 p.m. on Aug. 3, a subject stole $80 cash from a victim inside the locker room of Walter Reed Recreation Center. The subject is described as a black male, approximately 20 years old, 5'6" tall and 130 lbs. He was wearing a black shirt, jeans and black shoes at the time of the incident.

MALICIOUS WOUNDING, 2300 block of N. 11th Street. At 10:40 p.m. on Aug. 4, an argument escalated between known parties and a female subject cut the hand of the male victim with a knife. A 30-year-old Arlington woman was arrested and charged with malicious wounding. She was held without bond.

MALICIOUS WOUNDING, 2100 block of N. 15th Street. At 1:47 p.m. on Aug. 3, a subject assaulted a man after he made inappropriate comments to the subject's girlfriend. A 50-year-old man from Stone Ridge, Va., was arrested and charged with malicious wounding and strangulation. He was held without bond.

EXPOSURE, 400 block of N. Park Drive. At 4 p.m. on Aug. 5, a unknown male subject began to masturbate in

See Crime, Page 11

"Flourishing After 55"

"Flourishing After 55" from Arlington's fice of Senior Adult Programs for Sept. 7.

Arlington senior centers: Aurora lls, 735 S. 18th St.; Walter Reed, 2909 16th St.; Culpepper Garden, 4435 N. rshing Dr.; Langston-Brown, 2121 N. lpeper St.; Lee, 5722 Lee Hwy.; Ar-igton Mill at Fairlington, 3308 S. afford St.; also Madison Community enter, 3829 N. Stafford St.; TJ Com-unity Center, 3501 S. 2nd St.

Senior trips: Thursday, Sept. 5, hoboth Beach, Del., $44; Friday, Sept. U.S. State Department, D.C., tour plomatic Reception Rooms, $8; Satur-y, Sept. 7, Maryland Seafood Festival, napolis, $20. Call Arlington County 5+ Travel, 703-228-4748. Registration quired.

Senior centers will be closed Mon-y, Sept. 2 for Labor Day.

Tennis, Monday through Friday, 8 m. – 12 p.m., Bluemont Courts, Wilson d Manchester. Details, 703-228-4745.

Encore Chorale begins rehearsals, uesday, Sept. 3, 2 p.m., Langston-rown. New members welcome; no ditions. Call for semester fee, 301-51-5747.

Pickleball played Tuesday-Thurs-ay-Friday, 11 a.m. -3 p.m., Walter eed. Details, 703-228-0955.

Shop smart for groceries, Vednesday, Sept. 4, 1:30 p.m., Aurora Hills. Free. Register, 703-228-5722.

Learn to play chess or canasta, Wednesdays, 10 a.m. – 12 p.m., Walter Reed. Free. Register, 703-228-0955.

Drop-in basketball for women, Wednesdays, 7 p.m., Langston-Brown. Details, 703-228-4771.

55+ Biking Group to cycle to all senior centers, Thursday, Sept. 5, 10 a.m., Details, 703-228-4771.

Arlington Poets Group, Thursday, Sept. 5, 3 p.m., Langston-Brown. Free. Register, 703-228-6300.

Volleyball, co-ed, Thursdays, 1:30 p.m., Langston-Brown. Free. Register, 703-228-6300.

Advanced line dancing, Thursdays, 1:30p.m., Lee. Details, 703-228-0555.

Ballroom Dance, Friday, Sept. 6, 1 p.m., Lee. Free. Register, 703-228-0555.

Intro to Microsoft Word, Friday, Sept. 6, 10:30 a.m., Lee. Free. Register, 703-228-0555.

Computer instruction, Fridays, 10 a.m. – 1 p.m., Lee. Free. Register, 703-228-0555.

Fast-paced walking group, Fridays, 8 a.m., Aurora Hills. Free. Register, 703-228-5722.

Opening ceremonies, Northern Virginia Senior Olympics, Saturday, Sept. 7, 9 a.m., Thomas Jefferson Community Center. Free. Details, 703-228-4721.

SHILLELAGHS
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Includes Coach pickups in Vienna & Rockville, 11 Nights Hotel with Daily Breakfast, 7 Dinners. Visiting Dallas, Fort Worth, San Antonio, Houston Sightseeing – Call for Itinerary

OCEANIA CRUISES BARCELONA TO BARCELONA • Nov. 9 – 20 ..... Prices beginning at $2449
Includes Air from Dulles, 10 Nights Cruise on "Marina" With All Meals & Entertainment, Transfers, Included Gratuities, Free Internet & $500 Onboard Credit per Stateroom!!

AZAMARA – Small Deluxe Ship from Athens to Dubai • Oct. 23 – Nov. 9 ..... Prices beginning at $2980 plus taxes
Includes Air from Dulles, 14 Nights Cruise with All Meals, All Drinks & Entertainment, Hotel Night in Athens, Gratuities Included, Complimentary Evening Tour

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Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

Agency: Department of the Army, Arlington National Cemetery

Public Comment Period: August 19 to October 21, 2013

Summary: The Department of the Army, Arlington National Cemetery (ANC) prepared a Real Property Master Plan (RPMP) for ANC. The RPMP outlines how the cemetery will accommodate future development and operational needs. The recommended projects add burial capacity, facilitate future cemetery operations, enhance family experiences during committal services, enhance visitor experiences, and promote sustainability.

In order to implement the projects in the RPMP, ANC must first comply with the National Environmental Policy Act of 1969 (NEPA). NEPA requires the evaluation and consideration of the environmental impacts prior to taking federal actions. Therefore, pursuant to the provisions of NEPA, Council on Environmental Quality (CEQ) Regulations [40 CFR Parts 1500-1508], and Environmental Analysis of Army Actions (32 CFR 651), ANC has prepared an Environmental Assessment (EA) to identify the potential environmental consequences of projects recommended in the ANC RPMP.

The EA is referred to as a Programmatic EA because it is a broad scale analysis of the RPMP recommendations. The RPMP recommendations included phased and conceptual projects. Limited information about these projects was available during the preparation of the EA. In some cases the information needed to determine specific effects was not available. Therefore, recommended projects were evaluated to the fullest extent possible in the Programmatic EA and ANC committed to prepare project-specific NEPA documentation as required prior to implementing the specific projects.

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Master Planner, Arlington National Cemetery
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Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

Attachment 5:

Web Site Documentation

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THE OFFICIAL WEBSITE OF
ARLINGTON NATIONAL CEMETERY
HONOR - REMEMBER - EXPLORE

Public Notices

Arlington National Cemetery Real Property Master Plan

- Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact
- Programmatic Environmental Assessment
- Appendices
- Comment Form

U.S. Soldiers' and Airmen's Home National Cemetery Real Property Master Plan

- Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact
- Programmatic Environmental Assessment
- Comment Form

Notice of Availability: Programmatic Environmental Assessment and Draft Finding of No Significant Impact

Arlington National Cemetery Real Property Master Plan

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Arlington, VA 22211-5003
usarmy.pentagon.hqda-anc-osa.mbx.environmental@mail.mil

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Attachment 6:

Comments and Responses

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ARLINGTON
VIRGINIA

OFFICE OF THE COUNTY MANAGER

2100 Clarendon Boulevard, Suite 302, Arlington, VA 22201
TEL 703-228-3120 FAX 703-228-3218 TTY 703-228-4611 www.arlingtonva.us

October 21, 2013

Mr. Patrick K. Hallinan
Executive Director
Army National Cemeteries Program
Arlington National Cemetery
Arlington, VA 22211-5003

Dear Mr. Hallinan:

Thank you for the opportunity to provide comments on the Environmental Assessment for the Arlington National Cemetery Real Property Master Plan and Draft Finding of No Significant Impact. I commend you for sharing these documents with the community and with your stakeholders and partners, such as Arlington County. I look forward to continuing to work with you on this important effort.

Much progress has been made since The County and Arlington National Cemetery signed the Memorandum of Understanding in January 2013. We have both gained an understanding of our respective needs and those of other stakeholders. As such, we have refined our conceptual plans and we have had several productive conversations.

Arlington National Cemetery and its future are important to Arlington County. We remain particularly interested in the Cemetery's Real Property Master Plan, the Area Development Plan for the former Navy Annex Site, the Short and Long Range Plan and the Cemetery Design Guide. Arlington County staff reviewed the Environmental Assessment and prepared specific comments, which are attached. These comments are made in the spirit of helping your organization prepare the best documentation possible, but also to assure the elements of the MOU are included in your analysis.

I am concerned that none of the options presented reflect ongoing discussions between our two organizations regarding a potential future land exchange agreement. The County has been negotiating with Cemetery representatives and the Department of the Army in good faith over the course of the last year on this. I would have expected to see the framework of our discussions as at least one of the options considered in the Plan. I am also concerned that the Environmental Assessment is not consistent with the Council of Environmental Quality and the Department of the Army implementing regulations for NEPA, particularly with regard to scoping, public participation, and consideration of alternatives. The county staff is available to discuss county plans, studies and other documents that should have been considered and that are reference in our attached comments. 1

Further, I am specifically concerned with several assumptions made in developing the various planning options, namely that: 1.) Arlington County will transfer ownership of County property to the Cemetery without any corresponding transfer of federal land to the County, 2.) Arlington 2

County will remove the existing Southgate Road from our local street network without providing for a new public street connection to Foxcroft Heights neighborhood or Joint Base Myer-Henderson Hall, and 3.) the reconfigured roadways scenario presents a realignment of Columbia Pike that does not reflect material prepared by the County. All of these assumptions are incorrect and are not consistent with our verbal and written correspondence with you on these issues over the course of the last year. 2 cont.

Nevertheless, I am convinced and hopeful that a mutually agreeable outcome can be developed. I look forward to receiving for comment by the county and all stakeholders an amended Environmental Assessment that considers options that Arlington County has presented. Our discussions that began last spring regarding a future land exchange agreement to expand the cemetery and realign the roadway network had the primary goal to substantially increase the contiguous area of land available for grave sites and other cemetery-related purposes. Such an agreement would also seek to address the County's goals to secure a site for an Arlington Heritage Center and Freedman's Village Museum, provide for the realignment of Southgate Road to the western edge of the Navy Annex site, and provide for a realigned Columbia Pike. 3

The availability to the Cemetery of the Navy Annex site is a significant moment in the history of Arlington National Cemetery and represents a unique opportunity for all of us to work together to support each other's respective goals and missions. If done right, our mutual efforts in this area will greatly impact and enhance your ability to honor and remember those who have served our Nation while providing for efficient and effective modes of transportation in an area with competing needs. We remain committed to working with you, and with all relevant stakeholders, to this end.

Sincerely,

Barbara M. Donnellan

Barbara M. Donnellan
County Manager

Enclosure

Letter from the Arlington County dated October 21, 2013		
Comment #	**Comment**	**ANC Response**

1	I am concerned that none of the options presented reflect ongoing discussions between our two organizations regarding a potential future land exchange agreement. The County has been negotiating with Cemetery representatives and the Department of the Army in good faith over the course of the last year on this. I would have expected to see the framework of our discussions as at least one of the options considered in the Plan. I am also concerned that the Environmental Assessment is not consistent with the Council of Environmental Quality and the Department of the Army implementing regulations for NEPA, particularly with regard to scoping, public participation, and consideration of alternatives. The county staff is available to discuss county plans, studies and other documents that should have been considered and that are reference in our attached comments.	We carefully considered the concerns expressed by Arlington County. As a result the August 2013 EA was revised as follows:
		
		• A description of the MOU was added to Chapter 1 under Section 1-1 *Background*.
		
		• The alternatives carried forward for environmental review were modified in the following manner:
		
		  • Alternative 3 - Alternative 3 is now similar to Alternative 2 in that ANC would acquire the Southgate Road right-of-way. However, with Alternative 3, ANC would divest itself of a 55-foot- wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike. The easement would allow Arlington County to build a road from Columbia Pike to Gate 3 of JBM-HH.
		
		  • Alternative 4 – With Alternative 4, ANC would acquire the Southgate Road right-of-way and divest itself of a 55-foot-wide easement along the western most boundary of the Navy Annex site. In addition, Columbia Pike would be realigned. Alternative 4 includes a corridor of potential alignments of Columbia Pike because the design of the realignment of Columbia Pike near Joyce Street is in the preliminary stage. A conceptual alignment was shown in the Memorandum of Understanding (MOU) between the Army and Arlington County. However, as part of preliminary design, various alignments are being considered. Therefore, for the purposes of the Revised EA, a corridor of potential alignments was considered. The MOU alignment of Columbia Pike falls within this corridor.
		
		The August 2013 EA was consistent with both Council on Environmental Quality (CEQ) and the Department of Army implementing regulations for NEPA. According to 32 CFR § 651.14 (d)(4) scoping is not required for an EA, “The proponent may incorporate scoping as part of the EA process, as well. If the proponent chooses a public involvement strategy, the extent of scoping incorporated is at the proponent’s discretion.” However, as

Letter from the Arlington County dated October 21, 2013		
Comment #	**Comment**	**ANC Response**
		stated in the August 2013 EA, ANC did conduct scoping. Scoping notifications were sent to federal, state and local agencies including Arlington County to advise them of the Proposed Action and request input. Also, a stakeholder-scoping meeting was held on July 15, 2012. Several representatives from Arlington County attended the scoping meeting and provided comments. Related materials are included in Appendix A of the EA. Public participation was also conducted in accordance with the CEQ and Department of Army implementing regulations for NEPA. 32 CFR § 651.14 (b)(2) states, "A proponent will make an EA and draft FNSI available to the public for review and comment for a minimum of 30 days prior to making a final decision and proceeding with an action." In this case, the August 2013 EA and Draft FNSI were available for 60 days. Letters and/or e-mails were sent to agencies including Arlington County representatives and the Foxcroft Heights Neighborhood Association to advise them of the availability of the August 2013 EA and Draft FNSI and to request comments. Public availability of the documents was announced in the Arlington Connection and on the ANC Web site at http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx. A Notice of Availability was published in the Arlington Connection on August 21, 2013 and was posted on the ANC Web site. The Notice summarized the NEPA evaluation and notified the public that the August 2013 EA and Draft FNSI were available for public review and comment on the ANC Web site and at three local public libraries. While the alternatives in the August 2013 EA were considered in accordance with the CEQ and Department of Army implementing regulations for NEPA, ANC chose to revise the alternatives to address the concerns of Arlington County. The alternatives carried forward for environmental review in the Revised EA were modified as discussed earlier in this response. We value your comments and will continue to work with you in developing the Southern Expansion Site. We look forward to receiving any County plans, studies and other documents that should be considered in the next steps of the planning process.

Letter from the Arlington County dated October 21, 2013		
Comment #	**Comment**	**ANC Response**
2	Further, I am specifically concerned with several assumptions made in developing the various planning options, namely that: 1.) Arlington County will transfer ownership of County property to the Cemetery without any corresponding transfer of federal land to the County, 2.) Arlington County will remove the existing Southgate Road from our local street network without providing for a new public street connection to Foxcroft Heights neighborhood or Joint Base Myer Henderson Hall, and 3.) the reconfigured roadways scenario presents a realignment of Columbia Pike that does not reflect material prepared by the County. All of these assumptions are incorrect and are not consistent with our verbal and written correspondence with you on these issues over the course of the last year.	The August 2013 EA did not presuppose the outcome of ongoing land negotiations between ANC and the County. Nor did it imply that ANC would receive land without equivalent consideration to the County. The August 2013 EA identified ANC's potential land use alternatives if parcels become available. For instance, the EA stated "ANC may have the opportunity to acquire the Southgate Road right-of-way." Also, the August 2013 EA stated, "It is expected that the conceptual layout of the existing road network developed for Alternative 3 will be re-examined and adjusted to incorporate additional design considerations as planning for the Arlington County transit project advances." Furthermore, the alternatives did not preclude others from using the parcels. For instance, the August 2013 EA stated "Locating the Interpretive Center on Parcel C would provide an opportunity to create a regional interpretive facility. Proposed interpretive centers/museums such as the Pentagon Memorial Interpretive Center and Freedman's Village Museum could be combined with the proposed ANC Interpretive Center." Regardless, ANC chose to revise the alternatives to address the concerns of Arlington County. The alternatives carried forward for environmental review in the Revised EA were modified in the following manner: • Alternative 3 - Alternative 3 is now similar to Alternative 2 in that ANC would acquire the Southgate Road right-of-way. However, with Alternative 3, ANC would divest itself of a 55- foot- wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike. The easement would allow Arlington County to build a road from Columbia Pike to Gate 3 of JBM-HH. • Alternative 4 – With Alternative 4, ANC would acquire the Southgate Road right-of-way and divest itself of a 55-foot-wide easement along the western most boundary of the Navy Annex site. In addition, Columbia Pike would be realigned. Alternative 4 includes a corridor of potential alignments of Columbia Pike because the design of the realignment of Columbia Pike near Joyce Street is in the preliminary stage. A conceptual alignment was shown in the Memorandum of Understanding (MOU) between the Army and Arlington County. However, as part of preliminary design, various alignments are being considered. Therefore, for the purposes of the Revised EA, a corridor of potential alignments was considered. The MOU alignment of Columbia Pike falls within this corridor.

Letter from the Arlington County dated October 21, 2013		
Comment #	**Comment**	**ANC Response**
3	Nevertheless, I am convinced and hopeful that a mutually agreeable outcome can be developed. I look forward to receiving for comment by the county and all stakeholders an amended Environmental Assessment that considers options that Arlington County has presented. Our discussions that began last spring regarding a future land exchange agreement to expand the cemetery and realign the roadway network had the primary goal to substantially increase the contiguous area of land available for grave sites and other cemetery-related purposes. Such an agreement would also seek to address the County's goals to secure a site for an Arlington Heritage Center and Freedman's Village Museum, provide for the realignment of Southgate Road to the western edge of the Navy Annex site, and provide for a realigned Columbia Pike.	ANC is committed to working with the County and all stakeholders for a mutually agreeable outcome. Therefore, the EA and Draft FNSI were revised to address Arlington County's concerns. The Revised EA and Draft FNSI are being circulated for review. Additionally, ANC will coordinate with the County during the next steps of developing the former Navy Annex site including preparing site-specific NEPA documentation.

The following comments were submitted by Arlington County via the comment form provided by ANC.

Arlington County CPHD Planning Division/Transportation Division Comments dated October 21, 2013			
Report Section	Page #	Comment	ANC Response
Forward Proposed Action and Alternatives	2-5	There are two over-riding issues with this document: 1)The scoping process was incomplete with the host community, Arlington County and possibly with other affected parties: - Although there is reference to working with Arlington County, the document does not fully capture either the land use, community planning or transportation context of the Columbia Pike Corridor or Pentagon City station area - Many Arlington adopted plans, studies and capital projects that are of direct relevance to the Navy Annex area should be referenced (including federally compliant NEPA documentation for the Columbia Pike Transit Initiative) - There should be reference to the MOU between Arlington and Arlington National Cemetery that was signed by both parties in January 2013, and which specifically addresses how the two parties will work together on property exchanges and infrastructure realignment - Arlington should have been offered meaningful opportunity to help shape the alternatives studied.	Scoping materials were sent to a large number of stakeholders including several Arlington County representatives: Rebeccah Ballo, Michael Leventhal, Brian Stout and Tim Mcintosh. Several Arlington County representatives (Bill Roberts, Leon Vignes, Rebeccah Ballo, Jeff Ham, Cythea Liccese-Torres) participated in a scoping meeting on July 25, 2012. Arlington County representatives also participated in the December 7, 2012 meeting to review the Real Property Master Plan. The Arlington County General Land Use Plan, Columbia Pike Neighborhoods Area Plan, Foxcroft Heights Neighborhood Conservation Plan, Columbia Pike Multimodal Project and Columbia Pike Realignment Study were referenced in the August 2013 EA. The Revised EA references the MOU in Section 1.2, *Background*. ANC chose to revise the alternatives to address the concerns of Arlington County. The alternatives carried forward for environmental review in the Revised EA were modified in the following manner: • Alternative 3 - Alternative 3 is now similar to Alternative 2 in that ANC would acquire the Southgate Road right-of-way. However, with Alternative 3, ANC would divest itself of a 55-foot- wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike. The easement would allow Arlington County to build a road from Columbia Pike to Gate 3 of JBM-HH. • Alternative 4 – Alternative 4 includes a corridor of potential alignments of Columbia Pike. The MOU alignment of Columbia Pike falls within this corridor.

Arlington County CPHD Planning Division/Transportation Division Comments dated October 21, 2013			
Report Section	Page #	Comment	ANC Response
		2) The finding of no significant impact for all three alternatives was not well substantiated. - None of the alternatives studied captured the importance of the Columbia Pike corridor to the County or adjacent jurisdictions such as Fairfax County. o Columbia Pike is a major multimodal transportation and development corridor in Arlington County that connects to the Metrorail System via S. Joyce Street. It is the highest bus ridership corridor in the State of Virginia with almost 500 bus trips per weekday. This corridor has been the subject of intensive replanning and investment from the late 1990's. The residential population of Arlington portion of the Corridor is expected to grow from 36,000 residents today to over 72,000 by 2040.	ANC chose to revise the alternatives to address the concerns of Arlington County. Alternative 4 includes a corridor of potential alignments of Columbia Pike. The MOU alignment of Columbia Pike falls within this corridor.
		- All three alternatives are in direct conflict with Arlington County plans for the corridor. o The County has targeted over $300 million of transportation capital investment in this corridor in the County Board adopted 10 year CIP (approved in July 2012)	ANC chose to revise the alternatives to address the concerns of Arlington County. With Alternatives 3 and 4, ANC would acquire the Southgate Road right-of-way and divest itself of a 55- foot-wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike.
		- Two of the alternatives assume the taking of Arlington County owned and operated infrastructure without any consultation and without any documentation of replacement facilities or necessary and appropriate exchanges of property. o Arlington believes that there is an adverse impact to the Foxcroft Heights community from the elimination of all public access (motor vehicle, bicycle and pedestrian) on the Arlington controlled Southgate Road that connects the neighborhood and Joint Base Myer Henderson Hall with the adjacent road network and the Pentagon Reservation without providing a replacement access road to Columbia Pike. This action diverts all of the base traffic from gates 1 and 3 and other neighborhood onto the three residential streets of Foxcroft Heights (recognized in the EA summary but determined that the impact would not exceed the threshold of significance).	The August 2013 EA addressed the impacts to the Foxcroft Heights community. Analysis of the roadway, bicycle and pedestrian impacts were discussed in Section 3.10.3 of the August 2013 EA. While impacts were identified, none were anticipated to exceed the threshold of significance. However, in response to Arlington County's concerns, additional traffic analysis of the road conditions in Foxcroft Heights was completed and the results were incorporated into the Revised EA. The "replacement access road" is included in the traffic analysis of Alternatives 3 and 4. Refer to Section 3.10.3, *Environmental Consequences of the Alternatives on Traffic and Transportation* and Appendix F, *Traffic Impact Assessment* in the Revised EA.

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FONSI	1	The draft should consider an appropriate range of alternatives, in that it specifically does not include consideration of alternatives recommended by the County in its comments to the December 7, 2012 Draft Report – *Forward to the Third Century The Master Plan Arlington National Cemetery U.S. Soldiers' and Airmen's Home National Cemetery - Area Development Plan Former Navy Annex Site*, and other alternatives consistent with the expressed intent of Arlington National Cemetery ("ANC") and the County, as expressed in the January 10, 2013 *Memorandum of Understanding Between the Department of the Army and County Board of Arlington County,* Virginia ("MOU").	The alternatives in the August 2013 EA were considered in accordance with the CEQ and Department of Army implementing regulations for NEPA. According to 32 CFR §651.34 (d) "The alternatives considered, including appropriate consideration of the ''No Action'' alternative, the ''Proposed Action,'' and all other appropriate reasonable alternatives that can be realistically accomplished." However, in response to Arlington County's concerns, a new alternative, Alternative 4 was generated and evaluated in the Revised EA. Alternative 4 includes a corridor of potential alignments of Columbia Pike. The MOU alignment of Columbia Pike falls within this corridor.
FONSI	2	None of the EA's three Action Alternatives describe and acknowledge any County ownership/use of land to be conveyed to the County in exchange for title to Southgate Road and portions of Columbia Pike, as addressed in the MOU, and as previously authorized by Act of Congress in *Public Law 108-375, Part IV, Section 2881 – Land Exchange Arlington County, Virginia* (October 28, 2004). Nor do the Action Alternatives include a reservation of land for a new Joint base Fort Myer Henderson Hall access road on USA (Navy Annex) property abutting Foxcroft Heights, as agreed in Section V.D. of the MOU.	The MOU establishes a framework for collaboration. While we fully intend to abide by the Memorandum of Understanding (MOU) and continue to work with the County, no land exchange agreements were finalized or agreed to as of the preparation of the Real Property Master Plan (RPMP) or the Environmental Assessment (EA). However, in response to Arlington County's concerns, the alternatives carried forward for environmental review in the Revised EA were modified in the following manner: • Alternative 3 - Alternative 3 is now similar to Alternative 2 in that ANC would acquire the Southgate Road right-of-way. However, with Alternative 3, ANC would divest itself of a 55 foot wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike. The easement would allow Arlington County to build a road from Columbia Pike to Gate 3 of JBM-HH. • Alternative 4 – With Alternative 4, ANC would acquire the Southgate Road right-of-way and divest itself of a 55-foot-wide easement along the western most boundary of the Navy Annex site. In addition, Columbia Pike would be realigned. Alternative 4 includes a corridor of potential alignments of Columbia Pike because the design of the

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			realignment of Columbia Pike near Joyce Street is in the preliminary stage. A conceptual alignment was shown in the Memorandum of Understanding (MOU) between the Army and Arlington County. However, as part of preliminary design, various alignments are being considered. Therefore, for the purposes of the Revised EA, a corridor of potential alignments was considered. The MOU alignment of Columbia Pike falls within this corridor.
FONSI	2-3	None of the EA's three Action Alternatives recognize and acknowledge (consistent with the MOU) that: 1) any road realignment will involve an exchange of property along the County and the USA, and the Virginia Department of Transportation (VDOT) and construction of a new Joint base Fort Myer Henderson Hall access road on USA (Navy Annex) property abutting Foxcroft Heights; 2) the environmental impacts of potential non-ANC uses of property that would be received by the County from ANC in any exchange.	In response to Arlington County's concerns the alternatives carried forward for environmental review in the Revised EA were modified in the following manner: • Alternative 3 - Alternative 3 is now similar to Alternative 2 in that ANC would acquire the Southgate Road right-of-way. However, with Alternative 3, ANC would divest itself of a 55-foot-wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike. The easement would allow Arlington County to build a road from Columbia Pike to Gate 3 of JBM-HH. • Alternative 4 – Alternative 4 includes a corridor of potential alignments of Columbia Pike. The MOU alignment of Columbia Pike falls within this corridor. The use of non-ANC land is not known at this time. Several alternatives for the alignment of Columbia Pike are being reviewed and negotiations for a land exchange continue. Therefore, land use on non-ANC land is generally presumed to conform to the Arlington County General Land Use Plan. Because of the lack of information, the realignment of Columbia Pike and proposed use of non-ANC property must be evaluated in a future project-level NEPA document tiered off of the programmatic Revised EA.

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FONSI	5	A valid Finding of No Significant Impact (FONSI) requires proper scoping, with proper notice and opportunity to provide input by all potentially affected stakeholders, and the consideration of a full range of appropriate alternatives.	Scoping was conducted and proper notice was provided. Scoping materials were sent to several stakeholders including the following Arlington County representatives; Rebeccah Ballo, Michael Leventhal, Brian Stout and Tim McIntosh. Several stakeholders including the following Arlington County representatives, Bill Roberts, Leon Vignes, Rebeccah Ballo, Jeff Harn and Cythea Liccese-Torres also participated in a scoping meeting on July 25, 2012. Related materials are included in Appendix A of the EA. Also, stakeholders including Arlington County representatives participated in the December 7, 2012 meeting to review the Real Property Master Plan. In addition, the August 2013 EA and Draft FNSI were available for public and agency reviews and comment for 60 days. Letters and/or e-mails were sent to agencies including Arlington County representatives and the Foxcroft Heights Neighborhood Association to advise them of the availability of the August 2013 EA and Draft FNSI and to request comments. Public availability of the documents was announced in the Arlington Connection and on the ANC Web site at http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx. A Notice of Availability was published in the Arlington Connection on August 21, 2013 and was posted on the ANC Web site. The Notice summarized the NEPA evaluation and notified the public that the August 2013 EA and Draft FNSI were available for public review and comment on the ANC Web site and at three local public libraries. In response to Arlington County's concerns regarding range of alternatives, the alternatives carried forward for environmental review were modified in the following manner: • Alternative 3 - Alternative 3 is now similar to Alternative 2 in that ANC would acquire the Southgate Road right-of-way. However, with Alternative 3, ANC would divest itself of a 55-foot-wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike. The easement would allow Arlington County to build a road from Columbia Pike to Gate 3 of JBM-HH. • Alternative 4 – Alternative 4 includes a corridor of potential alignments of Columbia Pike. The MOU alignment of Columbia Pike falls within this corridor.

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ES		According to federal regulations applicable to ANC, it "must identify and describe the range of reasonable alternatives to accomplish the purpose and need for the proposed action or project, taking a 'hard look' at the magnitude of potential impacts of implementing the reasonable alternatives, and evaluating their significance. To assist in identifying reasonable alternatives, [ANC] should consult with the installation environmental office and appropriate federal, tribal, state and *local agencies*, and the *general public*." (Emphasis added.) 23 C.F.R. §651.9(c). The ANC did not consider all reasonable alternatives, including all land swap options, in particular those submitted by Arlington County in its comments to the Arlington Cemetery Master Plan document and set out in the January 9, 2013 MOU, and did not adequately solicit input from the public to identify alternatives and their impacts.	The EA is consistent with both Council on Environmental Quality (CEQ) and the Department of Army implementing regulations for NEPA. According to 32 CFR § 651.14 (d)(4) scoping is not required for an EA, "The proponent may incorporate scoping as part of the EA process, as well. If the proponent chooses a public involvement strategy, the extent of scoping incorporated is at the proponent's discretion." However, as explained in the EA, ANC did conduct scoping. Scoping notifications were sent to federal, state and local agencies including Arlington County to advise them of the Proposed Action and request input. Also, a stakeholder-scoping meeting was held on July 25, 2012. Several representatives from Arlington County attended the scoping meeting and provided comments. Related materials are included in Appendix A of the EA. Public participation was also conducted in accordance with the CEQ and Department of Army implementing regulations for NEPA. 32 CFR § 651.14 (b)(2) states, "A proponent will make an EA and draft FNSI available to the public for review and comment for a minimum of 30 days prior to making a final decision and proceeding with an action." In this case, the August 2013 EA and Draft FNSI were available for 60 days. Letters and/or e-mails were sent to agencies including Arlington County representatives and the Foxcroft Heights Neighborhood Association to advise them of the availability of the August 2013 EA and Draft FNSI and to request comments. Public availability of the documents was announced in the Arlington Connection and on the ANC Web site at http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx. A Notice of Availability was published in the Arlington Connection on August 21, 2013 and was posted on the ANC Web site. The Notice summarized the NEPA evaluation and notified the public that the August 2013 EA and Draft FNSI were available for public review and comment on the ANC Web site and at three local public libraries. The alternatives were considered in accordance with the CEQ and Department of Army implementing regulations for NEPA. According to 32 CFR §651.34 (d) "The alternatives considered, including appropriate consideration of the ''No Action'' alternative, the ''Proposed Action,'' and all other appropriate reasonable

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			alternatives that can be realistically accomplished." The Arlington County proposed alignment of Columbia Pike was considered in the development of alternatives. However, in response to Arlington County's concerns the alternatives carried forward for environmental review were modified in the following manner: • Alternative 3 - Alternative 3 is now similar to Alternative 2 in that ANC would acquire the Southgate Road right-of-way. However, with Alternative 3, ANC would divest itself of a 55-foot-wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike. The easement would allow Arlington County to build a road from Columbia Pike to Gate 3 of JBM-HH. • Alternative 4 – Alternative 4 includes a corridor of potential alignments of Columbia Pike. The MOU alignment of Columbia Pike falls within this corridor.
ES		ANC did not adequately analyze cumulative effects to determine incremental impacts of its proposed action when added to other past, present and reasonably foreseeable future actions, including actions by federal and non-federal agencies and private parties. 23 C.F.R. §651.16.	Cumulative effects were addressed in the August 2013 EA. Other projects in the cemetery and adjacent to the cemetery were considered. However, to address Arlington County's concerns, additional projects are considered in the Revised EA: • 9/11 Pentagon Visitor Education Center (VEC) • Route 27 (Washington Boulevard) and Route 244 (Columbia Pike) Interchange Modifications Project • Pentagon Reservation Master Plan Projects • JBM-HH Real Property Master Plan Projects See Section 3.16 of the Revised EA.
ES.6	ES-3 (Table ES.1)	The EA's analyses of the three Action Alternatives considered are all incomplete because they do not include any non-ANC use (by e.g. Arlington County, the Commonwealth of Virginia or the memorial foundations) of any portion of the "Parcels" (property areas) being analyzed.	The use of non-ANC land is not known at this time. Several alternatives for the alignment of Columbia Pike are being reviewed and negotiations for a land exchange continue. Therefore, land use on non-ANC land is generally presumed to conform to the Arlington County General Land Use Plan. Because of the lack of information, the realignment of Columbia Pike and proposed use of non-ANC property must be evaluated in a future project-level NEPA document tiered off of the programmatic Revised EA.

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ES7.1	ES-4	The first paragraph of ES. 7.1 states that Alternatives 2 and 3 include "transfers of land to ANC". This statement and the analyses fail to consider and discuss any corresponding transfers of land from ANC to other entities required to implement any transfers to ANC. (See e.g. MOU and *Public Law 108-375, Part IV, Section 2881 – Land Exchange Arlington County, Virginia* (October 28, 2004.)	The RPMP and the August 2013 EA did not presuppose the outcome of ongoing land negotiations between ANC and the County. Nor did they imply that ANC will receive land without an equivalent consideration to the County. The RPMP and August 2013 EA identified ANC's potential land use alternatives if parcels become available. For instance, the August 2013 EA stated "It is expected that the conceptual layout of the existing road network developed for Alternative 3 will be re-examined and adjusted to incorporate additional design considerations as planning for the Arlington County transit project advances." However, in response to Arlington County's concerns, the alternatives carried forward for environmental review in the Revised EA were modified as follows to refer to a potential land transfer: • Alternative 3 - Alternative 3 is now similar to Alternative 2 in that ANC would acquire the Southgate Road right-of-way. However, with Alternative 3, ANC would divest itself of a 55-foot-wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike. The easement would allow Arlington County to build a road from Columbia Pike to Gate 3 of JBM-HH. • Alternative 4 – Alternative 4 includes a corridor of potential alignments of Columbia Pike. Similar to Alternative 3, ANC would ANC would divest itself of a 55-foot-wide easement along the western-most boundary of the former Navy Annex site. In addition, ANC may potentially divest itself of land south of realigned Columbia Pike and acquire property north of realigned Columba Pike.

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ES.7.10	ES-9	Alternative 1 assumes temporary closures of Southgate Road for burial activities. The document indicates this is not expected to result in substantial congestion or significant diversion of traffic through Foxcroft Heights. Arlington disagrees with this assessment. Temporary closures would require JBM-HH traffic and the neighbothood to rely on Oak and Orme for circulation. Base security activities could require more traffic and queuing on neighborhood streets. Also, this would require commercial vehicles such as buses to rely on Orme and Oak for all turning movements to and from the Sheraton hotel, or some alternative planning for these types of drop offs.	In response to Arlington County's concerns, additional traffic analysis of the road conditions in Foxcroft Heights was completed and the results were incorporated into the Revised EA. As a result of the traffic analysis, it was determined that the temporary closure of Southgate Road would cause traffic to divert through Foxcroft Heights. However, even with the diverted traffic the change in intersection level of service would not be significant. Refer to Section 3.10.3, *Environmental Consequences of the Alternatives on Traffic and Transportation* and Appendix F, *Traffic Impact Assessment in the Revised EA*.
ES.7.10	ES-9	Alternatives 2 and 3 would not include a "closing" of Southgate Road. Rather, the alternatives would include a vacation of Southgate Road and the conveyance of title of the underlying land from the County to ANC or the United States. Over the last ten (10) years, the County has informed ANC (in writing and in meetings) that no vacation or conveyance will occur without, among other things, 1) a corresponding conveyance of land to the County; and, 2) the construction of a new Joint base Fort Myer Henderson Hall access road on USA (Navy Annex) property abutting Foxcroft Heights.	In response to Arlington County's concerns, the alternatives carried forward for environmental review in the Revised EA were modified as follows: • Alternative 3 - Alternative 3 is now similar to Alternative 2 in that ANC would acquire the Southgate Road right-of-way. However, with Alternative 3, ANC would divest itself of a 55-foot-wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike. The easement would allow Arlington County to build a road from Columbia Pike to Gate 3 of JBM-HH. • Alternative 4 – Alternative 4 includes a corridor of potential alignments of Columbia Pike. Similar to Alternative 3, ANC would ANC would divest itself of a 55-foot-wide easement along the western-most boundary of the former Navy Annex site. In addition, ANC may potentially divest itself of land south of realigned Columbia Pike and acquire property north of realigned Columba Pike.

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ES.7.10	ES-9	The document indicates minimal effects on the streets in the Foxcroft Heights neighborhood. This programmatic EA should acknowledge that future construction on the ANC property and the circulation of construction vehicles could have impacts on the Foxcroft Heights neighborhood. Certain activities and heavy trucks/machinery would not be suitable in the neighborhood. Future environmental review would need to address project specific impacts.	The August 2013 EA stated- "During the construction of the ANC facilities on the former Navy Annex site, there would be minimal effects on the streets in the Foxcroft Heights neighborhood. Columbia Pike would be the primary truck route into and from the site. Much of the construction traffic would travel west toward the ramps with Washington Boulevard and not onto the more congested eastern portions of Columbia Pike." Furthermore the August 2013 stated the that construction crews would, as a courtesy to Arlington County, work in accordance with Arlington County's Noise Control Regulations.
ES.7.15 & 2.2.4 & 3.10	ES-12 (Table ES.2); 2-15 to 2-16; 3-38 to 3-58	Without the identification of lands to be offered to Arlington County in exchange for the closure and vacation of Southgate Road, and the failure to provide an alternative roadway, it is not possible to provide a full analysis of the transportation impacts to Columbia Pike, or the planned streetcar and bus service, or the Foxcroft Heights community. Alternatives 2 & 3 assume removal of Southgate Road which provides access to JBM-HH. The transportation impacts by traffic displaced from Southgate Road to Orme, Oak, and Ode Streets should be quantified and are likely to include impacts on air quality, socioeconomic conditions, protection of children, and traffic.	In response to Arlington County's concerns, additional traffic analysis of the road conditions in Foxcroft Heights was completed and the results are incorporated into the Revised EA. Traffic conditions were analyzed for the following: Alternative 1 – Temporary closures of Southgate Road Alternative 2 – Permanent closure of Southgate Road Alternative 3 – Permanent closure of Southgate Road and new road along the western-most boundary of the former Navy Annex Site. Refer to Section 3.10.3, *Environmental Consequences of the Alternatives on Traffic and Transportation* and Appendix F, *Traffic Impact Assessment* in the Revised EA. Also, refer to Section 3.9, *Socioeconomics*.
ES-17	ES-8	See prior comments on FNSI page 5	See associated response.

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ES.7.15	ES-12 (Table ES.2)	This document indicates No significant impacts for Socioeconomics. The document does not adequately consider how additional traffic in Foxcroft Heights neighborhood may reduce land values and would be disruptive to this mixed-income community, if JBM-HH traffic is routed, or encouraged with new traffic signals (as referenced on pg. 3-55; Table 3.6) into neighborhood.	As noted in the August 2013 EA, positive traffic impacts occurred on the local roadway network with the closure of the Navy Annex office buildings and elimination of approximately 1,560 parking spaces. Also, while the closure of Southgate Road would increase traffic on residential streets, the traffic volumes on the streets in the Foxcroft Heights community would remain low. However, in response to Arlington County's concerns, additional traffic analysis of the road conditions in Foxcroft Heights was completed and the results were incorporated into the Revised EA. It was verified that even with Alternative 2 (Southgate Road closed) the change in intersection level of service would not be significant. Refer to Section 3.10.3, *Environmental Consequences of the Alternatives on Traffic and Transportation* and Appendix F, *Traffic Impact Assessment* in the Revised EA. Also, refer to Section 3.9, *Socioeconomics*.
1.2	1-2	This section should cite the (various) historic congressional authorizations for the USA/Secretary of Defense to exchange property with the County for the conveyance of Southgate Road.	Comment noted.
1.2	Fig. 1-2	Arlington National Cemetery – the graphic does not accurately depict the land associated with Navy Annex. There is no recognition that Columbia Pike portions of S. Joyce Street and all of Southgate Road are owned, maintained, and regulated by Arlington County.	The purpose of Figure 1-2 is to show the general cemetery expansion areas, the Millennium Project Site and Former Navy Annex Site.
1.2.3	1-4	The document does not address the County's comments on the draft RPMP and those comments do not seem to have been considered in drafting the EA and its Action Alternatives.	All comments were considered.
1.4	1-8	See prior comments on FONSI page 5.	See associated response.

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1.4		ANC did not conduct a thorough scoping process with all interested agencies, organizations and the public on which to base a comprehensive environmental analysis of its proposed action. 32 C.F.R. §651.5(d)(10).	Scoping was conducted and proper notice was provided. Scoping materials were sent to several Arlington County representatives. Several participated in a scoping meeting on July 25, 2012. Also, Arlington County representatives participated in the December 7, 2012 meeting to review the Real Property Master Plan. Related materials are included in Appendix A of the EA. In addition, according to 32 CFR § 651.14 (d)(4) scoping is not required for an EA, "The proponent may incorporate scoping as part of the EA process, as well. If the proponent chooses a public involvement strategy, the extent of scoping incorporated is at the proponent's discretion." However, as explained in the EA, ANC did conduct scoping.
1.4		ANC did not involve local citizens and/or existing local advisory groups to assist in identifying environmental impacts or potentially controversial issues. 23 C.F.R. §651.14(a)(1).	Local citizens and existing local advisory groups were offered the opportunity to comment on the August 2013 EA and Draft FNSI. The August 2013 EA and Draft FNSI were available for 60 days. Letters and/or e-mails were sent to agencies including Arlington County representatives, the Foxcroft Heights Neighborhood Association and the Arlington Historical Society to advise them of the availability of the August 2013 EA and Draft FNSI and to request comments. Public availability of the documents was announced in the Arlington Connection and on the ANC Web site at http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx. A Notice of Availability was published in the Arlington Connection on August 21st, 2013 and was posted on the ANC Web site. No local citizens submitted comments.

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1.4		Due to the extent of the scope and impact of the project, the public interest and potential controversy, and the presence of an impacted minority or economically-disadvantaged community, ANC should have included public involvement early in the proposal development and preparation of the EA. 40 C.F.R. §1501.4(b); 23 C.F.R. §651.9 and .36.	ANC did involve environmental agencies and the public in the preparation of the August 2013 EA. Scoping was conducted and materials were sent to several agencies including Arlington County. Several agencies also participated in a scoping meeting on July 25, 2012 and the December 7, 2012 meeting to review the Real Property Master Plan. Agencies, local citizens and existing local advisory groups were offered the opportunity to comment on the August 2013 EA and Draft FNSI. The August 2013 EA and Draft FNSI were available for 60 days. Letters and/or e-mails were sent to agencies including Arlington County representatives, the Foxcroft Heights Neighborhood Association and the Arlington Historical Society to advise them of the availability of the August 2013 EA and Draft FNSI and to request comments. Public availability of the documents was announced in the Arlington Connection and on the ANC Web site at http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx. A Notice of Availability was published in the Arlington Connection on August 21st, 2013 and was posted on the ANC Web site. No local citizens submitted comments.
1.4		ANC's public participation process is inadequate and inconsistent with the CEQ and Army regulations and ANC's stated mandate in the EA for public involvement. The EA failed to include the residents of Foxcroft Heights who will be adversely impacted by traffic, noise, aesthetics of proximity to internment areas and construction. The EA does not reflect the Foxcroft Heights Neighborhood Conservation ("NC") Plan, an important community-generated document that explicitly identifies the following major issues: (i) traffic, *i.e.*, speeding and traffic displaced from Southgate Road; (ii) pedestrian safety; (iii) parking; and (iv) lack of full engagement in ANC decisions that will impact the community's quality of life.	The EA is consistent with both Council on Environmental Quality (CEQ) and the Department of Army implementing regulations for NEPA. According to 32 CFR § 651.14 (d)(4) scoping is not required for an EA, "The proponent may incorporate scoping as part of the EA process, as well. If the proponent chooses a public involvement strategy, the extent of scoping incorporated is at the proponent's discretion." However, as explained in the August 2013 EA, ANC did conduct scoping. Scoping notifications were sent to federal, state and local agencies including Arlington County to advise them of the Proposed Action and request input. Also, a stakeholder-scoping meeting was held on July 25, 2012. Several representatives from Arlington County attended the scoping meeting and provided comments. Related materials are included in Appendix A of the EA. Public participation was also conducted in accordance with the CEQ and Department of Army implementing regulations for

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			NEPA. 32 CFR § 651.14 (b)(2) states, "A proponent will make an EA and draft FNSI available to the public for review and comment for a minimum of 30 days prior to making a final decision and proceeding with an action." In this case, the August 2013 EA and Draft FNSI were available for 60 days. Letters and/or e-mails were sent to agencies including Arlington County representatives and the Foxcroft Heights Neighborhood Association to advise them of the availability of the August 2013 EA and Draft FNSI and to request comments. Public availability of the documents was announced in the Arlington Connection and on the ANC Web site at http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx. A Notice of Availability was published in the Arlington Connection on August 21st, 2013 and was posted on the ANC Web site. The Notice summarized the NEPA evaluation and notified the public that the August 2013 EA and Draft FNSI were available for public review and comment on the ANC Web site and at three local public libraries.
		The Foxcroft Heights NC Plan specifically states that the ANC expansion and closure of Southgate Road "...will alter access to our community and shift its landscape, [and] affect not only residents but also the owners and patrons of our neighborhood's popular commercial properties...." and identified significant traffic congestion related to Henderson Hall, especially on weekends, resulting in delays at the corner of Orme and Southgate and back-up traffic along Orme Street. The EA does not reflect these issues nor provide analysis of any proposed mitigation measures. ANC also did not evaluate the impacts of the expansion of the Cemetery in light of anticipated growth in the Foxcroft Heights community, both residentially and commercially.	The Foxcroft Heights NC Plan was written prior to the closure of the Navy Annex office buildings. Traffic is much reduced since the closure of these office buildings. The August 2013 EA addressed the impacts to the Foxcroft Heights community. Analysis of the roadway, bicycle and pedestrian impacts were discussed in Section 3.10.3 of the August 2013 EA. While impacts were identified, none were anticipated to exceed the threshold of significance. Additionally, Foxcroft Heights was offered the opportunity to review and comment on the August 2013 EA and Draft FNSI. No comments were received. However, in response to Arlington County's concerns, additional traffic analysis of the road conditions in Foxcroft Heights was completed and the results were incorporated into the Revised EA. Refer to Section 3.10.3, *Environmental Consequences of the Alternatives on Traffic and Transportation* and Appendix F, *Traffic Impact Assessment* in the Revised EA. Also, refer to Section 3.9, *Socioeconomics*.
1.4		ANC does not adequately address Arlington County's concern, raised in its comments, dated October 7, 2011, related to the EA for the Navy Annex/FOB2 Property Transfer, that the closing of	ANC chose to revise the alternatives to address the concerns of Arlington County. With Alternatives 3 and 4 ANC would acquire the Southgate Road right-of-way and divest itself of a 55- foot-

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		Southgate Road without a new access road along the western edge of the Navy Annex site would have "adverse" impacts on the community. Arlington County disputes ANC's conclusion that overall traffic is reduced by over 50% through closure of Gate 3 and removal of FOB2.	wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike. Also, in response to Arlington County's concerns, additional traffic analysis was completed and the results were incorporated into the Revised EA. The "replacement access road" was included in the traffic analysis of Alternatives 3 and 4. Refer to Section 3.10.3, *Environmental Consequences of the Alternatives on Traffic and Transportation* and Appendix F, *Traffic Impact Assessment* in the Revised EA.
2.1	2-1	The discussion of the proposed action does not address the need to provide land currently owned by DOD (USA) to Arlington County in exchange for the County owned Southgate Road right of way. This is in conflict with the MOU between the Dept. of Army and Arlington County signed in January, 2013.	The RPMP and the August 2013 EA did not presuppose the outcome of ongoing land negotiations between ANC and the County. Nor did they imply that ANC will receive land without equivalent consideration to the County. The RPMP and August 2013 EA identified ANC's potential land use alternatives if parcels become available. For instance, the August 2013 EA stated "ANC may have the opportunity to acquire the Southgate Road right-of-way." Also, the August 2013 EA stated "It is expected that the conceptual layout of the existing road network developed for Alternative 3 will be re-examined and adjusted to incorporate additional design considerations as planning for the Arlington County transit project advances." However, in response to Arlington County's concerns, the alternatives carried forward for environmental review were modified in the following manner: • Alternative 3 - Alternative 3 is now similar to Alternative 2 in that ANC would acquire the Southgate Road right-of-way. However, with Alternative 3, ANC would divest itself of a 55-foot- wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike. The easement would allow Arlington County to build a road from Columbia Pike to Gate 3 of JBM-HH. • Alternative 4 – Alternative 4 includes a corridor of potential alignments of Columbia Pike. The MOU alignment of Columbia Pike falls within this corridor.
2.2.1	2-4	As to Alternative 2 and acquisition of Southgate Road, see comments to FONSI page 2 and Section ES.7.1 above.	See associated responses.
2.2.1	2-6	Since the comment period began, the County has shared with the	The Arlington County proposed alignment of Columbia Pike as

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		ANC four feasible alternative road realignments, none of which are considered in the draft EA.	shown in the Columbia Pike Realignment Study was considered in the development of alternatives evaluated in the August 2013 EA. However, in response to Arlington County's concerns, a new alternative, Alternative 4 was generated. Alternative 4 includes a corridor of potential alignments of Columbia Pike.
2.2.4	2-15	The proposed location of an interpretive center depicted as part of Alternative 3 appears to be inconsistent with the spirit of the MOU, in that it is located in the general area proposed for a Freedmen Heritage Museum and Arlington Heritage Museum. If the intent is for the interpretive center to be a collocated or joint use facility with these museums, the EA should clearly state that intent.	The August 2013 EA stated "Locating the Interpretive Center on Parcel C would provide an opportunity to create a regional interpretive facility. Proposed interpretive centers/museums such as the Pentagon Memorial Interpretive Center and Freedman's Village Museum could be combined with the proposed ANC Interpretive Center." Similarly, the Revised EA states "The advantage of locating an interpretive center on Parcel C is that it could serve as a regional interpretive facility. Proposed interpretive centers/museums such as the Pentagon Memorial Interpretive Center and Freedman's Village Museum could be combined with the proposed ANC interpretive center."
3.1	Fig. 3-2	Arlington County is in the process of amending the General Land Use Plan to include a special planning district associated with the Neighborhoods Area Plan. The amendments are expected for approval in November 2013 and if timing permits, should considered in any supplement or amendment to this EA.	The Revised EA includes Figure 3-3 which shows the Columbia Pike areas that were designated a "Special Revitalization District" on 11/16/13.
3.1	3-2	Text should be revised as shown below in underline and strike-through. Arlington County designates ANC as "Public" ~~park land~~ ~~i~~on the County's ~~2011~~ General Land Use Plan.	Comment noted. The EA was edited to reflect requested revision.
3.1	Fig. 3-2	Map is not clear on whether this is indicating existing land use or is an interpretation of the General Land Use Plan which indicates future land use. If not an existing land use map but an interpretation, Arlington County's current GLUP map should be used to correctly illustrate proposed land use. http://magellan.co.arlington.va.us/Maps/Standard_Maps/Planning_Maps/GLUP.pdf	Comment noted. The EA was edited to include existing and future Land Use Maps.

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3.1.1.2	3-3	Text regarding Foxcroft Heights neighborhood should be revised to accurately reflect the existing conditions as follows in underline and strike-through: "Two residential neighborhoods…consists of about 15 acres of low-density residential (mostly row houses and single-family detached dwellings), ~~a few high-density residential land uses (~~two small apartment buildings along Southgate Road~~)~~, service commercial uses, and the 16-story Sheraton National Hotel that sits at …"	Comment noted. The EA was edited to reflect requested revision.
3.1.1.3		The EA is inconsistent with Arlington County's Columbia Pike Neighborhoods Area Plan. Both the Master Plan document ("Forward to the Third Century: The Master Plan for Arlington National Cemetery and U.S. Soldiers' and Airmen's Home National Cemetery") and the EA ignore Arlington County's condition for a new public access road to Joint Base Myer-Henderson Hall along the western edge of the Navy Annex site.	The RPMP and the August 2013 EA did not presuppose the outcome of ongoing land negotiations between ANC and the County. The RPMP and August 2013 EA identified ANC's potential land use alternatives if parcels become available. However, in response to Arlington County's concerns the Alternatives have been modified. Alternative 3 is now similar to Alternative 2 in that ANC would acquire the Southgate Road right-of-way. However, with Alternative 3, ANC would divest itself of a 55-foot-wide easement along the western-most boundary of the former Navy Annex site and potentially land south of Columbia Pike. The easement would allow Arlington County to build a road from Columbia Pike to Gate 3 of JBM-HH.
3.1.1.3		The EA is inconsistent with the Memorandum of Understanding ("MOU") between Department of the Army and County Board of Arlington County, Virginia, dated January 10, 2013. Pursuant to the regulations, the MOU is an appropriate mechanism to facilitate cooperation and intersection between the ANC and local governments. The purpose of the MOU is to generally frame the discussion of a land exchange and identify the issues and tasks in developing a new exchange agreement. In the MOU, the Army explicitly recognizes and supports Arlington County's interests in its land use planning, multi-modal transportation system, protection of the environment and historic preservation. The EA fails to adequately address and accommodate these interests	The RPMP and the August 2013 EA did not presuppose the outcome of ongoing land negotiations between ANC and the County. The RPMP and August 2013 EA identified ANC's potential land use alternatives if parcels become available. For instance, the August 2013 EA stated "ANC may have the opportunity to acquire the Southgate Road right-of-way." Furthermore, the alternatives did not preclude others from using the parcels. However, in response to Arlington County's concerns, the alternatives carried forward for environmental review were modified in the following manner in the Revised EA: • Alternative 3 - Alternative 3 is now similar to Alternative 2 in that ANC would acquire the Southgate Road right-of-way. However, with Alternative 3, ANC would divest itself of a 55-foot-wide easement along the western-most boundary of the former Navy Annex site and potentially

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			land south of Columbia Pike. The easement would allow Arlington County to build a road from Columbia Pike to Gate 3 of JBM-HH. • Alternative 4 – Alternative 4 includes a corridor of potential alignments of Columbia Pike. The MOU alignment of Columbia Pike falls within this corridor.
3.1	3-4	Text should be revised as shown below in underline and strike-through. Columbia Pike Initiative ~~Land Use and Housing Study~~ / Columbia Pike Neighborhoods Area Plan The Columbia Pike Neighborhoods Area Plan ~~Land Use and Housing Study~~ (July 2012) serves as the framework for the revitalization and improvement of the Columbia Pike corridor nearest to the ANC. This document does not mention or describe a main goal of the Neighborhoods Area Plan to retain a significant supply of affordable housing along the Columbia Pike corridor with revitalization. The Plan envisions a mix of market rate housing and a supply of housing available to households with incomes at or below 80% of the Area Median Income, mostly at 60% of the AMI. The Plan envisions a mix of housing types in the Foxcroft Heights neighborhoods both in form and affordability levels. The Plan envisions some redevelopment of properties along Orme Street, Columbia Pike and Southgate Road with a slight increase in density, with primarily residential uses including provision of affordable housing available at 60% AMI or below. Also, the Plan envisions the area in central Foxcroft Heights with single-family detached dwellings to remain; these dwellings provide affordable homeownership opportunities for the Columbia Pike corridor.	Comment noted. The EA was edited to reflect requested revisions.

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3.5	3-15	The noise impacts of the burial ceremonies on the Foxcroft Heights have not been fully evaluated.	The August 2013 EA stated and the Revised EA states "The potential noise impacts are a function of the distance between the rifle salutes and Foxcroft Heights. The further away from Foxcroft Heights, the less likely the rifle salutes will be heard above the high level of traffic noise and aircraft/ helicopter noise in this area. Where the rifle salutes might occur within the site is unknown as design has not been initiated. Therefore, it was not possible to assess the specific potential impacts on the Foxcroft Heights community. As previously explained, when information needed to determine specific impacts is not available, the development is evaluated to the fullest extent possible in this Programmatic EA. When more information about the layout of the Navy Annex site becomes available, site-specific NEPA documentation will be prepared and tiered from this Programmatic EA. Since the rifle salutes will occur only on weekdays between 9 am and 3 pm, and given the high level of traffic noise in the Foxcroft Heights neighborhood, it is not expected that the noise impact would exceed the threshold of significance. Furthermore, if detailed project design reveals that the noise would be expected to be significant, the site-specific project environmental analysis will include mitigation measures to reduce noise impacts below the level of significant. Such mitigation measures could include operational restrictions and/or design features."
3.7	3-32	Second paragraph, second sentence—typo. The word "five" is repeated in this sentence. It reads "Five five archaeological sites were identified…"	Comment noted. The EA was edited to correct the typo.
3.7		ANC needs to comprehensively evaluate impacts of its proposed action on the Foxcroft Heights community in light of its eligibility for the National Register of Historic Places. Consistent with its own implementing guidelines, ANC must assess the potential for adverse effects and implement mitigation measures through a National Historic Preservation Act Section 106 process, including additional indirect and cumulative impacts analysis. *Army NEPA Analysis Guidance Manual*, 4.3.	The Virginia Department of Historic Resources determined that the Foxcroft Heights neighborhood is not eligible for listing on the National Register of Historic Places on 3/29/12.

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3.73	3-33	The Cultural Landscape paragraph is vague as to what sections of the forest contribute to Arlington House and which contribute to ANC. The footnote references the ANC Millennium Project Draft from December, but there were changes prior to the final EA. These should be incorporated.	The EA was revised to reference the final Millennium Project EA.
3.7.3.1	Fig. 3-8	The portion of the forest in Section 29 on the northwest side of the stream is listed on the National Register as part of the Arlington House boundaries. Though it will be removed as part of the Millennium Project, the map is inaccurate in not including it within the blue shaded Historic Site/District boundary. Until the NR nomination is updated, this area is still in the NR.	The figure was updated to show the portion of the forest listed on the National Register.
3.7.3.3	3-34	Include the Foxroft Heights neighborhood in the paragraph concerning Potential Historic Resources. It is adjacent to the Navy Annex (closer to ANC then the VDOT control building) and is being treated as potentially NR eligible in other 106 undertakings in the vicinity.	The Virginia Department of Historic Resources determined that the Foxcroft Heights neighborhood is not eligible for listing on the National Register of Historic Places on 3/29/12.
3.7.6.2	Fig. 3-9	Enlarge the preliminary APE to include the Foxcroft Heights neighborhood. Earler text notes that this neighborhood will likely have short-medium term impacts from construction, including visual and noise impacts. The neighborhood is potentially NR eligible (VDHR has accepted a PIF on the neighborhood for a potential NR nomination) and will almost certainly be impacted in some way by the Navy Annex development.	The Virginia Department of Historic Resources determined that the Foxcroft Heights neighborhood is not eligible for listing on the National Register of Historic Places on 3/29/12.
3.7.6.2	3-36	Under “Historic buildings, Structures, and Objects” amend the last sentence about potential affects to historic properties in relation to the former Navy Annex site. As Foxcroft Heights is NR eligible and since the report notes it will be impacted during construction, this statement requires revision or deletion.	The Virginia Department of Historic Resources determined that the Foxcroft Heights neighborhood is not eligible for listing on the National Register of Historic Places on 3/29/12.
3.8.1.3	3-39	Under Historic Sites, clarify which portions of Section 29 are currently listed in the NR.	The EA was edited to reflect requested revision.
3.9.1.4		ANC did not adequately satisfy the NEPA requirement to determine whether there are any disproportionate impacts on minority or low-	The August 2013 EA stated and the Revised EA states, “Although CT 1025 as a whole does not exceed the 50 percent minority

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		income communities. 23 C.F.R. §651.17, and ANC itself identified Foxcroft Heights as an "environmental justice" population. The EA focus on Arlington County or census tract demographics and socio-economic factors is misplaced. ANC's evaluation does not provide sufficient information to determine whether or not impacts on the Foxcroft Heights comments would be significant.	threshold, 69 percent of residents in Foxcroft Heights are minority according to the Arlington County 2010 Civic Association Census data; therefore, this neighborhood was considered a minority community in terms of environmental justice analysis." Section 3.9 addressed/addresses the analysis of environmental justice impacts in relation to the Foxcroft Heights neighborhood.
3.10.3.3		EA does not adequately evaluate impacts of closure of Southgate Road on pedestrian connectivity, the bicycle community and tour bus traffic. Again, the Foxcroft Heights NC Plan identifies traffic as a main issue for the community and adverse impacts of a closure of Southgate Road, particularly with respect to Henderson Hall traffic and tour buses.	The Foxcroft Heights NC Plan was written prior to the closure of the Navy Annex office buildings. Traffic is much reduced since the closure of these office buildings. Additionally, Foxcroft Heights was offered the opportunity to review and comment on the August 2013 EA and Draft FNSI. No comments were received. In addition, the Foxcroft Heights neighborhood also has the opportunity to provide input on the expanded traffic analysis included in the Revised EA.
3.10.3.3	3-55 (Table 3.6)	Traffic volumes indicate poor condition today and document references prior study indicating that traffic would increase on neighborhood streets if Southgate Road is closed. The mitigation measure includes a new traffic signal at Orme/Columbia Pike in order to allow for gaps in traffic, facilitate turns, and this would alleviate congestion. This would not necessarily prevent congestion as JBM-HH traffic would continue to rely on streets within Foxcroft Heights community.	The VDOT modifications to the Washington Boulevard/ Columbia Pike (Rt. 27 / Rt. 244) interchange included installing a traffic signal at Columbia Pike and South Orme Street. The signal was installed in 2013. Also, note that the traffic light was a recommendation in the *Foxcroft Heights NC Plan* "Recommendation #6: Install a traffic light at the intersection of Orme Street and Columbia Pike." In response to Arlington County's concerns, additional traffic analysis of the road conditions in Foxcroft Heights was completed. The analysis included the traffic signal at the intersection of Orme and Columbia Pike. Refer to Section 3.10.3, *Environmental Consequences of the Alternatives on Traffic and Transportation* and Appendix F, *Traffic Impact Assessment* in the Revised EA.
3.11.1	3-58	The fourth paragraph in Section 3.11.1 states that, "Sanitary sewage captured in storm drains and sewers connects to a 36-inch sewer main running through ANC." Arlington does not have a combined sewer system. It is inaccurate to state that sanitary sewage is captured in any of the County's storm drains. Sanitary sewage is only conveyed to the County's Water Pollution Control Plant via sanitary sewers in Arlington County.	The text was corrected and updated to reflect the Potomac Interceptor relocation.

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3.11.3.3	3-59	The EA notes that Alternatives 2 and 3 would require the removal and/or consolidation of various underground utility lines that formerly served the Navy Annex in order to expand space available for interments and inurnments. Any utility network consolidation needs to be coordinated with the Arlington County Department of Environmental Services, as well as the electrical, communications, and natural gas utility companies to ensure appropriate coordination and scheduling well in advance of such work, and to ensure that adequate space is retained within utility easements to allow future maintenance and repair of any remaining lines that are located along Southgate Road.	Comment noted.
3.13.1.3	3.63	This section states that for the purposes of this EA, it is assumed that the Washington Headquarters Services will be responsible for any clean-up or remediation of the former Navy Annex site prior to conveyance to the Department of the Army under terms of an existing MOU. While this may be the expected outcome, the document should acknowledge known petroleum contamination incidents at the former gas station that was located in Parcel D and that were documented by the Virginia Department of Environmental Quality. This information should be presented in the EA and discussed with respect to potential site constraints, including potential soil and groundwater contamination issues that may exist at this time.	"The Memorandum of Agreement (MOA) concerning the transfer of the Navy Annex Property from Washington Headquarters Services (WHS) to Department of the Army established that WHS was responsible for the disposal and remediation of the Navy Annex site, including any hazardous materials, pollutants, and contaminants including petroleum." Therefore, it is reasonable to assume that the Navy Annex site will be free of hazardous materials, pollutants, and contaminants prior to construction of any of the Action Alternatives.
3.15.2	3-73 (Table 3.8)	The Cumulative Effects (Table 3.8) takes into account only the Columbia Pike realignment (Transit Project) and not other current and planned construction projects in the area of the ANC expansion including the nearby VDOT Washington Blvd./Columbia Pike (Rt. 27/Rt. 244) interchange modification project which is currently under construction and involves significant impacts to vegetative resources around the interchange including the removal of hundreds of trees. The adverse effects to the transportation network and the Foxcroft Heights Neighborhood resulting from the removal of Southgate Road without a replacement access road to the Joint Base are not insignificant as stated.	The Revised EA includes the Rt. 27/Rt. 244 interchange modifications in the consideration of cumulative effects. In response to Arlington County's concerns, additional traffic analysis of the road conditions in Foxcroft Heights was completed and the results were incorporated into the Revised EA. It was verified that even with Alternative 2 (Southgate Road closed and no new access road) the change in intersection level of service

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			would not be significant. Refer to Section 3.10.3, *Environmental Consequences of the Alternatives on Traffic and Transportation* and Appendix F, *Traffic Impact Assessment* in the Revised EA.

Mr. Daniel Delahaye, Master Planner
Arlington National Cemetery
1 Memorial Avenue, WC Building
Arlington, VA 22211-5003

October 19, 2013

Dear Mr. Delahaye:

Thank you for the solicitation and opportunity to submit comments on the Arlington National Cemetery Real Property Master Plan, Programmatic Environmental Assessment, and Finding of No Significant Impact.

Understanding that this effort does not cover or address the Millenium Project efforts, our comments to these documents remain consistent with those submitted earlier this year on the Millenium Project. We have thoroughly reviewed the documentation and offer the following comments.

The "No Action Alternative" would, according to your plan, "...result in impacts to many of the environmental impact categories evaluated." Your report also states that "There would be no significant impact under any of the Action Alternatives...but [these Action Alternatives] could affect historic resources."

We are concerned about any growth, extension, or expansion of the ANC burial capacity which at any point in time or at any geographical place, would negatively impact, threaten, endanger, modify, or eliminate anything of historical significance ("historic resources") at ANC, including, but not limited to:

1) Old growth forest, including trees and vegetation of unique properties or characteristics, or rarely found in the Northern Virginia area;
2) The Montgomery Meigs 1870's perimeter Seneca Sandstone wall, especially in the areas to the north and west bordering on the Ft. Myer Old Chapel and picnic area;
3) Recreation areas used by slaves at the Custis-Lee Mansion;
4) The natural flow of springs and creeks which run through the ANC area.

1

At this point in time, it is essential to do everything reasonable and possible to preserve and permanently protect what little still remains of historical and environmental significance at ANC in any of the proposed expansion areas (including the Millenium Project, Southgate, and former Navy Annex sites) , than to lose these unique and precious elements forever. Any of the Action Alternatives adopted must ensure preservation of all unique historic resources at ANC. We would be willing and eager to engage in further dialogue with you on this topic, and look forward to future cooperation and consultation. Thank you again for the opportunity to provide comments.

2

John Richardson, President, Arlington Historical Society

Letter from the Arlington Historical Society dated October 19, 2013		
Comment #	**Comment**	**ANC Response**
1	We are concerned about any growth, extension, or expansion of the ANC burial capacity which at any point in time or at any geographical place, would negatively impact, threaten, endanger, modify, or eliminate anything of historical significance ("historic resources") at ANC, including, but not limited to: 1) Old growth forest, including trees and vegetation of unique properties or characteristics, or rarely found in the Northern Virginia area; 2) The Montgomery Meigs 1870's perimeter Seneca Sandstone wall, especially in the areas to the north and west bordering on the Ft. Myer Old Chapel and picnic area; 3) Recreation areas used by slaves at the Custis-Lee Mansion; 4) The natural flow of springs and creeks which run through the ANC area.	As stated in the EA, initial analysis indicated that the Alternatives could affect historic resources. Only initial analysis was completed for the EA because detailed project information was not available. Detailed project information is needed to determine whether the Alternatives would actually result in an adverse effect to historic resources. Therefore, ANC committed to completing the analysis prior to implementation of any projects. During project design, ANC will continue consultation and endeavor to avoid and minimize impacts to historic resources. None of the proposed projects included in the Real Property Master Plan would be expected to affect items 1, 2 or 4. As for item 3, it is unclear where the slave recreation areas were located.
2	At this point in time, it is essential to do everything reasonable and possible to preserve and permanently protect what little still remains of historical and environmental significance at ANC in any of the proposed expansion areas (including the Millennium Project, Southgate, and former Navy Annex sites) , than to lose these unique and precious elements forever. Any of the Action Alternatives adopted must ensure preservation of all unique historic resources at ANC. We would be willing and eager to engage in further dialogue with you on this topic, and look forward to future cooperation and consultation.	ANC is committed to protecting the historic resources in the cemetery. As noted in the EA, ANC has developed an Integrated Cultural Resources Management Plan (ICRMP). The goals of the ICRMP include: • Integrate historic preservation compliance requirements with planning and conducting construction, maintenance, real property management land use decisions and other undertakings. • Maintain the historic fabric and character of the picturesque cemetery, memorials, buildings, and other elements that contribute to the Arlington National Cemetery historic district. • Establish manuals and handbooks for guiding treatment of historic buildings, structures, and landscapes. The Arlington Historical Society is identified as a consulting party in the ICRMP. As such, ANC will continue to consult with the Arlington Historical Society on matters affecting cultural resources.

The following comments were submitted by the National Capital Planning Commission via the comment form provided by ANC.

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General		Overall this is a thorough review of the master plan and issues related to it.	Comment noted.
General		There should be a separate section to describe the potential land transfer with the Arlington County Government. What is the location of the administrative building in Alternative 2 and 3 if this parcel is transferred to ACG? There only seems to be one viable alternative that is identified for the admin building, but this location is the same as the land to be transferred to ACG.	The EA was edited to include information regarding the Memorandum of Understanding Between Department of the Army and County Board of Arlington County, Virginia. Refer to Section 1.2 *Background*. ANC is not proposing a new administration building. As stated in Section 2.2.3 "The Administration Building originally housed both administration and committal service support functions. Recently ANC decided to repurpose the Welcome Center basement and move the administrative staff to the repurposed space. As a result, there will be space available in the Administration Building to expand the committal support services function. However, all of the Action Alternatives include the possibility of constructing an Interpretive Center on Parcel C. As stated in Section 2.2.4 of the Revised EA "The advantage of locating an interpretive center on Parcel C is that it could serve as a regional interpretive facility. Proposed interpretive centers/museums such as the Pentagon Memorial Interpretive Center and Freedman's Village Museum could be combined with the proposed ANC interpretive center."
General		How will the relocation of the administrative building from its current site to the Navy Annex site affect the mode split for the employees commuting to ANC? There should be some discussion of what the parking ratio is now and what it will be after this relocation is complete.	None of the alternatives include relocation of the administrative building.

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2.2.3 Enhance Family Experiences During Committal Services	2-10 to 2-13	This section needs to include some discussion of the use of shade structures or landscaping to cover the new queuing area. It would be helpful to also screen these parking areas and maybe there could be some photovoltaic arrays incorporated to provide some shade for the cars as well as providing some power to ANC.	Shade structures/landscaping/screening including photovoltaic arrays will all be considered as part of design of the queuing area.
2.2.3 Enhance Family Experiences During Committal Services	2-10 to 2-13	Alternative #2 seems like it is more convoluted to get to the queuing area than Alternative #1. There may be additional impacts from vehicle movements	During the preparation of the recommendations for the RPMP ANC recognized the need to simplify existing traffic circulation and congestion in vicinity of the Administration Building. Alternative 1 was considered to exacerbate existing problems. Alternative 2 was considered to help alleviate current problems. For Alternative 2, traffic and congestion in vicinity of the Administration Building would be relieved. From Eisenhower Drive, vehicles would turn left on Leahy Drive and turn left into the queuing area. These vehicles would be separated from other traffic accessing the Administration Building and Welcome Center. For Alternative 1 vehicles would access the queuing area by turning left from Eisenhower Drive onto King Drive along with all of the employees parking to access the Administration Building and Welcome Center.

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2.2.4 Enhance Visitor Experiences	2-14	Alternative 2 for the Welcome Center - the idea is to develop a secondary center (Transportation Center) for the tour buses visiting ANC. Will it get confusing to duplicate some of the functions at the Transportation Center and Welcome Center? What happens if the gift shop also moves to the Transportation Center?	Final functional programming and design for the Transportation Center, if it is to be built, will occur during the planning and design phase for the project. As envisioned, the center would be the central arrival and gathering point for organized tours. Its primary purpose would be to provide sheltered queuing areas, group ticket sales, group gathering and holding areas, and group comfort facilities sized appropriately to handle large groups simultaneously. This would free up space in the Welcome Center building to provide an enhanced and more reverential visitor orientation experience for all visitors by moving some of the "rest stop" type functions to the Transportation Center.
3.3 Water Resources	3-19	Neither E.O. 13514 nor EISA are described in this this EA. This should be added in the Water Resources section and the intention of ANC to comply with these federal requirements should be described. In particular the need to address stormwater management.	Both were briefly discussed in Section 3.1.1.4 of the August 2013 EA. However, the EA was edited to introduce EO 13514 and EISA in Section 1.3.5 and reference both in Section 3.5, *Water Resources*.
3.7 Cultural Resources	Figure 3-9	Shouldn't the APE be larger and encompass views from different areas as well? It should include Memorial Bridge, George Washington Parkway, West Potomac Park, Washington Monument, etc. This site can be seen from longer distances and these should be included in the APE.	The APE was expanded to encompass views that could be affected by the Action Alternatives. In addition, ANC will analyze the potential for adverse effects on historic properties on a case-by-case basis during implementation of the RPMP. The APEs, both direct and indirect, will be established in consultation with the Virginia Department of Historic Resources when this analysis is underway.

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3.10 Traffic and Transportation	3-48	There isn't any information about employees or the parking ratio for ANC. A TMP should be included to determine what the modal split currently is as well as what the goal modal split will be for the ANC employees in the future. This information is necessary for NCPC to understand if this project will be in conformance with the Federal Elements of the Comprehensive Plan for the National Capital transportation policies relating to employee parking ratios. Since there are significant numbers of visitors there should be some description of how many.	This request will be addressed as project planning and programming progresses IF there are to be major changes in staff location/function. As of this time, however, the RPMP does not envision any significant changes in staff location or function and therefore there would be no anticipated change in parking requirements or current work commuting patterns beyond that which normally occurs with the commuting characteristics of individual personnel rotating in and out of the organization.
3.14 Visual and Aesthetic Resources	Figure 3-17	The ANC Views and Vistas map is very good, however there are few missing views. • What about the view from I-395 towards the Navy Annex site and the Air Force Memorial? • View from Foxcroft Heights Neighborhood to ANC • View from the Pentagon (NHL site) toward ANC. • View from Pentagon toward Air Force Memorial	These views were added to Figure 3-18.
3.16 Cumulative Effects	Table 3.8	While I understand that there are positive and negative impacts associated with these project, the issue is where they are significant impacts. I think this table should identify whether or not these are significant impacts	The statement "No significant impact." was added in accordance with the comment.
3.17 Environmental Effects	Table 3.9	While I understand that there are positive and negative impacts associated with these project, the issue is where they are significant impacts. I think this table should identify whether or not these are significant impacts.	The statement "No significant impact." was added in accordance with the comment.

Barbara Bottiger

Subject: FW: GWMP Comments on ANC Master Plan PEA (UNCLASSIFIED)

From: Sheffer, Thomas [mailto:thomas_sheffer@nps.gov]
Sent: Friday, November 01, 2013 3:08 PM
To: Delahaye, Daniel B CIV USARMY HQDA (US)
Cc: Brandon Bies
Subject: GWMP Comments on ANC Master Plan PEA

Mr. Delahaye,

Firstly, our apologies for the delay in responding to Arlington National Cemetery's Real Property Master Plan PEA. The federal government shutdown sidetracked a number of our priorities, but we certainly remain very interested in involvement in this important document and process.

While all pertinent NPS staff were were not able to conduct a detailed review, we would like to take the opportunity to share the following comments on behalf of George Washington Memorial Parkway (GWMP):

1. Thank you very much for incorporating our comments on the draft document in January 2013. This draft clearly reflects your careful consideration of our previous comments, which we appreciate. 1

2. Regarding the Alternate Locations for the Interpretive Center, Alternative 3; GWMP would like for further consideration to be made for potential effects on visitor experience to NPS visitors before moving forward with a decision to relocate the Welcome Center to Parcel C. Of particular concern are effects to current visitor use of Arlington House, Memorial Avenue, the Women in Military Service for America Memorial and visitor links to NPS National Mall sites in DC. More detailed analysis and discussion appear to be warranted to better demonstrate that the advantages noted in the PEA truly do outweigh the disadvantages. 2

3. Regarding dismissed alternatives for improvements and/or expansion of the existing Welcome Center; as alluded to in our previous comments, those actions could still be of mutual benefit to both our agencies. Should improvements and/or expansion of the existing Welcome Center be further pursued, NPS would ask to be designated as a cooperating agency in order to be closely involved in the associated planning and compliance process. 3

Thank you for this opportunity to weigh in on the process. Please keep us informed of how we can continue to actively participate in the process. 4

Kind regards,

Thomas Sheffer

Thomas Sheffer, AICP

Park Planner
George Washington Memorial Parkway
703.289.2512
703.307.4798 (cell)

Classification: UNCLASSIFIED
Caveats: NONE

1

E-mail from the National Park Service dated November 1, 2013		
Comment #	**Comment**	**ANC Response**
1	Thank you very much for incorporating our comments on the draft document in January 2013. This draft clearly reflects your careful consideration of our previous comments, which we appreciate.	Comment noted.
2	Regarding the Alternate Locations for the Interpretive Center, Alternative 3; GWMP would like for further consideration to be made for potential effects on visitor experience to NPS visitors before moving forward with a decision to relocate the Welcome Center to Parcel C. Of particular concern are effects to current visitor use of Arlington House, Memorial Avenue, the Women in Military Service for America Memorial and visitor links to NPS National Mall sites in DC. More detailed analysis and discussion appear to be warranted to better demonstrate that the advantages noted in the PEA truly do outweigh the disadvantages.	Construction of an Interpretive Center on Parcel C does not include the relocation of the Welcome Center. ANC recognizes your concern for potential effects on visitor experience. These concerns will be further explored during the next steps of developing the former Navy Annex site including preparing site specific NEPA documentation.
3	Regarding dismissed alternatives for improvements and/or expansion of the existing Welcome Center; as alluded to in our previous comments, those actions could still be of mutual benefit to both our agencies. Should improvements and/or expansion of the existing Welcome Center be further pursued, NPS would ask to be designated as a cooperating agency in order to be closely involved in the associated planning and compliance process.	If improvements and/or expansion of the existing Welcome Center are pursued, ANC will consider NPS's request to be designated as a cooperating agency.
4	Thank you for this opportunity to weigh in on the process. Please keep us informed of how we can continue to actively participate in the process.	Comment noted.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
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October 16, 2013

Mr. Daniel Delahaye
Master Planner
Arlington National Cemetery
1 Memorial Avenue, WC Building
Arlington, Virginia 22211-5003

RE: Programmatic Environmental Assessment and Draft Finding of No Significant Impact, Arlington National Cemetery Real Property Master Plan; DEQ 13-155F

Dear Mr. Delahaye:

The Commonwealth of Virginia has completed its review of the above-referenced document, which includes a related federal consistency determination (FCD). The Department of Environmental Quality (DEQ) is responsible for coordinating Virginia's review of federal environmental documents submitted pursuant to the National Environmental Policy Act (NEPA) as well as the review of federal consistency determinations submitted pursuant to the Coastal Zone Management Act (CZMA) and the Virginia Coastal Zone Management Program (VCP). The following state agencies joined in this review:

Department of Environmental Quality
Department of Game and Inland Fisheries
Department of Conservation and Recreation
Department of Health
Department of Historic Resources
Department of Forestry
Virginia Marine Resources Commission

In addition, the Department of Agriculture and Consumer Services, the Northern Virginia Regional Commission, and Arlington County were invited to comment.

DESCRIPTION OF PROPOSED ACTION

The Arlington National Cemetery, which is administered by the U.S. Army, has prepared a Real Property Master Plan (RPMP). The RPMP includes a number of projects and outlines how the Cemetery will address future development and operational needs. The Programmatic Environmental Assessment (Programmatic EA) is a broad-scale analysis of the RPMP recommendations, which include phased projects and projects in the conceptual stage. The Army commits to preparing project-specific NEPA documentation before implementing these specific projects.

Components of the Proposed Action, which is based on the RPMP, include adding burial capacity, facilitating future Cemetery operations, enhancing family experiences during burial services, enhancing visitor experiences, and promoting sustainability. Developments proposed are grouped by area and include:

- *Arrival area:* transportation, center, re-configured administrative building, and new queuing area;
- *Former Navy Annex site area:* parcels A (interments), B (landscaping and memorial markers), C (building and parking), and D (maintenance and operations).
- *East of Eisenhower area:* maintenance and operations.
- *Cemetery-wide:* visitor amenities and sustainability.

The Proposed Action could be any of the three Action Alternatives, which vary primarily in how the area in the vicinity of the former Navy Annex is developed. These combinations are listed in the Executive Summary, Table ES-1 (page ES-3 of the on-line Programmatic EA; see also FCD, page B-1) and depicted in Figures 2-12, 2-13, and 2-14 of the Programmatic EA. In brief:

- Alternative 1 includes projects in the Cemetery including the former Navy Annex site;
- Alternative 2 is the same as Alternative 1, but includes additional projects in the Southgate Road Area of the Cemetery; and
- Alternative 3 is the same as Alternative 1, but includes the former Navy Annex site with realigned roads.

ENVIRONMENTAL IMPACTS AND MITIGATION

1. Erosion and Sediment Control and Stormwater Management Plans.

1(a) Agency Jurisdiction. The Department of Environmental Quality (DEQ) administers the Virginia Erosion and Sediment Control Law (Virginia Code sections 62.1-44.15:51 *et seq.*) and *Regulations*, the Virginia Stormwater Management Law (Virginia Code sections 62.1-44-15:24 *et seq.*), and the *Virginia Stormwater Management Regulations* (4 VAC 50 *et seq.*) Please note that Virginia's erosion control and stormwater management program administration was transferred from the

Department of Conservation and Recreation to DEQ's Water Quality Division effective July 1, 2013.

1(b) Erosion and Sediment Control Plans; Stormwater Management Plans. The Army and its authorized agents, conducting regulated land-disturbing activities on private and public lands in Virginia, must comply with the Virginia Stormwater Management Law and *Regulations* as well as the Virginia Erosion and Sediment Control Law and *Regulations* (see "Federal Consistency…," "Analysis of Enforceable Policies," item 1, below). This compliance relates to coverage under the General Permit for Stormwater Discharge from Construction Activities (see item 1(c), below) and other applicable federal non-point source pollution mandates (e.g., the federal Clean Water Act, section 313 and federal consistency under the CZMA; see "Federal Consistency…," below). Activities which result in a total land disturbance of 10,000 or more square feet (2,500 or more square feet in Chesapeake Bay Preservation Areas; see "Federal Consistency…," "Analysis of Enforceable Policies," item 3, below) are regulated under the Erosion and Sediment Control Law. These activities include:

- Clearing and grading activities;
- Installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, and soil stockpiles; and
- Related land-disturbing activities.

The Army must prepare and implement an Erosion and Sediment Control (ESC) Plan to ensure compliance with state law and regulations. The ESC Plan must be submitted to DEQ's Northern Regional Office for review and compliance; see "Regulatory and Coordination Needs," item 1, below. The Army is ultimately responsible for achieving project compliance through oversight of on-site contractors, regular field inspections, prompt action against non-compliant sites, and other mechanisms consistent with agency policy. 1

1(c) General Permit for Stormwater Discharge from Construction Activities. The Virginia Stormwater General Permit (VSGP) requirement applies to the following types of construction activities [reference: Virginia Code sections 62-1-44.15:34 (formerly Virginia Code section 10.1-603.8)]. See "Regulatory and Coordination Needs, item 1, below.

1(c)(i) Land Disturbance Equal to or Greater than 1 Acre. Operators of construction activities resulting in land disturbance that is equal to or greater than 1 acre must apply for the VSGP.

1(c)(ii) Land Disturbance in Chesapeake Bay Preservation Areas. Operators of construction activities resulting in land disturbance less than 1 acre and greater than 2,500 square feet in areas designated as Chesapeake Bay Preservation Areas must apply for the VSGP.

1(c)(iii) Land Disturbance for Construction in a Common Plan. Operators of construction activities resulting in land disturbance less than 1 acre, where the activities are part of a larger common plan of development or sale that ultimately disturbs 1 or more acres, must apply for the VSGP. See item 1(d), next. 1 cont.

1(d) Common Plan: Definition and Example.

1(d)(i) Definition. A larger common plan of development or sale is a contiguous area where separate and distinct construction may be taking place at different times on different schedules. A permit is required if 1 or more acres, or 2,500 square feet or more in all areas designated as subject to the Chesapeake Bay Preservation Act, will be disturbed, regardless of the size of the individually-owned or -developed sites.

A larger common plan of development or sale applies to various types of land development, including but not limited to residential, commercial, or industrial use.

1(d)(ii) Example. For example, if a developer buys a 20-acre lot and builds roads with the intention of building houses or other structures in the future, or if the land is parceled off or sold, and construction occurs on plots that are less than an acre by separate, independent builders, these activities would be subject to stormwater permitting requirements.

2. Natural Heritage Resources. The Programmatic EA indicates that Alternative 1 would result in reduced vegetation because of an enlarged committal services queuing area; this would be offset by development of the former Navy Annex and addition of new turf, trees, and other vegetation there. Alternative 2 would involve additional landscaping for Southgate Road and Patton Drive areas, with impacts similar to those of Alternative 1. Similar impacts would pertain to Alternative 3, which would involve additional grass and landscaping vegetation in the area between the cemetery boundary and Columbia Pike (Programmatic EA, pages 3-28 and 3-29, sections 3.6.2.2 through 3.6.2.4).

2(a) Agency Jurisdictions.

2(a)(1) Department of Conservation and Recreation: Division of Natural Heritage. The DCR-Natural Heritage Program's (DCR-DNH) mission is conserving Virginia's biodiversity through inventory, protection, and stewardship. The Virginia Natural Area Preserves Act, Virginia Code sections 10.1-209 through 10.1-217, codifies DCR's powers and duties related to statewide biological inventory: maintaining a statewide database for conservation planning and project review, land protection for the conservation of biodiversity, and the protection and ecological management of natural heritage resources. "Natural heritage resources" are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geological formations.

2(a)(2) Department of Agriculture and Consumer Services. The Endangered Plant and Insect Species Act of 1979, Virginia Code Chapter 39, sections 3.1-102 through 3.1-1030, as amended, authorizes the Virginia Department of Agriculture and Consumer Services (VDACS) to conserve, protect and manage endangered species of plants and insects. VDACS Virginia Endangered Plant and Insect Species Program personnel cooperate with the U.S. Fish and Wildlife Service, DCR-DNH and other agencies and organizations on the recovery, protection or conservation of listed threatened or endangered species and designated plant and insect species that are rare throughout their worldwide ranges. In those instances where recovery plans, developed by the U.S. Fish and Wildlife Service, are available, adherence to the order and tasks outlines in the plans are followed to the extent possible.

2(b) Findings. DCR-DNH has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined in the maps of the Draft Plan/EIS (see map of Manassas NBP, page 67). According to the information in DCR-DNH files, natural heritage resources are documented in the project area. However, due to the scope of proposed activities and the distance to the resources, DCR does not anticipate that the RPMP will adversely affect natural heritage resources.

Under a Memorandum of Agreement established between DCR and VDACS, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The proposed activities will not affect any documented state-listed plants or insects. 2

2(c) Natural Area Preserves. According to DCR, there are no state Natural Area Preserves under DCR's jurisdiction in the project vicinity.

2(d) Additional Information. DCR's Biotics Data System is continually updated with new information. Accordingly, DCR should be contacted if a significant amount of time elapses before the foregoing information is used.

See "Regulatory and Coordination Needs," item 5, below for additional information and guidance.

3. Solid and Hazardous Waste Management. With regard to solid wastes, the Programmatic EA indicates that construction contracts will require that at least 50% of solid wastes are to be diverted away from landfill disposal, and that yard waste is to be recycled to the maximum extent practicable, for all alternatives (Programmatic EA, pages 3-60 to 3-61, sections 3.12.3.2 through 3.12.3.4). With regard to hazardous wastes, the Programmatic EA indicates that an Abbreviated Preliminary Assessment completed in 2011 identified areas of concern, including Former South Post Fort Myer Facilities, Salvage Metal Yard, and Old Warehouse Area. The conclusion of the assessment was that these sites pose "low potential threat to human health and the environment" (Programmatic EA, page 3-62, section 3.13.1.1). Additional discussion indicates that any of the alternatives may, because of cemetery activity expansion,

result in greater use of hazardous materials, but none to a significant extent (pages 3-62 through 3-65, sections 3.13.1.1. through 3.13.3.4).

3(a) Agency Jurisdiction. Solid and hazardous wastes in Virginia are regulated by the Virginia Department of Environmental Quality, the Virginia Waste Management Board (VWMB), and the U.S. Environmental Protection Agency. DEQ administers programs created by the federal Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response Compensation and Liability Act (CERCLA, commonly called Superfund), and the Virginia Waste Management Act (Virginia Code sections 10.1-1400 *et seq.*). DEQ administers regulations established by the VWMB and reviews permit applications for completeness and conformance with facility standards and financial assurance requirements. All Virginia localities are required, under the *Solid Waste Management Planning Regulations*, to identify the strategies they will follow on the management of their solid wastes to include items such as facility siting, long-term (20-year) use, and alternative programs such as materials recycling and composting.

3(b) Findings. DEQ's Division of Land Protection and Revitalization (DEQ-DLPR) has conducted a cursory search of its databases (see item 3(c), below) and made the following findings relative to waste sites within 500 feet of the project area or in the 22211 zip code.

3(b)(i) Solid Waste Sites. No solid waste sites were found.

3(b)(ii) VRP (Voluntary Remediation Program) Sites. No VRP sites were found.

3(b)(iii) Petroleum Release Sites. Multiple petroleum contamination (PC) events were identified on the ANC property and nearby Fort Myer. The proximity of the PC sites to the project work was not determined, but should be reviewed by the project engineer(s) for possible impacts on the project. 3

1) ID# 19921775 – Arlington National Cemetery, Building 103. Event Date: 3/5/2007. Status: Closed.
2) ID# 19940580 – Arlington National Cemetery, Building 107. Event Date: 3/5/2007. Status: Closed.
3) ID# 1990437 – Arlington National Cemetery, Building 102. Event Date: 3/20/2006. Status: Closed.
4) ID# 19940579 – Arlington National Cemetery, Building 113. Event Date: 3/20/2006. Status: Closed.
5) ID# 20073119 – Arlington National Cemetery, Columbarium Site. Event Date: 6/1/2007. Status: Closed.
6) ID# 19930065 – Fort Myer, Building 305, Tank 24, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed.

7) ID# 19920578 – Fort Myer, Building 323, Tank 30, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed.
8) ID# 19930673 – Fort Myer, Building 305, Tank 24, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed.

DEQ-DLPR notes that DEQ's PC case files with the PC Case Numbers, within a defined radius of the proposed project(s), can be identified. These petroleum releases should be evaluated by the project engineer or manager to establish:

- the exact location of the release;
- the nature and extent of the petroleum release; and
- the potential to affect the proposed project.

The facility representative should contact DEQ's Northern Virginia Regional Office (Tanks Program) for further information and the administrative records of the PC cases which are in close proximity to any proposed projects. See "Regulatory and Coordination Needs," item 6, below.

3(b)(iv) FUD (Formerly Used Defense) Sites. No FUD sites were found.

3(b)(v) CERCLA/FFR (Comprehensive Environmental Response, Compensation, and Liability Act/Federal Facilities Restoration) Sites. One site was found:

VA8210020626 – Fort Myer, 204 Lee Avenue, Fort Myer, VA 22211. Status: Not NPL. 3 cont.

3(b)(vi) RCRA/HW (Resource Conservation and Recovery Act/Hazardous Waste) Sites. Three RCRA/HW sites were identified in zip code 22211. The report author or project engineer should access this information on the DEQ website at

http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/ReportsPublications/OriginalReports.aspx, and click on the Hazardous Waste Facilities link. Search by zip code 22211.

1) VA8210020626 – Department of the Army HQ, Joint Base Myer-Henderson Hall, Lee Avenue, Fort Myer, VA 22211. Contact: James Stratton at 703-696-2013.
2) VAR000000786 – DOD Federal Office Bldg #2, Columbia Pike & Old Ridge, Arlington, VA 22211. Contact: Stephen P. Best at 703-692-4114.
3) VA6210020032 – U.S. Arlington National Cemetery, Arlington, VA 22211. Contact: Joseph Bunton at 703-697-4915.

3(c) Additional Information. DEQ's Virginia Geographical Information Systems (VEGIS) database can be accessed at the following web address:

http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx. Through VEGIS's search options, one can identify, by address or zip code, the Solid Waste sites, VRP sites, and Petroleum Release sites in the area of the proposed project.

3(d) General Guidance on Waste Management. Any soil that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations (see "Regulatory and Coordination Needs," item 6(b), below).

3(d)(i) Demolition of Older Structures. If an older structure will be demolished as part of the project, the structure should be checked for asbestos-containing materials (ACM) and lead-based paints (LBP). Additional rules apply if ACM or LBP are found; see "Regulatory and Coordination Needs," item 6, below. 3 cont.

3(d)(ii) Pollution Prevention. DEQ encourages the Army to implement pollution prevention principles in its construction activities. These include reduction of wastes at the source, re-use of materials, and recycling of all solid wastes generated. Hazardous wastes should be minimized.

3(e) Additional Comment. DEQ's Northern Regional Office indicates that any of the three action alternatives will result in slight increases in waste amounts generated by the Cemetery.

4. Historic Structures and Archaeological Resources. The Programmatic EA lists a number of archaeological sites, and sites potentially eligible for listing on the National Register, on pages 3-30 through 3-32 (section 3.7.2). It does the same for structures (pages 3-33 to 3-34, sections 3.7.3.1 to 3.7.33), and analyzes impacts of the alternatives (pages 3-35 to 3-37, section 3.7.6.2).

4(a) Agency Jurisdiction. The Department of Historic Resources (DHR) conducts reviews of projects to determine their effect on historic structures or cultural resources under its jurisdiction. DHR, as the designated State's Historic Preservation Office, ensures that federal actions comply with Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, and its implementing regulation at 36 CFR Part 800. The NHPA requires federal agencies to consider the effects of federal projects on properties that are listed or eligible for listing on the National Register of Historic Places. Section 106 also applies if there are any federal involvements, such as licenses, permits, approvals or funding.

4(b) Comments. DHR has been in consultation with the Army concerning this project. DHR asks that the Army continue to consult directly with DHR as necessary, pursuant to section 106 of the NHPA and its implementing regulations (cited above, item 4(a)). See "Regulatory and Coordination Needs," item 2, below. 4

5. Forest Resources. According to the Programmatic EA, the Arlington Cemetery occupies 624 acres of landscaped, developed land, including 562 acres of turf around

the memorials and headstones. The Cemetery has approximately 8,400 trees, some of which are at least 200 years old; there are 300 varieties, including three state champion trees (largest specimens of their respective species in Virginia): the pin oak, the empress, and the yellowwood (Programmatic EA, page 3-26, section 3.6.1). All of the alternatives would follow the Cemetery Design Guide and reduce impervious surfaces as compared with the no-action alternative (Programmatic EA, page 3-7, sections 3.1.3.2 through 3.1.3.4).

5(a) Agency Jurisdiction. The mission of the Department of Forestry (DOF) is to protect and develop healthy, sustainable forest resources for Virginians. DOF was established in 1914 to prevent and suppress forest fires and re-forest bare lands. Since the Department's inception, it has grown and evolved to encompass other protection and management duties including: protecting Virginia's forests from wildfire, protecting Virginia's waters, managing and conserving Virginia's forests, managing state-owned lands and nurseries, and managing regulated incentive programs for forest landowners.

5(b) Comments: Alternative 3. The Department of Forestry notes that Alternative 3 requires realignment of Virginia roads; however, due to its urban nature, the project area is not heavily forested. DOF recommends, however, that any tree removal affecting the Foxcroft Heights Park be mitigated as much as possible.

5(c) Comments: No-Action Alternative. The No-action alternative would require removal of most of the trees in the future Millennium Project site. It appears from the project narrative that this would not be the case under any of the "Build" alternatives; accordingly, DOF would prefer any of the "Build" alternatives to no action. 5

5(d) Retaining Old Trees. DOF supports the Army's plan to place a priority on retaining the old trees (more than 200 years old) on the site. In particular, DOF requests that special attention be given to protecting the root structure or any other environmental variable that could jeopardize the health of the three state champion trees that are present in the Cemetery. These are the pin oak, the empress, and the yellowwood.

6. Drinking Water. The Programmatic EA does not appear to address drinking water as such. However, it indicates that the Potomac River is considered to have impaired water quality for fishing; the River is considered good for navigation, and not assessed for recreation (page 3-21, section 3.6.1.4).

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6(a) Agency Jurisdiction. The Virginia Department of Health (VDH), Office of Drinking Water (ODW) reviews projects for the potential to impact public drinking water sources (groundwater wells and surface water intakes).

6(b) Findings. VDH reviewed the RPMP for proximity of its activities to public drinking water sources (groundwater wells, springs, and surface water intakes). VDH found the following:

- There are no groundwater wells within a 1-mile radius of the project site.
- No surface water intakes are located within a 5-mile radius of the project site.
- The project is not within Zone 1 (up to 5 miles into the watershed) or Zone 2 (greater than 5 miles into the watershed) of any public surface water source.

6 cont.

6(c) Conclusion. The project is not likely to give rise to impacts to public drinking water, according to VDH.

6(d) Requirement. Potential impacts to public water distribution systems or sanitary sewage collection systems must be verified by the local utility.

7. Wildlife Resources. According to the Programmatic EA, wildlife species in and around the Cemetery consist of animals adapted to an urban environment, including squirrels, chipmunks, rabbits, raccoons, garter snakes, and songbirds. Bald eagles, listed by the Commonwealth as threatened, may pass over the Cemetery. However, the Cemetery is outside the Potomac River Bald Eagle Summer and Winter Concentration Areas (Programmatic EA, page 3-27, section 3.6.1.2). Alternative 1 would reduce vegetation because of construction of the committal service queuing area, but new compatible plantings would result in a net increase in vegetation, and new habitat for native wildlife. Alternative 2 would result in increased landscaping and vegetation in the Southgate Road and Patton Drive areas. Alternative 3 would add grass cover in the areas between the existing Cemetery boundary and the realigned Columbia Pike (Programmatic EA, pages 3-28 and 3-29, sections 3.6.3.2 through 3.6.3.4).

7(a) Agency Jurisdiction. The Department of Game and Inland Fisheries (DGIF), as the Commonwealth's wildlife and freshwater fish management agency, exercises enforcement and regulatory jurisdiction over wildlife and freshwater fish, including state- or federally-listed endangered or threatened species, but excluding listed insects (Virginia Code Title 29.1). DGIF is a consulting agency under the U.S. Fish and Wildlife Coordination Act (16 U.S.C. sections 661 *et seq.*) and provides environmental analysis of projects or permit applications coordinated through DEQ and several other state and federal agencies. DGIF determines likely impacts upon fish and wildlife resources and habitat, and recommends appropriate measures to avoid, reduce, or compensate for those impacts. For more information, see the DGIF website at *www.dgif.virginia.gov*.

7(b) Findings. DGIF records indicate that bald eagles and the Potomac River Anadromous Fish Use Area have been documented in the project area. DGIF has not identified any project in the plan that appears likely to result in adverse impacts upon bald eagles or anadromous fish resources. The project area is located within two miles of a documented occurrence of a listed natural heritage resource species, i.e., one that is listed by the state or federal government as threatened or endangered (see "Regulatory and Coordination Needs," item 5, below).

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7(c) Recommendations by DGIF.

7(c)(i) Minimizing Impacts from Development Activities. To minimize overall impacts to wildlife and natural resources, DGIF recommends that the Army do the following:

- Avoid impacts, or minimize them as much as possible, to undisturbed forest, wetlands, and streams. This may include relocating stream channels as opposed to filling or channelizing; using, and incorporating in the development plan, a natural stream channel design and wooded buffers.
- Maintain undisturbed, naturally vegetated buffers of at least 100 feet in width around all on-site wetlands and on both sides of all perennial and intermittent streams.
- Maintain wooded lots to the fullest extent possible.

DGIF does **not** support the following:

- Proposals to mitigate wetland impacts through the construction of stormwater management ponds;
- Creation of in-stream stormwater management ponds.

See item 7(d), below.

7(c)(ii)Designing Stormwater Controls. DGIF recommends that stormwater controls be designed to replicate and maintain the hydrographic condition of the site prior to the change in landscape. This should include, but not be limited to, utilizing bio-retention areas and minimizing the use of curb and gutter in favor of grassed swales. Bio-retention areas (also called rain gardens) and grassed swales are components of "Low-Impact Development" (LID). They are designed to capture stormwater runoff as close to the source as possible, and allow it to slowly infiltrate into the surrounding soil. Rain gardens benefit natural resources by filtering pollutants and reducing downstream runoff volumes. 7 cont.

7(c)(iii) Time-of-Year Restriction on Tree Clearing and Ground Clearing. All tree removal and ground clearing should adhere to a time-of-year restriction protective of resident and migratory songbird nesting from March 15 through August 15 of any year. That is, these activities should **not** take place during that time period.

7(d) Assistance and Coordination. DGIF is willing to assist the Army in developing a plan that includes open space, wildlife habitat, and natural stream channels which retain their wooded buffers (see item 7(c)(i), above). See "Regulatory and Coordination Needs," item 5(b), below.

7(e) Additional Information. The Virginia Department of Game and Inland Fisheries **(DGIF) maintains a database of wildlife locations, including threatened and endangered** species, trout streams, and anadromous fish waters that may contain

information not documented in this letter. The DGIF database may be accessed from http://vafwis.org/fwis/. 7 cont.

8. Regional and Local Comments.

8(a) Jurisdiction: Planning District Commissions. In accordance with Virginia Code section 15.2-4207, planning district commissions encourage and facilitate local government cooperation and state-local cooperation in addressing, on a regional basis, problems of greater than local significance. This cooperation is intended to facilitate the recognition and analysis of regional opportunities and take account of regional influences in planning and implementing public policies and services. Planning district commissions promote the orderly and efficient development of the physical, social, and economic elements of the districts by planning, and encouraging and assisting localities to plan, for the future.

8(b) Northern Virginia Regional Commission. The Northern Virginia Regional Commission did not respond to DEQ's request for comments on the proposed action.

FEDERAL CONSISTENCY UNDER THE COASTAL ZONE MANAGEMENT ACT

Pursuant to the Coastal Zone Management Act of 1972, as amended, federal activities located inside or outside of Virginia's designated coastal management area that can have reasonably foreseeable effects on coastal resources or coastal uses must, to the maximum extent practicable, be implemented in a manner consistent with the Virginia Coastal Zone Management Program (VCP). The VCP consists of a network of programs administered by several state agencies. In order to be consistent with the VCP, the project activities must be consistent with the enforceable policies of the VCP and all the applicable permits and approvals listed under the enforceable policies of the VCP must be obtained prior to commencing the project. DEQ coordinates the review of FCDs with agencies administering the enforceable and advisory policies of the VCP.

Public Participation

In accordance with 15 CFR §930.2, a public notice of this proposed action was published on the DEQ website from August 20, 2013 to September 25, 2013. No public comments were received in response to the notice.

Federal Consistency Concurrence

Based on our review of the federal consistency determination and the comments submitted by agencies administering the applicable enforceable policies of the VCP, DEQ concurs that the proposal is consistent with the VCP, provided any applicable permits and approvals are obtained as described below. However, other state approvals which may apply to this project are not included in this consistency concurrence. Therefore, the Coast Guard must ensure that this event is conducted in accordance with all applicable federal, state, and local laws and regulations. 8

Analysis of Enforceable Policies

The state agencies responsible for the administration of the enforceable policies of the VCP that may apply to the proposed event generally agree with the Army's determination that the actions contemplated in the RPMP will not affect enforceable policies of the VCP (FCD, page B-3). The Army must ensure that the activities contemplated in the RPMP are consistent with the enforceable policies.

The FCD (appendix B of the EA/RPMP document) indicates that the following enforceable policies are not affected by, and do not affect, the activities contemplated in the RPMP (page B-3):

- Fisheries Management,
- Dunes Management, and
- Shoreline Sanitation.

The analysis which follows responds to the discussion in the FCD of the enforceable policies of the VCP that apply, or may apply, to the proposed action.

1. Subaqueous Lands Management. According to the FCD, there are no subaqueous lands within the boundaries of the Cemetery, and therefore construction activities would not directly affect such lands (page B-2).

1(a) Agency Jurisdiction. The Virginia Marine Resources Commission (VMRC) has jurisdiction over any encroachments in, on, or over the beds of the bays, ocean, rivers, streams, or creeks which are the property of the Commonwealth (Virginia Code sections 28.2-1200 *et seq.*). Accordingly, if any part of the activities contemplated in the RPMP involve any encroachment channelward of ordinary high water along natural rivers and streams above the fall line, or mean low water below the fall line, a permit may be required from VMRC. VMRC generally requires permits along non-tidal waterways if the drainage area is greater than 5 square miles. See "Regulatory and Coordination Needs," item 2, below.

The VMRC serves as the clearinghouse for the Joint Permit Application (JPA) used by the:

- VMRC for encroachments on or over state-owned subaqueous beds as well as tidal wetlands;
- U.S. Army Corps of Engineers (Corps) for issuing permits pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act;
- DEQ for issuance of a Virginia Water Protection Permit; and
- Local wetlands board for impacts to wetlands.

1(b) Findings. According to VMRC, no jurisdictional waterways will be affected by the activities contemplated in the RPMP, and no authorization will be required from the Commission.

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1(c) Conclusion. VMRC did not disagree with the statement in the FCD that the proposed action (RPMP implementation) would not directly affect subaqueous lands.

2. Air Pollution Control. According to the FCD, the Washington region, home of the Cemetery, is a non-attainment area for ground-level ozone (O_3) and particulate matter ($PM_{2.5}$) and is a maintenance area for carbon monoxide (CO). Accordingly, the proposed action must conform to the State Implementation Plans for ozone, particulate matter, and carbon monoxide.

2(a) Agency Jurisdiction. DEQ is charged with carrying out mandates of the State Air Pollution Control Law (Virginia Code sections 10.1-1300 *et seq.*) and the *Regulations for the Control and Abatement of Air Pollution* as well as Virginia's obligations under the federal Clean Air Act, as amended in 1990. The objective is to protect and enhance public health and quality of life through control and mitigation of air pollution. DEQ's Division of Air Program Coordination and its Regional Offices ensure the safety and quality of air in Virginia by monitoring and analyzing air quality data, regulating sources of air pollution, and working with local, state and federal agencies to plan and implement strategies to protect Virginia's air quality. DEQ's Northern Regional Office is directly responsible for the issuance of necessary permits to construct and operate all stationary sources, as well as monitoring emissions from these sources for compliance, in the Northern Virginia region (which includes Arlington).

2(b) Findings. According to DEQ's Division of Air Program Coordination (DEQ-DAPC), the Cemetery is in an ozone non-attainment and emission control area for oxides of nitrogen (NO_x) and volatile organic compounds (VOCs).

2(c) Comments. DEQ-DAPC recommends that all precautions are necessary to restrict the emissions of VOCs and NO_x) in carrying out the proposed action.

2(d) Requirements. One or more of the following requirements may apply to activities contemplated in the RPMP. Questions regarding these requirements may be directed to DEQ's Northern Regional Office (see "Regulatory and Coordination Needs," item 4, below).

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(i) Fugitive Dust

During construction, fugitive dust must be kept to a minimum by using control methods outlined in 9 VAC 5-50-60 *et seq.* of the *Regulations for the Control and Abatement of Air Pollution*. These precautions include, but are not limited to, the following:

- Use, where possible, of water or chemicals for dust control;

- Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
- Covering of open equipment for conveying materials; and
- Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion.

(ii) Open Burning

If project activities include the open burning or use of special incineration devices for the disposal of demolition material, this activity must meet the requirements of 9 VAC 5-130 of the *Regulations* for open burning, and it may require a permit. The *Regulations* provide for, but do not require, the local adoption of a model ordinance concerning open burning. Norfolk and Portsmouth officials should be contacted to determine what local requirements, if any, exist.

10 cont.

(iii) Fuel-Burning Equipment

The installation of fuel burning equipment (e.g., boilers, generators, compressors, or any other air pollution emitting equipment), may require permitting from DEQ prior to beginning construction of the facility (9 VAC 5-80, Article 6, Permits for New and Modified Sources). The project proponent should contact DEQ-NRO for guidance on whether this provision applies.

(iv) Asphalt Paving

In accordance with 9 VAC 5-40-5490, there are limitations on the use of "cut-back" (liquefied asphalt cement, blended with petroleum solvents) that may apply to paving activities associated with the project. The asphalt must be "emulsified" (predominantly cement and water with a small amount of emulsifying agent) except when specified circumstances apply. Moreover, there are time-of-year restrictions on its use during the months of April through October in VOC emission control areas.

2(e) Conclusions. DEQ-DAPC did not disagree with the Army's statements in the FCD.

3. Non-point Source Pollution Control. According to the FCD, soils would be disturbed during construction activities contemplated in the RPMP (proposed action), and the proposed action would result in as much as an 8% increase in the size of the cemetery requiring maintenance (pages B-2, B-3).

3(a) Agency Jurisdiction. The Department of Environmental Quality (DEQ) administers the Virginia Erosion and Sediment Control Law (Virginia Code sections 62.1-44.15:51 *et seq.*), the *Virginia Erosion and Sediment Control Regulations*, the Virginia Stormwater Management Law (Virginia Code sections 62.1-44.15:24 *et seq.*), and the *Virginia Stormwater Management Regulations*.

3(b) Erosion and Sediment Control Plans; Stormwater Management Plans. The Army and its authorized agents conducting regulated land-disturbing activities on private and public lands in the state must comply with the above Erosion and Sediment Control Law and Regulations and the Stormwater Management Regulations, including coverage under the general permit for stormwater discharge from construction activities (see item 3(c), next), and other applicable federal non-point source pollution mandates (e.g., section 313 of the federal Clean Water Act and federal consistency under the Coastal Zone Management Act). Clearing and grading activities, installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, soil stockpiles, and related land-disturbing activities that result in the total land disturbance of equal to or greater than 10,000 square feet (2,500 square feet in Chesapeake Bay Preservation Areas) are regulated under the Erosion and Sediment Control Law and Regulations. Accordingly, the Army must prepare and implement an erosion and sediment control (ESC) plan to ensure compliance with state law and regulations. The ESC plan is submitted to DEQ's Northern Regional Office for review for compliance (see "Regulatory and Coordination Needs," item 1, below). The Army is ultimately responsible for achieving project compliance through oversight of on-site contractors, regular field inspection, prompt action against non-compliant sites, and other mechanisms consistent with agency policy.

3(c) General Permit for Stormwater Discharges from Construction Activities. DEQ is responsible for the issuance, denial, revocation, termination, and enforcement of the Virginia Stormwater Management Program (VSMP) General Permit for Stormwater Discharges from Construction Activities related to municipal separate storm sewer systems (MS4s) and construction activities for the control of stormwater discharges from MS4s and land disturbing activities under the Virginia Stormwater Management Program. The owner or operator of projects involving land-disturbing activities of equal to or greater than 1 acre (2,500 square feet or more in a Chesapeake Bay Preservation Area) is required to register for coverage under the General Permit for Discharges of Stormwater from Construction Activities and develop a project-specific Stormwater Pollution Prevention Plan (SWPPP). Construction activities requiring registration also include land disturbance of less than one acre of total land area that is part of a larger common plan of development or sale if the larger common plan of development will collectively disturb equal to or greater than one acre (or 2,500 square feet or more in a Chesapeake Bay Preservation Area). The SWPPP must be prepared prior to submission of the registration statement for coverage under the general permit; it must address water quality and quantity in accordance with the *VSMP Permit Regulations* (4 VAC 50 *et seq*. General information and registration forms for the General Permit are available at: http://www.deq.virginia.gov/Programs/Water/StormwaterManagement/VSMPPermits/ConstructionGeneralPermit.aspx. 11

3(d) Conclusions. DEQ's Water Division did not disagree with the findings in the FCD relative to non-point source pollution control.

4. Coastal Lands Management. According to the Programmatic EA (page 3-24, section 3.5.1.11) and FCD (page B-3 of the Programmatic EA), Arlington County is designated as a Chesapeake Bay Protection Area. The County has designated Resource Protection Areas (RPAs) in its Chesapeake Bay Preservation Ordinance, section 61-5 (see item 4(c), below). The Programmatic EA lists these and indicates that based on County mapping, there are no designated RPAs within the Cemetery boundaries (page 3-24).

4(a) Agency Jurisdiction. The Department of Environmental Quality administers the Chesapeake Bay Preservation Act (Virginia Code sections 62.1-44.15:67 *et seq.*) and the *Chesapeake Bay Preservation Area Designation and Management Regulations* (4 VAC 50-90-10 *et seq.*).

4(b) Applicability. Based on information provided in of the Programmatic EA (page 3-24), the project area includes lands analogous to locally-designated Chesapeake Bay Preservation Area (CBPA) lands, but does not include any locally-designated RPA lands. The proposed project must adhere to the general performance criteria, 4 VAC 50-90-130 of the *Regulations*, especially with respect to minimizing land disturbance, retaining indigenous vegetation, and minimizing impervious surfaces. Land-disturbing activities that exceed an area of 2,500 square feet must comply with the requirements of the local erosion and sediment control ordinance.

4(c) Local Implementation. In Arlington County, the areas protected by the Chesapeake Bay Preservation Act, as locally implemented, require conformance with performance criteria. These areas include Resource Protection Areas (RPAs) and Resource Management Areas (RMAs) as designated by the local government. RPAs include tidal wetlands, certain non-tidal wetlands and tidal shores. RPAs also include a 100-foot vegetated buffer area located adjacent to and landward of these features and along both sides of any water body with perennial flow. RMAs, which require less stringent performance criteria, include those areas of the County not included in the RPAs.

4(d) Chesapeake Ecosystem Unified Plan; Chesapeake 2000 Agreement.

4(d)(i) Chesapeake Ecosystem Unified Plan. The 1998 *Federal Agencies' Chesapeake Ecosystem Unified Plan* requires the signatories to fully cooperate with local and state governments in carrying out voluntary and mandatory actions to comply with the management of stormwater. The signatories also committed to encouraging construction design that minimizes natural area loss on new and rehabilitated federal facilities, adopts low impact development and best management technologies for stormwater and erosion and sediment control, and reduces impervious surfaces.

4(d)(ii) Chesapeake 2000 Agreement. The *Chesapeake 2000 Agreement* committed the government agencies to a number of sound land use and stormwater quality controls. The signatories additionally committed the agencies to lead by example with respect to controlling nutrient, sediment and chemical contaminant runoff from

government properties. In December 2001, the Executive Council of the Chesapeake Bay Program issued *Directive No. 01-1: Managing Storm Water on State, Federal and District-owned Lands and Facilities*, which includes specific commitments for the signatories to lead by example with respect to stormwater control.

4(c) Conclusions. Provided that the project is implemented in a manner that is consistent with the Chesapeake Bay Preservation Act and its implementing regulations, DEQ's Water Division finds that the proposed action would be consistent with the Coastal Lands Management enforceable policy of the VCP. 12

5. Wetlands Management. According to the FCD, there are no known wetlands in areas that would be affected by the proposed action (page B-2).

5(a) Agency Jurisdiction. The State Water Control Board (SWCB) promulgates Virginia's water regulations, covering a variety of permits to include Virginia Pollutant Discharge Elimination System Permit, Virginia Pollution Abatement Permit, Surface and Groundwater Withdrawal Permit, and the Virginia Water Protection Permit (VWPP). The VWPP is a state permit which governs wetlands, surface water, and surface water withdrawals/impoundments. It also serves as § 401 certification of the federal *Clean Water Act* § 404 permits for dredge and fill activities in waters of the U.S. The VWPP Program is administered by the Office of Wetlands and Stream Protection (OWSP), within the DEQ Division of Water Quality Programs.

5(b) Comments. DEQ's Northern Regional Office (DEQ-NRO) states that the most recent assessment of the project site showed wetlands to be present. Any activities in wetlands will require a Joint Permit Application (JPA) and review by appropriate agencies including DEQ-NRO. See item 1(a), above and "Regulatory and Coordination Needs," item 7, below. 13

5(c) Conclusion. DEQ-NRO indicates that wetlands are present in the project area.

6. Point Source Pollution Control. The FCD indicates that a Virginia Pollutant Discharge Elimination System (VPDES) permit is not required for the proposed action (page B-2).

6(a) Agency Jurisdiction. See item 5(a), above.

6(b) Comments. DEQ-NRO states that the project manager should follow all applicable regulations.

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6(c) Conclusions. DEQ-NRO did not disagree with the statement in the FCD that a VPDES permit is not required for the proposed action (FCD, page B-3).

7. Local and Regional Comments.

7(a) Federal Consistency Jurisdiction. In accordance with 15 CFR 930, Sub-part A, § 930.6(b) of the *Federal Consistency Regulations*, DEQ, on behalf of the state, is responsible for securing necessary review and comment from other state agencies, the public, regional government agencies, and local government agencies, in determining the Commonwealth's concurrence or objection to a federal consistency determination or certification.

7(b) Northern Virginia Regional Commission. The Northern Virginia Regional Commission did not respond to DEQ's request for comments on the proposed action.

7(c) Arlington County. Arlington County did not respond to DEQ's request for comments on the proposed action.

REGULATORY AND COORDINATION NEEDS

1. Non-point Source Pollution Control Enforceable Policy.

1(a) Coordination. For assistance with regard to erosion and sediment control plans, stormwater management plans, or stormwater management general permits for construction activities, the Army may contact the following:

- Erosion and Sediment Control Plans: DEQ's Water Division (Larry Gavan, telephone (804) 698-4040 or e-mail larry.gavan@deq.virginia.gov);
- Stormwater Management Plans: DEQ's Water Division (Holly Sepety, telephone (804) 698-4039 or e-mail holly.sepety@deq.virginia.gov);
- Stormwater General Permit for Construction Activities: (Holly Sepety, telephone (804) 698-4039 or e-mail holly.sepety@deq.virginia.gov).

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1(b) Authorities. Legal and regulatory authorities for the above programs include, but are not limited to, the following:

- Erosion and sediment control: Virginia Code sections 62.1-44.15:51 *et seq.* and
- Stormwater management: Virginia Code sections 62.1-44.15:24 *et seq.*

2. Subaqueous Lands Management.

2(a) Coordination. Questions about the permitting requirements of the Virginia Marine Resources Commission may be directed to the Commission (Jordan Creed, telephone (757) 247-2200). Copies of the Joint Permit Application may be obtained from the Commission (telephone (757) 247-2200).

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2(b) Authorities. As indicated above ("Federal Consistency..," "Analysis of Enforceable Policies," item 1(a)), the subaqueous lands permitting requirement stems from Virginia Code sections 28.2-1200 *et seq.*

3. Historic Structures and Archaeological Resources.

3(a) Coordination. As indicated above ("Environmental Impacts and Mitigation," item 4(b)), the Department of Historic Resources requests that the Army continue the consultation begun with the Department concerning the RPMP.

3(b) Authorities. Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations at 36 CFR Part 800, require federal agencies to consult with appropriate State Historic Preservation Offices regarding the impacts of their undertakings on historic resources. 17

4. Air Pollution Control Enforceable Policy.

4(a) Coordination. As indicated above ("Federal Consistency...," "Analysis of Enforceable Policies," item 2(d)), the Army should consult with DEQ's Northern Regional Office (James LaFratta, telephone (703) 583-3928) in regard to the applicability of air pollution control permits or other matters pertaining to regulation of air pollution.

4(b) Authorities. Provisions of the *Regulations for the Control and Abatement of Air Pollution* which may apply to activities contemplated in the RPMP include, but are not limited to, the following: 18

- Open burning: 9 VAC 5-130 *et seq.*
- Fugitive dust control: 9 VAC 5-50-60 *et seq.*
- Asphalt paving: 9 VAC 5-40-5490
- Permitting of fuel-burning equipment: 9 VAC 5-80-1100 *et seq.*

5. Natural Heritage and Wildlife Resources.

5(a) Coordination. The Army should contact the Department of Conservation and Recreation's Division of Natural Heritage (Rene' Hypes, telephone (804) 371-2708) if a significant amount of time passes before the natural heritage information presented above ("Environmental Impacts and Mitigation," item 2(d)) is used.

In the event any project under the RPMP appears likely to affect either bald eagle habitat or the Potomac River and its tributaries, the Army should coordinate with the Department of Game and Inland Fisheries (begin with Amy Ewing, telephone (804) 367-2211 or e-mail amy.ewing@dgif.virginia.gov) and the U.S. Fish and Wildlife Service's Virginia field office (begin with Cindy Schultz, telephone (804) 693-6694). 19

5(b) Additional Information and Guidance. For additional information on DGIF's database of wildlife locations and related information contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov).

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Updated information on natural heritage resources should be requested from DCR's Division of Natural Heritage (Rene' Hypes, telephone (804) 371-2708) if a significant amount of time elapses before the natural heritage information above ("Environmental Impacts and Mitigation," item 2) is used.

As indicated above ("Environmental Impacts and Mitigation," item 7(d)), DGIF is willing to assist the Army in developing a plan that includes open space, wildlife habitat, and natural stream channels which retain their wooded buffers. To pursue this assistance, please feel free to contact DGIF (begin with Amy Ewing, telephone (804) 367-2211 or e-mail amy.ewing@dgif.virginia.gov). 19 cont.

5(c) Authorities. DCR's responsibility for natural heritage resources stems from Virginia Code sections 10.1-209 through 10.1-217.

DGIF's regulatory authority for protection and management of endangered and threatened species stems from Virginia Code sections 29.1-563 through 29.1-570.

6. Solid and Hazardous Waste Management.

6(a) Coordination.

6(a)(i) Petroleum Contamination. For additional information and the administrative records of petroleum contamination cases which are in close proximity to proposed projects, the Army may contact DEQ's Northern Regional Office (DEQ-NRO) (Tanks Program, telephone (703) 583-3800.

6(a)(ii) Asbestos-Containing Materials; Lead-based Paints. Questions on these topics may be directed to DEQ-NRO (Kathryn Persyzk, telephone (703) 583-3856 or e-mail kathryn.persyzk@deq.virginia.gov).

6(a)(iii) General Questions. General questions concerning waste management may be directed to DEQ's Division of Land Protection and Revitalization (Steve Coe, telephone (804) 698-4029 or e-mail steve.coe@deq.virginia.gov). 20

6(b) Authorities. Legal and regulatory authorities for waste management include, but are not limited to, the following:

Virginia:

- Virginia Waste Management Act, Virginia Code sections 10.1-1400 *et seq.*;
- *Virginia Hazardous Waste Management Regulations*, 9 VAC 20-60;
  - See 9 VAC 20-60-261 for rules on lead-based paints
- *Virginia Solid Waste Management Regulations*, 9 VAC 20-81;
  - See 9 VAC 20-81-620 for asbestos-containing materials
- *Virginia Regulations for the Transportation of Hazardous Materials*, 9 VAC 20-110.

Federal:

- Resource Conservation and Recovery Act, 42 U.S.C. sections 6901 *et seq.*
- Applicable provisions in Title 40, *Code of Federal Regulations*
- U.S. Department of Transportation *Rules for Transportation of Hazardous Materials*, 49 CFR Part 107.

20 cont.

7. Wetlands Management Enforceable Policy; Water Resources.

7(a) Coordination. Questions relating to water resource permitting may be directed to DEQ's Northern Regional Office (Bryant Thomas, telephone (703) 583-3843).

7(b) Authorities. The Virginia Water Protection Permit is required by Virginia Code sections 62.1-44.15:5D, which is implemented by regulations found in 9 VAC 25-210-10.

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Thank you for the opportunity to comment. If you have questions, please feel free to contact me (telephone (804) 698-4325 or e-mail ellie.irons@deq.virginia.gov) or Charles Ellis of this Office (telephone (804) 698-4195 or e-mail charles.ellis@deq.virginia.gov).

Sincerely,

Ellie L. Irons, Program Manager
Environmental Impact Review

ec: Amy M. Ewing, DGIF
Robbie D. Rhur, DCR
Keith R. Tignor, VDACS
Ezekiel Dufore, VDH-ODW
G. Stephen Coe, DEQ-DLPR
Kotur S. Narasimhan, DEQ-DAPC
Larry Gavan, DEQ-E&S
Daniel Moore, DEQ-CB
Daniel Burstein, DEQ-NRO
Roger W. Kirchen, DHR
Gregory Evans, DOF
Jordan Creed, VMRC
G. Mark Gibb, NVRC
Barbara Donnellan, Arlington County

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DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR PROGRAM COORDINATION

ENVIRONMENTAL REVIEW COMMENTS APPLICABLE TO AIR QUALITY

TO: Charles H. Ellis III **DEQ - OEIA PROJECT NUMBER: 13 – 155F**

PROJECT TYPE: ☐ STATE EA / EIR **X FEDERAL EA / EIS** ☐ SCC

X CONSISTENCY DETERMINATION

PROJECT TITLE: ARLINGTON NATIONAL CEMETERY REAL PROPERTY MASTER PLAN

PROJECT SPONSOR: DOD: ARMY: ARLINGTON NATIONAL CEMETERY

PROJECT LOCATION: **X OZONE NON ATTAINMENT AND EMISSION CONTROL AREA FOR NOX & VOC**

REGULATORY REQUIREMENTSMAY BE APPLICABLE TO: ☐ CONSTRUCTION ☐ OPERATION

STATE AIR POLLUTION CONTROL BOARD REGULATIONS THAT MAY APPLY:

1. ☐ 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 E – STAGE I
2. ☐ 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 F – STAGE II Vapor Recovery
3. **X 9 VAC 5-40-5490 et seq. – Asphalt Paving operations**
4. **X 9 VAC 5-130 et seq. – Open Burning**
5. **X 9 VAC 5-50-60 et seq. Fugitive Dust Emissions**
6. ☐ 9 VAC 5-50-130 et seq. - Odorous Emissions; Applicable to_____
7. ☐ 9 VAC 5-50-160 et seq. – Standards of Performance for Toxic Pollutants
8. ☐ 9 VAC 5-50-400 Subpart_____, Standards of Performance for New Stationary Sources, designates standards of performance for the_____
9. ☐ 9 VAC 5-80-1100 et seq. of the regulations – Permits for Stationary Sources
10. ☐ 9 VAC 5-80-1700 et seq. Of the regulations – Major or Modified Sources located in PSD areas. This rule may be applicable to the _____
11. ☐ 9 VAC 5-80-2000 et seq. of the regulations – New and modified sources located in non-attainment areas
12. ☐ 9 VAC 5-80-800 et seq. Of the regulations – Operating Permits and exemptions. This rule may be applicable to _____

COMMENTS SPECIFIC TO THE PROJECT:

All precautions are necessary to restrict the emissions of volatile organic compounds (VOC) and oxides of nitrogen (NO_X).

K. S. Narasimhan

(Kotur S. Narasimhan)
Office of Air Data Analysis **DATE: August 23, 2013**

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

MEMORANDUM

TO: Charles Ellis, Environmental Program Planner

FROM: Steve Coe, Division of Land Protection & Revitalization Review Coordinator

DATE: September 24, 2013

COPIES: Sanjay Thirunagari, Division of Land Protection & Revitalization Review Manager; EIR file

SUBJECT: Environmental Impact Statement: Project #13-155F. Arlington National Cemetery Real Property Master Plan, Arlington, VA 22211. DOD/Army

The Division of Land Protection & Revitalization (DLPR) has completed its review of the Environmental Review Request for the Arlington National Cemetery (ANC) Real Property Master Plan, Arlington, VA 22211.

The project scope: planned development to increase burial space at the ANC. The project would include new construction and reconfiguration of an existing structure at ANC, as well as development of the former Navy Annex site.

Solid and hazardous waste issues were generally addressed in the submittal. DLPR staff has reviewed the submittal, conducted a cursory search of its waste databases, and has the following comments concerning possible waste issues associated with this proposed program:

DEQ's Virginia Geographical Information Systems (VEGIS) database can be accessed at the following web address: http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx. Through VEGIS's search options, you can identify by address or zip code the Solid Waste sites, VRP sites, and Petroleum Release sites in the area of the proposed project. Within the 22211 zip code or within 500 feet of the project site(s):

Solid waste sites – none

VRP sites – none

Petroleum release sites – Multiple petroleum contamination (PC) events were identified on the ANC property and nearby Fort Myer. The proximity of the PC sites to the project work was not determined, but should be reviewed by the project engineer(s) for possible impacts on the project.

1) ID# 19921775 – Arlington National Cemetery, Building 103. Event Date: 3/5/2007. Status: Closed.
2) ID# 19940580 – Arlington National Cemetery, Building107. Event Date: 3/5/2007. Status: Closed.
3) ID# 1990437 – Arlington National Cemetery, Building 102. Event Date: 3/20/2006. Status: Closed.
4) ID# 19940579 – Arlington National Cemetery, Building 113. Event Date: 3/20/2006. Status: Closed.
5) ID# 20073119 – Arlington National Cemetery, Columbarium Site. Event Date: 6/1/2007. Status: Closed.
6) ID# 19930065 – Fort Myer, Building 305, Tank 24, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed.
7) ID# 19920578 – Fort Myer, Building 323, Tank 30, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed.
8) ID# 19930673 – Fort Myer, Building 305, Tank 24, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed.

Please note that the DEQ's PC case files with the PC Case Nos., within a defined radius of the proposed project(s), can be identified and these petroleum releases should be evaluated by the project engineer or manager to establish the exact location of the release and the nature and extent of the petroleum release and the potential to impact the proposed project. The facility representative should contact the DEQ's Northern Virginia Regional Office (Tanks Program) for further information and the administrative records of the PC cases which are in close proximity to any proposed projects.

FUD sites – none

CERCLA/FFR sites – one

VA8210020626 – Fort Myer, 204 Lee Avenue, Fort Myer, VA 22211. Status: Not NPL.

RCRA/HW sites – 3 identified in zip code 22211. The report author or project engineer should access this information on the DEQ website at http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/ReportsPublications/OriginalReports.aspx, and clicking on the Hazardous Waste Facilities link. Search by zip code 22211.

1) VA8210020626 – Department of the Army HQ, Joint Base Myer-Henderson Hall, Lee Avenue, Fort Myer, VA 22211. Contact: James Stratton at 703-696-2013.
2) VAR000000786 – DOD Federal Office Bldg #2, Columbia Pike & Old Ridge, Arlington, VA 22211. Contact: Stephen P. Best at 703-692-4114.
3) VA6210020032 – U.S. Arlington National Cemetery, Arlington, VA 22211. Contact: Joseph Bunton at 703-697-4915.

With any demolition or construction project, it is anticipated that there will be a waste stream that must be managed properly. Waste management guidance is provided in the General Comments section below.

GENERAL COMMENTS

Any soil that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable Federal, State, and local laws and regulations. Some of the applicable state laws and regulations are: Virginia Waste Management Act, Code of Virginia Section 10.1-1400 et seq.;

Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20-60); Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-81); and Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110). Some of the applicable Federal laws and regulations are: the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901 et seq., the applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U.S. Department of Transportation Rules for Transportation of Hazardous materials, 49 CFR Parts 107.

Also, if an older structure will be demolished as part of this project, the structure should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP). If they are found, in addition to the federal waste-related regulations mentioned above, State regulations 9VAC 20-81-620 for ACM and 9VAC 20-60-261 for LBP must be followed. Questions may be directed to Kathryn Persyzk at DEQ's Northern Virginia office at 703-583-3856.

Finally, DEQ encourages all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All hazardous wastes should be minimized.

If you have any questions or need further information, please contact Steve Coe at (804) 698-4029.

From: Burstein, Daniel (DEQ)
Sent: Wednesday, September 25, 2013 1:34 PM
To: Ellis, Charles (DEQ)
Subject: Re: Army: Arlington National Cemetery Real Property Master Plan, Arlington County, DEQ #13-155F - REVIEW

NRO comments regarding the Environmental Assessment and Consistency Determination for DOD/Army: Arlington National Cemetery Real Property Master Plan, located in Arlington County are as follows:

Land Protection Division - All but the no action alternative will result in slight increase in the amount of waste generated by Arlington National Cemetery. The facility should follow applicable federal, state, and county regulations for the disposal of any solid or hazardous waste is generated/encountered during development and operations.

Air Compliance/Permitting - The project manager is reminded that during the construction phases that occur with this project; the project is subject to the Fugitive Dust/Fugitive Emissions Rule 9 VAC 5-50-60 through 9 VAC 5-50-120. In addition, should the project install fuel burning equipment (Boilers, Generators, Compressors, etc...), or any other air pollution emitting equipment, the project may be subject to 9 VAC 5-80, Article 6, Permits for New and Modified sources and as such the project manager should contact the Air Permit Manager DEQ-NRO prior to installation or construction, and operation, of fuel burning or other air pollution emitting equipment for a permitting determination. Lastly, should any open burning or use of special incineration devices be employed in the disposal of land clearing debris during demolition and construction, the operation would be subject to the Open Burning Regulation 9 VAC 5-130-10 through 9 VAC 5-130-60 and 9 VAC 5-130-100.

Virginia Water Protection Permit (VWPP) Program – The most recent assessment of the site showed wetlands on the site and any activities in those wetlands will require a Joint Permit Application (JPA) and review. Upon receipt of a JPA for the proposed surface water impacts, DEQ VWP Permit staff will review the proposed project in accordance with the VWP permit program regulations and current VWP permit program guidance.

Water Permitting/VPDES Program/Stormwater: The project manager is reminded to follow all applicable regulations.

Daniel Burstein
Regional Enforcement Specialist, Sr.
Virginia Department of Environmental Quality
Northern Virginia Regional Office
13901 Crown Court
Woodbridge, VA 22193
Phone: (703) 583-3904
Fax: (703) 583-3821
daniel.burstein@deq.virginia.gov

From: Gavan, Larry (DEQ)
Sent: Wednesday, September 11, 2013 10:31 AM
To: Ellis, Charles (DEQ)
Subject: RE: NEW PROJECT Army 13-155F

Hi Charlie,
Pls. see the comments below.
Thx
L

(a) Agency Jurisdiction. The Department of Environmental Quality (DEQ) administers the *Virginia Erosion and Sediment Control Law and Regulations* (*VESCL&R*) and *Virginia Stormwater Management Law and Regulations* (*VSWML&R*).

(b) Erosion and Sediment Control and Stormwater Management Plans. The Applicant and its authorized agents conducting regulated land-disturbing activities on private and public lands in the state must comply with *VESCL&R* and *VSWML&R*, including coverage under the general permit for stormwater discharge from construction activities, and other applicable federal nonpoint source pollution mandates (e.g. Clean Water Act-Section 313, federal consistency under the Coastal Zone Management Act). Clearing and grading activities, installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, soil stockpiles, and related land-disturbing activities that result in the total land disturbance of equal to or greater than 10,000 square feet (2,500 square feet in Chesapeake Bay Preservation Area) would be regulated by *VESCL&R*. Accordingly, the Applicant must prepare and implement an erosion and sediment control (ESC) plan to ensure compliance with state law and regulations. The ESC plan is submitted to the DEQ Regional Office that serves the area where the project is located for review for compliance. The Applicant is ultimately responsible for achieving project compliance through oversight of on-site contractors, regular field inspection, prompt action against non-compliant sites, and other mechanisms consistent with agency policy. [Reference: VESCL 62.1-44.15 et seq.]

From: Fulcher, Valerie (DEQ)
Sent: Tuesday, August 20, 2013 3:29 PM
To: dgif-ESS Projects (DGIF); Tignor, Keith (VDACS); Rhur, Robbie (DCR); odwreview (VDH); Coe, Stephen (DEQ); Narasimhan, Kotur (DEQ); Gavan, Larry (DEQ); Moore, Daniel (DEQ); Sepety, Holly (DEQ); Nicholson, Shantelle (DEQ); Burstein, Daniel (DEQ); Kirchen, Roger (DHR); Kline, Everette (DOF); Evans, Gregory (DOF); Watkinson, Tony (MRC); gmq@novaregion.org; Aimee Vosper; countymanager@arlingtonva.us
Cc: Ellis, Charles (DEQ)
Subject: NEW PROJECT Army 13-155F

Good afternoon - attached is a new EIR review request/project:

Army: Arlington National Cemetery Real Property
Master Plan, Arlington County, DEQ #13-155F

You can access the documents at the following link:

http://www.arlingtoncemetery.mil/AboutUs/PublicNotices.aspx
The due date for comments is SEPTEMBER 25, 2013. You can send your comments either directly to Charlie by email (Charles.Ellis@deq.virginia.gov), or you can send your comments by regular interagency/U.S. mail to the Department of Environmental Quality, Office of Environmental Impact Review, 629 E. Main St., 6th Floor, Richmond, VA 23219. If you have any questions, please email Charlie.

Thanks!

Valerie

Valerie A. Fulcher, CAP-OM, Executive Secretary Sr.
Department of Environmental Quality
Environmental Enhancement - Office of Environmental Impact Review
629 E. Main St., 6th Floor
Richmond, VA 23219
804/698-4330
804/698-4319 (Fax)
email: Valerie.Fulcher@deq.virginia.gov
www.deq.virginia.gov

From: Gavan, Larry (DEQ)
Sent: Monday, September 23, 2013 1:24 PM
To: Sepety, Holly (DEQ); Ellis, Charles (DEQ)
Cc: Fisher, John (DEQ)
Subject: RE: checking on citations for stormwater regs-- Arlington Cemetery master plan review, 13-155F

Kelly Vanover would be the DEQ NRO SWM Manager contact at (540) 347-6420.
Thx
L

From: Sepety, Holly (DEQ)
Sent: Monday, September 23, 2013 11:51 AM
To: Gavan, Larry (DEQ); Ellis, Charles (DEQ)
Cc: Fisher, John (DEQ)
Subject: RE: checking on citations for stormwater regs-- Arlington Cemetery master plan review, 13-155F

Charles,

The exemption code can be found at: 62.1-44.15:34 [10.1-603.8] Regulated activities; submission and approval of a permit
application; security for performance; exemptions.

This is from our website, regarding who must apply:

Who Must Apply for Construction General Permit Coverage

- Operators of construction activities resulting in land disturbance equal to or greater than one acre.
- Operators of construction activities resulting in land disturbance equal to or greater than 2,500 square feet and less than one acre within areas designated as subject to the Chesapeake Bay Preservation Act.
- Operators of construction activities resulting in land disturbance less than one acre that are part of a larger common plan of development or sale that ultimately disturbs one or more acres. A larger common plan of development or sale is a contiguous area where separate and distinct construction may be taking place at different times on different schedules. A permit is required if one or more acres, or 2,500 square feet or more in all areas designated as subject to the Chesapeake Bay Preservation Act, of land will be disturbed, regardless of the size of the individually owned or developed sites. For example, if a developer buys a 20-acre lot and builds roads with the intention of building homes or other structures in the future, or if the land is parceled off or sold, and construction occurs on plots that are less than an acre by separate, independent builders, these activities would still be subject to stormwater permitting requirements. A larger common plan of development or sale applies to various types of land development including but not limited to residential, commercial or industrial use.

Let me know if you have questions.

Regards,
Holly

Holly C. Sepety
Stormwater Permit Specialist
Dept. of Environmental Quality
Phone: (804) 698-4039

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
Fax: 804-698-4019 - TDD (804) 698-4021
www.deq.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4020
1-800-592-5482

MEMORANDUM

TO: Charles Ellis, DEQ Environmental Impact Review Coordinator

FROM: Daniel Moore, DEQ Principal Environmental Planner

DATE: September 12, 2013

SUBJECT: DEQ 13-155F, DOD: Army – Arlington National Cemetery Master Plan, Arlington County Virginia

We have reviewed the Consistency Determination (CD) for the proposed Real Property Master Plan for Arlington National Cemetery in Arlington County and offer the following comments regarding consistency with the provisions of the *Chesapeake Bay Preservation Area Designation and Management Regulations* (Regulations):

In Arlington County, the areas protected by the Chesapeake Bay Preservation Act, as locally implemented, require conformance with performance criteria. These areas include Resource Protection Areas (RPAs) and Resource Management Areas (RMAs) as designated by the local government. RPAs include tidal wetlands, certain non-tidal wetlands and tidal shores. RPAs also include a 100-foot vegetated buffer area located adjacent to and landward of these features and along both sides of any water body with perennial flow. RMAs, which require less stringent performance criteria, include those areas of the County not included in the RPAs.

Pursuant to the *Coastal Zone Management Act* (the Management Act) of 1972, as amended, Federal activities affecting Virginia's coastal resources or coastal uses must be consistent with the Virginia Coastal Zone Management Program (Section 307(c)(1) of the Management Act and 15 CFR Part 930, sub-part C of the *Federal Consistency Regulations*).

The Chesapeake Bay Preservation Act and Regulations are incorporated in the Virginia Coastal Zone Management Program. Federal Consistency regulations implementing the Coastal Zone Management Act require that federal actions, and/or projects requiring federal approvals or assistance that may impact natural resources in a coastal zone, must be conducted in a manner consistent to the maximum extent practicable with the enforceable policies of a coastal state's federally approved coastal management program.

The 1998 *Federal Agencies' Chesapeake Ecosystem Unified Plan* requires the signatories to fully cooperate with local and state governments in carrying out voluntary and mandatory actions to comply with the management of stormwater. The signatories also committed to encouraging construction design that minimizes natural area loss on new and rehabilitated federal facilities, adopts low impact development and best management technologies for stormwater and erosion and sediment control, and reduces impervious surfaces. In addition, the *Chesapeake 2000* agreement committed the government agencies to a number of sound land use and stormwater quality controls. The signatories additionally committed the agencies to lead by example with respect to controlling nutrient, sediment and chemical contaminant runoff from government properties. In December 2001, the Executive Council of the Chesapeake Bay Program issued *Directive No. 01-1: Managing Storm Water on State, Federal and District-owned Lands and Facilities*, which includes specific commitments for the signatories to lead by example with respect to stormwater control.

Based on information provided in Section 3.5.1.11 of the Programmatic Environmental Assessment, the project area includes lands analogous to locally-designated Chesapeake Bay Preservation Area (CBPA) lands, but does not include any locally-designated RPA lands. The proposed project must adhere to the general performance criteria, 4 VAC 50-90-130 of the Regulations, especially with respect to minimizing land disturbance, retaining indigenous vegetation and minimizing impervious surfaces. Land disturbing activities that exceed an area of 2,500 square feet shall comply with the requirements of the local erosion and sediment control ordinance.

Provided adherence to the above requirements the proposed activity would be consistent with the Regulations and the *Chesapeake Bay Preservation Act.*

From: Gavan, Larry (DEQ)
Sent: Monday, September 23, 2013 11:09 AM
To: Ellis, Charles (DEQ); Sepety, Holly (DEQ)
Cc: Fisher, John (DEQ)
Subject: RE: checking on citations for stormwater regs-- Arlington Cemetery master plan review, 13-155F

Hi Charlie,
These questions relate to the VSMP Permit Program so I'll forward it on to Ms. Holly Sepety.
I'll stay on the e-mail discussion thread and be available to assist.
Thanks and Regards
L

Hi Holy,
I've not seen your comments for this project but I suspect that it might take care of some/all of Charlie's queries below.
Thanks and Regards
L

From: Ellis, Charles (DEQ)
Sent: Monday, September 23, 2013 10:55 AM
To: Gavan, Larry (DEQ)
Cc: Fisher, John (DEQ)
Subject: checking on citations for stormwater regs-- Arlington Cemetery master plan review, 13-155F

Larry – I'm starting to write the response on the Army's Environmental Assessment/federal consistency determination on the Real Property Master Plan, and I got your September 11 e-mailed comments last week.

In your paragraph (b) on E&S and Stormwater, you cited the Erosion and Sediment Control Law as being Virginia Code sections 62.1-44.15 *et seq.* – which means that the E&S law got moved into the Water Law, if memory serves. I have recently seen a "crosswalk" (on the web) saying that the E&S provisions are extensions of that Code section, specifically 62.1-44.15:24 and following.

First, did you intend to provide guidance on stormwater management plans as well?

Second, do the DEQ regional offices now handle E&S Plan review and Stormwater Plan review? Do you have a suggested contact in DEQ's Northern Regional Office for that purpose?

Third, does stormwater management (1 acre or more, right?) apply to projects that might take place in the Cemetery under the master plan? If so, what are the legal and regulatory citations?

Thanks for anything you can tell me.

Charlie

Charles H. Ellis III, Environmental Review Coordinator
Department of Environmental Quality
629 East Main Street
Richmond, Virginia 23219
(804) 698-4195
charles.ellis@deq.virginia.gov

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Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION
600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804) 786-6124

MEMORANDUM

DATE: September 24, 2013

TO: Charlie Ellis, DEQ

FROM: Roberta Rhur, Environmental Impact Review Coordinator

SUBJECT: DEQ 13-155F, Arlington National Cemetery Master Plan

Division of Natural Heritage

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Biotics documents the presence of natural heritage resources in the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov). This project is located within 2 miles of documented occurrences of state listed animals. Therefore, DCR recommends coordination with VDGIF, Virginia's regulatory authority for the management and protection of these species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

State Parks • Nonpoint Pollution Prevention • Outdoor Recreation Planning
Natural Heritage • Dam Safety and Floodplain Management • Land Conservation

The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.

Cc: Amy Ewing, VDGIF

From: Ewing, Amy (DGIF)
Sent: Thursday, September 26, 2013 1:32 PM
To: Ellis, Charles (DEQ)
Cc: Cason, Gladys (DGIF); nhreview (DCR)
Subject: RE: ESSLog# 34117_13-155F_ANC Master Plan

And...

Assuming adherence to erosion and sediment controls, we find this project consistent with the Fisheries Management Section of the CZMA.

Thanks,
Amy Ewing

Environmental Services Biologist | VA Dept. of Game and Inland Fisheries | 4010 West Broad St. Richmond, VA 23230 | 804-367-2211 | www.dgif.virginia.gov

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From: Ewing, Amy (DGIF)
Sent: Thursday, September 26, 2013 1:32 PM
To: Ellis, Charles (DEQ)
Cc: Cason, Gladys (DGIF); nhreview (DCR)
Subject: ESSLog# 34117_13-155F_ANC Master Plan

We have reviewed the master plan for Arlington National Cemetery.

According to our records, bald eagles and the Potomac River Anadromous Fish Use Area have been documented from the project area. At this time, we have not identified any project in the plan that appears likely to result in adverse impacts upon bald eagles or anadromous fish resources. However, we recommend that any projects requiring either impacts upon bald eagle habitats or impacts upon the Potomac River and/or its tributaries be coordinated with us, and the USFWS, so that we may make protective recommendations for these resources.

This project is located within 2 miles of a documented occurrence of a state or federal threatened or endangered plant or insect species and/or other Natural Heritage coordination species. Therefore, we recommend coordination with VDCR-DNH regarding the protection of these resources.

To minimize overall impacts to wildlife and our natural resources, we offer the following comments about development activities: We recommend that the applicant avoid and minimize impacts to undisturbed forest, wetlands, and streams to the fullest extent practicable. Avoidance and minimization of impact may include relocating stream channels as opposed to filling or channelizing as well as using, and incorporating into the development plan, a natural stream channel design and wooded buffers. We recommend maintaining undisturbed naturally vegetated buffers of at least 100 feet in width around all on-site wetlands and on both sides of all perennial and intermittent streams. We recommend maintaining wooded lots to the fullest extent possible. We generally do not support proposals to mitigate wetland impacts through the construction of stormwater management ponds, nor do we support the creation of in-stream stormwater management ponds. We are willing to assist the applicant in developing a plan that includes open-space, wildlife habitat, and natural stream channels which retain their wooded buffers.

We recommend that the stormwater controls for this project be designed to replicate and maintain the hydrographic condition of the site prior to the change in landscape. This should include, but not be limited to, utilizing bioretention areas, and minimizing the use of curb and gutter in favor of grassed swales. Bioretention areas (also called rain gardens) and grass swales are components of Low Impact Development (LID). They are designed to capture stormwater runoff as close to the source as possible and allow it to slowly infiltrate into the surrounding soil. They benefit natural resources by filtering pollutants and decreasing downstream runoff volumes.

We recommend that all tree removal and ground clearing adhere to a time of year restriction protective of resident and migratory songbird nesting from March 15 through August 15 of any year.

We recommend adherence to erosion and sediment controls during ground disturbance.

Thanks,
Amy Ewing

Environmental Services Biologist | VA Dept. of Game and Inland Fisheries | 4010 West Broad St.
Richmond, VA 23230 | 804-367-2211 | www.dgif.virginia.gov

From: Dufore, Ezekiel (VDH)
Sent: Friday, August 30, 2013 4:29 PM
To: Ellis, Charles (DEQ)
Cc: Matthews, Barry (VDH); Albrecht, Edward (VDH)
Subject: 13-155F Arlington National Cemetery Real Property Master Plan

Arlington National Cemetery Real Property Master Plan
Project #: 13-155F
Location: Arlington

VDH – Office of Drinking Water has reviewed the above project. Below are our comments as they relate to proximity to **public drinking water sources** (groundwater wells, springs and surface water intakes). Potential impacts to public water distribution systems or sanitary sewage collection systems must be verified by the local utility.

No groundwater wells are within a 1 mile radius of the project site.

No surface water intakes are located within a 5 mile radius of the project site.

The project is not within Zone 1 (up to 5 miles into the watershed) or Zone 2 (greater than 5 miles into the watershed) of any public surface water sources.

There are no apparent impacts to public drinking water sources due to this project.

Ezekiel Dufore
Office of Drinking Water
Virginia Department of Health
James Madison Building
109 Governor Street
Richmond, VA 23219
(w) 804-864-7201
ezekiel.dufore@vdh.virginia.gov

COMMONWEALTH of VIRGINIA

Marine Resources Commission
2600 Washington Avenue
Third Floor
Newport News, Virginia 23607

Douglas W. Domenech
Secretary of Natural Resources

Jack G. Travelstead
Commissioner

August 21, 2013

Mr. Charles H. Ellis III
Department of Environmental Quality
Office of Environmental Impact Review
629 East Main Street, 6th Floor
Richmond, Virginia 23219

Re: ANC Real Property Master Plan
Project # 13-155F
Arlington, Virginia

Dear Mr. Ellis:

We have reviewed the above-referenced consistency determination documentation for the Arlington National Cemetery Real Property Master Plan. Based on the information provided, no jurisdictional waterways will be impacted, and therefore, no authorization will be required from the Marine Resources Commission.

Please be advised that the Commission, under Section 28.2-1200 et. seq. of the Code of Virginia, has jurisdiction over any encroachments in, on, or over the beds of the bays, ocean, rivers, streams, or creeks which are the property of the Commonwealth. Accordingly, if any portion of the subject project involves any encroachments channelward of ordinary high water along natural rivers and streams above the fall line or mean low water below the fall line, a permit may be required from our agency. For your information, we generally only require permits along nontidal waterways if the drainage area is greater than five square miles.

Thank you for the opportunity to comment on this project. If we may be of further assistance, please do not hesitate to contact us.

Sincerely,

JMCreed

Jordan Creed
Environmental Engineer

An Agency of the Natural Resources Secretariat
www.mrc.virginia.gov
Telephone (757) 247-2200 (757) 247-2292 V/TDD Information and Emergency Hotline 1-800-541-4646 V/TDD

COMMENT FORM

Programmatic Environmental Assessment and Draft Finding of No Significant Impact
for the U.S. Soldiers' and Airmen's Home National Cemetery
Real Property Master Plan

Agency/Organization Name: Virginia Department of Forestry (VDOF) **Date:** 9/19/13
Name and E-mail of Commenter: Greg Evans, gregory.evans@dof.virginia.gov

Instructions: Please fill out the information above and provide comments in the following table. Insert rows as necessary and e-mail completed comment forms to arlingtoncemetery.masterplan@mail.mil by 30 September 2013.

Report Section	Page Number	Agency Comment
3.6 Biological Resources	3-26	VDOF is commenting on this PEA as a participating agency in the Virginia DEQ environmental impact review process and specifically to determine federal consistency. VDOF's responsibility is to assess the impact of the project on the forest resources of Virginia. VDOF notes that Alternative 3 requires realignment of Virginia roadways but due to the urban nature of the project area, it is not heavily forested. It recommends however that any tree removal impacting the Foxcroft Heights Park be mitigated as much as possible VDOF further notes that the No Action alternative would require removal of most of the trees in the future Millenium project site. It appears from the project narrative that this would not be the case under any of the Build scenarios so those would be preferable to VDOF. Finally, VDOF supports ANC's plan to place a priority on retaining the old trees (200 years+) on the site and in particular requests that special attention be given to not disturbing the root structure or any other environmental variable that could jeopardize the health of the three state champion trees that are present in ANC.

From: Kirchen, Roger (DHR)
Sent: Wednesday, September 18, 2013 3:51 PM
To: Ellis, Charles (DEQ)
Subject: Arlington National Cemetery (DEQ #13-155F; DHR File No. 2012-0965)

DHR has been in consultation with the Army regarding this project. We request that the Army continue to consult directly with DHR, as necessary, pursuant to Section 106 of the National Historic Preservation Act (as amended) and its implementing regulations codified at 36 CFR Part 800 which require Federal agencies to consider the effects of their undertakings on historic properties.

Roger

Roger W. Kirchen, Manager
Office of Review and Compliance
Division of Resource Services and Review
Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221
phone: 804-482-6091 (NEW!)
fax: 804-367-2391
roger.kirchen@dhr.virginia.gov

Letter from the Commonwealth of Virginia dated October 16, 2013		
Comment #	**Agency Comment**	**ANC Response**
Environmental Impacts and Mitigation		
1	***1. Erosion and Sediment Control and Stormwater Management Plans*** *1(b) Erosion and Sediment Control Plans; Stormwater Management Plans.* The Army and its authorized agents, conducting regulated land-disturbing activities on private and public lands in Virginia, must comply with the Virginia Stormwater Management Law and *Regulations* as well as the Virginia Erosion and Sediment Control Law and *Regulations* (see "Federal Consistency ... ," "Analysis of Enforceable Policies," item 1, below). This compliance relates to coverage under the General Permit for Stormwater Discharge from Construction Activities (see item 1 (c), below) and other applicable federal non-point source pollution mandates (e.g., the federal Clean Water Act, section 313 and federal consistency under the CZMA; see "Federal Consistency ... ," below). Activities which result in a total land disturbance of 10,000 or more square feet (2,500 or more square feet in Chesapeake Bay Preservation Areas; see "Federal Consistency ... ," "Analysis of Enforceable Policies," item 3, below) are regulated under the Erosion and Sediment Control Law. These activities include: • Clearing and grading activities; • Installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, and soil stockpiles; and • Related land-disturbing activities. The Army must prepare and implement an Erosion and Sediment Control (ESC) Plan to ensure compliance with state law and regulations. The ESC Plan must be submitted to DEQ's Northern Regional Office for review and compliance; see "Regulatory and Coordination Needs," item 1, below. The Army is ultimately responsible for achieving project compliance through oversight of on-site contractors, regular field inspections, prompt action against non-compliant sites, and other mechanisms consistent with agency policy.	Erosion and Sediment Control Plans will be developed and implemented for any proposed activity that disturbs greater than 2,500 square feet of land.

Letter from the Commonwealth of Virginia dated October 16, 2013		
Comment #	**Agency Comment**	**ANC Response**
Environmental Impacts and Mitigation		
	1(c) General Permit for Stormwater Discharge from Construction Activities. The Virginia Stormwater General Permit (VSGP) requirement applies to the following types of construction activities [reference: Virginia Code sections 62-1-44.15:34 (formerly Virginia Code section 10.1-603.8)]. See "Regulatory and Coordination Needs, item 1, below. *1(c)(i) Land Disturbance Equal to or Greater than 1 Acre.* Operators of construction activities resulting in land disturbance that is equal to or greater than 1 acre must apply for the VSGP. *1(c)(ii) Land Disturbance in Chesapeake Bay Preservation Areas.* Operators of construction activities resulting in land disturbance less than 1 acre and greater than 2,500 square feet in areas designated as Chesapeake Bay Preservation Areas must apply for the VSGP. *1(c)(iii) Land Disturbance for Construction in* a *Common Plan.* Operators of construction activities resulting in land disturbance less than 1 acre, where the activities are part of a larger common plan of development or sale that ultimately disturbs 1 or more acres, must apply for the VSGP.	Application for coverage under the General Permit for Discharges of Stormwater from Construction Activities will occur prior to initiating any activities that would disturb more than 2,500 square feet of land.
2	**2. Natural Heritage Resources.** 2(b) Findings. Department of Conservation and Recreation: Division of Natural Heritage (DCR-DNH) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined in the maps of the Draft Plan/EIS (see map of Manassas NBP, page 67). According to the information in DCR-DNH files, natural heritage resources are documented in the project area. However, due to the scope of proposed activities and the distance to the resources, DCR does not anticipate that the RPMP will adversely affect natural heritage resources.	Comment noted.

Letter from the Commonwealth of Virginia dated October 16, 2013		
Comment #	**Agency Comment**	**ANC Response**
Environmental Impacts and Mitigation		
	Under a Memorandum of Agreement established between DCR and VDACS, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The proposed activities will not affect any documented state-listed plants or insects.	Comment noted.
	2(c) Natural Area Preserves. According to DCR, there are no state Natural Area Preserves under DCR's jurisdiction in the project vicinity.	Comment noted.
	2(d) Additional Information. DCR's Biotics Data System is continually updated with new information. Accordingly, DCR should be contacted if a significant amount of time elapses before the foregoing information is used	Comment noted.
3	**3. Solid and Hazardous Waste Management** 3(b) Findings. DEQ's Division of Land Protection and Revitalization (DEQ-DLPR) has conducted a cursory search of its databases (see item 3(c), below) and made the following findings relative to waste sites within 500 feet of the project area or in the 22211 zip code.	
	3(b)(i) Solid Waste Sites. No solid waste sites were found.	Comment noted.
	3(b)(ii) VRP (Voluntary Remediation Program) Sites. No VRP sites were found.	Comment noted.
	3(b)(iii) Petroleum Release Sites. Multiple petroleum contamination (PC) events were identified on the ANC property and nearby Fort Myer. The proximity of the PC sites to the project work was not determined, but should be reviewed by the project engineer(s) for possible impacts on the project. 1) ID# 19921775 -Arlington National Cemetery, Building 103. Event Date: 3/5/2007. Status: Closed. 2) ID# 19940580 -Arlington National Cemetery, Building 107. Event Date: 3/5/2007. Status: Closed.	These sites will be reviewed as part of project-specific NEPA documentation.

Letter from the Commonwealth of Virginia dated October 16, 2013		
Comment #	**Agency Comment**	**ANC Response**
Environmental Impacts and Mitigation		
	3) ID# 1990437- Arlington National Cemetery, Building 102. Event Date: 3/20/2006. Status: Closed. 4) ID# 19940579- Arlington National Cemetery, Building 113. Event Date:3/20/2006. Status: Closed. 5) ID# 20073119- Arlington National Cemetery, Columbarium Site. Event Date: 6/1/2007. Status: Closed. 6) ID# 19930065- Fort Myer, Building 305, Tank 24, Washington Boulevard and Arlington Boulevard, Arlington VA 22211. Event Date: 2/27/2007. Status: Closed. 7) ID# 19920578- Fort Myer, Building 323, Tank 30, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed. 8) ID# 19930673- Fort Myer, Building 305, Tank 24, Washington Boulevard and Arlington Boulevard, Arlington, VA 22211. Event Date: 2/27/2007. Status: Closed. DEQ-DLPR notes that DEQ's PC case files with the PC Case Numbers, within a defined radius of the proposed project(s), can be identified. These petroleum releases should be evaluated by the project engineer or manager to establish: • the exact location of the release; • the nature and extent of the petroleum release; and • the potential to affect the proposed project. The facility representative should contact DEQ's Northern Virginia Regional Office (Tanks Program) for further information and the administrative records of the PC cases which are in close proximity to any proposed projects. See "Regulatory and Coordination Needs," item 6, below.	

Letter from the Commonwealth of Virginia dated October 16, 2013		
Comment #	**Agency Comment**	**ANC Response**
Environmental Impacts and Mitigation		
	3(b)(iv) FUD (Formerly Used Defense) Sites. No FUD sites were found.	Comment noted.
	3(b)(v) CERCLA/FFR (Comprehensive Environmental Response, Compensation, and Liability Act/Federal Facilities Restoration) Sites. One site was found: VA8210020626- Fort Myer, 204 Lee Avenue, Fort Myer, VA 22211. Status: Not NPL.	Comment noted.
	3(b)(vi) RCRAIHW (Resource Conservation and Recovery Act/Hazardous Waste) Sites. Three RCRAIHW sites were identified in zip code 22211. The report author or project engineer should access this information on the DEQ website at http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/ReportsPublications/OriginaiReports.aspx, and click on the Hazardous Waste Facilities link. Search by zip code 22211. 1) VA8210020626- Department of the Army HQ, Joint Base Myer-Henderson Hall, Lee Avenue, Fort Myer, VA 22211. Contact: James Stratton at 703-696-2013. 2) VAR000000786- DOD Federal Office Bldg #2, Columbia Pike & Old Ridge,Arlington, VA 22211. Contact: Stephen P. Best at 703-692-4114. 3) VA6210020032- U.S. Arlington National Cemetery, Arlington, VA 22211.Contact: Joseph Bunton at 703-697-4915.	These sites will be reviewed as part of project-specific NEPA documentation.
	3(c) Additional Information. DEQ's Virginia Geographical Information Systems (VEGIS) database can be accessed at the following web address:http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS.aspx. Through VEGIS's search options, one can identify, by address or zip code, the Solid Waste sites, VRP sites, and Petroleum Release sites in the area of the proposed project.	Comment noted.

Letter from the Commonwealth of Virginia dated October 16, 2013		
Comment #	**Agency Comment**	**ANC Response**
Environmental Impacts and Mitigation		
	3(d) General Guidance on Waste Management. Any soil that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations (see "Regulatory and Coordination Needs," item 6(b), below).	Comment noted.
	3(d)(i) Demolition of Older Structures. If an older structure will be demolished as part of the project, the structure should be checked for asbestos-containing materials (ACM) and lead-based paints (LBP). Additional rules apply if ACM or LBP are found; see "Regulatory and Coordination Needs," item 6, below.	Asbestos and lead based paint programs have been established at ANC to ensure proper disposal of these materials.
	3(d)(ii) Pollution Prevention. DEQ encourages the Army to implement pollution prevention principles in its construction activities. These include reduction of wastes at the source, re-use of materials, and recycling of all solid wastes generated. Hazardous wastes should be minimized.	ANC has a recycling program and an Integrated Solid Waste Management Plan. The objectives of this plan include reducing, reusing and recycling solid waste to the maximum extent possible. The plan notes that Army Regulations 420-1 requires that all military construction, renovation, and demolition projects include performance requirements for a 50 percent minimum diversion of construction and demolition waste, by weight, from landfill disposal. ANC also has a Hazardous Materials & Hazardous Waste Management Plan. Hazardous waste minimization is one of the primary goals of the Plan. Hazardous waste minimization is achieved through: • Waste reduction • Recycling • Material substitution
	3(e) Additional Comment. DEQ's Northern Regional Office indicates that any of the three action alternatives will result in slight increases in waste amounts generated by the Cemetery.	Comment noted.
4	**4. Historic Structures and Archaeological Resources** 4(b) Department of Historic Resources (DHR) asks that the Army continue to consult directly with DHR as necessary, pursuant to section 106 of the NHPA and its implementing regulations.	ANC will continue to consult with the DHR as necessary..

Letter from the Commonwealth of Virginia dated October 16, 2013		
Comment #	**Agency Comment**	**ANC Response**
Environmental Impacts and Mitigation		
5	**5. Forest Resources** 5(b) Comments: Alternative 3. The Department of Forestry (DOF) notes that Alternative 3 requires realignment of roads in an area not heavily forested. DOF recommends, however, that any tree removal affecting the Foxcroft Heights Park be mitigated as much as possible. 5(c) Comments: No-Action Alternative. The No-Action alternative would require removal of most of the trees in the future Millennium Project site. It appears from the project narrative that this isn't the case for the "Build" alternatives; accordingly, DOF would prefer any of the "Build" alternatives to the no action. 5(d) Retaining Old Trees. DOF supports the priority on retaining the old trees on the site (more than 200 years old). DOF requests that special attention be given to protecting the root structure or any other environmental variable that could jeopardize the health of the three state champion trees present at ANC. These are the pin oak, the empress, and the yellowwood.	Comment noted. The No-Action alternative includes projects that will occur whether or not any of the Action Alternatives are implemented. Therefore, selection of a "Build" alternative would still result in tree removal due to the Millennium Project. The tree removal was addressed in the *Arlington National Cemetery Millennium Project Final Environmental Assessment* and the associated Finding of No Significant Impact (FONSI). Comment noted.
6	**6. Drinking Water.** The Programmatic EA does not appear to address drinking water as such. 6(b) Findings. VDH reviewed the RPMP for proximity of its activities to public drinking water sources (groundwater wells, springs, and surface water intakes). VDH found the following: • There are no groundwater wells within a 1-mile radius of the project site. • No surface water intakes are located within a 5-mile radius of the project site. • The project is not within Zone 1 (up to 5 miles into the watershed) or Zone 2 (greater than 5 miles into the watershed) of any public surface water source. 6(c) Conclusion. The project is not likely to give rise to impacts to public drinking water, according to VDH.	Comment noted. A brief discussion was added to the Programmatic EA to address proximity of the project site to drinking water sources.

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Comment #	**Agency Comment**	**ANC Response**
Environmental Impacts and Mitigation		
	6(d) Requirement. Potential impacts to public water distribution systems or sanitary sewage collection systems must be verified by the local utility.	Potential impact will be verified when more detailed information is available and site-specific NEPA documentation is being prepared.
7	**7 Wildlife Resources.** 7(b) Findings. Department of Game and Inland Fisheries (DGIF) records indicate that bald eagles and the Potomac River Anadromous Fish Use Area have been documented in the project area. DGIF has not identified any project that appears likely to result in adverse impacts upon bald eagles or anadromous fish resources. The project area is located within two miles of a documented occurrence of a listed natural heritage resource species, i.e., one that is listed by the state or federal government as threatened or endangered. 7(c) Recommendations by DGIF include: 7(c)(i) Minimizing impacts from developmental activities. Recommends that the Army do the following: - Avoid impacts, or minimize them as much as possible, to undisturbed forest, wetlands, and streams. This may include relocating stream channels as opposed to filling or channelizing; using, and incorporating in the development plan, a natural stream channel design and wooded buffers. - Maintain undisturbed, naturally vegetated buffers of at least 100 feet in width around all on-site wetlands and on both sides of all perennial and intermittent streams. - Maintain wooded lots to the fullest extent possible. DGIF does not support the following: - Proposals to mitigate wetland impacts through the construction of stormwater management ponds; - Creation of in-stream stormwater management ponds.	Comment noted. Comments noted.

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Comment #	**Agency Comment**	**ANC Response**
Environmental Impacts and Mitigation		
	7(c)(ii) Designing stormwater controls: DGIF recommends that stormwater controls be designed to replicate and maintain the hydrographic condition of the site prior to the change in landscape. This should include, but not be limited to, utilizing bio-retention areas and minimizing the use of curb and gutter in favor of grassed swales. Bioretention areas (also called rain gardens) and grassed swales are components of "Low Impact Development" (LID). They are designed to capture stormwater runoff as close to the source as possible, and allow it to slowly infiltrate into the surrounding soil. Rain gardens benefit natural resources by filtering pollutants and reducing downstream runoff volumes. 7(c)(iii)Time-of-year Restriction on Tree Clearing and Ground Clearing. All tree removal and ground clearing should adhere to a time-of-year restriction protective of resident and migratory songbird nesting from March 15 through August 15 of any year. That is, these activities should not take place during that time period.	
	7(d) Assistance and Coordination. DGIF is willing to assist the Army in developing a plan that includes open space, wildlife habitat, and natural stream channels which retain their wooded buffers.	Comment noted.
	7(e) Additional Information: The Virginia Department of Game and Inland Fisheries (DGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. The DGIF database may be accessed from http://vafwis.org/fwis/	Comment noted.

Letter from the Commonwealth of Virginia dated October 16, 2013		
Comment #	**Agency Comment**	**ANC Response**
Federal Consistency Under the Coastal Zone Management Act		
8	**Federal Consistency Concurrence** Based on our review of the federal consistency determination and the comments submitted by agencies administering the applicable enforceable policies of the VCP, DEQ concurs that the proposal is consistent with the VCP, provided any applicable permits and approvals are obtained as described below. However, other state approvals which may apply to this project are not included in this consistency concurrence. Therefore, the Coast Guard [Army] must ensure that this event is conducted in accordance with all applicable federal, state, and local laws and regulations.	Comment noted.
9	**1. Subaqueous Lands Management.** 1(b) Findings. According to Virginia Marine Resources Commission (VMRC), no jurisdictional waterways will be affected by the activities contemplated in the RPMP, and no authorization will be required from the Commission. 1(c) Conclusion. VMRC did not disagree with the statement in the FCD that the proposed action (RPMP implementation) would not directly affect subaqueous lands.	Comment noted. Comment noted.

Letter from the Commonwealth of Virginia dated October 16, 2013		
Comment #	**Agency Comment**	**ANC Response**
Federal Consistency Under the Coastal Zone Management Act		
10	**2. Air Pollution Control.** 2(b) Findings. According to DEQ's Division of Air Program Coordination (DEQ-DAPC), the Cemetery is in an ozone non-attainment and emission control area for oxides of nitrogen (NOx) and volatile organic compounds (VOCs). 2(c) Comments. DEQ-DAPC recommends that all precautions are necessary to restrict the emissions of VOCs and NOx) in carrying out the proposed action. 2(d) Requirements. One or more of the following requirements may apply to activities contemplated in the RPMP. Questions regarding these requirements may be directed to DEQ's Northern Regional Office (see "Regulatory and Coordination Needs," item 4, below). *(i) Fugitive Dust* - During construction, fugitive dust must be kept to a minimum by using control methods outlined in 9 VAC 5-50-60 *et seq.* of the *Regulations for the Control and Abatement of Air Pollution.* These precautions include, but are not limited to, the following: • Use, where possible, of water or chemicals for dust control; • Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials; • Covering of open equipment for conveying materials; and • Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion. *(ii) Open Burning* - If project activities include the open burning or use of special incineration devices for the disposal of demolition material, this activity must meet the requirements of 9 VAC 5-130 of the *Regulations* for open burning, and it may require a permit. The *Regulations* provide for, but do not require, the local adoption of a model ordinance concerning open burning. Norfolk and Portsmouth officials should be contacted to determine what local requirements, if any, exist.	 Comment noted. The August 2013 EA stated and the Revised EA states that the Cemetery is in an ozone non-attainment area. Comment noted. Comment noted.

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Federal Consistency Under the Coastal Zone Management Act		
	(iii) Fuel-Burning Equipment - The installation of fuel burning equipment (e.g., boilers, generators, compressors, or any other air pollution emitting equipment), may require permitting from DEQ prior to beginning construction of the facility (9 VAC 5-80, Article 6, Permits for New and Modified Sources). The project proponent should contact DEQ-NRO for guidance on whether this provision applies. *(iv) Asphalt Paving* - In accordance with 9 VAC 5-40-5490, there are limitations on the use of "cut-back" (liquefied asphalt cement, blended with petroleum solvents) that may apply to paving activities associated with the project. The asphalt must be "emulsified" (predominantly cement and water with a small amount of emulsifying agent) except when specified circumstances apply. Moreover, there are time-of-year restrictions on its use during the months of April through October in VOC emission control areas. 2(e) Conclusions. DEQ-DAPC did not disagree with the Army's statements in the FCD.	Comment noted.
11	***3. Non-point Source Pollution Control***. 3(b) Erosion and Sediment Control Plans; Stormwater Management Plans. The Army and its authorized agents conducting regulated land-disturbing activities on private and public lands in the state must comply with the above Erosion and Sediment Control Law and Regulations and the Stormwater Management Regulations, including coverage under the general permit for stormwater discharge from construction activities (see item 3(c), next), and other applicable federal non-point source pollution mandates (e.g., section 313 of the federal Clean Water Act and federal consistency under the Coastal Zone Management Act). Clearing and grading activities, installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, soil stockpiles, and related land disturbing activities that result in the total land disturbance of equal to or greater than 10,000 square feet (2,500 square feet in Chesapeake Bay Preservation Areas) are	Erosion and Sediment Control Plans for any proposed activity that disturbs greater than 2,500 square feet of land will be prepared and implemented.

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Federal Consistency Under the Coastal Zone Management Act		
	regulated under the Erosion and Sediment Control Law and Regulations. Accordingly, the Army must prepare and implement an erosion and sediment control (ESC) plan to ensure compliance with state law and regulations. The ESC plan is submitted to DEQ's Northern Regional Office for review for compliance (see "Regulatory and Coordination Needs," item 1, below). The Army is ultimately responsible for achieving project compliance through oversight of on-site contractors, regular field inspection, prompt action against non-compliant sites, and other mechanisms consistent with agency policy.	
	3(c) General Permit for Stormwater Discharges from Construction Activities. DEQis responsible for the issuance, denial, revocation, termination, and enforcement of the Virginia Stormwater Management Program (VSMP) General Permit for Stormwater Discharges from Construction Activities related to municipal separate storm sewer systems (MS4s) and construction activities for the control of Stormwater discharges from MS4s and land disturbing activities under the Virginia Stormwater Management Program. The owner or operator of projects involving land-disturbing activities of equal to or greater than 1 acre (2,500 square feet or more in a Chesapeake Bay Preservation Area) is required to register for coverage under the General Permit for Discharges of Stormwater from Construction Activities and develop a project-specific Stormwater Pollution Prevention Plan (SWPPP). Construction activities requiring registration also include land disturbance of less than one acre of total land area that is part of a larger common plan of development or sale if the larger common plan of development will collectively disturb equal to or greater than one acre (or 2,500 square feet or more in a Chesapeake Bay Preservation Area). The SWPPP must be prepared prior to submission of the registration statement for coverage under the general permit; it must address water quality and quantity in accordance with the VSMP Permit Regulations (4VAC 50 et seq. General information and registration forms for the General Permit are available at: http://www.deq.virginia.gov/Programs/Water/StormwaterManagementVSMPPermits/ConstructionGeneraiPermit.aspx.	Application for coverage under the General Permit for Discharges of Stormwater from Construction Activities will occur prior to initiating any activities that would disturb more than 2,500 square feet of land.

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Federal Consistency Under the Coastal Zone Management Act		
	3(d) Conclusions. DEQ's Water Division did not disagree with the findings in the FCD relative to non-point source pollution control.	Comment noted.
12	**4. Coastal Lands Management.** 4(c) Conclusions. Provided that the project is implemented in a manner that is consistent with the Chesapeake Bay Preservation Act and its implementing regulations, DEQ's Water Division finds that the proposed action would be consistent with the Coastal Lands Management enforceable policy of the VCP.	Comment noted.
13	**5. Wetlands Management.** 5(b) Comments. DEQ's Northern Regional Office (DEQ-NRO) states that the most recent assessment of the project site showed wetlands to be present. Any activities in wetlands will require a Joint Permit Application (JPA) and review by appropriate agencies including DEQ-NRO. See item 1 (a), above and "Regulatory and Coordination Needs," item 7, below. 5(c) Conclusion. DEQ-NRO indicates that wetlands are present in the project area.	Comment noted. Two wetlands were identified on the Millennium Site. These wetlands were documented as part of preparation of a separate EA, the *Arlington National Cemetery Millennium Project Final Environmental Assessment* dated June 2013. The proposed projects included in the Action Alternatives would not impact this site. Comment noted.
14	**6. Point Source Pollution Control.** 6(b) Comments. DEQ-NRO states that the project manager should follow all applicable regulations. 6(c) Conclusions. DEQ-NRO did not disagree with the statement in the FCD that a VPDES permit is not required for the proposed action (FCD, page B-3).	Comment noted. Comment noted.

Letter from the Commonwealth of Virginia dated October 16, 2013		
Comment #	**Agency Comment**	**ANC Response**
Regulatory and Coordination Needs		
15	**1. Non-point Source Pollution Control Enforceable Policy.** *1(a) Coordination.* For assistance with regard to erosion and sediment control plans, stormwater management plans, or stormwater management general permits for construction activities, the Army may contact the following: ▪ Erosion and Sediment Control Plans: DEQ's Water Division (Larry Gavan, telephone (804) 698-4040 or e-mail larry.gavan@deq.virginia.gov); ▪ Stormwater Management Plans: DEQ's Water Division (Holly Sepety, telephone (804) 698-4039 or e-mail holly.sepety@deq.virginia.gov); ▪ Stormwater General Permit for Construction Activities: (Holly Sepety, telephone (804) 698-4039 or e-mail holly.sepety@deq.virginia.gov). *1(b) Authorities.* Legal and regulatory authorities for the above programs include, but are not limited to, the following: ▪ Erosion and sediment control: Virginia Code sections 62.1-44.15:51 *et seq.* and ▪ Stormwater management: Virginia Code sections 62.1-44.15:24 *et seq.*	Comment noted. Comment noted.
16	**2. Subaqueous Lands Management.** *2(a) Coordination.* Questions about the permitting requirements of the Virginia Marine Resources Commission may be directed to the Commission (Jordan Creed, telephone (757) 247-2200). Copies of the Joint Permit Application may be obtained from the Commission (telephone (757) 247-2200). *2(b) Authorities.* As indicated above ("Federal Consistency .. ," "Analysis of Enforceable Policies," item 1 (a)), the subaqueous lands permitting requirement stems from Virginia Code sections 28.2-1200 *et seq.*	Comment noted. Comment noted.

Letter from the Commonwealth of Virginia dated October 16, 2013		
Comment #	**Agency Comment**	**ANC Response**
Regulatory and Coordination Needs		
17	**3. Historic Structures and Archaeological Resources.** *3(a) Coordination.* As indicated above ("Environmental Impacts and Mitigation," item 4(b)), the Department of Historic Resources requests that the Army continue the consultation begun with the Department concerning the RPMP. *3(b) Authorities.* Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations at 36 CFR Part 800, require federal agencies to consult with appropriate State Historic Preservation Offices regarding the impacts of their undertakings on historic resources.	Comment noted. Comment noted.
18	**4. Air Pollution Control Enforceable Policy.** *4(a) Coordination.* As indicated above ("Federal Consistency ... ," "Analysis of Enforceable Policies," item 2(d)), the Army should consult with DEQ's Northern Regional Office (James LaFratta, telephone (703) 583-3928) in regard to the applicability of air pollution control permits or other matters pertaining to regulation of air pollution. · *4(b) Authorities.* Provisions of the *Regulations for the Control and Abatement of Air Pollution* which may apply to activities contemplated in the RPMP include, but are not limited to, the following: • Open burning: 9 VAC 5-130 *et seq.* • Fugitive dust control: 9 VAC 5-50-60 *et seq.* • Asphalt paving: 9 VAC 5-40-5490 • Permitting of fuel-burning equipment: 9 VAC 5-80-1100 *et seq.*	Comment noted. Comment noted.
19	**5. Natural Heritage and Wildlife Resources.** *5(a) Coordination.* The Army should contact the Department of Conservation and Recreation's Division of Natural Heritage (Rene' Hypes, telephone (804) 371-2708) if a significant amount of time passes before the natural heritage information presented above ("Environmental Impacts and Mitigation," item 2(d)) is used.	Comment noted.

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Regulatory and Coordination Needs		
	In the event any project under the RPMP appears likely to affect either bald eagle habitat or the Potomac River and its tributaries, the Army should coordinate with the Department of Game and Inland Fisheries (begin with Amy Ewing, telephone (804) 367-2211 or e-mail amy.ewing@dgif.virginia.gov) and the U.S. Fish and Wildlife Service's Virginia field office (begin with Cindy Schultz, telephone (804) 693-6694).	Comment noted.
	5(b) Additional Information and Guidance. For additional information on DGIF's database of wildlife locations and related information contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov). Updated information on natural heritage resources should be requested from OCR's Division of Natural Heritage (Rene' Hypes, telephone (804) 371-2708) if a significant amount of time elapses before the natural heritage information above ("Environmental Impacts and Mitigation," item 2) is used. As indicated above ("Environmental Impacts and Mitigation," item 7(d)), DGIF is willing to assist the Army in developing a plan that includes open space, wildlife habitat, and natural stream channels which retain their wooded buffers. To pursue this assistance, please feel free to contact DGIF (begin with Amy Ewing, telephone (804) 367-2211 or e-mail amy.ewing@dgif.virginia.gov).	Comment noted.
	5(c) Authorities. OCR's responsibility for natural heritage resources stems from Virginia Code sections 10.1-209 through 10.1-217. DGIF's regulatory authority for protection and management of endangered and threatened species stems from Virginia Code sections 29.1-563 through 29.1-570.	Comment noted.

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Comment #	**Agency Comment**	**ANC Response**
Regulatory and Coordination Needs		

20	**6. Solid and Hazardous Waste Management.**
	
	6(a) *Coordination.*
	6(a)(i)Petroleum Contamination. For additional information and the administrative records of petroleum contamination cases which are in close proximity to proposed projects, the Army may contact DEQ's Northern Regional Office (DEQ-NRO) (Tanks Program, telephone (703) 583-3800.
	
	6(a)(ii)Asbestos-Containing Materials; Lead-based Paints. Questions on these topics may be directed to DEQ-NRO (Kathryn Persyzk, telephone (703) 583-3856 oremail kathryn.persyzk@deq.virginia.gov).
	
	6(a)(ii)General Questions. General questions concerning waste management may be directed to DEQ's Division of Land Protection and Revitalization (Steve Coe, telephone (804) 698-4029 or e-mail steve.coe@deq.virginia.gov).
	
	6(b) Authorities. Legal and regulatory authorities for waste management include, but are not limited to, the following:
	Virginia:
	▪ Virginia Waste Management Act, Virginia Code sections 10.1-1400 *et seq.;*
	▪ *Virginia Hazardous Waste Management Regulations,* 9 VAC 20-60;
	  ○ See 9 VAC 20-60-261 for rules on lead-based paints
	▪ Virginia Solid Waste Management Regulations, 9 VAC 20-81;
	  ○ See 9 VAC 20-81-620 for asbestos-containing materials
	▪ Virginia Regulations for the Transportation of Hazardous Materials, 9 VAC 20-110.
	
	Federal:
	▪ Resource Conservation and Recovery Act, 42 U.S.C. sections 6901 *et seq.*
	▪ Applicable provisions in Title 40, *Code of Federal Regulations*
	▪ U.S. Department of Transportation *Rules for Transportation of Hazardous Materials,* 49 CFR Part 107.
		Comment noted.
		
		Comment noted.
		
		Comment noted.
		
		Comment noted

Letter from the Commonwealth of Virginia dated October 16, 2013		
Comment #	**Agency Comment**	**ANC Response**
Regulatory and Coordination Needs		
21	**7. Wetlands Management Enforceable Policy; Water Resources.** *7(a)Coordination.* Questions relating to water resource permitting may be directed to DEQ's Northern Regional Office (Bryant Thomas, telephone (703) 583-3843). *7(b)Authorities.* The Virginia Water Protection Permit is required by Virginia Code sections 62.1-44.15:50, which is implemented by regulations found in 9 VAC 25-210-10.	 Comment noted. Comment noted.

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APPENDIX E

Memorandum of Understanding Between Department of the Army and County Board of Arlington County, Virginia

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APPENDIX E
Memorandum of Understanding Between Department of the Army and County Board of Arlington County, Virginia

The Memorandum of Understanding (MOU) between the Department of the Army and the County Board of Arlington County, Virginia follows this page.

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MEMORANDUM OF UNDERSTANDING

BETWEEN

DEPARTMENT OF THE

ARMY AND

COUNTY BOARD OF ARLINGTON COUNTY, VIRGINIA

I. Purpose: The purpose of this Memorandum of Understanding (MOU) is to establish a framework for collaboration between the Department of the Army (Army), now having administrative jurisdiction for certain lands of the United States of America (USA), and the County Board of Arlington County, Virginia (County) for the consideration and development of a future land exchange agreement between the County and the Army. The properties under consideration are in and around the site now or previously known as the Navy Annex site (FOB-2).

This MOU generally describes the properties under consideration, the key objectives of both the Army and the County (Parties), the numerous additional entities having a legal or other interest in any possible exchange, and some of the due-diligence processes needed to be completed by both the Parties before any exchange.

II. Background: As authorized by Sec. 2881 of the National Defense Authorization Act for Fiscal Year 2005 (Public Law 108-375), the Department of Defense, Washington Headquarters Service (WHS), then having administrative jurisdiction for certain lands of the USA, and the County and the USA executed a land exchange agreement (Exchange Agreement) on September 17, 2008 whereby part of the County-owned Southgate Road right of way would be conveyed to the USA in exchange for an approximately equal amount of acreage on the Navy Annex property north of Columbia Pike, subject to certain preconditions.

As required by Public Law 106-65, on January 1, 2012, administrative jurisdiction over the Navy Annex was transferred from the Secretary of Defense to the Secretary of the Army.

After the execution of the 2008 Exchange Agreement, the Army made further analysis of its expansion plans for Arlington National Cemetery. In April 2012, the Department of Defense WHS terminated the Exchange Agreement.

Although the 2008 Exchange Agreement was terminated, the Army indicated a willingness and desire to work collaboratively with the County to formulate a new exchange agreement between the Army and the County which might better serve both Arlington National Cemetery and the County. The purpose of this MOU is to frame, generally, the concept of a future exchange, identify some of the potential issues, and address the tasks to be accomplished before a new exchange agreement can be prepared.

III. Objectives:

A. The Army understands that a larger, more comprehensive exchange of properties with the County presents the opportunity for Arlington National Cemetery to substantially increase the contiguous area of land available for grave sites and other cemetery-related purposes. In pursuit of that objective, the Army will evaluate the possible advantages to Arlington National Cemetery of the County's proposed realignment of Columbia Pike at, and easterly of, the Air Force Memorial (as generally depicted in Exhibit 1), the acquisition of the Southgate Road right-of-way, and the acquisition of land currently owned or controlled by the Commonwealth of Virginia (State).

B. The County understands that a larger, more comprehensive exchange of properties with the Army presents the opportunity for the County to acquire a larger parcel(s) of land south of a realigned Columbia Pike for County and/or public uses and purposes. In pursuit of that objective, the County will evaluate the advantages of a realignment of Columbia Pike at, and easterly of, the Air Force Memorial (as generally depicted in Exhibit 1), the conveyance of all County owned portions of the Southgate Road right-of-way to the Army, and the acquisition of land currently under the administrative jurisdiction of the Army.

C. The County recognizes and supports the mission of Arlington National Cemetery to provide the space, environment and protocols to "Honor the Fallen" while the Army recognizes and supports the County's interest in public land use planning, a multimodal transportation system, protection of the environment, historic preservation, commemoration and public education.

D. The Parties understand that, to achieve their respective objectives, there are a multitude of funding, planning, design, and construction requirements that must be met, in addition to the potential need for legislation. The Parties have a mutual goal of completing all appropriate due diligence, and negotiating and entering into an exchange agreement, as soon as reasonably practicable.

IV. Description of Lands: Exhibit 1 is a conceptual diagram that illustrates one potential "desired future state" that the Army and the County agree to evaluate and consider for a possible new exchange agreement. The exhibit shows the retention by the Army of all Navy Annex land to the north of a realigned and improved Columbia Pike, and a 55 foot wide easement for street and utility purposes to be conveyed by the Army to the County along the western-most boundary to provide for a County road for access from Columbia Pike to Joint Base Myer-Henderson Hall. Exhibit 1 also contemplates the conveyance to the Army of the entire County-owned Southgate Road right-of-way, along with certain portions of County-owned Columbia Pike, for Arlington National Cemetery purposes. In this diagram, all of the available land south of Columbia Pike, running from the now existing VDOT facility on the west to Joyce Street on the east, would be conveyed to the County. The Exhibit is based on the assumption that the State would agree to convey to the Army land south of Columbia Pike and east of S. Joyce Street that is currently owned by the State. However, both Parties recognize that this outcome will require the active participation and approval of the State, which is not a party to this MOU.

V. Mutual Understandings: The Parties hereby agree:

A. To work collaboratively with other federal, state and local stakeholders, and other interested entities, to discuss the feasibility and desirability of the County realigning Columbia Pike and exchanging lands, as generally depicted in Exhibit 1, for the purposes described in this MOU.

B. That the County will make an assessment, and determine the feasibility, of using the lands south of Columbia Pike, as generally depicted in Exhibit 1, for the purposes described in this MOU.

C. That the Parties will work collaboratively with VDOT, FHWA, WHS and other stakeholders on technical studies and processes to advance the redesign of the Washington Blvd./Columbia Pike interchange and the realignment of Columbia Pike as generally depicted in Exhibit 1.

D. That the Army will work with WHS, in deconstructing the Navy Annex, to physically reserve a 55-foot wide strip of property along the western boundary of the Navy Annex site, for conveyance to the County of an easement for street and utility purposes, necessary for construction of a County road sufficient to meet the current and future access needs of Joint Base Myer-Henderson Hall. The County shall be solely responsible for securing all funding necessary for the construction and ongoing maintenance of the street and any utilities.

E. To cooperate in the free and timely exchange of information; to allow access to their

respective lands by technical personnel involved in due diligence assessments and analysis; and to explore the possibility of participating collaboratively in each other's planning and community processes to the extent mutually beneficial.

F. To share all relevant maps, drawings, and other documents to support their respective due diligence and planning efforts and to provide access to key personnel.

G. Both parties agree to identify appropriate funding opportunities, within existing fiscal and statutory constraints, that must precede the contemplated land exchanges.

H. The Parties understand the complexities involved in the contemplated land exchanges and the major infrastructure modifications that would be necessary to achieve the "desired future state." The Parties further understand the necessity of maintaining a fully-functional, effective and safe transportation network through all phases of construction. To that end, the Parties agree to work together in an effort to provide each other with the necessary property interests required to maintain such a transportation network.

I. _To diligently pursue a new exchange agreement that, among other things, would result in an exchange of properties (not necessarily of equal acreage), to address the objectives outlined in Sections IIIA and IIIB above.

J. To work collaboratively with VDOT and State elected officials to achieve the related conveyance of State lands to the Army.

K. To collaborate and coordinate all external communications.

VI. Effective Date and Termination: This is a non-binding MOU which is effective on the date last signed below. This MOU will remain in effect for a period not to exceed 5 years from the effective date, unless this MOU is first terminated, in writing, by one of the Parties, effective upon 90 days prior written notice of such termination to the other Party, or until an exchange agreement is executed by and between the County and the Army.

COUNTY BOARD OF ARLINGTON COUNTY, VIRGINIA

By: Barbara M. Donnella

Title: County Manager

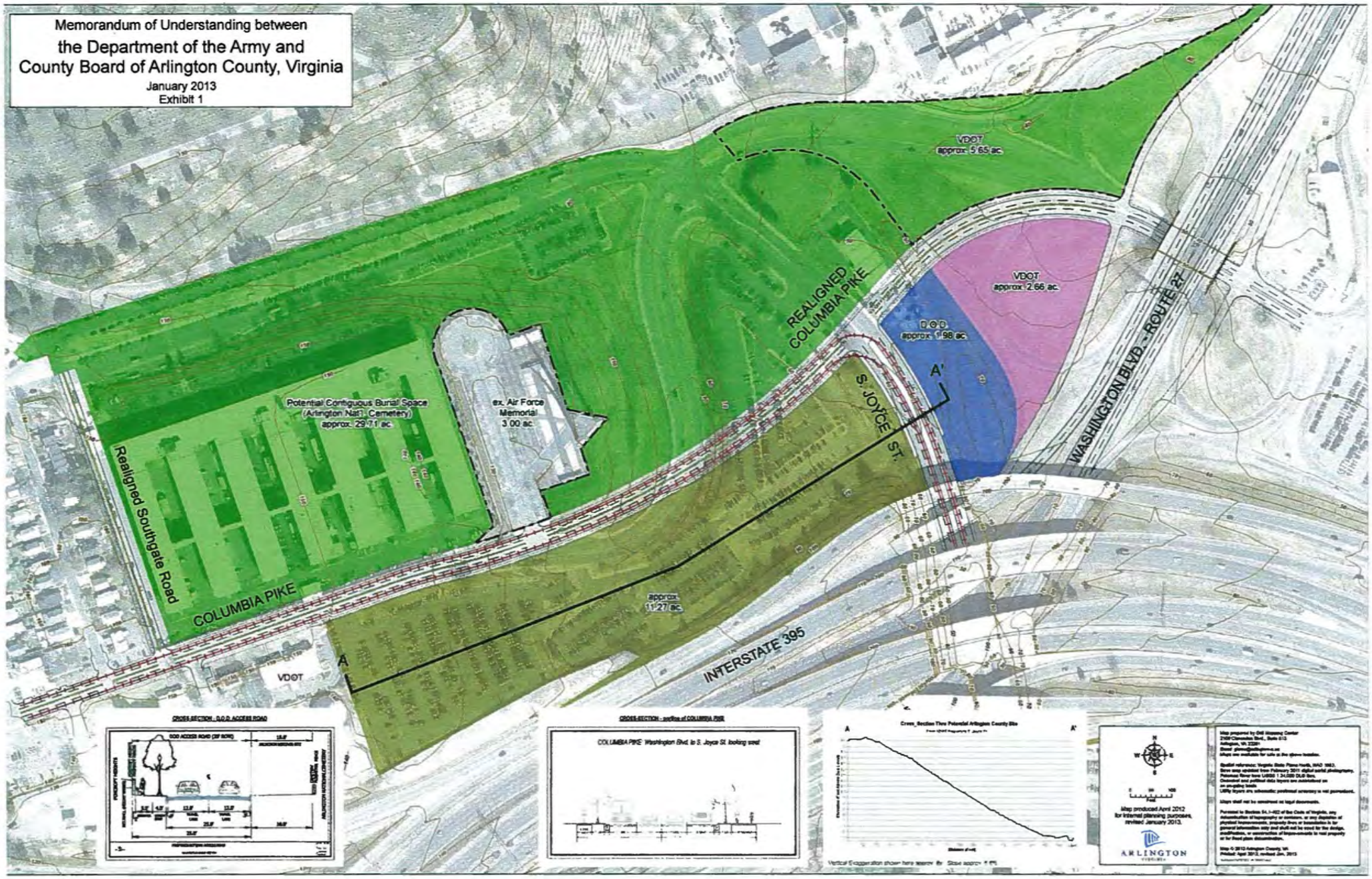
Date: January 10, 2013

DEPARTMENT OF THE ARMY

By: Kathryn A. Condon

Title: Executive Director, ANMC

Date: January 9, 2013


Memorandum of Understanding between
the Department of the Army and
County Board of Arlington County, Virginia
January 2013
Exhibit 1
VDOT
approx. 5.65 ac.
VDOT
approx. 2.66 ac.
D.O.D.
approx. 1.98 ac.
REALIGNED COLUMBIA PIKE
S. JOYCE ST.
A'
WASHINGTON BLVD. - ROUTE 27
Potential Contiguous Burial Space
(Arlington Nat'l. Cemetery)
approx. 29.71 ac.
ex. Air Force
Memorial
3.00 ac.
Realigned Southgate Road
COLUMBIA PIKE
approx.
11.27 ac.
INTERSTATE 395
A
VDOT
CROSS-SECTION - D.O.D. ACCESS ROAD
CROSS-SECTION - portion of COLUMBIA PIKE
COLUMBIA PIKE: Washington Blvd. to S. Joyce St. looking west
Cross_Section Thru Potential Arlington County Bike
Map produced April 2012
for internal planning purposes,
revised January 2013.
ARLINGTON

APPENDIX F

Traffic Impact Assessment

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APPENDIX F
Traffic Impact Assessment

The Arlington National Cemetery (ANC) Real Property Master Plan includes redevelopment of the Southern Expansion Site. The alternatives for redevelopment may affect local roadways and traffic conditions in the Foxcroft Heights neighborhood adjacent to the Southern Expansion Site. As a result, a Traffic Impact Assessment was performed to assess the potential impacts on local traffic operations. Exiting traffic conditions as well as those under the No Action and Action Alternatives in 2020 (opening year) and 2040 (design year) were evaluated.

This report documents the assessment of traffic impacts and is organized in the following manner:

- Section 1 – Study Area and the Existing Transportation Network
- Section 2 - Other Planned Project
- Section 3 – Traffic Analysis Methodology and Assumptions
- Section 4 – Traffic Analysis Results
- Section 5 - Summary of Findings

1 Study Area and Existing Transportation Network

The study area, shown in **Figure 1**, is the area bounded by Columbia Pike (Route 244), Southgate Road and South Orme Street. The study area includes seven key intersections:

1. Columbia Pike and South Joyce Street / Southgate Road (signalized)
2. Columbia Pike and South Oak Street (unsignalized)
3. Columbia Pike and South Ode Street (unsignalized)
4. Columbia Pike and South Orme Street / VA 27 off-ramp (signalized)
5. Southgate Road and South Oak Street / Hobson Drive (unsignalized)
6. Southgate Road and South Ode Street (unsignalized)
7. Southgate Road and South Orme Street (unsignalized)

The transportation network within and adjacent to the study area consists of roadways, on-street parking, Metrorail and bus stops, pedestrian walkways, and bikeways. The surrounding facilities include Joint Base Myer-Henderson Hall (JBM-HH), the Pentagon and related Department of Defense facilities, Pentagon City, and three memorial facilities: ANC, the Pentagon 9/11 Memorial, and the Air Force Memorial. The immediate study area includes a residential community, a hotel, a Virginia Department of Transportation lot, and a small retail strip. All of these facilities have the potential to generate employee-, resident-, and/or tourism-related vehicular traffic during weekday peak periods.

Figure 1

Study Area

1.2 Roadways

Interstate 395 (I-395), Washington Boulevard (Route 27), and Columbia Pike (Route 244) provide regional and local access to and from the study area. Joyce Street, Southgate Road, South Orme Street, South Ode Street, and South Oak Street all provide local access within the study area. These key roadway segments are described in the following paragraphs. The 2012 Annual Average Daily Traffic (AADT) volumes[1], when available, are shown in **Figure 2.** The AADT is the average roadway traffic on a typical day (24 hours).

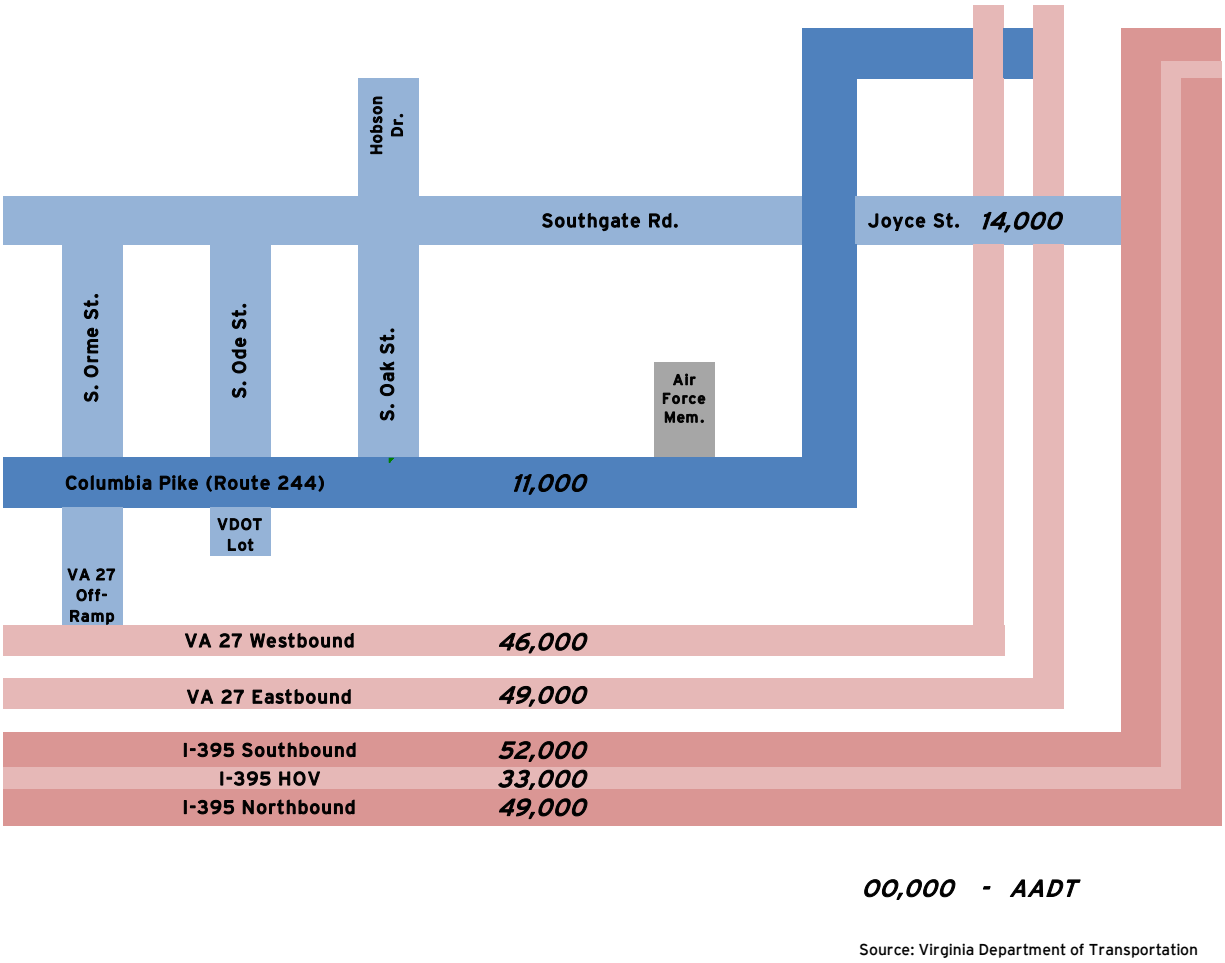
I-395

I-395, an urban interstate with high-occupancy vehicle (HOV) lanes, is a major commuter route between Northern Virginia and Washington, DC. I-395 connects with I-695 and I-295 north of the study area in Washington, DC, and with I-495 and I-95 south of the study area near Springfield, Virginia.

[1] VDOT's Info Center: http://www.virginiadot.org/info/2012_traffic_data_by_jurisdiction.asp

Figure 2

AADT Around and Within the Study Area



Source: Virginia Department of Transportation

Washington Boulevard

Washington Boulevard (Route 27) is an urban principle four-lane arterial with two lanes in each direction that runs east-west, but curves around the perimeter of the study area. Washington Boulevard connects major travel routes in Northern Virginia, such as the George Washington Memorial Parkway, Route 110, I-395, and US Route 50. Within the Study Area, the speed limit is 45 miles per hour (mph).

Columbia Pike

Columbia Pike (Route 244) is an urban principal arterial route with two lanes in each direction that runs east-west from Washington Boulevard and South Joyce Street to VA 236 (Little River Turnpike) in Annandale, Virginia. Columbia Pike intersects major routes in Northern Virginia such as Lincolnia Road, VA 7, George Mason Drive, and Glebe Road. Columbia Pike is also considered the principal street in South Arlington. Within the study area, the speed limit is 25 mph.

Joyce Street

Joyce Street is an urban minor arterial route with two lanes in each direction that connects the study area and Pentagon City underneath the I-395 overpass. The speed limit is 35 mph.

Southgate Road

Southgate Road is a local access road for employees and service vehicles to ANC and JBM-HH, and also provides access to three residential streets. Parking is available on both sides of the street. There are two access points to JBM-HH along Southgate Road. Access Point 1 (Gate 1) is located at the intersection of Southgate Road and South Orme Street and is open 24 hours a day, 7 days a week. The Marine Corps Exchange (a military commissary) is located directly past Gate 1 and is assumed to be a traffic sink/generator. Access Point 3 (Gate 3) is located on Hobson Drive, about 600 feet east of Access Point 1. Gate 3 is open from 6:00 AM until 6:00 PM, Monday through Friday.

South Orme Street, South Ode Street and South Oak Street

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 travel lane in the southbound direction and northbound direction respectively. The speed limit on all three roads is 25 mph, and parking is available on all roads on both sides of the street.

1.3 Public Transportation

The Washington Metropolitan Area Transit Authority (WMATA) operates both Metrorail and Metrobus service in the vicinity of the study area. The Pentagon and Pentagon City Metrorail stations are located approximately 1.0 miles from the study area. Metrobus service is provided along Columbia Pike with bus Routes 16A, 16B, 16D, 16E, 16G, 16H, 16J, 16K, 16P, and 16X stopping between South Orme and South Ode Streets, east of South Joyce Street in the eastbound direction, and in front of the closed Navy Annex building in the westbound direction. These lines service Annandale, Barcroft, Culmore, Baileys Crossroads, Pentagon City, Crystal City, and the Pentagon.

Arlington Transit (ART) operates Route 42, which connects the Pentagon with Ballston. The bus stops between South Orme and South Ode Streets in the eastbound direction and in front of the closed Navy Annex building in the westbound direction.

The Department of Defense offers a free shuttle bus service from JBM-HH to the Pentagon along Southgate Road, called the Fort Myer Flyer. A valid military or civilian contractor identification badge is required at all times to ride the bus.

1.4 Parking

Southgate Road currently provides around 380 (parallel and perpendicular) parking spaces. Designated parking along Southgate Road is reserved for staff, dignitaries, handicapped individuals, and visitors with a security clearance. Visitor parking on Southgate Road is allowed

between 6:30 AM and 3:30 PM on weekdays, and has no restrictions on weekends and holidays.

During a field visit in May 2014, the parking activity on Southgate Road was observed. All of the parking spaces were occupied by 10 AM in the morning with about 30 vehicles arriving during the AM peak hour. Most of these vehicles entered from the intersection of Columbia Pike and South Joyce Street. In the evening, the majority of these vehicles make a U-turn prior to Hobson Drive to exit via the intersection of Columbia Pike and South Joyce Street.

1.5 Pedestrian and Bicycle Circulation

Pedestrian and bicycle facilities within the study area are illustrated in **Figure 3**. Sidewalks within the study area provide connections with the Pentagon and Pentagon City. These sidewalks range in width from four feet along portions of the residential streets to twelve feet near the Sheraton Hotel.

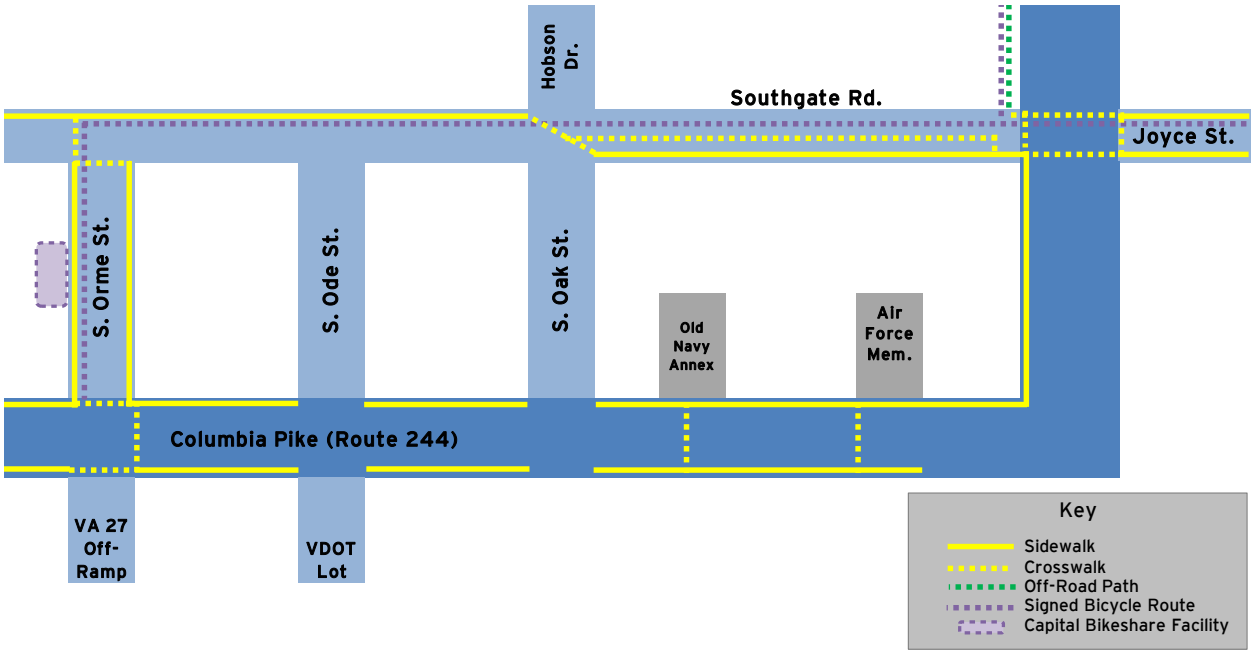
As shown in Figure 3**,** crosswalks are present at many locations in the study area. However, striping is extremely faint at crosswalks along Southgate Road. Crosswalks with pedestrian-actuated signals are available at the intersections of Columbia Pike and South Orme Street, and Columbia Pike and South Joyce Street. There are three pedestrian islands at the intersection of Joyce Street which provide higher safety to pedestrians. Many sidewalks and crosswalks in the study area are not Americans with Disabilities Act (ADA)-compliant.

There is a signed on-road bike route through the study area. This route connects with trails leading through JBM-HH, the Pentagon, ANC, the Mount Vernon Trail, and Arlington Memorial Bridge.

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

Figure 3

Existing Pedestrian and Bike Facilities in the Study Area



2 Other Planned Projects

Arlington County has major planned projects that could potentially affect the study area in the opening and design years.

- The County's *Columbia Pike Transit Initiative Locally Preferred Alternative Report*[2] was released in July 2012, firmly establishing a streetcar route along Columbia Pike by 2018.
- The County's *Multimodal Street Improvements Transportation Study*[3] released in June 2012 proposed to standardize the Columbia Pike roadway with a 56-foot-curb-to-curb cross-section and to make the corridor more appealing to multimodal transportation users, specifically public transit users, pedestrians, and bicyclists. This new cross-section includes the proposed streetcar along Columbia Pike. The County also wishes to introduce a 10-foot-wide sidewalk on the north side of Columbia Pike and to enhance bicycle access from Washington Boulevard to South Joyce Street.

[2] Columbia Pike Transit Initiative Locally Preferred Alternative Report; http://www.columbiapikeva.us/wp-content/uploads/2013/02/LPA_Report_7-16-12.pdf; accessed on June 18, 2014
[3] Multimodal Street Improvements Transportation Study; http://arlingtonapps.com/documents/Columbia_Pike_Multimodal_Street_Improvements_Transportation_Study.pdf; accessed on June 20, 2014

3 Traffic Analysis Methodology and Assumptions

Exiting traffic conditions as well as those under the No Action and Action Alternatives in 2020 (opening year) and 2040 (design year) were evaluated. Traffic Analysis was conducted at the seven key intersections in the study area. In order to analyze the intersections it was first necessary to conduct traffic counts, develop traffic forecasts for 2020 and 2040, and obtain signal timing.

3.1 Traffic Counts

Turning movement counts were performed in May and June 2014 at the seven key intersections. The raw traffic counts are provided in Section 1 of Attachment 1. These counts were conducted during the AM peak period (6:00 AM to 10:00 AM) and the PM peak period (3:30 PM to 6:30 PM). The hours when the summation of hourly traffic volume (across at all intersections) was the highest were identified as the AM and PM peak hours. Through this computation, the AM and PM peak hours were identified as 7:15-8:15 AM and 4:45-5:45 PM respectively.

3.2 Traffic Forecast

To forecast the traffic volume in 2020 and 2040, the Metropolitan Washington Council of Governments (MWCOG) model Version 2.3 Build 52 with Round 8.2 land use forecast was used. The models for the years 2010, 2020 and 2040 were used to match with the analysis years. MWCOG model forecasts future traffic volumes using financially-constrained transportation improvement projections and socioeconomic data in the National Capital Region. This is a regional forecast model used to predict regional travel trends and is not very accurate at a street or intersection level. It can, however, be used to predict growth on a travel corridor.

The model's 2010 traffic volumes included the Navy Annex, a facility that employed around 9,000 people within the Study Area which was closed in 2013. The traffic counts done for this study (in 2014) did not have the traffic related to Navy Annex. MWCOG's 2020 model showed negative growth or no growth throughout the study area to account for the proposed Columbia Pike Streetcar and the lack of the Navy Annex. As it was not possible to independently determine the influence of the Navy Annex closure and Columbia Pike Streetcar on the study area, a conservative assumption was made that there will be no growth between 2014 and 2020 in the Study Area.

Between 2020 and 2040, the model predicted unrealistic growth along Columbia Pike, estimating almost 90 percent growth along westbound Columbia Pike and over 40 percent growth along eastbound Columbia Pike in the peak direction of travel between Joyce Street and Washington Boulevard. Arlington County faced similar challenges using MWCOG's forecasts for a multimodal study on Columbia Pike. Refined MWCOG model results[3], developed by Arlington County to more accurately represent travel forecasts along Columbia Pike, were used in this study.

As shown in the volume diagrams (Figures F-1 to F-9 in Attachment 1), along westbound Columbia Pike, a growth rate of 18 and 7 percent was applied to AM and PM peak hour traffic,

respectively. Along eastbound Columbia Pike, a growth rate of 13 percent was applied to both AM and PM peak hour traffic. Based on the 2013 JBM-HH Real Property Master Plan's findings, no significant growth is predicted at the base. However, a conservative growth rate of 5% was applied to the rest of the study intersections.

3.3 Signal Timing

Signal timing for the intersection of Columbia Pike and Joyce Street was received from Arlington County. The intersection of Columbia Pike and South Orme Street was recently signalized by a third-party contractor as a part of the reconstruction of the interchange of Columbia Pike and VA 27. No signal timing information was available for this signal as it was being operated by the contractor at the time this study was being conducted. The signal timing recorded in the field was used with assumptions for various parameters that are consistent with the nearby Columbia Pike intersection with Joyce Street.

3.4 Intersection Analysis Procedures

All of the intersections were analyzed using procedures outlined in the Highway Capacity Manual (HCM) 2010. The analysis was performed using Highway Capacity Software (HCS) 2010 for unsignalized intersections and the Highway Capacity Manual 2010 procedures in Synchro 8 for signalized intersections.

4 Traffic Analysis Results

Traffic analysis was done for Existing Conditions (2014), Project Opening Year (2020), and Design Year (2040) during the identified peak hours. The results of the analysis are expressed in vehicle delay and Level of Service (LOS). The following LOS definitions[4] were used in this analysis:

- LOS A-C: Almost all vehicles are served at the end of the cycle with stable flow of traffic. Average vehicle delay is less than 35 seconds.
- LOS D: Individual cycles may fail occasionally resulting in vehicles waiting through more than one cycle. Average vehicle delay ranges between 35-55 seconds which is acceptable in the urban areas.
- LOS E: A noticeable queue of vehicles remains not served at the end of most cycles. Average vehicle delay ranges between 55-80 seconds.
- LOS F: A majority of vehicles in the queue remain not served at the end of most cycles. Average vehicle delay is typically above 80 seconds. An intersection operating at LOS F might have more demand than it is capable of serving.

In urban areas generally, LOS D or better is acceptable. LOS E or worse is considered degraded with undesirable vehicular delays. In this study, operations at LOS E or F are considered as a significant impact.

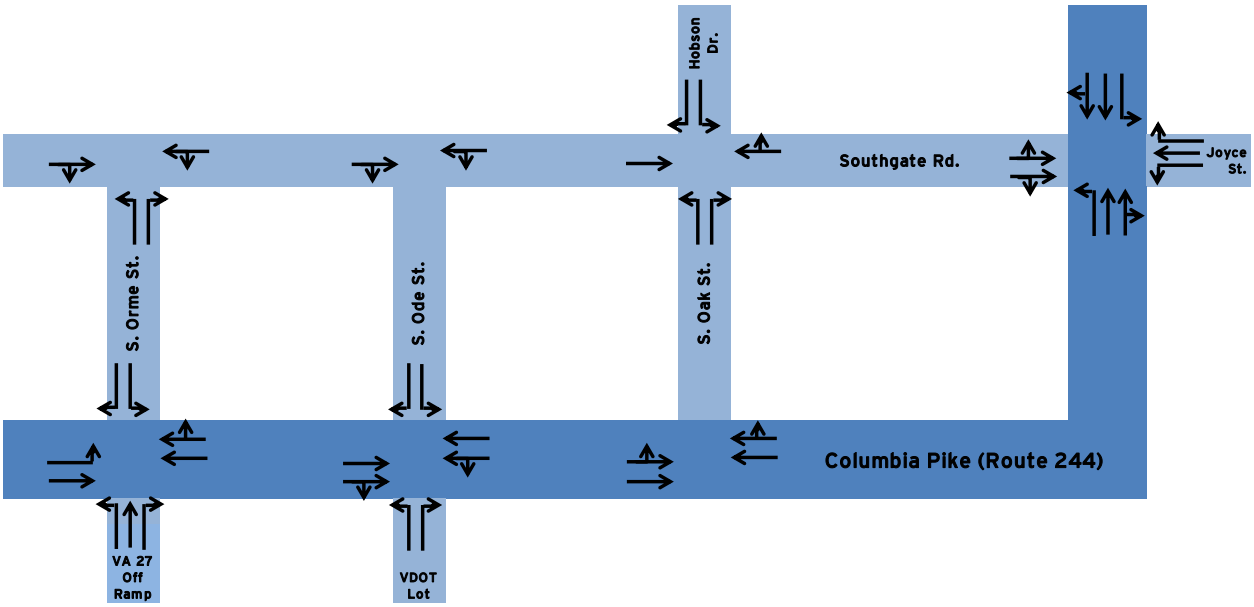
[4] 2010 Highway Capacity Manual; Pages 18-5 to 18-6; Transportation Research Board

4.1 Existing Conditions

Existing conditions (2014) were evaluated at the seven key intersections. The lane configuration evaluated is illustrated in **Figure 4**.

Figure 4

Lane Configuration – Existing Conditions



AM and PM peak hour traffic volumes for the existing conditions are presented in Figure F-1, in Attachment 1. Traffic analysis results for the existing conditions are shown in **Table 1**.

Table 1

Existing Conditions Intersection Delay and LOS (2014)

Intersection	Control Type	AM		PM	
		Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
Columbia Pk. & S. Joyce St.	S	23	C	28	C
Columbia Pk. & S. Ode St.	U	12	B	13	B
Columbia Pk. & S. Orme St.	S	21	C	30	C
Southgate & S. Oak St.	U	10	A	11	B
Southgate & S. Orme St.	U	9	A	10	A

Notes: S – Signalized
U – Unsignalized
sec/vh – seconds per vehicle

Source: HNTB analysis, 2014.

Under existing conditions, all of the intersections operate at an overall LOS C or better, which indicates stable and free flow of traffic with no congestion. In the PM peak hour, the southbound left movement at the intersection of Columbia Pike and South Joyce Street operates at LOS E with a delay of 68 seconds. Delay and LOS by movement are shown in detailed HCS and Synchro analysis worksheets in Attachment 1.

4.2 No Action Alternative

For the No Action Alternative, land use and the transportation network in the study area remain the same as with the existing conditions. The lane configuration is also the same as the existing conditions shown in Figure 4. AM and PM peak hour traffic volumes for the No Action Alternative are presented in Figures F-2 and F-6 in Attachment 1. For the No Action Alternative, signal timing was optimized such that the overall intersection and individual movements would operate at LOS C or better. Detailed HCS and Synchro analysis worksheets are shown in Attachment 1. Traffic analysis results for the No Action Alternative in 2020 and 2040 are shown in **Table 2 and Table 3**, respectively.

Table 2
No Action Alternative Intersection Delay and LOS (2020)

Intersection	Control Type	AM		PM	
		Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
Columbia Pk. & S. Joyce St.	S	18	B	19	B
Columbia Pk. & S. Ode St.	U	10	B	11	B
Columbia Pk. & S. Orme St.	S	21	C	27	C
Southgate & S. Oak St.	U	10	A	11	B
Southgate & S. Orme St.	U	9	A	9	A

Notes: S – Signalized
U – Unsignalized
sec/vh – seconds per vehicle

Source: HNTB analysis, 2014.

Table 3
No Action Alternative Intersection Delay and LOS (2040)

Intersection	Control Type	AM		PM	
		Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
Columbia Pk. & S. Joyce St.	S	19	B	21	C
Columbia Pk. & S. Ode St.	U	10	B	12	B
Columbia Pk. & S. Orme St.	S	22	C	29	C
Southgate & S. Oak St.	U	10	A	12	B
Southgate & S. Orme St.	U	9	A	9	A

Notes: S – Signalized
U – Unsignalized
sec/vh – seconds per vehicle

Source: HNTB analysis, 2014.

4.3 Alternative 1- ANC Including the Southern Expansion Site

From a traffic movement and roadway access perspective, Alternative 1 would be identical to the existing conditions and the No Action Alternative. Under Alternative 1, ANC expansion would take place south of Southgate Road, with the road remaining open to the public. The lane configuration for Alternative 1 is shown in Figure 4

A maximum of 6 interments may occur in this site resulting in two-10 minute closures of Southgate Road per interment. Interments are expected to occur during the mid-day between 9am-3pm which is equivalent to two-10 minutes closures every hour. As discussed in detail in Section 3.10.3.2 of the EA, during the temporary closure, vehicles would experience an average delay of 5.4 minutes with a maximum of 10 minutes and a minimum of 40 seconds for those that would arrive just as the traffic resumes. Even if Southgate Road is assumed to closed during the mid-day with all the traffic diverted to residential streets, a scenario similar to Alternative 2, the operations will remain within the acceptable range of LOS C or better as shown in Alternative 2 analysis. In the analysis of Alternative 2, as peak hour traffic on Southgate Road is shifted to the residential streets with acceptable LOS, the effect of shifting mid-day traffic is expected to be minimal.

The effect of these temporary closures on Southgate Road was not analyzed as they do not overlap with the identified peak hours (7:15-8:15 AM and 4:45-5:45 PM) in the study area. AM and PM peak hour traffic volumes for 2020 and 2040 Alternative 1 Scenarios are presented in Figures F-3 and F-7 in Attachment 1. Traffic analysis results are shown in **Table 4 and Table 5** for Alternative 1 in 2020 and 2040, respectively. With Alternative 1, during the peak hours, traffic operations would be identical to the No Action Alternative with the intersection and individual movements at LOS C or better. Detailed HCS and Synchro analysis worksheets are shown in Attachment 1.

Table 4
Alternative 1 Intersection Delay and LOS (2020)

Intersection	Control Type	AM		PM	
		Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
Columbia Pk. & S. Joyce St.	S	18	B	19	B
Columbia Pk. & S. Ode St.	U	10	B	11	B
Columbia Pk. & S. Orme St.	S	21	C	27	C
Southgate & S. Oak St.	U	10	A	11	B
Southgate & S. Orme St.	U	9	A	9	A

Notes: S – Signalized
U – Unsignalized
sec/vh – seconds per vehicle

Source: HNTB analysis, 2014.

Table 5

Alternative 1 Intersection Delay and LOS (2040)

Intersection	Control Type	AM		PM	
		Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
Columbia Pk. & S. Joyce St.	S	19	B	21	C
Columbia Pk. & S. Ode St.	U	10	B	12	B
Columbia Pk. & S. Orme St.	S	22	C	29	C
Southgate & S. Oak St.	U	10	A	12	B
Southgate & S. Orme St.	U	9	A	9	A

Notes: S – Signalized
U – Unsignalized
sec/vh – seconds per vehicle

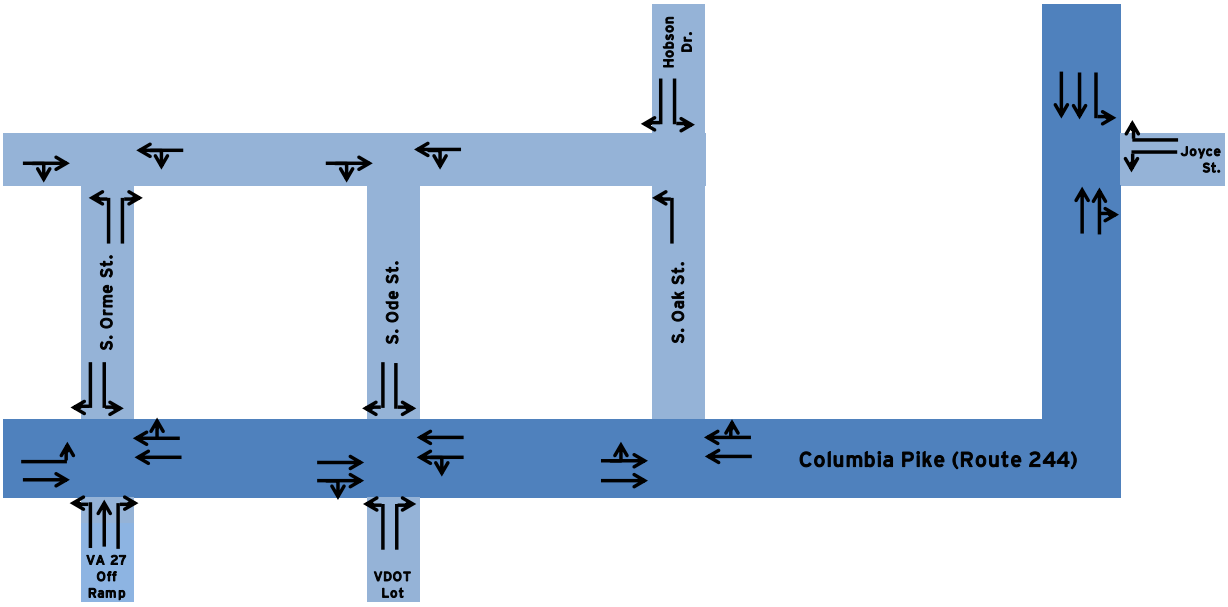
Source: HNTB analysis, 2014.

4.4 Alternative 2- ANC Including the Southern Expansion Site and Southgate Road

Alternative 2 would involve the removal of Southgate Road between Hobson Drive and Columbia Pike. Also, parking along Southgate Road would be eliminated. The land occupied by Southgate Road would become part of ANC. For analysis of this alternative, all of the traffic currently using Southgate Road is diverted to Columbia Pike and assigned to the shortest path to their destination. Traffic using Southgate Road is generally destined to JBM-HH (via Gates 1 and 3), residences along South Orme Street, South Ode Street and South Oak Street, and parking spaces on Southgate Road. The lane configuration for Alternative 2 is shown in **Figure 5**. The redistributed AM and PM peak hour traffic volumes for Alternative 2 in 2020 and 2040 are presented in Figures F-4 and F-8 in Attachment 1.

Figure 5

Lane Configuration – Alternative 2



Traffic analysis results are shown in **Table 6 and Table 7** for Alternative 2 in 2020 and 2040, respectively. With Alternative 2, though all the intersections operate at an overall LOS C or better, delay at the intersections of Columbia Pike with South Orme Street and South Ode Street would increase by 2040 resulting in individual movements operating at an acceptable LOS D in the PM peak hour (see page 1-116 and 1-117 of Attachment 1). Detailed HCS and Synchro analysis worksheets are shown in Attachment 1.

Table 6
Alternative 2 Intersection Delay and LOS (2020)

Intersection	Control Type	AM		PM	
		Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
Columbia Pk. & S. Joyce St.	S	18	B	18	B
Columbia Pk. & S. Ode St.	U	16	C	20	C
Columbia Pk. & S. Orme St.	S	21	C	30	C
Southgate & S. Oak St.	U	8	A	9	A
Southgate & S. Orme St.	U	9	A	9	A

Notes: S – Signalized
U – Unsignalized
sec/vh – seconds per vehicle

Source: HNTB analysis, 2014.

Table 7
Alternative 2 Intersection Delay and LOS (2040)

Intersection	Control Type	AM		PM	
		Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
Columbia Pk. & S. Joyce St.	S	19	B	20	B
Columbia Pk. & S. Ode St.	U	19	C	33	C
Columbia Pk. & S. Orme St.	S	23	C	34	C
Southgate & S. Oak St.	U	9	A	9	A
Southgate & S. Orme St.	U	9	A	9	A

Notes: S – Signalized
U – Unsignalized
sec/vh – seconds per vehicle

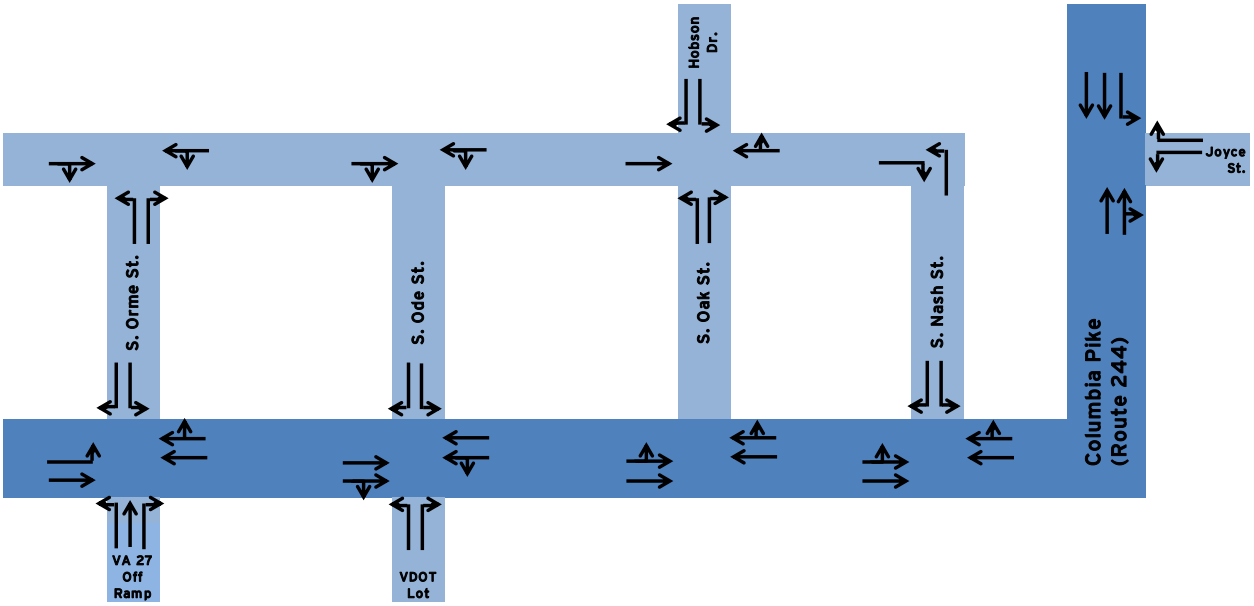
Source: HNTB analysis, 2014.

4.5 Alternative 3 ANC Including the Southern Expansion Site, Southgate Road and Easement

Alternative 3 involves all of the assumptions present in Alternative 2, along with a new access road parallel to and east of South Oak Street. This new road, South Nash Drive, would be the fourth road linking Columbia Pike and Southgate Road at Hobson Drive, and would carry a majority of the traffic diverted from the closed portion of Southgate Road to JBM-HH. The lane configuration for Alternative 3 is shown in **Figure 6**. The redistributed AM and PM peak hour traffic volumes for Alternative 3 in 2020 and 2040 are presented in Figures F-5 and F-9 in Attachment 1.

Figure 6

Lane Configuration – Alternative 3



The traffic operations at the intersection of Columbia Pike and South Nash Drive were tested with and without a signal. Traffic analysis results for Alternative 3 are shown in **Table 8 and Table 9** for 2020 and 2040, respectively. Under Alternative 3, the new access road, South Nash Drive, was assumed to carry traffic to and from JBM-HH Gates 1 and 3. All of the intersections except Columbia Pike and South Nash Drive would operate with similar or lower delay compared to the No Action Alternative.

If the intersection of Columbia Pike and South Nash Street were unsignalized, it would operate at an acceptable LOS D in the AM peak hour (in 2040) and a failing LOS F in the PM peak hour (in both 2020 and 2040). Signalizing this intersection will improve the operations to LOS B or better in both 2020 and 2040 AM and PM peak hours. Detailed HCS and Synchro analysis worksheets are shown in Attachment 1.

Table 8
Alternative 3 Intersection Delay and LOS (2020)

Intersection	Control Type	AM		PM	
		Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
Columbia Pk. & S. Joyce St.	S	18	B	18	B
Columbia Pk. & S. Ode St.	U	10	B	11	B
Columbia Pk. & S. Orme St.	S	21	C	26	C
Southgate & S. Oak St.	U	10	A	11	B
Southgate & S. Orme St.	U	9	A	9	A
Columbia Pk. & S. Nash Dr.	U	23	C	94	F
Columbia Pk. & S. Nash Dr.	S	9	A	16	B

Notes: S – Signalized
U – Unsignalized
sec/vh – seconds per vehicle

Source: HNTB analysis, 2014.

Table 9
Alternative 3 Intersection Delay and LOS (2040)

Intersection	Control Type	AM		PM	
		Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
Columbia Pk. & S. Joyce St.	S	19	B	18	B
Columbia Pk. & S. Ode St.	U	10	B	12	B
Columbia Pk. & S. Orme St.	S	22	C	28	C
Southgate & S. Oak St.	U	10	A	11	B
Southgate & S. Orme St.	U	9	A	9	A
Columbia Pk. & S. Nash Dr.	U	31	D	863	F
Columbia Pk. & S. Nash Dr.	S	9	A	10	B

Notes: S – Signalized
U – Unsignalized
sec/vh – seconds per vehicle

Source: HNTB analysis, 2014.

4.6 Alternative 4

Alternative 4 involves all of the assumptions present in Alternative 3, along with the realignment of Columbia Pike. Arlington County's Columbia Pike Transit Initiative - Alternatives Assessment/Environmental Analysis indicates that if Columbia Pike were realigned, a Construction Staging and Permanent Storage Site would be constructed near where the Navy Annex currently stands. However, since the streetcar's opening year is 2018, it is assumed that the portions of this site which would generate traffic would be removed so that the site would not be a major traffic generator or sink by 2020.

Based on the proposed concepts for the realignment by Arlington County as of July 15, 2014, the alignment of Columbia Pike does not change west of the entrance to Air force memorial. As the traffic circulation and operations of Alternative 4 are identical to Alternative 3, with the exception of the intersection of Columbia Pike and South Joyce Street, it can be concluded that Alternative 4 would not result in significant traffic impacts at 6 out of 7 study intersections. As there is limited information available on the final alignment of Columbia Pike east of the Air force Memorial entrance, changes at this intersection and the associated roadways will be analyzed as part of a project-level NEPA evaluation at a later date.

5 Summary of Findings

The following findings are based on the summarized traffic analysis results shown in **Table 10**.

Under existing conditions, the No Action Alternative and Alternative 1, all of the intersections would operate at LOS C or better, which indicates stable and free flow of traffic with no congestion.

Alternative 2, which includes the closure of Southgate Road, would increase delay at the intersections of Columbia Pike with South Orme Street and South Ode Street, with some movements operating at LOS D. However, all intersections would still operate at LOS C or better.

Under Alternative 3, if the new intersection of Columbia Pike and South Nash Drive was signalized, all of the intersections, including individual movements, would operate at LOS C or better with similar or lower delay than with the No Action Alternative. If the intersection of Columbia Pike and South Nash Drive was unsignalized, it would operate at LOS D in the AM peak hour and a failing LOS F in the PM peak hour by 2040.

Alternative 4 would not result in significant traffic impacts at 6 out of 7 study intersections. A more detailed analysis of the intersection of Columbia Pike and South Joyce Street and the associated roadways will be done as part of a project-level NEPA evaluation at a later date.

Table 10

Overall intersection delay and LOS, Years 2020 and 2040

Opening Year (2020)																	
Intersection	Control Type	AM								PM							
		No Action		Alt 1		Alt 2		Alt 3		No Action		Alt 1		Alt 2		Alt 3	
		Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
Columbia Pk. & S. Joyce St.	S	18	B	18	B	18	B	18	B	19	B	19	B	18	B	18	B
Columbia Pk. & S. Ode St.	U	10	B	10	B	16	C	10	B	11	B	11	B	20	C	11	B
Columbia Pk. & S. Orme St.	S	21	C	21	C	21	C	21	C	27	C	27	C	30	C	26	C
Southgate & S. Oak St.	U	10	A	10	A	8	A	10	A	11	B	11	B	9	A	11	B
Southgate & S. Orme St.	U	9	A	9	A	9	A	9	A	9	A	9	A	9	A	9	A
Columbia Pk. & S. Nash Dr.	U							23	C							94	F
Columbia Pk. & S. Nash Dr.	S							9	A							16	B

Design Year (2040)																	
Intersection	Control Type	AM								PM							
		No Action		Alt 1		Alt 2		Alt 3		No Action		Alt 1		Alt 2		Alt 3	
		Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS	Delay (sec/vh)	LOS
Columbia Pk. & S. Joyce St.	S	19	B	19	B	19	B	19	B	21	C	21	C	20	B	18	B
Columbia Pk. & S. Ode St.	U	10	B	10	B	19	C	10	B	12	B	12	B	33	C	12	B
Columbia Pk. & S. Orme St.	S	22	C	22	C	23	C	22	C	29	C	29	C	34	C	28	C
Southgate & S. Oak St.	U	10	A	10	A	9	A	10	A	12	B	12	B	9	A	11	B
Southgate & S. Orme St.	U	9	A	9	A	9	A	9	A	9	A	9	A	9	A	9	A
Columbia Pk. & S. Nash Dr.	U							31	D							863	F
Columbia Pk. & S. Nash Dr.	S							9	A							10	B

Notes: S – Signalized
U – Unsignalized
sec/vh – seconds per vehicle

Source: HNTB analysis, 2014.

Attachment 1

Traffic Operations

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1 Raw Traffic Counts

Raw traffic counts refer to the turning movement counts conducted in May and June 2014 at 7 key intersections listed below. These counts were performed for four hours in the morning (6:00 AM to 10:00 AM) and for three hours in the evening (3:30 PM to 6:30 PM).

1. Columbia Pike and Joyce Street
2. Columbia Pike and South Oak Street
3. Columbia Pike and South Ode Street
4. Columbia Pike and South Orme Street
5. Southgate Road and South Oak Street
6. Southgate Road and South Ode Street
7. Southgate Road and South Orme Street

Raw traffic counts, per intersection, are shown in the following pages.

Table F - 1: Raw traffic counts for the intersection of Columbia Pike and Joyce Street

Intersection

Major Street	Columbia Pike
Minor Street	Southgate Rd / Joyce St
Intersection	1
Collection Date	June 3, 2014

	Columbia Pike						Joyce St			Southgate Rd			Pedestrians			
Interval Start	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EB**	**WB**	**NB**	**SB**
6:00 AM	0	20	4	14	21	14	10	6	21	4	2	0	0	0	0	0
6:15 AM	3	33	26	18	10	15	12	7	30	6	4	0	0	5	3	0
6:30 AM	2	42	27	26	16	13	15	9	38	11	2	0	0	3	6	2
6:45 AM	2	48	30	22	35	23	20	10	63	10	5	0	0	2	0	6
7:00 AM	2	69	42	21	34	26	27	17	64	9	6	1	0	2	6	2
7:15 AM	1	60	49	31	32	28	22	12	72	20	11	0	0	0	1	0
7:30 AM	1	111	52	34	24	29	33	17	48	21	14	2	0	5	2	3
7:45 AM	3	96	51	21	24	23	34	31	65	30	8	0	1	8	2	2
8:00 AM	2	108	63	27	29	17	24	23	102	15	17	2	0	0	0	0
8:15 AM	1	115	60	26	22	10	26	20	86	19	12	1	1	5	0	2
8:30 AM	0	87	39	25	21	9	24	15	76	16	15	0	0	3	3	1
8:45 AM	1	100	69	18	33	14	25	19	90	13	10	0	0	0	0	0
9:00 AM	1	75	52	17	22	11	27	12	74	20	6	0	2	2	0	1
9:15 AM	1	68	41	15	32	8	26	12	61	10	18	2	0	8	0	1
9:30 AM	1	35	51	23	30	22	19	16	41	9	6	3	1	2	1	4
9:45 AM	0	32	37	28	30	21	17	17	42	10	12	0	0	1	0	2

	Columbia Pike						Joyce St			Southgate Rd			Pedestrians			
Interval Start	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EB**	**WB**	**NB**	**SB**
3:30 PM	1	32	38	32	37	15	34	14	60	30	16	1	2	3	1	5
3:45 PM	2	22	16	38	43	17	34	15	51	28	16	0	0	1	0	1
4:00 PM	2	30	24	42	53	27	45	18	66	50	23	6	0	0	2	3
4:15 PM	1	29	39	45	62	24	48	22	72	40	22	0	0	2	0	3
4:30 PM	0	35	51	38	63	31	52	18	78	39	31	4	0	1	2	1
4:45 PM	0	29	47	42	69	29	71	24	65	26	33	1	4	1	1	1
5:00 PM	2	26	31	49	73	34	58	19	90	50	35	0	1	3	3	2
5:15 PM	3	26	52	53	56	27	88	12	80	21	24	0	3	3	1	5
5:30 PM	1	29	18	62	72	23	69	23	70	30	30	2	1	6	2	0
5:45 PM	0	32	40	48	56	18	58	25	62	28	21	0	2	3	3	4
6:00 PM	0	19	23	41	55	19	56	9	80	23	18	0	2	6	0	5
6:15 PM	1	19	54	43	53	10	64	11	74	12	23	0	1	4	1	4

Table F - 2: Raw traffic counts for the intersection of Columbia Pike and South Oak Street

Intersection

Major Street	Columbia Pike
Minor Street	South Oak St
Intersection	2
Collection Date	May 29, 2014

	Columbia Pike						N/A			South Oak St			Pedestrians			
Interval Start	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EB**	**WB**	**NB**	**SB**
6:00 AM	NA	NA			NA	NA							NA		NA	
6:15 AM	NA	NA	N/A - No Approach	N/A - No Approach	NA	NA		N/A - No Northbound Approach			N/A - One Way Street, Northbound		NA		NA	
6:30 AM	NA	NA			NA	NA							NA		NA	
6:45 AM	NA	NA			NA	NA							NA		NA	
7:00 AM	3	113			44	0							2		3	
7:15 AM	10	138			49	2							0		1	
7:30 AM	1	154			47	1							0		2	
7:45 AM	8	167			63	0							1		1	
8:00 AM	5	182			39	1							0		0	
8:15 AM	6	155			50	2							4		1	
8:30 AM	6	165			45	2							0		0	
8:45 AM	2	165			56	3							0		4	
9:00 AM	6	119			47	0							1		1	
9:15 AM	4	82			40	2							1		2	
9:30 AM	0	62			42	0							0		1	
9:45 AM	2	59			31	3							0		0	

	Columbia Pike						N/A			South Oak St			Pedestrians			
Interval Start	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EB**	**WB**	**NB**	**SB**
3:30 PM	3	47			91	0							0		1	
3:45 PM	2	48	N/A - No Approach	N/A - No Approach	56	3		N/A - No Northbound Approach			N/A - One Way Street, Northbound		0		0	
4:00 PM	1	55			95	0							0		3	
4:15 PM	2	48			86	1							0		0	
4:30 PM	6	57			112	0							0		0	
4:45 PM	6	78			113	1							0		0	
5:00 PM	8	92			127	4							0		0	
5:15 PM	5	95			136	6							0		2	
5:30 PM	6	67			146	5							0		0	
5:45 PM	8	91			118	2							0		1	
6:00 PM	9	44			109	1							0		3	
6:15 PM	3	63			121	2							0		2	

Table F - 3: Raw traffic counts for the intersection of Columbia Pike and South Ode Street

Intersection

Major Street	Columbia Pike
Minor Street	South Ode St
Intersection	3
Collection Date	May 29, 2014

	Columbia Pike						VDOT Lot			South Ode St			Pedestrians			
Interval Start	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EB**	**WB**	**NB**	**SB**
6:00 AM		NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	
6:15 AM	N/A - One Way Street, Southbound	NA	NA	NA	NA	N/A - One Way Street, Southbound	NA	NA	NA	NA	NA	NA	NA	NA	NA	
6:30 AM		NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	
6:45 AM		NA	NA	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	
7:00 AM		113	4	0	44		5	0	0	1	0	7	1	3	0	
7:15 AM		138	1	0	49		0	0	0	0	0	7	3	1	1	
7:30 AM		154	1	0	47		0	0	0	5	0	7	0	2	0	
7:45 AM		167	0	0	63		0	0	0	0	0	4	0	1	0	
8:00 AM		182	1	0	39		0	0	0	0	0	2	0	0	0	
8:15 AM		155	2	0	50		2	0	0	1	0	10	0	1	1	
8:30 AM		165	1	0	45		0	0	0	2	1	6	0	0	0	
8:45 AM		165	5	0	56		2	0	0	2	0	9	0	4	0	
9:00 AM		119	3	2	47		4	0	1	1	0	5	0	1	0	
9:15 AM		82	5	0	40		2	0	0	1	0	8	0	2	0	
9:30 AM		62	4	1	42		1	0	0	0	0	8	0	1	0	
9:45 AM		59	3	0	31		0	0	0	1	0	5	0	0	0	

	Columbia Pike						VDOT Lot			South Ode St			Pedestrians			
Interval Start	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EB**	**WB**	**NB**	**SB**
3:30 PM		47	2	1	91		1	0	0	1	0	4	0	1	0	
3:45 PM	N/A - One Way Street, Southbound	48	2	0	56	N/A - One Way Street, Southbound	1	0	1	1	0	2	0	0	0	
4:00 PM		55	2	0	95		1	0	0	1	0	8	0	3	0	
4:15 PM		48	10	0	86		2	0	0	0	0	6	0	0	0	
4:30 PM		57	1	0	112		0	0	0	1	0	9	0	0	0	
4:45 PM		78	3	0	113		3	0	2	0	0	7	0	0	0	
5:00 PM		92	0	0	127		0	0	0	3	0	8	0	0	0	
5:15 PM		95	2	0	136		1	0	0	1	0	12	0	2	0	
5:30 PM		67	0	1	146		0	0	1	0	0	5	1	0	0	
5:45 PM		91	2	0	118		0	0	0	1	0	12	0	1	0	
6:00 PM		44	2	0	109		1	0	0	1	0	8	1	3	0	
6:15 PM		63	3	1	121		4	0	0	2	0	2	0	2	0	

Table F - 4: Raw traffic counts for the intersection of Columbia Pike and South Orme Street

Intersection

Major Street	Columbia Pike
Minor Street	South Orme St / VA-27 Off-Ram
Intersection	4
Collection Date	June 3, 2014

	Columbia Pike						VA-27 Off-Ramp			South Orme St			Pedestrians			
Interval Start	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EB**	**WB**	**NB**	**SB**
6:00 AM	11	50	6	0	24	0	13	23	14	0	0	8	0	5	0	1
6:15 AM	11	57	15	0	26	0	15	13	11	0	1	7	0	3	0	0
6:30 AM	14	92	18	0	56	0	20	24	4	2	0	6	3	6	0	0
6:45 AM	11	93	15	0	49	1	28	28	14	3	0	4	1	5	0	4
7:00 AM	19	103	15	0	64	2	24	35	4	2	0	15	0	4	0	2
7:15 AM	14	157	19	0	72	3	27	27	11	2	0	20	0	4	0	2
7:30 AM	15	157	24	0	51	3	24	29	5	3	0	21	2	2	1	3
7:45 AM	15	164	17	0	64	1	28	22	8	2	0	15	2	2	0	7
8:00 AM	18	160	15	0	57	4	19	12	9	4	0	19	1	3	0	3
8:15 AM	16	132	17	0	48	0	31	20	10	4	0	13	1	2	0	1
8:30 AM	14	164	21	0	54	1	16	11	10	3	1	10	1	1	0	5
8:45 AM	12	139	17	0	48	2	24	17	11	4	0	18	2	3	0	1
9:00 AM	18	96	11	0	71	4	14	21	13	2	0	14	0	1	0	1
9:15 AM	10	84	17	0	45	6	23	18	15	6	0	16	1	0	0	0
9:30 AM	9	35	15	1	33	5	11	15	12	1	0	8	1	2	0	2
9:45 AM	15	53	4	0	57	5	18	26	11	3	0	18	1	1	1	0

	Columbia Pike						VA-27 Off-Ramp			South Orme St			Pedestrians			
Interval Start	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EB**	**WB**	**NB**	**SB**
3:30 PM	7	54	6	0	72	8	49	28	12	1	0	19	0	1	0	2
3:45 PM	8	34	9	0	60	3	33	10	12	1	0	11	6	2	1	3
4:00 PM	12	48	9	1	78	1	38	24	10	1	0	46	1	3	0	12
4:15 PM	19	75	10	0	103	2	55	19	7	4	0	25	0	0	0	0
4:30 PM	25	81	13	0	127	2	69	17	6	4	0	45	0	4	0	7
4:45 PM	18	79	13	0	141	1	72	25	10	3	0	36	0	3	2	1
5:00 PM	7	66	14	0	145	2	62	19	10	4	0	52	0	4	0	6
5:15 PM	8	74	9	0	154	2	48	19	5	6	0	37	0	2	1	4
5:30 PM	6	64	9	1	135	3	64	15	5	10	0	37	1	7	0	1
5:45 PM	16	74	12	0	143	5	62	12	5	5	0	29	1	8	0	3
6:00 PM	14	47	20	0	118	2	64	15	3	2	0	34	0	6	2	3
6:15 PM	13	75	11	0	115	2	70	8	13	2	0	27	0	10	0	1

Table F - 5: Raw traffic counts for the intersection of Southgate Road and South Oak Street

Intersection

Major Street	Southgate Rd
Minor Street	South Oak St / Hobson Dr
Intersection	5
Collection Date	May 29, 2014

*Note: Pedestrian totals estimated from Intersection 6 with small adjustments.

	Southgate Rd						South Oak St			Hobson Dr			Pedestrians			
Interval Start	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EB**	**WB**	**NB**	**SB**
6:00 AM		15			14	6	0		1	2		0			0	
6:15 AM	N/A - No Approach	3	N/A - One Way Street, Northbound	N/A - One Way Street, Northbound	12	5	0	N/A - No Approach	2	0	N/A - No Approach	3			2	
6:30 AM		14			9	5	1		1	0		1			0	
6:45 AM		21			17	10	3		1	1		2			0	
7:00 AM		22			25	11	1		6	2		3			1	
7:15 AM		38			28	11	3		2	0		2			2	
7:30 AM		31			31	18	2		9	3		7			0	
7:45 AM		39			25	16	2		3	3		8			1	
8:00 AM		29			25	12	0		8	3		11			0	
8:15 AM		29			20	14	1		4	0		4			1	
8:30 AM		27			18	15	7		5	1		3			0	
8:45 AM		18			27	7	1		8	1		1			0	
9:00 AM		17			26	10	1		2	3		2			0	
9:15 AM		17			32	15	2		3	3		6			3	
9:30 AM		18			26	22	5		3	3		5			2	
9:45 AM		20			24	22	2		4	3		2			6	

	Southgate Rd						South Oak St			Hobson Dr			Pedestrians			
Interval Start	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EB**	**WB**	**NB**	**SB**
3:30 PM		29			38	7	1		3	3		5			1	
3:45 PM	N/A - No Approach	31	N/A - One Way Street, Northbound	N/A - One Way Street, Northbound	24	5	4	N/A - No Approach	4	2	N/A - No Approach	6			0	
4:00 PM		67			23	10	2		0	5		14			2	
4:15 PM		60			36	6	4		1	3		11			1	
4:30 PM		34			36	5	3		4	4		13			0	
4:45 PM		50			48	12	2		0	3		4			0	
5:00 PM		36			60	2	4		3	5		7			0	
5:15 PM		33			51	8	3		2	3		11			0	
5:30 PM		42			48	9	4		3	2		7			2	
5:45 PM		43			36	4	4		1	4		6			4	
6:00 PM		40			31	0	1		1	3		0			2	
6:15 PM		41			37	1	1		2	0		1			3	

Table F - 6: Raw traffic counts for the intersection of Southgate Road and South Ode Street

Intersection

Major Street	Southgate Rd
Minor Street	South Ode St
Intersection	6
Collection Date	May 29, 2014

	Southgate Rd						South Ode St			N/A			Pedestrians			
Interval Start	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EB**	**WB**	**NB**	**SB**
6:00 AM		16	0	2	21								0	0		
6:15 AM	N/A - No Approach	3	0	0	6	N/A - No Approach		N/A - One Way Street, Southbound					0	2	N/A - No Crosswalk	N/A - No Crosswalk
6:30 AM		14	0	1	9								0	0		
6:45 AM		21	0	1	20								0	0		
7:00 AM		23	3	3	25								1	0		
7:15 AM		42	1	1	28								0	0		
7:30 AM		33	3	2	35								0	0		
7:45 AM		39	3	2	28								0	1		
8:00 AM		30	1	1	24								0	0		
8:15 AM		30	1	0	24								0	1		
8:30 AM		24	0	3	22								0	0		
8:45 AM		18	3	1	27								0	0		
9:00 AM		17	2	3	26								0	0		
9:15 AM		16	1	3	29								0	0		
9:30 AM		18	0	3	28								0	2		
9:45 AM		19	0	4	23								0	6		

	Southgate Rd						South Ode St			N/A			Pedestrians			
Interval Start	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**	**EB**	**WB**	**NB**	**SB**
3:30 PM		29	5	4	33								0	1		
3:45 PM	N/A - No Approach	30	1	3	20	N/A - No Approach		N/A - No Southbound Approach					0	0	N/A - No Crosswalk	N/A - No Crosswalk
4:00 PM		68	5	0	25								0	0		
4:15 PM		63	3	6	41								0	1		
4:30 PM		31	4	6	27								0	0		
4:45 PM		51	6	5	42								0	0		
5:00 PM		39	3	5	50								0	0		
5:15 PM		38	1	6	48								0	0		
5:30 PM		42	4	6	39								0	1		
5:45 PM		43	1	7	32								1	3		
6:00 PM		40	3	4	28								0	2		
6:15 PM		41	1	1	33								0	3		

Table F - 7: Raw traffic counts for the intersection of Southgate Road and South Orme Street

Intersection	
Major Street	Southgate Rd
Minor Street	South Orme St
Intersection	7
Collection Date	June 3, 2014

*Note: PM pedestrian totals approximated from field estimates.

	Southgate Rd						South Orme St			N/A			Pedestrians			
Interval Start	EBL (U)	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EB	WB	NB	SB
6:00 AM	1	4	1	1	11		20		0				2		2	
6:15 AM	0	6	1	0	9	N/A - No Approach	27	N/A - No Approach	3		N/A - No Southbound Approach		2		1	
6:30 AM	0	12	1	2	9		16		5				2		4	
6:45 AM	1	13	0	1	13		23		7				6		2	
7:00 AM	0	13	2	9	22		31		7				5		5	
7:15 AM	0	23	5	6	20		29		18				2		6	
7:30 AM	0	27	3	4	35		29		11				6		3	
7:45 AM	0	35	3	6	28		18		13				2		6	
8:00 AM	1	21	6	6	21		19		12				1		0	
8:15 AM	0	28	5	6	21		17		7				2		1	
8:30 AM	0	22	6	2	10		13		5				4		3	
8:45 AM	0	11	6	2	24		18		11				6		7	
9:00 AM	2	19	6	6	15		12		13				3		5	
9:15 AM	0	14	3	3	8		23		9				1		3	
9:30 AM	1	9	7	2	21		17		7				5		4	
9:45 AM	3	20	0	3	22		19		8				5		1	

	Southgate Rd						South Orme St			N/A			Pedestrians			
Interval Start	EBL (U)	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EB	WB	NB	SB
3:30 PM	0	37	18	6	16		19		8				1			
3:45 PM	0	27	18	5	23	N/A - No Approach	10	N/A - No Approach	5		N/A - No Southbound Approach		1			
4:00 PM	0	46	0	12	15		16		9				0			
4:15 PM	0	40	20	8	34		21		8				0			
4:30 PM	0	47	21	18	31		18		9				1			
4:45 PM	0	40	23	10	26		19		10				1			
5:00 PM	0	58	29	14	36		19		2				0			
5:15 PM	0	32	15	9	29		11		5				0			
5:30 PM	0	41	17	14	26		9		7				1			
5:45 PM	0	34	19	16	22		11		11				0			
6:00 PM	0	30	15	5	22		15		7				0			
6:15 PM	0	24	20	4	19		8		11				0			

2 Volume Diagrams

Raw counts shown in the previous section have been “balanced” to account for driveways, parking, and counts performed on different days. Volume diagrams are developed on a per-scenario basis; nine diagrams are shown here:

1. 2014 Existing Conditions
2. 2020 No-Action
3. 2020 Alternative 1
4. 2020 Alternative 2
5. 2020 Alternative 3
6. 2040 No-Action
7. 2040 Alternative 1
8. 2040 Alternative 2
9. 2040 Alternative 3

Volume diagrams, per year and scenario, are shown in the following pages.

Figure F - 1: AM and PM peak hour volume for 2014 Existing Conditions

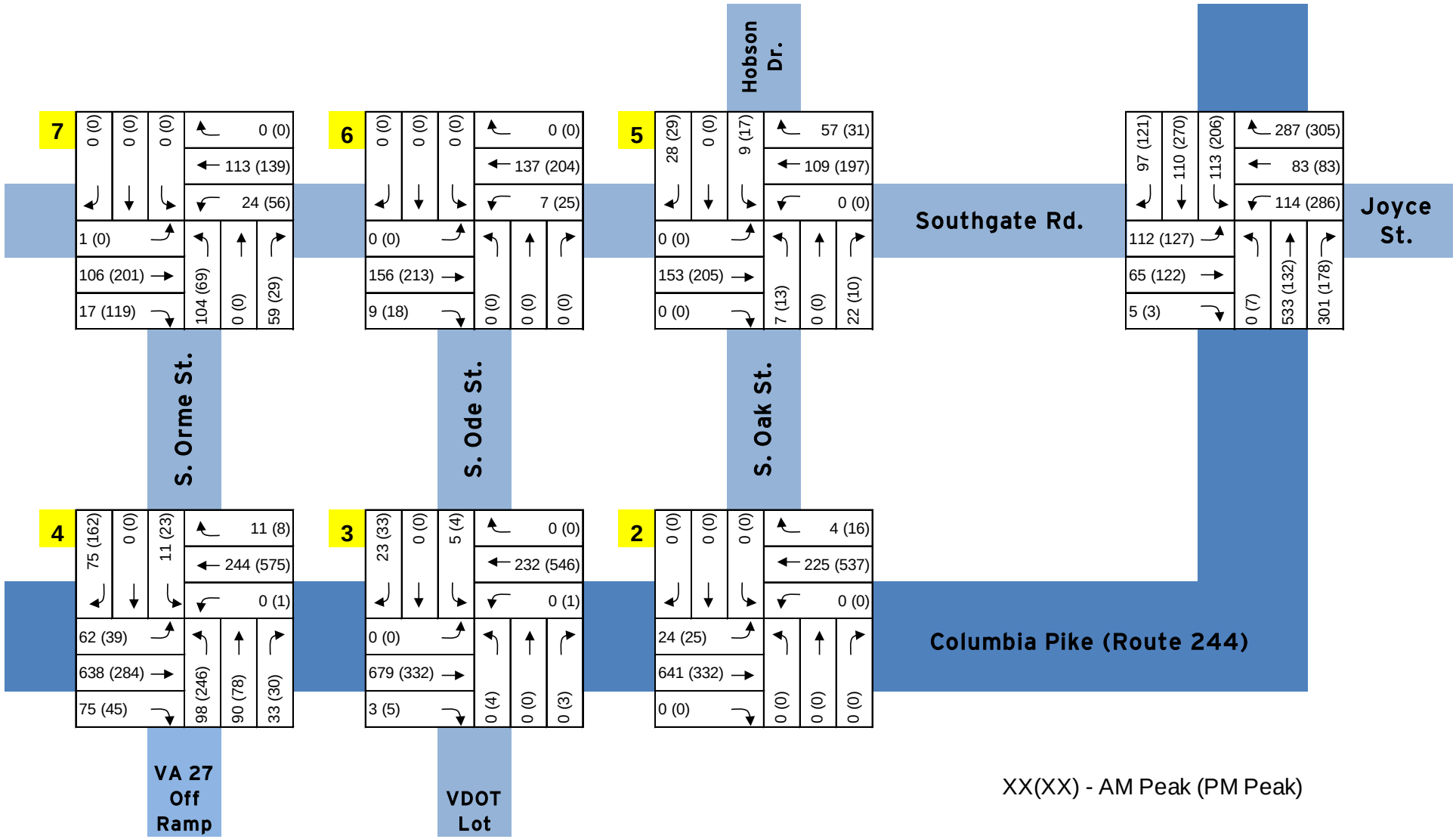


Figure F - 2: AM and PM peak hour volume for 2020 No-Action Scenario

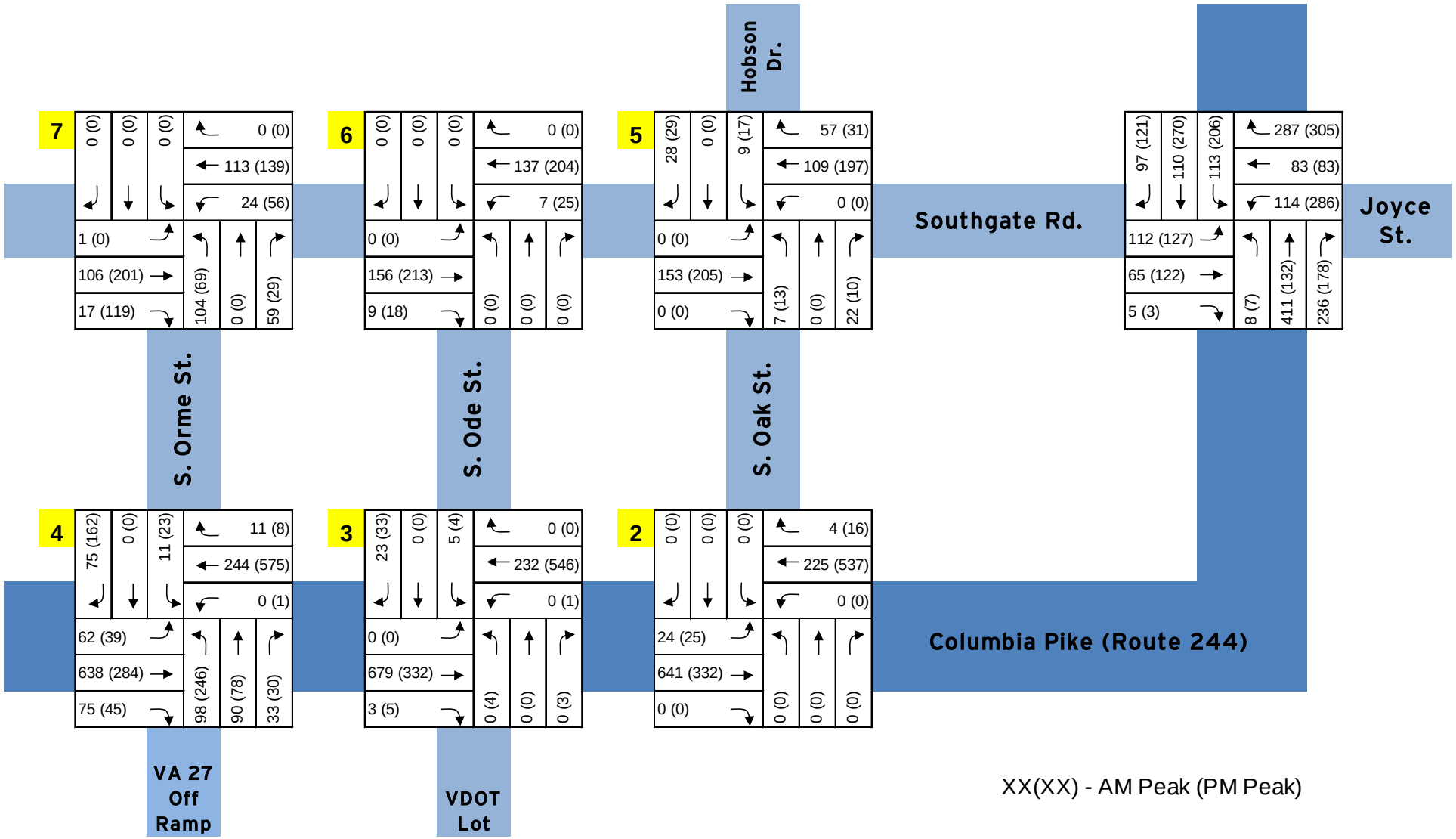


Figure F - 3: AM and PM peak hour volume for 2020 Alternative 1

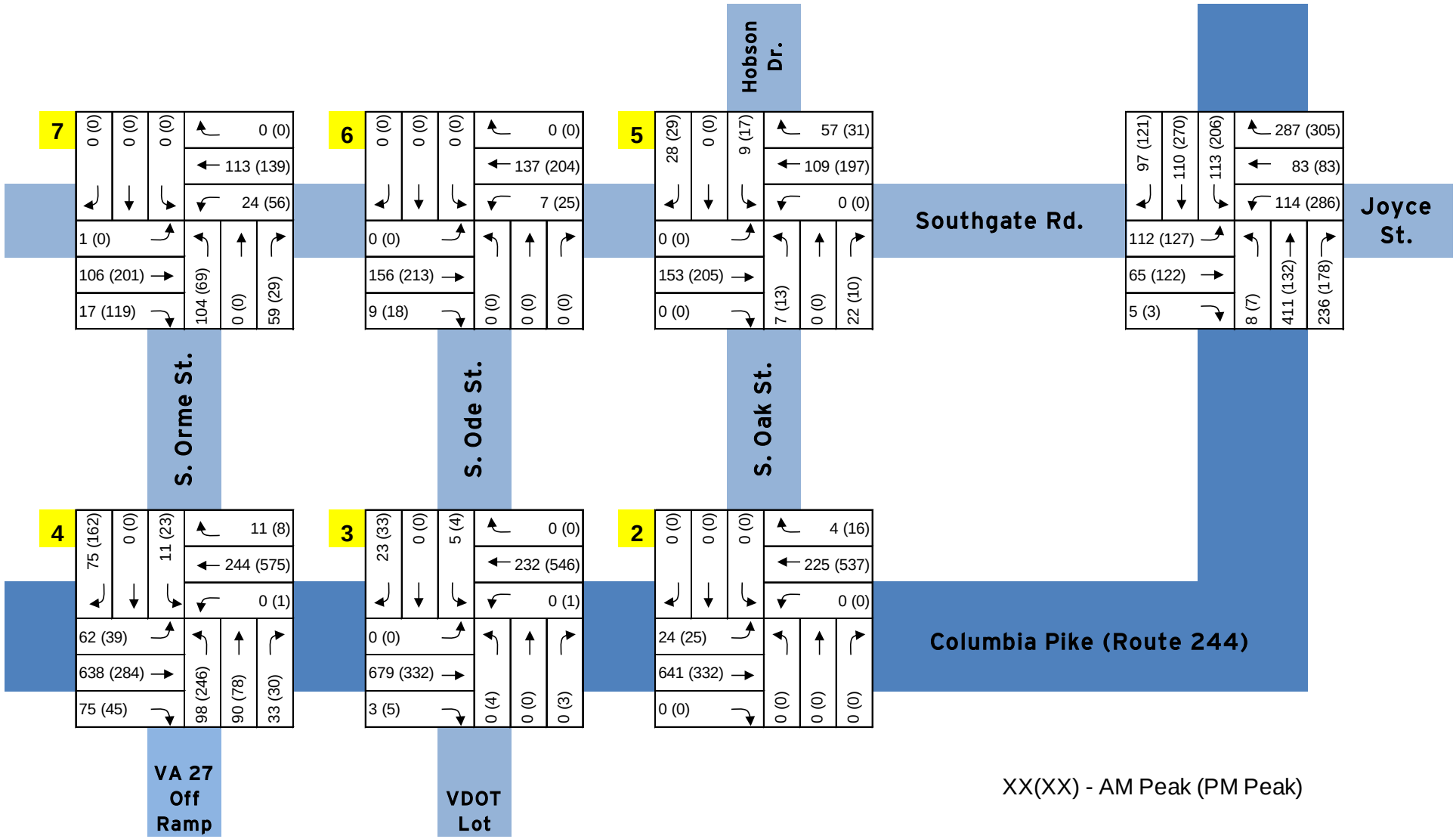
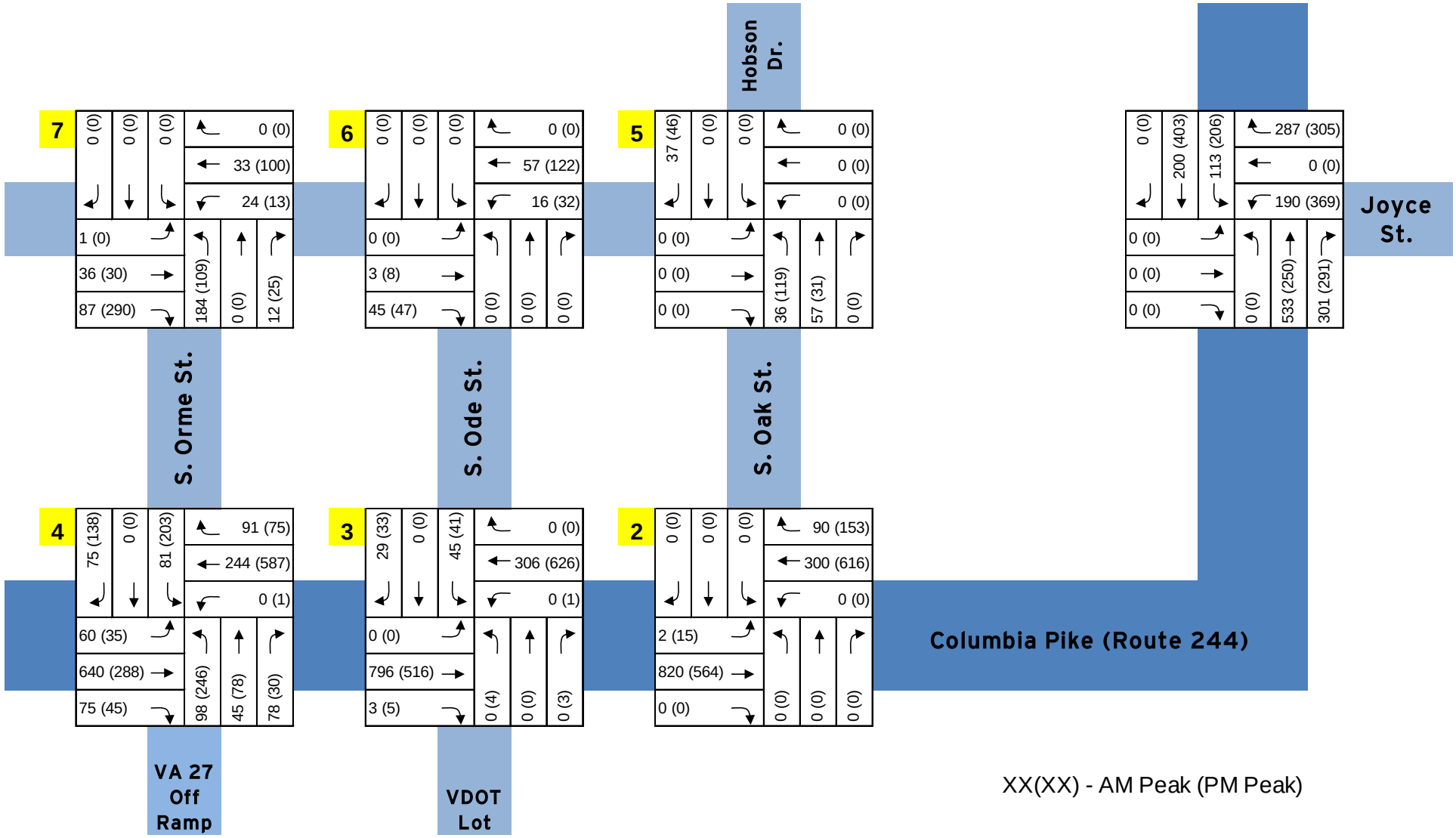


Figure F - 4: AM and PM peak hour volume for 2020 Alternative 2



XX(XX) - AM Peak (PM Peak)

Figure F - 5: AM and PM peak hour volume for 2020 Alternative 3

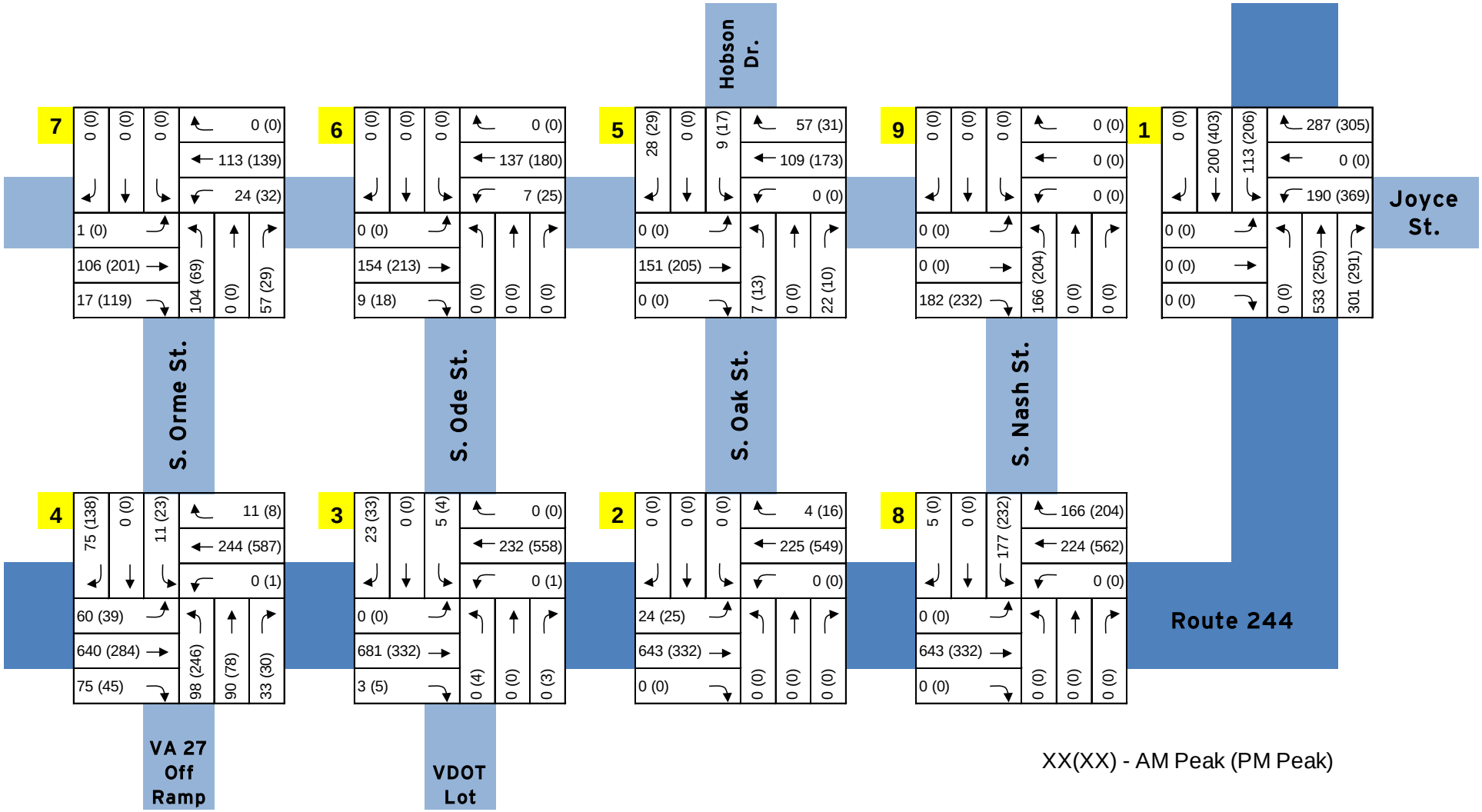


Figure F - 6: AM and PM peak hour volume for 2040 No-Action Scenario

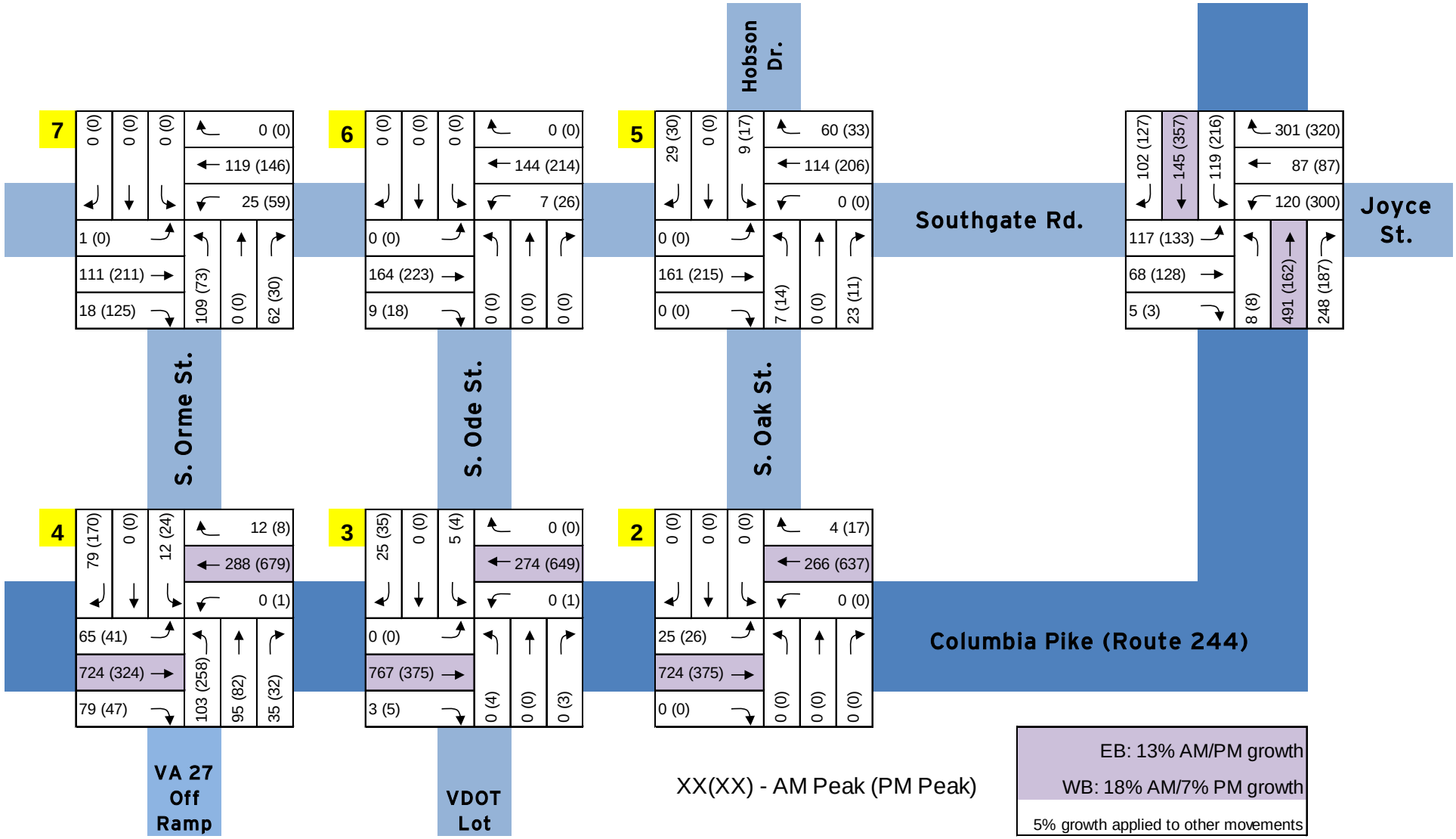


Figure F - 7: AM and PM peak hour volume for 2040 Alternative 1

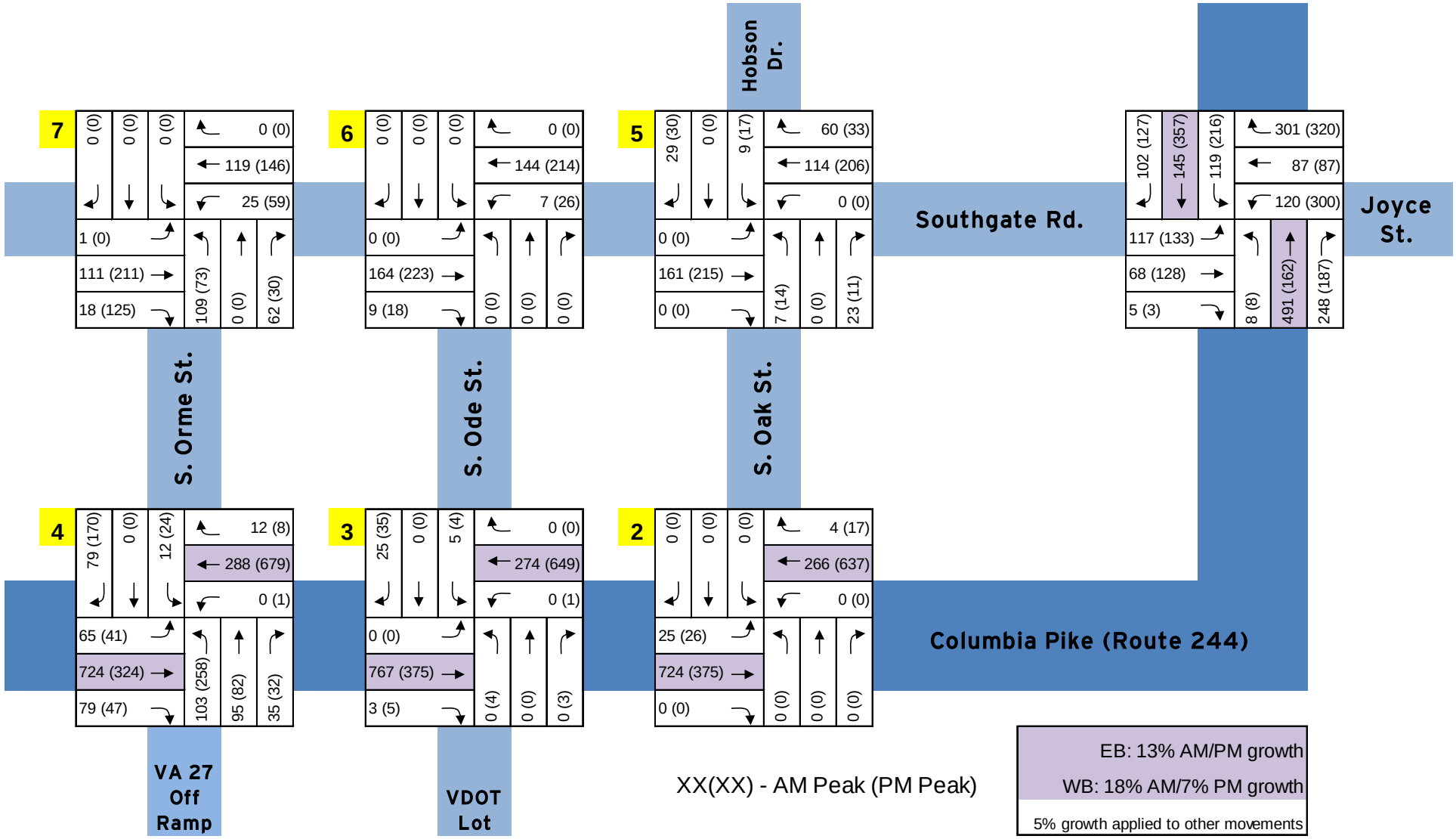


Figure F - 8: AM and PM peak hour volume for 2040 Alternative 2

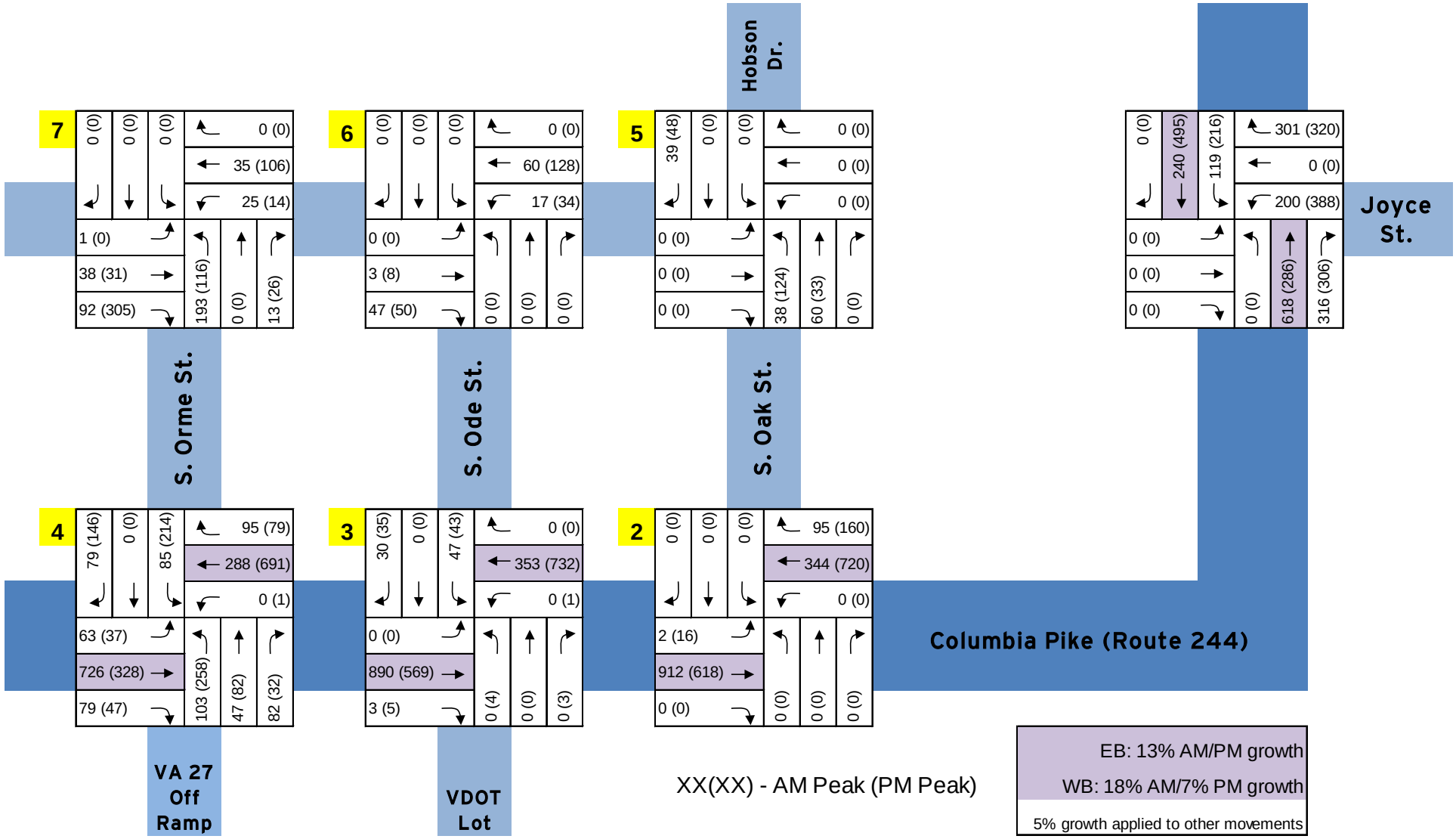
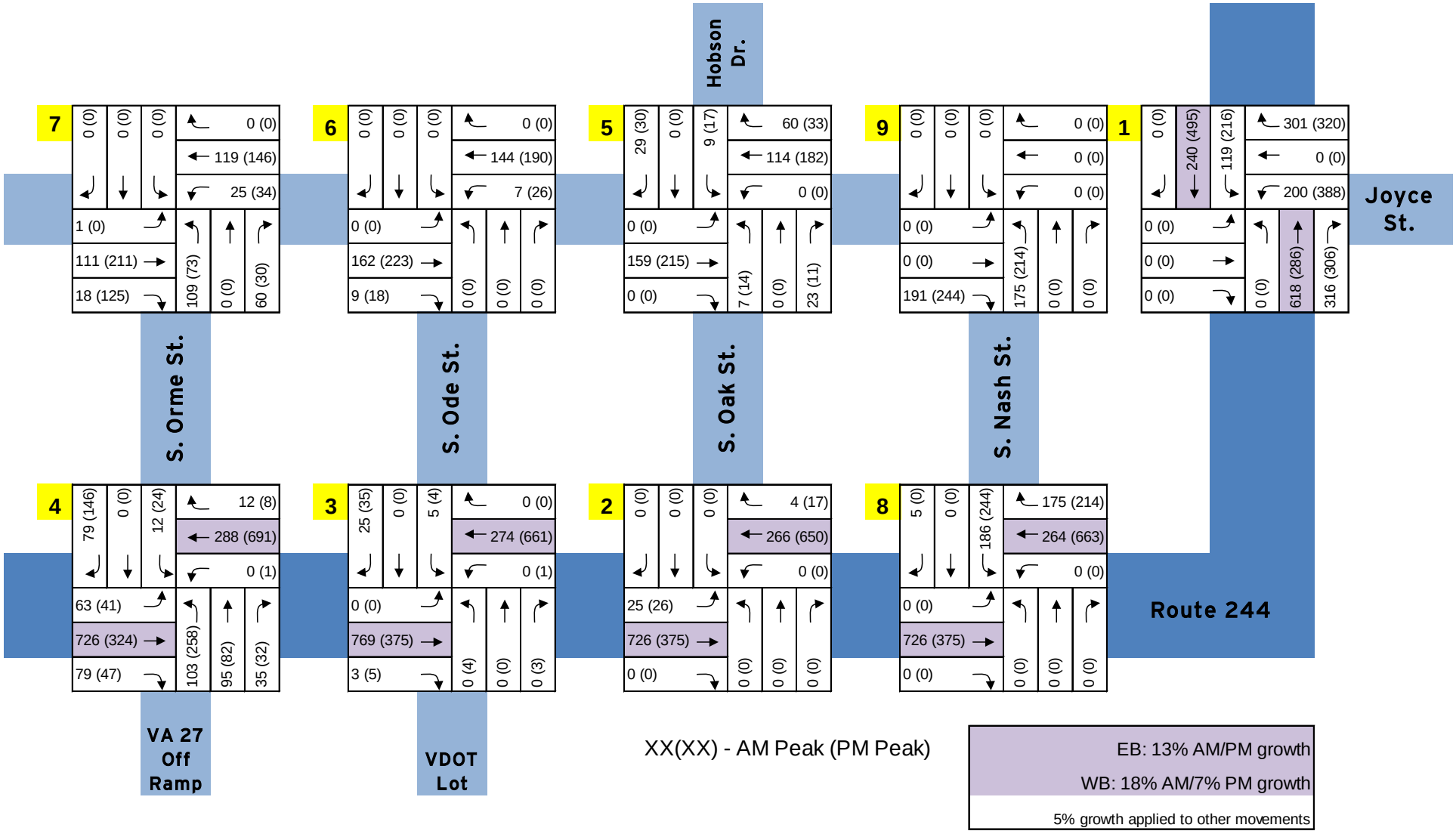


Figure F - 9: AM and PM peak hour volume for 2040 Alternative 3



3 2010 HCS and Synchro Worksheets

In this section, the traffic analysis inputs and results are presented for all the 9 scenarios. These worksheets provide detailed measures of effectiveness by each movement.

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EXISTING CONDITIONS

AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	112	65	5	114	83	287	8	411	236	113	110	97
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1937	1937	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	193	77	6	137	98	342	10	613	0	157	149	194
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.58	0.84	0.85	0.83	0.85	0.84	0.83	0.67	0.70	0.72	0.74	0.50
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	348	500	39	436	524	446	23	1013	0	196	679	608
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.01	0.29	0.00	0.11	0.38	0.38
Sat Flow, veh/h	983	1775	138	1310	1863	1583	1774	3632	0	1774	1770	1583
Grp Volume(v), veh/h	193	0	83	137	98	342	10	613	0	157	149	194
Grp Sat Flow(s),veh/h/ln	983	0	1913	1310	1863	1583	1774	1770	0	1774	1770	1583
Q Serve(g_s), s	12.1	0.0	2.1	5.7	2.6	12.9	0.4	9.8	0.0	5.6	3.7	5.6
Cycle Q Clear(g_c), s	14.7	0.0	2.1	7.9	2.6	12.9	0.4	9.8	0.0	5.6	3.7	5.6
Prop In Lane	1.00		0.07	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	348	0	538	436	524	446	23	1013	0	196	679	608
V/C Ratio(X)	0.55	0.00	0.15	0.31	0.19	0.77	0.44	0.61	0.00	0.80	0.22	0.32
Avail Cap(c_a), veh/h	493	0	821	630	800	680	218	1790	0	218	895	801
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.3	0.0	17.6	20.6	17.8	21.5	32.0	20.1	0.0	28.3	13.5	14.1
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.1	1.1	5.0	2.7	0.0	15.4	0.7	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	1.1	2.1	1.3	5.7	0.2	5.1	0.0	3.6	1.9	2.7
LnGrp Delay(d),s/veh	23.9	0.0	17.7	20.7	17.8	22.6	37.0	22.8	0.0	43.7	14.3	15.5
LnGrp LOS	C		B	C	B	C	D	C		D	B	B
Approach Vol, veh/h		276			577			623			500	
Approach Delay, s/veh		22.0			21.4			23.0			24.0	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.2	50.4		25.4	7.8	56.8		25.4
Change Period (Y+Rc), s	7.0	7.0		7.0	7.0	7.0		7.0
Max Green Setting (Gmax), s	8.0	33.0		28.0	8.0	33.0		28.0
Max Q Clear Time (g_c+I1), s	7.6	11.8		16.7	2.4	7.6		14.9
Green Ext Time (p_c), s	0.0	6.9		1.8	0.0	7.4		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	22.6
HCM 2010 LOS	C

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2014 (Existing Conditions)*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*679*	*3*	*0*	*232*	
Peak-Hour Factor, PHF	*0.92*	*0.88*	*0.75*	*0.92*	*0.79*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*771*	*4*	*0*	*293*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*5*	*0*	*23*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.25*	*0.92*	*0.71*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*20*	*0*	*32*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*0*		*0*			*52*	
C (m) (veh/h)		*843*					*549*	
v/c		*0.00*					*0.09*	
95% queue length		*0.00*					*0.31*	
Control Delay (s/veh)		*9.3*					*12.2*	
LOS		*A*					*B*	
Approach Delay (s/veh)	--	--	*12.2*					
Approach LOS	--	--	*B*					

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	62	638	0	0	244	11	98	90	33	11	0	75
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	72	658	0	0	287	16	111	115	44	16	0	84
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.86	0.97	0.78	0.92	0.85	0.69	0.88	0.78	0.75	0.69	0.92	0.89
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	457	855	0	0	942	52	179	188	160	127	0	113
Arrive On Green	0.06	0.46	0.00	0.00	0.28	0.28	0.10	0.10	0.10	0.07	0.00	0.07
Sat Flow, veh/h	1774	1863	0	0	3503	189	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	72	658	0	0	148	155	111	115	44	16	0	84
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1829	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.5	16.8	0.0	0.0	3.8	3.8	3.4	3.4	1.5	0.5	0.0	3.0
Cycle Q Clear(g_c), s	1.5	16.8	0.0	0.0	3.8	3.8	3.4	3.4	1.5	0.5	0.0	3.0
Prop In Lane	1.00		0.00	0.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	457	855	0	0	489	505	179	188	160	127	0	113
V/C Ratio(X)	0.16	0.77	0.00	0.00	0.30	0.31	0.62	0.61	0.28	0.13	0.00	0.74
Avail Cap(c_a), veh/h	507	1407	0	0	964	996	405	425	362	405	0	362
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.1	12.9	0.0	0.0	16.3	16.3	24.6	24.5	23.7	24.8	0.0	25.9
Incr Delay (d2), s/veh	0.1	6.6	0.0	0.0	1.6	1.6	1.3	1.2	0.3	0.2	0.0	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	10.2	0.0	0.0	2.0	2.2	1.7	1.8	0.7	0.2	0.0	1.4
LnGrp Delay(d),s/veh	12.1	19.5	0.0	0.0	17.9	17.9	25.9	25.7	24.0	24.9	0.0	29.5
LnGrp LOS	B	B			B	B	C	C	C	C		C
Approach Vol, veh/h		730			303			270			100	
Approach Delay, s/veh		18.8			17.9			25.5			28.7	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.4	55.8		12.7		66.2		11.1
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	31.0		13.0		43.0		13.0
Max Q Clear Time (g_c+I1), s	3.5	5.8		5.4		18.8		5.0
Green Ext Time (p_c), s	0.0	7.4		0.4		7.3		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	20.6
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2014 (Existing Conditions)*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*153*			*109*	*57*
Peak-Hour Factor, PHF	*1.00*	*0.88*	*1.00*	*1.00*	*0.88*	*0.79*
Hourly Flow Rate, HFR (veh/h)	*0*	*173*	*0*	*0*	*123*	*72*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*7*	*0*	*22*	*9*	*0*	*28*
Peak-Hour Factor, PHF	*0.58*	*0.92*	*0.61*	*0.75*	*0.92*	*0.64*
Hourly Flow Rate, HFR (veh/h)	*12*	*0*	*36*	*12*	*0*	*43*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*48*			*55*	
C (m) (veh/h)				*776*			*800*	
v/c				*0.06*			*0.07*	
95% queue length				*0.20*			*0.22*	
Control Delay (s/veh)				*9.9*			*9.8*	
LOS				*A*			*A*	
Approach Delay (s/veh)	--	--	*9.9*			*9.8*		
Approach LOS	--	--	*A*			*A*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2014 (Existing Conditions)*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	1	106	17	24	113	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	104	0	59	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.76	0.71	0.77		0.79			
Flow Rate (veh/h)	140	23	177		205			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.2		0.6			
Prop. Right-Turns	0.0	1.0	0.0		0.4			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.0		-0.1			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.12	0.02	0.16		0.18			
hd, final value (s)	5.20	4.49	4.77		4.64			
x, final value	0.20	0.03	0.23		0.26			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.9	2.2	2.8		2.6			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	390	273	427		455			
Delay (s/veh)	9.21	7.32	9.23		9.30			
LOS	A	A	A		A			
Approach: Delay (s/veh)	8.94		9.23		9.30			
LOS	A		A		A			
Intersection Delay (s/veh)	9.17							
Intersection LOS	A							

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EXISTING CONDITIONS

PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	127	122	3	286	83	305	7	132	178	206	270	121
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	193.7	193.7	190.0	186.3	186.3	186.3	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Cap, veh/h	432	679	21	508	677	575	20	462	0	331	557	473
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.36	0.01	0.12	0.00	0.19	0.30	0.30
Sat Flow, veh/h	968	1869	58	1253	1863	1583	1774	3725	0	1774	1863	1583
Grp Volume(v), veh/h	254	0	132	345	90	367	9	163	0	322	310	318
Grp Sat Flow(s),veh/h/ln	968	0	1927	1253	1863	1583	1774	1863	0	1774	1863	1583
Q Serve(g_s), s	15.3	0.0	3.0	16.7	2.1	12.4	0.3	2.6	0.0	11.6	9.0	11.3
Cycle Q Clear(g_c), s	17.4	0.0	3.0	19.7	2.1	12.4	0.3	2.6	0.0	11.6	9.0	11.3
Prop In Lane	1.00		0.03	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	432	0	700	508	677	575	20	462	0	331	557	473
V/C Ratio(X)	0.59	0.00	0.19	0.68	0.13	0.64	0.44	0.35	0.00	0.97	0.56	0.67
Avail Cap(c_a), veh/h	502	0	838	598	810	689	220	1679	0	331	955	812
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.5	0.0	14.0	20.8	13.7	17.0	31.6	25.8	0.0	26.0	19.0	19.8
Incr Delay (d2), s/veh	0.5	0.0	0.0	1.6	0.0	0.8	5.4	2.1	0.0	42.0	4.0	7.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	3.6	0.0	1.3	4.9	0.8	4.3	0.2	1.3	0.0	8.9	4.6	5.2
Lane Grp Delay (d), s/veh	20.1	0.0	14.1	22.4	13.7	17.8	37.0	27.9	0.0	68.1	23.0	27.2
Lane Grp LOS	C		B	C	B	B	D	C		E	C	C
Approach Vol, veh/h		386			802			172			950	
Approach Delay, s/veh		18.0			19.3			28.4			39.7	
Approach LOS		B			B			C			D	

Timer												
Assigned Phs		4			8		5	2		1	6	
Phs Duration (G+Y+Rc), s		30.4			30.4		7.7	15.0		19.0	26.2	
Change Period (Y+Rc), s		7.0			7.0		7.0	7.0		7.0	7.0	
Max Green Setting (Gmax), s		28.0			28.0		8.0	29.0		12.0	33.0	
Max Q Clear Time (g_c+I1), s		19.4			21.7		2.3	4.6		13.6	13.3	
Green Ext Time (p_c), s		1.9			1.6		0.0	3.4		0.0	3.3	

Intersection Summary	
HCM 2010 Ctrl Delay	28.1
HCM 2010 LOS	C

Notes

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2014 (Existing Conditions)*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*332*	*5*	*1*	*546*	
Peak-Hour Factor, PHF	*0.92*	*0.87*	*0.42*	*0.25*	*0.89*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*381*	*11*	*4*	*613*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*	*0*	*3*	*4*	*0*	*33*
Peak-Hour Factor, PHF	*0.33*	*0.92*	*0.38*	*0.33*	*0.92*	*0.67*
Hourly Flow Rate, HFR (veh/h)	*12*	*0*	*7*	*12*	*0*	*49*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*4*		*19*			*61*	
C (m) (veh/h)		*1170*		*400*			*550*	
v/c		*0.00*		*0.05*			*0.11*	
95% queue length		*0.01*		*0.15*			*0.37*	
Control Delay (s/veh)		*8.1*		*14.4*			*12.4*	
LOS		*A*		*B*			*B*	
Approach Delay (s/veh)	--	--	*14.4*			*12.4*		
Approach LOS	--	--	*B*			*B*		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	39	284	0	0	575	8	246	78	30	23	0	162
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	0.0	0.0	186.3	190.0	186.3	186.3	186.3	186.3	186.3	190.0
Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Cap, veh/h	385	943	0	0	1077	21	356	374	318	356	0	318
Arrive On Green	0.06	0.51	0.00	0.00	0.30	0.30	0.20	0.20	0.20	0.20	0.00	0.20
Sat Flow, veh/h	1774	1863	0	0	3642	71	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	72	316	0	0	316	314	194	232	40	40	0	208
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1863	1850	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.2	4.8	0.0	0.0	6.9	6.9	4.7	5.4	1.0	0.9	0.0	5.8
Cycle Q Clear(g_c), s	1.2	4.8	0.0	0.0	6.9	6.9	4.7	5.4	1.0	0.9	0.0	5.8
Prop In Lane	1.00		0.00	0.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	385	943	0	0	551	547	356	374	318	356	0	318
V/C Ratio(X)	0.19	0.33	0.00	0.00	0.57	0.57	0.54	0.62	0.13	0.11	0.00	0.65
Avail Cap(c_a), veh/h	456	1364	0	0	896	890	594	623	530	668	0	596
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.8	7.0	0.0	0.0	14.3	14.3	17.1	17.4	15.7	15.6	0.0	17.6
Incr Delay (d2), s/veh	0.1	1.0	0.0	0.0	4.3	4.3	0.5	0.6	0.1	0.1	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.4	2.0	0.0	0.0	3.5	3.5	1.9	2.4	0.4	0.4	0.0	2.2
Lane Grp Delay (d), s/veh	9.9	8.0	0.0	0.0	18.6	18.6	17.6	18.1	15.7	15.7	0.0	18.4
Lane Grp LOS	A	A			B	B	B	B	B	B		B
Approach Vol, veh/h		388			630			466			248	
Approach Delay, s/veh		8.3			18.6			17.7			18.0	
Approach LOS		A			B			B			B	

Timer												
Assigned Phs	1	6			2			4			8	
Phs Duration (G+Y+Rc), s	10.1	31.2			21.1			16.6			16.6	
Change Period (Y+Rc), s	7.0	7.0			7.0			7.0			7.0	
Max Green Setting (Gmax), s	5.0	35.0			23.0			16.0			18.0	
Max Q Clear Time (g_c+I1), s	3.2	6.8			8.9			7.4			7.8	
Green Ext Time (p_c), s	0.0	6.9			5.3			1.7			1.8	

Intersection Summary	
HCM 2010 Ctrl Delay	16.0
HCM 2010 LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2014 (Existing Conditions)*
Analysis Time Period	*PM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*205*			*197*	*31*
Peak-Hour Factor, PHF	*1.00*	*0.81*	*1.00*	*1.00*	*0.86*	*0.65*
Hourly Flow Rate, HFR (veh/h)	*0*	*253*	*0*	*0*	*229*	*47*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*13*	*0*	*10*	*17*	*0*	*29*
Peak-Hour Factor, PHF	*0.81*	*0.92*	*0.67*	*0.65*	*0.92*	*0.66*
Hourly Flow Rate, HFR (veh/h)	*16*	*0*	*14*	*26*	*0*	*43*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*30*			*69*	
C (m) (veh/h)				*555*			*628*	
v/c				*0.05*			*0.11*	
95% queue length				*0.17*			*0.37*	
Control Delay (s/veh)				*11.9*			*11.4*	
LOS				*B*			*B*	
Approach Delay (s/veh)	--	--	*11.9*			*11.4*		
Approach LOS	--	--	*B*			*B*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2014 (Existing Conditions)*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	201	119	56	139	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	69	0	29	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.74	0.72	0.82		0.72			
Flow Rate (veh/h)	271	165	237		135			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.3		0.7			
Prop. Right-Turns	0.0	1.0	0.0		0.3			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.1		-0.0			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.24	0.15	0.21		0.12			
hd, final value (s)	5.11	4.41	4.91		5.33			
x, final value	0.38	0.20	0.32		0.20			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.8	2.1	2.9		3.3			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	521	415	487		385			
Delay (s/veh)	11.01	8.23	10.25		9.66			
LOS	B	A	B		A			
Approach: Delay (s/veh)	9.95		10.25		9.66			
LOS	A		B		A			
Intersection Delay (s/veh)	9.99							
Intersection LOS	A							

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	112	65	5	114	83	287	8	411	236	113	110	97
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1937	1937	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	122	71	5	124	90	312	9	447	0	123	120	105
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	374	460	32	449	479	407	21	764	0	158	547	440
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.01	0.22	0.00	0.09	0.29	0.29
Sat Flow, veh/h	1018	1789	126	1318	1863	1583	1774	3632	0	1774	1865	1502
Grp Volume(v), veh/h	122	0	76	124	90	312	9	447	0	123	113	112
Grp Sat Flow(s),veh/h/ln	1018	0	1915	1318	1863	1583	1774	1770	0	1774	1770	1598
Q Serve(g_s), s	5.1	0.0	1.5	3.9	1.8	8.7	0.2	5.4	0.0	3.3	2.3	2.5
Cycle Q Clear(g_c), s	6.9	0.0	1.5	5.3	1.8	8.7	0.2	5.4	0.0	3.3	2.3	2.5
Prop In Lane	1.00		0.07	1.00		1.00	1.00		0.00	1.00		0.94
Lane Grp Cap(c), veh/h	374	0	493	449	479	407	21	764	0	158	519	468
V/C Ratio(X)	0.33	0.00	0.15	0.28	0.19	0.77	0.43	0.59	0.00	0.78	0.22	0.24
Avail Cap(c_a), veh/h	706	0	1118	879	1087	924	296	2435	0	296	1218	1099
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	0.0	13.8	15.8	13.9	16.5	23.5	16.9	0.0	21.4	12.8	12.9
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.1	0.1	1.1	5.1	3.3	0.0	3.1	1.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.8	1.4	0.9	3.9	0.1	3.0	0.0	1.7	1.3	1.3
LnGrp Delay(d),s/veh	16.8	0.0	13.8	16.0	14.0	17.6	28.7	20.2	0.0	24.5	13.8	14.1
LnGrp LOS	B		B	B	B	B	C	C		C	B	B
Approach Vol, veh/h		198			526			456			348	
Approach Delay, s/veh		15.6			16.6			20.3			17.7	
Approach LOS		B			B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.3	59.4		19.3	7.6	63.1		19.3
Change Period (Y+Rc), s	7.0	7.0		7.0	7.0	7.0		7.0
Max Green Setting (Gmax), s	8.0	33.0		28.0	8.0	33.0		28.0
Max Q Clear Time (g_c+I1), s	5.3	7.4		8.9	2.2	4.5		10.7
Green Ext Time (p_c), s	0.1	2.9		1.6	0.0	3.0		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	17.8
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 No Action*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*679*	*3*	*0*	*232*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*738*	*3*	*0*	*252*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*5*	*0*	*23*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*5*	*0*	*24*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*0*		*0*			*29*	
C (m) (veh/h)		*868*					*734*	
v/c		*0.00*					*0.04*	
95% queue length		*0.00*					*0.12*	
Control Delay (s/veh)		*9.1*					*10.1*	
LOS		*A*					*B*	
Approach Delay (s/veh)	--	--	*10.1*					
Approach LOS	--	--	*B*					

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	62	638	0	0	244	11	98	90	33	11	0	75
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	67	693	0	0	265	12	102	104	36	12	0	82
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	486	882	0	0	1019	46	167	175	149	122	0	109
Arrive On Green	0.06	0.47	0.00	0.00	0.30	0.30	0.09	0.09	0.09	0.07	0.00	0.07
Sat Flow, veh/h	1774	1863	0	0	3542	156	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	67	693	0	0	135	142	102	104	36	12	0	82
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1835	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.4	18.0	0.0	0.0	3.4	3.4	3.2	3.1	1.2	0.4	0.0	2.9
Cycle Q Clear(g_c), s	1.4	18.0	0.0	0.0	3.4	3.4	3.2	3.1	1.2	0.4	0.0	2.9
Prop In Lane	1.00		0.00	0.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	486	882	0	0	523	542	167	175	149	122	0	109
V/C Ratio(X)	0.14	0.79	0.00	0.00	0.26	0.26	0.61	0.59	0.24	0.10	0.00	0.75
Avail Cap(c_a), veh/h	538	1387	0	0	950	985	399	419	356	399	0	356
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.5	12.7	0.0	0.0	15.5	15.5	25.1	25.1	24.3	25.2	0.0	26.4
Incr Delay (d2), s/veh	0.0	7.0	0.0	0.0	1.2	1.2	1.4	1.2	0.3	0.1	0.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	10.8	0.0	0.0	1.8	1.9	1.6	1.6	0.5	0.2	0.0	1.4
LnGrp Delay(d),s/veh	11.6	19.7	0.0	0.0	16.7	16.7	26.5	26.3	24.6	25.4	0.0	30.4
LnGrp LOS	B	B			B	B	C	C	C	C		C
Approach Vol, veh/h		760			277			242			94	
Approach Delay, s/veh		19.0			16.7			26.1			29.7	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.3	56.3		12.4		66.6		11.0
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	31.0		13.0		43.0		13.0
Max Q Clear Time (g_c+I1), s	3.4	5.4		5.2		20.0		4.9
Green Ext Time (p_c), s	0.0	7.6		0.4		7.4		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	20.5
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2020 No Action*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*153*			*109*	*57*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*166*	*0*	*0*	*118*	*61*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*7*	*0*	*22*	*9*	*0*	*28*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*7*	*0*	*23*	*9*	*0*	*30*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*30*			*39*	
C (m) (veh/h)				*799*			*816*	
v/c				*0.04*			*0.05*	
95% queue length				*0.12*			*0.15*	
Control Delay (s/veh)				*9.7*			*9.6*	
LOS				*A*			*A*	
Approach Delay (s/veh)	--	--	*9.7*			*9.6*		
Approach LOS	--	--	*A*			*A*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 No Action*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	1	106	17	24	113	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	104	0	59	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	116	18	148		177			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.2		0.6			
Prop. Right-Turns	0.0	1.0	0.0		0.4			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.0		-0.1			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.10	0.02	0.13		0.16			
hd, final value (s)	5.07	4.36	4.64		4.49			
x, final value	0.16	0.02	0.19		0.22			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.8	2.1	2.6		2.5			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	366	268	398		427			
Delay (s/veh)	8.76	7.16	8.73		8.75			
LOS	A	A	A		A			
Approach: Delay (s/veh)	8.55		8.73		8.75			
LOS	A		A		A			
Intersection Delay (s/veh)	8.69							
Intersection LOS	A							

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	127	122	3	286	83	305	7	132	178	206	270	121
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1937	1937	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	138	133	3	311	90	332	8	143	0	224	293	132
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	448	664	15	507	655	557	19	402	0	279	623	274
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.01	0.11	0.00	0.16	0.26	0.26
Sat Flow, veh/h	1000	1887	43	1248	1863	1583	1774	3632	0	1774	2393	1053
Grp Volume(v), veh/h	138	0	136	311	90	332	8	143	0	224	215	210
Grp Sat Flow(s),veh/h/ln	1000	0	1930	1248	1863	1583	1774	1770	0	1774	1770	1677
Q Serve(g_s), s	6.1	0.0	2.7	12.9	1.8	9.6	0.2	2.1	0.0	6.8	5.7	5.9
Cycle Q Clear(g_c), s	7.9	0.0	2.7	15.6	1.8	9.6	0.2	2.1	0.0	6.8	5.7	5.9
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.00	1.00		0.63
Lane Grp Cap(c), veh/h	448	0	679	507	655	557	19	402	0	279	460	436
V/C Ratio(X)	0.31	0.00	0.20	0.61	0.14	0.60	0.43	0.36	0.00	0.80	0.47	0.48
Avail Cap(c_a), veh/h	582	0	937	674	904	769	159	1718	0	478	1177	1116
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.0	0.0	12.6	18.0	12.3	14.8	27.4	22.8	0.0	22.6	17.3	17.4
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.4	0.0	0.4	5.8	2.5	0.0	2.1	3.4	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	1.4	4.5	0.9	4.2	0.1	1.1	0.0	3.5	3.2	3.1
LnGrp Delay(d),s/veh	15.1	0.0	12.6	18.5	12.3	15.2	33.1	25.2	0.0	24.7	20.7	21.2
LnGrp LOS	B		B	B	B	B	C	C		C	C	C
Approach Vol, veh/h		274			733			151			649	
Approach Delay, s/veh		13.9			16.2			25.6			22.2	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	15.7	47.7		26.6	7.6	55.8		26.6
Change Period (Y+Rc), s	7.0	7.0		7.0	7.0	7.0		7.0
Max Green Setting (Gmax), s	15.0	27.0		27.0	5.0	37.0		27.0
Max Q Clear Time (g_c+I1), s	8.8	4.1		9.9	2.2	7.9		17.6
Green Ext Time (p_c), s	0.2	2.2		2.4	0.0	2.3		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.8
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 No Action*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*332*	*5*	*1*	*546*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*360*	*5*	*1*	*593*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*	*0*	*3*	*4*	*0*	*33*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*3*	*4*	*0*	*35*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*1*		*7*			*39*	
C (m) (veh/h)		*1197*		*453*			*642*	
v/c		*0.00*		*0.02*			*0.06*	
95% queue length		*0.00*		*0.05*			*0.19*	
Control Delay (s/veh)		*8.0*		*13.1*			*11.0*	
LOS		*A*		*B*			*B*	
Approach Delay (s/veh)	--	--	*13.1*			*11.0*		
Approach LOS	--	--	*B*			*B*		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	39	284	0	0	575	8	246	78	30	23	0	162
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	42	309	0	0	625	9	176	212	33	25	0	176
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	263	759	0	0	947	14	260	273	232	247	0	220
Arrive On Green	0.04	0.41	0.00	0.00	0.26	0.26	0.15	0.15	0.15	0.14	0.00	0.14
Sat Flow, veh/h	1774	1863	0	0	3665	51	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	42	309	0	0	310	324	176	212	33	25	0	176
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1854	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.1	8.1	0.0	0.0	10.7	10.7	6.4	7.5	1.2	0.8	0.0	7.4
Cycle Q Clear(g_c), s	1.1	8.1	0.0	0.0	10.7	10.7	6.4	7.5	1.2	0.8	0.0	7.4
Prop In Lane	1.00		0.00	0.00		0.03	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	263	759	0	0	469	491	260	273	232	247	0	220
V/C Ratio(X)	0.16	0.41	0.00	0.00	0.66	0.66	0.68	0.78	0.14	0.10	0.00	0.80
Avail Cap(c_a), veh/h	321	1089	0	0	724	759	363	381	324	389	0	347
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.8	14.4	0.0	0.0	22.4	22.4	27.7	28.1	25.4	25.7	0.0	28.5
Incr Delay (d2), s/veh	0.1	1.6	0.0	0.0	7.1	6.8	1.2	4.0	0.1	0.1	0.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.5	0.0	0.0	6.1	6.3	3.2	4.1	0.5	0.4	0.0	3.4
LnGrp Delay(d),s/veh	16.9	16.0	0.0	0.0	29.5	29.2	28.8	32.2	25.5	25.8	0.0	31.5
LnGrp LOS	B	B			C	C	C	C	C	C		C
Approach Vol, veh/h		351			634			421			201	
Approach Delay, s/veh		16.1			29.4			30.2			30.8	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	9.7	46.7		17.0		56.5		16.5
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	28.0		14.0		40.0		15.0
Max Q Clear Time (g_c+I1), s	3.1	12.7		9.5		10.1		9.4
Green Ext Time (p_c), s	0.0	5.5		0.5		7.0		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	26.9
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2020 No Action*
Analysis Time Period	*PM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*205*			*197*	*31*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*222*	*0*	*0*	*214*	*33*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*13*	*0*	*10*	*17*	*0*	*29*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*14*	*0*	*10*	*18*	*0*	*31*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*24*			*49*	
C (m) (veh/h)				*589*			*668*	
v/c				*0.04*			*0.07*	
95% queue length				*0.13*			*0.24*	
Control Delay (s/veh)				*11.4*			*10.8*	
LOS				*B*			*B*	
Approach Delay (s/veh)	--	--	*11.4*			*10.8*		
Approach LOS	--	--	*B*			*B*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 No Action*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	201	119	56	139	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	69	0	29	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	218	129	211		105			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.3		0.7			
Prop. Right-Turns	0.0	1.0	0.0		0.3			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.1		-0.0			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.19	0.11	0.19		0.09			
hd, final value (s)	4.97	4.27	4.70		5.08			
x, final value	0.30	0.15	0.28		0.15			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.7	2.0	2.7		3.1			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	468	379	461		355			
Delay (s/veh)	9.80	7.73	9.49		8.96			
LOS	A	A	A		A			
Approach: Delay (s/veh)	9.03		9.49		8.96			
LOS	A		A		A			
Intersection Delay (s/veh)	9.17							
Intersection LOS	A							

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	112	65	5	114	83	287	8	411	236	113	110	97
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1937	1937	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	122	71	5	124	90	312	9	447	0	123	120	105
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	374	460	32	449	479	407	21	764	0	158	547	440
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.01	0.22	0.00	0.09	0.29	0.29
Sat Flow, veh/h	1018	1789	126	1318	1863	1583	1774	3632	0	1774	1865	1502
Grp Volume(v), veh/h	122	0	76	124	90	312	9	447	0	123	113	112
Grp Sat Flow(s),veh/h/ln	1018	0	1915	1318	1863	1583	1774	1770	0	1774	1770	1598
Q Serve(g_s), s	5.1	0.0	1.5	3.9	1.8	8.7	0.2	5.4	0.0	3.3	2.3	2.5
Cycle Q Clear(g_c), s	6.9	0.0	1.5	5.3	1.8	8.7	0.2	5.4	0.0	3.3	2.3	2.5
Prop In Lane	1.00		0.07	1.00		1.00	1.00		0.00	1.00		0.94
Lane Grp Cap(c), veh/h	374	0	493	449	479	407	21	764	0	158	519	468
V/C Ratio(X)	0.33	0.00	0.15	0.28	0.19	0.77	0.43	0.59	0.00	0.78	0.22	0.24
Avail Cap(c_a), veh/h	706	0	1118	879	1087	924	296	2435	0	296	1218	1099
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	0.0	13.8	15.8	13.9	16.5	23.5	16.9	0.0	21.4	12.8	12.9
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.1	0.1	1.1	5.1	3.3	0.0	3.1	1.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.8	1.4	0.9	3.9	0.1	3.0	0.0	1.7	1.3	1.3
LnGrp Delay(d),s/veh	16.8	0.0	13.8	16.0	14.0	17.6	28.7	20.2	0.0	24.5	13.8	14.1
LnGrp LOS	B		B	B	B	B	C	C		C	B	B
Approach Vol, veh/h		198			526			456			348	
Approach Delay, s/veh		15.6			16.6			20.3			17.7	
Approach LOS		B			B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.3	59.4		19.3	7.6	63.1		19.3
Change Period (Y+Rc), s	7.0	7.0		7.0	7.0	7.0		7.0
Max Green Setting (Gmax), s	8.0	33.0		28.0	8.0	33.0		28.0
Max Q Clear Time (g_c+I1), s	5.3	7.4		8.9	2.2	4.5		10.7
Green Ext Time (p_c), s	0.1	2.9		1.6	0.0	3.0		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	17.8
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 Alternative 1*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*679*	*3*	*0*	*232*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*738*	*3*	*0*	*252*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*5*	*0*	*23*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*5*	*0*	*24*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*0*		*0*			*29*	
C (m) (veh/h)		*868*					*734*	
v/c		*0.00*					*0.04*	
95% queue length		*0.00*					*0.12*	
Control Delay (s/veh)		*9.1*					*10.1*	
LOS		*A*					*B*	
Approach Delay (s/veh)	--	--	*10.1*					
Approach LOS	--	--	*B*					

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	62	638	0	0	244	11	98	90	33	11	0	75
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	67	693	0	0	265	12	102	104	36	12	0	82
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	486	882	0	0	1019	46	167	175	149	122	0	109
Arrive On Green	0.06	0.47	0.00	0.00	0.30	0.30	0.09	0.09	0.09	0.07	0.00	0.07
Sat Flow, veh/h	1774	1863	0	0	3542	156	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	67	693	0	0	135	142	102	104	36	12	0	82
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1835	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.4	18.0	0.0	0.0	3.4	3.4	3.2	3.1	1.2	0.4	0.0	2.9
Cycle Q Clear(g_c), s	1.4	18.0	0.0	0.0	3.4	3.4	3.2	3.1	1.2	0.4	0.0	2.9
Prop In Lane	1.00		0.00	0.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	486	882	0	0	523	542	167	175	149	122	0	109
V/C Ratio(X)	0.14	0.79	0.00	0.00	0.26	0.26	0.61	0.59	0.24	0.10	0.00	0.75
Avail Cap(c_a), veh/h	538	1387	0	0	950	985	399	419	356	399	0	356
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.5	12.7	0.0	0.0	15.5	15.5	25.1	25.1	24.3	25.2	0.0	26.4
Incr Delay (d2), s/veh	0.0	7.0	0.0	0.0	1.2	1.2	1.4	1.2	0.3	0.1	0.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	10.8	0.0	0.0	1.8	1.9	1.6	1.6	0.5	0.2	0.0	1.4
LnGrp Delay(d),s/veh	11.6	19.7	0.0	0.0	16.7	16.7	26.5	26.3	24.6	25.4	0.0	30.4
LnGrp LOS	B	B			B	B	C	C	C	C		C
Approach Vol, veh/h		760			277			242			94	
Approach Delay, s/veh		19.0			16.7			26.1			29.7	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.3	56.3		12.4		66.6		11.0
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	31.0		13.0		43.0		13.0
Max Q Clear Time (g_c+I1), s	3.4	5.4		5.2		20.0		4.9
Green Ext Time (p_c), s	0.0	7.6		0.4		7.4		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	20.5
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2020 Alternative 1*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*153*			*109*	*57*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*166*	*0*	*0*	*118*	*61*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*7*	*0*	*22*	*9*	*0*	*28*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*7*	*0*	*23*	*9*	*0*	*30*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*30*			*39*	
C (m) (veh/h)				*799*			*816*	
v/c				*0.04*			*0.05*	
95% queue length				*0.12*			*0.15*	
Control Delay (s/veh)				*9.7*			*9.6*	
LOS				*A*			*A*	
Approach Delay (s/veh)	--	--	*9.7*			*9.6*		
Approach LOS	--	--	*A*			*A*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 Alternative 1*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	1	106	17	24	113	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	104	0	59	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	116	18	148		177			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.2		0.6			
Prop. Right-Turns	0.0	1.0	0.0		0.4			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.0		-0.1			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.10	0.02	0.13		0.16			
hd, final value (s)	5.07	4.36	4.64		4.49			
x, final value	0.16	0.02	0.19		0.22			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.8	2.1	2.6		2.5			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	366	268	398		427			
Delay (s/veh)	8.76	7.16	8.73		8.75			
LOS	A	A	A		A			
Approach: Delay (s/veh)	8.55		8.73		8.75			
LOS	A		A		A			
Intersection Delay (s/veh)	8.69							
Intersection LOS	A							

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2020 ALTERNATIVE 1

PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	127	122	3	286	83	305	7	132	178	206	270	121
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1937	1937	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	138	133	3	311	90	332	8	143	0	224	293	132
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	448	664	15	507	655	557	19	402	0	279	623	274
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.01	0.11	0.00	0.16	0.26	0.26
Sat Flow, veh/h	1000	1887	43	1248	1863	1583	1774	3632	0	1774	2393	1053
Grp Volume(v), veh/h	138	0	136	311	90	332	8	143	0	224	215	210
Grp Sat Flow(s),veh/h/ln	1000	0	1930	1248	1863	1583	1774	1770	0	1774	1770	1677
Q Serve(g_s), s	6.1	0.0	2.7	12.9	1.8	9.6	0.2	2.1	0.0	6.8	5.7	5.9
Cycle Q Clear(g_c), s	7.9	0.0	2.7	15.6	1.8	9.6	0.2	2.1	0.0	6.8	5.7	5.9
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.00	1.00		0.63
Lane Grp Cap(c), veh/h	448	0	679	507	655	557	19	402	0	279	460	436
V/C Ratio(X)	0.31	0.00	0.20	0.61	0.14	0.60	0.43	0.36	0.00	0.80	0.47	0.48
Avail Cap(c_a), veh/h	582	0	937	674	904	769	159	1718	0	478	1177	1116
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.0	0.0	12.6	18.0	12.3	14.8	27.4	22.8	0.0	22.6	17.3	17.4
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.4	0.0	0.4	5.8	2.5	0.0	2.1	3.4	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	1.4	4.5	0.9	4.2	0.1	1.1	0.0	3.5	3.2	3.1
LnGrp Delay(d),s/veh	15.1	0.0	12.6	18.5	12.3	15.2	33.1	25.2	0.0	24.7	20.7	21.2
LnGrp LOS	B		B	B	B	B	C	C		C	C	C
Approach Vol, veh/h		274			733			151			649	
Approach Delay, s/veh		13.9			16.2			25.6			22.2	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	15.7	47.7		26.6	7.6	55.8		26.6
Change Period (Y+Rc), s	7.0	7.0		7.0	7.0	7.0		7.0
Max Green Setting (Gmax), s	15.0	27.0		27.0	5.0	37.0		27.0
Max Q Clear Time (g_c+I1), s	8.8	4.1		9.9	2.2	7.9		17.6
Green Ext Time (p_c), s	0.2	2.2		2.4	0.0	2.3		2.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.8
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*332*	*5*	*1*	*546*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*360*	*5*	*1*	*593*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*	*0*	*3*	*4*	*0*	*33*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*3*	*4*	*0*	*35*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*1*		*7*			*39*	
C (m) (veh/h)		*1197*		*453*			*642*	
v/c		*0.00*		*0.02*			*0.06*	
95% queue length		*0.00*		*0.05*			*0.19*	
Control Delay (s/veh)		*8.0*		*13.1*			*11.0*	
LOS		*A*		*B*			*B*	
Approach Delay (s/veh)	--	--	*13.1*			*11.0*		
Approach LOS	--	--	*B*			*B*		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	39	284	0	0	575	8	246	78	30	23	0	162
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	42	309	0	0	625	9	176	212	33	25	0	176
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	263	759	0	0	947	14	260	273	232	247	0	220
Arrive On Green	0.04	0.41	0.00	0.00	0.26	0.26	0.15	0.15	0.15	0.14	0.00	0.14
Sat Flow, veh/h	1774	1863	0	0	3665	51	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	42	309	0	0	310	324	176	212	33	25	0	176
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1854	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.1	8.1	0.0	0.0	10.7	10.7	6.4	7.5	1.2	0.8	0.0	7.4
Cycle Q Clear(g_c), s	1.1	8.1	0.0	0.0	10.7	10.7	6.4	7.5	1.2	0.8	0.0	7.4
Prop In Lane	1.00		0.00	0.00		0.03	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	263	759	0	0	469	491	260	273	232	247	0	220
V/C Ratio(X)	0.16	0.41	0.00	0.00	0.66	0.66	0.68	0.78	0.14	0.10	0.00	0.80
Avail Cap(c_a), veh/h	321	1089	0	0	724	759	363	381	324	389	0	347
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.8	14.4	0.0	0.0	22.4	22.4	27.7	28.1	25.4	25.7	0.0	28.5
Incr Delay (d2), s/veh	0.1	1.6	0.0	0.0	7.1	6.8	1.2	4.0	0.1	0.1	0.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.5	0.0	0.0	6.1	6.3	3.2	4.1	0.5	0.4	0.0	3.4
LnGrp Delay(d),s/veh	16.9	16.0	0.0	0.0	29.5	29.2	28.8	32.2	25.5	25.8	0.0	31.5
LnGrp LOS	B	B			C	C	C	C	C	C		C
Approach Vol, veh/h		351			634			421			201	
Approach Delay, s/veh		16.1			29.4			30.2			30.8	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	9.7	46.7		17.0		56.5		16.5
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	28.0		14.0		40.0		15.0
Max Q Clear Time (g_c+I1), s	3.1	12.7		9.5		10.1		9.4
Green Ext Time (p_c), s	0.0	5.5		0.5		7.0		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	26.9
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	
Analysis Time Period	*PM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*205*			*197*	*31*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*222*	*0*	*0*	*214*	*33*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*13*	*0*	*10*	*17*	*0*	*29*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*14*	*0*	*10*	*18*	*0*	*31*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*24*			*49*	
C (m) (veh/h)				*589*			*668*	
v/c				*0.04*			*0.07*	
95% queue length				*0.13*			*0.24*	
Control Delay (s/veh)				*11.4*			*10.8*	
LOS				*B*			*B*	
Approach Delay (s/veh)	--	--	*11.4*			*10.8*		
Approach LOS	--	--	*B*			*B*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 Alternative 1*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	201	119	56	139	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	69	0	29	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	218	129	211		105			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.3		0.7			
Prop. Right-Turns	0.0	1.0	0.0		0.3			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.1		-0.0			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.19	0.11	0.19		0.09			
hd, final value (s)	4.97	4.27	4.70		5.08			
x, final value	0.30	0.15	0.28		0.15			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.7	2.0	2.7		3.1			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	468	379	461		355			
Delay (s/veh)	9.80	7.73	9.49		8.96			
LOS	A	A	A		A			
Approach: Delay (s/veh)	9.03		9.49		8.96			
LOS	A		A		A			
Intersection Delay (s/veh)	9.17							
Intersection LOS	A							

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2020 ALTERNATIVE 2

AM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	190	287	533	301	113	200
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	207	312	579	0	123	217
Adj No. of Lanes	1	1	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	428	382	903	0	159	1709
Arrive On Green	0.24	0.24	0.26	0.00	0.09	0.48
Sat Flow, veh/h	1774	1583	3725	0	1774	3632
Grp Volume(v), veh/h	207	312	579	0	123	217
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	0	1774	1770
Q Serve(g_s), s	5.1	9.4	7.4	0.0	3.4	1.7
Cycle Q Clear(g_c), s	5.1	9.4	7.4	0.0	3.4	1.7
Prop In Lane	1.00	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	428	382	903	0	159	1709
V/C Ratio(X)	0.48	0.82	0.64	0.00	0.77	0.13
Avail Cap(c_a), veh/h	980	874	2163	0	350	3350
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	18.2	16.8	0.0	22.6	7.2
Incr Delay (d2), s/veh	0.3	1.7	3.5	0.0	3.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	4.3	4.0	0.0	1.8	0.9
LnGrp Delay(d),s/veh	16.9	19.8	20.3	0.0	25.6	7.4
LnGrp LOS	B	B	C		C	A
Approach Vol, veh/h	519		579			340
Approach Delay, s/veh	18.7		20.3			14.0
Approach LOS	B		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.5	59.2				70.8		19.2
Change Period (Y+Rc), s	7.0	7.0				7.0		7.0
Max Green Setting (Gmax), s	10.0	31.0				48.0		28.0
Max Q Clear Time (g_c+I1), s	5.4	9.4				3.7		11.4
Green Ext Time (p_c), s	0.1	3.6				3.9		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	18.2
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 Alternative 2*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*796*	*3*	*0*	*306*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*865*	*3*	*0*	*332*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*45*	*0*	*29*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*48*	*0*	*31*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*0*		*0*			*79*	
C (m) (veh/h)		*778*					*398*	
v/c		*0.00*					*0.20*	
95% queue length		*0.00*					*0.74*	
Control Delay (s/veh)		*9.6*					*16.3*	
LOS		*A*					*C*	
Approach Delay (s/veh)	--	--	*16.3*					
Approach LOS	--	--	*C*					

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	640	0	0	244	91	98	45	78	81	0	75
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	65	696	0	0	265	99	78	90	85	88	0	82
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	444	891	0	0	779	284	159	167	142	146	0	131
Arrive On Green	0.06	0.48	0.00	0.00	0.31	0.31	0.09	0.09	0.09	0.08	0.00	0.08
Sat Flow, veh/h	1774	1863	0	0	2635	927	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	65	696	0	0	183	181	78	90	85	88	0	82
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1699	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.4	18.7	0.0	0.0	4.8	5.0	2.5	2.8	3.1	2.9	0.0	3.0
Cycle Q Clear(g_c), s	1.4	18.7	0.0	0.0	4.8	5.0	2.5	2.8	3.1	2.9	0.0	3.0
Prop In Lane	1.00		0.00	0.00		0.55	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	444	891	0	0	542	521	159	167	142	146	0	131
V/C Ratio(X)	0.15	0.78	0.00	0.00	0.34	0.35	0.49	0.54	0.60	0.60	0.00	0.63
Avail Cap(c_a), veh/h	494	1334	0	0	914	877	384	403	343	384	0	343
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.8	13.1	0.0	0.0	16.1	16.2	26.0	26.1	26.3	26.6	0.0	26.7
Incr Delay (d2), s/veh	0.1	6.8	0.0	0.0	1.7	1.8	0.9	1.0	1.5	1.5	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	11.1	0.0	0.0	2.6	2.6	1.3	1.5	1.4	1.5	0.0	1.4
LnGrp Delay(d),s/veh	11.9	19.8	0.0	0.0	17.8	18.0	26.9	27.1	27.8	28.1	0.0	28.5
LnGrp LOS	B	B			B	B	C	C	C	C		C
Approach Vol, veh/h		761			364			253			170	
Approach Delay, s/veh		19.1			17.9			27.3			28.3	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.3	55.4		12.4		65.7		12.0
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	31.0		13.0		43.0		13.0
Max Q Clear Time (g_c+I1), s	3.4	7.0		5.1		20.7		5.0
Green Ext Time (p_c), s	0.0	8.3		0.4		8.0		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	21.2
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2020 Alternative 2*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*0*		*0*		*0*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*T*		*LTR*	*LR*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*36*	*57*			*0*	*37*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*39*	*61*	*0*	*0*	*0*	*40*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LTR*	*LT*					*TR*
v (veh/h)		*0*	*100*					*40*
C (m) (veh/h)		*1636*	*923*					*1091*
v/c		*0.00*	*0.11*					*0.04*
95% queue length		*0.00*	*0.36*					*0.11*
Control Delay (s/veh)		*7.2*	*9.4*					*8.4*
LOS		*A*	*A*					*A*
Approach Delay (s/veh)	--	--	*9.4*			*8.4*		
Approach LOS	--	--	*A*			*A*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 Alternative 2*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	1	36	87	24	33	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	184	0	12	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	40	94	61		212			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.4		0.9			
Prop. Right-Turns	0.0	1.0	0.0		0.1			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.1		0.2			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.04	0.08	0.05		0.19			
hd, final value (s)	5.09	4.38	4.77		4.50			
x, final value	0.06	0.11	0.08		0.27			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.8	2.1	2.8		2.5			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	290	344	311		462			
Delay (s/veh)	8.10	7.64	8.19		9.12			
LOS	A	A	A		A			
Approach: Delay (s/veh)	7.78		8.19		9.12			
LOS	A		A		A			
Intersection Delay (s/veh)	8.54							
Intersection LOS	A							

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2020 ALTERNATIVE 2

PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	369	305	250	291	206	403
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	401	332	272	0	224	438
Adj No. of Lanes	1	1	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	483	431	597	0	276	1624
Arrive On Green	0.27	0.27	0.17	0.00	0.16	0.46
Sat Flow, veh/h	1774	1583	3725	0	1774	3632
Grp Volume(v), veh/h	401	332	272	0	224	438
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	0	1774	1770
Q Serve(g_s), s	11.1	10.1	3.6	0.0	6.4	4.0
Cycle Q Clear(g_c), s	11.1	10.1	3.6	0.0	6.4	4.0
Prop In Lane	1.00	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	483	431	597	0	276	1624
V/C Ratio(X)	0.83	0.77	0.46	0.00	0.81	0.27
Avail Cap(c_a), veh/h	954	851	2107	0	341	3262
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	17.8	17.4	19.5	0.0	21.2	8.7
Incr Delay (d2), s/veh	1.4	1.1	2.5	0.0	9.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	4.5	1.9	0.0	3.8	2.0
LnGrp Delay(d),s/veh	19.2	18.6	22.0	0.0	30.6	9.1
LnGrp LOS	B	B	C		C	A
Approach Vol, veh/h	733		272			662
Approach Delay, s/veh	18.9		22.0			16.4
Approach LOS	B		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	15.1	53.7				68.8		21.2
Change Period (Y+Rc), s	7.0	7.0				7.0		7.0
Max Green Setting (Gmax), s	10.0	31.0				48.0		28.0
Max Q Clear Time (g_c+I1), s	8.4	5.6				6.0		13.1
Green Ext Time (p_c), s	0.1	3.2				3.3		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	18.4
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 Alternative 2*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*516*	*5*	*1*	*626*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*560*	*5*	*1*	*680*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*	*0*	*3*	*41*	*0*	*33*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*3*	*44*	*0*	*35*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*1*		*7*			*79*	
C (m) (veh/h)		*1010*		*319*			*307*	
v/c		*0.00*		*0.02*			*0.26*	
95% queue length		*0.00*		*0.07*			*1.03*	
Control Delay (s/veh)		*8.6*		*16.5*			*20.8*	
LOS		*A*		*C*			*C*	
Approach Delay (s/veh)	--	--	*16.5*			*20.8*		
Approach LOS	--	--	*C*			*C*		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	288	0	0	587	75	246	78	30	203	0	138
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	38	313	0	0	638	82	176	212	33	221	0	150
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	229	757	0	0	858	110	258	271	231	277	0	248
Arrive On Green	0.04	0.41	0.00	0.00	0.27	0.27	0.15	0.15	0.15	0.16	0.00	0.16
Sat Flow, veh/h	1774	1863	0	0	3249	405	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	38	313	0	0	357	363	176	212	33	221	0	150
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1791	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.0	8.6	0.0	0.0	13.3	13.3	6.8	7.9	1.3	8.6	0.0	6.4
Cycle Q Clear(g_c), s	1.0	8.6	0.0	0.0	13.3	13.3	6.8	7.9	1.3	8.6	0.0	6.4
Prop In Lane	1.00		0.00	0.00		0.23	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	229	757	0	0	481	487	258	271	231	277	0	248
V/C Ratio(X)	0.17	0.41	0.00	0.00	0.74	0.74	0.68	0.78	0.14	0.80	0.00	0.61
Avail Cap(c_a), veh/h	287	932	0	0	590	597	370	388	330	444	0	396
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.9	15.2	0.0	0.0	23.9	23.9	29.2	29.6	26.8	29.3	0.0	28.3
Incr Delay (d2), s/veh	0.1	1.7	0.0	0.0	9.9	9.9	1.2	3.8	0.1	2.0	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.8	0.0	0.0	7.8	7.9	3.4	4.3	0.6	4.4	0.0	2.9
LnGrp Delay(d),s/veh	18.0	16.9	0.0	0.0	33.8	33.8	30.3	33.4	26.9	31.3	0.0	29.2
LnGrp LOS	B	B			C	C	C	C	C	C		C
Approach Vol, veh/h		351			720			421			371	
Approach Delay, s/veh		17.0			33.8			31.6			30.4	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	9.7	44.6		17.5		54.3		18.2
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	24.0		15.0		36.0		18.0
Max Q Clear Time (g_c+I1), s	3.0	15.3		9.9		10.6		10.6
Green Ext Time (p_c), s	0.0	4.3		0.6		7.6		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	29.5
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2020 Alternative 2*
Analysis Time Period	*PM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*0*		*0*		*0*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*T*		*LTR*	*LR*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*119*	*31*			*0*	*46*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*129*	*33*	*0*	*0*	*0*	*49*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LTR*	*LT*					*TR*
v (veh/h)		*0*	*162*					*49*
C (m) (veh/h)		*1636*	*938*					*1091*
v/c		*0.00*	*0.17*					*0.04*
95% queue length		*0.00*	*0.63*					*0.14*
Control Delay (s/veh)		*7.2*	*9.6*					*8.5*
LOS		*A*	*A*					*A*
Approach Delay (s/veh)	--	--	*9.6*			*8.5*		
Approach LOS	--	--	*A*			*A*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 Alternative 2*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	30	290	13	100	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	109	0	25	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	32	315	122		145			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.1		0.8			
Prop. Right-Turns	0.0	1.0	0.0		0.2			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.0		0.1			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.03	0.28	0.11		0.13			
hd, final value (s)	5.00	4.30	4.78		4.97			
x, final value	0.04	0.38	0.16		0.20			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.7	2.0	2.8		3.0			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	282	565	372		395			
Delay (s/veh)	7.94	9.59	8.71		9.21			
LOS	A	A	A		A			
Approach: Delay (s/veh)	9.44		8.71		9.21			
LOS	A		A		A			
Intersection Delay (s/veh)	9.24							
Intersection LOS	A							

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2020 ALTERNATIVE 3

AM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	190	287	533	301	113	200
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	207	312	579	0	123	217
Adj No. of Lanes	1	1	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	428	382	903	0	159	1709
Arrive On Green	0.24	0.24	0.26	0.00	0.09	0.48
Sat Flow, veh/h	1774	1583	3725	0	1774	3632
Grp Volume(v), veh/h	207	312	579	0	123	217
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	0	1774	1770
Q Serve(g_s), s	5.1	9.4	7.4	0.0	3.4	1.7
Cycle Q Clear(g_c), s	5.1	9.4	7.4	0.0	3.4	1.7
Prop In Lane	1.00	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	428	382	903	0	159	1709
V/C Ratio(X)	0.48	0.82	0.64	0.00	0.77	0.13
Avail Cap(c_a), veh/h	980	874	2163	0	350	3350
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	18.2	16.8	0.0	22.6	7.2
Incr Delay (d2), s/veh	0.3	1.7	3.5	0.0	3.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	4.3	4.0	0.0	1.8	0.9
LnGrp Delay(d),s/veh	16.9	19.8	20.3	0.0	25.6	7.4
LnGrp LOS	B	B	C		C	A
Approach Vol, veh/h	519		579			340
Approach Delay, s/veh	18.7		20.3			14.0
Approach LOS	B		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.5	59.2				70.8		19.2
Change Period (Y+Rc), s	7.0	7.0				7.0		7.0
Max Green Setting (Gmax), s	10.0	31.0				48.0		28.0
Max Q Clear Time (g_c+I1), s	5.4	9.4				3.7		11.4
Green Ext Time (p_c), s	0.1	3.6				3.9		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	18.2
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 Alternative 3*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*681*	*3*	*0*	*232*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*740*	*3*	*0*	*252*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*5*	*0*	*23*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*5*	*0*	*24*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*0*		*0*			*29*	
C (m) (veh/h)		*867*					*734*	
v/c		*0.00*					*0.04*	
95% queue length		*0.00*					*0.12*	
Control Delay (s/veh)		*9.2*					*10.1*	
LOS		*A*					*B*	
Approach Delay (s/veh)	--	--	*10.1*					
Approach LOS	--	--	*B*					

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	640	0	0	244	11	98	90	33	11	0	75
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	65	696	0	0	265	12	102	104	36	12	0	82
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	486	885	0	0	1028	46	167	175	149	122	0	109
Arrive On Green	0.06	0.47	0.00	0.00	0.30	0.30	0.09	0.09	0.09	0.07	0.00	0.07
Sat Flow, veh/h	1774	1863	0	0	3542	156	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	65	696	0	0	135	142	102	104	36	12	0	82
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1835	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.3	18.1	0.0	0.0	3.4	3.4	3.2	3.1	1.2	0.4	0.0	2.9
Cycle Q Clear(g_c), s	1.3	18.1	0.0	0.0	3.4	3.4	3.2	3.1	1.2	0.4	0.0	2.9
Prop In Lane	1.00		0.00	0.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	486	885	0	0	528	547	167	175	149	122	0	109
V/C Ratio(X)	0.13	0.79	0.00	0.00	0.26	0.26	0.61	0.59	0.24	0.10	0.00	0.75
Avail Cap(c_a), veh/h	540	1382	0	0	947	982	398	418	355	398	0	355
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.5	12.8	0.0	0.0	15.5	15.5	25.2	25.2	24.3	25.3	0.0	26.5
Incr Delay (d2), s/veh	0.0	7.0	0.0	0.0	1.2	1.1	1.4	1.2	0.3	0.1	0.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	11.0	0.0	0.0	1.8	1.9	1.6	1.6	0.5	0.2	0.0	1.4
LnGrp Delay(d),s/veh	11.6	19.7	0.0	0.0	16.6	16.6	26.6	26.4	24.6	25.4	0.0	30.4
LnGrp LOS	B	B			B	B	C	C	C	C		C
Approach Vol, veh/h		761			277			242			94	
Approach Delay, s/veh		19.0			16.6			26.2			29.8	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.2	56.3		12.4		66.6		11.0
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	31.0		13.0		43.0		13.0
Max Q Clear Time (g_c+I1), s	3.3	5.4		5.2		20.1		4.9
Green Ext Time (p_c), s	0.0	7.7		0.4		7.4		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	20.6
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2020 Alternative 3*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*151*			*109*	*57*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*164*	*0*	*0*	*118*	*61*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*7*	*0*	*22*	*9*	*0*	*28*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*7*	*0*	*23*	*9*	*0*	*30*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*30*			*39*	
C (m) (veh/h)				*801*			*816*	
v/c				*0.04*			*0.05*	
95% queue length				*0.12*			*0.15*	
Control Delay (s/veh)				*9.7*			*9.6*	
LOS				*A*			*A*	
Approach Delay (s/veh)	--	--	*9.7*			*9.6*		
Approach LOS	--	--	*A*			*A*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 Alternative 3*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	1	106	17	24	113	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	104	0	57	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	116	18	148		174			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.2		0.6			
Prop. Right-Turns	0.0	1.0	0.0		0.4			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.0		-0.1			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.10	0.02	0.13		0.15			
hd, final value (s)	5.06	4.36	4.63		4.49			
x, final value	0.16	0.02	0.19		0.22			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.8	2.1	2.6		2.5			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	366	268	398		424			
Delay (s/veh)	8.75	7.15	8.72		8.74			
LOS	A	A	A		A			
Approach: Delay (s/veh)	8.54		8.72		8.74			
LOS	A		A		A			
Intersection Delay (s/veh)	8.67							
Intersection LOS	A							

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Columbia Pk. & S. Nash St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2020 Alternative 3*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Nash Street (Tentative)*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*643*			*224*	*166*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*698*	*0*	*0*	*243*	*180*
Percent Heavy Vehicles	*1*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*	*T*			*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*177*	*0*	*5*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*192*	*0*	*5*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LTR*	
v (veh/h)	*0*						*197*	
C (m) (veh/h)	*1140*						*393*	
v/c	*0.00*						*0.50*	
95% queue length	*0.00*						*2.93*	
Control Delay (s/veh)	*8.2*						*23.3*	
LOS	*A*						*C*	
Approach Delay (s/veh)	--	--				*23.3*		
Approach LOS	--	--				*C*		

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	643	224	166	177	5
Number	1	6	2	12	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	0	699	243	180	192	5
Adj No. of Lanes	0	2	2	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	0	2417	1350	962	246	220
Arrive On Green	0.00	0.68	0.68	0.68	0.14	0.14
Sat Flow, veh/h	0	3725	2069	1408	1774	1583
Grp Volume(v), veh/h	0	699	217	206	192	5
Grp Sat Flow(s),veh/h/ln	0	1770	1770	1614	1774	1583
Q Serve(g_s), s	0.0	5.3	3.0	3.1	7.0	0.2
Cycle Q Clear(g_c), s	0.0	5.3	3.0	3.1	7.0	0.2
Prop In Lane	0.00			0.87	1.00	1.00
Lane Grp Cap(c), veh/h	0	2417	1209	1103	246	220
V/C Ratio(X)	0.00	0.29	0.18	0.19	0.78	0.02
Avail Cap(c_a), veh/h	0	2417	1209	1103	843	752
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	4.2	3.9	3.9	28.0	25.1
Incr Delay (d2), s/veh	0.0	0.3	0.3	0.4	5.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.6	1.6	1.5	3.8	0.1
LnGrp Delay(d),s/veh	0.0	4.5	4.2	4.3	33.3	25.1
LnGrp LOS		A	A	A	C	C
Approach Vol, veh/h		699	423		197	
Approach Delay, s/veh		4.5	4.2		33.1	
Approach LOS		A	A		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		74.7				74.7		15.3
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		46.0				46.0		32.0
Max Q Clear Time (g_c+I1), s		5.1				7.3		9.0
Green Ext Time (p_c), s		10.1				10.0		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	8.7
HCM 2010 LOS	A

2020 ALTERNATIVE 3

PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	369	305	250	291	206	403
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	401	332	272	0	224	438
Adj No. of Lanes	1	1	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	483	431	597	0	276	1624
Arrive On Green	0.27	0.27	0.17	0.00	0.16	0.46
Sat Flow, veh/h	1774	1583	3725	0	1774	3632
Grp Volume(v), veh/h	401	332	272	0	224	438
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	0	1774	1770
Q Serve(g_s), s	11.1	10.1	3.6	0.0	6.4	4.0
Cycle Q Clear(g_c), s	11.1	10.1	3.6	0.0	6.4	4.0
Prop In Lane	1.00	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	483	431	597	0	276	1624
V/C Ratio(X)	0.83	0.77	0.46	0.00	0.81	0.27
Avail Cap(c_a), veh/h	954	851	2107	0	341	3262
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	17.8	17.4	19.5	0.0	21.2	8.7
Incr Delay (d2), s/veh	1.4	1.1	2.5	0.0	9.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	4.5	1.9	0.0	3.8	2.0
LnGrp Delay(d),s/veh	19.2	18.6	22.0	0.0	30.6	9.1
LnGrp LOS	B	B	C		C	A
Approach Vol, veh/h	733		272			662
Approach Delay, s/veh	18.9		22.0			16.4
Approach LOS	B		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	15.1	53.7				68.8		21.2
Change Period (Y+Rc), s	7.0	7.0				7.0		7.0
Max Green Setting (Gmax), s	10.0	31.0				48.0		28.0
Max Q Clear Time (g_c+I1), s	8.4	5.6				6.0		13.1
Green Ext Time (p_c), s	0.1	3.2				3.3		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	18.4
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 Alternative 3*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*332*	*5*	*1*	*558*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*360*	*5*	*1*	*606*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*	*0*	*3*	*4*	*0*	*33*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*3*	*4*	*0*	*35*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*1*		*7*			*39*	
C (m) (veh/h)		*1197*		*449*			*635*	
v/c		*0.00*		*0.02*			*0.06*	
95% queue length		*0.00*		*0.05*			*0.20*	
Control Delay (s/veh)		*8.0*		*13.1*			*11.0*	
LOS		*A*		*B*			*B*	
Approach Delay (s/veh)	--	--	*13.1*			*11.0*		
Approach LOS	--	--	*B*			*B*		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	39	284	0	0	587	8	246	78	30	23	0	138
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	42	309	0	0	638	9	176	212	33	25	0	150
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	260	761	0	0	936	13	268	281	239	217	0	194
Arrive On Green	0.04	0.41	0.00	0.00	0.26	0.26	0.15	0.15	0.15	0.12	0.00	0.12
Sat Flow, veh/h	1774	1863	0	0	3666	50	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	42	309	0	0	316	331	176	212	33	25	0	150
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1854	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.1	7.8	0.0	0.0	10.6	10.6	6.2	7.2	1.2	0.8	0.0	6.1
Cycle Q Clear(g_c), s	1.1	7.8	0.0	0.0	10.6	10.6	6.2	7.2	1.2	0.8	0.0	6.1
Prop In Lane	1.00		0.00	0.00		0.03	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	260	761	0	0	464	486	268	281	239	217	0	194
V/C Ratio(X)	0.16	0.41	0.00	0.00	0.68	0.68	0.66	0.75	0.14	0.11	0.00	0.77
Avail Cap(c_a), veh/h	323	1016	0	0	643	674	457	480	408	430	0	384
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.3	13.8	0.0	0.0	21.9	21.9	26.4	26.9	24.3	25.8	0.0	28.1
Incr Delay (d2), s/veh	0.1	1.6	0.0	0.0	7.9	7.5	1.0	1.6	0.1	0.1	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.3	0.0	0.0	6.2	6.4	3.1	3.8	0.5	0.4	0.0	2.8
LnGrp Delay(d),s/veh	16.4	15.4	0.0	0.0	29.8	29.4	27.5	28.4	24.4	25.9	0.0	30.6
LnGrp LOS	B	B			C	C	C	C	C	C		C
Approach Vol, veh/h		351			647			421			175	
Approach Delay, s/veh		15.6			29.6			27.7			29.9	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	9.7	48.3		17.0		58.0		15.1
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	24.0		17.0		36.0		16.0
Max Q Clear Time (g_c+I1), s	3.1	12.6		9.2		9.8		8.1
Green Ext Time (p_c), s	0.0	4.7		0.8		6.9		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	26.0
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2020 Alternative 3*
Analysis Time Period	*PM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*205*			*173*	*31*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*222*	*0*	*0*	*188*	*33*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*13*	*0*	*10*	*17*	*0*	*29*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*14*	*0*	*10*	*18*	*0*	*31*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*24*			*49*	
C (m) (veh/h)				*606*			*693*	
v/c				*0.04*			*0.07*	
95% queue length				*0.12*			*0.23*	
Control Delay (s/veh)				*11.2*			*10.6*	
LOS				*B*			*B*	
Approach Delay (s/veh)	--	--	*11.2*			*10.6*		
Approach LOS	--	--	*B*			*B*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2020 Alternative 3*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	201	119	32	139	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	104	0	57	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	218	129	185		174			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.2		0.6			
Prop. Right-Turns	0.0	1.0	0.0		0.4			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.0		-0.1			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.19	0.11	0.16		0.15			
hd, final value (s)	5.16	4.45	4.90		5.02			
x, final value	0.31	0.16	0.25		0.24			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.9	2.2	2.9		3.0			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	468	379	435		424			
Delay (s/veh)	10.19	8.00	9.56		9.62			
LOS	B	A	A		A			
Approach: Delay (s/veh)	9.38		9.56		9.62			
LOS	A		A		A			
Intersection Delay (s/veh)	9.48							
Intersection LOS	A							

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Columbia Pk. & S. Nash St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2020 Alternative 3*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Nash Street (Tentative)*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*332*			*562*	*204*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*360*	*0*	*0*	*610*	*221*
Percent Heavy Vehicles	*1*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*	*T*			*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*232*	*0*	*0*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*252*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LTR*	
v (veh/h)	*0*						*252*	
C (m) (veh/h)	*803*						*282*	
v/c	*0.00*						*0.89*	
95% queue length	*0.00*						*13.34*	
Control Delay (s/veh)	*9.5*						*94.4*	
LOS	*A*						*F*	
Approach Delay (s/veh)	--	--				*94.4*		
Approach LOS	--	--				*F*		

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	332	562	204	232	0
Number	1	6	2	12	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	0	361	611	222	252	0
Adj No. of Lanes	0	2	2	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	0	1848	1329	482	641	572
Arrive On Green	0.00	0.52	0.52	0.52	0.36	0.00
Sat Flow, veh/h	0	3725	2639	924	1774	1583
Grp Volume(v), veh/h	0	361	425	408	252	0
Grp Sat Flow(s),veh/h/ln	0	1770	1770	1700	1774	1583
Q Serve(g_s), s	0.0	4.9	13.6	13.6	9.5	0.0
Cycle Q Clear(g_c), s	0.0	4.9	13.6	13.6	9.5	0.0
Prop In Lane	0.00			0.54	1.00	1.00
Lane Grp Cap(c), veh/h	0	1848	924	888	641	572
V/C Ratio(X)	0.00	0.20	0.46	0.46	0.39	0.00
Avail Cap(c_a), veh/h	0	1848	924	888	641	572
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	11.4	13.5	13.5	21.4	0.0
Incr Delay (d2), s/veh	0.0	0.2	1.6	1.7	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.4	7.0	6.8	4.9	0.0
LnGrp Delay(d),s/veh	0.0	11.7	15.2	15.2	23.2	0.0
LnGrp LOS		B	B	B	C	
Approach Vol, veh/h		361	833		252	
Approach Delay, s/veh		11.7	15.2		23.2	
Approach LOS		B	B		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		53.0				53.0		37.0
Change Period (Y+Rc), s		6.0				6.0		4.5
Max Green Setting (Gmax), s		47.0				47.0		32.5
Max Q Clear Time (g_c+I1), s		15.6				6.9		11.5
Green Ext Time (p_c), s		10.1				10.8		0.7

Intersection Summary	
HCM 2010 Ctrl Delay	15.7
HCM 2010 LOS	B

2040 NO-ACTION

AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	117	68	5	120	87	301	8	491	248	119	145	102
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1937	1937	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	127	74	5	130	95	327	9	534	0	129	158	111
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	361	471	32	442	489	416	21	853	0	166	659	436
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.01	0.24	0.00	0.09	0.32	0.32
Sat Flow, veh/h	1000	1795	121	1314	1863	1583	1774	3632	0	1774	2042	1352
Grp Volume(v), veh/h	127	0	79	130	95	327	9	534	0	129	136	133
Grp Sat Flow(s),veh/h/ln	1000	0	1916	1314	1863	1583	1774	1770	0	1774	1770	1624
Q Serve(g_s), s	5.9	0.0	1.7	4.4	2.1	10.0	0.3	7.0	0.0	3.7	2.9	3.2
Cycle Q Clear(g_c), s	8.0	0.0	1.7	6.0	2.1	10.0	0.3	7.0	0.0	3.7	2.9	3.2
Prop In Lane	1.00		0.06	1.00		1.00	1.00		0.00	1.00		0.83
Lane Grp Cap(c), veh/h	361	0	503	442	489	416	21	853	0	166	571	524
V/C Ratio(X)	0.35	0.00	0.16	0.29	0.19	0.79	0.43	0.63	0.00	0.78	0.24	0.25
Avail Cap(c_a), veh/h	636	0	1030	803	1001	851	272	2242	0	272	1121	1029
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	0.0	14.8	17.1	14.9	17.8	25.6	17.7	0.0	23.1	12.9	13.0
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.1	0.1	1.3	5.2	3.5	0.0	3.0	1.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.9	1.6	1.1	4.5	0.2	3.8	0.0	1.9	1.6	1.6
LnGrp Delay(d),s/veh	18.2	0.0	14.8	17.2	15.0	19.1	30.8	21.1	0.0	26.1	13.9	14.2
LnGrp LOS	B		B	B	B	B	C	C		C	B	B
Approach Vol, veh/h		206			552			543			398	
Approach Delay, s/veh		16.9			18.0			21.3			18.0	
Approach LOS		B			B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.9	57.5		20.7	7.6	61.7		20.7
Change Period (Y+Rc), s	7.0	7.0		7.0	7.0	7.0		7.0
Max Green Setting (Gmax), s	8.0	33.0		28.0	8.0	33.0		28.0
Max Q Clear Time (g_c+I1), s	5.7	9.0		10.0	2.3	5.2		12.0
Green Ext Time (p_c), s	0.0	3.5		1.7	0.0	3.6		1.7

Intersection Summary	
HCM 2010 Ctrl Delay	18.9
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 No Action*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*767*	*3*	*0*	*274*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*833*	*3*	*0*	*297*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*5*	*0*	*25*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*5*	*0*	*27*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*0*		*0*			*32*	
C (m) (veh/h)		*800*					*698*	
v/c		*0.00*					*0.05*	
95% queue length		*0.00*					*0.14*	
Control Delay (s/veh)		*9.5*					*10.4*	
LOS		*A*					*B*	
Approach Delay (s/veh)	--	--	*10.4*					
Approach LOS	--	--	*B*					

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	65	724	0	0	288	12	103	95	35	12	0	79
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	71	787	0	0	313	13	108	109	38	13	0	86
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	505	949	0	0	1198	50	167	175	149	128	0	114
Arrive On Green	0.06	0.51	0.00	0.00	0.35	0.35	0.09	0.09	0.09	0.07	0.00	0.07
Sat Flow, veh/h	1774	1863	0	0	3557	143	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	71	787	0	0	159	167	108	109	38	13	0	86
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1837	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.5	23.2	0.0	0.0	4.2	4.2	3.8	3.6	1.4	0.4	0.0	3.5
Cycle Q Clear(g_c), s	1.5	23.2	0.0	0.0	4.2	4.2	3.8	3.6	1.4	0.4	0.0	3.5
Prop In Lane	1.00		0.00	0.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	505	949	0	0	612	636	167	175	149	128	0	114
V/C Ratio(X)	0.14	0.83	0.00	0.00	0.26	0.26	0.65	0.62	0.25	0.10	0.00	0.75
Avail Cap(c_a), veh/h	543	1236	0	0	847	879	356	374	318	356	0	318
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.2	13.5	0.0	0.0	15.2	15.2	28.3	28.2	27.2	28.1	0.0	29.5
Incr Delay (d2), s/veh	0.0	8.3	0.0	0.0	1.0	1.0	1.6	1.3	0.3	0.1	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	14.0	0.0	0.0	2.2	2.3	1.9	1.9	0.6	0.2	0.0	1.6
LnGrp Delay(d),s/veh	11.2	21.8	0.0	0.0	16.3	16.2	29.9	29.6	27.6	28.2	0.0	33.2
LnGrp LOS	B	C			B	B	C	C	C	C		C
Approach Vol, veh/h		858			326			255			99	
Approach Delay, s/veh		20.9			16.3			29.4			32.6	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.6	54.6		13.1		65.2		11.7
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	31.0		13.0		43.0		13.0
Max Q Clear Time (g_c+I1), s	3.5	6.2		5.8		25.2		5.5
Green Ext Time (p_c), s	0.0	9.1		0.4		7.8		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	22.1
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2040 No Action*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*161*			*114*	*60*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*174*	*0*	*0*	*123*	*65*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*7*	*0*	*23*	*9*	*0*	*29*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*7*	*0*	*24*	*9*	*0*	*31*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*31*			*40*	
C (m) (veh/h)				*790*			*805*	
v/c				*0.04*			*0.05*	
95% queue length				*0.12*			*0.16*	
Control Delay (s/veh)				*9.7*			*9.7*	
LOS				*A*			*A*	
Approach Delay (s/veh)	--	--	*9.7*			*9.7*		
Approach LOS	--	--	*A*			*A*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 No Action*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	1	111	18	25	119	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	109	0	62	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	121	19	156		185			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.2		0.6			
Prop. Right-Turns	0.0	1.0	0.0		0.4			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.0		-0.1			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.11	0.02	0.14		0.16			
hd, final value (s)	5.11	4.40	4.67		4.52			
x, final value	0.17	0.02	0.20		0.23			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.8	2.1	2.7		2.5			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	371	269	406		435			
Delay (s/veh)	8.86	7.20	8.86		8.89			
LOS	A	A	A		A			
Approach: Delay (s/veh)	8.64		8.86		8.89			
LOS	A		A		A			
Intersection Delay (s/veh)	8.81							
Intersection LOS	A							

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2040 NO-ACTION

PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	128	3	300	87	320	8	162	187	213	357	127
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1937	1937	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	145	139	3	326	95	348	9	176	0	232	388	138
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	441	682	15	506	673	572	21	449	0	283	707	248
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.36	0.01	0.13	0.00	0.16	0.28	0.28
Sat Flow, veh/h	980	1889	41	1241	1863	1583	1774	3632	0	1774	2570	903
Grp Volume(v), veh/h	145	0	142	326	95	348	9	176	0	232	266	260
Grp Sat Flow(s),veh/h/ln	980	0	1930	1241	1863	1583	1774	1770	0	1774	1770	1703
Q Serve(g_s), s	7.0	0.0	3.0	14.6	2.0	10.7	0.3	2.7	0.0	7.5	7.6	7.8
Cycle Q Clear(g_c), s	9.0	0.0	3.0	17.7	2.0	10.7	0.3	2.7	0.0	7.5	7.6	7.8
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.00	1.00		0.53
Lane Grp Cap(c), veh/h	441	0	697	506	673	572	21	449	0	283	487	469
V/C Ratio(X)	0.33	0.00	0.20	0.64	0.14	0.61	0.44	0.39	0.00	0.82	0.55	0.56
Avail Cap(c_a), veh/h	531	0	874	620	844	717	149	1662	0	417	1098	1057
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	0.0	13.1	19.2	12.8	15.6	29.3	23.9	0.0	24.2	18.4	18.5
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.8	0.0	0.4	5.3	2.6	0.0	5.0	4.3	4.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	1.6	5.1	1.1	4.7	0.2	1.5	0.0	4.1	4.3	4.2
LnGrp Delay(d),s/veh	16.0	0.0	13.2	20.0	12.9	16.0	34.6	26.5	0.0	29.2	22.8	23.2
LnGrp LOS	B		B	C	B	B	C	C		C	C	C
Approach Vol, veh/h		287			769			185			758	
Approach Delay, s/veh		14.6			17.3			26.9			24.9	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.5	44.9		28.5	7.7	53.8		28.5
Change Period (Y+Rc), s	7.0	7.0		7.0	7.0	7.0		7.0
Max Green Setting (Gmax), s	14.0	28.0		27.0	5.0	37.0		27.0
Max Q Clear Time (g_c+I1), s	9.5	4.7		11.0	2.3	9.8		19.7
Green Ext Time (p_c), s	0.2	2.8		2.5	0.0	2.9		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	20.7
HCM 2010 LOS	C

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 No Action*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*375*	*5*	*1*	*649*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*407*	*5*	*1*	*705*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*	*0*	*3*	*4*	*0*	*35*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*3*	*4*	*0*	*38*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*1*		*7*			*42*	
C (m) (veh/h)		*1151*		*391*			*582*	
v/c		*0.00*		*0.02*			*0.07*	
95% queue length		*0.00*		*0.05*			*0.23*	
Control Delay (s/veh)		*8.1*		*14.4*			*11.7*	
LOS		*A*		*B*			*B*	
Approach Delay (s/veh)	--	--	*14.4*			*11.7*		
Approach LOS	--	--	*B*			*B*		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	41	324	0	0	679	8	258	82	32	24	0	170
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	45	352	0	0	738	9	184	223	35	26	0	185
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	237	776	0	0	1001	12	269	283	240	255	0	228
Arrive On Green	0.04	0.42	0.00	0.00	0.28	0.28	0.15	0.15	0.15	0.14	0.00	0.14
Sat Flow, veh/h	1774	1863	0	0	3674	44	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	45	352	0	0	365	382	184	223	35	26	0	185
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1855	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.2	9.9	0.0	0.0	13.6	13.6	7.2	8.4	1.4	0.9	0.0	8.3
Cycle Q Clear(g_c), s	1.2	9.9	0.0	0.0	13.6	13.6	7.2	8.4	1.4	0.9	0.0	8.3
Prop In Lane	1.00		0.00	0.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	237	776	0	0	494	518	269	283	240	255	0	228
V/C Ratio(X)	0.19	0.45	0.00	0.00	0.74	0.74	0.68	0.79	0.15	0.10	0.00	0.81
Avail Cap(c_a), veh/h	286	945	0	0	606	636	389	409	347	389	0	347
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.7	15.3	0.0	0.0	23.9	23.9	29.3	29.8	26.8	27.1	0.0	30.3
Incr Delay (d2), s/veh	0.1	1.9	0.0	0.0	9.5	9.1	1.1	3.8	0.1	0.1	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	5.5	0.0	0.0	7.9	8.2	3.6	4.6	0.6	0.5	0.0	3.9
LnGrp Delay(d),s/veh	17.8	17.2	0.0	0.0	33.3	32.9	30.4	33.6	26.9	27.2	0.0	34.8
LnGrp LOS	B	B			C	C	C	C	C	C		C
Approach Vol, veh/h		397			747			442			211	
Approach Delay, s/veh		17.3			33.1			31.7			33.9	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.0	44.4		18.1		54.4		17.5
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	25.0		16.0		37.0		16.0
Max Q Clear Time (g_c+I1), s	3.2	15.6		10.4		11.9		10.3
Green Ext Time (p_c), s	0.0	4.7		0.7		8.1		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	29.4
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2040 No Action*
Analysis Time Period	*PM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*215*			*206*	*33*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*233*	*0*	*0*	*223*	*35*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*14*	*0*	*11*	*17*	*0*	*30*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*15*	*0*	*11*	*18*	*0*	*32*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*26*			*50*	
C (m) (veh/h)				*574*			*656*	
v/c				*0.05*			*0.08*	
95% queue length				*0.14*			*0.25*	
Control Delay (s/veh)				*11.6*			*10.9*	
LOS				*B*			*B*	
Approach Delay (s/veh)	--	--	*11.6*			*10.9*		
Approach LOS	--	--	*B*			*B*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 No Action*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	211	125	59	146	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	73	0	30	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	229	135	222		111			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.3		0.7			
Prop. Right-Turns	0.0	1.0	0.0		0.3			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.1		-0.0			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.20	0.12	0.20		0.10			
hd, final value (s)	5.00	4.30	4.75		5.15			
x, final value	0.32	0.16	0.29		0.16			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.7	2.0	2.7		3.1			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	479	385	472		361			
Delay (s/veh)	10.03	7.82	9.71		9.12			
LOS	B	A	A		A			
Approach: Delay (s/veh)	9.21		9.71		9.12			
LOS	A		A		A			
Intersection Delay (s/veh)	9.36							
Intersection LOS	A							

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	117	68	5	120	87	301	8	491	248	119	145	102
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1937	1937	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	127	74	5	130	95	327	9	534	0	129	158	111
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	361	471	32	442	489	416	21	853	0	166	659	436
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.01	0.24	0.00	0.09	0.32	0.32
Sat Flow, veh/h	1000	1795	121	1314	1863	1583	1774	3632	0	1774	2042	1352
Grp Volume(v), veh/h	127	0	79	130	95	327	9	534	0	129	136	133
Grp Sat Flow(s),veh/h/ln	1000	0	1916	1314	1863	1583	1774	1770	0	1774	1770	1624
Q Serve(g_s), s	5.9	0.0	1.7	4.4	2.1	10.0	0.3	7.0	0.0	3.7	2.9	3.2
Cycle Q Clear(g_c), s	8.0	0.0	1.7	6.0	2.1	10.0	0.3	7.0	0.0	3.7	2.9	3.2
Prop In Lane	1.00		0.06	1.00		1.00	1.00		0.00	1.00		0.83
Lane Grp Cap(c), veh/h	361	0	503	442	489	416	21	853	0	166	571	524
V/C Ratio(X)	0.35	0.00	0.16	0.29	0.19	0.79	0.43	0.63	0.00	0.78	0.24	0.25
Avail Cap(c_a), veh/h	636	0	1030	803	1001	851	272	2242	0	272	1121	1029
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	0.0	14.8	17.1	14.9	17.8	25.6	17.7	0.0	23.1	12.9	13.0
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.1	0.1	1.3	5.2	3.5	0.0	3.0	1.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.9	1.6	1.1	4.5	0.2	3.8	0.0	1.9	1.6	1.6
LnGrp Delay(d),s/veh	18.2	0.0	14.8	17.2	15.0	19.1	30.8	21.1	0.0	26.1	13.9	14.2
LnGrp LOS	B		B	B	B	B	C	C		C	B	B
Approach Vol, veh/h		206			552			543			398	
Approach Delay, s/veh		16.9			18.0			21.3			18.0	
Approach LOS		B			B			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.9	57.5		20.7	7.6	61.7		20.7
Change Period (Y+Rc), s	7.0	7.0		7.0	7.0	7.0		7.0
Max Green Setting (Gmax), s	8.0	33.0		28.0	8.0	33.0		28.0
Max Q Clear Time (g_c+I1), s	5.7	9.0		10.0	2.3	5.2		12.0
Green Ext Time (p_c), s	0.0	3.5		1.7	0.0	3.6		1.7

Intersection Summary	
HCM 2010 Ctrl Delay	18.9
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 Alternative 1*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*767*	*3*	*0*	*274*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*833*	*3*	*0*	*297*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*5*	*0*	*25*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*5*	*0*	*27*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*0*		*0*			*32*	
C (m) (veh/h)		*800*					*698*	
v/c		*0.00*					*0.05*	
95% queue length		*0.00*					*0.14*	
Control Delay (s/veh)		*9.5*					*10.4*	
LOS		*A*					*B*	
Approach Delay (s/veh)	--	--				*10.4*		
Approach LOS	--	--				*B*		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	65	724	0	0	288	12	103	95	35	12	0	79
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	71	787	0	0	313	13	108	109	38	13	0	86
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	505	949	0	0	1198	50	167	175	149	128	0	114
Arrive On Green	0.06	0.51	0.00	0.00	0.35	0.35	0.09	0.09	0.09	0.07	0.00	0.07
Sat Flow, veh/h	1774	1863	0	0	3557	143	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	71	787	0	0	159	167	108	109	38	13	0	86
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1837	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.5	23.2	0.0	0.0	4.2	4.2	3.8	3.6	1.4	0.4	0.0	3.5
Cycle Q Clear(g_c), s	1.5	23.2	0.0	0.0	4.2	4.2	3.8	3.6	1.4	0.4	0.0	3.5
Prop In Lane	1.00		0.00	0.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	505	949	0	0	612	636	167	175	149	128	0	114
V/C Ratio(X)	0.14	0.83	0.00	0.00	0.26	0.26	0.65	0.62	0.25	0.10	0.00	0.75
Avail Cap(c_a), veh/h	543	1236	0	0	847	879	356	374	318	356	0	318
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.2	13.5	0.0	0.0	15.2	15.2	28.3	28.2	27.2	28.1	0.0	29.5
Incr Delay (d2), s/veh	0.0	8.3	0.0	0.0	1.0	1.0	1.6	1.3	0.3	0.1	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	14.0	0.0	0.0	2.2	2.3	1.9	1.9	0.6	0.2	0.0	1.6
LnGrp Delay(d),s/veh	11.2	21.8	0.0	0.0	16.3	16.2	29.9	29.6	27.6	28.2	0.0	33.2
LnGrp LOS	B	C			B	B	C	C	C	C		C
Approach Vol, veh/h		858			326			255			99	
Approach Delay, s/veh		20.9			16.3			29.4			32.6	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.6	54.6		13.1		65.2		11.7
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	31.0		13.0		43.0		13.0
Max Q Clear Time (g_c+I1), s	3.5	6.2		5.8		25.2		5.5
Green Ext Time (p_c), s	0.0	9.1		0.4		7.8		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	22.1
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2040 Alternative 1*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*161*			*114*	*60*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*174*	*0*	*0*	*123*	*65*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*7*	*0*	*23*	*9*	*0*	*29*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*7*	*0*	*24*	*9*	*0*	*31*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*31*			*40*	
C (m) (veh/h)				*790*			*805*	
v/c				*0.04*			*0.05*	
95% queue length				*0.12*			*0.16*	
Control Delay (s/veh)				*9.7*			*9.7*	
LOS				*A*			*A*	
Approach Delay (s/veh)	--	--	*9.7*			*9.7*		
Approach LOS	--	--	*A*			*A*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 Alternative 1*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	1	111	18	25	119	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	109	0	62	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	121	19	156		185			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.2		0.6			
Prop. Right-Turns	0.0	1.0	0.0		0.4			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.0		-0.1			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.11	0.02	0.14		0.16			
hd, final value (s)	5.11	4.40	4.67		4.52			
x, final value	0.17	0.02	0.20		0.23			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.8	2.1	2.7		2.5			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	371	269	406		435			
Delay (s/veh)	8.86	7.20	8.86		8.89			
LOS	A	A	A		A			
Approach: Delay (s/veh)	8.64		8.86		8.89			
LOS	A		A		A			
Intersection Delay (s/veh)	8.81							
Intersection LOS	A							

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2040 ALTERNATIVE 1

PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	133	128	3	300	87	320	8	162	187	213	357	127
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1937	1937	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	145	139	3	326	95	348	9	176	0	232	388	138
Adj No. of Lanes	1	1	0	1	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	441	682	15	506	673	572	21	449	0	283	707	248
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.36	0.01	0.13	0.00	0.16	0.28	0.28
Sat Flow, veh/h	980	1889	41	1241	1863	1583	1774	3632	0	1774	2570	903
Grp Volume(v), veh/h	145	0	142	326	95	348	9	176	0	232	266	260
Grp Sat Flow(s),veh/h/ln	980	0	1930	1241	1863	1583	1774	1770	0	1774	1770	1703
Q Serve(g_s), s	7.0	0.0	3.0	14.6	2.0	10.7	0.3	2.7	0.0	7.5	7.6	7.8
Cycle Q Clear(g_c), s	9.0	0.0	3.0	17.7	2.0	10.7	0.3	2.7	0.0	7.5	7.6	7.8
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.00	1.00		0.53
Lane Grp Cap(c), veh/h	441	0	697	506	673	572	21	449	0	283	487	469
V/C Ratio(X)	0.33	0.00	0.20	0.64	0.14	0.61	0.44	0.39	0.00	0.82	0.55	0.56
Avail Cap(c_a), veh/h	531	0	874	620	844	717	149	1662	0	417	1098	1057
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	0.0	13.1	19.2	12.8	15.6	29.3	23.9	0.0	24.2	18.4	18.5
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.8	0.0	0.4	5.3	2.6	0.0	5.0	4.3	4.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	1.6	5.1	1.1	4.7	0.2	1.5	0.0	4.1	4.3	4.2
LnGrp Delay(d),s/veh	16.0	0.0	13.2	20.0	12.9	16.0	34.6	26.5	0.0	29.2	22.8	23.2
LnGrp LOS	B		B	C	B	B	C	C		C	C	C
Approach Vol, veh/h		287			769			185			758	
Approach Delay, s/veh		14.6			17.3			26.9			24.9	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.5	44.9		28.5	7.7	53.8		28.5
Change Period (Y+Rc), s	7.0	7.0		7.0	7.0	7.0		7.0
Max Green Setting (Gmax), s	14.0	28.0		27.0	5.0	37.0		27.0
Max Q Clear Time (g_c+I1), s	9.5	4.7		11.0	2.3	9.8		19.7
Green Ext Time (p_c), s	0.2	2.8		2.5	0.0	2.9		1.9

Intersection Summary	
HCM 2010 Ctrl Delay	20.7
HCM 2010 LOS	C

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 Alternative 1*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*375*	*5*	*1*	*649*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*407*	*5*	*1*	*705*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*	*0*	*3*	*4*	*0*	*35*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*3*	*4*	*0*	*38*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*1*		*7*			*42*	
C (m) (veh/h)		*1151*		*391*			*582*	
v/c		*0.00*		*0.02*			*0.07*	
95% queue length		*0.00*		*0.05*			*0.23*	
Control Delay (s/veh)		*8.1*		*14.4*			*11.7*	
LOS		*A*		*B*			*B*	
Approach Delay (s/veh)	--	--	*14.4*			*11.7*		
Approach LOS	--	--	*B*			*B*		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	41	324	0	0	679	8	258	82	32	24	0	170
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	45	352	0	0	738	9	184	223	35	26	0	185
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	237	776	0	0	1001	12	269	283	240	255	0	228
Arrive On Green	0.04	0.42	0.00	0.00	0.28	0.28	0.15	0.15	0.15	0.14	0.00	0.14
Sat Flow, veh/h	1774	1863	0	0	3674	44	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	45	352	0	0	365	382	184	223	35	26	0	185
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1855	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.2	9.9	0.0	0.0	13.6	13.6	7.2	8.4	1.4	0.9	0.0	8.3
Cycle Q Clear(g_c), s	1.2	9.9	0.0	0.0	13.6	13.6	7.2	8.4	1.4	0.9	0.0	8.3
Prop In Lane	1.00		0.00	0.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	237	776	0	0	494	518	269	283	240	255	0	228
V/C Ratio(X)	0.19	0.45	0.00	0.00	0.74	0.74	0.68	0.79	0.15	0.10	0.00	0.81
Avail Cap(c_a), veh/h	286	945	0	0	606	636	389	409	347	389	0	347
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.7	15.3	0.0	0.0	23.9	23.9	29.3	29.8	26.8	27.1	0.0	30.3
Incr Delay (d2), s/veh	0.1	1.9	0.0	0.0	9.5	9.1	1.1	3.8	0.1	0.1	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	5.5	0.0	0.0	7.9	8.2	3.6	4.6	0.6	0.5	0.0	3.9
LnGrp Delay(d),s/veh	17.8	17.2	0.0	0.0	33.3	32.9	30.4	33.6	26.9	27.2	0.0	34.8
LnGrp LOS	B	B			C	C	C	C	C	C		C
Approach Vol, veh/h		397			747			442			211	
Approach Delay, s/veh		17.3			33.1			31.7			33.9	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.0	44.4		18.1		54.4		17.5
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	25.0		16.0		37.0		16.0
Max Q Clear Time (g_c+I1), s	3.2	15.6		10.4		11.9		10.3
Green Ext Time (p_c), s	0.0	4.7		0.7		8.1		0.4

Intersection Summary	
HCM 2010 Ctrl Delay	29.4
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2040 Alternative 1*
Analysis Time Period	*PM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*215*			*206*	*33*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*233*	*0*	*0*	*223*	*35*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*14*	*0*	*11*	*17*	*0*	*30*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*15*	*0*	*11*	*18*	*0*	*32*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*26*			*50*	
C (m) (veh/h)				*574*			*656*	
v/c				*0.05*			*0.08*	
95% queue length				*0.14*			*0.25*	
Control Delay (s/veh)				*11.6*			*10.9*	
LOS				*B*			*B*	
Approach Delay (s/veh)	--	--	*11.6*			*10.9*		
Approach LOS	--	--	*B*			*B*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 Alternative 1*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	211	125	59	146	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	73	0	30	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	229	135	222		111			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.3		0.7			
Prop. Right-Turns	0.0	1.0	0.0		0.3			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.1		-0.0			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.20	0.12	0.20		0.10			
hd, final value (s)	5.00	4.30	4.75		5.15			
x, final value	0.32	0.16	0.29		0.16			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.7	2.0	2.7		3.1			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	479	385	472		361			
Delay (s/veh)	10.03	7.82	9.71		9.12			
LOS	B	A	A		A			
Approach: Delay (s/veh)	9.21		9.71		9.12			
LOS	A		A		A			
Intersection Delay (s/veh)	9.36							
Intersection LOS	A							

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2040 ALTERNATIVE 2

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	200	301	618	316	119	240
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	217	327	672	0	129	261
Adj No. of Lanes	1	1	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	438	391	994	0	166	1773
Arrive On Green	0.25	0.25	0.28	0.00	0.09	0.50
Sat Flow, veh/h	1774	1583	3725	0	1774	3632
Grp Volume(v), veh/h	217	327	672	0	129	261
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	0	1774	1770
Q Serve(g_s), s	5.8	10.9	9.3	0.0	3.9	2.2
Cycle Q Clear(g_c), s	5.8	10.9	9.3	0.0	3.9	2.2
Prop In Lane	1.00	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	438	391	994	0	166	1773
V/C Ratio(X)	0.50	0.84	0.68	0.00	0.78	0.15
Avail Cap(c_a), veh/h	864	771	2043	0	320	3128
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	17.9	19.8	17.7	0.0	24.6	7.5
Incr Delay (d2), s/veh	0.3	1.9	3.7	0.0	2.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	4.9	5.1	0.0	2.1	1.1
LnGrp Delay(d),s/veh	18.3	21.7	21.4	0.0	27.5	7.6
LnGrp LOS	B	C	C		C	A
Approach Vol, veh/h	544		672			390
Approach Delay, s/veh	20.3		21.4			14.2
Approach LOS	C		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	12.2	57.1				69.3		20.7
Change Period (Y+Rc), s	7.0	7.0				7.0		7.0
Max Green Setting (Gmax), s	10.0	32.0				49.0		27.0
Max Q Clear Time (g_c+I1), s	5.9	11.3				4.2		12.9
Green Ext Time (p_c), s	0.1	4.2				4.7		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	19.3
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 Alternative 2*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*890*	*3*	*0*	*353*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*967*	*3*	*0*	*383*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*47*	*0*	*30*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*51*	*0*	*32*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*0*		*0*			*83*	
C (m) (veh/h)		*712*					*341*	
v/c		*0.00*					*0.24*	
95% queue length		*0.00*					*0.96*	
Control Delay (s/veh)		*10.1*					*18.9*	
LOS		*B*					*C*	
Approach Delay (s/veh)	--	--	*18.9*					
Approach LOS	--	--	*C*					

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	63	726	0	0	288	95	103	47	82	85	0	79
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	68	789	0	0	313	103	82	94	89	92	0	86
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	459	954	0	0	930	301	158	166	141	148	0	132
Arrive On Green	0.05	0.51	0.00	0.00	0.35	0.35	0.09	0.09	0.09	0.08	0.00	0.08
Sat Flow, veh/h	1774	1863	0	0	2725	851	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	68	789	0	0	209	207	82	94	89	92	0	86
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1713	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.5	23.9	0.0	0.0	5.8	5.9	2.9	3.2	3.6	3.3	0.0	3.5
Cycle Q Clear(g_c), s	1.5	23.9	0.0	0.0	5.8	5.9	2.9	3.2	3.6	3.3	0.0	3.5
Prop In Lane	1.00		0.00	0.00		0.50	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	459	954	0	0	625	605	158	166	141	148	0	132
V/C Ratio(X)	0.15	0.83	0.00	0.00	0.33	0.34	0.52	0.57	0.63	0.62	0.00	0.65
Avail Cap(c_a), veh/h	497	1203	0	0	824	797	346	364	309	346	0	309
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.5	13.7	0.0	0.0	15.8	15.8	29.0	29.1	29.3	29.5	0.0	29.6
Incr Delay (d2), s/veh	0.1	8.2	0.0	0.0	1.4	1.5	1.0	1.1	1.7	1.6	0.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	14.2	0.0	0.0	3.0	3.0	1.5	1.7	1.6	1.7	0.0	1.6
LnGrp Delay(d),s/veh	11.5	21.9	0.0	0.0	17.2	17.4	29.9	30.2	31.0	31.1	0.0	31.6
LnGrp LOS	B	C			B	B	C	C	C	C		C
Approach Vol, veh/h		857			416			265			178	
Approach Delay, s/veh		21.1			17.3			30.4			31.3	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.6	53.9		12.9		64.5		12.5
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	31.0		13.0		43.0		13.0
Max Q Clear Time (g_c+I1), s	3.5	7.9		5.6		25.9		5.5
Green Ext Time (p_c), s	0.0	9.6		0.4		8.2		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	22.7
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2040 Alternative 2*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*0*		*0*		*0*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*T*		*LTR*	*LR*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*38*	*60*			*0*	*39*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*41*	*65*	*0*	*0*	*0*	*42*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LTR*	*LT*					*TR*
v (veh/h)		*0*	*106*					*42*
C (m) (veh/h)		*1636*	*922*					*1091*
v/c		*0.00*	*0.11*					*0.04*
95% queue length		*0.00*	*0.39*					*0.12*
Control Delay (s/veh)		*7.2*	*9.4*					*8.4*
LOS		*A*	*A*					*A*
Approach Delay (s/veh)	--	--	*9.4*			*8.4*		
Approach LOS	--	--	*A*			*A*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 Alternative 2*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*1*	*38*	*92*	*25*	*35*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*193*	*0*	*13*	*0*	*0*	*0*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LT*	*R*	*LT*		*LTR*			
PHF	*0.92*	*0.92*	*0.92*		*0.92*			
Flow Rate (veh/h)	*42*	*99*	*65*		*223*			
% Heavy Vehicles	*0*	*0*	*0*		*0*			
No. Lanes	*2*		*1*		*1*		*0*	
Geometry Group	*5*		*3a*		*1*			
Duration, T	*1.00*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.0*	*0.0*	*0.4*		*0.9*			
Prop. Right-Turns	*0.0*	*1.0*	*0.0*		*0.1*			
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*		*0.0*			
hLT-adj	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*		
hRT-adj	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*		
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*		
hadj, computed	*0.0*	*-0.7*	*0.1*		*0.1*			

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*		*3.20*			
x, initial	*0.04*	*0.09*	*0.06*		*0.20*			
hd, final value (s)	*5.13*	*4.41*	*4.81*		*4.53*			
x, final value	*0.06*	*0.12*	*0.09*		*0.28*			
Move-up time, m (s)	*2.3*		*2.0*		*2.0*			
Service Time, t_s (s)	*2.8*	*2.1*	*2.8*		*2.5*			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*292*	*349*	*315*		*473*			
Delay (s/veh)	*8.16*	*7.72*	*8.26*		*9.29*			
LOS	*A*	*A*	*A*		*A*			
Approach: Delay (s/veh)	*7.85*		*8.26*		*9.29*			
LOS	*A*		*A*		*A*			
Intersection Delay (s/veh)	*8.66*							
Intersection LOS	*A*							

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2040 ALTERNATIVE 2

PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	388	320	286	306	216	495
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	422	348	311	0	235	538
Adj No. of Lanes	1	1	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	498	445	651	0	285	1661
Arrive On Green	0.28	0.28	0.18	0.00	0.16	0.47
Sat Flow, veh/h	1774	1583	3725	0	1774	3632
Grp Volume(v), veh/h	422	348	311	0	235	538
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	0	1774	1770
Q Serve(g_s), s	12.6	11.4	4.4	0.0	7.2	5.3
Cycle Q Clear(g_c), s	12.6	11.4	4.4	0.0	7.2	5.3
Prop In Lane	1.00	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	498	445	651	0	285	1661
V/C Ratio(X)	0.85	0.78	0.48	0.00	0.83	0.32
Avail Cap(c_a), veh/h	886	791	1958	0	317	3032
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	18.6	20.5	0.0	22.8	9.3
Incr Delay (d2), s/veh	1.6	1.2	2.5	0.0	13.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	5.1	2.4	0.0	4.6	2.7
LnGrp Delay(d),s/veh	20.6	19.7	23.0	0.0	36.2	9.8
LnGrp LOS	C	B	C		D	A
Approach Vol, veh/h	770		311			773
Approach Delay, s/veh	20.2		23.0			17.8
Approach LOS	C		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	16.0	51.3				67.3		22.7
Change Period (Y+Rc), s	7.0	7.0				7.0		7.0
Max Green Setting (Gmax), s	10.0	31.0				48.0		28.0
Max Q Clear Time (g_c+I1), s	9.2	6.4				7.3		14.6
Green Ext Time (p_c), s	0.0	3.9				4.1		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	19.7
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 Alternative 2*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*569*	*5*	*1*	*732*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*618*	*5*	*1*	*795*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*	*0*	*3*	*43*	*0*	*0*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*3*	*46*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*1*		*7*			*46*	
C (m) (veh/h)		*961*		*282*			*166*	
v/c		*0.00*		*0.02*			*0.28*	
95% queue length		*0.00*		*0.08*			*1.13*	
Control Delay (s/veh)		*8.8*		*18.1*			*34.9*	
LOS		*A*		*C*			*D*	
Approach Delay (s/veh)	--	--	*18.1*			*34.9*		
Approach LOS	--	--	*C*			*D*		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	37	328	0	0	691	79	258	82	32	214	0	146
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	40	357	0	0	751	86	184	223	35	233	0	159
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	214	795	0	0	960	110	258	271	230	283	0	252
Arrive On Green	0.04	0.43	0.00	0.00	0.30	0.30	0.15	0.15	0.15	0.16	0.00	0.16
Sat Flow, veh/h	1774	1863	0	0	3294	366	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	40	357	0	0	415	422	184	223	35	233	0	159
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1798	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.1	10.6	0.0	0.0	16.8	16.8	7.7	9.1	1.5	9.9	0.0	7.3
Cycle Q Clear(g_c), s	1.1	10.6	0.0	0.0	16.8	16.8	7.7	9.1	1.5	9.9	0.0	7.3
Prop In Lane	1.00		0.00	0.00		0.20	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	214	795	0	0	531	539	258	271	230	283	0	252
V/C Ratio(X)	0.19	0.45	0.00	0.00	0.78	0.78	0.71	0.82	0.15	0.82	0.00	0.63
Avail Cap(c_a), veh/h	261	929	0	0	611	621	295	310	263	386	0	344
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.6	15.9	0.0	0.0	25.0	25.0	31.9	32.4	29.2	31.8	0.0	30.7
Incr Delay (d2), s/veh	0.2	1.8	0.0	0.0	10.9	10.8	5.1	12.9	0.1	7.4	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	5.9	0.0	0.0	9.8	9.9	4.2	5.6	0.7	5.4	0.0	3.3
LnGrp Delay(d),s/veh	18.8	17.7	0.0	0.0	35.9	35.8	37.0	45.3	29.3	39.2	0.0	31.7
LnGrp LOS	B	B			D	D	D	D	C	D		C
Approach Vol, veh/h		397			837			442			392	
Approach Delay, s/veh		17.8			35.9			40.6			36.2	
Approach LOS		B			D			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	9.9	42.3		18.4		52.2		19.5
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	27.0		13.0		39.0		17.0
Max Q Clear Time (g_c+I1), s	3.1	18.8		11.1		12.6		11.9
Green Ext Time (p_c), s	0.0	4.7		0.3		9.2		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	33.5
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2040 Alternative 2*
Analysis Time Period	*PM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*0*		*0*		*0*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*0*	*0*
Configuration		*T*		*LTR*	*LR*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*124*	*33*			*0*	*0*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*134*	*35*	*0*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LTR*	*LT*					*TR*
v (veh/h)		*0*	*169*					*0*
C (m) (veh/h)		*1636*	*999*					
v/c		*0.00*	*0.17*					
95% queue length		*0.00*	*0.61*					
Control Delay (s/veh)		*7.2*	*9.3*					
LOS		*A*	*A*					
Approach Delay (s/veh)	--	--	*9.3*					
Approach LOS	--	--	*A*					

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 Alternative 2*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	31	305	14	106	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	116	0	26	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	33	331	130		154			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.1		0.8			
Prop. Right-Turns	0.0	1.0	0.0		0.2			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.0		0.1			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.03	0.29	0.12		0.14			
hd, final value (s)	5.05	4.34	4.84		5.04			
x, final value	0.05	0.40	0.17		0.22			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.7	2.0	2.8		3.0			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	283	581	380		404			
Delay (s/veh)	7.99	9.92	8.86		9.42			
LOS	A	A	A		A			
Approach: Delay (s/veh)	9.74		8.86		9.42			
LOS	A		A		A			
Intersection Delay (s/veh)	9.49							
Intersection LOS	A							

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2040 ALTERNATIVE 3

AM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	200	301	618	316	119	240
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	217	327	672	0	129	261
Adj No. of Lanes	1	1	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	438	391	994	0	166	1773
Arrive On Green	0.25	0.25	0.28	0.00	0.09	0.50
Sat Flow, veh/h	1774	1583	3725	0	1774	3632
Grp Volume(v), veh/h	217	327	672	0	129	261
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	0	1774	1770
Q Serve(g_s), s	5.8	10.9	9.3	0.0	3.9	2.2
Cycle Q Clear(g_c), s	5.8	10.9	9.3	0.0	3.9	2.2
Prop In Lane	1.00	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	438	391	994	0	166	1773
V/C Ratio(X)	0.50	0.84	0.68	0.00	0.78	0.15
Avail Cap(c_a), veh/h	864	771	2043	0	320	3128
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	17.9	19.8	17.7	0.0	24.6	7.5
Incr Delay (d2), s/veh	0.3	1.9	3.7	0.0	2.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	4.9	5.1	0.0	2.1	1.1
LnGrp Delay(d),s/veh	18.3	21.7	21.4	0.0	27.5	7.6
LnGrp LOS	B	C	C		C	A
Approach Vol, veh/h	544		672			390
Approach Delay, s/veh	20.3		21.4			14.2
Approach LOS	C		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	12.2	57.1				69.3		20.7
Change Period (Y+Rc), s	7.0	7.0				7.0		7.0
Max Green Setting (Gmax), s	10.0	32.0				49.0		27.0
Max Q Clear Time (g_c+I1), s	5.9	11.3				4.2		12.9
Green Ext Time (p_c), s	0.1	4.2				4.7		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	19.3
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 Alternative 3*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*769*	*3*	*0*	*274*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*835*	*3*	*0*	*297*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*5*	*0*	*25*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*5*	*0*	*27*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*0*		*0*			*32*	
C (m) (veh/h)		*799*					*698*	
v/c		*0.00*					*0.05*	
95% queue length		*0.00*					*0.14*	
Control Delay (s/veh)		*9.5*					*10.4*	
LOS		*A*					*B*	
Approach Delay (s/veh)	--	--	*10.4*					
Approach LOS	--	--	*B*					

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	63	726	0	0	288	12	103	95	35	12	0	79
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	68	789	0	0	313	13	108	109	38	13	0	86
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2	2	2	2
Cap, veh/h	505	951	0	0	1206	50	167	175	149	128	0	114
Arrive On Green	0.05	0.51	0.00	0.00	0.35	0.35	0.09	0.09	0.09	0.07	0.00	0.07
Sat Flow, veh/h	1774	1863	0	0	3557	143	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	68	789	0	0	159	167	108	109	38	13	0	86
Grp Sat Flow(s),veh/h/ln	1774	1863	0	0	1770	1837	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.5	23.4	0.0	0.0	4.2	4.2	3.8	3.7	1.4	0.4	0.0	3.5
Cycle Q Clear(g_c), s	1.5	23.4	0.0	0.0	4.2	4.2	3.8	3.7	1.4	0.4	0.0	3.5
Prop In Lane	1.00		0.00	0.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	505	951	0	0	616	640	167	175	149	128	0	114
V/C Ratio(X)	0.13	0.83	0.00	0.00	0.26	0.26	0.65	0.62	0.25	0.10	0.00	0.75
Avail Cap(c_a), veh/h	545	1234	0	0	845	878	355	373	317	355	0	317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.2	13.5	0.0	0.0	15.2	15.2	28.4	28.3	27.3	28.2	0.0	29.6
Incr Delay (d2), s/veh	0.0	8.3	0.0	0.0	1.0	1.0	1.6	1.3	0.3	0.1	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	14.0	0.0	0.0	2.2	2.3	1.9	1.9	0.6	0.2	0.0	1.6
LnGrp Delay(d),s/veh	11.2	21.8	0.0	0.0	16.2	16.2	29.9	29.6	27.6	28.3	0.0	33.3
LnGrp LOS	B	C			B	B	C	C	C	C		C
Approach Vol, veh/h		857			326			255			99	
Approach Delay, s/veh		21.0			16.2			29.5			32.6	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.5	54.7		13.1		65.2		11.7
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	31.0		13.0		43.0		13.0
Max Q Clear Time (g_c+I1), s	3.5	6.2		5.8		25.4		5.5
Green Ext Time (p_c), s	0.0	9.1		0.4		7.8		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	22.1
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2040 Alternative 3*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*159*			*114*	*60*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*172*	*0*	*0*	*123*	*65*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*7*	*0*	*23*	*9*	*0*	*29*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*7*	*0*	*24*	*9*	*0*	*31*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*31*			*40*	
C (m) (veh/h)				*792*			*806*	
v/c				*0.04*			*0.05*	
95% queue length				*0.12*			*0.16*	
Control Delay (s/veh)				*9.7*			*9.7*	
LOS				*A*			*A*	
Approach Delay (s/veh)	--	--	*9.7*			*9.7*		
Approach LOS	--	--	*A*			*A*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*AM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 Alternative 3*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	1	111	18	25	119	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	109	0	60	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	121	19	156		183			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.2		0.6			
Prop. Right-Turns	0.0	1.0	0.0		0.4			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.0		-0.1			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.11	0.02	0.14		0.16			
hd, final value (s)	5.10	4.39	4.67		4.53			
x, final value	0.17	0.02	0.20		0.23			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.8	2.1	2.7		2.5			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	371	269	406		433			
Delay (s/veh)	8.85	7.20	8.85		8.88			
LOS	A	A	A		A			
Approach: Delay (s/veh)	8.63		8.85		8.88			
LOS	A		A		A			
Intersection Delay (s/veh)	8.80							
Intersection LOS	A							

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Columbia Pk. & S. Nash St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2040 Alternative 3*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Nash Street (Tentative)*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*726*			*264*	*175*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*789*	*0*	*0*	*286*	*190*
Percent Heavy Vehicles	*1*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*	*T*			*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*186*	*0*	*5*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*202*	*0*	*5*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LTR*	
v (veh/h)	*0*						*207*	
C (m) (veh/h)	*1090*						*344*	
v/c	*0.00*						*0.60*	
95% queue length	*0.00*						*4.27*	
Control Delay (s/veh)	*8.3*						*30.9*	
LOS	*A*						*D*	
Approach Delay (s/veh)	--	--				*30.9*		
Approach LOS	--	--				*D*		

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	726	264	175	186	5
Number	1	6	2	12	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	0	789	287	190	202	5
Adj No. of Lanes	0	2	2	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	0	2412	1409	907	256	229
Arrive On Green	0.00	0.68	0.68	0.68	0.14	0.14
Sat Flow, veh/h	0	3725	2160	1330	1774	1583
Grp Volume(v), veh/h	0	789	244	233	202	5
Grp Sat Flow(s),veh/h/ln	0	1770	1770	1628	1774	1583
Q Serve(g_s), s	0.0	6.3	3.5	3.7	7.6	0.2
Cycle Q Clear(g_c), s	0.0	6.3	3.5	3.7	7.6	0.2
Prop In Lane	0.00			0.82	1.00	1.00
Lane Grp Cap(c), veh/h	0	2412	1206	1110	256	229
V/C Ratio(X)	0.00	0.33	0.20	0.21	0.79	0.02
Avail Cap(c_a), veh/h	0	2412	1206	1110	798	712
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	4.5	4.1	4.1	28.5	25.3
Incr Delay (d2), s/veh	0.0	0.4	0.4	0.4	5.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.2	1.8	1.7	4.1	0.1
LnGrp Delay(d),s/veh	0.0	4.9	4.4	4.5	33.8	25.4
LnGrp LOS		A	A	A	C	C
Approach Vol, veh/h		789	477		207	
Approach Delay, s/veh		4.9	4.5		33.6	
Approach LOS		A	A		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		74.0				74.0		16.0
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		47.0				47.0		31.0
Max Q Clear Time (g_c+I1), s		5.7				8.3		9.6
Green Ext Time (p_c), s		12.0				11.8		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	8.8
HCM 2010 LOS	A

2040 ALTERNATIVE 3

PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	388	320	286	306	216	495
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	422	348	311	0	235	538
Adj No. of Lanes	1	1	2	0	1	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	498	444	643	0	290	1663
Arrive On Green	0.28	0.28	0.18	0.00	0.16	0.47
Sat Flow, veh/h	1774	1583	3725	0	1774	3632
Grp Volume(v), veh/h	422	348	311	0	235	538
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	0	1774	1770
Q Serve(g_s), s	12.6	11.4	4.4	0.0	7.2	5.3
Cycle Q Clear(g_c), s	12.6	11.4	4.4	0.0	7.2	5.3
Prop In Lane	1.00	1.00		0.00	1.00	
Lane Grp Cap(c), veh/h	498	444	643	0	290	1663
V/C Ratio(X)	0.85	0.78	0.48	0.00	0.81	0.32
Avail Cap(c_a), veh/h	854	762	1704	0	475	3092
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	18.6	20.6	0.0	22.6	9.3
Incr Delay (d2), s/veh	1.6	1.2	2.6	0.0	2.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	5.1	2.4	0.0	3.7	2.7
LnGrp Delay(d),s/veh	20.6	19.8	23.2	0.0	24.7	9.8
LnGrp LOS	C	B	C		C	A
Approach Vol, veh/h	770		311			773
Approach Delay, s/veh	20.2		23.2			14.3
Approach LOS	C		C			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	16.2	51.1				67.3		22.7
Change Period (Y+Rc), s	7.0	7.0				7.0		7.0
Max Green Setting (Gmax), s	15.0	27.0				49.0		27.0
Max Q Clear Time (g_c+I1), s	9.2	6.4				7.3		14.6
Green Ext Time (p_c), s	0.2	3.8				4.1		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	18.3
HCM 2010 LOS	B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*3 - Columbia Pk. & S. Ode St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 Alternative 3*

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Ode Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*375*	*5*	*1*	*661*	
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*407*	*5*	*1*	*718*	*0*
Percent Heavy Vehicles	*1*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*	*LT*	*T*	
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*4*	*0*	*3*	*4*	*0*	*35*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*3*	*4*	*0*	*38*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*			*LTR*	
v (veh/h)		*1*		*7*			*42*	
C (m) (veh/h)		*1151*		*386*			*575*	
v/c		*0.00*		*0.02*			*0.07*	
95% queue length		*0.00*		*0.06*			*0.24*	
Control Delay (s/veh)		*8.1*		*14.5*			*11.8*	
LOS		*A*		*B*			*B*	
Approach Delay (s/veh)	--	--	*14.5*			*11.8*		
Approach LOS	--	--	*B*			*B*		

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	41	324	0	1	691	8	258	82	32	24	0	146
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	0	1900	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	45	352	0	1	751	9	184	223	35	26	0	159
Adj No. of Lanes	1	1	0	0	2	0	1	1	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	0	2	2	2	2	2	2	2	2	2
Cap, veh/h	244	805	0	50	1033	12	268	281	239	224	0	200
Arrive On Green	0.04	0.43	0.00	0.29	0.29	0.29	0.15	0.15	0.15	0.13	0.00	0.13
Sat Flow, veh/h	1774	1863	0	1	3507	42	1774	1863	1583	1774	0	1583
Grp Volume(v), veh/h	45	352	0	399	0	362	184	223	35	26	0	159
Grp Sat Flow(s),veh/h/ln	1774	1863	0	1862	0	1688	1774	1863	1583	1774	0	1583
Q Serve(g_s), s	1.2	9.6	0.0	0.0	0.0	13.9	7.1	8.4	1.4	0.9	0.0	7.1
Cycle Q Clear(g_c), s	1.2	9.6	0.0	13.9	0.0	13.9	7.1	8.4	1.4	0.9	0.0	7.1
Prop In Lane	1.00		0.00	0.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	244	805	0	598	0	497	268	281	239	224	0	200
V/C Ratio(X)	0.18	0.44	0.00	0.67	0.00	0.73	0.69	0.79	0.15	0.12	0.00	0.79
Avail Cap(c_a), veh/h	294	1004	0	744	0	630	368	386	328	368	0	328
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.9	14.4	0.0	22.9	0.0	22.9	29.1	29.6	26.7	28.0	0.0	30.7
Incr Delay (d2), s/veh	0.1	1.7	0.0	5.8	0.0	9.0	1.2	5.2	0.1	0.1	0.0	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	5.3	0.0	8.1	0.0	7.7	3.6	4.7	0.6	0.5	0.0	3.2
LnGrp Delay(d),s/veh	17.1	16.1	0.0	28.7	0.0	32.0	30.3	34.8	26.8	28.1	0.0	33.4
LnGrp LOS	B	B		C		C	C	C	C	C		C
Approach Vol, veh/h		397			761			442			185	
Approach Delay, s/veh		16.2			30.3			32.3			32.7	
Approach LOS		B			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		8
Phs Duration (G+Y+Rc), s	10.0	45.9		17.9		55.9		16.2
Change Period (Y+Rc), s	7.0	7.0		7.0		7.0		7.0
Max Green Setting (Gmax), s	5.0	27.0		15.0		39.0		15.0
Max Q Clear Time (g_c+I1), s	3.2	15.9		10.4		11.6		9.1
Green Ext Time (p_c), s	0.0	5.4		0.6		8.4		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	27.9
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Southgate Rd. & S. Oak St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2040 Alternative 3*
Analysis Time Period	*PM Peak Hour*		

Project Description *49103*

East/West Street: *Southgate Road* | North/South Street: *South Oak Street*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*215*			*182*	*33*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*233*	*0*	*0*	*197*	*35*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*14*	*0*	*11*	*17*	*0*	*30*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*15*	*0*	*11*	*18*	*0*	*32*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration				*LTR*			*LTR*	
v (veh/h)				*26*			*50*	
C (m) (veh/h)				*591*			*680*	
v/c				*0.04*			*0.07*	
95% queue length				*0.14*			*0.24*	
Control Delay (s/veh)				*11.4*			*10.7*	
LOS				*B*			*B*	
Approach Delay (s/veh)	--	--	*11.4*			*10.7*		
Approach LOS	--	--	*B*			*B*		

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*Mitchell Langley*
Agency/Co.	*HNTB*
Date Performed	*6/24/2014*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Southgate Rd. & S. Orme St.*
Jurisdiction	*Arlington County*
Analysis Year	*2040 Alternative 3*

Project ID *49103*

East/West Street: *Southgate Road* | North/South Street: *South Orme Street*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	0	211	125	34	146	0
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	73	0	30	0	0	0
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT	R	LT		LTR			
PHF	0.92	0.92	0.92		0.92			
Flow Rate (veh/h)	229	135	194		111			
% Heavy Vehicles	0	0	0		0			
No. Lanes	2		1		1		0	
Geometry Group	5		3a		1			
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0	0.0	0.2		0.7			
Prop. Right-Turns	0.0	1.0	0.0		0.3			
Prop. Heavy Vehicle	0.0	0.0	0.0		0.0			
hLT-adj	0.5	0.5	0.2	0.2	0.2	0.2		
hRT-adj	-0.7	-0.7	-0.6	-0.6	-0.6	-0.6		
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7		
hadj, computed	0.0	-0.7	0.0		-0.0			

Departure Headway and Service Time

hd, initial value (s)	3.20	3.20	3.20		3.20			
x, initial	0.20	0.12	0.17		0.10			
hd, final value (s)	4.97	4.27	4.72		5.08			
x, final value	0.32	0.16	0.25		0.16			
Move-up time, m (s)	2.3		2.0		2.0			
Service Time, t_s (s)	2.7	2.0	2.7		3.1			

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	479	385	444		361			
Delay (s/veh)	9.97	7.78	9.33		9.02			
LOS	A	A	A		A			
Approach: Delay (s/veh)	9.16		9.33		9.02			
LOS	A		A		A			
Intersection Delay (s/veh)	9.19							
Intersection LOS	A							

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*Mitchell Langley*	Intersection	*Columbia Pk. & S. Nash St.*
Agency/Co.	*HNTB*	Jurisdiction	*Arlington County*
Date Performed	*6/24/2014*	Analysis Year	*2040 Alternative 3*
Analysis Time Period	*AM Peak Hour*		

Project Description *49103*

East/West Street: *Columbia Pike* | North/South Street: *South Nash Street (Tentative)*

Intersection Orientation: *East-West* | Study Period (hrs): *1.00*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*643*			*663*	*214*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*698*	*0*	*0*	*720*	*232*
Percent Heavy Vehicles	*1*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*	*T*			*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*244*	*0*	*0*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*265*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LTR*	
v (veh/h)	*0*						*265*	
C (m) (veh/h)	*724*						*185*	
v/c	*0.00*						*1.43*	
95% queue length	*0.00*						*48.24*	
Control Delay (s/veh)	*10.0*						*862.7*	
LOS	*A*						*F*	
Approach Delay (s/veh)	--	--				*862.7*		
Approach LOS	--	--				*F*		

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	643	663	214	244	0
Number	1	6	2	12	3	18
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1863	1900	1863	1863
Adj Flow Rate, veh/h	0	699	721	233	265	0
Adj No. of Lanes	0	2	2	0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	0	2297	1708	552	322	287
Arrive On Green	0.00	0.65	0.65	0.65	0.18	0.00
Sat Flow, veh/h	0	3725	2725	850	1774	1583
Grp Volume(v), veh/h	0	699	485	469	265	0
Grp Sat Flow(s),veh/h/ln	0	1770	1770	1713	1774	1583
Q Serve(g_s), s	0.0	6.1	9.4	9.4	10.2	0.0
Cycle Q Clear(g_c), s	0.0	6.1	9.4	9.4	10.2	0.0
Prop In Lane	0.00			0.50	1.00	1.00
Lane Grp Cap(c), veh/h	0	2297	1149	1112	322	287
V/C Ratio(X)	0.00	0.30	0.42	0.42	0.82	0.00
Avail Cap(c_a), veh/h	0	2297	1149	1112	801	715
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	5.4	6.0	6.0	27.9	0.0
Incr Delay (d2), s/veh	0.0	0.3	1.1	1.2	5.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.0	4.8	4.7	5.5	0.0
LnGrp Delay(d),s/veh	0.0	5.8	7.1	7.2	33.2	0.0
LnGrp LOS		A	A	A	C	
Approach Vol, veh/h		699	954		265	
Approach Delay, s/veh		5.8	7.2		33.2	
Approach LOS		A	A		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		71.1				71.1		18.9
Change Period (Y+Rc), s		6.0				6.0		6.0
Max Green Setting (Gmax), s		46.0				46.0		32.0
Max Q Clear Time (g_c+I1), s		11.4				8.1		12.2
Green Ext Time (p_c), s		16.1				16.7		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	10.3
HCM 2010 LOS	B