Appendix E

AIR QUALITY SUPPORTING DOCUMENTATION

E.1 – Draft General Conformity Determination

E.2 – Vehicle Micro-scale CO Concentration Modeling

E.3 – Criteria Air Pollutant—Sources and Impacts

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APPENDIX E.1
DRAFT GENERAL CONFORMITY DETERMINATION

Draft General Conformity Determination for Implementation of 2005 Base Realignment and Closure (BRAC) Recommendations and Related Army Actions at Fort Belvoir, Virginia

Prepared for

Fort Belvoir, Virginia

by the

U.S. Army Corps of Engineers, Mobile District

March 2007

EXECUTIVE SUMMARY

The U.S. Army is in the process of preparing a Draft Environmental Impact Statement (DEIS) to assess implementation of the Base Realignment and Closure (BRAC) Commission's recommendations at Fort Belvoir, Virginia, and the update to the installation's land use plan. Fort Belvoir is within an area currently designated by the U.S. Environmental Protection Agency (EPA) as in non-attainment of the National Ambient Air Quality Standards (NAAQS) for ozone (O_3; 8-hour standard) and fine particulates ($PM_{2.5}$). Therefore, under Section 176(c) of the Clean Air Act (CAA), the U.S. Army must demonstrate that its actions within the region conform to EPA's and the Commonwealth of Virginia's plans to attain these NAAQS.

EPA promulgated two sets of conformity rules to implement Section 176(c) of the CAA—Transportation Conformity Rules and General Conformity Rules. The Transportation Conformity Rules establish the criteria and procedures for determining that transportation plans, programs, and projects funded under Title 23 of the United States Code (U.S.C.) or the Federal Transit Act conform to State Implementation Plans (SIPs). Because the Proposed Action and Alternatives are not transportation projects, the transportation conformity rules do not apply.

The General Conformity Rules (GCR) are applicable to federal actions that are not encompassed by the Transportation Conformity Rules and are within non-attainment areas. The GCR are not applicable to certain federal actions, such as those which would result in total emission levels below applicable thresholds, those that would result in no emissions increase or an increase that is de minimis (of minimal importance), or actions for which the emissions are not reasonably foreseeable. In addition, general conformity determinations are not required for portions of actions that include major new or modified stationary sources that require a permit under the New Source Review (NSR) program (USEPA and FAA 2002).

Currently, the region has no applicable SIP for the 8-hour O_3 or $PM_{2.5}$ NAAQS. The SIP revisions to address non-attainment conditions with respect to the new 8-hour O_3 and $PM_{2.5}$ NAAQS are being developed and are expected to be approved by EPA by 2008 and 2009, respectively. In the interim, EPA has published some guidance to help address compliance with the CAA with respect to the new NAAQS. The applicable SIP revision in the Northern Virginia Area is for the 1-hour O_3 NAAQS. Although EPA recently revoked the 1-hour O_3 NAAQS, the GCR dictate the use of the in-place "applicable" SIP for determining the conformance of the proposed federal action. The 1-hour attainment demonstration O_3 SIP was developed and submitted by the Virginia Department of Environmental Quality (VDEQ) and approved by EPA on May 13, 2005 (70 FR 25688).

This purpose of this Draft General Conformity Determination (GCD) is to demonstrate that the emissions associated with two proposals at Fort Belvoir—implementation of base realignment and the update of the land use plan—conform to the purpose and intent of the applicable SIP.

On September 8, 2005, the BRAC Commission recommended numerous realignment and closure actions for domestic military installations. President Bush concurred with the 2005 BRAC Commission's report and sent it to Congress on September 15, 2005. Therefore, the BRAC actions at Fort Belvoir must be initiated by no later than September 15, 2007, and completed by no later than September 15, 2011. On November 9, 2005, the recommendations became law, and now they must be implemented as provided for in the Defense Base Closure and Realignment Act of 1990 (Public Law 101-510), as amended. The BRAC Commission's recommendations will generate a net increase of approximately 22,000 people in the workforce on Fort Belvoir. The

vast majority of these people, however, are already located within the National Capital Region (NCR). Fort Belvoir established its RPMP in 1993. In light of substantial changes at the post due to base realignment, the land use plan needs to be updated.

Fort Belvoir is approximately 15 miles south of Washington, D.C., in northern Virginia (Figure ES-1). The post is the host for one major command headquarters (Army Material Command), two Direct Reporting Unit headquarters (U.S. Army Intelligence and Security Command and U.S. Army Criminal Investigation Command), and more than 100 other elements of the Army and Department of Defense (DoD), including the Defense Logistics Agency headquarters, Army Management Staff College, Defense Acquisition University, and the National Geospatial-Intelligence Agency College.

The following paragraphs summarize the methodologies used to evaluate the applicability of the GCR to the Army's proposed action and alternatives, the methodologies used to evaluate total direct and indirect project-related emissions of volatile organic compounds (VOCs), nitrogen oxides (NO_x), $PM_{2.5}$, and sulfur dioxide (SO_2) from the sources subject to the GCR, and the results of the conformity evaluation.

Applicability. To determine whether the GCR are applicable, net (project-related) emission levels of VOC, NO_x, $PM_{2.5,}$ and SO_2 were compared to applicability threshold levels. The applicability threshold levels for the 8-hour O_3 and $PM_{2.5}$ NAAQS were used (50 tons of VOCs or 100 tons of NO_x, $PM_{2.5}$, and SO_2). On the basis of the results of the comparison, it was determined that the GCR apply to the proposed realignment activities at Fort Belvoir with respect to both NO_x and VOCs.

Construction Activity. The construction emission budgets in the currently approved SIP do not identify specific or individual projects with respect to emissions resulting from regional construction activity. Therefore, the BRAC-related emission estimates were compared to SIP-based projected emissions for the region for this type of activity to determine whether the emissions could reasonably be accounted for in the regional (nonroad and area) totals. The results of the comparison indicate that the greatest level of construction-related VOC and NO_x emissions would represent approximately 0.7 and 1.9 percent of VDEQ's regional emissions, respectively (Table ES-1). Because the project-related construction emissions would represent a relatively small percentage of the regional projections, the U.S. Army, in consultation with VDEQ, determined that it is reasonable to assume that the construction emissions can be accounted for in the inventories for the 1-hour O_3 SIP for the Proposed Actions and Alternatives (VDEQ 2007).

Motor Vehicles. The realignment of Fort Belvoir would decrease both the number of vehicles and the total vehicle miles traveled within the region. In turn, motor vehicle emissions would decrease. This decrease would be primarily due to a net reduction of approximately 1,700 personnel from the region and a slight overall decrease in vehicle miles traveled by the people remaining. These BRAC-related reductions in emissions would constitute an ongoing net benefit to the region's air quality. Therefore, although there is a SIP-based regional budget for on-road vehicles, it was unnecessary to perform a direct comparison.

The GCR state that notwithstanding the other requirements of the rules, a proposed action may not be determined to conform unless the total of direct and indirect emissions from the action is in compliance or consistent with all relevant requirements and milestones in the applicable SIP

Table ES-1
Comparison of 2010 Project-related Emissions to SIP-based Inventories: Construction Activities

Pollutant	SIP regional emission inventory (tons/summer weekday)	Project-related non-road emissions (tons/summer weekday)	Percent of regional emissions
Approved 1-hour SIP			
Nitrogen oxides (NO_X)	82.8[a]	1.58	1.9%
Volatile organic compounds (VOCs)	147.3[b]	0.98	0.7%
Draft 8-hour SIP			
Nitrogen oxides (NO_X)	76.9[c]	1.58	2.1%
Volatile organic compounds (VOCs)	191.8[d]	0.98	0.5%

Source: MWCOG, 2004a

[a] Reflects 2005 nonroad controlled NOx emissions inventory

[b] Reflect 2005 area controlled VOC emissions inventory

[c] Reflects 2009 nonroad controlled NOx emissions inventory

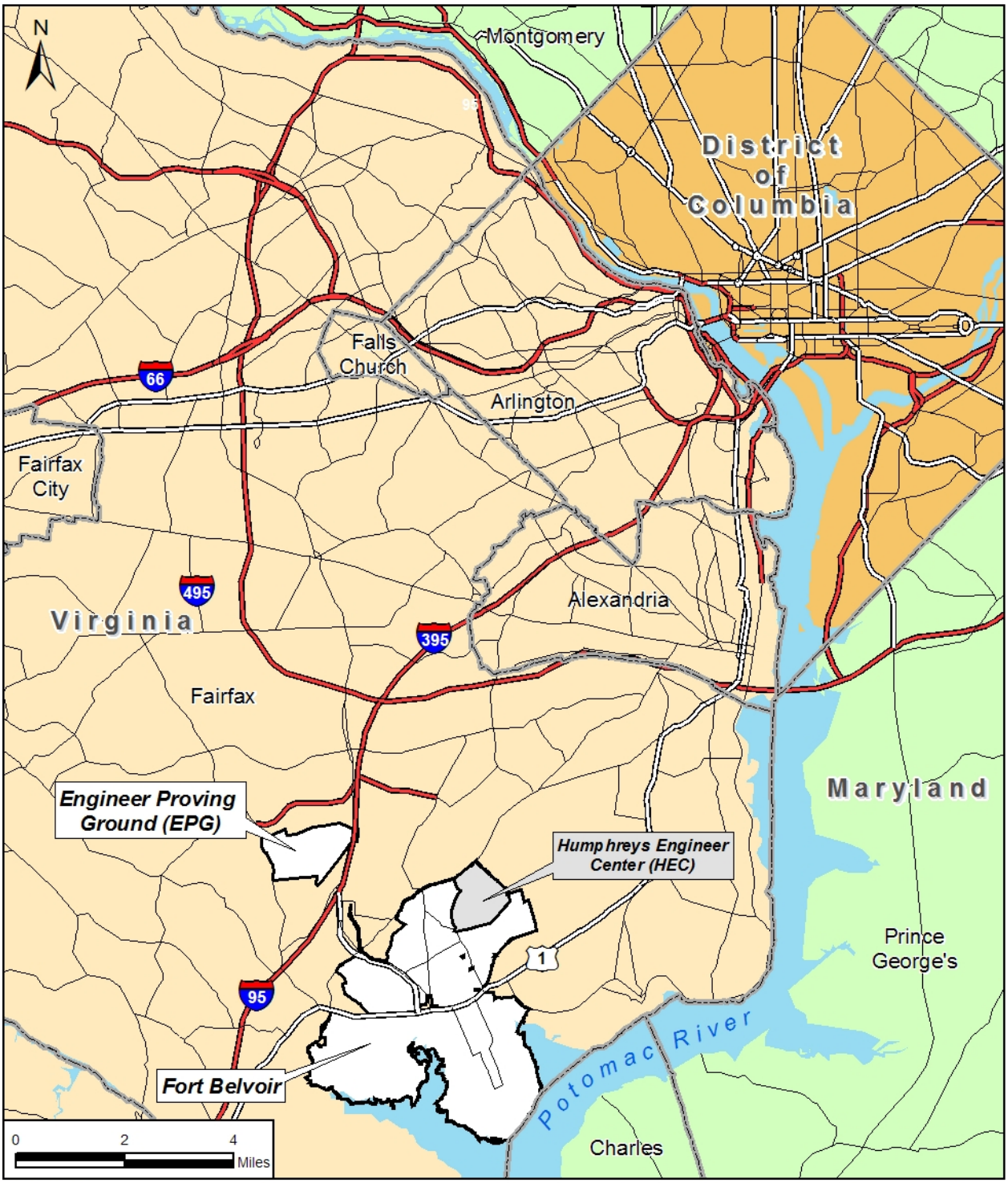
[d] Reflect 2009 area controlled VOC emissions inventory

(Title 40 of the Code of Federal Regulations [CFR] Section 93.158(c)). This requirement includes but is not limited to such issues as reasonable further progress schedules, assumptions specified in the attainment or maintenance demonstration, prohibitions, numerical emission limits, and work practice standards.

EPA and VDEQ have already promulgated, and will continue to promulgate, numerous requirements to support the goals of the CAA with respect to the NAAQS. Typically, these requirements take the form of rules regulating emissions from significant new sources, including emission standards for major stationary point sources and classes of mobile sources, as well as permitting requirements for new stationary point sources. Because states have the primary responsibility for implementing and enforcing requirements under the CAA and can impose stricter limitations than EPA, the EPA requirements often serve as guidance to the states in formulating their air quality management strategies.

In operating Fort Belvoir, the U.S. Army observes, and will continue to act in accordance with, a myriad of rules and regulations implemented and enforced by federal, state, regional, and local agencies to protect and enhance ambient air quality in the Metropolitan Washington Region. The U.S. Army will continue to act in accordance with all existing applicable air quality regulatory requirements for activities over which it has direct control and will meet in a timely manner all regulatory requirements that become applicable in the future. Likewise, the U.S. Army actively encourages all tenants and users of its facilities to comply with applicable air quality requirements.

In accordance with Section 176 of the CAA, the U.S. Army has assessed whether pollutant and pollutant precursor emissions that would result from its actions with respect to the proposed realignment at Fort Belvoir would conform to the Virginia SIP. Emission estimates for the GCD were prepared:



LEGEND

- Installation Boundary
- HEC Boundary
- County Boundary
- Interstate Highway
- US Highway

Source: Fort Belvoir GIS, 2006.

Installation Location

Fort Belvoir, Virginia

Figure ES-1

- Using the latest planning assumptions
- Using the latest and most accurate emission estimation techniques
- Based on the applicable air quality models, databases, and other requirements specified in the most recent version of EPA's *Guideline on Air Quality Models*, including supplements

On the basis of the results of the evaluation, the total direct and indirect project-related emissions of NO_x, VOCs, $PM_{2.5}$, and SO_2 were determined to be below the applicability threshold levels, accounted for in the emission projections incorporated into the 1-hour O_3 attainment demonstration SIP (the applicable SIP), or reasonably accounted for in established emission totals and/or excess regional emission estimates.

For these reasons, the U.S. Army has determined that the emissions associated with the Proposed Action and Alternatives conform to the CAA and, by definition, will not significantly impede the timely attainment of the NAAQS in the region.

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SECTION 1.0 INTRODUCTION

Within areas designated non-attainment or maintenance for any of the National Ambient Air Quality Standards (NAAQS), the Clean Air Act (CAA) requires that federal agencies ensure that their actions conform to the State Implementation Plan (SIPs). The requirements for determining conformity to SIPs are detailed in Title 40, Chapter I, Subchapter C, Part 51 of the Code of Federal Regulations (40 CFR Part 51).

In accordance with Section 176 of the CAA, in consultation with VDEQ, the U.S. Army has assessed whether pollutant and pollutant precursor emissions that would result from the update of the installation's land use plan and the Base Realignment and Closure (BRAC)-related activities at Fort Belvoir conform to the Virginia SIP. This document provides the supporting material, analytical methods, and conclusions relied on by the U.S. Army in performing the applicability analysis described in 40 CFR Part 51 and making a General Conformity Determination (GCD).

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SECTION 2.0 PROPOSED ACTION

The U.S. Army proposes to update Fort Belvoir's land use plan and to implement the BRAC Commission's recommendations. The BRAC realignment actions would involve constructing and renovating facilities and, consistent with the BRAC law, relocating units, agencies, and activities to the post by September 2011.

2.1 LAND USE PLAN UPDATE

Fort Belvoir's mission is to provide a secure, safe operating environment for numerous missions and functions, including the following:

- Administrative, logistics, and operations support for regional and worldwide military missions
- A creative learning environment for Army and DoD school students
- Military support for a variety of National Capital Region (NCR) contingency missions
- Regional housing for active duty military families
- Quality of life support for the military community, that includes health and recreation
- Environmental stewardship in concert with adequate land and facilities.

Land Use Plan Update Long-range Component. To support the foregoing, the Army proposes to adopt and implement a land use plan update to respond to changing conditions at the post to comply with AR 210-20, *Real Property Master Planning for Army Installations*, which mandates updates of existing plans as circumstances require. This GCD pertains to the initial step of the land use plan update process, the revision of the land use plan, which is necessary to siting of facilities for BRAC implementation. The update to the RPMP centers on the land use analysis and plan portion of the long-range component (LRC). This portion of the LRC shows the current and future relationships and use of installation land by generalized areas, including such facilities as family housing, troop housing, administration, and range and training areas.

Planning Principles. The following principles embody the aspirations for the future evolution of Fort Belvoir. These principles, compiled by Belvoir New Vision Planners and Fort Belvoir, provide guidance in deciding the future direction of facilities, space needs and meeting the goals of the installation, the Army, and the community. Adherence to these principles can provide the most efficient use of land, maximum use of previously disturbed areas, the least environmental impact and, ultimately, a world-class installation.

- *Transform Fort Belvoir:* Create a world-class installation.
- *Achieve a diversity of use and activities:* Enrich the program—a 24/7 environment.
- *Achieve environmental brilliance:* A sustainable approach in everything that is done.

- *Strengthen the natural habitat:* Protect and enhance the creeks, wetlands, and wildlife corridors.
- View the *installation as arboretum.*
- *Build compact neighborhoods:* Strengthen the sense of community and place.
- *Improve connectivity:* Consider strategies that allow people to *park once.*
- *Emphasize the public realm:* Create walkable neighborhoods.
- *Respect Fort Belvoir history:* Continue the legacy for future generations.
- *Community benefits:* Strengthen existing Army and surrounding neighborhoods.

Land use planning is a continual, collaborative, and integrated process, primarily performed at the installation level. While land use planning reflects local mission requirements, it is strongly influenced by the plans, guidance, and initiatives of higher headquarters. An installation RPMP is, therefore, the principal real property management tool in support of overall installation real property operation, management, development, privatization, realignment, cleanup, and disposal.

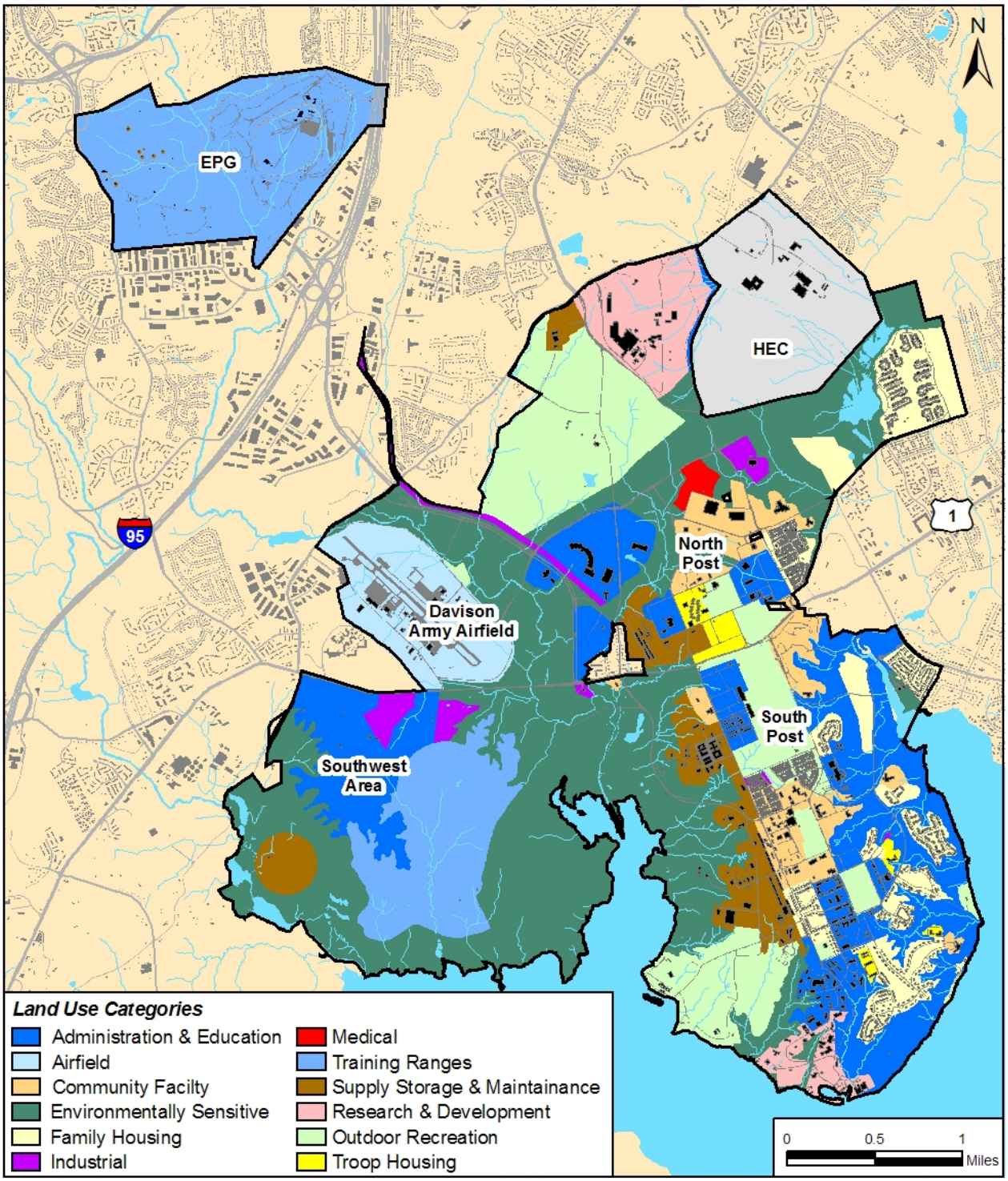
2.1.1 Fort Belvoir's Existing Land Use Plan

The land use plan that is the subject of this GCD is the 1993 land use plan and a 2002 update of the Fort Belvoir RPMP. The 1993 master plan consisted of four elements*: Real Property Master Plan Long-Range Component—1993; Real Property Master Plan Short-Range Component—1993–2000; a Capital Investment Strategy; and a Mobilization Mission Planning Component.* Figure 2-1 illustrates the 1993 land use plan.

Fort Belvoir created its current master plan in 1993 to reflect the post's transition from primarily a troop support and training mission to that of an administrative center providing support to multiple organizations within the NCR. Specifically, the U.S. Army Engineer School moved to Fort Leonard Wood, Missouri, in 1988, and BRAC directives realigned the Belvoir Research and Development Engineering Center (BRDEC). BRAC directives also resulted in relocating administrative functions to Fort Belvoir.

The 1993 long-range component identified Fort Belvoir's role as the "major administrative and logistics center for the Northern Virginia portion" of the Military District of Washington (MDW). As such, and recognizing that Fort Belvoir would continue to attract military tenants, the plan attempted to determine total build out (TBO—defined as the total daily employment when all land uses have been fully developed under the constraints and limitations of the plan). The plan recognized that TBO might never be reached and that "Progress toward TBO is mission-driven but infrastructure-constrained." The plan articulated goals, objectives, and assumptions that focused on the amount and type of development anticipated and attempted to limit impacts on the natural and man-made environments. The EPG was not included in the 1993 plan.

The 1993 land use plan shown in Figure 2-1 identified 3,287 acres on Main Post as developable. The TBO that could be supported was estimated to be 74,230 people housed in 30.5 million square feet of space. By comparison, in 2005 about 24,000 personnel work at Fort Belvoir daily; they are housed in about 10.8 million square feet of space.



LEGEND

Installation Property

1993 Land Use Designations

Fort Belvoir, Virginia

Sources: Fort Belvoir GIS, 2006; Fairfax County GIS, 2006.

Figure 2-1

The *1993 Real Property Master Plan* was revised in 2002 upon the adoption of a Regional Community Support Center Subarea Development Plan. The plan revision addressed a desire to locate additional related activities in the portion of the Lower North Post area designated in 1993 as the Regional Community Support Center. In particular, the 2002 Subarea Plan recommended that DeWitt Hospital (now on South Post) be relocated to the Regional Community Support Center area, that the post exchange (PX) be expanded, and a chapel be developed. The amendment also decreased the amount of land classified for community facilities, designated land for medical use, and increased the amount of land classified as environmentally sensitive.

2.1.2 Proposed Land Use Plan Revision

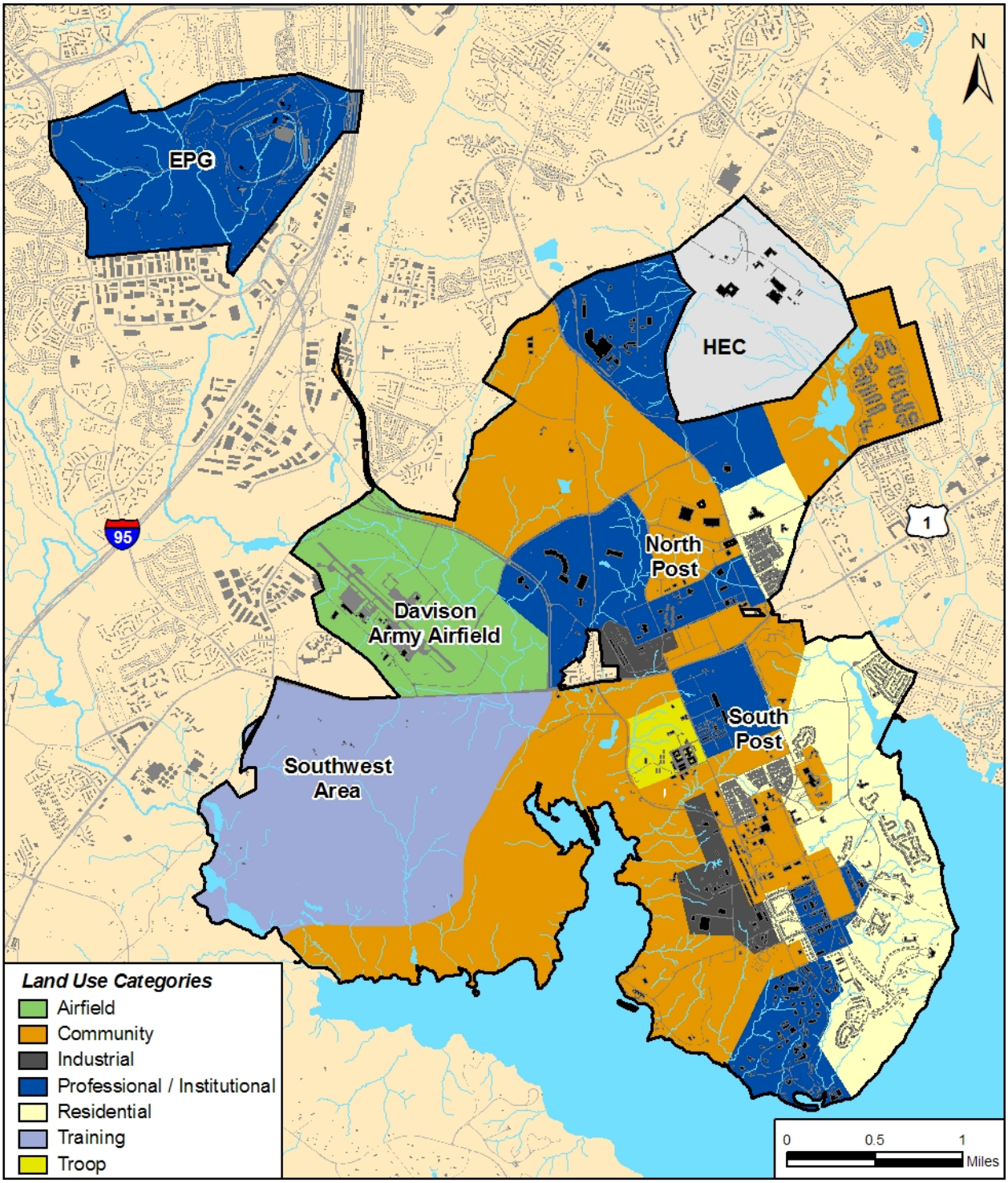
The proposed land use plan is shown in Figure 2-2. It differs from the 1993 land use plan in several important respects in that it:

- Includes the EPG in planning for future development.
- Uses fewer—but broader—land use designations that encompass compatible land uses. For example, the 1993 land use plan provided for Administration and Education and Research and Development categories; these are now included in the category of Professional/Institutional. These new categories allow for more flexible groupings of compatible types of facilities.
- Identifies additional areas for present and future Professional/Institutional and Residential uses.
- Relocates the Troop area from North Post to South Post.
- Changes land use designations for a number of areas on the basis of revised assessment of their suitability for particular uses, projection of future needs, and the desire to make land uses broader and more encompassing.

Table 2-1 provides a comparison of the land use areas in the 1993 master plan, as amended in 2002, to those proposed in the long-range component of the RPMP revision.

The difference between the total number of acres for the 1993 land use plan as amended in 2002 (7,687) and the total for the proposed land use plan (8,508) is the result of including the EPG and several land areas being added or recognized as belonging to Fort Belvoir since 1993. These include 4 acres of islands in Accotink Bay and Gunston Cove; 16 acres west of Colchester Road that became part of Fort Belvoir following realignment of Colchester Road; a net increase of 16 acres resulting from the swap of the McNaughton ballfields; and an area of Humphreys Engineering Center (HEC) west of the proposed Connector Road shown as Residential and designated for potential acquisition on the proposed land use plan.

The proposed land use plan aggregates land uses into larger, more flexible areas than did the 1993 plan (compare Figure 2-1 and Figure 2-2). Reflecting the evolution in Fort Belvoir's mission, the land use categories gaining land are those that support its regional mission as an administrative, logistics, and operations center; military support center; classroom center; housing center; military community support center; and a leader in environmental stewardship. The Airfield land use gained land because it consumed areas formerly designated as Environmentally Sensitive around the airfield. Land use categories losing land—particularly Training Range and Supply,



LEGEND
Installation Property

Proposed Land Use Plan

Fort Belvoir, Virginia

Sources: Fort Belvoir GIS, 2006; Fairfax County GIS, 2006.

Figure 2-2

Table 2-1
Comparison of 1993 and 2011 Land Use Allocations

1993 master plan		Proposed land use plan	
Land use	**Acres**	**Land use**	**Acres[a]**
Administration & Education	724	Airfield	697
Airfield	391	Community	2,950
Community Facilities	452	Industrial	213
Family Housing	576	Professional/Institutional	2,132
Industrial	126	Residential	1,116
Medical	97	Training	1,287
Outdoor Recreation	1,006	Troop	101
Research & Development	340		
Supply, Storage, & Maintenance	378		
Training Range	462		
Troop Housing	72		
Environmentally Sensitive	3,063		
Total	**7,687**		**8,508**

[a] All proposed land use designation acreages were calculated in GIS, and the totals may differ from the official acreages for the installation.

Storage & Maintenance—reflect Fort Belvoir's earlier missions that require fewer resources and less land today.

Principal features and elements of the proposed land use plan include the following:

- *Professional/Institutional.* The Administration & Education and Research & Development land use categories used in the 1993 land use plan would change to Professional/Institutional. The proposed land use plan increases the amount of land designated for Professional/Institutional use. A substantial part of the increase is due to the inclusion of EPG as well as medical facilities in the Professional/ Institutional category.
- *Residential.* The proposed land use plan would increase the land area dedicated to family housing on both the North and South Posts. Fort Belvoir Residential Communities, the program through which family housing has been privatized, is in the process of building and rehabilitating 2,070 family housing units. A portion of the land designated for Residential would be reserved for future development related to long-term growth on the installation.
- *Open Space.* Much of the area designated as Environmentally Sensitive in the 1993 land use plan would be redesignated as Community. This category includes safety clearances, security areas, water areas, wetlands, conservation areas, resource protection areas (RPAs), forest stands, and former training areas. These lands could be used for recreation, conservation, outdoor training, and general uses not involving the construction of facilities. Environmentally constrained land areas would continue to have all regulatory protections in place.
- *McNaughton Ballfields Land Swap.* The three McNaughton ballfields along Pole Road on the southern border of Woodlawn Village are pending exchange for the *Berman Tract* immediately east of Woodlawn Village, which will result in a net increase of 16 acres for Fort Belvoir. This area would be designated as Community land use.

- *South Post Golf Course.* The proposed land use plan would change the land use designation of most of the South Post golf course from Outdoor Recreation to Professional/Institutional.
- *Supply, Storage, and Maintenance Facilities.* The proposed land use plan would enable demolition of outdated and inefficient warehouses; relocation of most of the Supply, Storage, and Maintenance Operations in the 1400 Area to the 700/1100 Areas; and redevelopment of the eastern portion of the 1400 Area east of Gunston Road for Professional/Institutional uses.
- *Unaccompanied Personnel Housing.* The proposed land use plan would change the land use designation from Troop Housing to Troop and convert North Post areas designated for Troop uses to Professional/Institutional. A new Troop land use area would be provided on South Post, west of Gunston Road.
- *DeWitt Army Community Hospital.* In the 2002 master plan amendment, Fort Belvoir planned to site a new DeWitt Army Community Hospital on a parcel of land south of Kingman Road on North Post. The proposed land use plan now enables the new hospital to be sited on the South Post Golf Course in the southwest quadrant of the intersection of Route 1 and Belvoir Road. The present DeWitt hospital site would be designated for Community use.

In the revised land use plan, a new Troop Area would be established on South Post on approximately 75 acres west of Gunston Road in the western portion of the 1400 Area. Industrial uses in that area would relocate to other designated Industrial sites on post. The present Troop Area in the 2100 Area and consisting of approximately 50 acres generally bounded by Gunston, Abbot, Beauregard, and Goethals Roads on North Post, would become available for Professional/Institutional uses upon relocation of Soldier billeting and activities to the new Troop Area. Notwithstanding the proposed changes in land use classifications of these two areas, current land uses would continue until such time as the Army constructs and occupies necessary troop facilities at the new location on South Post.

In several cases the change in land use designations from the 1993 plan would allow Fort Belvoir to prepare for potential changes to its mission in the future even though, except to accommodate BRAC realignment actions, no specific uses for the sites are currently under consideration. For example, this is the case with the area that would be designated for Community at the site now occupied by Woodlawn Village.

The proposed land use plan has been structured so that only the best development sites are identified for growth. The best sites are those that have the fewest environmental, operational, cultural resource, and constructability constraints.

Force Protection Standards. The proposed land use plan has been developed to achieve compliance with force protection requirements for military facilities as set forth in DoD Unified Facilities Criteria 4-010-01, *Antiterrorism Standards for Buildings* (2003). The effect of the standards on the master plan is to require that buffer zones around buildings and roads be reserved as force protection standoff areas. The buffer zones affect the amount of land needed for any one facility as well as dictate its relationship to other facilities. Future military construction projects will be required to adhere to force protection setbacks. Buildings already built are exempt; however, it is strongly recommended that these requirements be implemented to the fullest extent possible. Any major investment requiring renovations or modifications where costs

exceed 50 percent of the replacement cost of the building require the entire building to be in compliance with the standards.

Buildings that are affected by the standoff requirements include those routinely occupied by 50 or more personnel (designated as a primary gathering structure) or buildings inhabited by 11 or more personnel and with a population density of greater than one person per 430 gross square feet (GSF). The standoff buffer for inhabited structures is 33 feet minimum; for primary gathering structures, it is 82 feet minimum, and some facilities require much greater distances than the minimum. Standoff distances from uncontrolled roads (such as U.S. Route 1) are to be 148 feet minimum, and for controlled roads, 82 feet minimum.

The standards recommend that a vulnerability assessment be conducted for existing buildings and that changes be made as necessary to improve building security. These changes can take varying form, from procedures and planning to physical changes to the buildings, such as replacing glass windows with reinforced glass in key areas.

2.2 BASE REALIGNMENT

2.2.1 Introduction

In July 2006 the U.S. Army considered three conceptual development strategies to address the question of where facilities could be sited to accommodate an increase of 22,000 additional personnel being assigned to Fort Belvoir from their existing locations in the NCR. That review process resulted in identifying a preferred land use strategy that reflected the best aspects of each of the three conceptual development strategies. The preferred land use strategy was then used as the basis for the proposed amendment to Fort Belvoir's land use plan.

BRAC realignment would result in a net increase of approximately 22,000 personnel at Fort Belvoir. The increase in personnel and facilities requires an updated land use plan. Siting of new facilities for the base realignment action would then comport with the updated land use plan. The land use planning, facilities construction, and personnel assignment functions are closely interrelated.

Most BRAC realignment actions for the U.S. Army conform to existing, sufficient master plans that are flexible and recognize future needs. BRAC realignment at Fort Belvoir involves two important considerations. First, the post's current master plan does not encompass the EPG because of past intentions to dispose of that 800-acre area for other development. The EPG must be incorporated into a new master plan. Second, the proposed increase of 22,000 personnel represents the largest relocation of personnel in the BRAC 2005 round. Approximately 7 million square feet of new and renovated facilities and approximately 7 million square feet of parking must be ready for use before September 15, 2011.

The following are the specific federal actions under this provision that are associated with the proposed realignment of Fort Belvoir.

- **Realign the National Geospatial-Intelligence Agency (NGA),** with various U.S. Army entities moving from leased space in the NCR (Army Lease) to Fort Belvoir, Virginia.

- **Realign the Washington Headquarters Services (WHS),** consisting of WHS and elements of the Office of the Secretary of Defense and defense agencies to Fort Belvoir, Virginia.

- **Realign U.S. Army Medical Command (MEDCOM)** to Fort Belvoir, Virginia.
- **Realign Program Executive Office, Enterprise Information Systems (PEO EIS)** to Fort Belvoir, Virginia.
- **Realign Missile Defense Agency Headquarters Command Center (MDA HQCC)** to Fort Belvoir, Virginia.
- **Realign Fort Belvoir, Virginia,** by relocating U.S. Army Prime Power School to Fort Leonard Wood, Missouri.
- **Realign Fort Belvoir, Virginia,** by relocating and consolidating Sensors, Electronics, and Electronic Warfare Research, Development and Acquisition activities to Aberdeen Proving Ground, Maryland.
- **Realign Fort Belvoir, Virginia,** by relocating the U.S. Army Criminal Investigation Command (CID) to Marine Corp Base Quantico, Virginia.
- **Realign Fort Belvoir, Virginia,** by relocating *Soldier* magazine to Fort Meade, Maryland.
- **Realign Fort Belvoir, Virginia,** by relocating U.S. Army Materiel Command (AMC) and the Security Assistance Command (USASAC, an AMC major subordinate command) to Redstone Arsenal, Alabama.
- **Realign Fort Belvoir, Virginia,** by relocating the Chemical Biological Defense Research component of the Defense Threat Reduction Agency to Edgewood Chemical Biological Center, Aberdeen Proving Ground, Maryland.
- **Realign Fort Belvoir, Virginia,** by relocating the U.S. Army Research Office to the National Naval Medical Center, Bethesda, Maryland. Realign the Defense Threat Reduction Agency Telegraph Road facility, Alexandria, Virginia, by relocating the Extramural Research Program Management function (except conventional armaments and chemical biological defense research) to the National Naval Medical Center, Bethesda, Maryland.
- **Realign Fort Belvoir, Virginia,** by relocating Defense Threat Reduction Agency National Command Region conventional armament research to Eglin Air Force Base, Florida.

Accommodation of personnel being realigned must take into account the needs of six major groups slated for realignment by the BRAC Commission: Washington Headquarters Services (WHS), consisting of WHS and elements of the Office of the Secretary of Defense and defense agencies; National Geospatial-Intelligence Agency (NGA); various U.S. Army entities moving from leased space in the NCR (*Army Lease*); U.S. Army Medical Command (MedCom); Program Executive Office, Enterprise Information Systems (PEO EIS); and Missile Defense Agency Headquarters Command Center (MDA HQCC). The numbers of personnel associated with each of these groups are shown in Table 2-2. Details of the BRAC Commission's recommendation can be found at http://www.brac.gov.

Table 2-2
Personnel Realigning to Fort Belvoir

Agency	Staff	Contractors	Total
Washington Headquarters Services	7,759	1,504	9,263
National Geospatial-Intelligence Agency	4,400	4,100	8,500
Army Lease	2,720	0	2,720
U.S. Medical Command	2,069	0	2,069
Program Executive Office, Enterprise Info Systems	480	0	480
Missile Defense Agency (HQ Command Center)	137	155	292
Total	17,565	5,759	23,324

Note: Personnel being realigned from Fort Belvoir to other installations result in a net increase at Fort Belvoir of approximately 22,000 personnel. Realignments from Fort Belvoir include the relocation of Army Materiel Command Headquarters and U.S. Army Security Assistance Command to Redstone Arsenal, Alabama; Prime Power School to Fort Leonard Wood, Missouri; U.S. Army Criminal Investigation Division Headquarters to Marine Corps Base, Quantico, Virginia; *Soldiers* magazine to Fort Meade, Maryland; Biomedical Science and Technology programs of the Defense Threat Reduction Agency to Aberdeen Proving Ground, Maryland; Defense Threat Reduction Agency conventional armaments research to Eglin Air Force Base, Florida; and Information Systems, Research, Development and Acquisition to Aberdeen Proving Ground, Maryland. Evaluation of environmental impacts associated with these realignments will be performed by the receiving locations.

2.2.2 Allocation of Facilities and Personnel

The July 2006 preferred land use strategy translates to an amended siting plan. Accommodations of BRAC requirements would involve the following siting of facilities:

- NGA and WHS would be on the eastern portion of EPG.
- Army lease units, agencies, and activities would be on South Post at sites on Gunston Road and Belvoir Road.
- The Dewitt Army Community Hospital would be on the South Post Golf Course.
- PEO EIS and MDA HQCC would be on South Post at sites on Gunston Road and Belvoir Road.

2.2.3 Construction and Renovation

Construction and renovation of facilities to support additional personnel at Fort Belvoir would result in more than 7 million square feet of additional built space and about 7 million square feet of parking structures.

Fort Belvoir would require essentially two types of construction projects. First, Fort Belvoir must construct or renovate facilities to create working space or other types of special use space for the proposed additional workforce. Second, Fort Belvoir must expand its general support capabilities to meet the needs of a larger on-post population. Table 2-3 identifies these projects, and Figure 2-3 shows where they would be sited under the preferred alternative.

Table 2-3
Proposed Construction and Renovation Projects

Map number	Project number	Project title	Fiscal year	Building size (ft^2)	Estimated impervious acreage
1	65416	NGA Administrative Facility	2007–2011	2,419,000	20.3
2	64234	WHS Administrative Facility	2008–2010	2,219,000	22.8
3	MDA 580	MDA Facility	2008–2009	107,000	1.3
4	64238	Hospital	2008	868,800	7.5
4	65676	Hospital	2009	-	-
4	65677	Hospital	2010	-	-
5	64241	Dental Clinic	2010–2011	16,000	0.2
6	65871	NARMC[a] Headquarters Building	2009	50,000	1.0
7	n/a	Corps of Engineers Project Integration Offices	2008	58,600	n/a
8	64097	Infrastructure	2008	n/a	n/a
8	67487	Infrastructure	2009	n/a	n/a
8	67959	Infrastructure	2010	25,000	0.6
9	64076	Emergency Services Center (EPG)	2008	14,700	3.4
10	65448	Network Operations Center (part of PEO EIS)	2010	21,525	0.3
11	65447	USANCA[b] Support Facility	2008	20,000	n/a
12	55661	Child Development Center (NGA)	2011	19,590	0.5
13	55662	Child Development Center	2011	24,036	0.6
14	65450	Administrative Facility (Bldgs 211, 214, 215, 220)	2011	133,000	0.0
15	63571	Access Road/Control Point	2009	280	8.2
16	66228	AMC[c] Relocatables	2007	230,000	0.0
17	65592/67231	PEO EIS Administrative Facility	2008	290,000	2.2
17	67231	PEO EIS Administrative Facility	2008	157,400	1.2
18	54347	Structured Parking Facility, 200 Area	2011	n/a	1.0
19	62892	Modernize Barracks	2011	171,000	n/a
20	54898	MWR[d] Family Travel Camp	2007–2010	1658	1.5

Notes: Project number is the construction project number assigned by the Army. Estimated impervious footprint acreage column was calculated based on the estimated number of building floors and adjacent parking spaces for each project. Parking garages were assumed for the larger projects.

[a]North Atlantic Regional Medical Center
[b]U.S. Army Nuclear and Chemical Agency
[c]Army Materiel Command
[d]Morale, Welfare, and Recreation

LEGEND

Installation Property

(8) Map Number

Construction Project Locations

Fort Belvoir, Virginia

Sources: Fort Belvoir GIS, 2006; Fairfax County GIS, 2006.

Figure 2-3

The following paragraphs provide details on facility construction and renovation projects listed in Table 2-3 that are proposed to occur through fiscal year 2011.

- *NGA Administrative Facility* (Project number 65416, FY 2007-2011, Map number [MN] 1 in Figure 2-6). This project would provide a 2,419,000-square-foot Sensitive Compartmented Information Facility (SCIF) for use by the NGA. This project is required to implement the BRAC 2005 recommendation to consolidate NGA intelligence and training operations; provide a secure facility to enhance command and control; promote acquisition, assimilation, and analysis of real-time intelligence; and enhance organizational productivity and intra-agency connectivity and operability. NGA elements are currently housed in numerous government-owned and leased facilities in and around the NCR. Their physical separation negatively affects their intelligence mission. There are no existing facilities at Fort Belvoir sufficient to support consolidation of all NGA intelligence operations, administrative functions, and training programs.
- *WHS Administrative Facility* (64234, FY 2008–2010, MN 2). This project would provide 2,219,000 square feet of secure administrative space for various units, agencies, and activities relocating to Fort Belvoir from leased facilities in the NCR. The project would include uninterruptible power supply and standby power generation. It would provide facilities on a secure installation, thereby improving force protection. This project would consolidate a number of similar activities with a resultant improvement in coordination, information exchange, and productivity. Various DoD offices are in leased facilities, primarily in Arlington and Alexandria, Virginia. Most of these facilities do not meet minimal DoD antiterrorism/force protection (AT/FP) construction standards for setbacks, progressive collapse, laminated windows, and so on. The facilities are dispersed throughout the NCR, negatively affecting direct coordination.
- *MDA Facility* (MDA 580, FY 2008–2009, MN 3). This project would provide a 107,000 square-foot administrative facility to serve as the MDA Headquarters Command Center for approximately 292 personnel. The project would consist of a multistory reinforced concrete or structural steel building on concrete footings. Functional areas that would be provided include administrative space, command suite, security operations center, sensitive compartmentalized information facilities, special access areas, and meeting rooms. AT/FP measures would include building standoff distances, structural preventive collapse, laminated glass, lighting, bollards, and control gates.
- *Hospital* (64238, 65676, and 65677, FY 2008–2010, MN 4). This project would provide a new hospital. Primary facilities would include the hospital (868,800 square feet), special foundations, central energy plant, helipad, ambulance shelter (2,200 square feet), vehicle parking garage, and building information systems. This project is required to provide a hospital to support BRAC 2005 restationing actions within the NCR affecting Walter Reed Army Medical Center (WRAMC) in Washington, D.C.; National Naval Medical Center (NNMC) at Bethesda; Malcolm Grow Medical Center (MGMC) at Andrews Air Force Base; and Dewitt Army Community Hospital at Fort Belvoir. This project is required for integrating WRAMC and NNMC and for establishing the new Walter Reed National Military Medical Center at Bethesda and a large Army community hospital at Fort Belvoir. The NCR medical service market supports care for more than 439,000 beneficiaries. A robust Army community hospital is required to support the relocation of nontertiary patient care functions consequent to the BRAC 2005 restationing actions, which include the closure of WRAMC and closure of inpatient care at MGMC. The restationing actions result in a growth of the NCR South Submarket (supported by a new Army community hospital) of more than 76,000 eligible beneficiaries to a total of

220,803 beneficiaries; a tripling of inpatient workload to more than 9,500 annual admissions; and a doubling of outpatient care, most of which is specialty care. The existing DeWitt Army Community Hospital at Fort Belvoir was constructed in 1957 as a 250-bed inpatient facility and still has the original heating, ventilating, and air conditioning system; plumbing system; medical gas system; and electrical distribution system. The building structure remains intact and usable, but the facility and its major utility systems fall far short of meeting the requirements of a modern medical treatment facility. Outpatient care must be performed in areas designed for inpatient care, resulting in personnel and space inefficiency and patient inconvenience. There are asbestos-containing materials in the existing pipe insulation, floor tile, and mastic at various locations, which significantly delays and escalates the cost of projects to upgrade and improve the facility.

- *Dental Clinic* (64241, FY 2010-2011, MN 5). This project would provide renovation of, and construction to add to, Building 1099 for a 16,000-square-foot dental clinic. The project is required to provide a quality dental clinic to support BRAC 2005 restationing actions of assigned troops working and living on or near Fort Belvoir. The existing facility, Building 1099, is not large enough to provide 40 dental treatment rooms, the necessary number to serve the larger population at Fort Belvoir. There is no available capacity elsewhere to support the increase in dental workload generated by the projected increase at Fort Belvoir of 4,200 active duty Soldiers as directed by the BRAC 2005 restationing actions.
- *NARMC HQ Building* (65871, FY 2009, MN 6). This project would construct a 50,000-square-foot general administration building for the North Atlantic Regional Medical Command (NARMC), as well as other Office of the Secretary of Defense Supporting Units and regional support offices, such as the North Atlantic Regional Dental Command, North Atlantic Regional Veterinary Command, and the North Atlantic Regional Contracting Office. The project is required to provide administrative and operational space for activities to be relocated to Fort Belvoir in accordance with the recommendations of BRAC 2005. Related medical administrative activities are currently located at the WRAMC, Washington, D.C. Currently, there is no adequate, permanent administrative space available at Fort Belvoir to accommodate proposed relocations of medical activities. This project would accommodate such activities by constructing a new, permanent multi-story administrative facility at Fort Belvoir within the proposed hospital campus.
- *Corps of Engineers Project Integration Offices (Temporary)* (FY 2007, MN 7). This project would place temporary facilities for personnel of the Baltimore District Corps of Engineers Integration Office, which would provide integration of BRAC construction management for facilities being developed to accommodate realigned units, agencies, and activities. There would be approximately 22,500 square feet of temporary facilities (relocatable buildings) on EPG, north of Cissna Road and northwest of Building 5073. There would be another 36,100 square feet of temporary facilities on the northwest portion of the South Post golf course. These facilities would be in use for the duration of facilities construction in support of BRAC requirements.
- *Infrastructure* (64097, 67487, and 67959, FY 2008–2010, MN 8). These three projects would provide a 25,000-square-foot communications center, access control facilities, one 10,000-square-foot heating plant building, one 10,000-square foot refrigeration and air conditioning unit, and water, sewer, and electrical services for the EPG. The projects include demolishing 57,000 square feet of existing space. They are required to provide necessary infrastructure for units, agencies, and activities relocating to EPG and to

maintain adequate levels of infrastructure support at Main Post. Current infrastructure at EPG is minimal. There is no access control, and heating and air conditioning is provided through self-contained systems adequate to support only past or current use requirements. Communications are virtually nonexistent. The road network consists of a two-lane road in poor condition. The Bailey Bridge over Accotink Creek is structurally compromised and is closed to vehicular traffic. The projects would provide replacement of the present bridge over Accotink Creek, as well as an additional bridge over Accotink and replacement of the bridge over Dogue Creek (South Post). Water, sanitary sewer, and electrical support are sized to the one occupied building. The perimeter fencing is in such poor condition that it affords little impediment to unauthorized access. Table 2-4 identifies the principal elements of infrastructure included in these projects, as well as infrastructure that would be constructed or installed in support of Main Post requirements.

- *Emergency Services Center* (64076, FY 2008, MN 9). This project would provide 14,700 square feet of space and 15,000 square yards of maintenance apron for emergency services functions at EPG. The project is required to provide military police, Enhanced 911, hazardous materials response, and fire prevention and protection services at EPG in support of the facilities proposed to be constructed to implement BRAC 2005. The project would provide a combined police and fire station to provide traffic control and law enforcement in support of the agencies and activities on EPG and to provide rapid response to structural fires and medical emergencies. Currently, there is no police or fire station at EPG. There are three fire stations at Fort Belvoir—Building 191 constructed in 1934 and in poor condition, Building 2119 constructed in 1993, and Building 3242 constructed in 2003 at Davison Army Airfield. The military police station, Building 2124, was constructed in 2002. Because of their physical separation, none of these facilities is adequate to support EPG with emergency services. The fire stations are too far away to meet minimum response times. The police station is capable of supporting EPG with patrols but is too distant to effectively deliver any other law enforcement services.
- *Network Operations Center* (part of PEO EIS) (65448, FY 2010, MN 10). This project would provide a 6,525-square-foot operations center, a 10,000-square-foot storage area, and a 14,000-square-yard satellite yard. The project is required to provide satellite test facilities in support of the BRAC 2005 recommendation to station Project Manager Defense Communications and Army Transmission Systems (PM DCATS) at Fort Belvoir. There are no facilities at Fort Belvoir to support satellite testing and stationing of PM DCATS.
- *USANCA Support Facility* (65447, FY 2008, MN 11). This project, which would approximately 20,000 square feet of renovated spaced in Building 238 required to support additional U.S. Army Nuclear and Chemical Agency (USANCA) personnel as part of BRAC 2005. The project would provide replacement facilities for the USANCA facilities on EPG, thereby allowing construction of multimillion-square-foot campuses for units, agencies, and activities relocating to EPG. USANCA is the unit charged with providing the Army's core critical nuclear and chemical expertise. Primary USANCA missions include enhanced force survivability in nuclear, biological, and chemical (NBC) environments; communication of the impact of nuclear and other weapons of mass destruction on military operations; enhanced interoperability of forces in NBC environments; planning Army employment of and assessing vulnerability to nuclear weapons; safe and secure storage and demilitarization of the DoD chemical weapons stockpile; and safe and secure operation and maintenance of Army nuclear reactors,

active or deactivated. USANCA now occupies Building 5073, a 13,618-square-foot facility constructed in 1954 at the EPG. Building 5073 is in the center of the most developable portion of EPG. Its location and associated access and force-protection issues significantly reduce possible development in support of BRAC 2005.

- *Child Development Center (NGA)* (55661, FY 2011, MN 12). This project would provide a child development center with 19,590 square feet of space and a 24,430 square-foot outdoor area for 244 children. The project is required to provide a safe, healthy, and affordable developmental environment for dependent children of eligible personnel assigned to EPG. This project would improve morale and performance by providing affordable, on-site developmental services, thereby improving employees' peace of mind and reducing the time of daily commutes. There are currently three child development centers at Fort Belvoir. They are in Buildings 1028, 1745, and 2468, which were constructed in 1988, 1992, and 1997, respectively. Though in relatively good condition, the facilities are at or near capacity, with waiting lists for some categories of services.
- *Child Development Center* (55662, FY 2011, MN 13). This project would provide a child development center with 24,000 square feet of space and a 40,300-square-foot outdoor area for 303 children. See the description for the similar project MN 12 above.
- *Administrative Facility* (Buildings 211, 214, 215, and 220) (65450, FY 2011, MN 14). This project is required to implement BRAC 2005 by modernizing existing facilities to provide 133,000 square feet of general and secure administrative space and structured parking for various units, agencies, and activities relocating to Fort Belvoir from leased facilities in the NCR. This project would provide facilities on a secure installation, thereby improving force protection. It would consolidate a number of similar activities, improving coordination, information exchange, and productivity. Currently, the following are in leased facilities, primarily in Arlington and Alexandria, Virginia: administrative assistants to the Secretary of the Army (SA); Office of the Assistant SA Financial Management and Comptroller; Office of the Chief of Chaplains; Communication and Electronics Command; Defense Finance and Accounting Service; Defense Human Resource Activities; Defense Technology Security Administration; Department of Defense Education Activity; Deputy Under SA—Operations Research; DoD Inspector General; MDA HQCC; Office of the Secretary of Defense; PM Acquisition, Logistics, and Technology Enterprise Systems and Services; Senior Executive Public Affairs Training; U.S. Army Audit Agency; U.S. Army Environmental Policy Institute; U.S. Army G1/Army Research Institute; U.S. Army G1/Civilian Personnel Office; U.S. Army G3/Army Simulation; U.S. Army G6; U.S. Army G8/Force Development; U.S. Army Network Enterprise Technology Command; U.S. Army Office of Environmental Technology; U.S. Army Office of the Chief of Army Reserve; U.S. Army Safety Office; U.S. G1/Personnel Transformation; and U.S. Army Legal Services Agency. The majority of these facilities do not meet minimal DoD AT/FP construction standards for setbacks, progressive collapse, laminated windows and the like. The facilities are dispersed throughout the NCR, negatively affecting direct coordination.
- *Access Road/Control Point* (63571, FY 2009, MN 15). This project would construct an access control point (ACP) with vehicle inspection station; access control building (280 square feet); booth, and canopy, vehicle turnarounds; security lighting; backup generator; two-lane access road (306,000 square feet) with sidewalks/bike path; street lighting; drainage; traffic signal; and Richmond Highway (U.S. Route 1) left and right turns. The ACP, directly across Richmond Highway from Pence Gate, is required to provide safe force protection-compliant controlled access from Richmond Highway onto Fort Belvoir North Post. It would provide an ACP meeting DoD AT/FP construction standards with

sufficient marshalling area and an adequate vehicle inspection station. This project is required to provide a second access onto North Post reducing congestion on Gunston Road and providing alternate access during periods of force protection conditions Charlie and Delta. The only access point from U.S. Route 1 onto North Post is Woodlawn Gate (Route 618). Woodlawn Gate is currently closed. The existing ACP is inadequate. Constructed after the September 11, 2001, terrorist attack, the ACP meets minimal DoD criteria for an ACP; however, the staging area is inadequate, the vehicle inspection station is temporary, the guard post is not hardened, and there is no overhead cover. The configuration of the ACP places the guard force at risk of being hit by vehicles while performing their force protection duties. If this project is not provided, the level of service on U.S. Route 1 would be such that there would be a breakdown in traffic flow resulting in extreme congestion during peak periods. AT/FP would not be provided in accordance with DoD standards. Traffic flow would be degraded, control and inspection of vehicles and personnel entering the installation would be inadequate, and military and contract law enforcement personnel would continue to be at risk from inadequate separation from vehicles and inadequate protective facilities.

- *AMC Relocatables* (66228, FY 2007, MN 16). This project would purchase the facilities at Fort Belvoir that were leased to house the headquarters function of the U.S. Army Materiel Command (AMC). The facilities consist of two modular, two-story office buildings having a total of 230,000 square feet of space. The buildings include open and closed office space, along with special-purpose areas like an Emergency Operations Center (EOC), SCIF, auditorium, secure and nonsecure conference rooms, video teleconference center, technical library, data process center, and office support space. The facilities, located along Gunston Road, will be vacated upon the tenant's relocation to Redstone Arsenal, Alabama, as required by BRAC 2005. Several Fort Belvoir tenants occupy buildings that do not meet minimum requirements. Inadequate office space negatively affects individual job performance, as does lack of special use space such as training and conference rooms, on-site storage, video conferencing, and so on. In addition, one-tenth of the general-purpose administrative space inventory is inadequate and exacerbates space deficit impacts. Fort Belvoir anticipates that its working population increase will place a further strain on the capacity of the general-purpose administrative space inventory. The two two-story, contractor-owned buildings are available for purchase.
- *PEO EIS Administrative Facility* (65592 and 67231, FY 2007, MN 17). Project Number 65592 would provide 290,000 square feet of general administrative space and a parking garage, and Project Number 67321 would provide an additional 157,400 square feet of secure administrative space. The projects are required to accommodate elements of PEO EIS relocating to Fort Belvoir as a consequence of BRAC 2005 and to consolidate operations to enhance operational efficiencies and to reduce total square footage requirements. Approximately 370 personnel assigned to PEO EIS are at the post in Building 1445 (a converted barracks and dining facility constructed in 1969) and Buildings 322 and 323 (World War II facilities originally constructed as vehicle maintenance shops). Another 454 personnel are at Fort Monmouth, and 802 personnel are in leased space in the NCR. Overall mission performance is degraded by the physical separation of activities, and the lack of adequate space negatively affects mission readiness.
- *Structured Parking Facility, 200 Area* (54347, FY 2011, MN 18). This project would construct a parking structure with a capacity of 400 parking spaces in the 200 Area of Fort Belvoir. The structure would be constructed of reinforced concrete with structural

steel framing, and it would have parking decks and a sloped interior ramp system. Fort Belvoir is required to provide parking for both its military personnel and civilian workforce. Based on 60 percent of the working population in this area, 1,730 parking spaces are required to accommodate vehicle parking. The 200 Area is extensively used by Defense Systems Management College and numerous administrative activities. Parking in this area is extremely inadequate. All land suitable for parking is being used, and there is no room for expansion. The only means of accommodating the shortfall of parking spaces is to construct a parking structure on the existing area. If the project is not provided, the lack of adequate parking will continue to adversely affect the morale and efficiency of personnel who work or conduct business the 200 Area.

- *Modernize Barracks* (62892, FY 2011, MN 19). This project would provide renovations to 171,000 square feet of space in six barracks buildings in the McRee Barracks Complex. Renovation work would extend to living modules, hallways, stairwells, utilities, fire alarms and suppression systems, and building information systems. The existing barracks do not meet current standards for privacy, space, or amenities. The barracks are severely deteriorated. Inadequate heating, air conditioning, and ventilation systems contribute to mold growth and unhealthy living conditions.
- *MWR Family Travel Camp* (54898, FY 2007–2010, MN 20). This project would provide a Family Travel Camp with 52 recreational vehicle (RV) campsites, a camp support facility, 15 cabins, and 12 tent sites in four phases, each of which would be usable upon completion. The camp support facility would include a laundry section, camper's lounge space, restrooms and showers, and vending machine space. The project would also include relocating the existing Johnson Road to provide better camp circulation and space, landscaping, site lighting, sewage lift stations, and utility upgrades. Provisions for persons with disabilities would be provided. This project is required to provide adequate outdoor camping opportunities for the Belvoir/NCR customers. The project would provide for the high demand for RV camp sites, and for those looking for cabin camping opportunities. This project would enhance the morale and quality of life of Soldiers, family members, retirees, and DoD civilians. Currently, there are no family travel campgrounds on-post for customers assigned to or supported by Fort Belvoir, or for those visiting the area. Customers are forced to seek service from commercially operated facilities that are overcrowded in the peak travel times, have higher cost, and are an average of 45 minutes from Washington, D.C.

2.2.2.4 Schedule

Implementation of the various aspects of the proposed actions would occur until approximately the end of fiscal year 2011. Actions with respect to the land use plan revision would begin upon issuance of the EIS ROD and continue until further revision of the master plan. Construction and renovation of facilities in support of base realignment and other requirements of Fort Belvoir would begin in fiscal year 2007 and continue through fiscal year 2011.

2.3 DESCRIPTION OF ALTERNATIVES RETAINED FOR DETAILED CONSIDERATION

In June and July 2006, the Army considered three conceptual development strategies for accommodating the increase in units, agencies, and activities associated with base realignment at Fort Belvoir. The strategies, named in a manner suggesting the principal concept of each, were identified as *Town Center, City Center, and Satellite Campuses*. Each strategy had two alternative plans for allocating land to specific functions (e.g., NGA, Army Lease) being

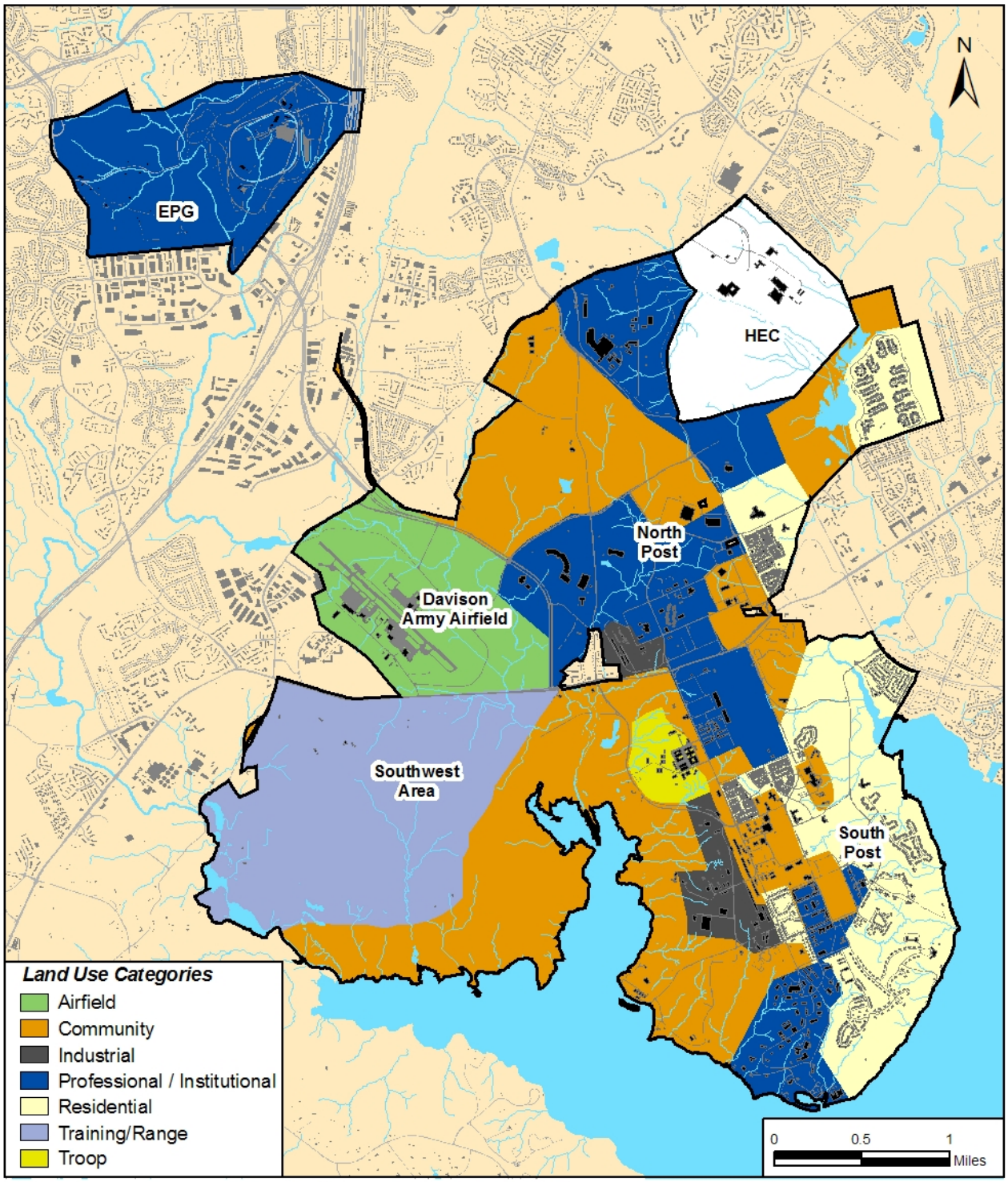
realigned to Fort Belvoir; thus, the Army considered six different ways to meet base realignment requirements.

The following sections present alternatives related to each of the strategies. Also presented is the preferred alternative which emerged as a hybrid of the three conceptual development strategies.

2.3.1 Town Center

Under the Town Center alternative, the majority of new facilities to accommodate base realignment would be sited between J.J. Kingman Road on North Post and 12th Street on South Post. Developed areas bounded by 16th and 21st Streets and Gunston Road and Belvoir Road would be available for future redevelopment. The EPG, Davison Army Airfield, and the North Post golf course would remain available for future growth after 2011. Figure 2-4 shows the Town Center alternative. For land use planning, several land parcels affected by the Town Center strategy would be redesignated for Professional/Institutional or Community uses. Accommodation of BRAC realignments under this alternative would result in the following major sitings:

- NGA and associated parking structures would be sited in the area bounded by Route 1, Belvoir Road, 9th Street, and Gunston Road. This would be facilitated by changing the South Post golf course land use designation from Community to Professional/Institutional.



LEGEND
Installation Property

Town Center Conceptual Development

Fort Belvoir, Virginia

Sources: Fort Belvoir GIS, 2006; Fairfax County GIS, 2006.

Figure 2-4

- WHS and associated parking structures would be sited in the area bounded by Route 1, Belvoir Road, 9th Street, and Gunston Road and in the adjacent area north of Route 1 that is bounded by Constitution Drive, Route 1, and Gunston, Abbot, and Beauregard Roads. This would be facilitated by changing the South Post golf course land use designation from Community to Professional/Institutional and by changing the land use designations north of Route 1 from Community and Troop to Professional/Institution.

- Army Lease and associated parking structures would be sited on North Post, in the southern half of the area bounded by Woodlawn, Abbott, Gunston, and J.J. Kingman Roads. This would be facilitated by changing the present land use designations from Community to Professional/Institutional. Army Lease would also be located in the 200 area, in the northwest quadrant of the intersection of Belvoir Road and 21st Street.

- Medical Command and MDA and associated parking structures would be sited in the area that is bounded by Constitution Drive, Route 1, and Gunston, Abbot, and Beauregard Roads. This would be facilitated by changing the land use designations north of Route 1 from Community and Troop to Professional/Institution.

- PEO EIS and associated parking structures would be sited on North Post, in the southern half of the area bounded by Woodlawn, Abbott, Gunston, and J.J. Kingman Roads. This would be facilitated by changing the present land use designations from Community to Professional/Institutional.

Since EPG would not be developed in order to accomplish BRAC realignment actions, the proposed emergency services center project and much of the infrastructure project would not be required and would not proceed at EPG. Under this alternative, areas of EPG west of Accotink Creek would be designated for Community use, and areas east of the creek would be designated for Professional/Institutional use to support future development.

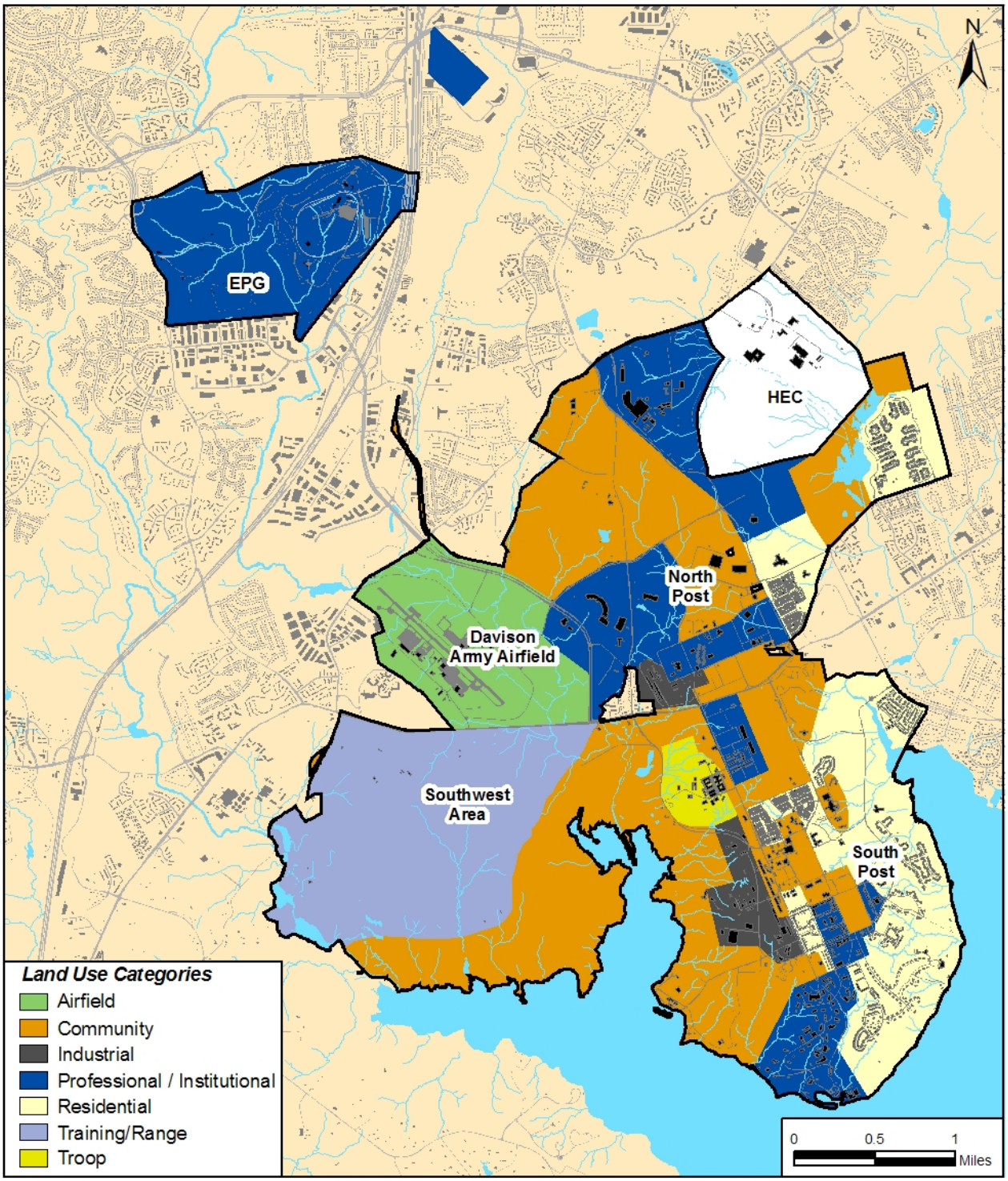
2.3.2 City Center

Under the City Center alternative, all new facilities to accommodate base realignment would be sited on EPG and a nearby 65-acre parcel currently occupied by the General Services Administration (GSA). North and South Posts at Fort Belvoir would remain available for future growth after 2011. Figure 2-5 shows the City Center alternative. For land use planning, parcels affected by the City Center alternative would be redesignated for Professional/Institutional use. Accommodation of BRAC realignments under this alternative would result in the following major sitings:

- NGA, Army Lease, Medical Command, PEO EIS, and MDA and associated parking structures would be sited at EPG.

- Portions of Army Lease would be sited in existing facilities along the east side of Gunston Road between Route 1 and 9th Street, and in the northwest quadrant of the intersection of Belvoir Road and 21st Street. Units, agencies, and activities that could not be assigned to the existing facilities would occupy EPG.

- WHS would be sited at the GSA parcel on Loisdale Road.



LEGEND
Installation Property

City Center Conceptual Development

Fort Belvoir, Virginia

Sources: Fort Belvoir GIS, 2006; Fairfax County GIS, 2006.

Figure 2-5

Army adoption of the City Center alternative would require measures not inherent in other alternatives. The Army would expect GSA to vacate its facilities, relocate GSA functions to other facilities at a location other than Fort Belvoir,[1] demolish all existing structures, conduct any cleanup required under hazardous waste laws, and transfer administrative control of the property to the Army. These actions would have to occur within a timeframe that would provide the Army sufficient time to construct facilities for WHS use.

2.3.3 Satellite Campuses

Under the Satellite Campuses alternative, new facilities to accommodate base realignment would be sited on Davison Army Airfield, North Post golf course, and North Post and South Post (from Kingman Road to 12th Street). Figure 2-6 shows the Satellite Campuses alternative. For land use planning, land parcels affected by the Satellite Campuses strategy would be redesignated for Professional/Institutional or Community uses. Accommodation of BRAC realignments under this alternative would result in the following major sitings:

- NGA and associated parking structures would be sited at Davidson Army Airfield. This would be facilitated by changing the present land use designations from Airfield to Professional/Institutional.

- WHS and MDA and associated parking structures would be sited in the North Port area that is bounded by Constitution Drive, Route 1, and Gunston, Abbott, and Beauregard Roads. This would be facilitated by changing the land use designations north of Route 1 from Community and Troop to Professional/Institution.

- Army Lease would be sited in existing facilities along the east side of Gunston Road between Route 1 and 9th Street, and in the northwest quadrant of the intersection of Belvoir Road and 21st Street in renovated facilities.

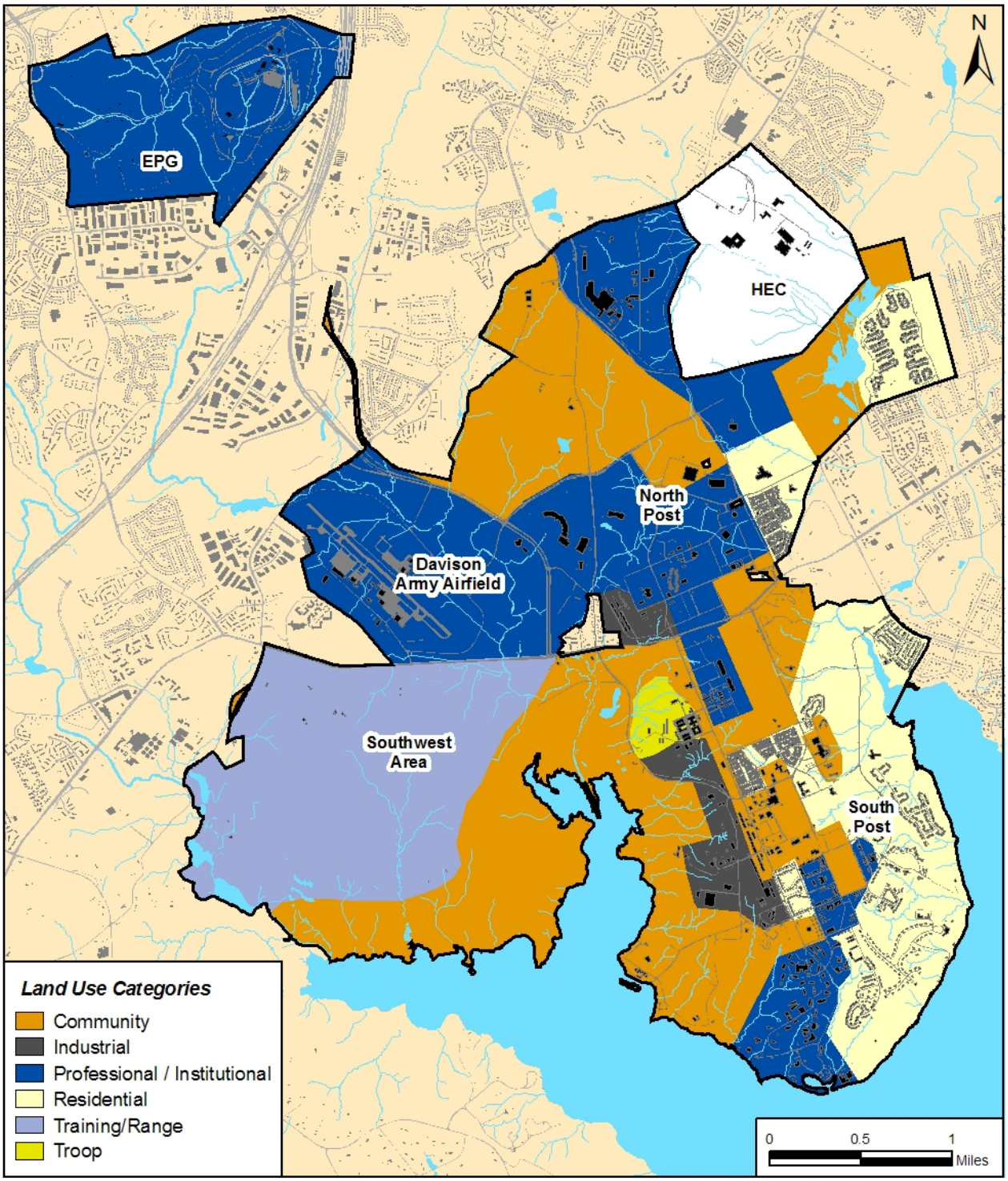
- Medical Command and associated parking structures would be sited on the southern portion of the North Post golf course. This would be facilitated by changing the land use designation from Recreation to Community.

- PEO EIS and associated parking structures would be sited on North Post, in the southern half of the area bounded by Woodlawn, Abbot, Gunston, and J.J. Kingman Roads. This would be facilitated by changing the present land use designations from Community to Professional/Institutional.

2.3.4 Preferred Alternative

Consideration of the Town Center, City Center, and Satellite Campuses conceptual development strategies resulted in a determination that any single strategy was insufficient to meet Fort Belvoir's base realignment needs. The Army reached this determination based on giving high priority to traffic-related issues and development density; specifically, use of EPG for all base realignment units, agencies, and activities would have resulted in development densities that

[1]The Army estimates that relocation of GSA warehouse functions would require a site of 40 to 60 acres. In areas classified for industrial use, no such site is available at Fort Belvoir.



LEGEND
Installation Property

Satellite Campuses Conceptual Development

Fort Belvoir, Virginia

Sources: Fort Belvoir GIS, 2006; Fairfax County GIS, 2006.

Figure 2-6

might not be supportable due to traffic congestion. In light of these circumstances, the Army identified the Preferred Land Use Strategy.

The Preferred Land Use Plan contains two sub-alternatives with respect to the present and proposed Troop Area. The proposed plan would change the Troop Area on North Post to Professional/Institutional uses and create a new Troop Area on South Post in an Industrial area (the western portion of the 1400 area) along Gunston Road. Availability of funding, however, might cause current uses in the present and proposed Troop Areas to continue for an indeterminate period.

2.4 ALTERNATIVES FOR BRAC IMPLEMENTATION

The Defense Base Closure and Realignment Act requires implementation of base realignment actions by not later than September 15, 2011, 6 years following the President's sending the BRAC Commission's recommendation to Congress. Because those recommendations became law effective November 9, 2005, the Army is required to implement them in accordance with their terms. Consideration of alternatives such as not relocating personnel or relocating them to other installations is not legally permissible.

The implementation of base realignment at Fort Belvoir essentially centers on what facilities must be provided, where those facilities would be sited, and which personnel would be assigned to new or renovated facilities. The determinations on these matters are, in large part, guided by the post's land use plan, which identifies areas appropriate for Professional/Institutional purposes. This GCD examines four land use plan alternatives that serve as the surrogate for alternative means of accommodating the units, agencies, and activities being relocated. No other alternatives to BRAC implementation are evaluated in this GCD.

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SECTION 3.0 GENERAL CONFORMITY

In November 1993 EPA promulgated two sets of conformity rules to implement Section 176(c) of the CAA—Transportation Conformity Rules (58 FR 62188) and General Conformity Rules (58 FR 63214). The Transportation Conformity Rules are applicable to highways and mass transit projects within non-attainment areas and establish the criteria and procedures for determining that transportation plans, programs, and projects that are funded under Title 23 of the U.S.C., or the Federal Transit Act, conform to SIPs. Projects adopted, accepted, approved, or funded by the Federal Highway Administration (FHWA) or the Federal Transit Authority (FTA) must be included in a conforming transportation improvement plan (TIP). Because the Proposed Action and Alternatives are not transportation projects and not adopted, accepted, approved, or funded by the FHWA or FTA, the Transportation Conformity Rules do not apply.

The General Conformity Rules (GCR) are applicable to all federal actions within non-attainment areas that are not covered by the Transportation Conformity Rules. Because the proposed Fort Belvoir BRAC action is a non-transportation project supported by a federal agency, compliance with the GCR must be assessed. Notably, some actions are exempt from the GCR. In addition to exempt actions, some other action-related emissions are also not subject to conformity. These include emissions from sources subject to New Source Review; those covered by the Comprehensive Environmental Response, Compensation, and Liability Act or by other environmental laws; actions that are not reasonable foreseeable; and those for which federal agencies would have no continuing program responsibility.

Fort Belvoir is within Fairfax County, Virginia. Fairfax County is included in an area that EPA has designated as in moderate non-attainment for the 8-hour O_3 NAAQS and in non-attainment for the $PM_{2.5}$ NAAQS.

EPA had designated Fairfax County as within a severe non-attainment area for the 1-hour O_3 NAAQS (56 FR 56694). In April 2004, EPA published the final rules that are guiding the implementation of a new 8-hour O_3 NAAQS (69 FR 23951). These rules specified that the 1-hour NAAQS would be revoked on June 15, 2005 (69 FR 23954 and 69 FR 23858). The mandated date by which the area is to attain the 8-hour NAAQS is June 15, 2010. Areas are not obligated to continue to demonstrate conformity to the 1-hour O_3 NAAQS as of the effective date of the revocation of the 1-hour NAAQS (June 15, 2005). At that time, conformity to the 8-hour O_3 NAAQS became required. Until such time that states are required to submit SIPs that will address the 8-hour O_3 NAAQS (2007), the SIP that addresses the 1-hour O_3 NAAQS is the "applicable" SIP. In addition, in December of 2006 a federal appellate court partially invalidated EPA's implementation of the 8-hour ozone standard (United States Court of Appeals 2006). As of this time, no changes in effective regulations or guidances have been issued based on this court decision.

On December 17, 2004, EPA designated areas of the United States with respect to the NAAQS for $PM_{2.5}$ (70 FR 944). The CAA mandates areas designated non-attainment for fine particulate matter to attain the NAAQS for this pollutant by no later than the year 2010.

Finally, there are areas within the NCR designated as maintenance areas for carbon monoxide. These areas include Washington, D.C.; Arlington County; Alexandria; and parts of Montgomery and Prince George counties (MWCOG 2004). None of these areas encompasses (partially or wholly) Fort Belvoir.

Fairfax County (and, therefore, Fort Belvoir) is designated in attainment for all other criteria air pollutants. Table 3-1 summarizes the air quality status of Fairfax County with respect to the NAAQS.

Table 3-1
Attainment status of Fairfax County and Fort Belvoir

Pollutant	Designation	Mandated Attainment Year
Carbon monoxide	Attainment	NA
Nitrogen dioxide	Attainment	NA
O_3	Non-attainment (moderate)	2010
PM_{10}	Attainment	NA
$PM_{2.5}$	Non-attainment	2010
Sulfur dioxide	Attainment	NA
Lead	Attainment	NA

Notes: NA = not applicable.
PM_{10} = particulate matter 10 microns or less in size.
$PM_{2.5}$ = particulate matter 2.5 microns or less in size.
Source: 40 CFR Part 81, Air Quality Designations and Classifications.

For the purpose of the Fort Belvoir BRAC GCD, the following discussion of conformity is limited to the air pollutants and criteria that are applicable to the National Capital Interstate Air Quality Control Region and, specifically, Fort Belvoir. The criteria for determining whether the GCR apply or the action conforms to the applicable SIP are as follows:

- Total project-related direct and indirect emissions are below applicability threshold levels *or*
- Total project-related direct and indirect emissions are specifically identified and accounted for in the SIP *or*
- The total project-related emissions from the action(s) are fully offset within the same non-attainment or maintenance area through a revision to the SIP, or similarly enforceable measure, that effects emission reductions so that there is no net increase in emissions of that pollutant *or*
- VDEQ determines that the level of emissions, which together with all other emissions in the non-attainment (or maintenance) area, would not exceed the emission targets specified in the SIP, *or*
- VDEQ commits to include the project-related emissions in the upcoming SIP and to accommodate the increased emissions by achieving reductions from other sources *or*
- Any combination of the above.

Emissions associated with BRAC-related programs are not typically identified or accounted for in SIPs. Therefore, guidance issued by EPA states that if emissions are not readily identifiable in a SIP inventory, the federal agency should coordinate with the state to determine what portion of a category, if any, could or would be allocated to any given project. The determination of whether

a project/action is specifically identified in a SIP is made case by case in consultation with the state/local air quality agency and the EPA regional office (USEPA and FAA 2002). The EPA guidance also states that if total emissions for the project/action are below the levels identified or accounted for in the SIP, it has been demonstrated that the project/action conforms to the applicable SIP.

3.1 EMISSIONS ESTIMATIONS AND METHODOLOGY

The GCR require the federal agency to consider net emissions generated from all direct and indirect sources of air emission that are reasonably foreseeable. *Direct emissions* are emissions that are caused or initiated by a federal action and occur at the same time and place as the action. *Indirect emissions* are defined as reasonably foreseeable emissions that are caused by the action but might occur later in time and/or be farther removed in distance from the action itself, and that the federal agency can practicably control. For the evaluation of the RPMP update and the Fort Belvoir realignment, direct emissions subject to the GCR are considered emissions from construction activities, motor vehicles, and point sources that are not large enough to be subject to the Major New Source Review permitting process (USEPA and FAA 2002). More specifically, project-related direct emissions would result from the following:

- *Demolition and construction activities:* the use of nonroad equipment (e.g., bulldozers, backhoes), worker vehicles, the use of VOC paints, paving off-gasses, and fugitive particles from surface disturbances

- *Operational activities:* Emergency generators and small heating boilers not subject to major new source review, and the use of private motor vehicles

No direct or indirect emissions are associated with the planning activities associated with the federal action; all direct and indirect emissions would be associated with the BRAC activities. Regardless of the alternative, all activities associated with the BRAC action that would generate direct and indirect emissions would be identical in magnitude and occur within the region. Slight variation in the siting of the new facilities on Fort Belvoir would not change the emission estimations, the applicability of the GCR, or the determination of conformity. Therefore, the Proposed Action and Alternatives were carried forward under a single analysis regardless of planning alternative.

The emissions from major new or modified stationary sources subject to the Major New Source Review will undergo analysis as part of the review required by those programs, and it is not necessary to include them in the general conformity review. The GCR specifically exempt those emissions (40 CFR 93.153(d)(1)).

Permits for minor stationary and area sources under VDEQ's new minor source review program are not specifically exempt from analysis under the regulations. To issue such a permit, however, VDEQ must determine that the emissions are in conformity with the SIP (40 CFR 51.160(a) and 9 VAC 5-160-160(5)(A)(1).). The permits, once issued, will demonstrate emissions from the minor permitted sources were determined and documented by the state agency primarily responsible for the applicable SIP to result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance) area, would not exceed the emissions budgets specified in the applicable SIP. Therefore, the U.S. Army presumes that all stationary sources of emission subject to the permitting process will conform, and the U.S. Army will use the permit as evidence in documentation that the emissions are included in the SIP (40 CFR 3.158(a)(5)(i)(A)) (USEPA and FAA 2002) (VDEQ 2007). The only stationary units of air emissions carried

forward for detailed analysis are those small enough not to be subject to VDEQ's permitting procedures.

3.1.1 Demolition and Construction Emissions

Demolition and construction emissions associated with the use of construction equipment (e.g., bulldozers, backhoes), worker vehicles, the use of VOC paints, paving off-gasses, and fugitive particles from surface disturbances are tabulated in Table 3-2 for all the years of construction.

Table 3-2
Estimated Construction Emissions

	Construction Emissions (tons/yr)			
Year	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
2007	129	76	10	19
2008	323	188	21	48
2009	329	216	21	52
2010	374	238	26	63
2011	130	69	13	24

2007 Annual Construction Emissions Construction Activity	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
Heavy equipment emissions	128	12	8	19
Worker trip emissions	2	1	0	0
Architectural coating emissions	0	63	0	0
Paving off-gas emissions	0	0	0	0
Fugitive dust emissions	0	0	1	0
Total	129	76	10	19

2008 Annual Construction Emissions Construction Activity	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
Heavy equipment emissions	318	29	20	48
Worker trip emissions	5	4	0	0
Architectural coating emissions	0	155	0	0
Paving off-gas emissions	0	0	0	0
Fugitive dust emissions	0	0	1	0
Total	323	188	21	48

2009 Annual Construction Emissions Construction Activity	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
Heavy equipment emissions	323	29	20	52
Worker trip emissions	6	5	0	0
Architectural coating emissions	0	181	0	0
Paving off-gas emissions	0	0	0	0
Fugitive dust emissions	0	0	0	0
Total	329	216	21	52

Table 3-2
Estimated Construction Emissions *(continued)*

	Construction Emissions (tons/yr)			
Year	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
2010 Annual Construction Emissions Construction Activity	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
Heavy equipment emissions	368	33	24	63
Worker trip emissions	6	6	0	0
Architectural coating emissions	0	200	0	0
Paving off-gas emissions	0	0	0	0
Fugitive dust emissions	0	0	1	0
Total	374	238	26	63
2011 Annual Construction Emissions Construction Activity	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
Heavy equipment emissions	128	11	12	24
Worker trip emissions	2	2	0	0
Architectural coating emissions	0	56	0	0
Paving off-gas emissions	0	0	0	0
Fugitive dust emissions	0	0	1	0
Total	130	69	13	24

Note: Rounded to the nearest whole number.

This section also outlines all the calculations and assumptions made to derive these construction emission estimations.

3.1.1.1 Heavy Construction Equipment

Pollutant emissions resulting from activities associated with constructing the new buildings, parking facilities, and roadways were estimated. The typical demolition and construction would involve such activities as demolition of existing buildings or structures, utility installation, road construction, site clearing and grading, building construction, asphalt paving, and landscaping.

Demolition and construction would involve the use of various nonroad equipment, power generators, and trucks. Pieces of equipment to be used for building construction include, but are not limited to, backhoes, loaders, excavators, air compressors, chain saws, chipping machines, dozers, cranes, pavers, graders, rollers, and heavy trucks. Information regarding the number of pieces and types of construction equipment to be used on the project, the schedule for deployment of equipment (monthly and annually), and the approximate daily operating time (including power level or usage factor) were estimated for each individual construction project based on a schedule of construction activity.

Emissions from construction activities were estimated based on the projected construction activity schedule, the number of vehicles/pieces of equipment, and vehicle/equipment utilization rates. Emission factors for heavy-duty diesel equipment were obtained from EPA's *NONROAD2005 Emissions Model* (USEPA 2004). This model, which is the current EPA standard for nonroad vehicle emission, calculated emission factors based on information in the following documents:

- *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling—Compression-Ignition* (USEPA 2004a);
- *Exhaust Emission Factors for Nonroad Engine Modeling—Spark-Ignition* (USEPA 2004b);
- *Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling* (USEPA 2004c)
- *Nonroad Engine Population Estimates* (USEPA 2004d)

The equipment and vehicle operation hours were estimated based on R.S.Means' *Building Cost Construction Data*, 64th annual edition (Waier 2006), and field experience from similar projects.

Emission factors in grams of pollutant per hour were multiplied by the estimated running time to calculate total grams of pollutant from each piece of equipment. Finally, these total grams of pollutant were converted to tons of pollutant. The following formula was used to calculate hourly emissions from nonroad engine sources, including cranes, backhoes, and the like:

$M_i = N \times EF_i$

where
M_i = mass of emissions of i^{th} pollutant during inventory period;
N = source population (units); and
EF_i = average emissions of i^{th} pollutant per unit of use (e.g., grams per hour).

The total annual emissions levels are summarized in Table 3-3. In addition, estimated emissions from the potential demolition and construction are presented in Attachment 1.

Table 3-3
Estimated Annual Emissions from Construction and Demolition Equipment

	Annual Emissions (tons/yr)			
Year	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
2007	127.6	11.7	8.1	18.5
2008	318.5	28.5	19.7	48.3
2009	323.4	29.4	20.4	51.9
2010	367.9	32.6	24.1	62.9
2011	127.8	11.2	11.5	23.5

Sources: USEPA *NONROAD2005*; SQAQMD 1993.

3.1.1.2 Construction Worker Vehicle Operations

The emissions due to construction worker vehicle use were included in the analysis. Emission factors for motor vehicles were conservatively calculated using the EPA *MOBILE6.2* mobile source emission factor model associated with input parameters provided by Metropolitan Washington Council of Government (MWCOG 2004). These emission factors were then multiplied by the vehicle operational hours to determine motor vehicle emissions. The analysis

assumed conservatively that the worker's vehicle would drive 30 miles per day on post at an average speed of 35 miles per hour. The total annual emissions levels are summarized in Table 3-4.

Table 3-4
Estimated Annual Emissions from Construction Worker Vehicles

	Annual Emissions (tons/yr)			
Year	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
2007	1.6	1.4	0.1	0.1
2008	4.8	4.5	0.2	0.1
2009	5.6	5.1	0.2	0.2
2010	6.2	5.7	0.2	0.2
2011	1.9	1.8	0.1	0.1

Sources: USEPA 2002, *MOBILE6.2,* SQAQMD 1993.

In addition, estimated emissions from the potential demolition and construction are presented in Attachment 1.

3.1.1.3 Emissions from Architectural Coatings

Emission factors relating emissions to total square footage to be built were used to estimate VOC emissions from architectural coating activities. For office space, the area to be painted was assumed to be approximately twice the heated area of the facility and the dry film thickness was assumed to be three mils. The following formula was used to calculate emissions from the painting of the facilities:

$E = [(F \times G) / 1000] \times H$

where

E = emissions of VOCs from architectural coatings;
F = pounds of VOC emissions per 1,000 ft^2 for a dry film thickness of 1 mil;
G = total area to be coated (heated area x 2); and
H = dry film thickness (3 mils).

A sample calculation for an architectural coating VOC emissions during construction of example facility is provided below:

Heated area = 100,000 ft^2
Dry film thickness = 3 mils
Standard water-based paint = 18.5 lb of VOCs per 1000 ft^2 per for a dry film thickness of 1 mil

E = [(18.5 [lb/1000 ft^2/mil] x (100,000 [ft^2] x 2) / 1000] x 3 mils]/2,000 [lb/ton]
= 2.77 tons

The total annual emissions levels are summarized in Table 3-5. In addition, estimated emissions from the potential demolition and construction are presented in Attachment 1.

Table 3-5
Annual VOC Emissions from Architectural Coatings

Year	Annual VOC Emissions (tons/yr)
2007	62.9
2008	155.2
2009	181.3
2010	200.0
2011	55.5

Source: SQAQMD 1993.

3.1.1.4 Asphalt Curing Emissions

Asphalt paving would generate emissions from (1) asphalt curing, (2) operation of on-site paving equipment, and (3) operation of motor vehicles, including paving material delivery trucks and worker commuting vehicles. Because the emissions resulting from the operation of on-site paving equipment, trucks, and vehicles were included in the previous section, only asphalt curing-related emissions are discussed in this section. Asphalt curing-related VOC emissions were calculated based on the amount of paving anticipated for the on-site parking lot and new roadways. The following assumptions were used in VOC emission calculations for asphalt curing (SQAQMD 1993):

E = area paved x 2.62 lb VOC/ac

A sample calculation is provided below:

Paved area = 100 ac

E = 100 ac x 2.62 lb VOC/ac/2000 lb/ton
= 0.131 ton

The total annual emissions levels are summarized in Table 3-6. In addition, estimated emissions from the potential demolition and construction are presented in Attachment 1.

Table 3-6
Annual VOC Emissions from Asphalt Curing

Year	Annual VOC Emissions (tons/yr)
2007	0.00
2008	0.02
2009	0.03
2010	0.06
2011	0.06

Source: SQAQMD 1993.

3.1.1.5 Surface Disturbance

The quantity of dust emissions from construction operations is proportional to the area of land being worked and to the level of construction activity. The following assumptions were used in $PM_{2.5}$ emission calculations for fugitive dust emissions (AP-42 Section 13.2.3; USEPA 2005c).

E = open area x EF x PM10/TSP x $PM_{2.5}$/PM10 x capture fraction

where

Open area = number of acres open
EF = 80 lb TSP/acre
PM10/TSP = 0.45 lb PM_{10}/lb TSP
$PM_{2.5}/PM_{10}$ = 0.15 lb $PM_{2.5}$/lb PM10
Capture fraction = 0.5

A sample calculation is provided below:

Paved area = 100 acres

E = 100 ac x 80 lb TSP/ac x 0.45 lb PM10/lb TSP x 0.15 lb $PM_{2.5}$/ lb PM10 x 2000 lb/ton
= 1.35 tons

The total annual emissions levels are summarized in Table 3-7. In addition, estimated emissions from the potential demolition and construction are presented in Attachment 1.

Table 3-7
Annual $PM_{2.5}$ Emissions from Surface Disturbance

Year	Annual PM2.5 Emissions (tons/yr)
2007	1.36
2008	0.81
2009	0.02
2010	1.11
2011	1.43

Sources: AP-42 Section 13.2.3, USEPA 2005c.

3.1.3 Operational Activities

Operational emissions occur as a result of the operation of the new facilities associated with the Proposed Action and Alternatives. As previously stated, some action-related emissions are not subject to the GCR. These include emissions from sources subject to major New Source Review. Major *New Source Review* is a term used to describe EPA's preconstruction permitting program. In addition, the minor new source review permitting procedures ensure that air quality conditions are not significantly degraded as a result of the addition of new and modified factories, industrial boilers, and power plants above a certain size. In non-attainment areas, this program ensures that

new emissions do not slow progress toward cleaner air. With respect to the Fort Belvoir BRAC action, emissions associated with the heating/cooling plant, standby generators, and large boilers are subject to permitting. Therefore, emissions, although considered, have not been carried forward for detailed analysis in the conformity evaluation. The remaining direct and indirect emissions due to small heating boilers and commuter vehicles constitute a small net decrease in emissions when compared to the no-action (no-build) scenario. The total annual operational emissions levels are summarized in Table 3-8. Notably, the operating emissions are less than the no-build alternative; this is primarily due to the decrease in communing distance and the net decrease in commuters.

Table 3-8
Estimated Net Operating Emissions Subject to the General Conformity Rule

	Operating Emissions (tons/yr)			
Roll-up (Total Operating Emissions)	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
2008	-4.4	-4.5	-0.2	-0.1
2009	-8.1	-9.1	-0.3	-0.3
2010	-9.6	-13.7	-0.2	-0.4
2011	-10.2	-14.8	-0.2	-0.4
2012	-11.6	-16.2	-0.3	-0.5

2008 Additional Operating Emissions	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
Heating and cooling emissions	0	0	0	0
Employee commuting emissions	-4.4	-4.5	-0.2	-0.1
Total	-4.4	-4.5	-0.2	-0.1

2009 Additional Operating Emissions	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
Heating and cooling emissions	0.9	0	0.1	0
Employee commuting emissions	-4.5	-4.6	-0.2	-0.1
Total	-3.6	-4.5	-0.1	-0.1

2010 Additional Operating Emissions	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
Heating and cooling emissions	3.2	0.2	0.2	0
Employee commuting emissions	-4.7	-4.8	-0.2	-0.1
Total	-1.5	-4.6	0.1	-0.1

2011 Additional Operating Emissions	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
Heating and cooling emissions	0.4	0	0	0
Employee commuting emissions	-1.1	-1.1	0	0
Total	-0.6	-1.1	0	0
2012 Additional Operating Emissions	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
Heating and cooling emissions	0	0	0	0
Employee commuting emissions	-1.4	-1.4	-0.1	0
Total	-1.4	-1.4	-0.1	0

3.1.3.1 Heating Boiler Emissions

According to Virginia's air pollution control regulations (9 VAC 5 Chapter 40), any fuel-burning equipment using a liquid and gaseous fuel with a maximum heat input of less than 10 million British thermal units (BTU) per hour is exempt from the air permitting process and is normally considered an insignificant emission source with minimal air quality impacts. Based on the size of the buildings that would be constructed as the action is implemented, many of the new heating boilers to be installed would likely have a heating capacity of less than 10 million BTU per hour. Emissions from these boilers would not be regulated under Virginia's New Source Review air-permitting regulations, and therefore the emissions are subject to the GCR.

The action also includes several large-scale facilities, such as NGA, WHS, Dewitt Hospital, and Army leased space. These facilities would likely be equipped with heating boilers that are regulated under Virginia's air permitting regulations or connected to the proposed heating plant. When these projects reach the design phase, the developer will need to determine the actual size of the boilers and the amount of new emissions associated with each building to allow VDEQ to determine whether a stationary source air permit is required and establish whether significant stationary source impacts would occur. Those boilers are not subject to the GCR and therefore are not considered in this analysis.

Each building is assumed to be adequately heated, with heating values based on the U.S. Department of Energy's *Consumption and Gross Energy Intensity by Census Region for Sum of Major Fuels, Commercial Buildings Energy Consumption Survey* (DOE 1999). The heating area used is the net change of heating space, calculated by subtracting the known existing building spaces to be demolished, when applicable. In the case of a new facility where the demolition area would be greater than the area to be constructed, no net increase in boiler emissions was considered. An example calculation of heating gas requirements for an individual project is presented below:

Total building size	=	26,000 GSF
Natural gas energy intensity	=	31.4 ft^3/GSF
Total natural gas	=	26,000 GSF x 31.4 cubic feet/GSF
	=	816,400 ft^3

Emission estimates were calculated based on the EPA-provided AP-42 emission factors for a natural-gas boiler. An example calculation for the annual emission rate for VOCs from building boiler operations for a sample project is presented below:

AP-42 emission factor	= 5.5 lb/10^6 ft^3
Annual emission level	= 816,400 ft^3/year x 5.5 lb/10^6 ft^3
	= 4.5 lb/year
	= 0.0022 tons/yr

It is expected that building boiler emissions from each building would occur immediately after the completion of the project. The total annual emissions levels are summarized in Table 3-9. In addition, estimated emissions from the potential demolition and construction are presented in Attachment 1.

Table 3-9
Annual Emissions from New Small Heating and Cooling Sources

	Annual Emissions (tons/yr)			
Year	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
2009	0.85	0.05	0.06	0.01
2010	3.17	0.17	0.24	0.02
2011	0.45	0.02	0.03	0

Sources: AP-42 Section 1.4, DOE 1999.

3.1.3.2 Employee Commuting Vehicular Emissions

Emission factors for motor vehicles were conservatively calculated for the year 2010 for commuter vehicles (modeled as light-duty gasoline vehicles and light-duty gasoline trucks such as SUVs) using the EPA *MOBILE6.2* mobile source emission factor model. Metropolitan Washington Council of Government (MWCOG 2004) provided the most current input parameters containing the current planning assumptions for the region. A sample calculation for the annual emission rate for NO_x from new employee vehicles from a sample project is presented below:

Additional employees	=	150
Number of trips per day	=	2
Number of days per year	=	250
Average vehicle commute distance	=	20 miles
MOBIEL6.2 emission factor	=	0.3 grams/mile

Annual emission level = 150 x 2 x 250 x 20 x 0.3/907,185 grams/ton
= 0.49 ton/yr

The estimated net annual vehicular emissions for applicable projects are calculated in detail in Table 3-10 and presented in Attachment 1.

Table 3-10
Annual Emissions from New Employees' Vehicles (Net Decrease)

	Annual Emissions (tons/yr)			
Year	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
2008	-4.44	-4.55	-0.16	-0.14
2009	-4.47	-4.58	-0.16	-0.14
2010	-4.71	-4.82	-0.17	-0.15
2011	-1.05	-1.08	-0.04	-0.03
2012	-1.38	-1.42	-0.05	-0.04

Sources: USEPA 2002; *MOBILE6.2*.

3.1.4 Total Annual Emission

Table 3-11 provides the total annual estimated action-related emissions of VOC, NO_x, $PM_{2.5,}$ and SO_2 respectively. The annual estimates are provided for the proposed construction schedule and for conditions estimated to occur under all the alternatives except the No Action Alternative. Notably, the construction-related activities would be the predominate source of emissions.

Table 3-11
Total Annual Emissions from the 2005 Realignment of Fort Belvoir

	Annual Emissions (tons/yr)			
Year	**NO_x**	**VOC**	**$PM_{2.5}$**	**SO_2**
2007	129.2	76.0	9.5	18.5
2008	318.9	183.6	20.5	48.3
2009	320.9	206.7	20.4	51.7
2010	364.5	224.7	25.3	62.7
2011	119.5	53.8	12.8	23.2
2012+	-11.6	-16.2	-0.3	-0.5

Sources: USEPA NONROAD2004; SQAQMD 1993; USEPA 2002; *MOBILE6.2*; USEPA AP-42; USEPA 2005; DOE 1999.

3.2 APPLICABILITY ANALYSIS

The GCR apply to federal actions in non-attainment areas. EPA established applicability threshold levels to exclude federal actions from the requirements to provide a GCD. It is understood that emissions below these levels would not impede an area's ability to attain the NAAQS. If the total direct and indirect action-related emissions are below the applicability threshold levels, and the action-related emissions are determined not to be regionally significant, it is assumed that the emission level conforms to a state's plans to attain or maintain the NAAQS. Project/action-related emissions are determined to be regionally significant if the emission level represents 10 percent or more of the regional total of emissions for which the area is in non-attainment. The applicability threshold levels for O_3 and $PM_{2.5}$ within the NCR are provided in Table 3-12.

With respect to the proposed Fort Belvoir BRAC action, project-related emissions are those emissions that would occur with the action when compared to the emissions that would occur without the action (the net change in emission level). Table 3-12 presents the estimated increase in emissions with the proposed Fort Belvoir BRAC action (the project-related emissions).

Because the total of direct and indirect emissions of NO_x and VOC exceed the respective general conformity applicability thresholds, the general conformity requirements apply to these pollutants. Consequently, a formal conformity determination is required and these pollutants will be carried forward for detailed analysis. Notably, because the project-related emissions of these pollutants exceed the applicability threshold, performing the regional significance applicability test would be redundant.

Table 3-12
Applicability Thresholds for the National Capital Interstate Air Quality Control Region

Criteria pollutants	Greatest Annual Project- Related Emissions	Applicability Threshold Levels (tons/yr)	Exceeds Applicability Threshold (yes/no)
O_3 (NO_x or VOCs)			
Marginal and moderate NAAs inside an O_3 transport region			
VOC	225	50	Yes
NO_x	365	100	Yes
PM2.5 ($PM_{2.5}$, NO_x, SO_2)			
$PM_{2.5}$	25	100	No
NO_x	365	100	Yes
SO_2	63	100	No

Sources: 40 CFR 93.153; USEPA 2006.
Note:
NAA = non-attainment area.

The total of direct and indirect emissions of $PM_{2.5}$ and of SO_2 is less than the applicability thresholds. Pending the full implementation of the $PM_{2.5}$ NAAQS, there is no current regional emission budget for $PM_{2.5}$ or SO_2. However, due to the limited size and scope of the Proposed Action and Alternatives when compared to the overall regional activity, it is not anticipated that emissions of $PM_{2.5}$ or SO_2 would be regionally significant. Therefore, the general conformity requirements do not apply to these pollutants, and there will be no further evaluation of these pollutants herein.

3.3 CONFORMITY EVALUATION

This section evaluates the ability of the Proposed Action and Alternatives to conform to the SIP with respect to the pollutants NO_x and VOC, as outlined under the GCR.

3.3.1 Evaluation Cases

The GCR require that the analysis of project-related emissions reflect the scenarios expected to occur under each of the following cases:

- The CAA-mandated attainment year or, if applicable, the farthest year for which emissions are projected in the maintenance plan
- Any year for which the applicable SIP specifies an emission budget
- The year during which the total of direct and indirect emissions from the action is expected to be the greatest on an annual basis

The following paragraphs discuss each of the above cases as each relates to the proposed Fort Belvoir BRAC action.

CAA-Mandated Attainment Year. The CAA-mandated attainment year for both the 8-hour O_3 and the $PM_{2.5}$ NAAQS is 2010, and therefore, project-related emissions in 2010 are subjected to

the conformity evaluation. There are currently no maintenance plans in place for Fairfax County. Therefore, the GCR requirement to evaluate the farthest year for which emissions are projected in the maintenance plan is not applicable.

Regional Emission Budgets. The 1-hour O_3 attainment demonstration SIP also includes Rate of Progress-based regional emission target levels for the years 2002 and 2005. The earliest that the proposed action or alternatives would affect local or regional air quality conditions is the year 2007 (assuming that the U.S. Army issues a Record of Decision for the proposed improvements in 2007 and construction begins). Therefore, project-related emission estimates for the year 2005 were not subjected to the conformity evaluation.

The draft 8-hour O_3 attainment demonstration SIP also includes Rate of Progress-based regional emission target levels for the years 2008 and 2009. The proposed action or alternatives would included emissions during these years. Therefore, project-related emission estimates for the year 2008 and 2009 were carried forward for informational purposes.

Greatest Annual Project-Related Emissions. As shown, the greatest total direct and indirect project-related emissions would occur in the year 2010. Coincidentally, this is the CAA-mandated attainment year for both the 8-hour O_3 and $PM_{2.5}$ NAAQS.

Table 3-13 summarizes the years and levels of project-related emissions meeting the requirements of the GCR. It should be noted that the project alternatives vary by scenario and by pollutant precursor. These combinations of years and emissions reflect the levels of project-related emissions that would occur in (1) the CAA-mandated attainment years for the 1-hour and 8-hour O_3 NAAQS, (2) the year in which the SIP contains an emissions budget and the project would affect local and/or regional air quality conditions, and (3) the years in which the greatest *project-related* emissions of VOC and NO_x are estimated to occur with the realignment of Fort Belvoir. The greatest annual project-related emissions of VOCs and NO_x (409.7 and 264.3 tons, respectively) would occur in the year 2010. These levels of emissions are the greatest total project-related direct and indirect emissions estimated to occur over the planning horizon, regardless of year or alternative.

Table 3-13
Annual Project-related Emission Levels Subject to Conformity Determination

		Annual Emissions (tons per year]	
	Year	**Nitrogen Oxides (NO_x)**	**Volatile Organic Compounds (VOCs)**
Act-mandated attainment year (O_3 and $PM_{2.5}$)	2010	364	224
Regional emission budgets	2008	347	203
	2009	321	207
Greatest annual project-related emissions	2010	364	224

The current SIP emission estimates are expressed in tons of VOC and NO_x emitted on a *summer weekday*. States use summer weekday emissions to assess regional emissions of VOCs and NO_x,

precursor emissions to the air pollutant O_3, because the O_3 NAAQS are generally exceeded during O_3 season weekdays when the precursor emissions are greatest and meteorological conditions are more conducive to O_3 formation. For comparing the Fort Belvoir-related emission estimates to the MWCOG-prepared regional inventories, the source emissions were converted from tons per year to tons per summer weekday. They are shown in Table 3-14.

Table 3-14
Daily Project-related Emission Levels Subject to Conformity Determination

		Annual Emissions (tons per day]	
	Year	**Nitrogen Oxides (NO_x)**	**Volatile Organic Compounds (VOC)**
Act-mandated attainment year (O_3 and $PM_{2.5}$)	2010	1.58	0.98
Regional emission budgets	2008	1.39	0.80
	2009	1.40	0.90
Greatest annual project-related emissions	2010	1.58	0.98

3.3.2 Comparison Project-Related Emissions to SIP-Based Inventories

This section outlines a comparison of the project-related emissions with the regional emissions of like pollutants. As previously stated, the GCR state that when projects are within O_3 non-attainment areas and project-related emissions of VOCs and NO_x exceed the applicability thresholds, one of the criteria for determining conformity is that the emissions from the project/action are specifically identified and accounted for in the SIP. As also stated, EPA recognizes that emissions associated with BRAC programs are not specifically identified or accounted for in SIPs (USEPA and FAA 2002).

3.3.2.1 The State Implementation Plan

The CAA, as amended in 1990, mandates that state agencies adopt SIPs that target the elimination or reduction of the severity and number of violations of the NAAQS. SIPs set forth policies to expeditiously achieve and maintain attainment of the NAAQS. Currently, the region has no applicable SIP for the 8-hour O_3 or the $PM_{2.5}$ NAAQS. The SIP revisions to address non-attainment conditions with respect to the new 8-hour O_3 and $PM_{2.5}$ NAAQS are being developed and are expected to be approved by EPA by 2008 and 2009, respectively.

Because monitored levels of O_3 in the Washington, D.C., Metropolitan Area exceeded the 1-hour NAAQS, the Commonwealth of Virginia, State of Maryland, and Washington, D.C., were required to develop SIPs that outline the actions that would be taken to achieve the 1-hour NAAQS before 2007. The current SIP presents the regional air quality plan for attaining the federal 1-hour NAAQS for ground-level O_3 developed by the Metropolitan Washington Air Quality Committee (MWAQC) for the Washington, D.C., multi-jurisdictional non-attainment area. MWAQC was established in accordance with Section 174 of the CAA by the governors of Maryland and Virginia and the mayor of the District of Columbia to prepare a regionally coordinated air quality plan to comply with these requirements. On June 13, 2005, EPA approved the *State Implementation Plan—Plan to Improve Air Quality in the Washington, DC-MD-VA*

Region (MWCOG 2004). The plan predicted that the 1-hour O_3 NAAQS would be attained by 2005. In addition, a draft SIP for the 8-hour ozone standard was recently developed (MWAQC 2006). Although not finalized or approved by the region or EPA, information developed for the draft SIP was carried forward for informational purposes.

Following requirements of the CAA, the MWCOG and VDEQ prepared a 1990 base year emissions inventory for the Washington non-attainment area. The inventory serves as the base year by which attainment plans were prepared for the 1-hour O_3 NAAQS. The base year 1990 emissions inventory was also used by the VDEQ, along with growth and control factors, to project year 2005 emission estimates. The general categories of sources included in the MWCOG's inventory are point, area, nonroad, and on-road. General descriptions of these categories are outlined below, and the regional emission inventories for the categories are shown on Table 3-15 and 3-16.

- ***Point Sources.*** Point sources are stationary, commercial, or industrial operations that emit more than 10 tons per year (tons/yr) of VOCs, or 100 tons/yr or more of NO_x or carbon monoxide. The point source inventory within the SIP consists of actual emissions sources within the geographical area of the Washington DC-MD-VA non-attainment area.

- ***Area Sources.*** Area sources are sources of emissions that are too small to be inventoried individually and collectively contribute significant emissions. Area sources include smaller stationary point sources not included in the states' point source inventories, such

Table 3-15
Regional NO_x Emission Inventory

	Controlled Emissions (tons/d)		
Source Category	**1-Hour Attainment Year (2005)**	**8-Hour Rate-of-progress Year (2008)**	**8-Hour Attainment Year (2009)**
Point	109	229	123
Area	60	27	27
Nonroad	82	77	75
On-road	234	160	147
Total	487	493	372

Source: MWCOG 2004, MWAQC 2006.

Table 3-16
Regional VOC Emission Inventory

	Controlled Emissions (tons/d)		
Source Category	**1-Hour Attainment Year (2005)**	**8-Hour Rate-of-progress Year (2008)**	**8-Hour Attainment Year (2009)**
Point	16	14	14
Area	147	192	192
Nonroad	68	92	88
On-road	97	71	67
Total	325	369	362

Source: MWCOG 2004, MWAQC 2006.

as printing establishments, dry cleaners, and auto refinishing companies, as well as non-stationary sources.

- ***Nonroad Vehicle and Engine Sources.*** Nonroad sources include a wide variety of categories, including industrial, lawn and garden, construction, recreational, and farm equipment. Within the SIP, emissions from this category were obtained from a 1991 EPA contractor's report titled "Non-Road Engine and Vehicle Emission Inventories for Carbon Monoxide and O_3 Non-attainment Boundaries, Washington, D.C. MSA." This group of sources is of primary interest because heavy construction vehicles are the primary source of emissions due to the Proposed Action and Alternatives.

- ***On-road Mobile Sources.*** In the SIP, emissions from on-road mobile sources were derived from the use of the MWCOG travel demand forecasting procedure, which simulates vehicle travel across the region's transportation system. Travel was simulated on all highways in the region, including both volume and speed of travel for each hour of the day. Input for this simulation included locally specific information such as age distribution of registered vehicles, evaporation characteristics of motor fuel, and temperature data.

3.3.2.2 Milestone Budget Years

The year 2005 was the last milestone year with an emission budget with respect to attaining the 1-hour O_3 NAAQS. In 2005 there were no project-related emissions. The earliest that the proposed action or alternatives would affect local or regional air quality conditions is the year 2007 (assuming that the U.S. Army issues a Record of Decision for the proposed improvements in 2007 and construction begins). Therefore, project-related activities are not subjected to the conformity evaluation for the year 2005 milestone budget year.

The draft 8-hour O_3 attainment demonstration SIP also includes Rate of Progress-based regional emission target levels for the years 2008 and 2009. The proposed action or alternatives would included emissions during these years. Therefore, project-related emission estimates for the year 2008 and 2009 were evaluated.

To evaluate whether the level of year 2008 and 2009 project-related construction emissions could be considered included within the regional estimates for this type of activity, the project-related construction emissions were compared with the total emissions for the non-attainment area (Table 3-17). As shown, when comparing the project-related construction emissions of VOC and NO_x with the 2008 and 2009 draft emissions for the non-attainment area, project-related emissions would represent a small percentage of the like regional emissions, respectively. Notably, the regional inventory for nonroad sources was used for the NO_x comparison because of the overwhelming contribution of these sources to the project-related NO_x emissions. In addition, the regional inventory for area sources was used for the VOC comparison because of the overwhelming contribution of architectural coatings and paving off-gasses to the project-related emissions of VOCs.

Because the project-related construction emission estimates represent a relatively small percentage of the regional projection, it is reasonable to assume that the project-related construction emissions can be accounted for in the inventories for the draft 8-hour O_3 attainment demonstration SIP (40 CFR 93.158(a)(5); USEPA and FAA 2002; VDEQ 2007).

Table 3-17
Comparison of 2008 and 2009 Project-related Emissions to SIP-based Inventories

Pollutant	SIP regional emission inventory (tons/summer weekday)	Project-related non-road emissions (tons/summer weekday)	Percent of regional emissions
Draft 8-hour SIP (2008)			
Nitrogen oxides (NO_X)	75.0[a]	1.39	1.9%
Volatile organic compounds (VOCs)	192.5[b]	0.80	0.4%
Draft 8-hour SIP (2009)			
Nitrogen oxides (NO_X)	76.9[c]	1.40	1.8%
Volatile organic compounds (VOCs)	191.8[d]	0.90	0.4%

Source: MWCOG, 2006

[a] Reflects 2008 nonroad controlled NOx emissions inventory

[b] Reflect 2008 area controlled VOC emissions inventory

[c] Reflects 2009 nonroad controlled NOx emissions inventory

[d] Reflect 2009 area controlled VOC emissions inventory

3.3.2.3 Act-mandated Attainment Year and Greatest Annual Project-related Emissions (2010)

This section of the documentation discusses the evaluation of project-related emissions that would occur in the act-mandated attainment year for both the 8-hour O_3 and $PM_{2.5}$ NAAQS, and the year when the greatest annual project-related emissions are expected (2010). Project-related emissions from construction activities and from the operation of motor vehicles within the defined study area were evaluated.

The draft 8-hour SIP does not contain a regional emission projection for the 2010 attainment year. Consequently, it is not possible to compare project-related year 2010 emission estimates with regional estimates for the same years. To be conservative and to provide an indication of the magnitude of project-related emissions beyond the attainment year with respect to emission levels in the 1-hour O_3 and the draft 8-hour attainment demonstration SIP, the 2010 project-related emissions were compared with the regional projections previously presented for the year 2005 and 2009 respectively.

Construction. At the time that EPA prepared VDEQ's 1990 estimates of emissions from construction-related activities for the non-attainment area, VDEQ or MWCOG would not have had an estimate of construction-related equipment emissions for the 2005 BRAC action at Fort Belvoir. Furthermore, because of the methodology used by MWAQC to calculate the regional emissions from this type of source, it can be said that no individual projects were considered. Therefore, the inventories prepared in support of the attainment demonstration for the 1-hour O_3 or the 8-hour NAAQS do not specifically identify construction-related emissions for any of the alternatives under consideration.

To evaluate whether the level of year 2010 project-related construction emissions could be considered included within the regional estimates for this type of activity, the project-related construction emissions were compared with the total emissions for the non-attainment area (Table 3-18). As shown, when comparing the project-related construction emissions of VOC and NO_x with the emissions inventories for the non-attainment area, project-related emissions would represent a small percentage of the like regional emissions. Notably, the regional inventory for nonroad sources was used for the NO_x comparison because of the overwhelming contribution of these sources to the project-related NO_x emissions. In addition, the regional inventory for area sources was used for the VOC comparison because of the overwhelming contribution of architectural coatings and paving off-gasses to the project-related emissions of VOCs.

Table 3-18
Comparison of 2010 Project-related Emissions to SIP-based Inventories

Pollutant	SIP regional emission inventory (tons/summer weekday)	Project-related non-road emissions (tons/summer weekday)	Percent of regional emissions
Approved 1-hour SIP (2005)			
Nitrogen oxides (NO_x)	82.8[a]	1.58	1.9%
Volatile organic compounds (VOCs)	147.3[b]	0.98	0.7%
Draft 8-hour SIP (2009)			
Nitrogen oxides (NO_x)	76.9[c]	1.58	2.1%
Volatile organic compounds (VOCs)	191.8[d]	0.98	0.5%

Source: MWCOG 2004a and MWAQC 2006

[a] Reflects 2005 nonroad controlled NOx emissions inventory

[b] Reflect 2005 area controlled VOC emissions inventory

[c] Reflects 2009 nonroad controlled NOx emissions inventory

[d] Reflect 2009 area controlled VOC emissions inventory

Because the project-related construction emission estimates represent a relatively small percentage of the regional projection, it is reasonable to assume that the project-related construction emissions can be accounted for in the inventories for the 1-hour O_3 attainment demonstration SIP (40 CFR 93.158(a)(5); USEPA and FAA 2002; VDEQ 2007).

On-road Vehicle Emissions. The realignment of Fort Belvoir would decrease both the number of vehicles and subsequently the total vehicle miles traveled within the region. In turn, regional motor vehicle emissions would decrease. This decrease would be primarily because of a net reduction of approximately 1,700 personnel leaving Fort Belvoir to locations outside the region. Although overall additional personnel at Fort Belvoir is expected to increase, the new personnel and the miles they currently commute are already with in the NCR. In addition, many of the new personnel are expected to either relocated to or be replaced by individuals living in areas outside, primarily south of, the region. These BRAC-related reductions in emissions would constitute an ongoing net benefit to the region's air quality. Therefore, although there is an SIP-based regional budget for motor vehicles, it was unnecessary to perform a direct comparison.

3.3.3 Consistency with Requirements and Milestones in Applicable SIP

The GCR state that notwithstanding the other requirements of the rules, a proposed action or alternatives may not be determined to conform unless the total of direct and indirect emissions from the action is in compliance or consistent with all relevant requirements and milestones in the applicable SIP (40 CFR 93.158(c) and 9 VAC 5-160-160(c)). This requirement includes but is not limited to such issues as reasonable further progress schedules, assumptions specified in the attainment or maintenance demonstration, prohibitions, numerical emission limits, and work practice standards. This section briefly addresses how the Proposed Action and Alternatives were assessed for SIP consistency for this evaluation.

EPA and VDEQ have already promulgated, and will continue to promulgate, numerous requirements to support the goals of the CAA with respect to the NAAQS. Typically, these requirements take the form of rules regulating emissions from significant new sources, including emission standards for major stationary point sources and classes of mobile sources as well as permitting requirements for new major stationary point sources. Because states have the primary responsibility for implementing and enforcing requirements under the CAA and can impose stricter limitations than EPA, the EPA requirements often serve as guidance to the states in formulating their air quality management strategies.

In operating Fort Belvoir, the U.S. Army already observes, and will continue to act in accordance with a myriad of rules and regulations implemented and enforced by federal, state, regional, and local agencies to protect and enhance ambient air quality in the Metropolitan Washington Region. The U.S. Army will continue to act in accordance with all existing applicable air quality regulatory requirements for activities over which it has direct control and will meet in a timely manner all regulatory requirements that become applicable in the future. Likewise, the U.S. Army actively encourages all tenants and users of its facilities to comply with applicable air quality requirements.

3.4 SUMMARY

Within areas designed non-attainment or maintenance for any of the NAAQS, the CAA requires that federal agencies ensure that their actions conform to SIPs. The requirements for determining conformity to SIPs are detailed in Title 40, Chapter I, Subchapter C, Part 51 of the Code of Federal Regulations (40 CFR Part 51).

In accordance with Section 176 of the CAA, in consultation with VDEQ, the U.S. Army has assessed whether the pollutant and pollutant precursor emissions that would result from the U.S. Army's actions with respect to the proposed realignment at Fort Belvoir are in conformance with the Virginia SIP.

The emission estimates for the GCD were prepared

- Using the latest planning assumptions
- Using the latest and most accurate emission estimation techniques
- Based on the applicable air quality models, databases, and other requirements specified in the most recent version of EPA's *Guideline on Air Quality Models,* including supplements.

On the basis of the results of the evaluation, the total direct and indirect project-related emissions of NO_x, VOCs, $PM_{2.5}$, and SO_2 and were determined to be

- Below the applicability thresholds *or*
- Accounted for in the emission projections incorporated into the 1-hour O_3 attainment demonstration SIP (the applicable SIP) *or*
- Reasonably accounted for in established emission totals and/or excess regional emission estimates

For these reasons, the U.S. Army has determined that the emissions associated with the Proposed Action and Alternatives conform to the CAA.

3.5 REPORTING REQUIREMENTS/FREQUENCY OF DETERMINATIONS

Following the requirements of the GCR, federal agencies must make public their draft and final conformity determinations by placing a notice in a daily newspaper of general circulation in the area affected by the action and by providing 30 days to obtain any written public comments prior to taking any formal action on the determinations. Also required are responses to all comments received on the Draft GCD. The federal agency must make these responses available within 30 days of the agency's final conformity determination.

It is the intent of the U.S. Army to publish a notice of the availability of this Draft GCD and the Final GCD in the *Washington Post, Springfield Times, Mt. Vernon Gazette, Mt. Vernon Voice, and Belvoir Eagle*.

This Draft GCD is being published as an appendix to the DEIS. The DEIS provides a detailed evaluation of the affect of the realignment at Fort Belvoir on air quality. The U.S. Army intends to publish the Final GCD as an appendix to the Final EIS.

The conformity status of a federal action automatically lapses after a period of 5 years (from the date a final conformity determination is reported) unless the federal action has been completed or a continuous program has been commenced to implement the federal action within a reasonable time. Furthermore, if, after the final conformity determination is made, the federal action is changed so that there is an increase in the total direct and indirect emissions from the action, above the applicability threshold levels, a new conformity determination is required.

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ACRONYMS AND ABBREVIATIONS

AAFES	Army and Air Force Exchange Service
ACP	access control point
AKO	Army Knowledge Online
AMC	Army Materiel Command
AR	Army Regulation
AT/FP	Antiterrorism/ Force Protection
BRAC	Base Realignment and Closure
BRDEC	Belvoir Research and Development Engineering Center
CAA	Clean Air Act
CFR	Code of Federal Regulations
CID	Criminal Investigations Command
DEIS	Draft Environmental Impact Statement
DGCD	Draft General Conformity Determination
DOE	Department of Energy
EPA	U.S. Environmental Protection Agency
EPG	Engineer Proving Ground
FTA	Federal Transit Authority
FWHA	Federal Highway Administration
FY	fiscal year
GCR	General Conformity Rules
GSA	General Services Administration
GSF	gross square feet
HEC	Humphreys Engineering Center
HVAC	heating, ventilation, and air conditioning
LRC	long-range component
MDA HQCC	Missile Defense Agency Headquarters Command Center
MDW	Military District of Washington
MedCom	U.S. Army Medical Command
MGMC	Malcolm Grow Medical Center
MN	map number
MWAQC	Metropolitan Washington Air Quality Committee
MWCOG	Metropolitan Washington Council of Governments
MWR	Army and Air Force Morale, Welfare, and Recreation
NAAQS	National Ambient Air Quality Standards
NBC	nuclear, biological, and chemical
NCR	National Capital Region
NGA	National Geospatial-Intelligence Agency
NNMC	National Naval Medical Center
NO_x	nitrogen oxides
NPS	National Park Service
NSF	net square feet
NSR	New Source Review
O_3	ozone
PCS	Permanent Change of Station
PDA	Physical Disability Agency
PEO EIS	Program Executive Office Enterprise Information Systems
PM DCATS	Project Manager Defense Communications and Army Transmission Systems
PM_{10}	particulate matter less than 10 microns in diameter

$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PX	post exchange
RFI	request for information
ROD	Record of Decision
RPA	Resource Protection Area
RPMP	real property master plan
RV	recreational vehicle
SA	Secretary of the Army
SCIF	sensitive compartmented information facility
SIP	State Implementation Plan
SO_2	sulfur dioxide
TBO	total build- out
TIP	Transportation Improvement Plan
U.S.C.	United States Code
USASAC	Secretary Assistance Command
USEPA	U.S. Environmental Protection Agency
VAC	Virginia Administrative Code
VDEQ	Virginia Department of Environmental Quality
VOC	volatile organic compounds
WHS	Washington Headquarters Services
WRAMC	Walter Reed Army Medical Center
WWII	World War II

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Attachment 1
Emission Calculations

Table A1-1
Nonroad Heavy Equipment Emissions

Project	NO_x (tons)	VOC (tons)	$PM_{2.5}$ (tons)	SO_2 (tons)
Family Travel Camp, Clearing and Grading	0.99	0.09	0.07	0.15
MDA (2007), Building Construction	3.85	0.36	0.23	0.55
MDA, Clearing and Grading	0.15	0.01	0.01	0.02
NGA Admin (EPG), Clearing and Grading	14.79	1.27	1.05	2.24
PEO EIS Administrative Facility - Parking Garage, Building Construction	37.27	3.50	2.25	5.30
PEO EIS Administrative Facility, Building Construction	37.27	3.50	2.25	5.30
PEO EIS Administrative Facility, Clearing and Grading	1.77	0.15	0.13	0.27
Secure Admin Facility (EPG) (WHS), Clearing and Grading	16.76	1.44	1.19	2.54
EPG Infrastructure (EPG) (2008), Building Construction	0.98	0.09	0.06	0.15
EPG Infrastructure (EPG), Clearing and Grading	5.60	0.36	0.37	0.89
Family Travel Camp, Building Construction	1.77	0.16	0.11	0.27
Gunston Road Improvements, Clearing and Grading	3.41	0.22	0.22	0.54
Gunston Road Improvements, Paving	5.07	0.33	0.34	0.80
Hospital (2008), Building Construction	30.74	2.82	1.89	4.64
Hospital, Clearing and Grading	10.92	0.71	0.72	1.74
MDA (2008), Building Construction	5.52	0.51	0.34	0.83
Network Enterprise Communications Facility (AKO), Building Construction	4.49	0.41	0.28	0.68
Network Enterprise Communications Facility (AKO), Clearing and Grading	0.73	0.05	0.05	0.12
Network Enterprise Communications Facility (AKO), Demolition	0.17	0.01	0.01	0.03
NGA Admin (EPG), Building Construction	64.20	5.89	3.95	9.68
NGA Admin (EPG), Building Construction	64.20	5.89	3.95	9.68
PEO EIS Administrative Facility, Landscaping	0.25	0.03	0.01	0.04
PEO EIS Administrative Facility, Paving	0.20	0.01	0.01	0.03
Secure Admin Facility (EPG) (WHS) (2008), Building Construction	117.78	10.81	7.25	17.76
Structured Parking Facility, 200 Area, Clearing and Grading	0.91	0.06	0.06	0.15
Structured Parking Facility, 200 Area, Demolition	0.04	0.00	0.00	0.01

Table A1-1
Nonroad Heavy Equipment Emissions *(continued)*

Project	NO_x (tons)	VOC (tons)	$PM_{2.5}$ (tons)	SO_2 (tons)
USANCA Support Facility, Building Construction	1.05	0.10	0.06	0.16
USANCA Support Facility, Clearing and Grading	0.10	0.01	0.01	0.02
Access Road/Control Point, Clearing and Grading	0.07	0.00	0.00	0.01
Access Road/Control Point, Paving	0.09	0.01	0.01	0.01
Emergency Services Center (EPG), Building Construction	1.29	0.12	0.08	0.21
Emergency Services Center (EPG), Clearing and Grading	0.04	0.00	0.00	0.01
EPG Infrastructure (EPG) , Paving	1.08	0.07	0.07	0.18
Family Travel Camp, Paving	0.16	0.01	0.01	0.03
Gunston Road Improvements, Landscaping	0.37	0.04	0.02	0.06
Hospital (2009), Building Construction	28.92	2.63	1.83	4.64
MDA, Landscaping	0.03	0.00	0.00	0.00
MDA, Paving	0.06	0.00	0.00	0.01
NARMC HQ Building, Building Construction	0.66	0.06	0.04	0.11
NARMC HQ Building, Clearing and Grading	0.06	0.00	0.00	0.01
NARMC HQ Building, Landscaping	0.01	0.00	0.00	0.00
NARMC HQ Building, Paving	0.02	0.00	0.00	0.00
Network Enterprise Communications Facility (AKO), Landscaping	0.02	0.00	0.00	0.00
Network Enterprise Communications Facility (AKO), Paving	0.28	0.02	0.02	0.05
Network Operations Center (part of PEO EIS), Building Construction	0.29	0.03	0.02	0.05
Network Operations Center (part of PEO EIS), Clearing and Grading	0.09	0.01	0.01	0.02
NGA Admin (EPG), Building Construction	60.39	5.50	3.82	9.68
Secure Admin Facility (EPG) (WHS) (2009 Parking Garage), Building Construction	99.85	9.10	6.31	16.01
Secure Admin Facility (EPG) (WHS) (2009), Building Construction	110.79	10.09	7.00	17.77
Structured Parking Facility, 200 Area (2009), Building Construction	12.78	1.16	0.81	2.05
USANCA Support Facility, Landscaping	0.01	0.00	0.00	0.00
USANCA Support Facility, Paving	0.06	0.00	0.00	0.01
Admin Bldg, MEDCOM, Building Construction	0.56	0.05	0.04	0.09
Admin Bldg, MEDCOM, Clearing and Grading	0.04	0.00	0.00	0.01

Table A1-1
Nonroad Heavy Equipment Emissions *(continued)*

Project	NO_x (tons)	VOC (tons)	$PM_{2.5}$ (tons)	SO_2 (tons)
Administrative Facility (Bldgs 211, 215, 219, 220), Clearing and Grading	0.31	0.02	0.02	0.06
Administrative Facility (Bldgs 211, 215, 219, 220), Demolition	0.02	0.00	0.00	0.00
Administrative Facility (Bldgs 211, 215, 219, 220), Parking Garage	8.24	0.75	0.54	1.40
Child Dev Center – 244 (EPG), Building Construction	0.91	0.08	0.06	0.15
Child Dev Center – 244 (EPG), Clearing and Grading	0.32	0.02	0.02	0.06
Child Development Center (EPG), Building Construction	1.68	0.15	0.11	0.28
Child Development Center (EPG), Clearing and Grading	0.40	0.03	0.03	0.07
Dental Clinic, Building Construction	1.40	0.13	0.09	0.24
Dental Clinic, Clearing and Grading	0.08	0.00	0.01	0.01
Emergency Services Center (EPG), Paving	0.01	0.00	0.00	0.00
Family Travel Camp, Landscaping	0.08	0.01	0.00	0.01
Hospital (2010), Building Construction	27.29	2.48	1.78	4.64
Infrastructure Upgrades - Fort Belvoir, Building Construction	1.74	0.16	0.11	0.30
Infrastructure Upgrades - Fort Belvoir, Clearing and Grading	25.22	1.63	1.77	4.56
Infrastructure Upgrades - Fort Belvoir, Paving	9.56	0.61	0.67	1.71
Network Operations Center (part of PEO EIS), Landscaping	0.01	0.00	0.00	0.00
Network Operations Center (part of PEO EIS), Paving	0.03	0.00	0.00	0.01
NGA Admin (EPG) , Landscaping	0.68	0.08	0.04	0.12
NGA Admin (EPG) , Paving	0.18	0.01	0.01	0.03
NGA Admin (EPG), Building Construction	57.00	5.19	3.71	9.68
NGA Admin (EPG), Parking Structure, Building Construction	227.99	20.76	14.83	38.74
Secure Admin Facility (EPG) (WHS), Landscaping	0.81	0.10	0.05	0.14
Secure Admin Facility (EPG) (WHS), Paving	0.30	0.02	0.02	0.05
Structured Parking Facility, 200 Area (2010), Building Construction	2.97	0.27	0.19	0.51
Structured Parking Facility, 200 Area, Landscaping	0.03	0.00	0.00	0.01
Admin Bldg, MEDCOM, Landscaping	0.01	0.00	0.00	0.00
Admin Bldg, MEDCOM, Paving	0.01	0.00	0.00	0.00
Administrative Facility (Bldgs 211, 215, 219, 220), Landscaping	0.03	0.00	0.00	0.01

Table A1-1
Nonroad Heavy Equipment Emissions *(continued)*

Project	NO_x (tons)	VOC (tons)	$PM_{2.5}$ (tons)	SO_2 (tons)
Administrative Facility (Bldgs 211, 215, 219, 220), Paving	0.05	0.00	0.01	0.01
Child Dev Center – 244 (EPG), Landscaping	0.02	0.00	0.00	0.00
Child Dev Center – 244 (EPG), Paving	0.09	0.01	0.01	0.02
Child Development Center (EPG), Landscaping	0.02	0.00	0.00	0.00
Child Development Center (EPG), Paving	0.06	0.00	0.01	0.01
Dental Clinic , Landscaping	0.01	0.00	0.00	0.00
Dental Clinic , Paving	0.03	0.00	0.00	0.01
Hospital (2011 Parking Garage), Building Construction	85.77	8.27	7.57	15.47
Hospital , Landscaping	0.42	0.06	0.04	0.08
Hospital , Paving	0.27	0.02	0.03	0.05
Infrastructure Upgrades - Fort Belvoir, Clearing and Grading	30.99	2.09	2.89	5.97
Infrastructure Upgrades - Fort Belvoir, Landscaping	1.30	0.17	0.12	0.24
Infrastructure Upgrades - Fort Belvoir, Paving	8.71	0.58	0.81	1.65

Source: USEPA NONROAD2004; SQAQMD 1993.

Table A1-2
Worker Vehicle Emissions

Project	Trips Per Day	Duration (days)	VMT	EFNO$_x$ (g/mile)	NO$_x$ (tons)	EFVOC (g/mile)	VOC (tons)	EF PM$_{2.5}$ (g/mile)	PM$_{2.5}$ (tons)	EF SO$_2$ (g/mile)	SO$_2$ (tons]
Family Travel Camp, Clearing and Grading	2	170	10605	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
MDA (2007), Building Construction	37	151	169865	0.32	0.06	0.29	0.05	0.01	0.00	0.01	0.00
MDA, Clearing and Grading	3	19	1560	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
NGA Admin (EPG), Clearing and Grading	46	113	157765	0.32	0.05	0.29	0.05	0.01	0.00	0.01	0.00
PEO EIS Administrative Facility - Parking Garage, Building Construction	322	170	1644177	0.32	0.57	0.29	0.53	0.01	0.02	0.01	0.02
PEO EIS Administrative Facility, Building Construction	322	170	1644177	0.32	0.57	0.29	0.53	0.01	0.02	0.01	0.02
PEO EIS Administrative Facility, Clearing and Grading	17	38	18860	0.32	0.01	0.29	0.01	0.01	0.00	0.01	0.00
Secure Admin Facility (EPG) (WHS), Clearing and Grading	53	113	178771	0.32	0.06	0.29	0.06	0.01	0.00	0.01	0.00
EPG Infrastructure (EPG) (2008), Building Construction	18	85	45937	0.32	0.02	0.29	0.01	0.01	0.00	0.01	0.00
EPG Infrastructure (EPG), Clearing and Grading	23	85	57780	0.32	0.02	0.29	0.02	0.01	0.00	0.01	0.00

Table A1-2
Worker Vehicle Emissions *(continued)*

Project	Trips Per Day	Duration (days)	VMT	EFNO$_x$ (g/mile)	NO$_x$ (tons)	EFVOC (g/mile)	VOC (tons)	EF PM$_{2.5}$ (g/mile)	PM$_{2.5}$ (tons)	EF SO$_2$ (g/mile)	SO$_2$ (tons]
Family Travel Camp, Building Construction	12	230	82757	0.32	0.03	0.29	0.03	0.01	0.00	0.01	0.00
Gunston Road Improvements, Clearing and Grading	21	57	35157	0.32	0.01	0.29	0.01	0.01	0.00	0.01	0.00
Gunston Road Improvements, Paving	16	170	79902	0.32	0.03	0.29	0.03	0.01	0.00	0.01	0.00
Hospital (2008), Building Construction	209	230	1438733	0.32	0.50	0.29	0.46	0.01	0.02	0.01	0.01
Hospital, Clearing and Grading	33	113	112727	0.32	0.04	0.29	0.04	0.01	0.00	0.01	0.00
MDA (2008), Building Construction	37	230	258336	0.32	0.09	0.29	0.08	0.01	0.00	0.01	0.00
Network Enterprise Communications Facility (AKO), Building Construction	53	132	210085	0.32	0.07	0.29	0.07	0.01	0.00	0.01	0.00
Network Enterprise Communications Facility (AKO), Clearing and Grading	7	38	7538	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Network Enterprise Communications Facility (AKO), Demolition	1	57	1702	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
NGA Admin (EPG), Building Construction	435	230	3004398	0.32	1.04	0.29	0.96	0.01	0.04	0.01	0.03
NGA Admin (EPG), Building Construction	435	230	3004398	0.32	1.04	0.29	0.96	0.01	0.04	0.01	0.03
PEO EIS Administrative Facility, Landscaping	5	28	4377	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
PEO EIS Administrative Facility, Paving	4	28	3203	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Secure Admin Facility (EPG) (WHS) (2008), Building Construction	799	230	5511996	0.32	1.92	0.29	1.76	0.01	0.07	0.01	0.06

Table A1-2
Worker Vehicle Emissions *(continued)*

Project	Trips Per Day	Duration (days)	VMT	EFNO$_x$ (g/mile)	NO$_x$ (tons)	EFVOC (g/mile)	VOC (tons)	EF PM$_{2.5}$ (g/mile)	PM$_{2.5}$ (tons)	EF SO$_2$ (g/mile)	SO$_2$ (tons]
Structured Parking Facility, 200 Area, Clearing and Grading	3	113	9392	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Structured Parking Facility, 200 Area, Demolition	0	38	423	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
USANCA Support Facility, Building Construction	14	113	48999	0.32	0.02	0.29	0.02	0.01	0.00	0.01	0.00
USANCA Support Facility, Clearing and Grading	2	19	1038	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Access Road/Control Point, Building Construction	0	38	229	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Access Road/Control Point, Clearing and Grading	1	19	721	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Access Road/Control Point, Paving	1	38	1423	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Emergency Services Center (EPG), Building Construction	14	151	64353	0.32	0.02	0.29	0.02	0.01	0.00	0.01	0.00
Emergency Services Center (EPG), Clearing and Grading	1	19	456	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
EPG Infrastructure (EPG) , Paving	21	28	18037	0.32	0.01	0.29	0.01	0.01	0.00	0.01	0.00
Family Travel Camp, Paving	1	170	2664	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Gunston Road Improvements, Landscaping	4	57	6818	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Hospital (2009), Building Construction	209	230	1438733	0.32	0.50	0.29	0.46	0.01	0.02	0.01	0.01
MDA, Landscaping	1	28	509	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
MDA, Paving	1	28	1068	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00

Table A1-2
Worker Vehicle Emissions *(continued)*

Project	Trips Per Day	Duration (days)	VMT	EFNO$_x$ (g/mile)	NO$_x$ (tons)	EFVOC (g/mile)	VOC (tons)	EF PM$_{2.5}$ (g/mile)	PM$_{2.5}$ (tons)	EF SO$_2$ (g/mile)	SO$_2$ (tons]
NARMC HQ Building, Building Construction	6	170	33075	0.32	0.01	0.29	0.01	0.01	0.00	0.01	0.00
NARMC HQ Building, Clearing and Grading	1	19	649	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
NARMC HQ Building, Landscaping	0	19	117	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
NARMC HQ Building, Paving	1	19	356	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Network Enterprise Communications Facility (AKO), Landscaping	0	28	360	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Network Enterprise Communications Facility (AKO), Paving	6	28	4754	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Network Operations Center (part of PEO EIS), Building Construction	4	132	14292	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Network Operations Center (part of PEO EIS), Clearing and Grading	1	38	1038	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
NGA Admin (EPG), Building Construction	435	230	3004398	0.32	1.04	0.29	0.96	0.01	0.04	0.01	0.03
Secure Admin Facility (EPG) (WHS) (2009 Parking Garage), Building Construction	720	230	4968000	0.32	1.73	0.29	1.59	0.01	0.06	0.01	0.05
Secure Admin Facility (EPG) (WHS) (2009), Building Construction	799	230	5511996	0.32	1.92	0.29	1.76	0.01	0.07	0.01	0.06
Structured Parking Facility, 200 Area (2009), Building Construction	92	230	635904	0.32	0.22	0.29	0.20	0.01	0.01	0.01	0.01

Table A1-2
Worker Vehicle Emissions *(continued)*

Project	Trips Per Day	Duration (days)	VMT	EFNO$_x$ (g/mile)	NO$_x$ (tons)	EFVOC (g/mile)	VOC (tons)	EF PM$_{2.5}$ (g/mile)	PM$_{2.5}$ (tons)	EF SO$_2$ (g/mile)	SO$_2$ (tons]
USANCA Support Facility, Landscaping	0	28	196	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
USANCA Support Facility, Paving	1	28	1068	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Admin Bldg, MEDCOM, Building Construction	6	151	29400	0.32	0.01	0.29	0.01	0.01	0.00	0.01	0.00
Admin Bldg, MEDCOM, Clearing and Grading	1	19	440	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Administrative Facility (Bldgs 211, 215, 219, 220), Clearing and Grading	3	38	3592	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Administrative Facility (Bldgs 211, 215, 219, 220), Demolition	0	19	221	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Administrative Facility (Bldgs 211, 215, 219, 220), Parking Garage	96	151	434462	0.32	0.15	0.29	0.14	0.01	0.01	0.01	0.00
Child Dev Center – 244 (EPG), Building Construction	14	113	47995	0.32	0.02	0.29	0.02	0.01	0.00	0.01	0.00
Child Dev Center – 244 (EPG), Clearing and Grading	3	38	3717	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Child Development Center (EPG), Building Construction	17	170	88331	0.32	0.03	0.29	0.03	0.01	0.00	0.01	0.00
Child Development Center (EPG), Clearing and Grading	3	57	4710	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Dental Clinic, Building Construction	12	214	74044	0.32	0.03	0.29	0.02	0.01	0.00	0.01	0.00
Dental Clinic, Clearing and Grading	2	19	878	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Emergency Services Center (EPG), Paving	0	19	135	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Family Travel Camp, Landscaping	1	57	1466	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00

Table A1-2
Worker Vehicle Emissions *(continued)*

Project	Trips Per Day	Duration (days)	VMT	EFNO$_x$ (g/mile)	NO$_x$ (tons)	EFVOC (g/mile)	VOC (tons)	EF PM$_{2.5}$ (g/mile)	PM$_{2.5}$ (tons)	EF SO$_2$ (g/mile)	SO$_2$ (tons]
Hospital (2010), Building Construction	209	230	1438733	0.32	0.50	0.29	0.46	0.01	0.02	0.01	0.01
Infrastructure Upgrades - Fort Belvoir, Building Construction	18	170	91874	0.32	0.03	0.29	0.03	0.01	0.00	0.01	0.00
Infrastructure Upgrades - Fort Belvoir, Clearing and Grading	58	170	294734	0.32	0.10	0.29	0.09	0.01	0.00	0.01	0.00
Infrastructure Upgrades - Fort Belvoir, Paving	50	113	169488	0.32	0.06	0.29	0.05	0.01	0.00	0.01	0.00
Network Operations Center (part of PEO EIS), Landscaping	0	28	98	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Network Operations Center (part of PEO EIS), Paving	1	28	534	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
NGA Admin (EPG) , Landscaping	16	28	13214	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
NGA Admin (EPG) , Paving	4	28	3203	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
NGA Admin (EPG), Building Construction	435	230	3004398	0.32	1.04	0.29	0.96	0.01	0.04	0.01	0.03
NGA Admin (EPG), Parking Structure, Building Construction	1742	230	12017592	0.32	4.18	0.29	3.84	0.01	0.15	0.01	0.12
Secure Admin Facility (EPG) (WHS), Landscaping	19	28	15746	0.32	0.01	0.29	0.01	0.01	0.00	0.01	0.00

Table A1-2
Worker Vehicle Emissions *(continued)*

Project	Trips Per Day	Duration (days)	VMT	EFNO$_x$ (g/mile)	NO$_x$ (tons)	EFVOC (g/mile)	VOC (tons)	EF PM$_{2.5}$ (g/mile)	PM$_{2.5}$ (tons)	EF SO$_2$ (g/mile)	SO$_2$ (tons]
Secure Admin Facility (EPG) (WHS), Paving	6	28	5329	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Structured Parking Facility, 200 Area (2010), Building Construction	46	113	156798	0.32	0.05	0.29	0.05	0.01	0.00	0.01	0.00
Structured Parking Facility, 200 Area, Landscaping	1	19	626	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Admin Bldg, MEDCOM, Landscaping	0	19	117	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Admin Bldg, MEDCOM, Paving	0	19	147	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Administrative Facility (Bldgs 211, 215, 219, 220), Landscaping	1	28	651	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Administrative Facility (Bldgs 211, 215, 219, 220), Paving	1	28	1068	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Child Dev Center – 244 (EPG), Landscaping	0	28	383	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Child Dev Center – 244 (EPG), Paving	2	28	1830	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Child Development Center (EPG), Landscaping	1	28	470	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Child Development Center (EPG), Paving	1	28	1179	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Dental Clinic , Landscaping	0	28	313	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Dental Clinic , Paving	1	28	534	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Hospital (2011 Parking Garage), Building Construction	720	230	4968000	0.32	1.73	0.29	1.59	0.01	0.06	0.01	0.05
Hospital , Landscaping	11	28	9141	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00

Table A1-2
Worker Vehicle Emissions *(continued)*

Project	Trips Per Day	Duration (days)	VMT	EFNO$_x$ (g/mile)	NO$_x$ (tons)	EFVOC (g/mile)	VOC (tons)	EF PM$_{2.5}$ (g/mile)	PM$_{2.5}$ (tons)	EF SO$_2$ (g/mile)	SO$_2$ (tons]
Hospital , Paving	6	28	5329	0.32	0.00	0.29	0.00	0.01	0.00	0.01	0.00
Infrastructure Upgrades - Fort Belvoir, Clearing and Grading	58	230	398436	0.32	0.14	0.29	0.13	0.01	0.00	0.01	0.00
Infrastructure Upgrades - Fort Belvoir, Landscaping	12	76	28149	0.32	0.01	0.29	0.01	0.01	0.00	0.01	0.00
Infrastructure Upgrades - Fort Belvoir, Paving	50	113	169488	0.32	0.06	0.29	0.05	0.01	0.00	0.01	0.00

Sources: USEPA and FAA 2002; *MOBILE 6.2*; SQAQMD 1993.

Table A1-3
Architectural Coating Emissions

Project	Heated Area	Wall Surface	VOC (tons)
Expand and Renovate PX and Commissary, Building Construction	186300	372600	10.3
MDA (2007), Building Construction	52000	104000	2.9
PEO EIS Administrative Facility - Parking Garage, Building Construction	447400	894800	24.8
PEO EIS Administrative Facility, Building Construction	447400	894800	24.8
EPG Infrastructure (EPG) (2008), Building Construction	25000	50000	1.4
Family Travel Camp, Building Construction	16658	33316	0.9
Hospital (2008), Building Construction	289600	579200	16.1
MDA (2008), Building Construction	52000	104000	2.9
Network Enterprise Communications Facility (AKO), Building Construction	73500	147000	4.1
NGA Admin (EPG), Building Construction	604750	1209500	33.6
NGA Admin (EPG), Building Construction	604750	1209500	33.6
Secure Admin Facility (EPG) (WHS) (2008), Building Construction	1109500	2219000	61.6
USANCA Support Facility, Building Construction	20000	40000	1.1
Access Road/Control Point, Building Construction	280	560	0.0
Emergency Services Center (EPG), Building Construction	19700	39400	1.1
Hospital (2009), Building Construction	289600	579200	16.1
NARMC HQ Building, Building Construction	9000	18000	0.5
Network Operations Center (part of PEO EIS), Building Construction	5000	10000	0.3
NGA Admin (EPG), Building Construction	604750	1209500	33.6
Secure Admin Facility (EPG) (WHS) (2009 Parking Garage), Building Construction	1000000	2000000	55.5
Secure Admin Facility (EPG) (WHS) (2009), Building Construction	1109500	2219000	61.6
Structured Parking Facility, 200 Area (2009), Building Construction	128000	256000	7.1
Admin Bldg, MEDCOM, Building Construction	9000	18000	0.5
Administrative Facility (Bldgs 211, 215, 219, 220), Parking Garage	133000	266000	7.4
Child Dev Center – 244 (EPG), Building Construction	19590	39180	1.1
Child Development Center (EPG), Building Construction	24036	48072	1.3
Dental Clinic, Building Construction	16000	32000	0.9
Hospital (2010), Building Construction	289600	579200	16.1

Table A1-3
Architectural Coating Emissions *(continued)*

Project	Heated Area	Wall Surface	VOC (tons)
Infrastructure Upgrades - Fort Belvoir, Building Construction	25000	50000	1.4
NGA Admin (EPG), Building Construction	604750	1209500	33.6
NGA Admin (EPG), Parking Structure, Building Construction	2419000	4838000	134.3
Structured Parking Facility, 200 Area (2010), Building Construction	64000	128000	3.6
Hospital (2011 Parking Garage), Building Construction	1000000	2000000	55.5

Source: SQAQMD 1993.

Table A1-4
Paving Off-gas Emissions

Project	Paved Area (Acres)	EFVOC (lbs/acre)	VOC (tons)
Gunston Road Improvements, Paving	12.52	2.62	0.016
PEO EIS Administrative Facility, Paving	3.01	2.62	0.004
Access Road/Control Point, Paving	1	2.62	0.001
EPG Infrastructure (EPG) , Paving	16.96	2.62	0.022
Family Travel Camp, Paving	0.42	2.62	0.001
MDA, Paving	1	2.62	0.001
NARMC HQ Building, Paving	0.5	2.62	0.001
Network Enterprise Communications Facility (AKO), Paving	4.47	2.62	0.006
USANCA Support Facility, Paving	1	2.62	0.001
Emergency Services Center (EPG), Paving	0.19	2.62	0.000
Infrastructure Upgrades - Fort Belvoir, Paving	39.85	2.62	0.052
Network Operations Center (part of PEO EIS), Paving	0.5	2.62	0.001
NGA Admin (EPG) , Paving	3.01	2.62	0.004
Secure Admin Facility (EPG) (WHS), Paving	5.01	2.62	0.007
Admin Bldg, MEDCOM, Paving	0.21	2.62	0.000
Administrative Facility (Bldgs 211, 215, 219, 220), Paving	1	2.62	0.001
Child Dev Center – 244 (EPG), Paving	1.72	2.62	0.002
Child Development Center (EPG), Paving	1.11	2.62	0.002
Dental Clinic , Paving	0.5	2.62	0.001
Hospital , Paving	5.01	2.62	0.007
Infrastructure Upgrades - Fort Belvoir, Paving	39.85	2.62	0.052

Source: SQAQMD 1993.

Table A1-5
Fugitive Particle Emissions

Project	PM10/TSP	$PM_{2.5}/PM_{10}$	EF TSP (lb/ac/d)	Capture Fraction	Duration of Grading (days)	Cleared Area (acres)	$PM_{2.5}$ (tons)
Family Travel Camp, Clearing and Grading	0.45	0.15	80	0.5	170.14	1.66	0.04
MDA, Clearing and Grading	0.45	0.15	80	0.5	18.9	2.2	0.01
NGA Admin (EPG), Clearing and Grading	0.45	0.15	80	0.5	113.42	37.09	0.57
PEO EIS Administrative Facility, Clearing and Grading	0.45	0.15	80	0.5	37.81	13.3	0.07
Secure Admin Facility (EPG) (WHS), Clearing and Grading	0.45	0.15	80	0.5	113.42	42.03	0.64
EPG Infrastructure (EPG), Clearing and Grading	0.45	0.15	80	0.5	85.07	18.11	0.21
Gunston Road Improvements, Clearing and Grading	0.45	0.15	80	0.5	56.71	16.53	0.13
Hospital, Clearing and Grading	0.45	0.15	80	0.5	113.42	26.5	0.41
Network Enterprise Communications Facility (AKO), Clearing and Grading	0.45	0.15	80	0.5	37.81	5.32	0.03
Network Enterprise Communications Facility (AKO), Demolition	0.45	0.15	80	0.5	56.71	0.8	0.01
Structured Parking Facility, 200 Area, Clearing and Grading	0.45	0.15	80	0.5	113.42	2.21	0.03
Structured Parking Facility, 200 Area, Demolition	0.45	0.15	80	0.5	37.81	0.3	0.00
USANCA Support Facility, Clearing and Grading	0.45	0.15	80	0.5	18.9	1.46	0.00
Access Road/Control Point, Clearing and Grading	0.45	0.15	80	0.5	18.9	1.02	0.00
Emergency Services Center (EPG), Clearing and Grading	0.45	0.15	80	0.5	18.9	0.64	0.00
NARMC HQ Building, Clearing and Grading	0.45	0.15	80	0.5	18.9	0.92	0.00

Table A1-5
Fugitive Particle Emissions *(continued)*

Project	PM10/TSP	$PM_{2.5}$/ PM_{10}	EF TSP (lb/ac/d)	Capture Fraction	Duration of Grading (days)	Cleared Area (acres)	$PM_{2.5}$ (tons)
Network Operations Center (part of PEO EIS), Clearing and Grading	0.45	0.15	80	0.5	37.81	0.73	0.00
Admin Bldg, MEDCOM, Clearing and Grading	0.45	0.15	80	0.5	18.9	0.62	0.00
Administrative Facility (Bldgs 211, 215, 219, 220), Clearing and Grading	0.45	0.15	80	0.5	37.81	2.53	0.01
Administrative Facility (Bldgs 211, 215, 219, 220), Demolition	0.45	0.15	80	0.5	18.9	0.31	0.00
Child Dev Center – 244 (EPG), Clearing and Grading	0.45	0.15	80	0.5	37.81	2.62	0.01
Child Development Center (EPG), Clearing and Grading	0.45	0.15	80	0.5	56.71	2.21	0.02
Dental Clinic, Clearing and Grading	0.45	0.15	80	0.5	18.9	1.24	0.00
Infrastructure Upgrades - Fort Belvoir, Clearing and Grading	0.45	0.15	80	0.5	170.14	46.2	1.06
Infrastructure Upgrades - Fort Belvoir, Clearing and Grading	0.45	0.15	80	0.5	230	46.2	1.43
Total Fugitive Dust Emissions							4.86

Sources: AP-42 Section 13.2.3; USEPA 2005c.

Table A1-6
Emissions from Small Heating and Cooling Activities

Project Name	Heated Area	Fuel Used (cubic feet)	NO_x	VOC	$PM_{2.5}$	SO_2
Access Road/Control Point, Operations	280	26796	0.0013	0.0001	0.0001	0
EPG Infrastructure (EPG) (2008), Operations	25000	2392500	0.1196	0.0066	0.0091	0.0007
MDA (2007), Operations	104000	3036800	0.1518	0.0084	0.0115	0.0009
NARMC HQ Building, Operations	9000	861300	0.0431	0.0024	0.0033	0.0003
NARMC HQ Building, Operations	39825	3811252.5	0.1906	0.0105	0.0145	0.0011
Network Enterprise Communications Facility (AKO), Operations	73500	2528400	0.1264	0.007	0.0096	0.0008
Network Enterprise Communications Facility (AKO), Operations	73500	2528400	0.1264	0.007	0.0096	0.0008
USANCA Support Facility, Operations	20000	1914000	0.0957	0.0053	0.0073	0.0006
Dental Clinic, Operations	16000	1531200	0.0766	0.0042	0.0058	0.0005

Table A1-6
Emissions from Small Heating and Cooling Activities *(continued)*

Project Name	Heated Area	Fuel Used (cubic feet)	NOx	VOC	PM2.5	SO2
Family Travel Camp, Operations	16658	1594170.5	0.0797	0.0044	0.0061	0.0005
Network Operations Center (part of PEO EIS), Operations	5000	478500	0.0239	0.0013	0.0018	0.0001
Admin Bldg, MEDCOM, Operation	9000	861300	0.0431	0.0024	0.0033	0.0003
Administrative Facility (Bldgs 211, 215, 219, 220), Operations	133600	3901120	0.1951	0.0107	0.0148	0.0012
Child Dev Center – 244 (EPG), Operations	19590	1874763	0.0937	0.0052	0.0071	0.0006
Child Development Center (EPG), Operations	24036	2300245.25	0.115	0.0063	0.0087	0.0007

Sources: AP-42 Section 1.4; DOE 1999.

Table A1-7
Employee Vehicle Emissions

Project Name	Number of Employees	Average Commute[a]	$EFNO_x$ (tons)	NO_x (tons)	EFVOC (tons)	VOC (tons)	EF $PM_{2.5}$ (tons)	$PM_{2.5}$ (tons)	EF SO_2 (tons)	SO_2 (tons)
PEO EIS, Commuters	480	-3	0.31	-0.24	0.31	-0.25	0.01	-0.01	0.01	-0.01
Realigned Away From Belvoir, Commuters	-1769	14	0.31	-4.2	0.31	-4.3	0.01	-0.15	0.01	-0.13
NGA , Commuters	8500	-3	0.31	-4.32	0.31	-4.43	0.01	-0.16	0.01	-0.14
MDA, Commuters	292	-3	0.31	-0.15	0.31	-0.15	0.01	-0.01	0.01	0
WHS , Commuters	9263	-3	0.31	-4.71	0.31	-4.82	0.01	-0.17	0.01	-0.15
MEDCOM , Commuters	2069	-3	0.31	-1.05	0.31	-1.08	0.01	-0.04	0.01	-0.03
Army Lease , Commuters	2720	-3	0.31	-1.38	0.31	-1.42	0.01	-0.05	0.01	-0.04

Sources: USEPA and FAA 2002, *MOBILE6.2*.
[a] Represents the net change in commuting distance due to the action.