
ENVIRONMENTAL ASSESSMENT

The South Post Child Development Center Fort Belvoir, Virginia



Department of the Army
US Army Garrison Fort Belvoir, Virginia

October 2009



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Draft Finding of No Significant Impact

The South Post Child Development Center
US Army Garrison Fort Belvoir
Directorate of Public Works
Fort Belvoir, Virginia

Name of Action: Construction and Operation of the South Post Child Development Center (CDC)

Description of the Proposed Action: Under the proposed action, the Army would construct and operate a CDC on the South Post of Fort Belvoir. The CDC would be a one story, 38,000-square foot building, with several rooms for children, office and reception areas, and space for various support functions. The Army examined two possible locations for the CDC, identified as the Pence Gate site and the 21st Street site. The Pence Gate site is located on Taylor Road near US Route 1. The 21st Street site is located along Caples Road near the T-17 Area. The Army also evaluated a No Action alternative. However, the No Action alternative would not provide the necessary additional child care services at Fort Belvoir.

Environmental Consequences: The Environmental Assessment (EA) identified and evaluated the following potential impacts and possible mitigation strategies:

Land Use, Plans, and Coastal Zone Management: The proposed action at either site would change current land uses. A ball field located at the Pence Gate site would not be replaced elsewhere on-Post. Some parking areas at the 21st Street site would be replaced nearby, but the thrift store and Boy Scouts of America and Girls Scouts of the USA meeting space would be discontinued on-Post. A CDC at either site would be consistent with current land use patterns, the Fort Belvoir Real Property Master Plan, and the Virginia Coastal Resources Management Program.

Natural Resources: The EA concluded there would be minimal impacts for topography, soil integrity, migratory birds, surface water, water quality, flood plains, waters of the US including wetlands and Chesapeake Bay Resource Protection Areas.

Small forested areas located at the Pence Gate site would be impacted by the proposed action. The 21st Street site would experience less of an impact, because it is in a less natural condition.

Habitat for Special Status species, Northern Virginia Well Amphipod, has been found adjacent to the 21st Street site and may be located near the Pence Gate site. If either site is chosen, Fort Belvoir would take steps to protect seeps and recharge areas for Northern Virginia Well Amphipod and supporting habitat. No other Special Status species would be affected by the proposed action at either site.

The Army would mitigate natural resource impacts by maximizing retention and protection of existing trees and native vegetation; planting trees at a 2:1 ratio to replace those of 4-inch diameter or greater; planting native wetland plants in storm drainage areas to promote water quality; adhere to standards per the Virginia Stormwater Management Program or Northern Virginia Best Management Practices handbook for new development; and adhering to the Fort Belvoir Invasive and Exotic Vegetation Management Plan.

Petroleum and Hazardous Substances: One underground storage tank (UST) previously located at the Pence Gate site has been removed and the surrounding area was remediated. Three USTs are currently located at the 21st Street site, and this area was previously a firing range. If the 21st Street site is chosen,

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the Army would comply with requirements to clean up the site to levels appropriate for a CDC. Any contamination encountered during construction would be remediated to applicable standards. Operation of construction equipment would result in a short-term increase in the use of hazardous materials and generation of hazardous wastes.

Air Quality: The proposed action would not have a significant impact on air quality, or trigger a General Conformity Analysis, at either site. Minor cumulative air impacts from construction would be mitigated by applying the restrictions outlined in the Construction Performance Plan for the Reduction of Air Emissions for Implementation of 2005 Base Realignment and Closure.

Cultural Resources: The Army would adhere to the recommendations of the Woodlawn Historic Viewshed Study to avoid adverse impacts to historic resources at the Pence Gate site.

Noise: The Army would mitigate the short-term construction noise at either site by limiting construction to weekday business hours, and by using construction equipment mufflers. Noise from the operation of the CDC is expected to be negligible.

Community Facilities and Services: Constructing the CDC at the Pence Gate site would require the removal of a ball field. This ball field would not be replaced on-Post. Constructing the CDC at the 21st Street site would require the demolition of building used for a thrift store and a Boy Scouts of America and Girls Scouts of the USA meeting area; these former site uses would be discontinued on-Post.

The EA concluded there would be minimal impacts for socioeconomic, infrastructure, utilities, traffic and transportation.

Summary of Environmental Impacts: The proposed action would not have significant impacts to human health or the environment. No significant cumulative impacts or indirect impacts are anticipated.

Conclusions: On reviewing the Environmental Assessment and other project information, the Garrison Commander at Fort Belvoir has concluded that the proposed action would not have significant impacts on the environment. Therefore, an Environmental Impact Statement is not needed.

Notice of Availability: The Environmental Assessment is available for public review at the Directorate of Public Works and Van Noy Library, Fort Belvoir, Virginia; and at John Marshall, Lorton, Sherwood, Kingstowne and Fairfax City Regional branches of the Fairfax County Public Libraries. A copy of this notice and the Environmental Assessment can be viewed at www.belvoir.army.mil.

Interested parties are invited to submit written comments for consideration on or before 30 days after publication date to Commander, U.S. Army Garrison Fort Belvoir, 9430 Jackson Loop, Suite 100, ATTN: IMNE-BEL-PW, Fort Belvoir, VA 22060-5116 or e-mail comments to environmental-fb-dpw@conus.army.mil. For more information, contact Mr. Patrick McLaughlin, Chief of Environmental and Natural Resource Division, Directorate of Public Works, at (703) 806-4007.

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ENVIRONMENTAL ASSESSMENT

THE SOUTH POST CHILD DEVELOPMENT CENTER

US Army Garrison Fort Belvoir, Virginia

October 2009

Reviewed by:



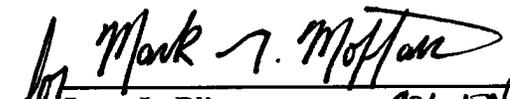
**Patrick M. McLaughlin
Chief, Environmental Natural Resource Division**

Recommended for Approval:



**Bill Saunders
Director, Public Works**

Approved by:



**Jerry L. Blixt
Colonel, US Army
Commanding**

**COL, EN
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Acronym	Definition
APE	Area of Potential Effect
AQCR	Air Quality Control Region
AR	Army Regulation
AST	Above Ground Storage Tank
BMPs	Best Management Practices
BRAC	Base Realignment and Closure
CCTV	Closed Circuit Television
CDC	Child Development Center
CDP	Census Designated Place
CFR	Code of Federal Regulations
CIS	Capital Improvements Strategy
CO	Carbon Monoxide
CRMP	Coastal Resources Management Program
CZMARA	Coastal Zone Management Act Reauthorization Amendment
dB	decibel
DBA	A-weighted decibel
DNL	Day-Night Level
DoD	Department of Defense
DPW	Department of Public Works
EA	Environmental Assessment
EIS	Environmental Impact Statement
ENRD	Environmental and Natural Resources Division
EO	Executive Order
EPG	Engineer Proving Ground
FEIS	Final Environmental Impact Statement
FMWR	Directorate of Family, Morale, Welfare, and Recreation
GCR	General Conformity Rules
GIS	Geographic Information System
HOV	High Occupancy Vehicle
I-95	Interstate 95
IDG	Installation Design Guide
L _{eq}	Equivalent Sound Level
LEED	Leadership in Energy and Environmental Design
LRC	Long Range Component
MP	Military Police
MS4	Municipal Separate Storm Sewer System
NAAQS	National Ambient Air Quality Standards
NAEYC	National Association for the Education of Young Children
NCPC	National Capital Planning Commission
NCR	National Capital Region
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NMUSA	National Museum of the US Army
NO _x	Nitrous Oxides
NR	National Register (of Historic Places)
NRCS	National Resource Conservation Service

Acronym	Definition
NSA	Noise Sensitive Area
O ₃	Ozone
PA PCB PIF PM _{2.5} PM ₁₀ PX	Programmatic Agreement Poly-Chlorinated Biphenyl Partners in Flight Fine Particulate Matter Particulate Matter Post Exchange
RCRA RMA ROD RONA RPA RPMP	Resource Conservation and Recovery Act Resource Management Area Record of Decision Record of Non-Applicability Resource Protection Area Real Property Master Plan
SIP SO ₂ SRC SWPPP	State Implementation Plan Sulfur Dioxide Short Range Component Stormwater Pollution Prevention Plan
USACE USC USFWS USGS USEPA UST	US Army Corps of Engineers US Code US Fish and Wildlife Service US Geological Survey US Environmental Protection Agency Underground Storage Tank
VDCR VDEQ VDGIF VDHR VOC VPH VSMP	Virginia Department of Conservation and Recreation Virginia Department of Environmental Quality Virginia Department of Game and Inland Fisheries Virginia Department of Historic Resources Volatile Organic Compounds Vehicles Per Hour Virginia Stormwater Management Program
WHS	Washington Headquarters Service

1 INTRODUCTION

Fort Belvoir's Directorate of Family and Morale, Welfare and Recreation (FMWR) proposes to build a Child Development Center (CDC) at US Army Garrison Fort Belvoir, Virginia (see Figure 1-1, *Location of Fort Belvoir*). The CDC would serve both military and civilian personnel living and / or working on the South Post of Fort Belvoir (the portion of the Post located to the south of US Route 1). There are already two CDCs present on Fort Belvoir, and two more are planned, one on the North Post (the portion of the Post located adjacent north of US Route 1), and one at the Fort Belvoir North Area (located west of Interstate 95 and formerly called the Engineer Proving Ground). However, the projected increase in the military and non-military resident and workforce populations as a result of the 2005 Base Realignment and Closure (BRAC) Act will create the need for an additional child care facility on the South Post.

Two sites, both located on the South Post, are being considered as potential locations for the new CDC (Figure 1-2, *Alternative Sites for the New Child Development Center on Fort Belvoir*):

- A site on Taylor/Washington Road, near the Pence Gate and adjacent to the Fort Belvoir Community Hospital. This site is referred to as "the Pence Gate site."
- A site located at Caples Road, where 21st Street crosses Gunston Road. This site is referred to as "the 21st Street site."

The potential impacts of the CDC's construction and operation ("the proposed action") at either site are addressed in this EA. If the Pence Gate site is chosen for the proposed action, it will preclude the use of that site for the National Museum of the United States Army (NMUSA). The Army is currently preparing a revised Environmental Assessment (EA) for the construction and operation of the NMUSA, based on a Draft EA for the NMUSA released in October 2008.

1.1 What is the purpose of this document?

This EA will compare the environmental impacts of the proposed action to the impacts and implications of the "no action" ("do nothing") alternative in order to:

- Assist the Fort Belvoir Garrison Commander with his decision on whether or not to construct the CDC.
- Assist in the siting decision, should the Garrison Commander decide to construct the CDC.
- Document the Garrison Commander's decision process.

- Inform the public of the Army's proposed plan, and provide them with the opportunity to comment on the project.
- Comply with the requirements of the National Environmental Policy Act (NEPA) of 1969. Fort Belvoir is preparing this EA to publicly document the environmental consequences of the proposed action. This EA has been prepared pursuant to the Council on Environmental Quality regulations in 40 Code of Federal Regulations (CFR) Part 1500-1508, and 32 CFR Part 651, Army Regulation 200-2, *Environmental Effects of Army Actions*.

The National Environmental Policy Act (NEPA)

NEPA requires the consideration of environmental issues in federal agency planning and decision-making. An EA is meant to be a concise public document that provides the basis for determining whether or not to prepare an *Environmental Impact Statement* (EIS). The EA should address the need for the proposed action; the reasonable alternatives, the environmental impacts of the proposed action and the alternatives, and a listing of agencies and persons consulted.

The EA results in either a *Finding of No Significant Impact* or a *Notice of Intent* to prepare an EIS. If the Garrison Commander determines that the proposed action might have a significant impact on the quality of the human environment, then he will direct his staff to prepare an EIS.

1.2 In what ways will the public be involved?

In keeping with established Army policy regarding an open decision-making process, this EA and resulting decision document (in the form of a Finding of No Significant Impact, a Notice of Intent to prepare an EIS, or a memorandum documenting a decision to take no action) will be made available to agencies and the general public for review and comment. A Notice of Availability will be published in the applicable local newspapers and copies of the EA made available to the general public at local libraries and a public review website.

Location of Fort Belvoir



Fort Belvoir

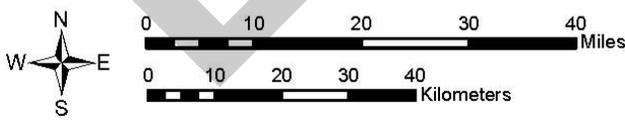
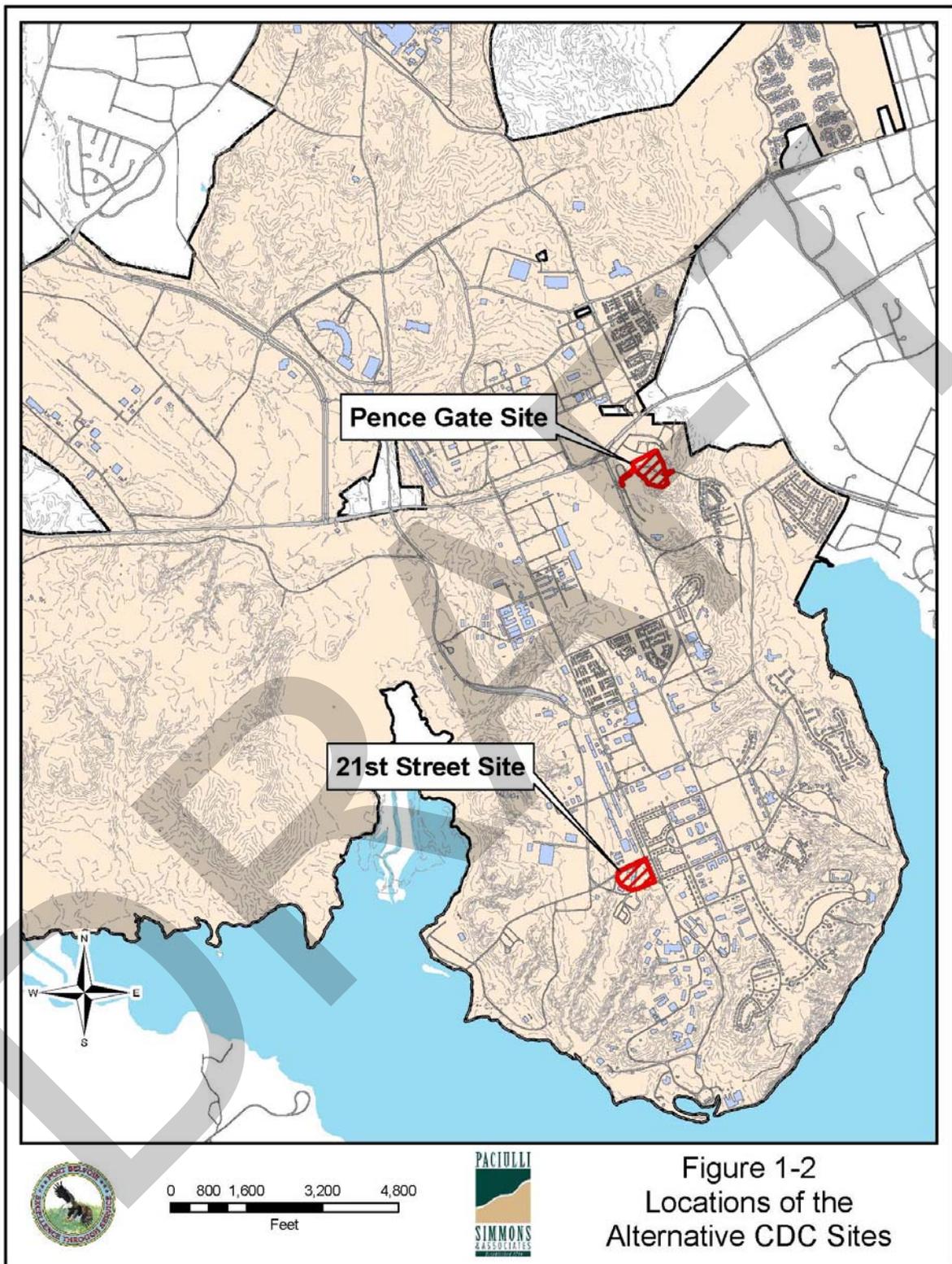


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2 PURPOSE AND NEED FOR THE PROJECT

2.1 What is the purpose of the proposed action?

The purpose of the proposed action is to provide a new, large-capacity (338 children) child development center (CDC) at Fort Belvoir for children between six weeks and five years of age. The CDC would be available to both resident and non-resident military and civilian workers at Fort Belvoir. The CDC would be constructed and operated in accordance with established Army standards, and would be comparable to – and provide the same services as – a civilian daycare center. The design would provide safe and age-appropriate indoor and outdoor activity spaces, and would provide staff with visual control of the entire building and outdoor areas.

Army Standards for Child Development Centers

Army Standards mandate the components, functional capabilities and relationships, and features and characteristics of the facility. The Army Standards for Child Development Centers for children 6 weeks – 5 years of age are based on Army Baseline Standards, Department of Defense (DoD) requirements for certification, and the National Association for the Education of Young Children requirements for accreditation.

2.2 Why does the Army need the Child Development Center?

The Army needs a CDC to meet the rising demands for child care resulting from Fort Belvoir's expanding workforce population. This expansion was documented in August 2007 in the Final Environmental Impact Statement (FEIS) and Record of Decision for *Implementation of the 2005 Base Realignment and Closure (BRAC) Recommendations and Related Army Actions at Fort Belvoir, Virginia*. Those documents indicated that the 2005 workforce of approximately 22,300 would expand by an additional 19,000 people.

Since that time, a major component of the BRAC 2005 realignment (BRAC 133) has been redirected to a new location on Seminary Road in Alexandria, VA (Fort Belvoir BRAC EIS Website, May 2009). The BRAC 133 accounts for 6,200 of the 19,000 workers being realigned to Fort Belvoir.

BRAC 133

BRAC 133 would realign approximately 6,200 personnel in miscellaneous DoD agencies and field activities (including Washington Headquarters Services [WHS]) that are currently located in leased facilities within the National Capital Region (NCR).

Approximately 5,600 personnel (45 percent military and 55 percent civilian) will be assigned to the South Post; the remaining 7200 will be assigned to the North Area. The current military and civilian resident and workforce populations on the South Post and their families generate a need for 718 CDC spaces. Existing or other proposed CDCs can accommodate 737 children, so there will be a surplus of 19 openings as the realigned personnel move or start working on the South Post. Using standard DoD planning formulas, the planners at Fort Belvoir have estimated a need for an additional 330 to 340 openings – far more than the 19 surplus openings available (Fort Belvoir Family and Morale, Welfare and Recreation [FMWR] 2009).

DoD Planning Formulas

Military personnel x 0.15 = # children requiring a CDC

Civilian and contractor personnel x 0.025 = # children requiring a CDC

The Army requires childcare facilities that are geared specifically to the needs of the military. The Army and all DoD agencies support the readiness of its members by reducing the conflict between military mission requirements and parental responsibilities. Several factors unique to military life affect the needs of military parents:

- Military families tend to be separated from grandparents and other extended family members that often provide child care support in non-military living situations.
 - Because military members are predominantly young, military families tend to have large infant and toddler populations, requiring care specific to those age groups.
 - Military personnel often have jobs requiring them to work extended or unusual hours. Therefore, they need a variety of short and long-term childcare program options. Childcare services are often required 10-12 hours a day, and on evenings and weekends.
-

3 DESCRIPTION OF THE PROPOSED ACTION & ALTERNATIVES

3.1 What would the CDC include?

Figures 3.1-1 and 3.1-2 show the conceptual plans for the CDC. The CDC would consist of a one story, 38,000-gross square foot cinder block or similar construction building, and would include:

- Twelve rooms for infants, pre-toddlers, and toddlers.
- Nine rooms for pre-school-, pre-kindergarten-, and kindergarten-age children.
- Two active play rooms.
- Office and reception areas.
- A kitchen.
- A staff lounge.
- An outreach/transition care room.
- A mechanical room.
- Small laundry, video, and electricity control rooms.
- Closets and storage spaces.

The project would also include 2.4 acres of paved parking (for 124 concurrent staff members and 84 patrons), sidewalks, and internal roadways. For safety reasons, the parking lot would connect directly to the front entrance by a sidewalk that does not cross traffic lanes. A pick-up and drop-off area would be provided at curbside, with a sidewalk that connects directly to the CDC building to avoid crossing traffic lanes.

Parking Allocation

1 space for every 2 staff members
1 space for every 4 patrons

3.2 Is the Army considering any alternative sites for the CDC?

Yes. The Army is evaluating two sites, both located on the South Post (Figure 1-2, Potential Sites for the New Child Development Center). Pence Gate is the preferred site. The other site is at Caples Road, located farther south on the Post.

The Pence Gate site is preferred because of its proximity to the Fort Belvoir Community Hospital, the primary expected user of the CDC. The site is easily accessible from US Route 1 and Belvoir Road, and is therefore very convenient to a large part of the Fort Belvoir worker population.

The Pence Gate site consists of a central plateau located between two steep-sided stream valleys. The site was formerly part of the Gray's Hill Village military housing area, and has therefore already been disturbed by past development. All portions of the housing area have been removed; current improvements on the Pence Gate site include Taylor/Washington Road, a baseball field, two dugouts, two bleachers, a shed and a concessions building. The CDC would be constructed in a relatively flat area to minimize cut-and-fill requirements, and avoid the steep slopes and environmentally-sensitive stream valleys. Approximately 8 acres would be required for the building, outdoor play areas, parking, roadways, and sidewalks.

There are several constraints on construction at this site. No buildings can be constructed on a 50-foot wide sanitary sewer easement which crosses the northern third of the site. For the safety of aircraft at the nearby Davison Army Airfield, building height at the Taylor Road site is restricted to 213 above mean sea level. The site is also near the Woodlawn Historic District. Due to viewshed concerns, no building on this site may exceed 50 feet in height.

The 21st Street site is more developed than the Pence Gate site. It is located within an area of South Post formerly used for supply and storage, and still characterized by warehouses and an old rail bed. The 21st Street site is also located near the residential areas east of Gunston Road between 21st and 18th Streets. The site presently includes a large warehouse building, a smaller building, and parking lots. While a reasonable alternative, the site is not ideally located – it is farther away from the area of the South Post where the Fort Belvoir Community Hospital, the North Atlantic Regional Medical Center Headquarters building, a Dental Clinic building, and the Army Corps of Engineers Project Integration Offices will be constructed as part of the 2005 BRAC action (US Army Corps of Engineers, Mobile District, August 2007).

3.3 Are other site designs being considered?

The designer would have limited flexibility in site design. The proposed CDC must follow the draft Army Standards for Child Development Centers (large size), and therefore must be a one story building, constructed of concrete or other non-combustible material, with the specified number of classrooms, indoor and outdoor play areas, office space and kitchen, etc. The building cannot exceed one story, to enable caretakers to evacuate the children quickly and easily in case of fire or other emergency. Only the Assistant Chief of Staff for Installation Management has the authority to approve exceptions to the Army Standard.

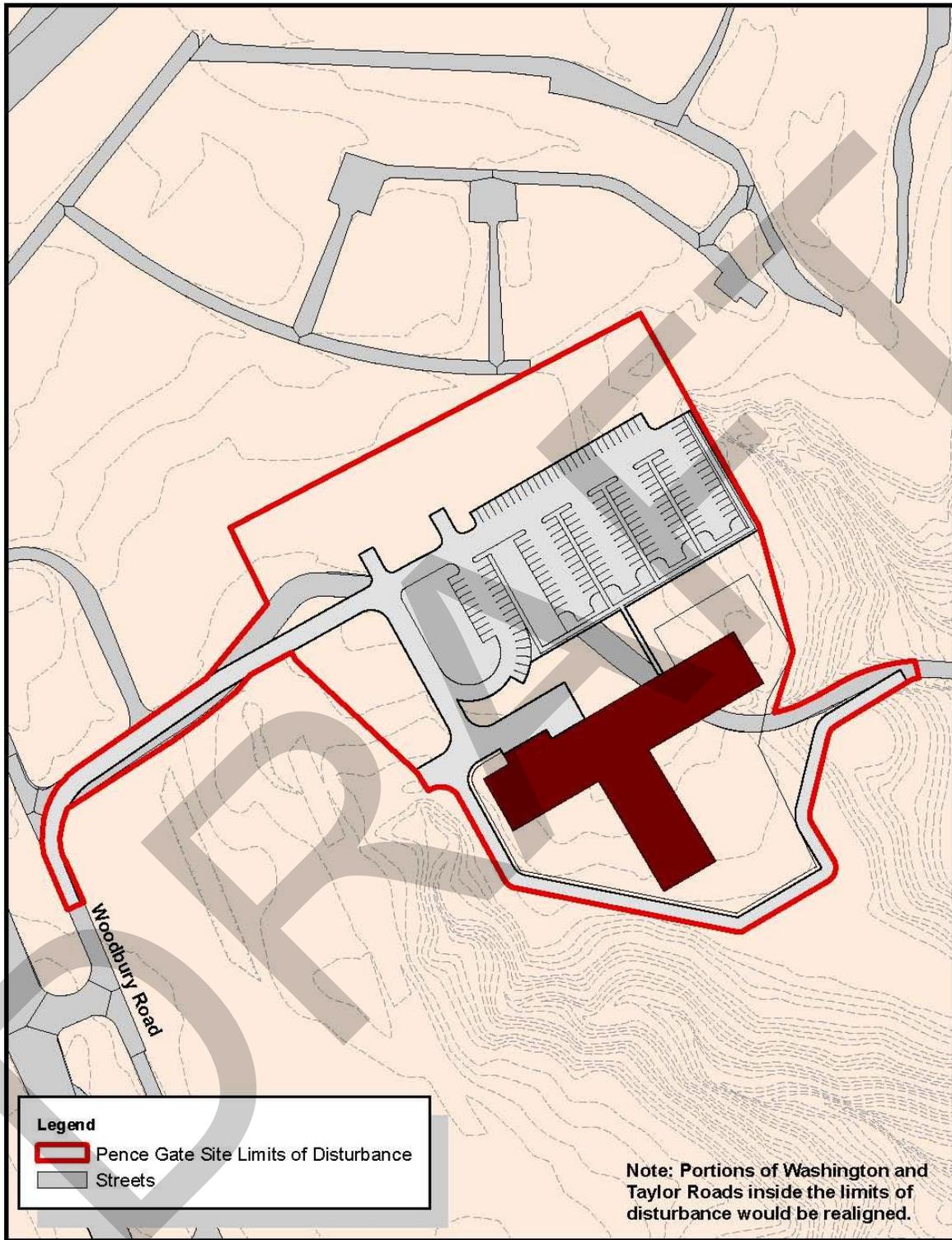
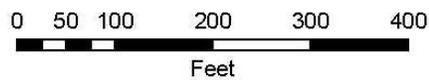


Figure 3.1-1: CDC Conceptual Layout for the Pence Gate Site



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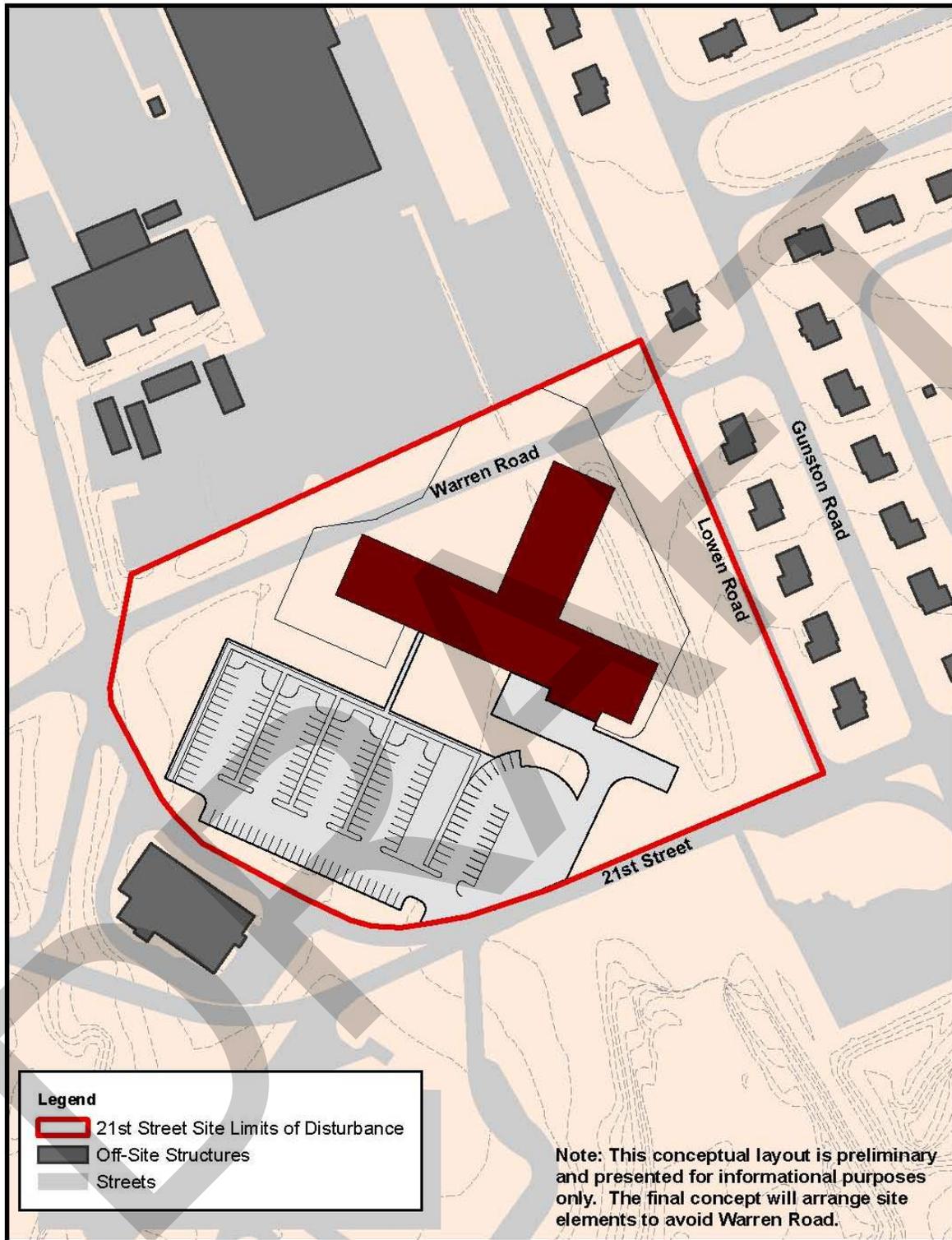
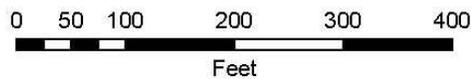


Figure 3.1-2: CDC Conceptual Layout for the 21st Street Site



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3.4 Why not expand one or more of the childcare facilities presently located on Fort Belvoir?

There is one CDC already located on the South Post, at 5952 12th Street, about midway between the two alternative sites being considered for the proposed CDC. There is also a CDC located on the North Post at 5925 Meeres Road. The DoD, Army, and recognized industry standards (e.g., the National Association for the Education of Young Children [NAEYC]) require a certain amount of classroom, indoor and outdoor play space, and parking area based on the number of children being served. The indoor space must be provided in a one-story facility. The Army would therefore need to double the size of an existing CDC, including both indoor and outdoor components, to accommodate the anticipated number of children.

Expansion of either the 12th Street CDC or the Meeres Road CDC is not considered a reasonable alternative. There is not enough space at the 12th Street location to essentially double the size of the existing CDC. The Meeres Road location is not convenient to the South Post resident or workforce populations that the proposed CDC is meant to serve. Patrons would have to cross US Route 1 to drop off and pick up their children, adding to traffic issues on US Route 1. Also, the available space for expansion at the Meeres Road CDC consists of forest and a stream valley – the environmental impacts of expanding the Meeres Road CDC would be greater than either of the two proposed alternatives, where land has already been disturbed by development.

3.5 What does the Army need to do to construct the CDC?

Building the CDC at the Pence Gate site would require demolition of the baseball field and a section of Taylor Road. Building the CDC at the 21st Street site would require demolition of a warehouse; a second, smaller building; Caples Road; and a small parking lot. Because the 21st Street alternative would require space used for parking and storage to the north of Warren Road, the Army would need to evaluate the parking and storage needs of nearby tenants to create a reconfiguration or replacement plan for these areas based on final design impacts to the area.

At either site, the proposed action would include:

- Clearing and grading.
- Sanitary sewer and potable water hook-ups.
- Installation of communications and cable systems.
- Installation of curbs, gutters, storm sewers, stormwater detention facilities, and other stormwater

management measures.

- Asphalt paving for roadways, sidewalks, and parking spaces, as indicated in Subchapter 3.1.
- Landscaping around the building and the playground area.
- Installation of Closed Circuit Television (CCTV) to provide for complete classroom visual monitoring.
- Installation of security lighting and signage.

3.6 What would be required to operate the CDC?

FMWR anticipates employing a workforce of approximately 130-150 people, including teachers, teaching assistants, administrative personnel, building and grounds caretakers, and housekeeping. No more than 124 staff members are expected to be on-site at any one time.

3.7 When would the CDC be built, and how long would it take?

At either site, construction of the CDC would begin in fiscal year 2010, and would take approximately 16 months.

3.8 Did environmental factors affect your selection of the site or design for the CDC?

Yes. Important reasons for choosing the currently-proposed alternative sites include the fact that both sites have been developed – re-use of these sites would have a smaller environmental impact than building on undisturbed land. Both sites have sufficient space to construct a CDC without encroaching on surface waters, riparian areas, Chesapeake Bay Resource Protection Areas (RPAs), or archeological sites.

3.9 Why do we consider a No Action alternative?

We evaluate a No Action alternative to create a baseline for comparing the effects of the proposed action alternatives. The No Action alternative does not satisfy the intended purpose and need of providing a CDC and is not considered a reasonable alternative.

4 ENVIRONMENTAL IMPACTS: A COMPARISON OF THE ALTERNATIVES

The proposed action would have environmental impacts, regardless of which site is selected. These impacts are addressed in the following sections, along with the expected environmental impacts of the No Action alternative.

4.1 Land Use, Plans, and Coastal Zone Management

4.1.1 What is the study area for this analysis?

The study area for this analysis is Fort Belvoir and the adjacent Fairfax County neighborhoods. The scope and nature of the proposed action is likely to have limited impacts on land uses beyond the limits of the alternative project sites, as discussed below.

4.1.2 What are the current land uses in the study area?

Fort Belvoir is approximately 8,640 acres in size; approximately 70 percent of this land is undeveloped. The post is divided into five areas: North Post, South Post, the Southwest Area, the Davison Army Airfield, and the Fort Belvoir North Area (formerly called the Engineer Proving Ground). The North and South Posts are separated by US Route 1, which bisects the post and is a major transportation corridor in this part of Virginia. The North and South Posts contain most of the development at Fort Belvoir.

Both the Pence Gate site and the 21st Street site are located on the South Post. The South Post is the location of the garrison headquarters and associated functions, including many administrative offices, warehouses, 11 housing areas, the new Fort Belvoir Community Hospital, and the proposed Warrior in Transition Unit complex (US Army Corps of Engineers, Baltimore District, October 2008).

4.1.3 What are the current uses at and next to the two alternative sites?

The Pence Gate site (Figure 1-2), located near the northeastern corner of the South Post, includes a little league ball field used by local residents. There are also a small building, a shed, two dugouts, and roadways from the former Gray's Hill Village - a military housing area that was demolished in the 1960s

(US Army Corps of Engineers, Baltimore District, October 2008). The remaining portions of the Pence Gate site are mowed fields and forest.

The Pence Gate site is located adjacent to the National Register-eligible Woodlawn Historic District. In accordance with a National Historic Preservation Act Programmatic Agreement for the BRAC action at Fort Belvoir (BRAC PA), Fort Belvoir is developing a historic viewshed study for the Woodlawn Historic District. The viewshed study has established a building height limit of 50 feet for the Pence Gate site to avoid adverse effects to the viewshed of the Woodlawn Historic District. Additional information on the Woodlawn Historic District is provided in Subchapter 4.6 of this EA.

Federal facilities such as Fort Belvoir are not bound by the Fairfax County Comprehensive Plan or zoning regulations. However, the Army does strive to ensure that its actions are compatible with county planning restrictions to the greatest extent practicable. In compliance with Section 106 of the National Historic Preservation Act (NHPA), the Army must take into account the effects of its actions on historic properties, including effects to historic viewsheds. An evaluation of this project under Section 106 is addressed in Subchapter 4.6 of this EA.

Viewsheds

A *viewshed* is defined as the area visible from a fixed vantage point. Viewsheds tend to be areas of particular scenic or historic value that are deemed worthy of preservation against development or other change. Development of a property that is not listed on (or eligible for) the National Register of Historic Places can still cause a significant effect if it is visible from a listed or eligible property.

The Pence Gate site is located 1.7 miles east of the Davison Army Airfield, inside an area that must be kept free of obstructions for the safety of aircraft. Given the distance from the airfield and the site topography, the maximum height of a building at the Pence Gate site could be 150 feet, which is more than sufficient for a child development facility (*US Army Corps of Engineers, Baltimore District, October 2008*; and *US Army Corps of Engineers, Mobile District, August 2007*).

The 21st Street site is a developed site located farther south on South Post (Figure 1-2). It is bounded by 21st Street to the south and west, a parking area to the north, and Lowen Road to the east. Caples Road crosses the site from north to south. The site is currently improved with a thrift store, a Boy Scouts of America and Girls Scouts of the USA (Boy Scouts / Girl Scouts) meeting building, a covered picnic area,

and two parking areas. Housing is the dominant neighboring land use to the east. Industrial buildings lie to the north and west. To the south across 21st Street are construction staging areas separated by forested areas. The height restrictions created by the airfield also apply to the 21st Street site. However, the maximum allowed height is more than sufficient for the CDC.

4.1.4 What comprehensive plan currently guides land use decisions at Fort Belvoir?

The Army recently updated the Fort Belvoir Real Property Master Plan – Long Range Component (RPMP-LRC) to comply with Army requirements (AR 210-20) that mandate new land use categories and the update of installation master plans as circumstances require. The requirement for an updated RPMP-LRC was triggered when the 2005 Defense Base Realignment and Closure (BRAC) Commission recommendations became law on November 9, 2005. Those recommendations included moving several Army agencies and their personnel to Fort Belvoir. The Final Environmental Impact Statement for the *Implementation of the 2005 Base Realignment and Closure Recommendations and Related Army Actions at Fort Belvoir* addressed the adoption of the land use categories mandated in AR 210-20 as well as the BRAC realignments (*US Army Corps of Engineers, Baltimore District*, October 2008; *US Army Corps of Engineers, Mobile District*, August 2007). The BRAC-related changes to the RPMP-LRC designate the Pence Gate site as proposed for community use, abutting a large area designated for professional/institutional uses. The BRAC-related changes designate the 21st Street site as industrial, abutting areas designated as residential (to the east) and community (to the south).

The Army continues to revise the RPMP-LRC through the AR 210-20 process to address future land uses at the garrison, beyond those immediate changes needed to accommodate the BRAC 2005 actions.

4.1.5 What other land use planning standards or restrictions apply?

Federal actions in the National Capital Region must be reviewed by the National Capital Planning Commission (NCPC) and must be consistent to the maximum extent practicable with the enforceable policies of the applicable state's Coastal Zone Management Program.

The **National Capital Planning Commission** (NCPC) is the central planning agency for the federal government in the National Capital Region, which includes the District and several counties in Maryland and Northern Virginia. NCPC prepares the *Federal Elements of the Comprehensive Plan for the National Capital*. One element of the Comprehensive Plan, *Federal Workplace: Location, Impact, and the*

Community, lists policies for building and development codes, energy efficiency, working environment, and physical security. Policies applicable to the proposed action include:

- Using innovative energy conserving techniques such as High Performance and Sustainable Building, Low Impact Building, Leadership in Energy and Environmental Design (LEED) strategies and requirements of the Energy Policy Act of 2005 (*EPACT*, 2005).
- Planning employee support through child-care among other considerations (*NCPC*, June 2009).

Sustainability Strategies

High Performance/Sustainable Building – buildings that reduce the lifetime operational cost of a building by increasing water and energy efficiency, providing healthy indoor environments, and using construction materials in a sustainable manner.

Low Impact Development – land planning, design practices, and technologies that conserve and protect natural resources and reduce infrastructure needs. This allows land to be developed in a more cost effective manner that mitigates environmental impacts.

Leadership in Energy and Environmental Design (LEED) - LEED is a certification program for building design, construction, and operation. LEED promotes sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

Federal Policies – several federal laws require the use of sustainable building practices. These include the Energy Policy Act of 2005, the Energy Independence and Security Act of 2007, and Executive Orders 13423 and 13514. Adhering to these requirements improves energy efficiency, reduces water use, and improves the overall quality of the environment.

A second element of the NCPC Comprehensive Plan, *Transportation*, lists federal parking policies and associated parking ratios to address the area's congestion and poor air quality. For suburban federal facilities located more than 2,000 feet away from a Metrorail Station, the parking ratio should reflect a phased approach linked to planned improvements over time. Federal facilities served by High Occupancy Vehicle (HOV) lanes are expected to achieve a parking ratio of one space per two employees (*US Army Corps of Engineers, Baltimore District*, October 2008).

Coastal Zone Management in the Commonwealth of Virginia is through a federally-approved Coastal Resources Management Program (CRMP) with enforceable policies relating to the following areas:

- Fisheries Management
- Subaqueous Lands Management
- Wetlands Management
- Dune Management

- Non-point Source Pollution Control
- Point Source Pollution Control
- Shoreline Sanitation
- Air Pollution Control
- Coastal Lands Management

Virginia's coastal zone includes all of Fairfax County and Fort Belvoir. Therefore, federal actions at Fort Belvoir are subject to federal consistency requirements. The Virginia Department of Environmental Quality (VDEQ) serves as the lead agency for consistency reviews.

The Coastal Zone Management Act

16 USC § 1451, et seq., as amended, provides assistance to the states, in cooperation with federal and local agencies, for developing land and water use programs in coastal zones. Section 307(c)(1) of the Coastal Zone Management Act Reauthorization Amendment (CZMARA) stipulates that federal projects that affect land uses, water uses, or coastal resources of a state's coastal zone must be consistent to the maximum extent practicable with the enforceable policies of that state's federally-approved coastal management plan.

4.1.6 How would the proposed action affect land uses at the two alternative sites?

The proposed action would alter the present land uses at either site. As described in Chapter 3, the Army may need to relocate infrastructure at either site.

If the Pence Gate site is chosen, the ball field would be lost on-Post. However, the Army would continue to implement the Recreation Master Plan, which is intended to address the recreational needs of Fort Belvoir. Portions of Taylor and Washington Roads would be demolished to make way for the building and parking lot. The Army would also have to move power lines and a sanitary sewer easement, or orient the proposed CDC improvements to avoid these features.

At the 21st Street site, the Army would need to demolish the existing buildings, parking lot, and Caples Road, remove the existing storage tanks, and displace some of the parking and storage areas located to the north of Warren Road. If the 21st Street site is chosen, the thrift shop and Boy Scouts / Girl Scouts meeting area would be discontinued on-post. The Army would evaluate the needs of adjacent tenants for the parking and storage areas north of Warren Road, and create a reconfiguration/replacement plan for any justified needs if this site is selected.

The benefit of using either of these sites is that they have been previously developed, and the impacts on natural resources would be minimal. Of the two sites, the Pence Gate site is less developed than the 21st Street site, but construction of the CDC at the Pence Gate site would impact the undeveloped portions of the site only slightly (Subchapter 4.3).

4.1.7 Is the proposed use consistent with the Fort Belvoir RPMP designated land use categories at the two sites?

Yes. At the Pence Gate site, building a CDC is compatible with the community designation of the area. Moreover, its location next to an area proposed for laboratory, office, and classroom space for the Fort Belvoir Community Hospital and other tenants makes this an ideal location.

The 21st Street site is designated industrial but borders on community and residential; therefore, the conflict is minor. It is also a good location – near families living on the South Post. The design of the CDC would incorporate measures such as landscaping buffers to screen the site from its industrial neighbors.

4.1.8 Is the proposed use consistent with the NCPC Comprehensive Plan?

Yes. The target LEED certification level for the proposed facility is silver (*EPACT*, 2005). Energy conservation and other “green building” measures would be part of the CDC design. The design of the facility at either location would incorporate any necessary traffic measures (signalization, turn-lanes, etc.).

The purpose of the proposed action would be consistent with the NCPC recommendation for employee support programs such as child-care. Finally, the proposed parking area would provide one space for every two employees, consistent with the applicable NCPC transportation management recommendations.

4.1.9 Is the proposed use consistent with the Coastal Resources Management Plan policies?

Fort Belvoir’s Coastal Zone Consistency Determination for the proposed action is included in Appendix A. Fort Belvoir has determined that the proposed action would be consistent with the Commonwealth of Virginia’s CRMP’s enforceable policies to the maximum extent practicable at either site. The proposed action would not affect fisheries, subaqueous lands, coastal dunes, or shoreline sanitation. It would have minor effects on resources subject to the following policies:

Wetlands Management: Subchapter 4.5 of this EA summarizes the impacts of the proposed action on wetlands. Construction of the proposed CDC at either site would not directly impact wetlands. Therefore, the proposed action would be consistent with this enforceable policy to the maximum extent practicable no matter what alternative is selected.

Non-point Source Pollution Control: No matter which alternative is selected, the Army would follow the standards required by the Code of Virginia and implementing regulations to ensure that non-source pollution control impacts are minimized during construction (Subchapter 4.4). The Army would also act consistently with the Fairfax County Chesapeake Bay Preservation Area regulations (Chapter 118 of the Fairfax County Code) to minimize long-term impacts on water quality. The stormwater management measures would be designed to provide consistency with Chesapeake Bay nutrient reduction goals. Therefore the proposed action would be consistent with this enforceable policy to the maximum extent practicable no matter which alternative is selected.

Point Source Pollution Control: The proposed action would result in a new point source (construction activity) of pollution. At either site, adverse impacts would be controlled through a Stormwater Pollution Prevention Plan (SWPPP) in compliance with Virginia General Permit for Discharges of Stormwater from Construction Activities (VAR10) (Subchapters 4.2, 4.4, and 4.5). No new sanitary point sources would result from the proposed action. Therefore the proposed action would be consistent with this enforceable policy to the maximum extent practicable no matter which alternative is selected.

Air Pollution Control: impacts of the proposed action on air quality are addressed in Subchapter 4.8 of this EA. The adverse impacts of the proposed action would be minimal at either site. Therefore the proposed action would be consistent with this enforceable policy to the maximum extent practicable no matter which alternative is selected.

Coastal Lands Management: Subchapters 4.4 and 4.5 outline the impacts of the proposed action on certain types of sensitive lands, including floodplains, Resource Protection Areas and Resource Management Areas. The Army would do everything practicable to minimize impacts on these resources, and impacts would be minimal at either site. Therefore the proposed action would be consistent with this enforceable policy to the maximum extent practicable no matter which alternative is selected.

4.1.10 How would project construction affect uses of other properties in the immediate vicinity?

The construction activity would temporarily generate noise, fumes, and dust. These impacts are addressed in Subchapters 4.8 and 4.9 of this document. Both alternatives would have long-term minor adverse effects to on-post traffic. Operation of the CDC would contribute to peak on-post traffic because employees coming from off-post would travel to pick up, drop off, and visit their children after entering the installation. In this respect, the Pence Gate alternative would have less effect to on-post traffic than the 21st Street alternative because the Pence Gate site is located closer to a gate, and closer to CDC patrons work locations such as the Fort Belvoir Community Hospital.

Noise-sensitive uses near the Pence Gate site include the Woodlawn Baptist Church, the Society of Friends Meetinghouse, and the Fort Belvoir Community Hospital. At the 21st Street site, noise-sensitive uses include the residential areas across Gunston Road. The noise generated by the construction would be minor, temporary, and restricted to normal business hours. No construction would be allowed on Saturdays or Sundays, to avoid disruptions to worship services at the Woodlawn Friends Meetinghouse and the Woodlawn Baptist Church. Playground activities would generate long term noise, but would generally be compatible with surrounding uses. The cumulative impacts of the proposed action at either site would be minor.

4.1.11 What effect would the No Action alternative have on land use at or next to Fort Belvoir?

If the CDC is not built, the two alternative sites would continue to operate in their current capacities for the near future. Either site could be redeveloped for other uses if the CDC is not built. Fort Belvoir in the RPMP-LRC has identified the Pence Gate site for potential uses associated with the hospital (an educational campus and hotel/conference center), and the CDC site is part of a larger site being considered for the National Museum of the US Army. No long-term changes in land use have been identified for the 21st Street site.

4.2 Soils and Topography

Soils and topography refer to the landforms of the study area, including the alternative sites' soils, general slope, valleys, hills, streambeds, and flat areas. Understanding the soils and topography of the project area is important to understanding the potential for wetlands and wildlife habitats, and for determining how surface and groundwater moves across the sites. Soil and topography can also affect development plans, because construction on areas of steep topography or weak soil can affect soil erosion and drainage.

4.2.1 What is the study area for soil and topography?

The study area for topography and soils is all the land inside the limits of disturbance for both project sites. This represents the area where topography, soils and sediment could potentially be impacted by the proposed site development.

4.2.2 What is considered a "significant effect" for soil and topography?

A "significant effect" is defined as erosion or other sedimentation problems that would normally result in enforcement action from local, state, or federal agencies. Note that erosion and sedimentation issues would not be considered significant if:

1. They are successfully managed through the use of erosion and sediment control measures in accordance with Section 4VAC50-30-40 of the Commonwealth of Virginia Erosion and Sediment Control Regulations.
2. Appropriate post-construction remediation (re-seeding, re-stabilization, etc.) is performed to ensure that erosion and sedimentation during operation of the site facility does not greatly exceed pre-construction levels.

4.2.3 What is the geology of the study area like?

All of Fort Belvoir, including both alternative sites, is located in the Coastal Plain Physiographic Province, an area composed primarily of unconsolidated, alternating layers of sand, gravel, shell rock, silt and clay (USGS, 2006). The Coastal Plain is underlain by a thick wedge of sediments that increases in thickness from the Fall Zone in the west to the Atlantic coast in the east. These sediments rest on an eroded surface of Precambrian to early Mesozoic rock.

4.2.4 What soil types are located in the study area?

Tables 4.2-1 and 4.2-2 summarize information on the soils present on the two alternative sites. In this table, Problem Class “A” refers to soils with a potential for unstable slopes, land slippage, high shrink-swell clays, poor foundation support, and high water tables. Problem Class “B” refers to soils with problems related to wetness and drainage that can be addressed in construction. Problem Class “C” soils are not considered problem soils for building foundations.

Table 4.2-1
Soil Types Identified at the Pence Gate Site

Name	Drainage Class	Problem Class	Flooding	Foundation Support	Hydric?	Area Present (acres)
Beltsville silt loam	MWD	B	No	Good with proper drainage; foundation drains and waterproofing necessary	No	1.142
Dumfries sandy loam	WD	A	No	Could be unstable, especially near marine clays	No	0.743
Matapeake silt loam	WD	C	Yes	Generally favorable	No	2.881
Sassafras fine sandy loam	WD	C	No	No data	No	0.005
Urban Land	N/A	Not Rated	N/A	Suitable	No	3.605
Total Acreage						8.376

Drainage Class Abbreviations: WD: Well Drained
 MWD: Moderately Well Drained PD: Poorly Drained Drained SPD: Somewhat Poorly Drained
 Source: Natural Resource Conservation Service (NRCS), Soil Survey Report, Fort Belvoir, 1982

Table 4.2-2
Soil Types Identified at the 21st Street Site

Name	Drainage Class	Problem Class	Flooding	Foundation Support	Hydric?	Area Present (acres)
Urban Build Up	N/A	Not Rated	N/A	Suitable	No	7.58
Total Acreage						7.58

Drainage Class Abbreviations: SPD: Somewhat Poorly Drained
 MWD: Moderately Well Drained PD: Poorly Drained WD: Well Drained Drained
 Source: Natural Resource Conservation Service (NRCS), Soil Survey Report, Fort Belvoir, 1982

4.2.5 What is the general topography of the study area?

The Pence Gate site is located on a relatively flat area trending northwest-southeast, and sits at an elevation that ranges from 122 to 128 feet above mean sea level. The central portion of the site, where the CDC structure would be built, grades very slightly (with a slope of less than 0.01 percent) towards the southeast. Steep stream valleys border the Pence Gate site to the south and east which extend towards the southeast and into Dogue Creek.

The 21st Street site is flat. This area was previously graded for the existing building and other improvements, and ranges from 134 to 136 feet above mean sea level.

4.2.6 How would the proposed action affect the soil and topography of the study area?

Because both proposed sites have already been graded and re-worked during previous development, the proposed action would not significantly affect the topography or soil integrity of either alternative site. Current plans take advantage of the previously-graded and developed areas to minimize land disturbance so that the amount of cut and fill required for the CDC at either site would be minimal. The Army estimates that construction of the CDC at either site would generate approximately 7,150 cubic yards of unsuitable soil that would have to be removed from the site. An additional 7,575 cubic yards of material cut from the site could be re-used on-site during development, and approximately 8,400 cubic yards of additional, off-site fill would be used during the course of project construction at either site. Areas of utility installation would be returned to grade with a minimum of ground disturbance.

Because the proposed action would affect more than 1 acre at either site, an erosion and sediment control plan employing soil Best Management Practices (BMPs), and a Virginia Stormwater Management Plan (VSMP) would be required for the clearing and grading activities. The erosion and sediment control plan would include measures consistent with the Virginia Erosion and Sediment Control Handbook, such as silt fences around the limits of clearing and grading to reduce construction impacts.

4.2.7 How would the No Action alternative affect the soils and topography of the study area?

Under the No Action alternative, there would be no effects to the topography or soils of the study area.

4.3 Vegetation and Wildlife

The amount and type of vegetation determines the type of wildlife present in an area. Wildlife and vegetation are important components of the natural environment. (Wetlands and riparian areas are specifically addressed in Subchapter 4.5).

4.3.1 What is the study area for vegetation and wildlife?

The study area for vegetation and wildlife includes all areas on both project sites where the effects of construction and operation of the CDC would be evident.

4.3.2 What is considered a “significant effect” for vegetation and wildlife?

For vegetation and wildlife, a “significant effect” is defined as the alteration, destruction or other measurable, long-term impact to any threatened or endangered species of plants or wildlife.

4.3.3 What types of vegetation are present in the study area?

Both alternative sites are dominated by urban land, defined as areas that have been extensively re-worked or otherwise disturbed by human development. The types of vegetation present on the alternative sites are shown on Tables 4.3-1 and 4.3-2. The locations and extents of these vegetation types on the alternative sites are shown in Figure 4.3-1.

Table 4.3-1
Vegetation Types Present on the Pence Gate Site

Vegetation Type	Occurrence and Characteristics	Amount Present On-Site (acres)
Beech – Mixed Oak Forest	Occurs on upland areas of gradual, well-drained ravine slopes and includes a mixture of hardwood trees including beech (<i>Fagus grandifolia</i>) and oak (<i>Quercus</i> spp).	0.43
Oak – Ericad Forest	Dominated by white oak (<i>Quercus alba</i>) and chestnut oak (<i>Q. prinus</i>), northern (<i>Q. rubra</i>) and southern red oak (<i>Q. falcata</i>), scarlet oak (<i>Q. coccinea</i>) and black oak (<i>Q. velutina</i>) with other hardwood species.	0.79
Urban Land	Cleared areas, or areas of landscaped trees and shrubs. Species such as tall fescue (<i>Festuca elatior</i>) and Kentucky bluegrass (<i>Festuca arundinacea</i>) predominate.	7.12
Total Acreage		8.344

Source: Fort Belvoir Geographic Information Systems Information, Fort Belvoir Department of Public Works

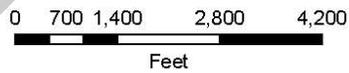
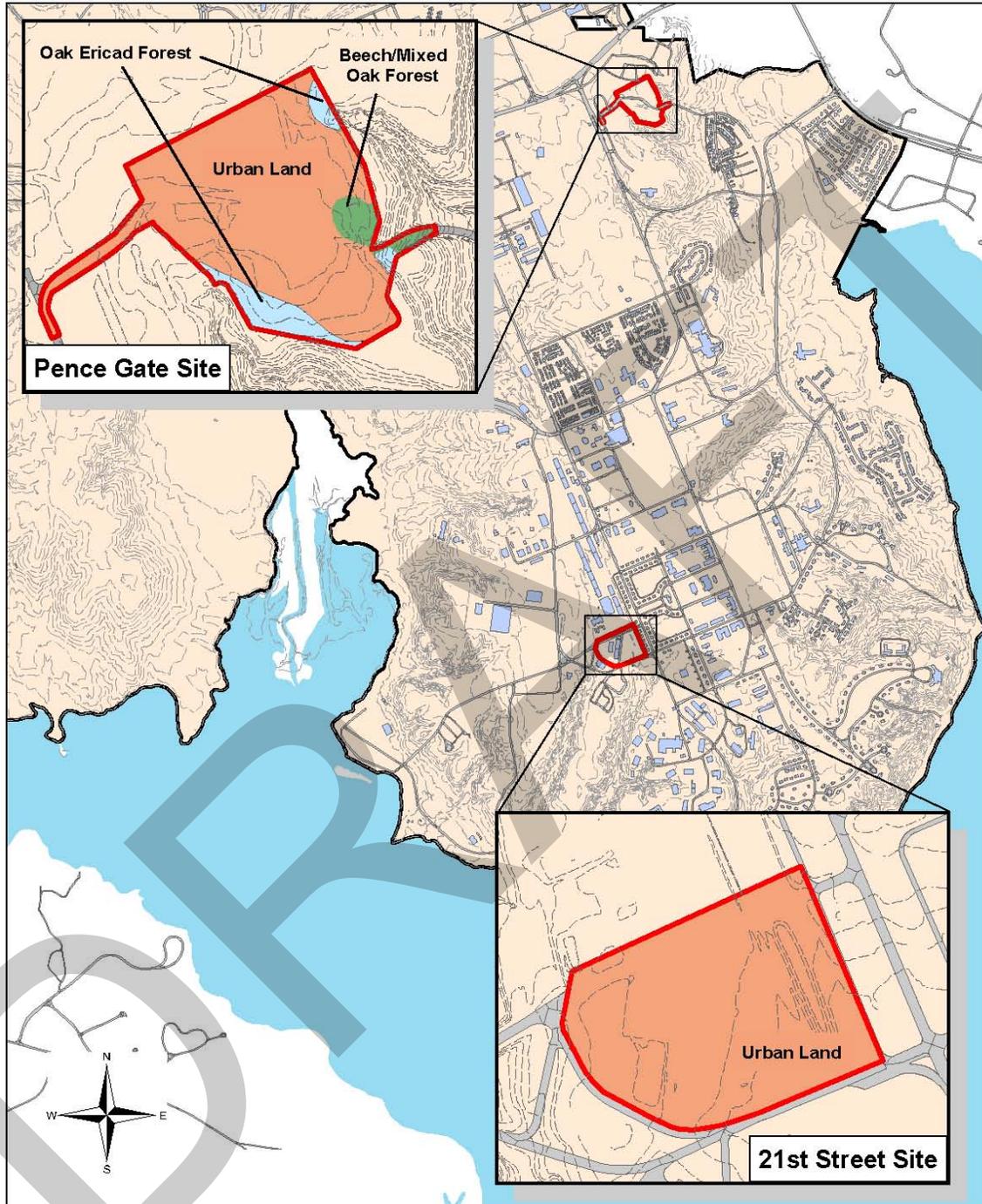


Figure 4.3-1
Current Vegetation Communities
on the CDC Alternative Sites

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Table 4.3-2
Vegetation Types Present on the 21st Street Site

Vegetation Type	Occurrence and Characteristics	Amount Present On-Site (acres)
Urban Land	Cleared areas, or areas of landscaped trees and shrubs. Species such as tall fescue (<i>Festuca elatior</i>) and Kentucky bluegrass (<i>Festuca arundinacea</i>) predominate.	7.58
Total Acreage		7.58

Source: Fort Belvoir Geographic Information Systems Information, Fort Belvoir Department of Public Works

4.3.4 How would this vegetation be impacted by the CDC?

Table 4.3-3 summarizes the amount of each vegetation community present inside the limits of disturbance for the proposed action. Note that not all vegetation inside these limits would necessarily be removed or disturbed during the course of construction and operation.

Table 4.3-3
Expected Impacts to Land Cover and Wildlife Habitat Types

Vegetation Community	Area Within the Limits of Disturbance (acres)	
	Pence Gate	21st Street
Beech – Mixed Oak Forest	0.43	None Present
Oak – Ericad Forest	0.79	None Present
Urban Land	7.13	7.58

As shown in Figure 4.3-1 and in Table 4.3-2, the 21st Street site has a slightly larger “urban” area than the Pence Gate site, and is therefore marginally preferable from the perspective of impacts to wildlife habitat. However, because both sites are 1) relatively small in area, 2) currently traversed by paved roads, and 3) in active use, they are not considered pristine wildlife habitat, and there does not appear to be a potential for a significant impact to wildlife habitats at either alternative site.

The Army is preparing a Tree Preservation Plan for the proposed action to more accurately delineate the anticipated vegetation impacts prior to construction. Disturbed areas would not extend beyond the limits of disturbance shown in Figure 4.3-1, and would be restored through planting and re-seeding after construction.

4.3.5 What common wildlife species live in the study area?

Based on the habitat available in the study area wildlife species that commonly occur in urban areas would be expected on the project site. This includes species such as raccoon, coyote, opossum, American crow, American robin, wood thrush, eastern wood pewee, scarlet tanager, various eagle species, and other common mammals and birds.

4.3.6 Do any “special status” plants or animals occur in the study area?

In order to determine if any special status plants or animals are located on or near either alternative site, the Army performed surveys for endangered species that might be present at or near the sites, reviewed previous investigations performed at the two alternative sites, and consulted with knowledgeable staff members from the Fort Belvoir Department of Public Works, Environmental and Natural Resources Division (ENRD). The Army also sent written requests for guidance and information to the Virginia Department of Conservation and Recreation (VDCR), the Virginia Department of Game and Inland Fisheries (VDGIF), and the US Fish and Wildlife Service (USFWS). Copies of the letters requesting guidance are provided in Appendix B. The VDGIF response was received on August 10, 2009; this response is summarized below.

Special Status Wildlife Species

Special status wildlife species include those listed as endangered or threatened under the Endangered Species Act; species that are candidates or are proposed for listing under the Endangered Species Act; Species of Federal Concern; species listed by the Virginia Department of Conservation and Recreation (VDCR) as state-endangered, threatened, candidate, or sensitive, and other priority species.

Virginia Department of Game and Inland Fisheries

In a response received on August 10, 2009, the VDGIF indicated that the following Special Status Wildlife Species are documented in the vicinity of the two CDC alternative sites.

Table 4.3-4

Responses from the Virginia Department of Game and Inland Fisheries

Name of Species	Status	Distance From Site (in miles)	
		Pence Gate	21 st Street
bald eagle (<i>Haliaeetus leucocephalus</i>)	federal species of concern / state threatened	0.5	0.75
wood turtle (<i>Glyptemys insculpta</i>)	state threatened	1.25	1.75
anadromous fish	Confirmed Anadromous Fish Use Area	0.25	0.50
bridle shiner fish (<i>Notropis bifrenatus</i>)	state special concern	N/A	2.0

No responses from the remaining agencies have been received. Once responses are received, the Army would comply with the recommendations of these agencies.

4.3.7 How would the proposed action affect common wildlife or special status species?

Reduction in the amount of vegetation could cause a reduction in the number of animals supported. However, because both of the alternative sites have already been developed, the impact is less than would be expected if virgin land was used. Noise from construction activities is expected to be noticeable, but this impact would be very short-term and is not expected to significantly impact breeding or migration patterns. Species that adapt well to developed areas would be least affected. Approximately 1.2 acres of hardwood and mixed forest at the Pence Gate site would be lost, which would be a greater impact to wildlife carrying capacity than at the 21st Street site. The impacts to specific wildlife are summarized below.

Partners in Flight

Partners in Flight (PIF) is a cooperative effort launched in 1990 to emphasize the conservation of birds not covered by existing conservation initiatives. PIF is a partnership among federal, state and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private individuals (*Partnersinflight.org*, accessed 2009).

**Entry Levels in the PIF Priority Species Pool, Listed in Decreasing
Order of Concern**

Tier I - High Continental Priority	Tier II – High Regional Priority
Tier I A - High Continental Priority – High Regional Responsibility	Tier II A - High Regional Concern
Tier I B - High Continental Priority – Low Regional Responsibility	Tier II B - High Regional Responsibility
	Tier II C - High Regional Threats
	Tier III – Additional Watch List
	Tier IV – Additional Federally Listed
	Tier V – Additional State Listed

PIF buffer areas located at the Pence Gate site are attributable to the wood thrush, an Entry Level IA in the PIF Priority Species Pool Order of Concern (*Partnersinflight.org*, accessed 2009). There are approximately 4.19 acres of PIF buffer area located within the limits of disturbance of the Pence Gate site. The vegetation that supports this area would be removed if the Pence Gate site is selected. In addition, noise from the construction and operation of the CDC at Pence Gate could make additional, nearby PIF areas unattractive to migratory birds. In addition to the wood thrush, PIF buffer areas for the scarlet tanager (Entry Level IA) are located approximately 150 feet southeast of the Pence Gate site. This is only a small fraction of the available PIF buffer on the installation, and the effects to these species should be minimal. The loss of this area could be mitigated by setting aside similar habitat on Fort Belvoir for migratory birds.

There are no PIF buffer areas located at or near the 21st Street site, so there are no projected impacts to PIF species if the 21st Street alternative is selected.

Small Whorled Pogonia

The only special status plant likely to occur in the area is the small whorled pogonia (*Isotria medeoloides*). EEE Consulting (EEE), Inc., performed a survey at the Pence Gate site for the federally listed threatened small whorled pogonia on June 23, 2009, but did not find any small whorled pogonia individuals. EEE did identify one area of “high potential” habitat and two areas of “medium potential” habitat to the south and east of the site.

For the 21st Street site, PSA consulted with Ms. Dorothy Keough of the Fort Belvoir ENRD. Ms. Keough indicated that, based on the historically-developed nature of the 21st Street site, this area is not considered a potential habitat for small whorled pogonia.

Bald Eagle

The bald eagle, a state-listed threatened species, has been known to forage within Fort Belvoir. Shorelines along creeks, rivers and lacustrine areas on Fort Belvoir provide valuable nesting and foraging habitat for resident and migratory bald eagles. “Bald Eagle Occasional Use Foraging Protection Areas” are defined as those areas within 750 feet of the shoreline. However, neither of the two alternative sites is located in these areas. Specifically, the Pence Gate site is located approximately 1,100 feet from Dogue Creek, and the 21st Street site is located approximately 0.70 mile north of Gunston Cove (*Paciulli, Simmons and Associates, 2001*).

USFWS and VDGIF Bald Eagle Protection Guidelines for Virginia

Primary Management Zone – This is defined as the area 750 feet in radius around an active nest.

Secondary Management Zone – This is defined as 750 feet to 1,320 feet in radius around an occupied nest.

According to GIS layers provided by Fort Belvoir, no known bald eagle nesting areas are located on or near either alternative site. Both sites are currently in use, and bald eagles tend to nest in areas away from human contact. The USFWS and VDGIF have published Bald Eagle Protection Guidelines for Virginia. Potential threats to bald eagle habitat include disturbances caused by near-shore activities and waterfowl hunting. Based on these guidelines, the construction and operation of the CDC would not adversely affect bald eagles at Fort Belvoir at either site.

Federal Laws Protecting the Bald Eagle

Bald and Golden Eagle Protection Act of 1940 – Prohibits the taking of bald and golden eagles or their nests and eggs. Under this Act, taking is defined as “to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.”

Migratory Bird Treaty Act of 1918 – This Act was established to protect migratory birds and prohibits the taking of any migratory bird, nest, egg, or part, except as permitted by the USFWS. The prohibitions under this law and its regulations generally include activities or attempted activities that pursue, hunt, shoot, wound, kill, trap, capture, possess, or collect any migratory bird species and their nests and eggs.

Wood Turtle

PSA contracted Dr. John Mitchell of Mitchell Ecological Research Service, LLC to perform field surveys for the threatened wood turtle at both the Pence Gate and the 21st Street site (*Mitchell Ecological Research Service, LLC, 2009*). Habitat assessments and visual encounter surveys for the wood turtle were performed in early June 2009. No individuals were located at either alternative CDC site. Regarding wood turtle habitat, this report concludes that the Pence Gate site “*is not suitable for Wood Turtles,*” and that the 21st Street site “*is unlikely to support Wood Turtles.*” Based on this conclusion, the disturbance of wood turtles or their habitat is not a concern at either alternative site.

Northern Virginia Well Amphipod

The Northern Virginia well amphipod (*Stygobromus phreaticus*) is a subterranean crustacean with a very limited range. Its habitat is limited to groundwater seeps, and it has been collected only three times since 1921, including once at Fort Belvoir’s T-17 training area in 1996 (*Virginia Department of Conservation and Recreation, Division of Natural Heritage, June 2003*). This amphipod is listed as G1/S1, indicating that it is critically imperiled because of its extreme rarity, or because of factors in its biology make it especially vulnerable to extinction (*MACTEC Engineering and Consulting, of Georgia, Inc., June 2003*).

Based on the lack of steep slopes and groundwater seeps, neither alternative site is considered a potential habitat for the Northern Virginia well amphipod. However, both sites are located immediately up-gradient from steeply sloped areas that represent potential habitats. An increase in impervious surfaces (such as building, asphalt, and concrete) at either site would reduce the amount of rainfall that recharges the local groundwater system, thus potentially altering the number, extent, or nature of down-gradient groundwater seeps.

The T-17 training area – where the Northern Virginia well amphipod was found in 1996 - is located immediately down-gradient of the 21st Street site. To determine if the Northern Virginia well amphipod was still present at the T-17 training area, Fort Belvoir performed a survey in 2003 (*Virginia Department of Conservation and Recreation*, June 2003). This study located 44 seepage areas at the T-17 area that represented potential habitats for the Northern Virginia well amphipod. Two individuals were discovered during the survey; both were found at a seep area located approximately 1,480 feet (0.28 mile) south of the 21st Street site, on the east bank of an unnamed stream. Because groundwater from the 21st Street site appears to drain into the west bank of this stream, the potential for development of the 21st Street site to impact this seep is minimal. If these individuals migrated to the west bank of the stream, if the population expanded to the west bank, or if unidentified individuals are present on the west bank, then the potential for impact to these individuals could not be discounted. If the 21st Street site is chosen, construction could reduce the flow of existing groundwater to nearby seeps that might support the Northern Virginia well amphipod.

The steep sloped area located approximately 150 feet east of the Pence Gate site was also surveyed during the 2003 investigation. No Northern Virginia well amphipod individuals were located in this area during the survey. However, several seeps were located which are considered potential habitat for the amphipod.

If either site is chosen, Fort Belvoir will protect seeps and recharge areas during the design and construction of the CDC to protect this potential Northern Virginia well amphipod habitat.

4.3.8 Do any rare ecological communities occur in the study area?

Yes. The T-17 Conservation Area is located adjacent south of the 21st Street site. The only natural heritage resource of concern at T-17 is the Northern Virginia well amphipod, which is addressed in the paragraphs above.

4.3.9 Where are the Fort Belvoir Special Natural Areas, relative to the study area?

Fort Belvoir has designated four Special Natural Areas, which are managed by Fort Belvoir with an emphasis on conservation. These are:

- The Accotink Bay Wildlife Refuge, a 1,360-acre area located along Accotink Bay and Accotink Creek in the central portion of the South Post. This area is located approximately 5,000 feet west of the Pence Gate site, and 1,400 feet west of the 21st Street site.

- The Jackson Miles Abbott Wetland Refuge, a 146-acre area located near the northeastern corner of the North Post. This area is located approximately one (1) mile north of the Pence Gate site and 2.5 miles north of the 21st Street site.
- The Fort Belvoir Forest and Wildlife Corridor, which connects Huntley Meadows Park to the Jackson Miles Abbott Wetland Refuge and the Accotink Bay Wildlife Refuge. This area is located approximately 4,200 feet northwest of the Pence Gate site at its closest point, and approximately 1.9 miles north of the 21st Street site at its closest point.
- The T-17 Conservation area. This 69.4-acre area is located approximately 1.5 miles south of the Pence Gate site and adjacent south of the 21st Street site, across Clapp Road and 21st Street.

No Special Natural Areas are located within the limits of disturbance of either alternative site.

4.3.10 How would the proposed action affect these Special Natural Areas?

The Accotink Bay Wildlife refuge, the Jackson Miles Abbot Wetland Refuge, and the Forest and Wildlife Corridor are located sufficiently distant from the two alternative sites that no impacts to these areas are expected. The T-17 Conservation Area is located adjacent south of the 21st Street site, across 21st Street. The potential effects on this area are explained in Section 4.3.7 above.

4.3.11 How would the Army avoid or minimize adverse effects on wildlife during construction?

Based on the current development plans and the results of recent wildlife surveys, the impacts to wildlife and upland vegetation within the study area would be minimal. In addition, Fort Belvoir would avoid or further minimize these impacts by implementing and maintaining strict erosion and sediment controls consistent with VDCR, Division of Soil and Water Conservation regulations, and the Public Facilities Manual of the County of Fairfax (*Fairfax County*, 2001). These regulations require the stabilization of exposed, disturbed soils and reseeded to immediately establish a cover of vegetation. The stormwater management system for the CDC at either site would be designed so as to minimize the impact to groundwater seeps, which are a potential habitat for *Stygobromus phreaticus*. Fort Belvoir would adhere to standards and regulations as per the Virginia Storm Water Management Handbook and the Fairfax County Public Facilities Manual for new development. In addition, Fort Belvoir would require pre-development runoff rates to be calculated with the assumption that the existing condition of either site was “Forested cover –good condition,” to further mitigate the impact on downstream areas.

4.3.12 Would the Army mitigate any unavoidable negative effects?

Yes. The Army would maintain or restore some wildlife habitat through:

- Adopting site-planning techniques to maximize retention and protection of existing trees and native vegetation, and remove only those trees and vegetation that would interfere with buildings and other improvements.
- Planting trees at a 2:1 ratio to replace those of 4-inch diameter or greater lost from clearing and grading.
- Planting native wetland plants in storm drainage areas to promote water quality through infiltration and/or filtration.
- Landscaping with a mixture of deciduous shade and flowering trees throughout the landscaped areas of the chosen site.
- Adherence to the Fort Belvoir Invasive and Exotic Vegetation Management Plan, to mitigate the potential for invasive species to be brought to or from the selected CDC site.

4.3.13 How would the No Action alternative affect vegetation and wildlife, including Special Status species?

Under the No Action alternative, the Army would continue to manage wildlife habitat on the project sites through periodic mowing, removing dead or dying trees and tree limbs, and clearing brush from roadways and designated open areas. These activities would prevent additional trees from establishing in open areas and prevent forested areas from developing snags and downed wood that would otherwise support a greater variety of wildlife. This is not expected to have an impact on vegetation or wildlife.

4.4 Surface Water, Water Quality, and Floodplains

Streams, rivers, and lakes are important resources for food, livelihood, employment, income, and culture. In addition, the groundwater system contributes to these surface water features and provides drinking water for the local human population. Understanding how the project might affect water quality and how to avoid or minimize those effects is a critical part of the environmental review process.

4.4.1 What is the study area for this analysis?

The study area includes both project sites and those waters directly receiving surface water runoff from the sites.

4.4.2 What is considered a “significant effect” for water quality?

An action would result in a “significant effect” if it causes a long-term reduction of the direct or indirect uses of the local surface water features by people, plants, and animals.

4.4.3 What surface water features are located in the study area?

With the exception of the first several feet of an intermittent stream channel abutting the northeast corner of the Pence Gate site, there are no surface waters located within the limits of disturbance of either alternative site shown on USGS topographic maps, or on GIS layers provided by Fort Belvoir. Fort Belvoir will adjust the design of the CDC to avoid this stream channel.

Two unnamed perennial streams are located immediately north and south of the Pence Gate site. Both of these streams flow east into Dogue Creek, which flows into the Potomac River. For the 21st Street site, the study area includes two unnamed perennial streams located to the south of the site. Both of these streams flow south into Gunston Cove, which is a part of the Potomac River (USGS, 1965, photorevised 1983).

Types of Streams

Perennial Streams are natural open channels that are primarily groundwater fed and support a continuous flow of water all year long.

Intermittent Streams are natural open channels that flow water in all but the dry seasons of the year.

Ephemeral Streams generally only flow for a short time immediately following a significant storm event.

4.4.4 What is the quality of surface water in the study area?

To date, there is no water quality data for the perennial streams which directly receive runoff from the study areas. These receiving streams, however, discharge to Dogue Creek (at the Pence Gate site) and Gunston Cove (at the 21st Street site). Dogue Creek and Gunston Cove have both been impacted by polychlorinated biphenyls (PCBs), a potentially carcinogenic industrial compound. This documented impact is attributed to wastewater treatment plants, sewer overflows, and “contaminated sites” and is considered a threat to human consumption of fish from Dogue Creek and Gunston Cove (VDEQ, *et. al.*, 2007). At the Pence Gate site, the two easterly-flowing streams located north and south of the planned CDC location have already been degraded by development.

4.4.5 Do flood hazard or floodplain areas exist in the study area?

No. According to Federal Emergency Management Agency floodplains mapping (Community Panel No. 5155250117D, dated March 5, 1990), neither of the two alternative sites for the CDC is located in a floodplain.

4.4.6 Would the construction of the CDC affect surface water, water quality, or floodplains?

The construction activity at either site would cause minor short-term impacts to streams due to erosion and sedimentation during clearing, grading, and excavation during construction. Stormwater Best Management Practices (BMPs) would be used to minimize the potential for sedimentation and erosion, and the impact to surface waters from construction is not likely to be significant.

Neither alternative site is located within a floodplain, so neither alternative would cause any indirect effect to floodplains at either site.

Dogue Creek and Gunston Cove have both been impacted by historical releases of PCBs. However, because the construction of the CDC is not expected to involve the use, generation, transportation, or storage of PCBs, the potential to exacerbate this water quality concern is negligible.

4.4.7 How would the Army minimize these construction effects?

A stormwater management system would be developed during the design of the project. In addition, the use of BMPs during construction would minimize impacts to the streams.

4.4.8 Would the operation of the CDC affect surface water, water quality, or floodplains?

The operation of the CDC would cause very minor long-term impacts to surface and groundwater due to the increase in the amount of impermeable surfaces and therefore runoff generated at the project site. Potential impacts due to these impervious surfaces include an increase in stream velocities and water infiltration rates, or effects on vegetation from the re-routing of water through stormwater management features. Water quality could be adversely affected by runoff from the parking lot, which may contain petroleum products such as motor oil, diesel fuel, and gasoline. These minor impacts would be expected to persist for as long as the impermeable surfaces are maintained.

Table 4.4-1 provides estimated existing and proposed imperviousness for both alternative sites, based on analysis of GIS layers provided by Fort Belvoir. The Pence Gate site currently has approximately 38,700 square feet (0.89 acre) of impervious area; the 21st Street site currently has approximately 102,450 square feet (2.35 acres) of impervious area.

Table 4.4-1
Existing and Anticipated Impervious Surface Areas for the CDC

Existing Impervious Area	Area Covered (square feet)	
	Pence Gate	21 st Street
Streets	38,025	30,240
Parking lots	0	52,455
Structures (including dugouts)	675	19,755
TOTAL EXISTING IMPERVIOUS AREA	38,700	102,450
Anticipated Impervious Area for the Proposed Action	Pence Gate	21 st Street
Streets, parking lots, and walkways	128,995	108,485
Parking areas to be relocated	0	24,300
Structures	39,470	39,470
TOTAL FOR PROPOSED ACTION	168,465	172,255
NET CHANGE	+129,765	+69,805

The anticipated impervious areas for the proposed action shown in Table 4.4-1 are based on preliminary CDC site concepts provided by Fort Belvoir and differing constraints. The total anticipated impervious surface area for the proposed action would differ slightly between the two sites, namely 168,465 square feet (3.87 acres) at the Pence Gate site, and 172,255 square feet (3.95 acres) at the 21st Street site.

The construction of the CDC at the Pence Gate site would result in an increase of 129,765 square feet (2.98 acres) of impervious area, while construction of the CDC at the 21st Street site would result in an increase of approximately 69,805 square feet (1.6 acre) in impervious area. Based on this, the 21st Street alternative would have less of an impact to surface water quality than the Pence Gate alternative. However, note that the CDC at either site would adhere to standards and regulations as per the Virginia Storm Water Management Handbook and the Fairfax County Public Facilities Manual for new development. In addition, Fort Belvoir would require pre-development runoff rates to be calculated with the assumption that the existing condition of either site was “Forested cover –good condition,” to further mitigate the impact on downstream areas.

Replacing Parking Areas at the 21st Street Site

Note that at the 21st Street site, the total existing impervious area includes approximately 24,300 square feet of parking area located on the north side of Warren Road. If the 21st Street site is chosen for the CDC, these parking areas will have to be replaced, either on-site or in the immediate vicinity. The paving of this 24,300 square foot area is therefore an additional impact of the 21st Street site, as shown on Table 4.4-1, under "*Parking areas to be relocated.*"

Although the 21st Street site would have less of an impact, it is important to note that the impact to water quality from the proposed action at either site would be minimal. This conclusion is based on the relatively small areas involved, and the lack of hazardous or regulated material use at the CDC following construction. In addition, a project-specific stormwater management system would be developed that would minimize the volume of pollutants discharged into the environment from CDC activities.

Dogue Creek and Gunston Cove have both been impacted by historical releases of PCBs. However, because the operation of the CDC is not expected to involve the use, generation, transportation, or storage of PCBs, the potential to exacerbate this water quality concern is negligible.

The operation of the CDC at either site is not expected to have any direct or indirect effect to floodplains.

4.4.9 How would the Army minimize these effects?

The stormwater management system developed for the CDC would minimize impacts to nearby streams at either site. The Army would design these stormwater controls to return the site to pre-development conditions – equivalent to a natural, forested site. This would reduce development impacts beyond the stormwater control requirements listed in the Fairfax County Public Facilities Manual.

At the Pence Gate site, the two easterly-flowing streams located north and south of the planned CDC location have already been degraded by development. If this site is chosen for the CDC, the Army would take additional steps to ensure that these streams do not become further damaged, including the installation of sufficient stormwater controls so that no change in velocity or hydrology from existing conditions would occur. This would include the use of sufficient stormwater detention facilities to decrease the peak flows associated with storm events, and energy dissipaters to simulate sheet flow to the greatest extent practicable, preventing concentrated flows from entering the streams.

4.4.10 Would the No Action alternative affect surface water, water quality, or floodplains in the study area?

If the CDC is not built, surface waters in the study area would not change. Both alternative sites would maintain their current impervious surface areas.

4.5 Waters, Wetlands, & Chesapeake Bay Preservation Areas

“Waters of the US” (defined below) are regulated by the US Army Corps of Engineers (USACE) and the US Environmental Protection Agency (USEPA) under Section 404 of the Clean Water Act. In Virginia, the Virginia Department of Environmental Quality (VDEQ) also regulates waters and wetlands under their Water Protection Permit Program. Whereas “waters of the US” do not typically include isolated wetlands or the extreme upper headwaters of streams, state waters do include these areas.

Wetlands, which are included in the broader category of the waters of the US, are a vital natural resource that provides habitat for many plants and animals. Wetlands moderate stormwater flow, improve water quality, reduce flooding by retaining floodwaters, and control erosion by slowing down water so sediment and chemicals can settle to the bottom.

Waters of the US: A Definition

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
 - (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
 - (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - (iii) Which are used or could be used for industrial purposes by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under this definition;
5. Tributaries of waters identified in paragraphs (s)(1) through (4) of this section;
6. The territorial sea;
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States.

Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with USEPA.

Source: 40 CFR 230.3(s)

Fort Belvoir also considers Fairfax County-designated Chesapeake Bay Resource Protection Areas (RPAs) on the installation. RPAs are sensitive areas that include:

- tidal wetlands.
- tidal shores.
- water bodies with perennial flow.
- non-tidal wetlands abutting tidal wetlands or water bodies with perennial flow.
- areas within the 100-year floodplain as defined by the Federal Emergency Management Administration, or within 100 feet of the four features listed above, whichever is greater.

The Fairfax County Chesapeake Bay Preservation Ordinance

The Chesapeake Bay Preservation Act was adopted to protect the Chesapeake Bay and local streams from pollution due to land use and development. In an effort to protect and improve the quality of these waterways, sensitive areas along streams throughout Fairfax County are designated as Resource Protection Areas (*Fairfax County website*, accessed March 9, 2009). Other sensitive areas are designated as "Resource Management Areas (RMAs). In Fairfax, all lands in the county not designated as RPA have been designated as RMA, and Fort Belvoir has opted to apply the Fairfax County requirements on the installation.

Development within RPAs is generally restricted to water-dependent activities, maintenance of public activities, passive recreation, water wells, and historic preservation (US Army Garrison Fort Belvoir, 2001). Fort Belvoir ensures that its actions are consistent to the maximum extent practicable with the Fairfax County Chesapeake Bay Preservation Ordinance.

Fort Belvoir also designates buffer areas adjacent to streams with intermittent flow as riparian areas. While not RPAs, these riparian areas are considered environmentally sensitive.

4.5.1 What is the study area for this analysis?

The study area for waters, wetlands and RPAs includes all areas within the proposed limits of disturbance for either site. Streams and wetlands outside of the limits of disturbance were mapped in the field, to help determine the potential for indirect effects from the proposed action.

4.5.2 How did the Army determine the extent of waters, wetlands, and RPAs in the study area?

Fort Belvoir performed two kinds of studies (perennial flow determinations and wetland delineations) at the alternative sites to determine the extent of waters, wetlands, and RPAs. The perennial flow determinations established the extent of perennial (year-round) flow in nearby streams. This assists in the determination of RPA boundaries, which are defined (in part) as areas within 100 feet of perennial streams. The perennial flow determination for the Pence Gate site was performed by Mr. Joseph Fiorello (*Perennial Flow Determination, Washington Road, March 2009*). The perennial flow determination for the 21st Street site was performed by PSA.

The purpose of the wetland delineations performed at both alternative sites was to identify and map the general locations and types of waterways and wetlands in the vicinity of the two alternative sites, not to serve as jurisdictional determinations. (Only the US Army Corps of Engineers can make jurisdictional determinations.)

Wetland Characteristics

Vegetation that is able to grow and thrive under wet conditions

Soils that lack oxygen during persistently wet conditions, technically know as anaerobic (without oxygen) conditions.

Hydrology that induces persistently wet conditions.

4.5.3 What is considered a “significant effect” for waters, wetlands, and RPAs?

A “significant effect” is any impact that would cause a long-term, irreversible impact to the function of wetlands or other waterways, or which would impair the uses of those waters.

4.5.4 Are any wetlands, waterways, or RPAs located in the study area?

No. As delineated by PSA, no wetlands, waterways or RPAs (Fiorello, March 2009) extend within the limits of disturbance at either site, except for approximately five linear feet of an intermittent stream in the northeastern portion of the Pence Gate site. Fort Belvoir would modify the design of the CDC site at Pence Gate to avoid this stream. Figures 4.5-1 and 4.5-2 show the extent of waterways, wetlands, and RPAs closest to the two sites. Fort Belvoir is pursuing a Jurisdictional Determination from the USACE to confirm the delineation at both sites. Some Fort Belvoir-designated riparian areas do, however, extend onto the Pence Gate site (see Subchapter 4.5.8 for details on this impact).

4.5.5 How would the proposed action affect wetlands, waterways and RPAs?

There would be no direct impact on wetlands or other “waters of the US,” state waters, or RPAs. Fort Belvoir would avoid the intermittent stream at Pence Gate site during the design and construction of the CDC if that site is selected.

It is possible that the construction of the CDC could indirectly impact waterways or RPAs at either site through increased rainwater runoff, or a reduction in the ability of the site soils to absorb rainwater, thus reducing the recharge rate of groundwater aquifers.

4.5.6 How would the Army avoid or minimize adverse indirect effects on these resources?

The Army would avoid disturbance of wetlands during construction. The proper implementation of an approved stormwater management plan, stormwater pollution prevention plan, and sediment and erosion control plan would ensure that indirect effects are reduced and would not be significant.

4.5.7 Are any riparian buffer areas located in the study area?

Yes. As shown on Figure 4.5-1, approximately 1.04 acres of riparian buffer areas are located within the limits of disturbance of the Pence Gate site. These areas are associated with the two nearby streams. No riparian buffer areas are located on the 21st Street site.

4.5.8 How would the proposed action affect riparian buffer areas?

The riparian buffer areas located inside the limits of disturbance at the Pence Gate site could be graded, cleared, or built upon. Because riparian vegetation provides a filter for sediments and other pollutants in stormwater runoff, loss of this buffer could contribute to minor degradation of water quality downstream. Also, these buffers provide valuable habitat and travel corridors for wildlife species. No impacts to riparian buffer areas would be expected if the 21st Street site is chosen.

4.5.9 How would the Army avoid or minimize impacts to the riparian buffer areas?

The Army would minimize the impact of building on the riparian buffer areas at the Pence Gate site by producing a final design that disturbs as little riparian buffer area as possible.

4.5.10 Would the No Action alternative affect waters, wetlands, RPAs, or riparian buffer areas?

The No Action alternative would have no impact to existing waters of the US, RPAs, or riparian buffer areas in the study area.

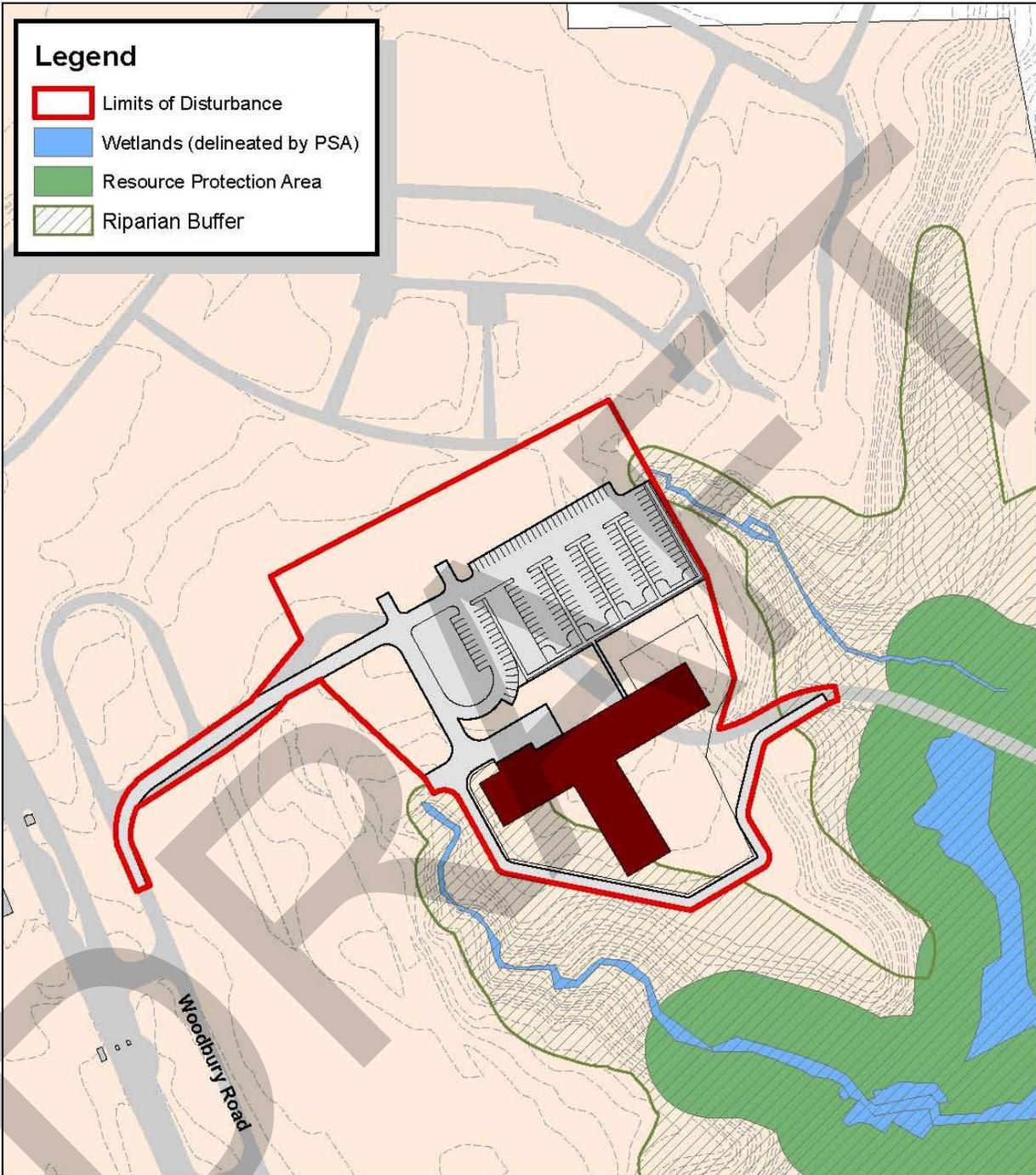
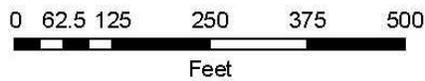


Figure 4.5-1: Wetlands, RPAs, and Riparian Areas at the Pence Gate Site



Note: Portions of Washington and Taylor Roads inside the limits of disturbance would be realigned.



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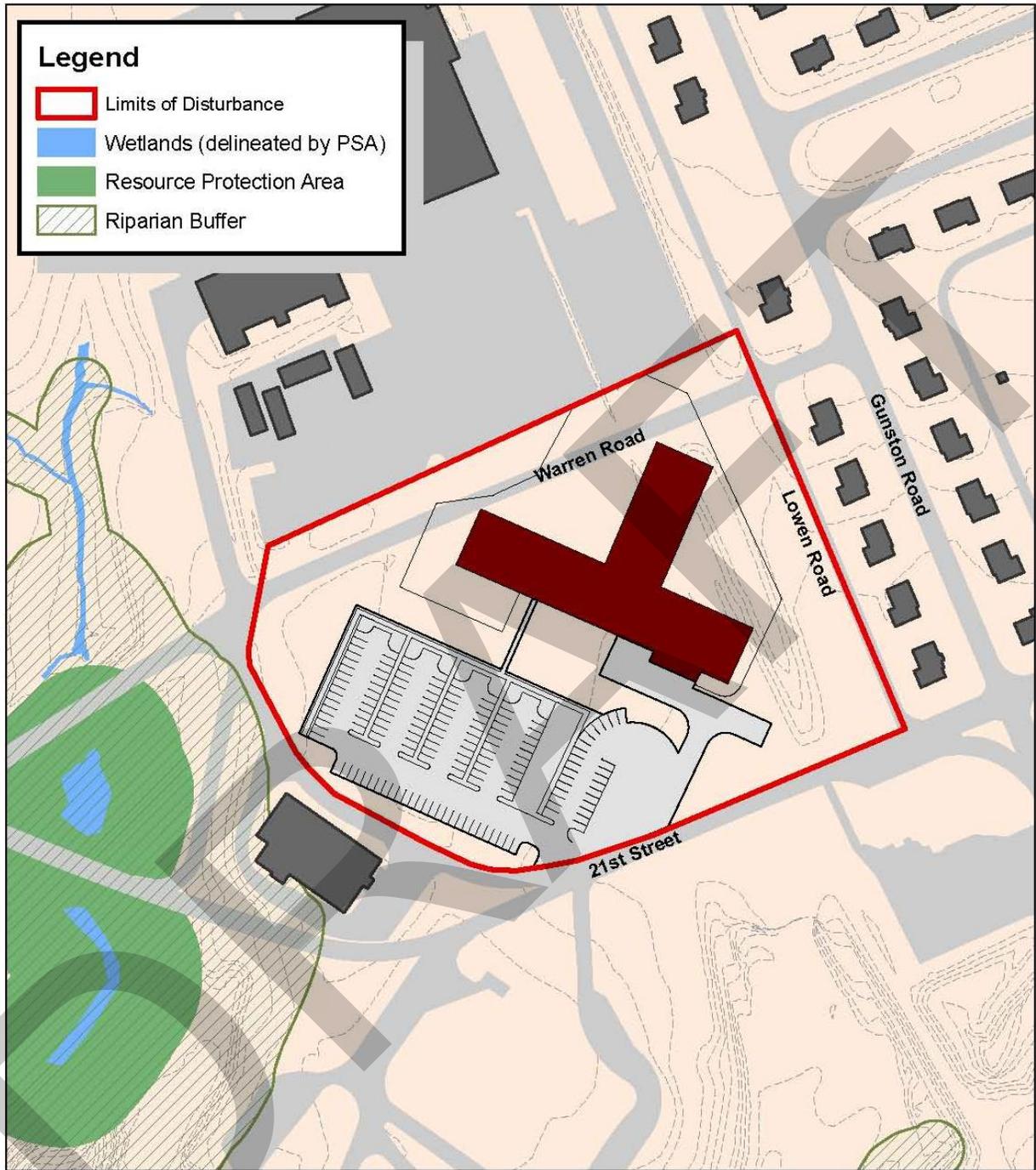
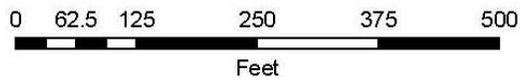


Figure 4.5-2: Wetlands, RPAs, and Riparian Areas at the 21st Street Site



Note: This conceptual layout is preliminary and presented for informational purposes only. The final concept will arrange site elements to avoid Warren Road.



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4.6 Historic, Cultural, and Architectural Resources

Cultural resources are the things, places, and institutions that provide information about people from the past, their experiences, and their cultural identities. Cultural resources can include archeological sites, cultural landscapes, spiritual places, people, documents, sites, buildings, and objects. Several interrelated federal, state and local laws and regulations require consideration of how development projects might adversely affect cultural resources.

Section 106 of the National Historic Preservation Act

The National Historic Preservation Act, as amended, requires federal agencies to integrate consideration of historic preservation issues into the early stages of their planning projects. Under Section 106, the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking is required to account for the effects of this action on any district, site, building, structure, or object that is included or eligible for inclusion in the National Register of Historic Places. Eligibility determinations are based on criteria for historic significance contained in 36 CFR 60.4.

Broadly speaking, historic properties fall into two categories. The first is *architectural resources*, defined as “a resource created principally to shelter any form of human activity, such as a house,” or “a functional construction made for purposes other than creating shelter, such as a bridge.” (National Park Service website, accessed 2009). The second category is *archeological resources*, defined in this report as “the location of significant prehistoric or historic event, occupation, or activity, where the location itself possesses historic, cultural, or archeological value regardless of the presence of any existing improvements.” Common examples of archeological sites include trash sites and burial sites.

4.6.1 What is the study area for this analysis?

For cultural resources, the study area is called the Area of Potential Effect (APE). For the purposes of this study the APE is defined as the cumulative area of three Sub-APEs; the land disturbance APE, the visual APE and the auditory APE. The land disturbance APE is defined as the limits of land disturbance required for site clearing and construction activities. The visual APE is defined as the viewshed to and from the project site. The auditory APE is defined as the range of noise generated by the construction and operation of the CDC.

Area of Potential Effect

The geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

Source: 36 CFR 800.16(d).

4.6.2 Are any cultural resources located in the APE?

One archeological resource (site 44FX1918) has been identified adjacent to the land disturbance APE for the Pence Gate site. Site 44FX1918 was evaluated for National Register of Historic Places (NR) eligibility in 2006 and was determined ineligible for NR listing. One architectural resource, the little league ballfield, has been identified within the land disturbance APE for the Pence Gate site. Constructed in 1969, the little league ballfield lacks the exceptional significance required for listing in the NR. The NR-eligible Woodlawn Historic District has been identified within the visual and auditory APEs of the Pence Gate site.

One archeological site (44FX1504) has been identified adjacent to the land disturbance APE for the 21st Street site. Site 44FX1504 was identified and evaluated for NR eligibility in 1994 and determined ineligible for NR listing. Three architectural resources (Building 629, 630, and 631) have been identified within the land disturbance APE for the 21st Street site. All three buildings were determined ineligible for NR listing in 2006. The NR-eligible Fort Belvoir Historic District and the NR-eligible Thermo-Con House have been identified within the visual and auditory APEs for the 21st Street site.

4.6.3 What are considered "impacts" for cultural resources?

Consideration of a project's effects on cultural resources can result in one of four determinations:

- no potential to cause effect.
- no historic properties affected.
- no adverse effect.
- adverse effect.

A determination of no potential to cause effect is made when the nature of the project is such that it does not have the potential to cause effect to historic properties assuming they are present. A determination of no historic properties affected is made when no historic properties have been identified within the APE. A

determination of no adverse effect is made when it is determined that any effects to historic properties would not be adverse. A determination of adverse effect is reached when the effects to the historic properties are deemed to be adverse as defined by 36 CFR 800.5(a)(1). The nature of the CDC project is such that it has the potential to cause effect to historic properties.

Criteria of Adverse Effect

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

Source: 36 CFR 800.5(a)(1)

4.6.4 What potential effects would the proposed action have on cultural resources? Are these effects adverse?

At the Pence Gate site, the CDC has the potential to have visual and auditory effects on the NR-eligible Woodlawn Historic District. The potential visual effect is the introduction of an incompatible structure to the historic viewshed of the Woodlawn Historic District. The Woodlawn Historic District Viewshed Study determined that views of any facility at the Pence Gate site that is 50 feet or less in height would be well screened from the Woodlawn Historic District. The height of the CDC is well below this 50-foot height limit. The vegetation that screens the CDC site from the Woodlawn Historic District is located outside of the limits of disturbance for the project. Landscaping at the CDC site would screen views of the CDC even further. Noise from the operation of the CDC would not cause adverse auditory effects to the Woodlawn Historic District. Based on an evaluation of the construction noise it has been determined that construction related noise would not exceed the noise generated by US Route 1 traffic. Construction of the CDC would not be allowed on Saturdays and Sundays, to avoid disruptions to worship services at the Woodlawn Friends Meetinghouse or the Woodlawn Baptist Church. Fort Belvoir has determined that the construction and operation of the CDC at the Pence Gate site would have no adverse effect on historic properties.

At the 21st Street site, the CDC has the potential to have visual and auditory effects on the NR-eligible Fort Belvoir Historic District and the NR-Eligible Thermo-Con House. Based on a review of historic maps and aerial photographs, Fort Belvoir has determined that the views from the NR-eligible Fort Belvoir Historic District and Thermo-Con House have undergone significant changes that have impacted the historic integrity of the viewshed towards the CDC site, and that the viewshed does not contribute to the historic significance of either resource. The noise generated during the operation of the CDC would consist primarily of children playing, which is consistent with the residential nature of the adjoining portion of the Fort Belvoir Historic District and the Thermo-Con House. Construction noise would have a short-term effect on the historic district, but due to the temporary nature of this effect it is not considered adverse. Fort Belvoir has determined that the construction and operation of the CDC at the 21st Street site would have no adverse effect on historic properties.

4.6.5 Would the No Action alternative affect cultural resources?

The No Action alternative would not impact cultural resources.

4.7 Petroleum and Hazardous Substances

Fort Belvoir uses, stores, generates, and transports a wide variety of chemicals during its day-to-day operation. This includes both petroleum products and those materials defined as hazardous substances by the US Environmental Protection Agency (USEPA). Current and former hazardous substance / petroleum facilities are potential constraints to future development, because closure of such sites is required prior to reuse.

Management of hazardous waste (a sub-category of “hazardous substances”) at Fort Belvoir is conducted in compliance with the Resource Conservation and Recovery Act (RCRA). Fort Belvoir has a Hazardous Waste Management / Waste Minimization Plan and a Master Spill Plan. Fort Belvoir also has a RCRA Part B permit from the Virginia Department of Environmental Quality (VDEQ) for the storage of hazardous wastes.

4.7.1 What is the study area for petroleum and hazardous substances?

For hazardous substances, the study area includes both alternative sites. This represents the area in which the current use or presence of hazardous substances (as defined by USEPA Regulations 40 Code of

Federal Regulations (CFR) 300) could impact or be impacted by the proposed action. This subchapter also discusses the presence and use of petroleum (gasoline, diesel fuel, heating oil, etc.). Although petroleum is not a hazardous substance as defined by the USEPA, improper storage or use of petroleum can negatively affect the human environment.

4.7.2 What is considered a “significant effect” for petroleum and hazardous substances?

For petroleum and hazardous substances, an action would result in a “significant effect” if it would involve the generation, use, storage, transportation, or disposal of petroleum products or hazardous substances in a manner that violates federal, state, or local laws or regulations, or otherwise represents a clear threat to human health or the environment. This includes both catastrophic releases and the cumulative effect of chronic, small-scale releases over the course of the CDC’s operation.

4.7.3 Were any petroleum products or hazardous substances previously used in the study area?

Yes. At the Pence Gate site, one 7,500-gallon underground storage tank (UST) containing #2 heating oil was removed from the ground in July 1997. The tank released fuel to the subsurface, and impacted soils were excavated and removed. The VDEQ required site characterization work at the site to assess the impact of the release. The Site Characterization Report indicated that most petroleum impacts had been removed, and recommended natural attenuation at the site. VDEQ agreed with this assessment in August 1999. No further action is required where the contaminant source has been removed and any remaining contaminant is deemed, by the VDEQ, to be at low enough concentrations that it will break-down through natural causes. There are no direct pathways and thus the contaminant will not easily interact or affect any flora, fauna, or humans (ENRD 2009).

If intrusive activities occur at the Pence Gate site, petroleum- or hazardous substance-impacted areas may be encountered. If this occurs, the contractor is required to immediately stop work and contact the Fort Belvoir Department of Public Works (DPW). DPW will identify and characterize any impacted soils, and dispose of them appropriately.

At the 21st Street site, former Building 631 maintained an aboveground storage tank (AST) that was removed when the building was demolished in October 2005. Building 630, located on the south-central portion of the site, previously maintained a 1,000-gallon UST which was removed from the ground and

disposed of in January 1994. Evidence of a release was detected during tank removal, and in response soils were excavated and removed. Subsequent site characterization work indicated that most petroleum impacts had been removed, and the Site Characterization Report recommended that the remaining contamination would best be addressed by natural attenuation (the natural breakdown of contaminants over time). VDEQ agreed with this assessment in August 2000, determining that no further action was required because the contaminant source has been removed, and remaining contaminant concentrations were low enough that natural attenuation was an appropriate response.

In addition, one documented surface release of petroleum occurred at the 21st Street site. On March 14, 2003, 2-4 gallons of heating oil was spilled onto the ground from a delivery truck at Building 630. The oil was promptly cleaned up and disposed of properly by Fort Belvoir personnel (ENRD 2009). Based on the small volume of this spill and the immediate response by Fort Belvoir, this spill is not expected to impact the future use of the site.

Building 612, located adjacent southwest of the 21st Street site, was previously used as a printing press. Chemicals commonly used in printing include inks, solvents, and various emulsifiers. In addition, other buildings in the vicinity of the 21st Street site have been used for various industrial purposes in the past. As a result of these historical uses, the potential for undocumented soil and/or groundwater contamination to be present in the subsurface cannot be discounted.

A waste oil storage area, a UST, a wash rack, and an oil/water separator have been identified in an area located approximately 150 feet north of the 21st Street site, across Warren Road. Concentrations of arsenic and benzo(a)pyrene detected near the wash rack and the separator suggest that additional sampling and possible remediation of the 21st Street site may be warranted prior to redevelopment for non-industrial use. A similar situation exists with waste sites identified south of 21st Street and east of Spengler Loop. Fort Belvoir is seeking regulator concurrence that these areas are appropriate for industrial use; however, residential use (such as a CDC) of areas near these sites may call for further investigation and possible remediation.

In addition, portions of the 21st Street site were previously used as a firing range. A Historical Records Review and Site Inspection determined that this firing range was used for small arms training only, and that no Munitions and Explosives of Concern are suspected to be present. This resulted in a determination that lead in soil was the only parameter of concern, and the reports recommended a Remedial

Investigation / Feasibility Study. On July 10, 2008 the VDEQ formally concurred with these conclusions and recommendations (Malcolm Pirnie, Inc., 2006 and 2008).

There are no known direct exposure pathways for contamination at the 21st Street site to easily affect any flora, fauna, or humans. However, if intrusive activities occur at the site, petroleum-impacted areas may potentially still be encountered. If that does occur the contractor is required to immediately stop work and contact the DPW. DPW will identify and characterize any impacted soils, and dispose of them appropriately.

If either site is chosen for the CDC, the Army would comply with requirements to clean up any contamination to appropriate levels for a children's facility. Based on the historical usage of the two alternative sites and the resulting potential for subsurface contamination, the Pence Gate site appears more suitable for use as a CDC, compared to the 21st Street site.

4.7.4 What petroleum products or hazardous substances are currently being used at the study area?

Other than the previously-discussed UST release, no additional petroleum products or hazardous substances are known to be located at the Pence Gate site.

Building 630, on the 21st Street site, maintains one 1,000-gallon heating oil UST. However, Building 630 currently uses natural gas to heat the building, and no longer uses this UST, and it is scheduled to be removed from the subsurface in the next 2-4 months through the Tank Removal and Replacement Stimulus Project (ENRD 2009).

Building 612, located to the southwest of the 21st Street site, maintains one 3,000-gallon UST that previously contained #2 heating oil, before Building 612 began using natural gas to heat the facility. This UST is no longer in use and is scheduled to be removed from the subsurface in the near future through the Tank Removal and Replacement Stimulus Project (ENRD 2009).

4.7.5 Would petroleum products or hazardous substances be used during the construction of the CDC?

Construction activities would involve the short-term use of petroleum fuel and lubricants, solvents, and fertilizers, and would generate solid and sanitary waste. Some of these substances could be considered

hazardous if released. The CDC construction contractors would follow the Fort Belvoir Master Spill Plan, which explains required petroleum and hazardous substance spill response procedures.

4.7.6 Would petroleum products or hazardous substances be used during the operation of the CDC?

The Army does not expect that ASTs or USTs containing petroleum or hazardous substances would be required for the operation of the CDC. Operation of the CDC would not involve use of more than minimal amounts of household cleaners for cleaning and fertilizers and pesticides for grounds maintenance. The operation of the CDC should contribute little to cumulative impacts from the use of these substances.

4.7.7 How would the Army mitigate the potential for a release of petroleum products or hazardous substances from the study area?

During construction, control measures (such as the use of approved containers and the proper training and protection of workers) would be implemented to minimize the potential for a release of petroleum or hazardous substances. If a spill of petroleum or hazardous substances were to occur during construction or operation of the CDC, the contractor would call the Fort Belvoir Fire Department immediately and then call the DPW hazardous waste manager. The DPW would direct the contractor on how to contain the spill, and how to dispose of any contaminated materials.

If storage tanks or other potential sources of petroleum or hazardous substances are encountered during construction, or if evidence of a chemical release (such as staining or odors) is detected, the contractor would immediately stop work in the affected area and notify the DPW, which would identify and characterize any impacted soils, and dispose of them appropriately.

If the 21st Street site is chosen for the CDC, the Army would comply with requirements to clean up any contamination to appropriate levels for a children's facility.

4.7.8 How would the No Action alternative affect the use and storage of petroleum products or hazardous substances?

Under the No Action alternative, no activities involving petroleum or hazardous substances would be performed on either site, unless additional concerns were encountered and required a response. Removal of USTs through the Tank Removal and Replacement Stimulus Project would proceed as scheduled.

If the CDC is not built, future plans for these areas might include the use or storage of petroleum or hazardous substances; however, no such plans have been made at this time.

4.8 Air Quality

4.8.1 What is the study area for air quality?

The study area for air quality is the National Capital Interstate Air Quality Control Region (AQCR), which consists of the District of Columbia, Montgomery and Prince Georges Counties in Maryland; Arlington, Fairfax, Loudoun, and Prince William Counties in Virginia, and the Cities of Alexandria, Fairfax, and Falls Church in Virginia.

4.8.2 What would be considered a “significant effect” for air quality?

Effects to air quality could be considered significant if (1) increases in emissions from the proposed action would exceed the “applicability thresholds” under the General Conformity Rules (GCR), or (2) the proposed action would violate federal, state, or local air regulations.

The National Ambient Air Quality Standards (NAAQS) and the General Conformity Rules (GCR)

The Clean Air Act requires the USEPA to set National Ambient Air Quality Standards (NAAQS) for wide-spread pollutants from numerous and diverse sources considered harmful to public health and the environment. The GCR ensure that federal actions in nonattainment and maintenance areas do not affect a region's ability to meet the NAAQS in a timely fashion.

Source: EPA website

4.8.3 Who regulates air quality?

The US Environmental Protection Agency (USEPA) Region 3 and the Virginia Department of Environmental Quality (VDEQ) regulate air quality in Virginia.

4.8.4 What standards apply to air quality?

The Clean Air Act (42 USC 7401-7671q), as amended, gives the USEPA responsibility to establish the primary and secondary National Ambient Air Quality Standards (NAAQS) (40 Code of Federal Regulations (CFR) Part 50) that set acceptable concentrations for seven criteria pollutants: particulate matter (PM₁₀), fine particulate matter (PM_{2.5}), sulfur dioxide (SO₂), carbon monoxide (CO), nitrous oxides (NO_x), ozone (O₃), and lead. Short-term NAAQS (1-, 8-, and 24-hour periods) have been established for pollutants contributing to acute health effects, while long-term NAAQS (annual averages) have been established for pollutants contributing to chronic health effects. While each state has the authority to adopt standards stricter than those established under the federal program, the Commonwealth of Virginia accepts the federal standards.

4.8.5 How is the air quality in this region?

Air-Quality Control Regions (AQCRs) in violation of the NAAQS are called *nonattainment* areas. AQCRs with levels below the NAAQS are *attainment* areas. *Maintenance* AQCRs are areas that were previously designated as nonattainment prior to being re-designated to attainment for a probationary period through implementation of maintenance plans. According to the type of pollutant and the severity of the pollution problem, nonattainment areas can be categorized as marginal, moderate, serious, severe, or extreme. Fairfax County (including Fort Belvoir) is within the National Capital Interstate AQCR (AQCR 47) (40 CFR 81.12). AQCR 47 is in the O₃ transport region that includes 12 states and Washington, DC. The USEPA has designated Fairfax County as the following:

- Moderate nonattainment for the 8-hour O₃ NAAQS.
- Nonattainment for the PM_{2.5} NAAQS.
- Attainment for all other criteria pollutants (40 CFR 81.347).

4.8.6 How does the Army evaluate air quality effects from the proposed action?

Both the USEPA and VDEQ have established the GCR to ensure that federal actions in nonattainment and maintenance areas do not affect a region's ability to meet the NAAQS in a timely fashion.

Although Fairfax County is in attainment for NO_x and SO₂, these pollutants combine in the atmosphere to create PM_{2.5}. In addition, PM_{2.5} is emitted directly. Similarly, O₃ is a byproduct of volatile organic compounds (VOCs) and NO_x emissions. However, unlike PM_{2.5}, O₃ is not emitted directly. Therefore, NO_x, SO₂, PM_{2.5}, and VOCs were analyzed in this EA. Because Fairfax County is in attainment for PM₁₀,

CO, and lead, these pollutants are not of primary concern for this area, and were not analyzed in detail in this EA.

The Army compared the total direct and indirect emissions of NO_x, SO₂, PM_{2.5}, and VOCs associated with the action to applicability threshold levels to determine the level of impact under NEPA (emission rates above which the GCR applies).

4.8.7 How would the proposed action affect air quality?

The proposed action would have both short-term minor and long-term negligible adverse effects to air quality at either site. However, increases in emissions would not exceed the applicability threshold values, and would not violate federal, state, or local air regulations.

The overall building size and construction phasing would be similar for both alternatives and they would have similar levels of emissions. All direct and indirect emissions were estimated (Table 4.8-1). The total direct and indirect emissions associated with the following activities were accounted for:

- Demolition of existing roadways and facilities.
- Construction of the new facilities.
- Personal operating vehicles for construction workers.
- Paving of parking areas.
- Storm water and sewer upgrades.
- Natural gas use.
- Personal operating vehicles for employees and patrons.

The analysis assumed that all the demolition and construction would take place during a single calendar year. Therefore, changes in schedule or construction phasing would not affect the annual emission estimations provided herein. The facility's operational emissions estimates included emissions from employee vehicles and patrons, and the combustion of natural gas. Natural gas demand encompasses the total heating load as well as miscellaneous equipment loads (e.g., ovens, ranges, water heaters, etc.). The use of natural gas is optional since other energy sources can be used to satisfy the heating (e.g., base-wide steam, etc.) and the miscellaneous equipment loads can be converted to electrical demands. Operational emissions would be the same for both alternative sites.

To determine the applicability of the GCR to the proposed action, air emissions were compared to the applicability thresholds and regional emissions budgets (Table 4.8-1 and 4.8-2). The requirements of this rule are not applicable because the highest total annual direct and indirect emissions from these alternatives would not exceed the applicability threshold for any criteria pollutant during any years, and would not be regionally significant. Detailed emission calculations and a Record of Non-Applicability (RONA) are provided in Appendix F.

Table 4.8-1.

Total Estimated Emissions for the Proposed Action

Year	Estimated emissions (tpy)			
	NO _x	VOC	PM _{2.5}	SO ₂
2010	8.7	1.4	0.6	<0.01
Operational	1.8	1.5	0.1	<0.01
<i>De minimis</i> threshold	100	50	100	100
Exceeds threshold?	No	No	No	No

tpy = tons per year

Table 4.8-2.

Annual Emissions Compared to Regional Emissions

	Criteria Pollutant or Precursor			
	NO _x	VOC	PM _{2.5}	SO ₂
Highest Annual Emissions (tpy)	8.7	2.0	0.6	0.02
Regional Emissions (tpy)	117,102	81,190	23,364	231,898
Percent Regional Emissions	<0.01%	<0.01%	<0.01%	<0.01%
Regionally Significant?	No	No	No	No

Source: MWCOG 2007 and 2008

tpy = tons per year

The project is not within a nonattainment or maintenance area for CO; therefore, localized CO hotspots from intersections are not anticipated to be an air quality concern. Particulate matter or Mobile Source Air Toxics from vehicles are not anticipated to be an air quality concern because the intersections affected are primarily secondary arterial roads (*USEPA, 2006 and Federal Highway Administration, 2006*).

4.8.8 How would the proposed action comply with existing air regulations?

During construction, the Army and any contractors would comply fully with current Virginia regulatory requirements, with compliant practices and/or products. These requirements include, but are not limited to, restrictions on:

- Visible emissions and fugitive dust and emissions (9 VAC 5-40-60).
- Asphalt paving operations (9 VAC 5-40-5490).
- Open burning (9 VAC 5-40-5600).
- Use of portable fuel containers (9 VAC 5-40-5700).
- Use of architectural and industrial maintenance coatings (9 VAC 5-40-7120).
- Production of consumer products (9 VAC 5-40-7240 *et seq.*).

4.8.9 Would there be any significant cumulative air quality effects?

No. The Commonwealth of Virginia takes into account the effects of all past, present, and reasonably foreseeable emissions during the development of the State Implementation Plan (SIP). The state attempts to account for all significant stationary, area, and mobile emission sources in the development of this plan. Estimated emissions generated by the proposed action would be below the applicability thresholds and would not be regionally significant. Therefore, the action would not contribute significantly to adverse cumulative effects on air quality.

Although the proposed action's emissions are expected to be minimal when considered alone, the CDC would be constructed during the same time frame as a number of BRAC and BRAC-related construction projects. The Army performed a General Conformity Determination for the BRAC and BRAC-related projects in the 2005 BRAC EIS and negotiated a plan for the reduction of air emissions from those projects ("Final Construction Performance Plan for the Reduction of Air Emissions for Implementation of 2005 Base Realignment and Closure (BRAC) Recommendations and Related Army Actions at Fort Belvoir, Virginia") (CPP), which is Attachment 1 of the Record of Decision for the Implementation of 2005 BRAC Recommendations and Related Army Actions at Fort Belvoir, Virginia and at Appendix D of this EA. Compliance with the CPP is not required for the 338 CDC proposed action; however, Fort Belvoir would voluntarily apply the mitigation measures outlined in the CPP to the construction of the CDC

4.8.10 Do air quality impacts from the proposed action require mitigation?

Standing alone, they do not. However, because the air quality impacts of construction of the proposed action would occur at the same time as the air quality impacts of numerous BRAC and BRAC-related construction projects, Fort Belvoir has decided to extend the mitigation measures contained in Sections 2.0 through 7.0 of the CPP to the proposed action. These mitigation measures consist of limiting construction on Code Orange, Red, and Purple ozone days, requiring all non-road diesel equipment not meeting Tier 2 or better standards to be retrofitted with emission control devices, implementing anti-idling restrictions for both onroad and non-road vehicles and equipment, using Ultra-Low Sulfur Diesel, alternate fuels or fuel additives, and meeting new engine standards for non-road vehicles. For ease of reference, the CPP is included in Appendix D to this EA.

4.8.11 What effect would the No Action alternative have on air quality?

None. Not implementing the proposed action would result in no construction or operational activities. Therefore, the ambient air quality would not change from its current condition.

4.9 Noise

Sound consists of vibrations that travel through a medium, such as air, and are sensed by the human ear. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise, the distance between the noise source and the receptor, the receptor's sensitivity, and the time of day. Noise is often generated by activities essential to a community's quality of life, such as construction or vehicular traffic.

Sound varies by both intensity and frequency. Sound pressure level, described in decibels (dB), is used to quantify sound intensity. The dB is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. *A-weighting*, measured in A-weighted decibels (dBA), approximates a frequency response expressing the perception of sound by humans. The dBA levels of common sounds are provided in Table 4.9-1.

Table 4.9-1
Common Sound Levels

Outdoor	Sound Level (dBA)	Indoor
Motorcycle	100	Subway train
Tractor	90	Garbage disposal
Noisy restaurant	85	Blender
Downtown (large city)	80	Ringling telephone
Freeway traffic	70	TV audio
Normal conversation	60	Sewing machine
Rainfall	50	Refrigerator
Quiet residential area	40	Library

Source: Harris, 1998.

The dBA noise metric describes steady noise levels. Because very few noises are actually constant, the Day-Night Sound Level (DNL) metric was developed. DNL is the average sound energy in a 24-hour period, with a 10-dB penalty added to the nighttime levels (10 PM to 7 AM). It is a useful descriptor for noise because: (1) it averages ongoing yet intermittent noise, and (2) it measures total sound energy over a 24-hour period. In addition, Equivalent Sound Level (L_{eq}) is often used to describe the overall noise environment. L_{eq} is the average sound level in dB.

4.9.1 What is the study area for noise?

The study area for noise includes the project site and all areas within 1,000 feet of the project boundaries. This includes all areas that could be impacted by appreciable levels of noise from either the construction or the operation of the CDC.

4.9.2 What is considered a "significant effect" for noise?

Noise effects would be considered significant if: (1) the proposed action increased the long term noise to levels that were incompatible with nearby sensitive receptors, or (2) the proposed action increased noise levels as to violate any federal, state, or local noise regulation.

4.9.3 What standards apply to noise?

The Noise Control Act of 1972 (Public Law 92-574) directs federal agencies to comply with applicable federal, state, interstate, and local noise control regulations. In 1974, the USEPA suggested that continuous and long-term noise levels in excess of DNL 65 dBA are normally unacceptable for noise-sensitive land uses such as residences, schools, churches, and hospitals.

The Fairfax County Code prohibits the creation of sound louder than 55 dB in an off-post residential area, and 60 dB in an off-post commercial area. In addition, they prohibit noise that interferes with the function of any school, institution of learning, court, or hospital (Fairfax County Code Section 108-4-1). Sounds generated from construction activities are exempt from the Fairfax County ordinance between 7:00 AM and 9:00 PM

4.9.4 What is the current noise environment in the study area?

Existing sources of noise near the proposed site include intermittent roadway traffic, high-altitude aircraft overflights, rotorcraft (helicopter) activities, and natural noises such as the rustling of leaves and bird vocalizations. In general, noise levels would be comparable to a suburban residential setting. Estimated existing noise levels (L_{eq} and DNL) are outlined in Table 4.9-2 (*American National Standards Institute, 2003*).

Table 4.9-2
Estimated Existing Noise Levels at the Alternative Sites (dBA)

Location	Closest Noise Sensitive Area (NSA)			Land Use Category	Estimated Existing Sound Levels (dBA)		
	Distance	Direction	Type		DNL	Leq (Daytime)	Leq (Nighttime)
Pence Gate Site	1000 ft (300 m)	East	Residential	Noisy Suburban	58	52	60
	930 ft (280 m)	North	Church	Residential			
21 st Street Site	145 ft (44 m)	East	Residential	Quiet Suburban	53	47	55
	200 ft (65 m)	North	Residential	Residential			

Source: ANSI, 2003.

4.9.5 How would the proposed action affect the existing noise environment?

Short-term minor and long-term negligible adverse effects to the noise environment would be expected from the construction and operation of the proposed action. Short-term effects would be primarily due to heavy equipment noise during construction. Depending on the types of construction activities and the level of background noise, persons located within 1,000 feet could experience substantial levels of construction noise.

Two churches are located approximately 1,000 feet from the Pence Gate site, adjacent to US Route 1. Noise from traffic on US Route 1 would be substantially louder than construction noise at this distance, and the construction noise would not likely be audible. There are on-post residences located approximately 1,000 feet from the Pence Gate site that would likely hear the construction. There are several on-post residences located closer than 800 feet to the 21st Street site that would experience appreciable amounts of construction noise. Given the temporary nature of construction, the amount of noise that construction equipment would generate, and the limited number of receptors, these effects would be minor.

The CDC would be primarily academic in nature, and there would be no appreciable long-term increases in the overall noise environment from its operation. Some minor changes in traffic patterns would occur, leading to incremental changes in traffic noise near the sites. These effects would be negligible.

4.9.6 How would the proposed action comply with existing noise regulations?

To be consistent with the Fairfax County noise ordinance, construction would occur primarily during normal weekday business hours. In addition, construction noise would dominate the soundscape for all on-site personnel. To comply with existing noise regulations, construction personnel would wear adequate personal hearing protection to limit exposure and ensure compliance with federal health and safety regulations.

4.9.7 Does the noise caused by the proposed action require mitigation?

Although construction-related noise effects would be minor, the following best management practices would be used to reduce these already limited noise effects:

- Construction would occur during normal weekday business hours.
- Construction equipment mufflers would be properly maintained and in good working order.

No other mitigation measures for noise would be required for the operation of the CDC.

4.9.8 Would there be any cumulative noise effects?

No. The proposed action would introduce only short-term incremental increases to the noise environment. These changes would be minor, temporary, and have negligible cumulative effects.

4.9.9 Would the No Action alternative have any noise effects?

No. The No Action alternative would result in no effects on the noise environment. No construction or changes in operations would occur. Noise conditions would remain unchanged compared to existing conditions.

4.10 Infrastructure and Utilities

Construction of any new facility requires an examination of the availability of potable water, electricity, natural gas, communications, stormwater control, sanitary wastewater disposal and solid waste service. This subchapter compares the estimated utility needs of the CDC to the capacities of the currently-available utility infrastructure, to ensure that sufficient utility service is available. This process helps identify what additional utilities infrastructure would be required to implement the proposed action. A maximum occupancy of 462 persons was used to determine the utility needs for the CDC (338 children and 124 staff).

4.10.1 What is the study area for this analysis?

The study area for utilities includes the project site and those nearby areas which are serviced by the same utility providers, as the utility availability to these areas would be impacted by the increased demand created by the CDC.

4.10.2 What is considered a “significant effect” for utilities and infrastructure?

For this analysis, a “significant effect” is defined as a utility demand by the CDC that would result in sporadic, unreliable, or insufficient utility service to the CDC or to other nearby facilities.

4.10.3 How would potable water be supplied to the CDC?

Fort Belvoir owns, operates and maintains the on-Post water supply and distribution system. Fairfax Water (formerly Fairfax County Water Authority) provides potable water for Fort Belvoir. Potable water would be supplied to the CDC from existing potable water lines at either the Pence Gate or the 21st Street site.

4.10.4 Is the study area currently supplied with sufficient potable water?

Yes. The CDC is expected to generate a peak demand of approximately 11,827 gallons per day (*Fairfax County Public Facilities Manual 2001 Section 10-0102.4*). Potable water would be supplied to the Pence Gate site from an existing 8-inch main located approximately 350 feet north west of the CDC. The existing potable water lines at the Pence Gate site would “*be sufficient to meet demand without negatively affecting water quality*” (ENRD 2009).

Potable water would be supplied to the 21st Street site from an existing 10-inch main located south of the project boundary along 21st street. The existing potable water lines at the 21st Street site would “*be sufficient to meet demand without negatively affecting water quality*” (ENRD, 2009).

4.10.5 How would sanitary sewer service be supplied to the CDC?

Fort Belvoir owns, operates, and maintains the on-Post sanitary sewer system, which includes 37 sewage pumping/lift stations and two main pumping stations. The installation discharges approximately 1.3 million gallons (5 million liters) per day of wastewater to the Fairfax County system (*US Army Garrison Fort Belvoir, 2001*).

Sanitary sewer service for either alternative site would be provided with existing sewer lines and pump stations.

4.10.6 Is the study area supplied with sufficient sanitary sewer service?

Yes. The CDC is expected to generate a peak sewer demand of approximately 29,568 gallons per day (*Fairfax County Public Facilities Manual 2001 Section 10-0102.4*). The Pence Gate site would connect to the existing 12-inch main that runs parallel to Belvoir Road. The 21st Street site would connect to the 15-inch line that runs through the northeast corner of the project site (ENRD, 2009). The existing sanitary sewer service at either site would “*be sufficient to meet demand without negatively affecting water quality*” (ENRD, 2009).

4.10.7 Is the existing stormwater infrastructure sufficient for the CDC?

The estimated peak stormwater discharge amount for the project site after construction of the CDC for two-year and ten-year rain events is shown in Table 4.10-1. These numbers are compared to the estimated pre-development (no action) discharges.

Table 4.10-1

Estimated Current and Anticipated Stormwater Discharges from the CDC

Storm Event	Site Condition	Stormwater Discharge Volume (in cubic feet per second)	
		Pence Gate Site	21 st Street Site
Two-year storm event	Pre-development	16.55	20.08
	Post-development	26.28	25.32
	Increase	9.73	5.24
Ten-year storm event	Pre-development	22.08	26.78
	Post-development	35.06	33.78
	Increase	12.98	7.00

The calculations supporting the discharge volumes in Table 4.10-1 are presented in Appendix G. As shown above, constructing the CDC at either site would result in a greater stormwater discharge as a result of the increase in the impervious surface area (asphalt, concrete, and compacted gravel). These post-development stormwater discharges are not considered a significant impact for either alternative site.

The Pence Gate alternative would result in slightly greater post-development stormwater discharge volumes when compared to the 21st Street alternative. This is due to the construction of access roads at the Pence Gate site which are not required at the 21st Street site. In addition, the increase in stormwater flow, compared to the No Action Alternative, is somewhat greater for the Pence Gate alternative than it is for the 21st Street alternative. This is due to the largely unpaved nature of the Pence Gate site – the 21st Street site currently includes a larger impervious surface area from buildings and roads.

4.10.8 How would the Army address the increased stormwater flow resulting from the CDC?

The CDC stormwater system at either alternative site would use stormwater Best Management Practices (BMPs) to reduce the anticipated two- and 10-year flows (the “post-development” row in Table 4.10-1) to no more than the no-action flows (the “pre-development” row in Table 4.10-1), ensuring compliance with stormwater regulations and consistency with Chesapeake Bay quantity and quality control requirements. As a result, the proposed action at either alternative site would not have a measurable effect on the stormwater flows from the study area.

If the Army determines that the receiving streams are not adequate for the stormwater flow, or that *Stygobromus* habitat would be adversely affected (See Subchapter 4.3), additional measures such as a detention pond, underground storage, stream restoration or stabilization, or other engineering solutions could be used.

Stormwater Regulatory Requirements

Section 402 of the Clean Water Act of 1977 established requirements for discharges of industrial and sanitary wastewater effluents, and of storm water through the National Pollutant Discharge Elimination System permit program. In Virginia, this program is administered through the Virginia Stormwater Management Permit (VSMP) program administered by the Department of Conservation and Recreation (VDCR). VDCR is also responsible for enforcing the other requirements of the Virginia Stormwater Management Law (Title 10.1, Chapter 6, Article 1.1 of the Code of Virginia) and regulations (4VAC3-20 et seq.) of the Virginia Administrative Code.

Fort Belvoir is classified as a small municipal separate storm sewer system (MS4) discharger under applicable stormwater regulations. It has a general storm water permit that is in effect through July 18, 2013. Any construction activity such as clearing, grading, and excavation that is greater than 2,500 square feet requires a Virginia Stormwater Management Permit (VSMP). In addition, based on the Executive Council of the Chesapeake Bay Program Directive 01-1, *Managing Storm Water on State, Federal and District-owned Lands and Facilities*, Fort Belvoir personnel are to lead by example in controlling nutrient, sediment and chemical contaminant runoff during project construction and operation of the proposed site. Fort Belvoir implements this by following the Fairfax County Chesapeake Bay Preservation Ordinance at Chapter 118 of the Fairfax County Code.

4.10.9 How would natural gas service be supplied to the CDC?

Fort Belvoir's natural gas system is owned and operated by Washington Gas. Natural gas is distributed to the Post through 25 miles of main gas line and 11 miles of service line, mostly servicing housing areas.

4.10.10 Is the study area supplied with sufficient natural gas?

Yes. For the Pence gate site, an existing 6-inch natural gas line located north of Taylor Road has enough capacity to meet the CDC's needs. Approximately 200 feet of on-site underground gas line would be

required to connect to this main. The 21st Street site would connect to the existing 4-inch natural gas line that runs through the proposed CDC site. This line has sufficient capacity to meet the CDC's needs.

4.10.11 Is the study area supplied with sufficient electrical power?

Dominion Virginia Power owns the entire on-Post electrical system, including the distribution feeder system. As of 2000, 10 substations were located on Post. These substations were used to transform from the Dominion Virginia Power substation to a Fort Belvoir-owned combination substation to switching stations (US Army Garrison Fort Belvoir, 1998), prior to Dominion Virginia Power ownership.

The estimated electrical demand of the CDC is 320,893 volt amps (US Army Corps of Engineers Website, 2009). A preliminary review has indicated that this usage would be within the capacity of the existing infrastructure at either alternative site. During the design stage of the CDC, a load letter would be sent to Virginia Dominion Power and the project would adhere to all applicable local, state and federal laws.

The Pence Gate site currently has both secondary and primary overhead electrical lines on the project site. The 21st Street site would connect to the 346 circuit along Theote Road.

4.10.12 Is the existing communications infrastructure sufficient for the CDC?

The installation owns the entire communications system, including copper and fiber optic cables, utility poles, and computerized switchboard systems. Most distribution cable is carried overhead on utility poles, while most fiber-optic cable is carried through an underground duct bank, along with some conventional cable (US Army Garrison Fort Belvoir, 1998). At the Pence Gate site, both an underground duct bank and communication lines run parallel to Taylor Road. Approximately 350 feet of additional communications line would be required to connect the CDC at the Pence Gate site. At the 21st Street site, existing underground duct banks and communications lines are located within 100 feet of the proposed CDC location.

4.10.13 Can the solid waste generated by the CDC be disposed of with the current waste services?

Based on the calculated maximum number of children and staff of 400, and on an estimated solid waste generation rate of 4.6 pounds per day per person (USEPA Solid Waste Website, 2009), the CDC could

generate up to 1,840 pounds (0.92 tons) of solid waste per day. With an expected operating schedule of 251 days per year, the CDC could generate up to 461,840 pounds (231 tons) per year of solid waste.

A civilian contractor currently collects Fort Belvoir's solid waste (approximately 10,460 tons per year), which is disposed of at a state-approved, off-Post landfill (US Army Garrison Fort Belvoir, 2001). The maximum expected solid waste generated by the CDC, given above, represents a 2.2 percent increase in the amount of solid waste generated by the installation, and is therefore expected to be well within the capacity of Fort Belvoir's existing infrastructure and contractual arrangements.

Fort Belvoir has a mandatory Post-wide Qualified Recycling Program which collects white paper, colored paper, newspaper, aluminum cans, tin/steel cans, scrap metal, cardboard, glass bottles, plastic containers, and toner cartridges. In 2008, 657 tons of cardboard, 387 tons of scrap metal, 346 tons of paper and 172 tons of commingled recyclables including aluminum, glass, plastic, and newspaper were collected on Fort Belvoir and sold through the Qualified Recycling Program. Controlled non-regulated solid waste (special and universal waste), such as tires, used oil, paint and fluorescent lighting, batteries, pesticides, thermostats, mercury-containing equipment and scrap metal, is handled through the Environment and Natural Resources Division in accordance with RCRA (40 CFR 273).

4.10.14 Would the No Action alternative impact the availability of utilities?

No. Under the No Action alternative, no new structures or other facilities would be constructed at either alternative site, and there would be no increase in the need for utilities. It is possible that the Army would eventually decide to build another facility at the project sites, but no such plans exist currently.

4.11 Socioeconomics

This subchapter analyzes:

- The impacts of the proposed action on the ability of local businesses and the local workforce to generate revenue and income.
- Any potential changes in the local population that could cause a change in the demand for goods and services, including housing.
- Whether the proposed action would have disproportionate impacts on any minority or low income populations located near the project area. Executive Order (EO) 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*)

requires all federal agencies to evaluate how their programs, policies, and activities could affect minority and low income neighborhoods.

4.11.1 What is the study area for this analysis?

The study area for socioeconomics is similar to that for land use for the purposes of assessing impacts on minority and low income populations. It is somewhat more far-reaching when assessing impacts on personal incomes in the region, and on businesses and revenues. The study area for impacts on personal and business revenues includes Fort Belvoir and the surrounding portion of Fairfax County. The CDC workforce would come primarily from Fairfax County, and possibly from Prince William and Stafford counties.

4.11.2 What is a significant effect for socioeconomics?

The impacts of the project would be considered significant if it had a long-term, disproportionate adverse impact on minority or low-income populations, or if it changed employment or generation of business revenues in Fairfax County by more than a few percent.

4.11.3 Who lives in the study area?

In 2006, an estimated 1.04 million people lived in Fairfax County (Fairfax County Website, 2008). Fairfax County's population (including Falls Church City) is expected to increase by another 95,000 people (nine percent) by the year 2010. The population along Northern Virginia's I-95 corridor (including Fairfax County, Fairfax City, Falls Church City, Prince William County, Manassas City, Manassas Park City, and Stafford County) is expected to increase by 177,000 (11 percent) by the year 2010 (*US Army Corps of Engineers, Mobile District, August 2007*).

As of January 2006, Fort Belvoir had a working population of about 22,150 persons and supported 2,070 family housing units (*US Army Garrison Fort Belvoir Website, 2006*) (the actual number of residents occupying family housing units varies over time). The workforce number will grow by about 19,000 (see Subchapter 2.2) additional workers for a total of 34,880 as a result of the 2005 Base Realignment and Closure actions (*College, Craig E, August 2007*).

Table 4.11-1 provides data from the 2000 US Census on race and ethnicity for Fort Belvoir, nearby Accotink Village, the surrounding Fairfax County, and the Commonwealth of Virginia as a whole. Table 4.11.2 provides similar data as estimated for 2005 by the American Community Survey. For Tables 4.11-

1 and 4.11-2, the “Fort Belvoir Census Designated Place (CDP)” is Fort Belvoir itself. Accotink Village is a small village on US Route 1 near the Pence Gate site, surrounded by Fort Belvoir. Accotink Village and Fairfax County are home to proportionately more non-white minorities than the state as a whole, but more than half of the population of Accotink Village (210 out of 390 residents) belongs to a racial or ethnic minority. Therefore, Accotink Village qualifies as an Environmental Justice community on the basis of racial or ethnic criteria.

Census Designated Place (CDP)

A CDP is a non-incorporated area identifiable by name with sufficient density of population to justify recognition for census purposes.

**Table 4.11-1
Race and Ethnic Distribution for 2000 Census (Percent)**

Jurisdiction	White	Black ¹	Other Non-White	Two or More Races	Total Non-White	Hispanic ²
Fort Belvoir CDP	55.7	31.8	8.2	4.3	44.3	10.5
Accotink Village ³	46.2	37.4	12.1	4.3	53.8	7.9
Fairfax County	69.9	8.6	17.9	3.7	30.1	11
Commonwealth of Virginia	72.3	19.6	6.1	2.0	27.7	4.7

Source: *US Census Bureau in: US Army Corps of Engineers, Baltimore District, October 2008*

¹ Having origins in any black racial groups of Africa.

² Hispanic origin, may be of any race.

³ Block group 2 of census tract 4220.

Table 4.11-2
2005 Total Population Estimate (Percent)

Race	Commonwealth of Virginia	Fairfax County	8 th Congressional District
White	71.7	68.3	68.8
Black or African American	19	9.2	13
Other Non-white	9.3	22.5	18.2
Hispanic (any race)	6	12.6	15.6

Source: US Census Bureau, 2005 American Community Survey in: US Army Corps of Engineers, Baltimore District, October 2008

The 2005 American Community Survey does not break out data for the Fort Belvoir CDP or Accotink Village. Instead, data for the 8th Congressional District (109th Congress) are presented. The 8th District is adjacent to Fort Belvoir, and includes Accotink Village and other parts of Fairfax. Tables 4.11-1 and 4.11-2 show that little change occurred in the racial and ethnic distribution of Virginia and Fairfax County between 2000 to 2005. They also show that both Fairfax County and the 8th Congressional District are more ethnically diverse than the state as a whole.

4.11.4 Are there low income communities in the study area?

Based on Census 2000 data, 5.6 percent of the population within the Fort Belvoir CDP was living in poverty (Table 4.11-3). However, military personnel salaries do not necessarily reflect benefits such as on-base housing (or off-base housing allowances), Army-provided medical care, or the ability to purchase goods at lower prices at the Post Exchange. Therefore, income alone is not a good metric for poverty level when considering a military community.

Table 4.11-3
Median Income and Poverty for 1999

Jurisdiction	Median Household Income (\$)	Median Family Income (\$)	Persons Living in Poverty (Percent)
Fort Belvoir CDP	39,592	39,107	5.6
Accotink Village ¹	31,696	26,875	N/A
Fairfax County	81,050	92,146	4.5
Commonwealth of Virginia	46,677	54,169	9.6

Source: US Census Bureau Website, 2005 and 2008 in: US Army Corps of Engineers, Baltimore District, October 2008

¹ Block group 2 of census tract 4220.

No Census 2000 poverty data are available for Accotink Village alone. However, income data from 1999 indicate that the median household income in Accotink Village at that time was \$31,696, as opposed to \$81,050 for Fairfax County and \$46,677 for Virginia as a whole. Thus, Accotink Village is significantly poorer than the surrounding jurisdictions, and qualifies as an Environmental Justice community on the basis of income, as well as race and ethnicity.

4.11.5 Would the proposed action unfairly affect minority or low-income populations?

Answering this question requires a determination of: 1) how would the construction and operation of the proposed CDC would affect people living in the area; and 2) would Accotink residents be disproportionately affected, compared to other area residents.

The potential vectors of impacts to residents around Fort Belvoir would be: 1) during construction, a slight increase in noise and fumes from construction machinery, and a slight increase traffic from construction workers and trucks delivering construction materials or hauling away debris; and 2) during operation, a slight increase in the number of vehicles using US Route 1 to access Fort Belvoir and the CDC.

Accotink Village is located approximately one mile from the Pence Gate site, and about 2.3 miles from the 21st Street site. It is unlikely that construction at either site would expose residents of Accotink Village to noise or fumes during construction. The additional vehicle trips generated by construction vehicles, visitors, and employees of the CDC would be minor, and any impact from these trips would be shared by residents at Fort Belvoir and this part of Northern Virginia equally. Therefore, neither proposed action alternative would result in disproportionate impacts to residents of Accotink Village. The details of these impacts are addressed in Sections 4.8, 4.9, and 4.13 of this document.

4.11.6 What about children living in the study area?

Table 4.11-4 shows the percentage of the populations at Fort Belvoir CDP, Accotink Village, Fairfax County, and Virginia that are under 18 as of 2000. The Fort Belvoir CDP had a higher proportion of under-18 residents than the state as a whole, because of the many military families housed on-Post. These under-18 residents are likely to be concentrated in the residential areas of the Post, most of which are located on the South Post.

Table 4.11-4
Under-18 Population in 2000

Jurisdiction	Population (%)
Fort Belvoir CDP	44.4
Accotink Village ¹	20.3
Fairfax County	25.4
Commonwealth of Virginia	24.5

Source: US Census Bureau Website 2005 in: *US Army Corps of Engineers, Baltimore District*, October 2008

¹Block group 2 of census tract 4220

Similar to EO 12898, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires government agencies to recognize that children may suffer more than adults from environmental health and safety risks. (Children are more apt to ingest or touch items that contain contaminants, e.g., lead paint on window sills). This EO directs federal agencies to identify and assess such risks, and to ensure that its policies, programs, activities, and standards address effects on children.

The Pence Gate site is located adjacent to one Post residential area – George Washington Village. The 21st Street site is located across Gunston Road from Gerber Village. It is unlikely that the implementation of the proposed action at either site would expose children from these neighborhoods or any other children to any health risks during construction. The Army would require the construction contractor to ensure that construction machinery, fuels, lubricants, etc. are not accessible to children.

The CDC itself would be constructed in compliance with the Army Standards for Child Development Centers, the National Association for the Education of Young Children [NAEYC]), and similar organizations. These standards prevent the use of toxic or hazardous substances in a manner that can cause risk to future users or residents, as well as define safety standards for various aspects of the indoor and outdoor CDC facilities.

4.11.7 Is there a high or low rate of employment within the study area?

The Virginia Employment Commission reported Fairfax County's employment in April 2009 to be 568,789. The number for Virginia as a whole was 3,879,460; thus, Fairfax County accounted for almost 14.7 percent of statewide employment. Unemployment in Fairfax County for April was 4.5 percent, as compared with 6.6 percent for Virginia and 8.6 percent for the United States as a whole (*Virginia*

Employment Commission Website, June 2009). However, these rates have risen from 2007, when the comparable rates were 2.2 percent for Fairfax County, 3.0 percent for Virginia, and 4.6 percent for the United States as a whole (*Virginia Employment Commission Website*, July 2008).

4.11.8 Would the proposed action increase or decrease area employment or revenues?

The proposed action would generate beneficial multiplier effects for local businesses as construction workers purchase gas and other local goods, and use local restaurants and other services. The construction of the CDC would generate construction jobs lasting about 6 months.

The operation of the CDC would generate 130-150 long-term jobs for teachers, administrative workers, and building and landscape maintenance workers. Most of these positions could be filled from the local workforce. Very few if any potential employees would move their residence to Fairfax as a result of the proposed project. There would be little impact to the demographics around Fort Belvoir, because the new long-term employees would be a small fraction of a percent of the current Fairfax County worker population.

4.11.9 Would the No Action alternative have an impact on socioeconomics?

The No Action alternative would forego the opportunity to generate the short-term construction and long-term caretaker jobs.

4.12 Community Facilities & Services

4.12.1 What are community facilities and services?

Community services include government-provided education, safety, security, medical services, and recreation centers. Community facilities primarily include: schools and colleges; police and other security services headquarters and stations; fire and emergency response stations; hospitals and emergency treatment centers; and active and passive recreational facilities in public ownership. An increase in a population living, working, or vacationing within a specific area can increase the need to use these services and facilities, thus pressuring governments to expand services or provide additional new facilities.

The proposed action is itself a community service. It is being provided by the Army to address the needs of new residents and workers that will be arriving as part of the 2005 BRAC action for child care in the 6 months to 5 year-old age group.

4.12.2 What is the study area for this analysis?

The study area for this analysis includes Fort Belvoir and the parts of Fairfax County located adjacent to the Main Post.

4.12.3 What is considered a “significant effect” for community facilities and services?

The proposed action would cause a significant effect if it generated the need for new facilities, such as a new fire station or a new emergency medical center; or if it contributed to the need to hire a large number of new security, fire, or emergency personnel.

4.12.4 Who currently provides safety and security services in the study area?

Safety and security issues at Fort Belvoir are handled by the Directorate of Emergency Services, which includes the Army’s Military Police (MP) and the Fire Department. The MP headquarters are located on Abbot Road on the North Post. There are three fire stations on Fort Belvoir housing five fire companies (three engine companies, one ladder truck company, and one airport crash company), with a total staff of approximately 65 firefighters (*Fort Belvoir DPW ENRD*, 2002, in: *US Army Corps of Engineers, Mobile District*, August 2007). At least 21 firefighters are on duty 24 hours a day. According to the 2008 Fort Belvoir map, the Fort Belvoir fire station off Abbott Road on the North Post is the closest station to the Pence Gate Site, while the station at the intersection of 16th Street and Gunston Road on the South Post is the closest station to the 21st Street site.

Additionally, Fort Belvoir has mutual aid police and fire service agreements with Fairfax County (*US Army Corps of Engineers, Mobile District*, August 2007). The stations closest to the site are Fairfax County Fire Station 37 at 7936 Telegraph Road, and the Franconia Police Department at 6121 Franconia Road (*Fairfax County Geographic Information Systems Website*, May 2008 in: *US Army Corps of Engineers, Baltimore District*, October 2008).

4.12.5 What medical services are available in the study area?

INOVA Mount Vernon Hospital is the closest operational hospital to Fort Belvoir. INOVA Mount Vernon Hospital is a 237-bed facility (*Fairfax County Website*, accessed February 2005 in: *US Army Corps of Engineers, Baltimore District*, October 2008) located about 4 miles (8 km) northeast of the Fort Belvoir South Post.

By 2011, medical needs of military personnel and their dependents (and, in an emergency, civilian personnel) at Fort Belvoir will be served by the Fort Belvoir Community Hospital located on the South Post, almost adjacent to the Pence Gate site. The hospital will serve up to 130 inpatients, and is expected to become a major outpatient facility.

Currently, there are also three dispensaries located at Fort Belvoir; two located near the residential areas and a third located at Davison Army Airfield. In addition, there are 16 hospital/urgent-care facilities in Fairfax County and five others in nearby Arlington County and Alexandria City (*Fairfax County Website*, February 2005 in: *US Army Corps of Engineers, Baltimore District*, October 2008).

4.12.6 How would the proposed action affect these services?

Any proposal that has the potential to increase the number of employees or visitors to an area may also cause an increased demand for fire, police, and medical services. However, the number of CDC employees would be negligible compared to the number of Fort Belvoir employees that are presently using these services (22,150), or that will be using these services (41,150) by the time the CDC would be operational. Most of the 124 workers would come from Fort Belvoir or adjacent communities, and would not therefore increase the number of people living, working, or vacationing within the area.

4.12.7 What recreational facilities are currently available to Fort Belvoir workers and residents?

Fort Belvoir offers 1,006 acres of recreational areas that are convenient to the population they serve. Facilities likely to be used by CDC staff for recreation or field trips for the children include softball and soccer fields, and some of the natural areas that are open to recreational uses (e.g., Accotink Bay Wildlife Refuge). The Fairfax County Park Authority also operates over 400 parks on more than 24,000 acres, including indoor recreational centers; five nature centers, a horticulture center, a working farm, an activities/equestrian center, an indoor ice-skating rink, and hundreds of athletic fields, picnic areas, playgrounds, historic sites and trails. A wide variety of activities and programs are operated at the county

parks and recreational centers (*Fairfax County Website, 2005 in: US Army Corps of Engineers, Baltimore District, October 2008*).

4.12.8 How would the proposed action affect these facilities?

The CDC would increase the availability of child development and care services to residents and workers on the Post. The CDC would generate a negligible increase in the demand for services such as security/police, medical/emergency services, and recreational facilities.

Constructing the CDC at the Pence Gate site would require the removal of a ball field. Constructing the CDC at the 21st Street site would require the demolition of a thrift store and a meeting area for the Boy Scouts of America and Girls Scouts of the USA. If the CDC is constructed, these former site uses would be discontinued on-Post.

4.12.9 How would the No Action alternative affect community facilities and services?

The No Action Alternative would not provide another child development and care for the local, regional, and national military community. Workers at Fort Belvoir would be forced to find child care services off-Post, and these services may not fit the needs of the military families attached to Fort Belvoir. The demand for community services and facilities would still increase as the resident and workforce populations increase as the result of BRAC 2005.

4.13 Transportation and Traffic

This section describes the existing transportation systems near Fort Belvoir, the effects of the proposed action, and potential mitigation measures, if required.

4.13.1 What is the study area for transportation and traffic?

The study area for transportation and traffic includes the roadway network, gates, and other transportation resources on and near Fort Belvoir (Figure 4.13-1, *Fort Belvoir Transportation Network*). The focus of the discussion is small changes in traffic volume at Pence Gate (near the intersection of Belvoir Road and US Route 1) and at Tulley Gate (near the intersections of Pohick Road and US Route 1).

4.13.2 What is considered a “significant effect” for transportation resources?

A “significant effect” for traffic is defined as a long-term increase in traffic that changes the operating conditions of nearby roadways, intersections, or gates.

4.13.3 What is off-post traffic like now?

Poor. Fort Belvoir is located along US Route 1 between Woodbridge and Alexandria. Traffic on roadways surrounding Fort Belvoir is generally congested in the morning and afternoon rush-hours. These include roadways such as the Fairfax County Parkway and US Route 1. Further to the west is Interstate 95 (I-95), which is congested during the morning and afternoon rush-hour, with up to three hours of congestion any given day.

During other times, very little traffic congestion occurs on roadways off-post. The intersection of Pohick Road and US Route 1 is currently uncongested during the weekday mornings, but congested during the afternoon. The intersection of Belvoir Road and US Route 1 is currently uncongested in both the morning and afternoon (*US Army Corps of Engineers (USACE), 2007*).

4.13.4 What is on-post and gate traffic like now?

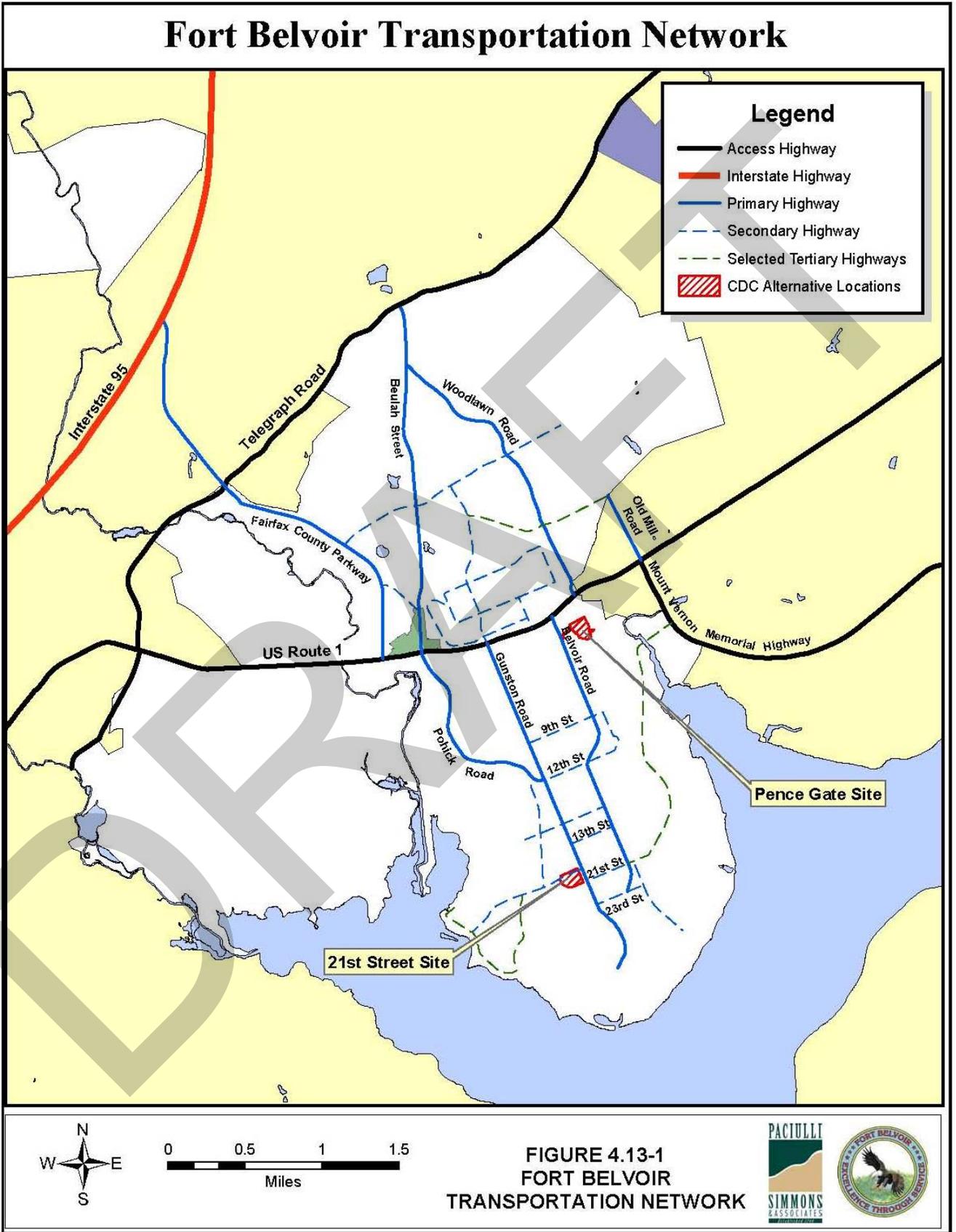
Fair. Roads on Fort Belvoir form a grid pattern, and primary roadways link the gates with major facilities on-post (Figure 4.13-1). Primary roads serve as main arteries carrying traffic onto and off the post and connecting main parts of the installation. Primary roads include:

- Pohick Road from the Tulley Gate/US Route 1 to Gunston Road.
- Belvoir Road from Pence Gate/US Route 1 to major functional areas on South Post.

Traffic heading for the CDC would likely enter the installation through Pence Gate or Tulley Gate as they are the most accessible (Figure 4.13-1, *Fort Belvoir Transportation Network*). Morning queues often form at these gates as people wait to be checked, sometimes causing traffic to back up onto US Route 1. The inbound traffic volume for Tulley Gate is 1,519 vehicles per hour (vph) during the busiest hour. The inbound traffic volume for Pence Gate is 585 vph during the busiest hour (USACE, 2007a). Most roadways on South Post have two lanes, with speed limits of 15 to 40 miles per hour.

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4.13.5 What transit service is available in the study area?

Bus routes link the US Route 1 Corridor to the Yellow Line Metro Stations, the King Street Virginia Railway Express Station, and an Amtrak Station. On-Post, the bus route runs along Belvoir Road, 9th Street, and Jackson Loop on South Post. The Metrorail facilities are located within four miles (Blue Line) and seven miles (Yellow Line) from Fort Belvoir. Currently, no on-Post shuttle circulator services exist.

4.13.6 How would the construction of the CDC affect traffic?

Traffic would increase due to additional construction vehicles and traffic delays near the construction site. These effects would be temporary in nature and would end when construction ends. The local roadway infrastructure is sufficient to support any increase in construction vehicle traffic.

4.13.7 How would the proposed action affect future traffic volumes?

In general, off-Post traffic would decrease due to a reduction in the use of off-post daycare facilities, consolidation of these services on the installation, and the subsequent reduction in the number of vehicle trips through the gates. These traffic volumes are a small fraction of the overall volume on US Route 1 during these peak periods, and changes in traffic patterns would be seen primarily on post. Regardless, intersection adjacent to both Pence and Tulley gates are expected to operate at an acceptable level of service with or without the proposed action.

Individual gates and on-post intersections may experience increases in traffic as patrons drop off and pick up their children. Because the patrons would work at Fort Belvoir with or without the proposed action, these increases would be offset by traffic decreases at other gates, and consolidation of patron travel from their work area to and from the CDC. For example, under the Pence Gate alternative, Pence Gate would likely see an increase in through traffic. However, other adjacent gates such as Tulley Gate would see an equivalent decrease in through traffic. These effects would be less pronounced under the 21st Street alternative because of that site's location internal to Fort Belvoir and its accessibility from multiple gates.

For the Pence Gate alternative, Old Washington Road and Taylor Road would be closed to through traffic. These are tertiary roadways within Fort Belvoir. Vehicles currently using these roadways would naturally reroute creating minor, unnoticeable, changes in on-post traffic patterns. Local traffic within the installation would continue to be heavy during the peak periods for areas of the installation that are primary destinations for on-post traffic. The primary and secondary roadways within the installation would service traffic changes created by the CDC.

For the 21st Street Alternative, Caples Road would be removed. However, this road only serves to provide access to Buildings 629 and 630, which would be demolished if the 21st Street site is chosen. Therefore the demolition of this road would not be expected to affect traffic.

Trip generation rates published by the Institute of Transportation Engineers were applied to determine the traffic volumes attributable to the CDC. The estimated daily and peak period traffic for full occupancy of the CDC are outlined in Table 4.13-1. The proposed action would introduce 130 to 150 permanent personnel and up to 338 patrons. Notably, the vast majority of the CDC patrons currently works on main post or will work on main post regardless of whether or not the CDC is built. The estimated daily and peak period traffic for full occupancy of the CDC are outlined in Table 4-1. At full capacity, CDC employees and patrons would account for 233 vehicle trips during the AM peak period and 181 vehicle trips during the PM peak period on any given weekday. This constitutes the upper bound of effects; assuming all patrons and employees would reside off-post and the CDC would operate at full occupancy. On weekends, traffic generated by the working population and most for the CDC would be absent. Slight changes in traffic are expected on South Post during weekday peak periods. These effects would be more noticeable on streets near the two alternative sites than on any of the regional roadways. See the Transportation Discipline Report in Appendix H for additional information.

Table 4.13-1

Estimated Trips Associated with the Proposed CDC at Full Occupancy^a

Period	Number of Trips	Percent of Gate Traffic
Pence Gate Alternative^b		
AM Peak Period	233	40%
PM Peak Period	181	31%
21st Street Alternative^c		
AM Peak Period	233	11%
PM Peak Period	181	9%

Source: ITE 2003.

a All trips would occur with or without the proposed action.

b All trips assumed to reroute to Pence Gate.

c All trips assumed to split between Pence Gate and Tulley gate.

4.13.8 How would local surface streets operate in the future?

To accommodate the BRAC Action, a number of roadways will be widened or otherwise improved (including Belvoir, Pohick, and Gunston Roads, and Ninth Street), Pence and Tulley Gates will be improved, and a new gate would be constructed (at the old Lieber Gate). Even with these improvements, it is expected that the road conditions would continue to deteriorate compared to existing conditions, because traffic volumes continue to grow. This is independent of the establishment of the CDC.

The operation of the CDC would have additional long-term minor adverse effects on transportation resources. Small, generally unnoticeable changes to the transportation system would be expected. As outlined above, the changes would be primarily caused by small shifts in localized traffic patterns from CDC patrons.

4.13.9 What changes or additions to the existing road network are expected with the CDC?

As shown in Figure 3-1, For the Pence Gate alternative Old Washington Road and Taylor would be closed to through traffic. These are tertiary roadways within Fort Belvoir. Vehicles currently using these roadways would naturally reroute creating minor, unnoticeable, changes in on-post traffic patterns. Local traffic within the installation would continue to be heavy during the peak periods for areas of the installation that are primary destinations for on-post traffic. The primary and secondary roadways within the installation would service traffic changes created by the CDC project. For the 21st Street Alternative, Caples Road would be permanently closed. This is not expected to affect traffic patterns on-Post.

4.13.10 How would the proposed action affect parking facilities?

Parking upgrades would be adequate for the new CDC. The CDC would have a total of 146 parking spaces, which would be adequate for the staff and patrons.

If the 21st Street site is chosen, approximately 24,500 square feet of parking and storage areas at the north-adjacent facility would be removed. Fort Belvoir would evaluate the need for parking and storage areas to the north of Warren Road and would create a reconfiguration or replacement plan to address these needs if the 21st Street site is selected.

4.13.11 How would the proposed action affect transit?

Because the administrative personnel and patrons would be within driving distance of the CDC and transit access would be limited, the proposed action would likely have no effect on public transit, rail, bus, or air traffic in the area.

4.13.12 How would the proposed action affect bicycle and pedestrian facilities?

The project would not affect the existing facilities once any new roadways have been completed. Depending on the construction sequence, short-term closures of bicycle and pedestrian facilities might be required during construction. However, these facilities would reopen once construction is completed. Impacts to bicycle and pedestrian facilities are therefore expected to be negligible.

4.13.13 How would the Army avoid or minimize adverse transportation effects from the proposed action?

During the construction and operation of the proposed CDC the following efforts could be implemented to minimize adverse effects:

- Equipping all construction vehicles with backing alarms, two-way radios, and Slow Moving Vehicle signs when appropriate.
- Routing and scheduling construction vehicle traffic to minimize conflicts with other traffic.
- Strategically locating construction material staging areas to minimize traffic effects.
- Designing circulation roads primarily one-way.
- Incorporate traffic-calming measures and create a more pedestrian-friendly environment.
Reducing the speed limits at the CDC itself.
- Installing speed bumps.
- Placing street signage and traffic control at new roadways.

No mitigation measures for traffic would be required for the operation of the CDC.

4.13.14 What impact would the No Action alternative have on transportation and traffic?

None. Not implementing the proposed action would result in no construction or operational activities. Therefore, the changes in transportation resources otherwise expected from the proposed action would not occur.

4.14 Impact Summary

All of the impacts shown below are adverse impacts, unless specifically noted as “beneficial.”

ISSUE	PENCE GATE SITE ALTERNATIVE	21 ST STREET SITE ALTERNATIVE	NO ACTION ALTERNATIVE
Land Use, Plans and Coastal Zone Management	Minor	Minor	No Impact
Soil and Topography	Negligible	Negligible	No Impact
Upland Vegetation and Wildlife	Minor	Negligible	No Impact
Surface Water, Water Quality, and Floodplains	Minor	Negligible	No Impact
Waters, Wetlands, and Chesapeake RPAs	Negligible	Negligible	No Impact
Historic, Cultural, and Architectural Resources	No Impact	No Impact	No Impact
Petroleum and Hazardous Substances	Negligible	Moderate	No Impact
Air Quality	Minor	Minor	No Impact
Noise	Minor	Minor	No Impact
Infrastructure and Utilities	Minor	Negligible	No Impact
Socioeconomics	Negligible Beneficial	Negligible Beneficial	Negligible
Community Facilities and Services	Negligible Adverse and Minor Beneficial	Negligible Adverse and Minor Beneficial	Negligible
Transportation and Traffic	Minor	Minor	No Impact

Impact magnitudes, in order of ascending concern, are: no impact, negligible, minor, moderate, and significant.

4.15 Mitigation

The CEQ NEPA Regulations (40 CFR § 1508.20) provide five types of mitigation measures to deal with significant environmental effects.

1. **Avoiding** the impact altogether by not taking a certain action or parts of an action.
2. **Minimizing** impacts by limiting the degree or magnitude of the action and its implementation.
3. **Rectifying** the impact by repairing, rehabilitating, or restoring the affected environment.
4. **Reducing or eliminating** the impact over time by preservation and maintenance operations during the life of the action.
5. **Compensating** for the impact by replacing or providing substitute resources or environments.

Adequate and effective mitigation should therefore result in a physical change to the proposed action that will actually reduce or eliminate impacts.

As discussed in the preceding sections, compliance with regulatory requirements such as Section 404 of the Clean Water Act and the Virginia Stormwater Management and Erosion and Sedimentation Control regulations would minimize most impacts and obviate the need for additional mitigation measures. Fort Belvoir's policies and other mitigation efforts would help minimize any additional impacts not regulated by state or federal statute. These include:

- Compliance with the Fairfax County Chesapeake ordinance would further minimize impacts on water quality and the resources dependent on good water quality, such as wetlands and wildlife, particularly the Northern Virginia well amphipod.
- Application of Fort Belvoir's Riparian Buffer Policy would protect or mitigate for impacts to stream buffers not otherwise protected under the Chesapeake Bay Ordinance. There are non-Chesapeake Bay riparian buffers at or near both alternative sites.
- Fort Belvoir would reduce impacts on existing trees and native vegetation that are not otherwise regulated. It would also plant trees at a 2:1 ratio to replace those of 4-inch diameter or greater lost from clearing and grading. These actions would, in turn, reduce impacts on wildlife habitat and the species associated with that habitat, such as Partners in Flight (PIF) species.
- Planting native wetland plants in storm drainage areas to promote habitat as well as maintenance of water quality through infiltration and/or filtration.
- Landscaping with a mixture of deciduous shade and flowering trees throughout the landscaped areas of the chosen site.
- Construction control measures to limit accessibility of hazardous substances stored on-site, and to minimize the potential for their release.

- Voluntary compliance with the Fairfax County Noise Control Ordinance to limit construction noise.
 - Limiting construction to normal business hours on weekdays, with no weekend work performed.
 - Short and long-term traffic control measures.
 - Implementation of the recommendations of the Woodlawn Historic District Viewshed Study.
 - Adherence to the Fort Belvoir Invasive and Exotic Vegetation Management Plan, to mitigate the potential for invasive species to be brought to or from the selected CDC site.
-

4.16 Cumulative Impacts

Cumulative impacts are the incremental impact caused by an action added to other past, present, and reasonably foreseeable future actions. The consideration of cumulative impacts is not necessarily restricted to only those actions caused by the same agency or project proponent. It is important that the Army consider the effects of the proposed action in the context of other development in the community or region (Council on Environmental Quality, January, 1997).

4.16.1 What is the study area for cumulative impacts?

The study area for this project includes Fort Belvoir and the adjacent portions of Fairfax County.

4.16.2 What other actions are reasonably foreseeable in the study area?

Implementation of BRAC 2005 will include construction of some 20 facilities at Fort Belvoir to support realignment of Army agencies and associated transfers of personnel. In addition, the Army foresees 32 non-BRAC projects at the installation that would occur during the same time as implementation of the BRAC implementation, from small-scale projects involving only renovations of existing buildings to large projects involving the construction of new structures and associated parking, utilities, and other infrastructure. For the BRAC 2005 EIS process, Fairfax County identified over 185 publicly and privately-proposed projects, planned within three miles of Fort Belvoir, 20 of which are at least 20 acres in size (*BRAC EIS*, August 2007).

4.16.3 To what extent would the proposed action contribute to cumulative impacts?

To a minor extent. The CDC project is an economic stimulus project. The proposed action would change land use at one of the two proposed CDC sites. Construction of the CDC at the Pence Gate site would result in the loss of recreational facilities and the conversion of unused fields and forested areas. The 21st Street alternative would displace the thrift store and the boy scouts/girl scouts meeting building. Fort Belvoir does not have another location to move these private functions to on-Post, but the use of nearby Fairfax County community resources to provide these opportunities in the future would make the loss negligible. The benefit of using either of these sites is that they have been previously developed, and the impacts on natural resources would be minimal.

The Army is also considering the Pence Gate site as the location of the planned National Museum of the US Army (NMUSA). As shown on Figure 4.16.1, constructing the CDC at the Pence Gate site would preclude siting the NMUSA at this location. Due to development constraints including US Route 1, Belvoir Road, and the slopes to the southeast, the NMUSA could not be constructed at Pence Gate without using land that is needed by the CDC. The Army is currently preparing a revised EA for the construction and operation of the NMUSA, based on a Draft EA released in October 2008.

The proposed action and other reasonably-foreseeable projects would involve land disturbance associated with soil excavation and would cause an increase in impervious surface area in numerous locations, many within the same watershed. These activities could result in potentially greater cumulative soil erosion and sedimentation and other pollution impacts to the receiving water bodies and wetlands, and eventually, the Potomac River and Chesapeake Bay. Cumulatively, these effects could adversely impact sensitive aquatic resources, as well as other users (wildlife and human) of these water bodies and wetlands.

However, any land disturbing activity greater than one acre requires a Virginia Stormwater Management Program permit, and a Storm Water Pollution Prevention Plan. The Army would follow the Virginia erosion and sediment control standards to ensure that pollution control impacts are minimized during construction. The Army would also follow the Fairfax County Chesapeake Bay Preservation Area regulations to minimize impacts on water quality. Construction activities would be monitored to ensure that erosion and stormwater management practices are adequate to prevent sediment and pollution migration into receiving waters. Furthermore, the planning of the proposed action includes the use of existing graded areas, minimizing the required land disturbance. Therefore, implementation of the

proposed action would have a negligible effect on cumulative impacts to receiving surface waters and wetlands.

Other projects would occur within the region, each of which would produce some amount of air pollutants. The Commonwealth of Virginia takes into account the effects of all past, present, and reasonably foreseeable emissions during the development of the State Implementation Plan (SIP). The state accounts for all significant stationary, area, and mobile emission sources in the development of this plan. Estimated emissions generated by the proposed would be below the applicability thresholds and would not be regionally significant. Therefore, the action would not contribute significantly to adverse cumulative effects on air quality as a standalone project.

However, because the air quality impacts of construction of the proposed action would occur at the same time as the air quality impacts of numerous BRAC and BRAC-related construction projects, Fort Belvoir has decided to extend the mitigation measures contained in Sections 2.0 through 7.0 of the BRAC Construction Performance Plan (CPP) to the proposed action as described in section 4.8.10. For ease of reference, the BRAC CPP is included in Appendix D to this EA.

The proposed action would introduce only short-term incremental increases to the noise environment. These changes would be minor, temporary, and have negligible cumulative effects.

The utility needs for the proposed action are well within the capacities of existing and planned services in the area of Pence Gate and 21st Street. Utility capacity at the Pence Gate site can accommodate both the CDC and the Fort Belvoir Community Hospital. Where necessary, existing lines would be extended to service the CDC, but this action is not expected to cause a cumulative effect on the availability of utilities to the study area.

The proposed action would occur simultaneously with other construction and development projects in the area, including the BRAC action at Fort Belvoir, the proposed expansions of the Commissary and Exchange, and the proposed National Museum of the US Army. These would produce some measurable amounts of traffic. However, the effects on transportation resources associated with the CDC are negligible on a regional scale, and would not contribute to cumulative adverse effects.

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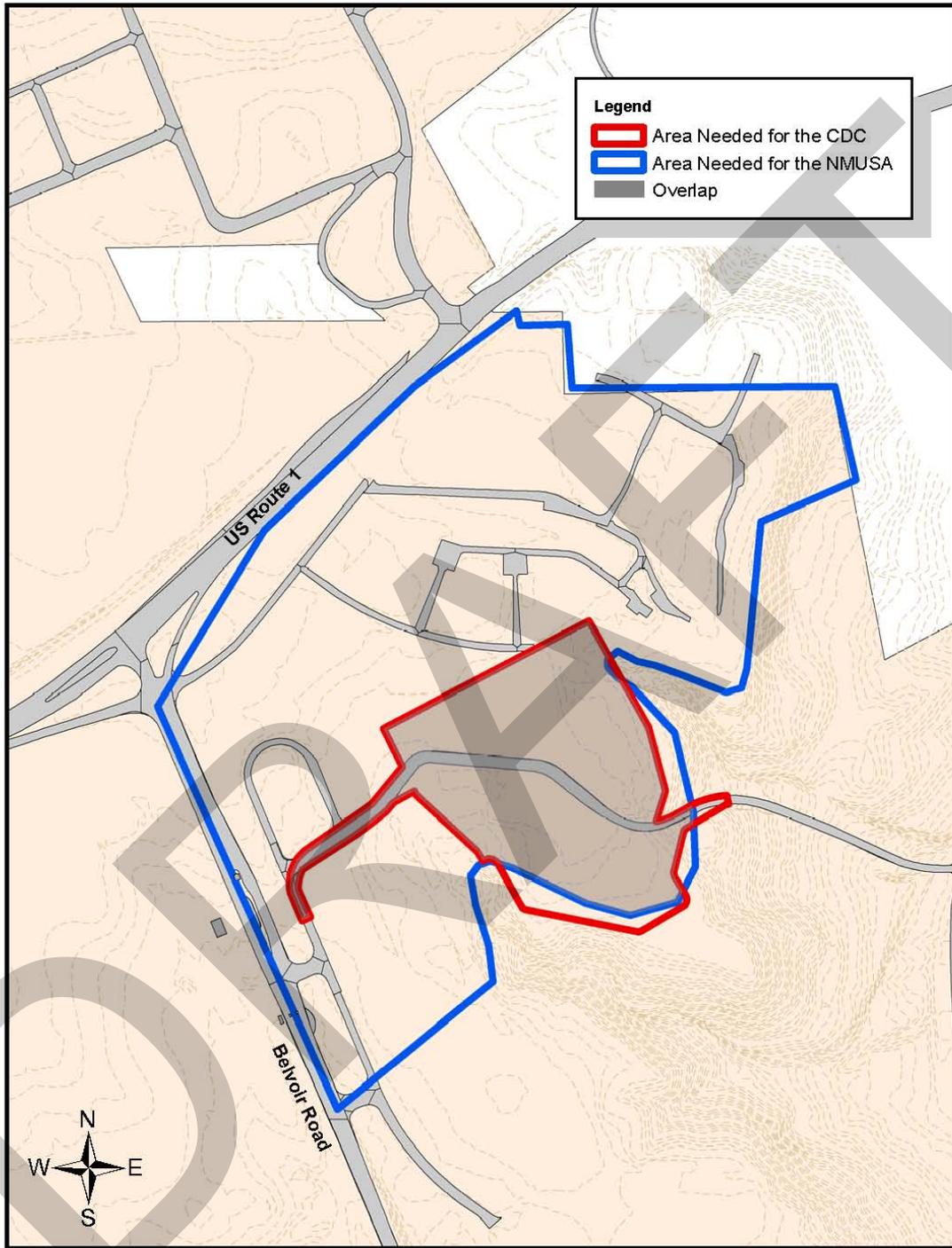
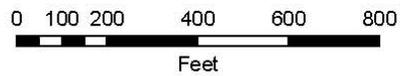


Figure 4.16-1: Spatial Conflict Between Plans for the National Museum of the US Army and the Child Development Center at the Pence Gate Site



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4.17 Indirect Impacts

Indirect impacts are reasonably foreseeable effects caused by the proposed action that occur later in time or are further removed from the alternative sites, compared to direct effects. At this time, the foreseeable indirect impacts of the proposed action are very limited.

At the Pence Gate site, the construction of the CDC would result in the removal of the existing ball field (a direct land use impact). If the Pence Gate site is selected, the Army may determine that this impact should be addressed by constructing a new ball field, by expanding the availability of existing ball fields, or by constructing new recreational facilities of a similar nature. The environmental effects of this new or expanded facility would be an indirect impact of constructing the CDC at the Pence Gate site. However, the environmental impacts of this course of action would likely be negligible, based on the amount of available space at Fort Belvoir, and the low-impact nature of this kind of recreational development.

The Community Hospital Area Development Plan (BNVP, 2008) would have to be modified if this site is chosen for the CDC. Specifically, plans to extend of 3rd Street to the east of Belvoir Road would have to be changed, and a hotel and portions of an educational campus would need to be relocated.

At the 21st Street site, the construction of the CDC would result in the demolition of buildings used by a thrift store and the Boy Scouts and Girls Scouts (a direct land use impact). If the 21st Street site is chosen, the Army may decide that the loss of these facilities is unacceptable, and that they should be relocated. The environmental effects of relocating the thrift store and/or the Boy Scouts/Girl Scouts meeting area would be an indirect impact of constructing the CDC at the 21st Street site. However, these facilities would likely be relocated to other existing structures on Fort Belvoir, and the environmental impact of the relocation would therefore be negligible.

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5 References

- 32 Code of Federal Regulations Part 651 (Army Regulation 200-2) *Environmental Effects of Army Actions*, 2002
- 36 Code of Federal Regulations Part 60, *National Register of Historic Places*.
- 36 Code of Federal Regulations Part 800, *Protection of Historic Properties*.
- 40 Code of Federal Regulations Part 40, *Resource Conservation and Recovery Act (RCRA)*.
- 40 Code of Federal Regulations Part 50, *National Primary and Secondary Ambient Air Quality Standards*
- 40 Code of Federal Regulations Part 81, *Designation of Areas for Air Quality Planning Purposes*
- 40 Code of Federal Regulations Part 230.3(s), *Guidelines for Specification of Disposal Sites for Dredged or Fill Material*, (definitions)
- 40 Code of Federal Regulations Part 273 and Parts 1500-1508, *President's Council on Environmental Quality (CEQ) Regulations for Implementing the National Environmental Policy Act (NEPA)*.
- 40 Code of Federal Regulations Part 300, *National Oil and Hazardous Substances Pollution Contingency Plan*
- American National Standard Institute, 2003. *American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound. Part 3: Short-term measurements with an observer present*. 2003. ANSI S12.9-1993 (R2003)/Part 3.
- Army Regulation 210-20, *Real Property Master Planning for Army Installations*, May 16, 2005
- Belvoir New Vision Planners, January 2008. *Community Hospital Area Development Plan*.
- Belvoir New Vision Website, accessed by Janet O'Neill May 19, 2009. *DoD/BRAC 133 Project at Mark Center, Mark Center, Alexandria, VA*.
http://www.belvoirmewvision.com/files/FINAL_BRAC133_Website_Collateral%5B1%5D.pdf
- California Air Resources Board, 2007a. *EMFAC 2007 (v2.3) Emission Factors (On-Road)*
- California Air Resources Board, 2007b. *EMFAC 2007 (v2.3) Emission Factors (Off-Road)*

- College, Craig E, August 2007. *Record of Decision for the Implementation of the 2005 Base Realignment and Closure (BRAC) Recommendations and Related Army Actions at Fort Belvoir, Virginia*. Signed by Craig E. College, Deputy Assistant Chief of Staff for Installation Management, US Department of the Army.
- Department of the Army, Department of Public Works, Environmental and Natural Resources Division, *Hydrogeologic Report, T-17 Area, U.S. Army Garrison Fort Belvoir, Virginia*, June 24, 2003. Prepared by MACTEC Engineering and Consulting of Georgia, Inc.
- Department of Energy, 2003. *Consumption and Gross Energy Intensity by Census Region for Sum of Major Fuels, Commercial Buildings Energy Consumption Survey*.
- Energy Polict Act of 2005, 42 USC 15801.
- ENRD 2009. Personnal communication between Derek Manning (Fort Belvoir Environmental and Natural Resources Division) and David Walls (Paciulli, Simmons & Associates) on June 16, 2009.
- ENRD 2009. Personnal communication between Dorothy Keough (Fort Belvoir Environmental and Natural Resources Division) and Jay Nunenkamp (Paciulli, Simmons & Associates) on August 7, 2009.
- ENRD 2009. E-Mail correspondence between Ben Wallen (Fort Belvoir Environmental and Natural Resources Division) and David Walls (Paciulli, Simmons & Associates) on June 11, 2009.
- Executive Order 12898, *Federal Actions to Address Environmetnal Justice in Minority Populations and Low-Income Populations*, February 11, 1994.
- Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, April 21, 1997.
- Fairfax County Code, Chapter 108-4-1, *Noise Ordinance*.
- Fairfax County Code, Chapter 118, *Fairfax County Chesapeake Bay Preservation Area Regulations*
Available at: http://library1.municode.com/default-test/template.htm?view=browse&doc_action=setdoc&doc_keytype=tocid&doc_key=914d0cbeb53b08d48a11ff6a38fbbadd&infobase=10051
- Fairfax County Public Facilities Manual, 2001, signed by Patti M. Hicks, Chief Deputy Clerk to the Board of Supervisors, 2007
- Federal Emergency Management Agency, 1990. *Flood Insurance Rate Mapping*, Community Panel Number 5155-250117D, March 5, 1990.
- Fiorello, Joseph, March 2009. Perennial Flow Determination, Washington Road, Fort Belvoir, Va.

Fort Belvoir Geographic Information Systems Office, Fort Belvoir Department of Public Works, *GIS Data*, various dates (requested and received 2009).

Fort Belvoir BRAC EIS Website, accessed by Janet O'Neill on May 19, 2009. *EA for Implementation of 2005 Base Realignment and Closure (BRAC) BRAC Recommendation 133: BRAC Recommendation 133*. <http://www.belvoirbrac-eis.net/133ea.htm>

Fort Belvoir Department of Public Works, 2009. E-Mail correspondence between Daniel O'Brien (Division Chief for Master Planning and Real Property, Fort Belvoir) and Michelle Royal (Compliance, Fort Belvoir ENRD).

Fort Belvoir Directorate of Family, Morale, Welfare and Recreation, 2009. Personal communications via e-mail between Sally Haskell (Fort Belvoir FMWR) and David Walls (Paciulli, Simmons & Associates) of June 8, 2009.

Harris, Cecil M. 1998. *Handbook of Acoustical Measurement and Noise Control*.

Institute of Transportation Engineers, 2003. *Transportation Engineers Trip Generation Manual, 7th Edition*.

Malcolm Pirnie, Inc., March 2006. *Historical Records Review*, Fort Belvoir, Virginia.

Malcolm Pirnie, Inc., January 2008. *Site Inspection Report*, Fort Belvoir, Virginia.

Metropolitan Washington Council of Governments, 2007. *Draft Plan to Improve the Air Quality in the Washington, DC-MD-VA Region - State Implementation Plan (SIP) for 8-Hour Ozone Standard and 2002 Base Year Inventory for the Washington, DC-MD-VA Nonattainment Area*. February 2007.

Metropolitan Washington Council of Governments, 2008. *Draft Plan to Improve the Air Quality in the Washington, DC-MD-VA Region - State Implementation Plan (SIP) for Fine Particle (PM_{2.5}) Standard and 2002 Base Year Inventory for the Washington, DC-MD-VA Nonattainment Area*. February 2008.

Mitchell Ecological Research Service, LLC, July 3, 2009. *Wood Turtle Surveys of Potential Sites for the 338 Child Development Center, the North Post Golf Course Realignment, and the National Museum of the United States Army, U.S. Army Garrison Fort Belvoir, Virginia*.

National Capital Planning Commission (NCPC), accessed by Meghan Morse on June 15, 2009. *Comprehensive Plan for the National Capital: Federal Elements*. <http://www.ncpc.gov/publication/pg.asp?p=comprehensiveplanforthenationalcapitalfederalelements>.

National Park Service website, accessed by Jay Nunenkamp, August 2009. http://www.nps.gov/nr/publications/bulletins/nrb16a/nrb16a_appendix_IV.htm

Natural Resource Conservation Service (NRCS, formerly the Soil Conservation Service), 1982. *Soil Survey Report, Fort Belvoir*.

Paciulli, Simmons & Associates, 2001. *US Army Fort Belvoir Bald Eagle Management Plan*.

Partners in Flight website, accessed by Cara Capobianco on January 28, 2009

<http://www.partnersinflight.org/>

South Coast Air Quality Management District, 1993. *CEQA Air Quality Handbook*.

US Army Corps of Engineers, Mobile District, August 2007. *Environmental Impact Statement for Implementation of 2005 Base Realignment and Closure (BRAC) Recommendations and Related Army Actions at Fort Belvoir, Virginia*. Prepared by TetraTech, August 2007.

Available at: http://www.tetratech-ffx.com/belvoir_braceis/feis.htm.

US Army Corps of Engineers, Baltimore District, October 2008. *Draft Environmental Assessment for the National Museum of the United States Army Fort Belvoir, VA*. Prepared by Paciulli, Simmons & Associates, Ltd.

Available at: http://www.belvoir.army.mil/news.asp?id=Draft_Envir_Assessment_for_NMUSA.

US Army Corps of Engineers Website, accessed by David Walls in June, 2009

<https://eportal.usace.army.mil/sites/COS/CDCIT/default.aspx>

US Army Garrison Fort Belvoir, 1998. *Environmental Assessment: Fairfax County Parkway Outgrant of Army Land, Fort Belvoir, Virginia*.

US Army Garrison Fort Belvoir, 2001. *Environmental Assessment: Implementation of an Integrated Natural Resources Management Plan, (INRMP)*. Prepared by Horne Engineering Services, Inc.

US Army Garrison Fort Belvoir, 2009. *Calendar Year 2008 Emission Statement*

USEPA, 1971. *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*. Washington, D.C. : s.n., Publication NTID300.1.

USEPA, 1995. *Compilation of Air Pollutant Emission Factors, AP-42, 5th edition, Vol. I: Stationary Point and Area Sources*.

USEPA, 2005. *Methodology to Estimate the Transportable Fraction (TF) of Fugitive Dust Emissions for Regional and Urban Scale Air Quality Analyses*.

USEPA, 2006. *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas* . 2006. EPA420-B-06-902.

USEPA, 2009. *EPA AirDATA Website*. Accessed by Tim LaVallee on May 25, 2009.

<http://www.epa/air/data>.

USEPA Solid Waste Website, accessed by David Walls on June 30, 2009.

<http://www.epa.gov/reg3wcmd/solidwastesummary.htm>

US Federal Highway Administration, 2006. *Interim Guidance on Air Toxic Analysis in NEPA Documents*.

US Geological Survey, 1965, photorevised 1983. *Fort Belvoir, VA-MD Topographic Map, 7.5-Minute Series*.

US Geological Survey, 2006. *US Geologic Survey (USGS) Professional Paper 1731, The Virginia Coastal Plain Hydrogeologic Framework*. E. Randolph McFarland and T. Scott Bruce, authors.

Virginia Department of Conservation and Recreation, Division of Natural Heritage, June 2003, *Surveys for the Northern Well [sic] Amphipod (Stygobromous phreaticus) at Fort Belvoir, Virginia*.

Virginia Department of Environmental Quality, et. al., 2007. *Total Maximum Daily Loads of Polychlorinated Biphenyls for Tidal Portions of the Potomac and Anacostia Rivers in the District of Columbia, Maryland, and Virginia*. Prepared by the Interstate Commission on the Potomac River Basin, September 28, 2007.

Virginia Employment Commission website, July 2009, accessed by Janet O'Neill on June 26, 2009

<http://www.vawc.virginia.gov/gsipub/index.asp?docid=279>

Virginia Employment Commission website, July 2008. by Janet O'Neill on July 10, 2008

<http://www.vawc.virginia.gov/gsipub/index.asp?docid=342>

<http://www.vec.virginia.gov/vecportal/index.cfm>

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6 List of Preparers

Paciulli, Simmons, & Associates, LTD

David Walls, Senior Environmental Scientist: 13 years of experience developing and managing environmental and natural resource services for public and private clients; West Coast University, 1995, MS, Environmental Management.

Jay Nunenkamp, Environmental Scientist: 11 years of experience in environmental field investigations, research, and preparation of assessments. Virginia Tech, 1997; BS, Geology.

Cara Capobianco, GIS Specialist and Environmental Scientist: 11 years of experience in geographic information systems for environmental and natural resources planning. George Mason University, 1997, BS, Biology.

John Houchins, Environmental Scientist: 11 years of experience in conservation and natural resources management. Lenoir-Rhyne College, 1997, BS, Biology.

Rinker Design Associates, PC

Janet O'Neill, Environmental Scientist: 35 years of experience in wetlands permitting, environmental field investigations, and preparation of environmental impact assessments. Tufts University, 1984, MS, Environmental Health Engineering; University of Massachusetts at Amherst, 1974, BS, Fisheries Biology.

Patricia String, Environmental Scientist: 12 years experience working with federal, state, and local organizations, and 1 year experience working with natural resources studies, NEPA documentation, and stormwater permitting and compliance. Ithaca College, 1996, BS, Communications; George Mason University, 2008, BS, Biology.

LPES, Inc

Timothy Lavalley, Environmental Scientist, 16 years of experience in environmental and transportation planning - air, noise, and traffic analysis. Tufts University, 1997, MS, Civil Engineering; Northeastern, 1992, BS, Mechanical Engineering.

Army Coordinators

Patrick M. McLaughlin, Chief, Environmental and Natural Resources Division, Directorate of Public Works, US Army Garrison Fort Belvoir.

**Michelle Royal, Environmental Specialist, Environmental and Natural Resources Division,
Directorate of Public Works, US Army Garrison Fort Belvoir.**

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Appendix A
Determination of Consistency

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Determination of Consistency with Virginia's Coastal Resources Management Program

Pursuant to Section 307 of the Coastal Zone Management Act of 1972, as amended, this is a Federal Consistency Determination for the construction and operation of a 338-Child Development Center (CDC) at Fort Belvoir, Virginia. The Army is required to determine the consistency of its activities affecting Virginia's coastal resources or coastal uses with the Virginia Coastal Resources Management Program (CRMP).

This document represents an analysis of project activities in light of established Virginia CRMP Enforceable Policies and Programs. Furthermore, submission of this consistency determination reflects the commitment of the Army to comply with those Enforceable Policies and Programs. The proposed action would be constructed and operated in a manner consistent with the Virginia CRMP. The Army has determined that the construction and operation of the CDC would have a negligible impact on the land and water uses or natural resources of the Commonwealth of Virginia's coastal zone.

1 Description of Proposed Action

The Army proposes to construct and operate the CDC, a one story, 38,000-square foot building which would include twelve rooms for infants, pre-toddlers, and toddlers; nine rooms for pre-school-, pre-kindergarten-, and kindergarten-age children; two active play rooms; office and reception areas; a kitchen; a staff lounge; an outreach/transition care room; a mechanical room; a small laundry, video, and electricity control rooms; and closets and storage spaces. The CDC would also include sidewalks, internal roadways, a school bus pick-up and drop-off area, and 2.4 acres of paved parking.

Two potential sites for the CDC (the Pence Gate Site and the 21st Street site) are evaluated in the Environmental Assessment, along with the No Build alternative. Construction at either site would require: clearing and grading, excavating and trenching for utilities, and construction of buildings and other improvements.

2 Assessment of Probable Effects

The Army intends to obtain all applicable permits required for implementation of the proposed action. A review of the permits and/or approvals required under the enforceable policies is being conducted. The Army has evaluated the construction and operation of the CDC for its foreseeable effects on the following enforceable policies:

Fisheries - The proposed action has no foreseeable impacts on fish or shellfish resources and would not affect the promotion of commercial or recreational fisheries at

either site. The Pence Gate Site is located in the Dogue Creek watershed, which discharges to the Potomac River. The site is located approximately 1,150 feet west of Dogue Creek, and 1.7 miles northwest of the Potomac River. The 21st Street site is located in the Accotink Creek/Gunston Cove watershed. Water from this site discharges to Gunston Cove and from there to the Potomac River. The site is located approximately 0.85 mile north of the Potomac River, 0.65 mile east of Accotink Bay, and 0.70 mile northeast of Gunston Cove. The contractor would be required to implement best management practices (BMPs) recommended by the Virginia Department of Conservation and Recreation (DCR) and Department of Forestry (DOF).

Subaqueous Lands Management –The Virginia Marine Resources Commission (VMRC), pursuant to Virginia Administrative Code (VAC) Section 28.2-1204, has jurisdiction over encroachments in, on, or over any State-owned rivers, streams and creeks. The proposed action would have no foreseeable impact on subaqueous resources.

Tidal and Non-tidal Wetlands Management – No wetlands are located within the project footprint for the 21st Street Site. Although the CDC layout at the Pence Gate Site has been configured to avoid wetlands and streams, a minimal amount of wetlands could be impacted if the Pence Gate alternative is selected. The Army would try to avoid these impacts as much as possible during design process. In areas where avoidance is not possible, the contractor would use culverts or other methods to minimize impacts, or mitigations would be identified during the permitting process. The Army would obtain permits from the U.S. Army Corps of Engineers (USACE) and the Virginia Department of Environmental Quality (VDEQ) prior to construction. The Army would provide compensation as required by the USACE and the VDEQ for unavoidable impacts.

Dunes Management – No sand dunes are located at or near either site. The proposed action would not affect any coastal primary sand dunes at either site.

Non-Point Source Water Pollution Control – Land disturbing activities during construction would require a Virginia Stormwater Management Program (VSMP) permit, and a Storm Water Pollution Prevention Plan (SWPPP). The Army would follow the Virginia erosion and sediment control standards of Title 10.1 Chapter 5, Article 4 of the Virginia Code to ensure that non-source pollution control impacts are minimized during construction. The Army would also follow the Fairfax County Chesapeake Bay Preservation Area regulations (Chapter 118 of the Fairfax County Code) to minimize long-term impacts on water quality. Construction activities would be monitored to ensure that erosion and stormwater management practices are adequate to prevent sediment and pollution migration into nearby surface waters. Stormwater management ponds would be designed to provide compliance with BMP nutrient reduction goals. From these ponds, stormwater would be discharged into tributaries of Dogue or Gunston Cove, depending on which alternative site is selected. Implementation of the proposed action at either site would have a negligible impact on non-point source pollution.

Point Source Water Pollution Control –The proposed action would be connected to the on-post sanitary sewer system. The Army would comply with the

Virginia Pollutant Discharge Elimination System (VPDES) Stormwater General Permit for associated construction activities. Construction and operation of the CDC would therefore have negligible impact on point source pollution.

Shoreline Sanitation – Neither of the proposed sites for the CDC are located near a shoreline, and neither site would be equipped with a septic system. The proposed action would therefore have no impact on shoreline sanitation.

Air Pollution Control – Adverse impacts would be minimal. Construction and operation of the CDC would be subject to Virginia DEQ Regulations 9 VAC 5-50-60, Control and Abatement Air Pollution, such as:

9 VAC 5-50-80/90	Visible and fugitive dust emissions.
9 VAC 5-40-55120	Restricting the use of cut-back asphalt (liquefied asphalt cement, blended with petroleum solvents) for paving during the months of April through October.

Both project sites are located within an ozone and PM2.5 non-attainment area, triggering the need to analyze emissions and determine the applicability of General Conformity Rule under the Clean Air Act (CAA). A construction emissions estimate indicates that the construction activity would not generate sufficient emissions to trigger a need for a full General Conformity Analysis. No changes to the Fort Belvoir’s Title V air permit would be required. Fort Belvoir intends to comply with the BRAC Construction Performance Plan for the Reduction of Air Emissions for the proposed action.

Coastal Lands Management – Construction and operation of the CDC would have no impact on any coastal lands.

Chesapeake Bay Preservation Areas –Fort Belvoir must be consistent with the performance criteria of the Chesapeake Bay Local Assistance Department Regulations to meet the enforceable policies of VCMP. Construction and operation of the CDC would have no impact on any Chesapeake Bay Preservation Areas (CBPAs). The project would include BMPs to comply with Chesapeake Bay Resource Management Area Requirements.

3 Summary of Findings

Based on the above analysis, which is elaborated on in the Environmental Assessment, Fort Belvoir personnel would: ensure that the construction contractor uses and maintains appropriate BMPs; obtain the requisite permits and approvals; and implement measures to mitigate potential environmental impacts. With the proposed mitigation measures, Fort Belvoir finds that the proposed installation and operation of the CDC would be consistent

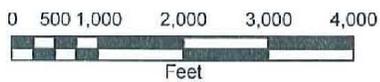
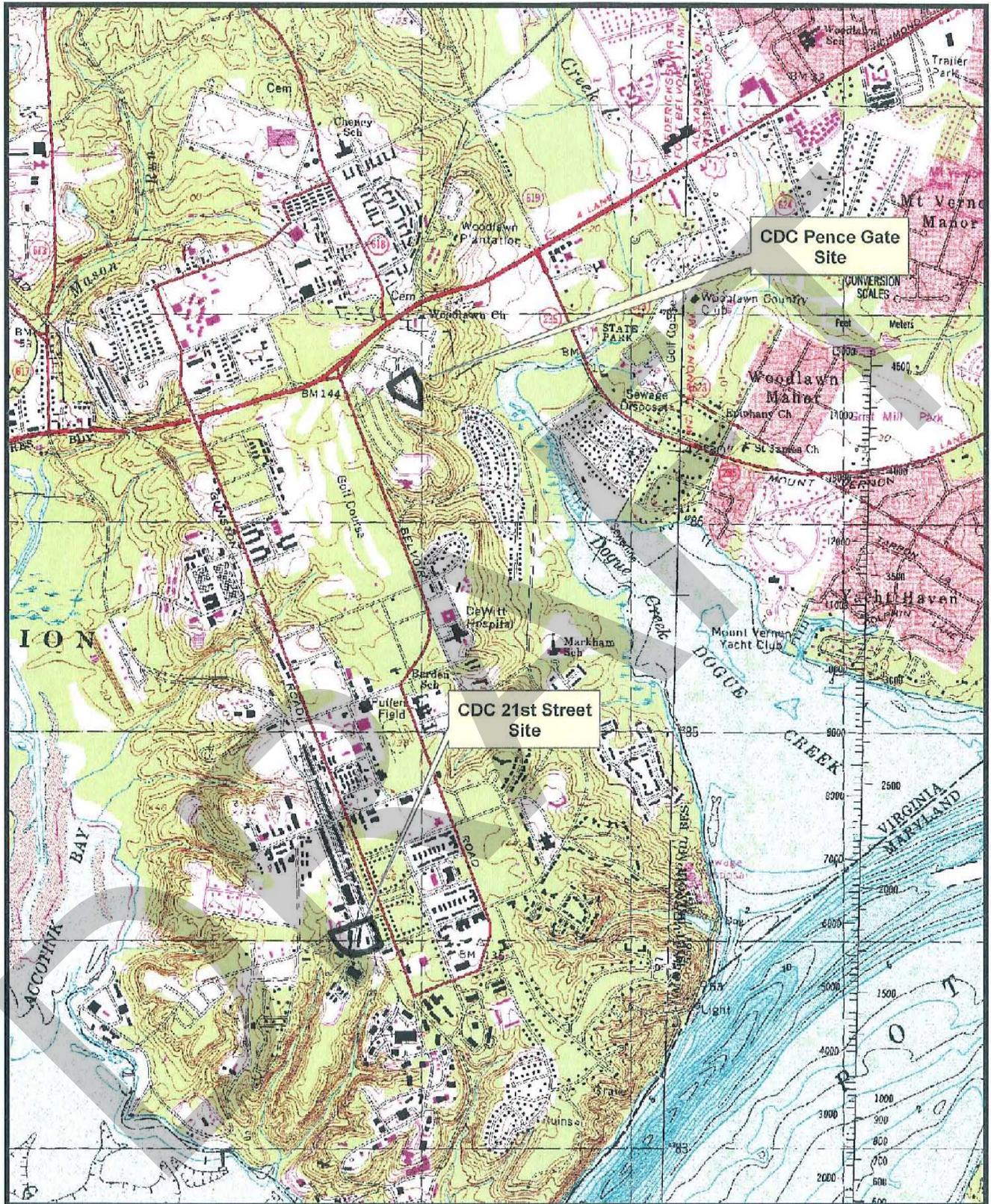
to the maximum extent practicable with the federally approved enforceable provisions of Virginia CRMP, pursuant to the Coastal Zone Management Act of 1972, as amended and in accordance with 15 CFR 930.30.

Sincerely,

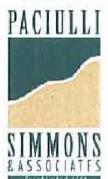
for Mark T. Moffatt
Colonel

Jerry L. Blixt
Colonel, US Army
Commander, U.S. Army Garrison Fort Belvoir

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**Possible Locations for the
338-Child Development Center
Fort Belvoir, Virginia**



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Appendix B

Natural Resource Coordination Letters

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COMMONWEALTH of VIRGINIA

L. Preston Bryant, Jr.
Secretary of Natural Resources

Department of Game and Inland Fisheries

Robert W. Duncan
Executive Director

August 10, 2009

Jay Nunenkamp
Environmental Scientist
Paciulli Simmons & Associates, Ltd.
11212 Waples Mill Road, Suite 100
Fairfax, Virginia 22030-7404

RE: ESSLOG #26722, Construction of a 338-Child Development Center, Two Potential Locations, Fort Belvoir, Fairfax County, VA– subscriber confirmation.

Dear Mr. Nunenkamp:

This letter is in response to your request for information related to the presence of threatened or endangered species in the vicinity of the above referenced project.

1. Caples Road or 21st Street Site, 15.2 acres:

I concur with your findings from the Virginia Fish and Wildlife Information Service. Though there are a number of species listed as “likely to occur” on the Project Review Reports, only the following species have been documented at approximately 0.75 mile and 1.75 miles, respectively, from this project area: *federal species of concern/state threatened* bald eagle (*Haliaeetus leucocephalus*) and *state threatened* wood turtle (*Glyptemys insculpta*). As well, this project area is within 0.5 mile of tributaries to a portion of Accotink Creek that is designated a Confirmed Anadromous Fish Use Area. This designation is due to documented occurrences of the following anadromous and semi-anadromous species: alewife and yellow perch. Additionally, Accotink Creek is a tributary to a portion of the Potomac River that is also designated a Confirmed Anadromous Fish Use Area. This designation is due to documented occurrences of the following anadromous and semi-anadromous species: alewife, striped bass, blueback herring, yellow perch, American shad, and hickory shad. Therefore, the applicant should coordinate with the VDGIF Environmental Services Section (804-367-6913) concerning potential impacts to these species and resources.

In addition, the *state special concern* bridle shiner (*Notropis bifrenatus*) has been documented within 2 miles of this project area. As well, a block survey of an area encompassing the project site documented the following *state special concern* species during

the breeding season: brown creeper (*Certhia americana*) and great egret (*Ardea alba*). However, the classification of *state special concern* is not a legal designation and does not require further coordination. Additionally, please note that portions of this project area may be within 2 miles of George Washington Grist Mill State Park and Mason Neck State Park, both of which are Virginia Department of Conservation and Recreation properties.

2. Pence Gate Site:

I concur with your findings from the Virginia Fish and Wildlife Information Service. Though there are a number of species listed as “likely to occur” on the Project Review Reports, only the following species have been documented at approximately 0.5 mile and 1.25 miles, respectively, from this project area: *federal species of concern/state threatened* bald eagle (*Haliaeetus leucocephalus*) and *state threatened* wood turtle (*Glyptemys insculpta*). As well, this project area is approximately 0.25 mile from a portion of Dogue Creek that is designated a Confirmed Anadromous Fish Use Area. This designation is due to documented occurrences of the following anadromous and semi-anadromous species: alewife, striped bass, blueback herring, and yellow perch. Additionally, Dogue Creek is a tributary to a portion of the Potomac River that is also designated a Confirmed Anadromous Fish Use Area. This designation is due to documented occurrences of the following anadromous and semi-anadromous species: alewife, striped bass, blueback herring, yellow perch, American shad, and hickory shad. Finally, this project is approximately 0.5 mile from a portion of Dogue Creek that is designated a Threatened and Endangered Species’ Water. This designation is due to documented occurrences of the *state threatened* wood turtle (*Glyptemys insculpta*). Therefore, the applicant should coordinate with the VDGIF Environmental Services Section (804-367-6913) concerning potential impacts to these species and resources.

In addition, the following *state special concern* species have been documented within 2 miles of this project area: bridle shiner (*Notropis bifrenatus*) and mourning warbler (*Oporornis philadelphia*). As well, a block survey of an area encompassing the project site documented the *state special concern* yellow-crowned night-heron (*Nyctanassa violacea*) during the breeding season. However, the classification of *state special concern* is not a legal designation and does not require further coordination. Additionally, please note that this project area may be within 2 miles of George Washington Grist Mill State Park, which is a Virginia Department of Conservation and Recreation property.

Information about fish and wildlife species was generated from our agency's computerized Fish and Wildlife Information System, which describes animals that are known or may occur in a particular

Jay Nunenkamp
ESSLog #26722
8/10/2009
Page 3

geographic area. Field surveys may be necessary to determine the presence or absence of some of these species on or near the proposed area. Also, additional sensitive animal species may be present, but their presence has not been documented in our information system.

Endangered plants and insects are under the jurisdiction of the Virginia Department of Agriculture and Consumer Services, Bureau of Plant Protection. Questions concerning sensitive plant and insect species occurring at the project site should be directed to Keith Tignor at (804) 786-3515.

The Virginia Department of Conservation and Recreation, Natural Heritage Program, maintains a database of natural heritage resources, including the habitat of rare, threatened, or endangered plant and animal species, unique exemplary natural communities, and significant geologic formations, that may contain information not documented in this letter. Their database may be accessed from <http://www.dcr.state.va.us/dnh/nhrinfo.htm>, or by contacting S. Rene Hypes at (804) 371-2708.

This letter summarizes the likelihood of the occurrence of endangered or threatened animal species at the project site. If you have any questions in this regard, please contact me at (804) 367-1185.

Please note that this response does not constitute consultation or management recommendations regarding endangered or threatened wildlife, or any other environmental concerns. These issues are analyzed by our Environmental Services Section, in conjunction with interagency review of applications for state and federal permits. If you have any questions in this regard, please contact the Environmental Services Section at (804) 367-6913.

Please note that the data used to develop this response are continually updated. Therefore, if significant changes are made to your project or if the project has not begun within 6 months of receiving this letter, then the applicant should request a new review of our data.

The Fish and Wildlife Information Service, the system of databases used to provide the information in this letter, can now be accessed via the Internet! The Service currently provides access to current and comprehensive information about all of Virginia's fish and wildlife resources, including those listed as threatened, endangered, or special concern; colonial birds; waterfowl; trout streams; and all wildlife. Users can choose a geographic location and generate a report of species known or likely to occur around that point. From our main web page at www.dgif.virginia.gov, choose the hyperlink to "Virginia Fish and Wildlife Information Service." For more information about the service, please contact Shirl Dressler at (804) 367-6913.

Jay Nunenkamp
ESSLog #26722
8/10/2009
Page 4

Thank you for your interest in the wildlife resources of Virginia.

Sincerely,



Susan H. Watson
Wildlife Biologist

cc: R.T. Fernald, VDGIF
R. Hypes, VDCR-NH

DRAFT



Virginia Department of Game and Inland Fisheries

7/2/2009 1:17:44 PM

Fish and Wildlife Information Service

VaFWIS Initial Project Assessment Report

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7/2/2009, 1:17:44 PM

Known or likely to occur within a **2 mile radius of 38,42,36.0 -77,08,20.8**
in **059 Fairfax County, VA**

600 Known or Likely Species ordered by Status Concern for Conservation
(displaying first 43) (43 species with Status* or Tier I**)

BOVA Code	Status*	Tier**	Common Name	Scientific Name	Confirmed	Database(s)
060006	SE	II	Floater, brook	Alasmidonta varicosa		BOVA
030062	ST	I	Turtle, wood	Glyptemys insculpta	Yes	Collections,TEWaters,BOVA
040096	ST	I	Falcon, peregrine	Falco peregrinus	Yes	CBC
040129	ST	I	Sandpiper, upland	Bartramia longicauda		BOVA
040293	ST	I	Shrike, loggerhead	Lanius ludovicianus	Yes	CBC,BOVA
040379	ST	I	Sparrow, Henslow's	Ammodramus henslowii		BOVA
100155	FSST	I	Skipper, Appalachian grizzled	Pyrgus wyandot		BOVA
040093	FSST	II	Eagle, bald	Haliaeetus leucocephalus	Yes	Collections,BBA,CBC,BOVA
040292	ST		Shrike, migrant loggerhead	Lanius ludovicianus migrans		BOVA
100248	FS	I	Fritillary, regal	Speyeria idalia idalia		BOVA
100154	FS	II	Butterfly, Persius duskywing	Erynnis persius persius		BOVA
060029	FSSS	III	Lance, yellow	Elliptio lanceolata		BOVA
010077	SS	I	Shiner, bridge	Notropis bifrenatus	Yes	Collections
040372	SS	I	Crossbill, red	Loxia curvirostra	Yes	CBC,BOVA

040306	SS	I	Warbler, golden-winged	Vermivora chrysoptera		BOVA
010032	SS	II	Sturgeon, Atlantic	Acipenser oxyrinchus		BOVA
040029	SS	II	Heron, little blue	Egretta caerulea caerulea		BOVA
040213	SS	II	Owl, northern saw-whet	Aegolius acadicus		BOVA
040304	SS	II	Warbler, Swainson's	Limnothlypis swainsonii		BOVA
040266	SS	II	Wren, winter	Troglodytes troglodytes	Yes	CBC,BOVA
030063	CC	III	Turtle, spotted	Clemmys guttata	Yes	Collections,BOVA
040094	SS	III	Harrier, northern	Circus cyaneus	Yes	CBC,BOVA
040036	SS	III	Night-heron, yellow-crowned	Nyctanassa violacea violacea	Yes	BBA,BOVA
040204	SS	III	Owl, barn	Tyto alba pratincola	Yes	CBC,BOVA
040270	SS	III	Wren, sedge	Cistothorus platensis	Yes	CBC
060071	SS	III	Lampmussel, yellow	Lampsilis cariosa		BOVA
030012	CC	IV	Rattlesnake, timber	Crotalus horridus		BOVA
040264	SS	IV	Creeper, brown	Certhia americana	Yes	BBA,CBC,BOVA
040180	SS	IV	Tern, Forster's	Sterna forsteri		BOVA
040364	SS		Dickcissel	Spiza americana		BOVA
040032	SS		Egret, great	Ardea alba egretta	Yes	BBA,CBC,BOVA
040366	SS		Finch, purple	Carpodacus purpureus	Yes	CBC,BOVA
040285	SS		Kinglet, golden-crowned	Regulus satrapa	Yes	CBC,BOVA
040112	SS		Moorhen, common	Gallinula chloropus cachinnans		BOVA
040262	SS		Nuthatch, red-breasted	Sitta canadensis	Yes	CBC,BOVA
040189	SS		Tern, Caspian	Sterna caspia		BOVA

040278	SS		Thrush, hermit	Catharus guttatus	Yes	CBC,BOVA
040314	SS		Warbler, magnolia	Dendroica magnolia		BOVA
040335	SS		Warbler, mourning	Oporornis philadelphia	Yes	Collections,BOVA
050045	SS		Otter, northern river	Lontra canadensis lataxina		BOVA
060076	SS		Lampmussel, eastern	Lampsilis radiata radiata		BOVA
040225		I	Sapsucker, yellow-bellied	Sphyrapicus varius	Yes	CBC,BOVA
040319		I	Warbler, black-throated green	Dendroica virens		BOVA

To view **All 600 species** [View 600](#)

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; FS=Federal Species of Concern; SC=State Candidate; CC=Collection Concern; SS=State Special Concern

** I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II - Very High Conservation Need; III=VA Wildlife Action Plan - Tier III - High Conservation Need; IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

Anadromous Fish Use Streams (3 records)

[View Map of All Anadromous Fish Use Streams](#)

Stream ID	Stream Name	Reach Status	Anadromous Fish Species			View Map
			Different Species	Highest TE*	Highest Tier**	
C18	Dogue creek	Confirmed	4		IV	Yes
C2	Accotink creek	Confirmed	2		IV	Yes
C64	Potomac river	Confirmed	6		IV	Yes

Fish Impediments

N/A

Colonial Water Bird Survey

N/A

Threatened and Endangered Waters (2 Reaches)

[View Map of All Threatened and Endangered Waters](#)

Stream Name	T&E Waters Species						View Map
	Highest TE*	BOVA Code, Status*, Tier**, Common & Scientific Name					
Dogue Creek (02070010)	ST	030062	ST	I	Turtle, wood	Glyptemys insculpta	Yes
Unnamed trib. of Dogue Creek (02070010)	ST	030062	ST	I	Turtle, wood	Glyptemys insculpta	Yes

**Cold Water Stream Survey (Trout Streams)
Managed Trout Species**

N/A

Public Holdings: (3 names)

Name	Agency	Level
Fort Belvoir Military Reservation	U.S. Dept. of Army	Federal
Jackson Mile Abbott Wetland Refuge	U.S. Dept. of Army	Federal
George Washington Grist Mill State Park	VA Dept. of Conservation and Recreation	State

audit no. 247036 7/2/2009 1:17:44 PM Virginia Fish and Wildlife Information Service
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Virginia Department of Game and Inland Fisheries

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Fish and Wildlife Information Service

VaFWIS Initial Project Assessment Report

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Known or likely to occur within a **2 mile radius of 38,41,13.8 -77,08,29.8**
in **059 Fairfax County, VA**

596 Known or Likely Species ordered by Status Concern for Conservation
(displaying first 43) (43 species with Status* or Tier I**)

BOVA Code	Status*	Tier**	Common Name	Scientific Name	Confirmed	Database(s)
060006	SE	II	Floater, brook	Alasmidonta varicosa		BOVA
030062	ST	I	Turtle, wood	Glyptemys insculpta	Yes	Collections,TEWaters,BOVA
040096	ST	I	Falcon, peregrine	Falco peregrinus	Yes	CBC
040129	ST	I	Sandpiper, upland	Bartramia longicauda		BOVA
040293	ST	I	Shrike, loggerhead	Lanius ludovicianus	Yes	CBC,BOVA
040379	ST	I	Sparrow, Henslow's	Ammodramus henslowii		BOVA
100155	FSST	I	Skipper, Appalachian grizzled	Pyrgus wyandot		BOVA
040093	FSST	II	Eagle, bald	Haliaeetus leucocephalus	Yes	Collections,BBA,CBC,BOVA
040292	ST		Shrike, migrant loggerhead	Lanius ludovicianus migrans		BOVA
100248	FS	I	Fritillary, regal	Speyeria idalia idalia		BOVA
100154	FS	II	Butterfly, Persius duskywing	Erynnis persius persius		BOVA
060029	FSSS	III	Lance, yellow	Elliptio lanceolata		BOVA
010077	SS	I	Shiner, bridle	Notropis bifrenatus	Yes	Collections
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040306	SS	I	Warbler, golden-winged	Vermivora chrysoptera		BOVA
010032	SS	II	Sturgeon, Atlantic	Acipenser oxyrinchus		BOVA
040029	SS	II	Heron, little blue	Egretta caerulea caerulea		BOVA
040213	SS	II	Owl, northern saw-whet	Aegolius acadicus		BOVA
040304	SS	II	Warbler, Swainson's	Limnothlypis swainsonii		BOVA
040266	SS	II	Wren, winter	Troglodytes troglodytes	Yes	CBC,BOVA
030063	CC	III	Turtle, spotted	Clemmys guttata	Yes	Collections,BOVA
040094	SS	III	Harrier, northern	Circus cyaneus	Yes	CBC,BOVA
040036	SS	III	Night-heron, yellow-crowned	Nyctanassa violacea violacea	Yes	BBA,BOVA
040204	SS	III	Owl, barn	Tyto alba pratincola	Yes	CBC,BOVA
040270	SS	III	Wren, sedge	Cistothorus platensis	Yes	CBC
060071	SS	III	Lampmussel, yellow	Lampsilis cariosa		BOVA
030012	CC	IV	Rattlesnake, timber	Crotalus horridus		BOVA
040264	SS	IV	Creeper, brown	Certhia americana	Yes	BBA,CBC,BOVA
040180	SS	IV	Tern, Forster's	Sterna forsteri		BOVA
040364	SS		Dickcissel	Spiza americana		BOVA
040032	SS		Egret, great	Ardea alba egretta	Yes	BBA,CBC,BOVA
040366	SS		Finch, purple	Carpodacus purpureus	Yes	CBC,BOVA
040285	SS		Kinglet, golden-crowned	Regulus satrapa	Yes	CBC,BOVA
040112	SS		Moorhen, common	Gallinula chloropus cachinnans		BOVA
040262	SS		Nuthatch, red-breasted	Sitta canadensis	Yes	CBC,BOVA
040189	SS		Tern, Caspian	Sterna caspia		BOVA

040278	SS		Thrush, hermit	Catharus guttatus	Yes	CBC,BOVA
040314	SS		Warbler, magnolia	Dendroica magnolia		BOVA
040335	SS		Warbler, mourning	Oporornis philadelphia		BOVA
050045	SS		Otter, northern river	Lontra canadensis lataxina		BOVA
060076	SS		Lampmussel, eastern	Lampsilis radiata radiata		BOVA
040225		I	Sapsucker, yellow-bellied	Sphyrapicus varius	Yes	CBC,BOVA
040319		I	Warbler, black-throated green	Dendroica virens		BOVA

To view **All 596 species** [View 596](#)

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; FS=Federal Species of Concern; SC=State Candidate; CC=Collection Concern; SS=State Special Concern

** I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II - Very High Conservation Need; III=VA Wildlife Action Plan - Tier III - High Conservation Need; IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

Anadromous Fish Use Streams (4 records)

[View Map of All Anadromous Fish Use Streams](#)

Stream ID	Stream Name	Reach Status	Anadromous Fish Species			View Map
			Different Species	Highest TE*	Highest Tier**	
C18	Dogue creek	Confirmed	4		IV	Yes
C2	Accotink creek	Confirmed	2		IV	Yes
C62	Pohick creek	Confirmed	3		IV	Yes
C64	Potomac river	Confirmed	6		IV	Yes

Fish Impediments

N/A

Colonial Water Bird Survey

N/A

Threatened and Endangered Waters (1 Reaches)

[View Map of All Threatened and Endangered Waters](#)

Stream Name	T&E Waters Species					View Map
	Highest TE*	BOVA Code, Status*, Tier**, Common & Scientific Name				
Dogue Creek (02070010)	ST	030062	ST	I	Turtle. wood Glyptemys insculpta	Yes

**Cold Water Stream Survey (Trout Streams)
Managed Trout Species**

N/A

Public Holdings: (2 names)

Name	Agency	Level
Fort Belvoir Military Reservation	U.S. Dept. of Army	Federal
George Washington Grist Mill State Park	VA Dept. of Conservation and Recreation	State

audit no. 247036 7/2/2009 1:24:38 PM Virginia Fish and Wildlife Information Service
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Appendix C

Air Conformity Analysis and Emission Calculations, and Record of Non-Conformity

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**CHILD DEVELOPMENT CENTER
ENVIRONMENTAL ASSESSMENT**

**U.S. ARMY GARRISON FORT BELVOIR
FAIRFAX COUNTY, VIRGINIA**

Appendix C: Air Quality Discipline Report

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Acronyms and Abbreviations

AQCR	Air Quality Control Region
AQCR 47	National Capital Interstate Air Quality Control Region
CFR	Code of Federal Regulations
FHWA	Federal Highway Administration
GCR	General Conformity Rules
MSAT	Mobile Source Air Toxics
MWCOG	Metropolitan Washington Council of Governments
NAAQS	National Ambient Air Quality Standards
NO _x	nitrogen oxides
O ₃	ozone
OTR	Ozone Transport Region
PM ₁₀	particulate matter less than 10 microns in diameter
PM _{2.5}	particulate matter less than 2.5 microns in diameter
ppm	Parts Per Million
RONA	Record of Non-Applicability
SO ₂	sulfur dioxide
tpy	tons per year
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
VAC	Virginia Administrative Code
VOC	volatile organic compounds

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1.0 Introduction

This air quality analysis includes a description of the existing air quality conditions, a general conformity analysis, and a regulatory review.

2.0 Affected Environment

2.1 National Ambient Air Quality Standards and Local Ambient Air Quality

U.S. Environmental Protection Agency (USEPA) Region 3 and VDEQ regulate air quality in Virginia. The Clean Air Act (42 U.S.C. 7401-7671q), as amended, gives the USEPA responsibility to establish the primary and secondary National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) that set acceptable concentration levels for seven criteria pollutants: particulate matter (PM₁₀), fine particulate matter (PM_{2.5}), sulfur dioxide (SO₂), carbon monoxide (CO), nitrous oxides (NO_x), ozone (O₃), and lead. Short-term NAAQS (1-, 8-, and 24-hour periods) have been established for pollutants contributing to acute health effects, while long-term NAAQS (annual averages) have been established for pollutants contributing to chronic health effects. While each state has the authority to adopt standards stricter than those established under the federal program, the Commonwealth of Virginia accepts the federal standards.

2.2 Attainment Status

Federal regulations designate Air-quality Control Regions (AQCRs) in violation of the NAAQS as *nonattainment* areas. Federal regulations designate AQCRs with levels below the NAAQS as *attainment* areas. *Maintenance* AQCRs are areas that have previously been designated nonattainment and have been re-designated to attainment for a probationary period through implementation of maintenance plans. According to the type of pollutant and severity of the pollution problem, nonattainment areas can be categorized as marginal, moderate, serious, severe, or extreme.

Fairfax County (and therefore Fort Belvoir) is within the National Capital Interstate AQCR (AQCR 47) (40 CFR 81.12). AQCR 47 is in the O₃ transport region (OTR) that includes 12 states and Washington, DC. The USEPA has designated Fairfax County as the following:

- Moderate nonattainment for the 8-hour O₃ NAAQS
- Nonattainment for the PM_{2.5} NAAQS
- Attainment for all other criteria pollutants (40 CFR 81.347)

2.3 Installation Wide and Regional Emissions.

Fort Belvoir tracks air emissions from the significant stationary emission sources on the installation. Most of the significant emission sources are boilers and generators; however, the installation also has other source types including gasoline dispensing, lithographic printing, cold solvent degreasing, and a firefighting training facility. Fort Belvoir also has hundreds of insignificant sources of air pollution including closed sanitary landfills, aboveground and underground storage tanks, spray painting operations, welding operations, oil-water separators, woodworking activities, fuel-burning heaters and boilers, and emergency generators. Concurrently, the Metropolitan Washington Council of Governments (MWCOG) compiles an emissions inventory for AQCR 47 and sets regional emissions budgets. Table 2-2 lists the emissions from significant sources at Fort Belvoir for calendar year 2008 and the estimated total emissions for AQCR 47 for 2009.

**Table 2-2.
Air Emissions from Significant Sources at Fort Belvoir (2008) and AQCR 47**

Criteria Pollutants	Annual Emissions (Tons per Year)	
	Fort Belvoir 2008 ¹	AQCR 47 ^{2,3}
VOC	2.9	81,190
NO _x	43.8	117,102
SO ₂	20.0	231,898
PM _{2.5}	2.2	23,364

Notes:

1 - Source: U.S. Army Fort Belvoir 2009.

2 - Source: MWCOG 2007, 2009 Projected Levels of VOC.

3 - Source: MWCOG 2008, 2009 Projected Levels of NO_x, SO₂, and PM_{2.5}.

3.0 Environmental Consequences

3.1 Proposed Action

Implementing either the Pence Gate or 21st Street Alternatives would have both short-term minor and long-term negligible adverse effects to air quality. However, increases in emissions would not exceed the General Conformity applicability threshold values, and would not violate federal, state, or local air regulations.

The overall building size and construction phasing would be similar for both alternatives in this EA. Therefore, both alternatives would have similar levels of emissions. All direct and indirect emissions associated with the proposed action were estimated (Table 3-1). The total direct and indirect emissions associated with the following activities were accounted for:

- Demolition of existing roadways and facilities
- Construction of the new facilities
- Personal operating vehicles for construction workers
- Paving of parking areas
- Storm water and sewer upgrades
- Personal operating vehicles for employees and patrons

It was assumed that all the demolition and construction would take place during a single calendar year. Therefore, changes in schedule or construction phasing would not affect the annual emission estimations provided herein. The facility's operational emissions estimates included emissions from employee vehicles and patrons, and the combustion of natural gas. Natural gas demand encompasses the total heating load as well as miscellaneous equipment loads (e.g., ovens, ranges, water heaters, etc.). The use of natural gas is optional since other energy sources can be used to satisfy the heating (e.g., base-wide steam, etc.) and the miscellaneous equipment loads can be converted to electrical demands. Operational emissions would be the same for all alternatives within this EA. Detailed breakdown of construction and operational emissions are located in Attachment B.

3.1.1 General Conformity

The General Conformity Rule specifies threshold emissions levels by pollutant to determine the applicability of conformity requirements for a project. For an area in moderate nonattainment for the 8-hour O₃ NAAQS within the OTR, the applicability criterion is 100 tons per year (tpy) for NO_x and 50 tpy for VOCs (40 CFR 93.153). For an area in nonattainment for the PM_{2.5} NAAQS, the applicability criterion is 100 tpy for PM_{2.5}, NO_x, and SO₂ (71 FR 40420). VOCs and ammonia were also identified as potential PM_{2.5} precursors. However, neither Virginia nor USEPA has

found that ammonia contributes to PM_{2.5} problems in AQCR 47 or other downwind areas. Therefore, ammonia was not carried forward for detailed analysis, while the VOC emissions are addressed as a precursor to O₃.

To determine the applicability of the General Conformity Rule (GCR) to the proposed action, air emissions of the nonattainment pollutants and their precursors were compared to the applicability thresholds and regional emissions budgets (Table 3-1 and 3-2). The requirements of this rule are not applicable because the highest total annual direct and indirect emissions from these alternatives would not exceed the applicability threshold for any applicable pollutant during any years, and would not be regionally significant. Detailed emission calculations and a Record of Non-Applicability (RONA) are provided in Attachment B and C respectively.

**Table 3-1.
Total Estimated Emissions for the Proposed Action**

Year	Estimated emissions (tpy)			
	NO _x	VOC	PM _{2.5}	SO ₂
2010	8.7	1.4	0.6	<0.01
Operational	3.4	2.0	0.2	0.02
<i>De minimis</i> threshold	100	50	100	100
Exceeds threshold?	No	No	No	No

tpy = tons per year

**Table 3-2.
Annual Emissions Compared to Regional Emissions**

	Criteria Pollutant or Precursor			
	NO _x	VOC	PM _{2.5}	SO ₂
Highest Annual Emissions (tpy)	8.7	2.0	0.6	0.02
Regional Emissions (tpy)	117,102	81,190	23,364	231,898
Percent Regional Emissions	<0.01%	<0.01%	<0.01%	<0.01%
Regionally Significant?	No	No	No	No

Source: MWCOG 2007 and 2008

tpy = tons per year

3.1.2 Regulatory Review and Air Permit Requirements

Stationary sources of air emissions associated with the proposed action may be subject to federal and state air permitting regulations. These requirements include, but are not limited to, minor new source review, nonattainment new source review, prevention of significant deterioration, and new source performance standards for selected categories of industrial sources. The new facilities would not be equipped with emergency generators; however, may be equipped with heating boilers. Therefore, a minor NSR permit may be required to construct. Proposed sources may require a Best Available Control Technology (BACT) review for each criteria pollutant, a MACT review for regulated HAPs, and designated categories and predictive air dispersion modeling, depending upon VDEQ's requests (Table 3-4). In addition, a modification to Fort Belvoir's Title V permit may be required.

3.1.3 Mobile Emissions

Mobile emissions of concern include primarily automobiles and vehicular traffic. The primary air pollutants from mobile-sources are CO, NO_x, and VOCs. Lead emissions from mobile sources have declined in recent years through the increased use of unleaded gasoline and are extremely small. Potential SO₂ and particulate emissions from mobile sources are small compared to emissions from point sources, such as power plants and industrial facilities. Air quality impacts from traffic are generally evaluated on two scales: *mesoscale* and *microscale*.

Mesoscale analysis is performed at the regional level. NO_x, VOCs, PM_{2.5}, and SO₂ are of regional concern in nonattainment areas for O₃ and PM_{2.5}. Changes in traffic patterns in AQCR 47 resulting from proposed action would introduce minute changes in regional O₃ and PM_{2.5} levels. The Metropolitan Planning Organization, using regional O₃ airshed models, generally evaluates regional effects on O₃. Mesoscale analysis is not generally conducted on a project-specific basis and is not necessary for this EA.

Microscale analysis is performed to identify localized hot spots of criteria pollutants. CO is a site-specific pollutant with higher concentrations found adjacent to roadways and signalized intersections. Microscale analysis is often conducted on a project-specific basis in regions where CO is of particular concern. Fairfax County, and therefore Fort Belvoir, is neither a nonattainment, nor a maintenance area for CO; therefore, micro-scale analysis is not necessary for this EA.

The traffic associated with the proposed action is not anticipated to be an air quality concern for particulate matter because it does not involve any new highways or expressways, and the intersections affected are primarily secondary arterial roads (USEPA, 2006). Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics emitted from highway vehicles and non-road equipment. As with PM, traffic is not anticipated to be an air quality concern for MSATs because the intersections affected are primarily secondary arterial roads, and new traffic is expected to be below the threshold that would have potential for meaningful MSAT effects. Quantitative procedures to address PM and MSATs are not standard practice for non-transportation projects on secondary arterials; therefore they are not included in this EA (FHWA, 2006).

3.3 No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and no construction or operational activities would take place. Therefore, the changes in ambient air quality conditions otherwise expected from the action would not occur.

4.0 BMPs/Mitigation

Although project emissions are expected to be de minimis (of minimal importance) when looked at in isolation, the CDC is being constructed in the same time frame as numerous BRAC-related construction projects. In order to reduce the cumulative impact of CDC construction emissions, the project will implement the same restrictions as outlined in the "Construction Performance Plan for the Reduction of Air Emissions for Implementation of 2005 Base Realignment and Closure (BRAC) Recommendations and Related Army Actions at Fort Belvoir, Virginia" (CPP) that is Attachment 1 of the Record of Decision for Implementation of 2005 Base Realignment and Closure (BRAC) Recommendations and Related Army Actions at Fort Belvoir, Virginia. The Army will extend the mitigation measures outlined in the Final General Conformity Determination (GCD) for Implementation of 2005 BRAC Recommendations and Related Army Actions at Fort Belvoir to the construction of the CDC. They consist of limiting construction on Code Orange, Red, and Purple ozone days, requiring all non-road diesel equipment not meeting

Tier 2 or better standards be retrofitted with emission control devices, implementing anti-idling restrictions for both on-road and non-road vehicles and equipment, using Ultra-Low Sulfur Diesel, alternate fuels or fuel additives, and meeting new engine standards for non-road vehicles. The Army has included the construction performance plan in Appendix A to this EA.

In addition, BMPs would be required and implemented for activities associated with the proposed action. The construction would be accomplished in full compliance with current Virginia regulatory requirements, with compliant practices and/or products. These requirements include:

- Visible emissions and fugitive dust and emissions (9 VAC 5-40-60)
- Asphalt paving operations (9 VAC 5-40-5490)
- Open burning (9 VAC 5-40-5600)
- Portable fuel containers (9 VAC 5-40-5700)
- Architectural and industrial maintenance coatings (9 VAC 5-40-7120)
- Consumer products (9 VAC 5-40-7240 *et seq.*)

This listing is not all-inclusive; the Army and any contractors would comply with all applicable air pollution control regulations. Outside of these BMPs, no mitigation measures would be required for the proposed action.

References

CARB (California Air Resources Board). 2007a. *EMFAC 2007 (v2.3) Emission Factors (On-Road)*

CARB (California Air Resources Board). 2007b. *EMFAC 2007 (v2.3) Emission Factors (Off-Road)*

DOE (Department of Energy). 2003. *Consumption and Gross Energy Intensity by Census Region for Sum of Major Fuels, Commercial Buildings Energy Consumption Survey.*

FHWA (Federal Highway Administration). 2006. *Interim Guidance on Air Toxic Analysis in NEPA Documents.*

MWCOG (Metropolitan Washington Council of Governments). 2007. *Draft Plan to Improve the Air Quality in the Washington, DC-MD-VA Region - State Implementation Plan (SIP) for 8-Hour Ozone Standard and 2002 Base Year Inventory for the Washington, DC-MD-VA Nonattainment Area.* February 2007.

MWCOG (Metropolitan Washington Council of Governments). 2008. *Draft Plan to Improve the Air Quality in the Washington, DC-MD-VA Region - State Implementation Plan (SIP) for Fine Particle (PM_{2.5}) Standard and 2002 Base Year Inventory for the Washington, DC-MD-VA Nonattainment Area.* February 2008.

USACE (U.S. Army Corp of Engineers). 2008. *Anticipated Utility Usage for COS Facilities.*

U.S. Army Fort Belvoir. 2009. *Calendar Year 2008 Emission Statement*

USEPA (U.S. Environmental Protection Agency). 1995. *Compilation of Air Pollutant Emission Factors, AP-42, 5th edition, Vol. I: Stationary Point and Area Sources.* .

USEPA (U.S. Environmental Protection Agency). 2005. *Methodology to Estimate the Transportable Fraction (TF) of Fugitive Dust Emissions for Regional and Urban Scale Air Quality Analyses.*

USEPA (U.S. Environmental Protection Agency). 2006. *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas.* 2006. EPA420-B-06-902.

USEPA (U.S. Environmental Protection Agency). 2009. *EPA AirDATA Website.* URL: <http://www.epa/air/data>. Accessed: May 25, 2009.

SCAQMD (South Coast Air Quality Management District). 1993. *CEQA Air Quality Handbook.*

**Attachment A: Draft Record of Non-Applicability (RONA)
to the General Conformity Rule**

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**Record of Non-Applicability (RONA)
to the General Conformity Rule for the Construction and Operation of
the Child Development Center, Fort Belvoir, VA**

October 22, 2009

Air emissions were estimated for the proposed construction and operation of the Child Development Center for the proposed Pence Gate and 21st Street Alternatives at Fort Belvoir. Emissions from demolition of existing structures, land clearing and grading, construction of buildings, associated parking areas and structures, traffic control upgrades, and stormwater systems and support utility upgrades were assessed. Operational emissions from motor vehicles and stationary sources of air emissions were assessed. General Conformity under the Clean Air Act, Section 176 has been evaluated according to the requirements of 40 CFR 93.153, Subpart B. Regardless of which alternative is ultimately selected, the requirements of this rule are not applicable because:

The highest total annual direct and indirect emissions from this proposed action have been estimated at 8.7 tons NO_x, 2.0 tons VOCs, 0.6 tons PM_{2.5}, and 0.02 tons SO₂ per year, which would be below the conformity threshold values of 50 tons VOCs and 100 tons for SO₂, PM_{2.5}, and NO_x, and would not be *regionally significant*.

Supported documentation and emission estimates:

- Are Attached
- Appear in the NEPA Documentation
- Other (Not Necessary)



PATRICK M. MCLAUGHLIN
Chief
Environmental and Natural Resources Division
US Army Garrison, Fort Belvoir

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Attachment B: Emissions Calculations

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Table B-1 Construction Equipment Use

Equipment Type	Number of Units	Days on Site	Hours Per Day	Operating Hours
Excavators Composite	1	230	4	920
Rollers Composite	1	173	8	1384
Rubber Tired Dozers Composite	1	230	8	1840
Plate Compactors Composite	2	115	4	920
Trenchers Composite	2	58	8	928
Air Compressors	2	115	4	920
Cement & Mortar Mixers	2	115	6	1380
Cranes	1	230	7	1610
Generator Sets	2	115	4	920
Tractors/Loaders/Backhoes	2	230	7	3220
Pavers Composite	1	58	8	464
Paving Equipment	2	58	8	928

Table B-2 Construction Equipment Emission Factors (lbs/hour)

Equipment	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}	CO ₂
Excavators Composite	0.5828	1.3249	0.1695	0.0013	0.0727	0.0727	119.6
Rollers Composite	0.4341	0.8607	0.1328	0.0008	0.0601	0.0601	67.1
Rubber Tired Dozers Composite	1.5961	3.2672	0.3644	0.0025	0.1409	0.1409	239.1
Plate Compactors Composite	0.0263	0.0328	0.0052	0.0001	0.0021	0.0021	4.3
Trenchers Composite	0.5080	0.8237	0.1851	0.0007	0.0688	0.0688	58.7
Air Compressors	0.3782	0.7980	0.1232	0.0007	0.0563	0.0563	63.6
Cement and Mortar Mixers	0.0447	0.0658	0.0113	0.0001	0.0044	0.0044	7.2
Cranes	0.6011	1.6100	0.1778	0.0014	0.0715	0.0715	128.7
Generator Sets	0.3461	0.6980	0.1075	0.0007	0.0430	0.0430	61.0
Tractors/Loaders/Backhoes	0.4063	0.7746	0.1204	0.0008	0.0599	0.0599	66.8
Pavers Composite	0.5874	1.0796	0.1963	0.0009	0.0769	0.0769	77.9
Paving Equipment	0.0532	0.1061	0.0166	0.0002	0.0063	0.0063	12.6

Source: CARB 2007b

Table B-3 Construction Equipment Emissions (Tons per Year)

Equipment	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}	CO ₂
Excavators Composite	0.2681	0.6095	0.0780	0.0006	0.0335	0.0335	55.0074
Rollers Composite	0.3004	0.5956	0.0919	0.0005	0.0416	0.0416	46.4006
Rubber Tired Dozers Composite	1.4684	3.0058	0.3353	0.0023	0.1296	0.1296	219.9772
Plate Compactors Composite	0.0121	0.0151	0.0024	0.0000	0.0010	0.0010	1.9843
Trenchers Composite	0.2357	0.3822	0.0859	0.0003	0.0319	0.0319	27.2467
Air Compressors	0.1740	0.3671	0.0567	0.0003	0.0259	0.0259	29.2594
Cement and Mortar Mixers	0.0309	0.0454	0.0078	0.0001	0.0031	0.0031	5.0012
Cranes	0.4839	1.2961	0.1432	0.0011	0.0576	0.0576	103.5770
Generator Sets	0.1592	0.3211	0.0494	0.0003	0.0198	0.0198	28.0566
Tractors/Loaders/Backhoes	0.6542	1.2470	0.1939	0.0012	0.0964	0.0964	107.5583
Pavers Composite	0.1363	0.2505	0.0455	0.0002	0.0178	0.0178	18.0811
Paving Equipment	0.0247	0.0492	0.0077	0.0001	0.0029	0.0029	5.8593
Total	3.95	8.18	1.10	0.0071	0.46	0.46	648.01

Table B-4 Painting

VOC Content	0.84	lbs/gallon	
Coverage	400	sqft/gallon	
Emission Factor	0.0021	lbs/sqft	
Building/Facility	Wall Surface	VOC [lbs]	VOC [tpy]
All Buildings Combined	76000	159.6	0.080
Total	76000	159.60	0.08

Table B-5 Delivery of Equipment and Supplies

Number of Deliveries	2						
Number of Trips	2						
Miles Per Trip	30						
Days of Construction	230						
Total Miles	27600						
Pollutant	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}	CO ₂
Emission Factor (lbs/mile)	0.0219	0.0237	0.0030	0.0000	0.0009	0.0007	2.7
Total Emissions (lbs)	605.80	654.47	82.60	0.71	23.63	20.41	75056.4
Total Emissions (tpy)	0.30	0.33	0.04	0.0004	0.01	0.01	37.53

Source: CARB 2007a

Table B-6 Paving Off Gasses

VOC Emissions Factor	2.62	lbs/acre	
Building/Facility	Area [acres]	VOC [lbs]	VOC [tpy]
All Combined Parking	2.42	6.33	0.0032
Total	2.42	6.33	0.0032

Source: SQAQMD 1993

Table B-7 Surface Disturbance

TSP Emissions	80	lb/acre				
PM ₁₀ /TSP	0.45					
PM _{2.5} /PM ₁₀	0.15					
Period of Disturbance	30	days				
Capture Fraction	0.5					
Building/Facility	Area [acres]	TSP[lbs]	PM ₁₀ [lbs]	PM ₁₀ [tons]	PM _{2.5} [lbs]	PM _{2.5} [tons]
Construction	3.3	7894	3552	1.78	266	0.13
Total	3.3	7894	3552	1.78	266	0.13

Sources: USEPA 1995 and USEPA 2005

Table B-8 Worker Commutes

Number of Workers	30						
Number of Trips	2						
Miles Per Trip	30						
Days of Construction	230						
Total Miles	414000						
Pollutant	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}	CO ₂
Emission Factor (lbs/mile)	0.0105	0.0011	0.0011	0.0000	0.0001	0.0001	1.1
Total Emissions (lbs)	4367.05	456.59	446.79	4.45	35.21	21.91	455206.4
Total Emissions (tpy)	2.18	0.23	0.22	0.0022	0.02	0.01	227.60

Source: CARB 2007a

Table B-9 Total Construction Emissions (Tons per Year)

Activity/Source	CO	NO _x	VOC	SO _x	PM ₁₀	PM _{2.5}	CO ₂
Construction Equipment	3.95	8.18	1.10	0.0071	0.46	0.46	648.01
Painting	0.00	0.00	0.08	0.0000	0.00	0.00	0.00
Delivery of Equipment and Supplies	0.30	0.33	0.04	0.0004	0.01	0.01	37.53
Paving Off Gasses	0.00	0.00	0.00	0.0000	0.00	0.00	0.00
Surface Disturbance	0.00	0.00	0.00	0.0000	1.78	0.13	0.00
Worker Commutes	2.18	0.23	0.22	0.0022	0.02	0.01	227.60
Total Construction Emissions	6.43	8.74	1.45	0.0097	2.27	0.62	913.14

B-10 Natural Gas Emissions

Total Consumption¹	14,191,200	(cf/yr)				
	CO	NO_x	VOC	SO_x	PM₁₀	PM_{2.5}
Emission Factors (lb/10⁶ cf)²	84	190	5.5	0.6	7.6	7.6
Total Emissions	0.60	1.35	0.04	0.00	0.05	0.05

1. Source: USACE, 2008.

2. Natural gas emission factors for all pollutants except NO_x were obtained from U.S. EPA's AP-42, Section 1.4.

Table B-11 Worker Commutes

Number of Workers	124					
Number of Trips	2					
Miles Per Trip	30					
Days of Work	260					
Total Miles	1934400					
Pollutant	CO	NO_x	VOC	SO_x	PM₁₀	PM_{2.5}
Emission Factor (lbs/mile)	0.0105	0.0011	0.0011	0.0000	0.0001	0.0001
Total Emissions (lbs)	20404.90	2133.42	2087.59	20.79	164.53	102.38
Total Emissions (tons)	10.20	1.07	1.04	0.01	0.08	0.05

Source: CARB 2007a

Table B-12 Patrons Commutes

Number of Workers	338					
Number of Trips	2					
Miles Per Trip	10					
Days of Work	260					
Total Miles	1757600					
Pollutant	CO	NO_x	VOC	SO_x	PM₁₀	PM_{2.5}
Emission Factor (lbs/mile)	0.0105	0.0011	0.0011	0.0000	0.0001	0.0001
Total Emissions (lbs)	18539.93	1938.43	1896.79	18.89	149.49	93.03
Total Emissions (tons)	9.27	0.97	0.95	0.01	0.07	0.05

Source: CARB 2007a

Table B-13 Total Operational Emissions (tons)

Activity/Source	CO	NO_x	VOC	SO_x	PM₁₀	PM_{2.5}
Natural Gas Emissions	0.60	1.35	0.04	0.00	0.05	0.05
Worker Commutes	10.20	1.07	1.04	0.01	0.08	0.05
Patrons Commutes	9.27	0.97	0.95	0.01	0.07	0.05
Total Operational Emissions	20.07	3.38	2.03	0.02	0.21	0.15

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Appendix D

Construction Performance Plan

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FINAL

***Construction Performance Plan for the Reduction of Air Emissions 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

July 2007

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1.0 Introduction

The U.S. Army has developed design and construction standards for equipment and vehicles that reduce air emissions through use restrictions on critical ozone days, diesel oxidation catalysts (DOCs), ultra-low sulfur diesel fuel (ULSD), idling restrictions, and cleaner vehicle options. This construction performance contract plan outlines policy and procedures for complying with emissions reduction requirements and air quality laws of the Commonwealth of Virginia during the period of construction for the Base Realignment and Closure (BRAC) and related activities at Fort Belvoir. This construction performance plan will be enacted during years that the project is expected to exceed the applicability threshold levels for air emissions in the National Capital Interstate Air Quality Control Region.

2.0 Code Red and Purple Ozone Days

Requirements

Contractors and sub-contractors shall not operate diesel powered non-road construction equipment with engine horsepower (HP) ratings of 60 HP and above on predicted Code Red and predicted Purple Ozone days. This restriction will be in effect between 7am to 5pm on the first two predicted Code Red or predicted Purple Ozone days during the period beginning June 1 and ending on August 31 of each calendar year.

Exemptions

The following activities are exempt from this requirement:

1. Operations for mandatory for testing, servicing, repairing, or diagnostic purposes;
2. Operations when verifying that the equipment is in safe operating condition as required by law and that all equipment is in good working order, either as part of a daily vehicle inspection or as otherwise needed, provided that such engine operation is mandatory for such verification;
3. Operation of authorized emergency vehicles while in the course of providing services for which the vehicle is designed; or
4. Operation for loading or offloading deliveries scheduled more than one day in advance.

Reporting Requirements

There are no special reporting requirements under the Code Red and Purple Ozone Days policy.

3.0 Code Orange Ozone Days

Requirements

Contractors and sub-contractors shall not operate diesel powered non-road construction equipment with engine horsepower (HP) ratings of above 600 HP unless equipped with selective catalytic reduction emission controls on predicted Code Orange days. This restriction will be in effect between 7am to 5pm on predicted Code Orange Ozone days during the period beginning June 1 and ending on August 31 of each calendar year.

Exemptions

The following activities are exempt from this requirement:

1. At the contractor's discretion, operations on the 3rd consecutive predicted Code Orange days, and subsequent consecutive predicted Code Orange days are exempt from this requirement;
2. This requirement is limited to a total of 10 days per year of limited operations;
3. Operations for mandatory for testing, servicing, repairing, or diagnostic purposes;
4. Operations when verifying that the equipment is in safe operating condition as required by law and that all equipment is in good working order, either as part of a daily vehicle inspection or as otherwise needed, provided that such engine operation is mandatory for such verification;
5. Operation of authorized emergency vehicles while in the course of providing services for which the vehicle is designed; or
6. Operation for loading or offloading deliveries scheduled more than one day in advance.
7. The use of cranes after the period when clearing and grading would occur.

Reporting Requirements

The contractor must include the dates which they enforce this requirement in their monthly report.

4.0 Limited Off-Road Trucks or Use of New Emission Standard Vehicles

Requirements

Contractors and sub-contractors shall not operate trucks that do not meet the on road emission standards for the National Capital Region. This restriction will be in effect beginning June 1 and ending on August 31 of each calendar year.

Exemptions

The following activities are exempt from this requirement:

1. The use of tier 2, 3 or 4 compliant nonroad trucks;
2. The use of nonroad trucks that have been retrofitted with selective catalytic reduction control technology;
3. The limited use of nonroad trucks that have prior approval from the ACO and Fort Belvoir ENRD; or
4. The use of nonroad trucks required ensuring safe and OSHA compliant construction operations.

Reporting Requirements

Construction shall not proceed until the contractor submits a list of the non-road and onroad diesel powered trucks that will be used onsite during the initial month of onsite work. The list shall include (1) the equipment number, type, make, and contractor/sub-contractor name; (2) the emission control device make, model and EPA verification number; (3) the type and source of fuel to be used; and (4) total cumulative number of days the equipment is expected to be on the site. No diesel-powered trucks may be brought onsite until this information has been submitted. Within 5 days of the end of each month, the contractor shall submit a report detailing the actual usage of the trucks during the previous month and the required information about trucks expected to be used during the current month.

5.0 Diesel Retrofit

Requirements

All Contractor and sub-contractor diesel powered non-road construction equipment with engine horsepower (HP) ratings of 60 HP and above that are assigned to the contract for a period in excess of 30 cumulative calendar days over the life of the project shall be retrofitted with Emission Control Devices in order to reduce diesel emissions. The Retrofit

Emission Control Devices shall consist of oxidation catalysts, or similar retrofit equipment control technology that (1) is included on the Environmental Protection Agency (EPA) *Verified Retrofit Technology List* and (2) is verified by EPA or certified by the manufacturer to provide a minimum emissions reduction of 20% PM₁₀, 40% CO, and 50% HC.

Exemptions

This requirement does not apply:

1. If the vehicle or equipment is either EPA Tier 2, 3 or 4 Rule compliant; or
2. To on-road vehicles and equipment. However, Contractors, Subcontractors and Suppliers that transport materials regularly to and from the project sites are encouraged to follow these requirements to the best of their ability.

Reporting Requirements

Construction shall not proceed until the contractor submits a list of the non-road diesel powered construction equipment that will be used onsite during the initial month of onsite work. The list shall include (1) the equipment number, type, make, and contractor/sub-contractor name; (2) the emission control device make, model and EPA verification number; (3) the type and source of fuel to be used; and (4) total cumulative number of days on the site. The contractor shall submit monthly summary reports, updating the same information stated above. The addition or deletion of non-road diesel equipment shall be included on the monthly report.

6.0 Anti-Idling Restrictions

Requirements

No contractor will allow any diesel-fueled commercial motor vehicles or diesel non-road construction equipment to idle for a period greater than 5 minutes.

Exemptions

The following activities are exempt from this requirement:

1. Idling when the vehicle must remain motionless due to traffic conditions, an official traffic control device, or an official traffic control signal over which the driver has no control, or at the direction of a police officer;

2. Idling of the primary engine or operating when forced to remain motionless due to immediate adverse weather conditions affecting the safe operation of the vehicle or due to mechanical difficulties over which the driver has no control;
3. Idling of the primary engine or operating a diesel-fueled is mandatory for testing, servicing, repairing, or diagnostic purposes;
4. Idling to verify that the vehicle is in safe operating condition as required by law and that all equipment is in good working order, either as part of a daily vehicle inspection or as otherwise needed, provided that such engine idling is mandatory for such verification;
5. Idling of the primary diesel engine outside of the hours of 7 AM – 5 PM when it is necessary to power a heater, air conditioner, or any ancillary equipment during sleeping or resting in a sleeper berth while on the project site;
6. Idling of the primary engine or operating a diesel-fueled authorized emergency vehicles while in the course of providing services for which the vehicle is designed; or
7. Idling during periods when ambient temperatures are less than 30 degrees Fahrenheit.

Reporting Requirements

There are no special reporting requirements under the anti-idling policy.

7.0 Use of Ultra Low Sulfur Diesel Fuel

Requirements

The contactor and subcontractor shall fuel all onroad construction and non-road diesel vehicles and equipment with only ultra low-sulfur diesel fuel with sulfur content of 15 ppm or lower. It should be noted that ULSD fuel is readily available in the project area. In addition, it should be noted that the requirements stated herein are compatible with current Federal requirements for the use of ULSD fuel for on-road vehicles, but in advance of the 2010 Federal requirements for the use of ULSD fuel for off-road vehicles.

Exemptions

This requirement does not apply to fueling activities outside the National Capital Region unless required by law.

Reporting Requirements

The contactor and/or subcontractor shall record and maintain onsite record of all fuel deliveries to the site. Documentations shall include information suitable for verification of the ULSD requirements.

8.0 Required By Law

Requirements

All construction should be accomplished in full compliance with the Virginia Regulations for the Control and Abatement of Air Pollution, particularly 9 VAC 5, Chapter 40, Part II. Articles of particular relevance are:

- Article 1, Visible Emissions and Fugitive Dust/Emissions (9 VAC 5-40-60 to 120);
- Article 39, Asphalt Paving Operations (9 VAC 5-40-5490 to 5590);
- Article 40, Open Burning (9 VAC 5-40-5600 to 5645);
- Article 42, Portable Fuel Containers Spillage Control (9 VAC 5-40-5700 to 5770);
- Article 49, Architectural and Industrial Maintenance Coatings (9 VAC 5-40-7120 to 7230); and
- Article 50, Consumer Products (9 VAC 5-40-7240 to 7360).

This listing is not all-inclusive; contractors should ensure compliance with all applicable Virginia air pollution control regulations.

Exemptions

There are no exemptions. Mandatory compliance with all laws of the Commonwealth of Virginia is required.

Reporting Requirements

There are no special reporting requirements.

9.0 Compliance Plan and Affirmative Commitment

Requirements

Construction shall not proceed until the contractor submits a plan outlining policies, procedure and systems to ensure compliance with this guidance to the ACO to be approved by Fort Belvoir ENRD. Included in the plan will be a Certificate of Intention to Comply signed by a responsible contractor representative. An example has been attached to this plan.

Exemptions

1. Outside the ozone season (April 1 through October 31) construction may begin without an approved plan to comply. However, a plan must be approved within 30 days of notice to proceed is given or April 1st which ever comes first.

Reporting Requirements

There are no special additional reporting requirements.

10.0 Enforcement

During the construction phase of the Fort Belvoir BRAC action, Administrative Contracting Officers (ACO) and their agents are anticipated to number 100 or more. One of their primary responsibilities will be to monitor and inspect the activities of the contractors and subcontractors performing the work and they will have the authority and responsibility to insure compliance with the policies and procedures outlined in this plan. All work shall be conducted under the general direction of the ACO and is subject to Government inspection at all places and at all reasonable times to ensure strict compliance (FAR 52.246-12).

The contractor holds an affirmative obligation to maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to these requirements. The Contractor shall maintain complete inspection records and make them available to the Government.

The Administrative Contracting Officer maintains the authority, by written order to the Contractor, to require the Contractor to stop all, or any part, of the work (FAR 52.242-15). When the ACO, or their agent, determines a violation of policies and procedures outlined in this guidance exists, he/she will notify the Contractor in writing within one business day, and direct the Contractor to correct the deficiency within a specified timeframe. The specified timeframe, which begins upon Contractor notification, will be from immediately to 24 hours long, based on the urgency of the situation and the nature of the deficiency. The ACO or their agent shall be the sole judge of these conditions. Upon receipt of the order, the Contractor shall, at their own expense, immediately comply with its terms and take all reasonable steps to come into compliance with policies and procedures outlined in this guidance.

If a Contractor or sub-contractor accumulates three (3) violations for the same issue, all Contractor operations will be shut down at their own expense until the deficiency is corrected and additional systems and controls are put in place to ensure future compliance.

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Attachment 1 - Equipment Worksheet(s)

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**FORT BELVOIR BRAC ACTION AND ASSOCIATED PROJECTS
CONTRACTOR EQUIPMENT LISTING**

Construction Air Quality – Diesel Vehicle Emissions Control

Month, Year: _____

Machine #	Description	Unit #	Serial #	Year	Horsepower Rating	Tier	Date Retrofitted (if applicable)	Number of Days on Site (Cumulative)	On Road Truck (Y/N)	Off Road Truck (Y/N)
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										

Certify the above information is accurate.

Company _____
 Print Name _____
 Title _____
 Signature _____
 Date _____

Dates Code Orange Limitation was enacted _____

REVIEWED BY: _____

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Attachment 2 - Certificate of Intention to Comply

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CERTIFICATE OF INTENTION TO COMPLY

FOR

***Construction Performance Plan for the Reduction of Air Emissions for
Implementation of 2005 Base Realignment and Closure (BRAC)
Recommendations and Related Army Actions at Fort Belvoir, Virginia***

I, authorized signatory for _____,
whose principal place of business is at _____,
do hereby certify our intent to comply with the Construction Performance Plan for the
Reduction of Air Emissions for Implementation of 2005 Base Realignment and Closure
(BRAC) Recommendations and Related Army Actions at Fort Belvoir, Virginia. The
requirements herein included but are not limited to:

- Limiting construction on Code Orange, Red and Purple ozone days;
- Limiting the use of off-road trucks on the project site;
- Requiring all non-road diesel equipment not meeting Tier 2 or better standards be retrofitted with emission control devices;
- Implementing anti-idling restrictions for both onroad and non-road vehicles and equipment;
- The use of Ultra-Low Sulfur Diesel (ULSD), alternate fuels or fuel additives; and
- Meeting new engine standards for nonroad vehicles.

I acknowledge that this certificate is being furnished as a requirement under this contract, and is subject to applicable, State and Federal Laws, both criminal and civil.

Date

Signature

Printed Name and Title

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Appendix E
Noise Discipline Report

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**CHILD DEVELOPMENT CENTER
ENVIRONMENTAL ASSESSMENT**

**U.S. ARMY GARRISON FORT BELVOIR
FAIRFAX COUNTY, VIRGINIA**

Appendix E: Noise Discipline Report

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Acronyms and Abbreviations

A.M.	<i>Ante Meridiem</i> (i.e. before noon)
ANSI	American National Standard Institute
dB	decibel
dBA	A-weighted decibel
DNL	Day-night Average Sound Level
Hz	Hertz
Leq	Equivalent Sound Level
P.M.	<i>Post Meridiem</i> (i.e. after noon)
USEPA	U.S. Environmental Protection Agency

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1.0 Affected Environment

1.1 Overview

Sound is a physical phenomenon consisting of vibrations that travel through a medium, such as air, and are sensed by the human ear. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise, distance between the noise source and the receptor, receptor sensitivity, and time of day. Noise is often generated by activities essential to a community's *quality of life*, such as construction or vehicular traffic.

Sound varies by both intensity and frequency. Sound pressure level, described in decibels (dB), is used to quantify sound intensity. The dB is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. Hertz (Hz) are used to quantify sound frequency. The human ear responds differently to different frequencies. *A-weighting*, measured in A-weighted decibels (dBA), approximates a frequency response expressing the perception of sound by humans. Sounds encountered in daily life and their dBA levels are provided in Table A1-1.

**Table A1-1
Common Sounds and Their Levels**

Outdoor	Sound Level (dBA)	Indoor
Motorcycle	100	Subway train
Tractor	90	Garbage disposal
Noisy restaurant	85	Blender
Downtown (large city)	80	Ringling telephone
Freeway traffic	70	TV audio
Normal conversation	60	Sewing machine
Rainfall	50	Refrigerator
Quiet residential area	40	Library

Source: Harris, 1998.

The dBA noise metric describes steady noise levels, although very few noises are, in fact, constant. Therefore, Day-night Sound Level (DNL) has been developed. DNL is defined as the average sound energy in a 24-hour period with a 10-dB penalty added to the nighttime levels (10 P.M. to 7 A.M.). It is a useful descriptor for noise because: (1) it averages ongoing yet intermittent noise, and (2) it measures total sound energy over a 24-hour period. In addition, Equivalent Sound Level (L_{eq}) is often used to describe the overall noise environment. L_{eq} is the average sound level in dB.

1.2 Regulatory Requirements

The Noise Control Act of 1972 (PL 92-574) directs federal agencies to comply with applicable federal, state, interstate, and local noise control regulations. In 1974, the USEPA provided information suggesting continuous and long-term noise levels in excess of DNL 65 dBA are normally unacceptable for noise-sensitive land uses such as residences, schools, churches, and hospitals.

The Fairfax County Code prohibits the creation of sound louder than 55 dB in an off-post residential area, and 60 dB in an off-post commercial area. In addition, they prohibit the creation of any excessive noise on any street adjacent to any school, institution of learning, court, or hospital that interferes with its function (Fairfax County Code Section 108-4-1). Sounds generated from construction activities are exempt from the Fairfax County ordinance between 7:00 A.M. and 9:00 P.M.

2.0 Existing Conditions

Existing sources of noise near the proposed sites include roadway traffic, high-altitude aircraft overflights, rotorcraft activities, and natural noises such as the rustling of leaves and bird vocalizations. In general, noise levels would be comparable to a suburban residential setting. Existing noise levels (L_{eq} and DNL) were estimated for the surrounding area using the techniques specified in the *American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound Part 3: Short-term measurements with an observer present* (Table A2-1) (ANSI, 2003).

**Table A2-1
Estimated Existing Noise Levels at Proposed Sites (dBA)**

Location	Closest Noise Sensitive Area (NSA)			Land Use Category	Estimated Existing Sound Levels (dBA)		
	Distance	Direction	Type		DNL	Leq (Daytime)	Leq (Nighttime)
Pence Gate Site	1000 ft (300 m)	East	Residential	Noisy Suburban Residential	58	52	60
	930 ft (280 m)	North	Church				
21 st Street Site	145 ft (44 m)	East	Residential	Quiet Suburban Residential	53	47	55
	200 ft (65 m)	North	Residential				

Source: ANSI, 2003.

3.0 Environmental Consequences

3.1 Pence Gate Site (Proposed Action)

Short-term minor and long-term negligible adverse effects to the noise environment would be expected with the implementation of the proposed action. Short-term effects would be primarily due to heavy equipment noise during construction activities.

The Proposed Action would require the construction of the CDC at the Pence Gate Site. Individual pieces of construction equipment typically generate noise levels of 80 to 90 dBA at a distance of 50 feet. With multiple items of equipment operating concurrently, noise levels can be relatively high during daytime periods at locations within several hundred feet of active construction sites. Table 3-1 presents typical noise levels (dBA at 50 feet) that the USEPA has estimated for the main phases of outdoor construction. The zone of relatively high construction noise typically extends to distances of 400 to 800 feet from the site of major equipment operations. Locations more than 1,000 feet from construction sites seldom experience noteworthy levels of construction noise. Two churches are approximately 1000 feet from the proposed site adjacent to Route 1. Noise from traffic on Route 1 would be substantially louder than construction noise at this distance, and the construction noise would not likely be audible. There are on-post residences about 1000 feet from the site that would likely hear the construction. Given the temporary nature of proposed activities, the amount of noise that construction equipment would generate, and the limited number of receptors, this effect would be minor.

**Table 3-1
Noise Levels Associated with Outdoor Construction**

Construction phase	L_{eq} (dBA)
Ground clearing	84
Excavation, grading	89
Foundations	78
Structural	85
Finishing	89

Source: USEPA, 1971.

Construction noise would dominate the soundscape for all onsite personnel. Construction personnel, and particularly equipment operators, would don adequate personal hearing protection to limit exposure and ensure compliance with federal health and safety regulations. In addition, since construction noise is the appreciable source of noise associated with the proposed action, and construction would occur primarily during normal weekday business hours, there would be no violation of the Fairfax County noise ordinance.

There would be no appreciable long-term increases in the overall noise environment (e.g., L_{eq}, DNL) with the implementation of the proposed action. No military training activities, use of weaponry, demolitions, or aircraft operations would occur. Therefore, there would be no changes in the existing noise environment associated with these sources. Some minor changes in traffic patterns would occur, leading to incremental changes in traffic noise near the site. The effects would be negligible.

3.1 21st Street Site

Implementation of 21st Street Site Alternative would have short-term minor and long-term negligible adverse effects on the noise environment. These minor increases in noise would primarily be due to the use of heavy equipment during construction. These minor increases would be temporary in nature and would end upon completion of construction.

This alternative would require the construction of the CDC at the 21st Street Site. The levels of noise associated with this alternative would be similar in both level and frequency as that outlined under the Proposed Action. There are several on-post residences closer than 800 feet to the site that would experience appreciable amounts of construction noise. BMPs would be similar to those outlined under the Proposed Action. These effects would be minor.

The facility would be primarily academic in nature. No use of weaponry, demolitions, or aircraft operations would occur. Therefore, no changes in the existing noise environment associated with these sources would be expected.

3.3 No Action Alternative

The No Action Alternative would result in no effects on the noise environment. No construction or changes in operations would occur. Noise conditions would remain as described in Section 2.0.

4.0 BMPs/ Mitigation

Although construction-related noise effects would be small, the following best management practices would be used to reduce these already-limited noise effects:

- Construction would predominately occur during normal weekday business hours; and
- Construction equipment mufflers would be properly maintained and in good working order.

Apart from general BMPs listed, no mitigation measures for noise would be required with the implementation of the proposed action.

References

ANSI (American National Standard Institute). 2003. *American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound. Part 3: Short-term measurements with an observer present.* 2003. ANSI S12.9-1993 (R2003)/Part 3.

Harris, Cecil M. 1998. *Handbook of Acoustical Measurement and Noise Control.*

USEPA (U.S. Environmental Protection Agency). 1971. *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.* Washington, D.C. : s.n., Publication NTID300.1.

Appendix F

Stormwater Discharge Calculations

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Increase in storm water runoff for the proposed Pence Gate Child Development Center:

Existing Site Conditions and Proposed Improvements:

The proposed site consists of 8.344 acres of land and is located on Taylor Road & Washington Road adjacent to Pence Gate, Fort Belvoir, Virginia. The existing site has a paved roadway crossing through the property with a few small buildings. This existing impervious area will be removed with construction of the proposed child development center. Computations provided below indicate the anticipated increase in storm water runoff resulting from development of this site based on the provided preliminary layout; see the attached plan for additional information. The Fairfax County Public Facilities Manual requires reduction of peak flow runoff for storms of 2 and 10 year intensity to pre-developments levels. Additionally, water quality improvements are required that will reduce phosphorus loads from the site by not less than 40%.

Pre-development runoff from the site:

Pre-development site plan area = 363,465 s.f. or 8.344 acres

Runoff coefficient:

Existing Impervious area, (streets, buildings, etc.)= 38,700 s.f. or 0.888 acres; C_2 & C_{10} =0.90

Lawn and natural area = 324,765 s.f. or 7.456 acres; C_2 & C_{10} =0.30

$$C_2 \text{ \& } C_{10} \text{ (Wt.)} = (0.90 \times 0.888) + (0.30 \times 7.456) / 8.344 = 0.364$$

Time of concentration:

Using PFM Plate No.: 4-6, "Time of concentration of small drainage basins"

Use $T_c = 5.0$ minutes: $I_2 = 5.45$, $I_{10} = 7.27$

$$Q_2 = 16.55 \text{ c.f.s.} \quad Q_{10} = 22.08 \text{ c.f.s.}$$

Post-development runoff from the site:

Post-development site plan area = 363,465 s.f. or 8.344 acres

Runoff coefficient:

Proposed impervious area, (streets, parking area, buildings, etc.)= 168,465 s.f. or 3.867 acres; C_2 & C_{10} =0.90

Proposed lawn and natural area = 195,000 s.f. or 4.477 acres; C_2 & C_{10} =0.30

$$C_2 \text{ \& } C_{10} \text{ (Wt.)} = (0.90 \times 3.867) + (0.30 \times 4.477) / 8.344 = 0.578$$

Time of concentration:

Using PFM Plate No.: 4-6, "Time of concentration of small drainage basins"

Use $T_c = 5.0$ minutes: $I_2 = 5.45$, $I_{10} = 7.27$

$$Q_2 = 26.28 \text{ c.f.s.} \quad Q_{10} = 35.06 \text{ c.f.s.}$$

Increase runoff due to proposed site development:

$Q_2 = 26.28 - 16.55 = 9.73$ c.f.s. Increase – Required decrease in storm water runoff for two year intensity storms

$Q_{10} = 35.06 - 22.08 = 12.98$ c.f.s. Increase – Required decrease in storm water runoff for ten year intensity storms

Estimated Increase in storm water runoff for the proposed 21st. Street Child Development Center:

Existing Site Conditions and Proposed Improvements:

The proposed site consists of 7.580 acres of land and is located on 21st. Street west of Gunston Road, Fort Belvoir, Virginia. The existing site has paved streets, parking and two existing buildings. The existing impervious area will be removed with construction of the proposed child developments center. The computations provided below indicate the anticipated increase in storm water runoff that results from development of this site. These computations are based on the provided preliminary layout; see the attached plan for additional information.

The Fairfax County Public Facilities Manual requires reduction of peak flow runoff for storms of 2 and 10 year intensity to pre-developments levels. Additionally, water quality improvements are required that will reduce phosphorus loads from the site by not less than 40%.

Pre-development runoff from the site:

Pre-development site plan area = 330,185 s.f. or 7.580 acres

Runoff coefficient:

Existing Impervious area, (streets, buildings, etc.)= 102,450 s.f. or 2.352 acres; C_2 & $C_{10}=0.90$

Lawn and natural area = 227,735 s.f. or 5.228 acres; C_2 & $C_{10}=0.30$

$$C_2 \text{ \& } C_{10} \text{ (Wt.)} = (0.90 \times 2.352) + (0.30 \times 5.228) / 7.580 = 0.486$$

Time of concentration:

Using PFM Plate No.: 4-6, "Time of concentration of small drainage basins"

Use $T_c = 5.0$ minutes; $I_2 = 5.45$, $I_{10} = 7.27$

$$Q_2 = 20.08 \text{ c.f.s.} \quad Q_{10} = 26.78 \text{ c.f.s.}$$

Post-development runoff from the site:

Post-development site plan area = 330,185 s.f. or 7.580 acres

Runoff coefficient:

Proposed impervious area, (streets, parking area, buildings, etc.)= 172,255 s.f. or 3.954 acres; C_2 & $C_{10}=0.90$

Proposed lawn and natural area = 157,930 s.f. or 3.626 acres; C_2 & $C_{10}=0.30$

$$C_2 \text{ \& } C_{10} \text{ (Wt.)} = (0.90 \times 3.954) + (0.30 \times 3.626) / 7.580 = 0.613$$

Time of concentration:

Using PFM Plate No.: 4-6, "Time of concentration of small drainage basins"

Use $T_c = 5.0$ minutes; $I_2 = 5.45$, $I_{10} = 7.27$

$$Q_2 = 25.32 \text{ c.f.s.} \quad Q_{10} = 33.78 \text{ c.f.s.}$$

Increase runoff due to proposed site development:

$Q_2 = 25.32 - 20.08 = 5.24$ c.f.s. Increase – Required decrease in storm water runoff for two year intensity storms

$Q_{10} = 33.78 - 26.78 = 7.00$ c.f.s. Increase – Required decrease in storm water runoff for ten year intensity storms

Appendix G
Traffic Impact Analysis

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**CHILD DEVELOPMENT CENTER
ENVIRONMENTAL ASSESSMENT**

**U.S. ARMY GARRISON FORT BELVOIR
FAIRFAX COUNTY, VIRGINIA**

Appendix G: Transportation Discipline Report

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Acronyms and Abbreviations

A.M.	<i>Ante Meridiem</i> (i.e. before noon)
BRAC	Base Realignment and Closure
FCP	Fairfax County Parkway
I	Interstate
ITE	Institute of Transportation Engineers
LOS	Level of Service
mph	miles per hour
P.M.	<i>Post Meridiem</i> (i.e. after noon)
POVs	personal operating vehicles
ROD	Record of Decision
USACE	U.S. Army Corp of Engineers
vpd	vehicles per day
vph	vehicles per hour

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1.0 Introduction

Fort Belvoir, located in Fairfax County Virginia, an installation of approximately 8,400 acres, currently accommodates 7,600 residents and 23,000 employees. The Base Realignment and Closure (BRAC) Action will increase the employment levels on Fort Belvoir to over 29,000 employees by the year 2011, and the residential population is expected to expand to nearly 9,400 residents at that same timeframe. Today there are transportation challenges on roadways in and around Fort Belvoir during the A.M. and P.M. peak periods, as off-post roadways are congested and queues form at the gates for access into the installation.

2.0 Existing Transportation Studies

The June 2007 *Final Environmental Impact Statement for Implementation of 2005 Base Realignment and Closure (BRAC) Recommendations and Related Army Actions at Fort Belvoir, Virginia* (USACE, 2007a) evaluated the effects of four alternatives on the transportation system at Fort Belvoir and surrounding areas that would result from the implementation of the realignment actions mandated by the BRAC Commission and other related actions. None of the alternatives analyzed in the EIS contained the proposed Child Development Center (CDC).

3.0 Affected Environment

Off-post Transportation Systems. Fort Belvoir is located along Route 1 between Fairfax and Alexandria. Traffic on roadways surrounding Fort Belvoir is generally congested in the peak direction of traffic flow in both the A.M. and P.M. peak periods. These roadways include facilities such as the Fairfax County Parkway (FCP) and Route 1 itself. Traffic tends to flow unimpeded in the off-peak direction of flow, except for turn bays into Fort Belvoir. Further to the west is Interstate 95 (I-95). I-95 is congested during the A.M. and P.M. peak hours in the peak direction of flow, often up to three hours of congestion during each of the peak periods. During the off-peak hours, very little traffic congestion occurs on roadways off post.

Level of Service (LOS) is a measure of the quality of service, operating conditions for a given roadway segment or intersection. At intersections, LOS is a function of the average overall wait time for a vehicle to pass through the intersection. In general, LOS can be characterized as follows: A= free flow; B=reasonably free flow; C=stable flow; D=approaching unstable flow; E=unstable flow, F=forced or breakdown flow. The two intersections accessing Fort Belvoir most likely to be effected by the proposed action are (1) Pohick Road and Route 1; and (2) Belvoir Road and Route 1. The Pohick Road and Route 1 intersection currently operates at LOS-C during the weekday A.M. peak period and a LOS-F during the weekday P.M. peak period. The Belvoir and Route 1 intersection currently operates at LOS-B during the weekday A.M. and P.M. peak periods (USACE 2007).

Gates and On-post Transportation Systems. The Fort Belvoir on-post road network primarily forms a gridded pattern with an adjunct circumferential system. Primary roadways link the gates with major facilities on-post. High-density areas are laid out with an additional grid based roadway system (Figure 3-1). The roadways on Fort Belvoir are classified as primary, secondary, and tertiary. Primary roads serve as main arteries carrying traffic onto and off the post and connecting the main parts of the installation. The primary roads include the following:

- Pohick Road from the Tulley Gate/Route 1 to Gunston Road
- Belvoir Road from Pence Gate/Route 1 to major functional areas on South Post

Secondary roads feed traffic to the primary roads, and provide for direct movement between areas of the installation. Tertiary roads provide access to all other activity areas and facilities.

Often during the A.M. peak period, queues form at the gates as people wait to be checked. Sometimes traffic backs up onto Route 1. Once past the gates, little congestion does occur, except along Gunston Road near Jackson Loop, as ingress and egress can be difficult for turning vehicles. In the P.M. peak period, vehicles

often have to wait several cycles at the traffic signals in order to get onto Route 1 or FCP. These corridors are often congested in the peak direction of traffic.

Traffic heading for the Pence Gate Site would enter Pence Gate at Route 1 and Belvoir Road as it is the most accessible (Figure 3-1). The A.M. inbound peak traffic volume for Pence Gate is 585 vph (Greenhorn and O'Mara, 2005). Direct access to the CDC would be provided by Taylor Road and Old Washington Road. After entering Fort Belvoir, traffic bound for the CDC would travel left onto Woodbury Road and follow it to Taylor Road and the CDC. On-post personnel may access the CDC via Old Washington Road. After dropping off or picking up their children, patrons would likely backtrack to resume their primary route along Belvoir Road. These roadways have two-lanes, with speed limits of 25 to 40 miles per hour (mph).

Traffic heading for the 21st Street Site would enter Fort Belvoir Pence Gate (at Route 1 and Belvoir Road), or Tulley Gate (at Route 1 and Pohick Road) as they are the most accessible (Figure 3-1). The A.M. inbound peak traffic volume for Tulley Gate is 1,519 vehicles per hour (vph) (Greenhorn and O'Mara, 2005). After entering Fort Belvoir, traffic bound for the CDC travels through South Post. Major South Post routes include Pohick to Theote Road, Gunston, and Belvoir Road. Most roadways have two-lanes, with speed limits of 25 to 40 mph. Secondary South Post roads, which provide access, are 9th, 12th, and 21st Streets. Direct access to the CDC would be provided by Warren Road and 21st Street.

Parking capacity at Fort Belvoir is appropriate for existing demand. Barracks and larger facilities have dedicated parking lots, and parallel parking is provided on many streets. Pedestrian traffic is accommodated by a system of sidewalks along many streets and walkways between buildings. Troop pathways are provided between foot traffic high-volume areas.

4.0 Environmental Consequences

4.1 Proposed Action

Short-term minor adverse and long-term minor beneficial effects on transportation resources would be expected from the proposed action. Short-term effects would be primarily due to construction vehicles. Long-term benefits would be due primarily to the reduction in use of off-post daycare facilities, consolidation of these services on the installation, and the subsequent reduction in the number of vehicle trips through the gates.

Construction: Traffic would increase because of additional construction vehicles and traffic delays near the construction site. These effects would be temporary in nature and would end with the construction phase. The local roadway infrastructure would be sufficient to support any increase in construction vehicle traffic. Such effects would be minimized by strategically placed detour signs, and placing construction staging areas where they interfere with traffic the least. All construction vehicles would be equipped with backing alarms, two-way radios, and Slow Moving Vehicle signs when appropriate. Although the effects would be minor, the following measures would be implemented during construction:

- Route and schedule construction vehicle traffic to minimize conflicts with other traffic
- Strategically locate construction material staging areas to minimize traffic effects

Operation: The proposed action would introduce approximately 62 permanent personnel and up to 338 patrons. Notably, the vast majority of the CDC patrons currently work on main post or will work on main post regardless of whether the CDC is built or not. The estimated daily and peak period traffic for both full of the CDC are outlined in Table 4-1. At full capacity, CDC employees and patrons would account for 233 vehicle trips during the a.m. peak period and 181 vehicle trips during the p.m. peak period on any give weekday. This constitutes the upper bound of effects; assuming all patrons and employees would reside off-post and the CDC would operate at full occupancy. On weekends, traffic generated by the working population and most for the CDC would be absent. Slight changes in traffic are expected on South Post during weekday peak periods. These effects would be more noticeable on streets near the project sites than on any of the regional roadways.

**Table 4-1
Estimated Trips Associated with the Proposed CDC at Full Occupancy^a**

Period	Number of Trips	Percent of Gate Traffic
Pence Gate Alternative^a		
A.M. Peak Period	233	40%
P.M. Peak Period	181	31%
21st Street Alternative^b		
A.M. Peak Period	233	11%
P.M. Peak Period	181	9%

Source: Evans & Chastain 2004, and ITE 2003.

a All trips would occur with or without the proposed action.

b All trips assumed to reroute to Pence Gate.

c All trips assumed to split between Pence Gate and Tully gate.

Off-post Transportation Systems. In general, off post traffic would decrease due to a reduction in utilization of off-post daycare facilities, consolidation of these services on the installation, and the subsequent reduction in the number of vehicle trips through the gates and off-post traffic. These traffic volumes are a small fraction of the overall volume on Route 1 during these peak periods. Therefore, these changes in traffic patterns would be seen primarily on post. Regardless, intersection adjacent to both Pence and Tulley gates are expected to operate at an acceptable LOS with or without the proposed action.

Gates and On-post Transportation Systems. Individual gates and intersections may experience increases in traffic so patrons may drop-off and pick-up their children. These increases would be offset by traffic decrease at other gates, and consolidation of patron travel from their work area to and from the CDC. For example, under the Pence Gate Alternative, Pence gate would likely see an increase in through traffic. However, other adjacent gates such a Tulley would see an equivalent decrease in through traffic. These effects would be less pronounced under the 21st Street Alternative because of the site’s location internal to Fort Belvoir and its accessibility from multiple gates.

For the Pence Gate alternative Old Washington Road and Taylor would be closed to through traffic. For the 21st Street Alternative, Caples Road would be permanently closed. These are tertiary roadways within Fort Belvoir. Vehicles currently using these roadways would naturally reroute creating minor, unnoticeable, changes in on-post traffic patterns. Local traffic within the installation would continue to be heavy during the peak periods for areas of the installation that are primary destinations for on-post traffic. The primary and secondary roadways within the installation would service traffic changes created by the CDC project.

Because the administrative personnel and patrons would be within driving distance of the CDC and transit access would be limited, the action would likely have no effect on public transit, rail, bus, or air traffic in the area. Parking upgrades would be adequate for the new CDC.

3.3 No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and no construction or operational activities would take place. Therefore, the changes in transportation resources otherwise expected from the proposed action would not occur.

4.0 BMPs/Mitigation

BMPs would consist of:

- Equipping all construction vehicles with backing alarms, two-way radios, and Slow Moving Vehicle signs when appropriate,
- Routing and scheduling construction vehicle traffic to minimize conflicts with other traffic,
- Strategically locating construction material staging areas to minimize traffic effects,
- Designing circulation roads primarily one-way,

- Incorporate traffic-calming measures and create a more pedestrian-friendly environment.
- Reducing the speed limits at the CDC itself
- Installing speed bumps, and
- Placing street signage and traffic control at new roadways.

Apart from general BMPs listed, no mitigation measures for traffic would be required with the implementation of the proposed action.

5.0 Cumulative Effects

The size and scope of the changes in the transportation systems associated with the proposed action would be extremely small when compared to other planned projects in the area. These projects include the BRAC action and the National Museum of the U.S. Army. As a result, the traffic impacts would not contribute appreciably to cumulative effects.

References

ITE (Institute of Transportation Engineers). 2003. *Transportation Engineers Trip Generation Manual, 7th Edition*.

USACE (U.S. Army Corp of Engineers, Mobile District). 2007a. *Final Environmental Impact Statement for Implementation of 2005 Base Realignment and Closure (BRAC) Recommendations and Related Army Actions at Fort Belvoir, Virginia*.

USACE (U.S. Army Corp of Engineers, Mobile District). 2007b. *Record of Decision for the Implementation of 2005 Base Realignment and Closure (BRAC) Recommendations and Related Army Actions at Fort Belvoir, Virginia*.