DRAFT ENVIRONMENTAL IMPACT STATEMENT

For Activities To Implement 2005 Base Realignment And Closure Actions
At
National Naval Medical Center
Bethesda, Maryland

Department of the Navy

December 2007

COVER SHEET

Action Proponent:

U.S. Navy, Bureau of Medicine and Surgery, Washington DC

Proposed Action:

The Navy's Proposed Action is to provide necessary facilities to implement BRAC 2005 actions at National Naval Medical Center.

The specific BRAC actions are to:

> "Realign Walter Reed Army Medical Center (WRAMC), Washington, DC, as follows: relocate all tertiary (sub-specialty and complex care) medical services to National Naval Medical Center, Bethesda, Maryland, establishing it as the Walter Reed National Military Medical Center Bethesda, Maryland; relocate Legal Medicine to the new Walter Reed National Military Medical Center Bethesda, Maryland; relocate sufficient personnel to the new Walter Reed National Military Medical Center Bethesda, Maryland, to establish a Program Management Office that will coordinate pathology results, contract administration, and quality assurance and control of Department of Defense (DoD) second opinion consults worldwide; relocate all non-tertiary (primary and specialty) patient care functions to a new community hospital at Fort Belvoir, VA."

Designation:

Draft Environmental Impact Statement (DEIS).

Abstract:

This DEIS evaluates the potential environmental effects of construction and operation of new facilities at the National Naval Medical Center (NNMC), Bethesda, Maryland. Alternative One would add approximately 1,144,000 square feet (SF) of new building construction, provide approximately 508,000 SF of renovation to existing building space at NNMC, and provide approximately 824,000 SF of new parking facilities. It would accommodate approximately 2,500 additional staff and an estimated 1,862 patients and visitors each weekday. The new construction or improvements to existing facilities would provide medical care and administration additions and alterations, a Traumatic Brain Injury/Post Traumatic Stress Disorder Intrepid Center of Excellence, permanent and temporary lodging facilities (Bachelor Enlisted Quarters and Fisher Houses™), a new physical fitness center, additional parking, and road and utility improvements on the installation as needed to support the new facilities. Under Alternative Two, the same facilities are proposed; some facility sites change and the choice of new construction versus renovation of some facilities differs from Alternative One. Alternative Two would add to NNMC approximately 1,230,000 SF feet of new building construction, approximately

423,000 SF of building renovation, and approximately 824,000 SF of new parking facilities. The estimated staffing increase would also be approximately 2,500 personnel and 1,862 patients and visitors each weekday under Alternative Two.

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EXECUTIVE SUMMARY

General

This Environmental Impact Statement (EIS) will examine the potential environmental impacts of the relocation of Walter Reed Army Medical Center (WRAMC) activities from the District of Columbia to the National Naval Medical Center (NNMC) in Bethesda, Maryland per Public Law 101-510, the Defense Base Closure and Realignment Act of 1990 (BRAC Law) as amended in 2005. The specific BRAC recommendation is to:

> "Realign Walter Reed Army Medical Center, Washington, DC, as follows: relocate all tertiary (sub-specialty and complex care) medical services to National Naval Medical Center, Bethesda, Maryland, establishing it as the Walter Reed National Military Medical Center Bethesda, Maryland; relocate Legal Medicine to the new Walter Reed National Military Medical Center Bethesda, Maryland; relocate sufficient personnel to the new Walter Reed National Military Medical Center Bethesda, Maryland, to establish a Program Management Office that will coordinate pathology results, contract administration, and quality assurance and control of Department of Defense (DoD) second opinion consults worldwide; relocate all non-tertiary (primary and specialty) patient care functions to a new community hospital at Fort Belvoir, VA."

In accordance with BRAC law, all closures and realignments must be completed by 15 September 2011 and require additional facilities and infrastructure to accommodate an increase of both inpatient and outpatient health care services provided at the NNMC campus.

The EIS is prepared pursuant to Section (102)(2)(c) of the National Environmental Policy Act (NEPA) of 1969, the regulations implemented by the Council on Environmental Quality (CEQ) (40 CFR Parts 1500 – 1508), Department of the Navy NEPA implementing regulations at 32 C.F.R. Part 775, OPNAVINST 5090.1C, the Navy's Environmental Readiness Program Manual, and the Supplemental Environmental Planning Policy, 23 September 2004.

The Navy published a Notice of Intent (NOI) to prepare an EIS in the Federal Register on Tuesday, 21 November 2006, which initiated a 45-day scoping period beginning on 21 November 2006 and ending on 4 January 2007. Official public notice of the four public scoping meetings held at the Bethesda Marriott Hotel between the 12th and 20th of December 2006 was publicized in leading local newspapers, to include the Washington Post, Washington Times, and Bethesda Gazette. The Navy also directly contacted key federal, state, and local officials and their representatives with a scoping notification letter and sent the official notice of public scoping meetings by letter to

21 key local government agencies and 293 local community associations. The Navy also made the scoping meeting notification widely available to the public at-large via an official announcement on the publicly accessible NNMC website. In response to the Navy's intensive communication effort, Montgomery County in turn distributed the official notice of the public scoping meetings to 2,000 individuals and organizations via the County's email distribution list and also posted the notice on the Montgomery County website. The notices invited comments pertaining to environmental issues that should be considered in development and analysis of alternatives during the 45-day scoping period and comments were accepted at the public scoping meetings or by mail, email, or telephone.

The Scoping Period ended on 4 January 2007. In response to the request from elected state and local officials, NNMC continued to accept comments until 3 February 2007 and held two public information meetings on 30 January and 01 February 2007. Comments were accepted at the public information meetings or by mail, email, or telephone. The comments were considered in the preparation of the Draft EIS (DEIS).

The DEIS will be made available for public review and comment. The U.S. Environmental Protection Agency will publish a Notice of Availability (NOA) and Notice of Public Hearing (NOPH) for the DEIS in the Federal Register and the Navy will publish an NOA and NOPH in the local newspapers. These will advise the public that the DEIS is available, where it can be obtained for review, and will advise of the public meetings. Public meetings will occur for the DEIS during a 45-day public review period that commences on the date of publication in the Federal Register. Comments provided by members of the interested public and federal, state, and local agencies on the DEIS will be reviewed and addressed before the Final EIS (FEIS) is released. An NOA will be published in the Federal Register and in the newspapers of record to inform the public that the FEIS has been released, starting a 30-day Wait Period (no action period). Comments received during the FEIS 30-day Wait Period (no action period) will be considered in reaching the final decision on the proposed action. Following the 30-day Wait Period (no action period), a Record of Decision (ROD) will be prepared and published in the Federal Register. The ROD is a concise summary of the decision made by the Secretary of the Navy or his/her designee from the alternatives presented in an FEIS. The ROD will state the decision, identify alternatives considered (including that which was environmentally preferable), and discuss other considerations (non-environmental) that influenced the decision identified. The ROD will also describe the intended implementation of all practical means to avoid impacts resulting from the chosen alternatives, and explain any decision behind the non-implementation of any of these means. Additionally, the ROD will address any monitoring associated with mitigation.

Throughout this process, the public will be able to obtain information on the status and progress of the Proposed Action and the EIS through the NNMC Public Affairs Office.

Background

NNMC in Bethesda, Maryland was founded in 1940, and was originally composed of the Naval Hospital, the Naval Medical School, the Naval Dental School, and the Naval Medical Research Institute. It has undergone many expansion and renovation projects over the years, to become one of the largest medical facilities in the country. NNMC has a campus that is surrounded by the National Institutes of Health (NIH) main campus to the west; Stone Ridge School of the Sacred Heart (Pre-K to 12 girls school) and residential housing to the north; North Chevy Chase Recreation Center, residential housing, and Rock Creek Park to the east, and Columbia Country Club, residential housing, parks, and a golf course to the south. Interstate 495 (I-495) is adjacent to the northeastern corner of the installation. Jones Bridge Road and Rockville Pike form the southern and western boundaries of the installation, respectively.

Under the BRAC law, the Army's flagship Medical Center at WRAMC will relocate all tertiary (sub-specialty and complex care) medical services to the NNMC campus in Bethesda from WRAMC. Tertiary care is treatment provided in a health center that includes highly trained specialists and often advanced technology. The term tertiary care is most often associated with inpatient services of a complex nature involving very specialized fields of medicine, such as cardiology and neurology. In the military health care system, a tertiary care facility such as NNMC Bethesda also provides primary care services such as family health care services. The transfer and integration of these services with existing functions at NNMC will result by law in creation of a new premier military health care command to be named the Walter Reed National Military Medical Center (WRNMMC) at Bethesda. The BRAC law calls for completion of the merger, establishment of the WRNMMC, and closure of WRAMC to be accomplished by 15 September 2011.

WRNMMC will serve as the premier DoD medical center with the full range of intensive and complex specialty and subspecialty medical services, including specialized facilities for the most seriously injured service members. This facility will serve as the U. S. military's worldwide tertiary referral center for casualty and beneficiary care. As the U.S. military's premier teaching hospital, WRNMMC will continue to provide assigned medical staff with world class graduate and post-graduate medical education programs and training while also improving the health of DoD health care beneficiaries and patients through robust basic and applied medical research programs.

Executive oversight for the BRAC-mandated consolidation and integration of the tertiary care and related medical support activities currently performed at WRAMC to the NNMC campus is managed by the Commander Joint Task Force National Capital Area (JTF CapMed). Reporting directly to the Secretary of Defense, the Commander JTF CapMed is chartered to oversee, manage, and direct all inter-Service actions between the Navy, Army, and Air Force to accomplish the BRAC

actions in the National Capital Area and implement an efficient, integrated, world-class health care delivery system bringing the 'best of the best' together to work in concert on behalf of warriors, retirees and their families.

The role of JTF CapMed in aligning the different Service resources is projected to optimize the availability of military health care in the National Capital Area, permitting the Services to efficiently consolidate and utilize available health care resources and personnel to eliminate redundancies, enhance clinical care, promote graduate education and joint training, and enhance research opportunities associated with the future WRNMMC at Bethesda. JTF CapMed was established on 14 September 2007 and the Commanders at the existing NNMC and WRAMC report to the JTF for all matters concerning BRAC implementation and establishment of the WRNMMC at Bethesda.

Purpose and Need for the Proposed Action

The purpose for the actions being evaluated is to establish a single premier military medical center at the NNMC Bethesda site in accordance with the BRAC legislation.

The need for the Proposed Action is to implement the BRAC law, which requires development of both new and improved facilities to accommodate the projected influx of patients and staff on account of the known shortfall of facility space and associated infrastructure to support them at the existing NNMC campus. The projected increase in staff is approximately 2,200 and additional visitors and patients entering NNMC could average approximately 1,862 on a typical weekday. The BRAC-directed relocations from WRAMC will result in movement of medical and medical support services to NNMC. Needed facilities would support additional inpatient and outpatient care; provide Traumatic Brain Injury (TBI) and Post Traumatic Stress Disorder (PTSD) care; provide additional medical administration space; provide transitional health care spaces for patients requiring aftercare following successful inpatient treatment to include appropriate lodging accommodations on campus for these patients and their supporting aftercare staff; provide a fitness center for patients and staff; and provide parking for the additional patients, staff, and visitors.

The BRAC-mandated movement of tertiary care requires the improvement of existing facilities and available treatment modalities supporting patients experiencing Traumatic Brain Injury (TBI) and Post-Traumatic Stress Disorders (PTSD). Delivery of appropriate tertiary care services for the TBI/PTSD patients will require provision of Intrepid Center for Excellence (ICE) facilities to include new spaces for advanced diagnostics and short-term clinical rehabilitative care and patient training programs. Space requirements account for the need for family member participation and education as a vital element in the support and advocacy for TBI/PTSD patients. The ICE facilities will also include two Fisher Houses™ to provide TBI/PTSD patients with

transitional home-like lodging to aid these patients and their families to functional reintegration as a vital ICE element of care.

Proposed Action and Alternatives

The Navy's Proposed Action is to provide necessary facilities to implement the BRAC 2005 realignment actions.

To implement the actions directed by the 2005 BRAC 2005 law, the Navy proposes to provide:

- Additional space for inpatient and outpatient medical care as well as necessary renovation of existing medical care space to accommodate the increase in patients
- An Intrepid Center of Excellence (ICE) to meet an urgent need for Traumatic Brain Injury (TBI) and Post Traumatic Stress Disorder (PTSD) care
- Medical administration space
- Clinical and administrative space for the Warrior Transition Unit to deliver transitional aftercare and associated patient education programs
- Bachelor Enlisted Quarters to accommodate the projected increase in permanent party enlisted medical and support staff as well as provide transitional lodging required to support aftercare patients receiving treatment on an extended basis
- A fitness center for staff as well as the rehabilitation of patients
- Parking for the additional patients, staff, and visitors
- Two Fisher Houses™ that would support short-term lodging and a home-like reintegration experience for the service members and their family member/care taker while they participate in education and treatment programs in the ICE. Fisher Houses™ are "family-style lodging" to address short-term lodging needs of patients and their families in hospital or requiring extended aftercare treatment.

To implement the Proposed Action, the Navy has identified two action alternatives that differ in their siting of the required facilities within the installation and in their use of new construction versus renovation of existing buildings to obtain some of the needed administrative space.

Under both action alternatives, the proposed action would provide the new WRNMMC approximately 1,652,000 square feet (SF) or 153,476 square

meters (m^2) of building construction and renovation, as well as approximately 824,000 SF (76,552 m^2) of parking facilities. The alternatives add approximately 2,500 parking spaces and demolish approximately 700 spaces for a net gain of approximately 1,800 spaces.

An additional 484,000 patients and visitors are estimated each year at WRNMMC. Assuming these are predominantly on weekdays, an average of 1,862 patients and visitors would enter and depart NNMC daily. The current estimate of additional staff is 2,200; however, the EIS assumes approximately 2,500 additional employees as a conservative estimate to insure any additional staff determined necessary have been evaluated in the EIS, as well as to account for possible increases in staff at NNMC under other ongoing or future projects on Base being addressed under cumulative impacts. Other off-Base projects, also discussed under cumulative impacts, do not add staff to NNMC.

Ongoing and foreseeable future projects at NNMC include an expansion to the Navy Lodge, an expansion to the Navy Exchange, additional Senior Non-Commissioned Officers Quarters, two day care centers, improvements to Morale Welfare and Recreation Athletics Fields, a truck inspection facility at Grier Road gate, access gate improvements at NNMC for all gates, an Academic Program Center for the Uniformed Services University of the Health Sciences (USUHS) Nursing School, a Metrorail link in the southwest corner of NNMC, and a pedestrian connection between NNMC and the NIH campus to NNMC. The EIS also addresses off-Base projects. The expansion of NIH under its master plan and approved area development projects, which could contribute to traffic, are evaluated for cumulative impacts. These are discussed in Section 4.12 Cumulative Impacts.

Tables 2-3 and 2-4 in the final section of Chapter 2 compare the requirements and impacts of the two action alternatives, listed below:

- Alternative One would add to NNMC approximately 1,144,000 SF (106,000 m^2) of building construction, provide approximately 508,000 SF (47,193 m^2) of renovation to existing building space, provide approximately 824,000 SF (76,552 m^2) of new parking facilities, accommodate approximately 2,500 additional staff, and accommodate approximately 1,862 patients and visitors per weekday. The new construction or improvements to existing facilities would provide medical care and administration additions and alterations, a TBI/PTSD ICE facility, permanent and temporary lodging facilities (BEQs and Fisher Houses™), a new physical fitness center, additional parking, and road and utility improvements on the installation to support the new facilities. Figure 2-2 in this document shows proposed facility sites under Alternative One.

- Under Alternative Two, the same facilities as under Alternative One are proposed. However, the location and the choice of new construction versus renovation of some facilities would differ

from Alternative One. Alternative Two would add to NNMC approximately 1,230,000 SF (114,271 m^2) of new building construction, provide approximately 423,000 SF (39,298 m^2) of renovation to existing building space, and provide approximately 824,000 SF (76,552 m^2) of new parking facilities. The number of staff, patients, and visitors would be the same as under Alternative One. Figure 2-3 in this document identifies the location of the proposed facilities.

The third alternative is the No Action Alternative, which is required by statute and will evaluate the impacts at NNMC in the event that additional growth from BRAC actions does not occur. NNMC would continue to maintain and repair facilities in response to requirements from Congressional action or revisions to building codes. Implementation of the No Action Alternative would require the Congress to change the existing BRAC Law. Figure 2-4 in this document shows the location of existing NNMC facilities under the No Action Alternative.

Environmental Consequences by Resource Area

Major issues and impacts associated with Alternatives One and Two are discussed below. The No Action Alternative would not implement the realignment; neither BRAC construction nor renovation would occur and staffing, patients, and visitors at NNMC would not change. The No Action Alternative, therefore, would not cause impacts to the environment.

Geology, Topography and Soils: Implementation of either of the action alternatives would not be expected to impact local geology. Site preparation under Alternatives One and Two would require excavation and grading and potential soil improvement as necessary to accommodate the proposed level of development. Approximately 13.2 acres (9.8 acres of construction on existing impermeable surfaces requiring demolition and 3.4 acres of new construction on open space) under Alternative One and up to 13.3 acres (8.5 acres of construction on existing impermeable surfaces requiring demolition and 4.8 acres of new construction on open space) under Alternative Two would be disturbed by the new facilities. Current impermeable surface area at NNMC is estimated as approximately 98 acres; Alternatives One and Two would increase impermeable surface area at NNMC by approximately 3.5 percent and 4.9 percent respectively. Construction projects with this amount of disturbance require an approved erosion and sediment control plan. This plan must comply with Maryland's environmental laws, including Environment Article, Title 4, Subtitle 1 and 2 for erosion and sediment control and stormwater management (COMAR 26.17.01 and 26.17.02). Prior to construction at any site, a General Permit for Construction Activity would be obtained, which would include an approved sediment and erosion control plan. Planning would develop appropriate site-specific best management practices (BMPs) for controlling runoff, erosion, and sedimentation during construction and demolition activities. With soil erosion and sediment control measures, the actions proposed under this alternative would likely

result in minor adverse impacts to soils from construction occurring on those previously open areas. No new impacts to soils are considered on those sites covered by existing manmade structures such as pavement.

Water Resources: Under Alternative One approximately 3.4 acres of existing pervious soil surfaces would be converted to impervious development. Under Alternative Two approximately 4.8 acres of existing pervious soil surfaces would be converted to impervious development. Implementation of erosion and sediment control plans would be required and would reduce erosion of exposed soils, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before they enter downstream water flow. The new construction would also require a stormwater management plan that adheres to the 2000 Maryland Stormwater Design Manual and Maryland's Stormwater Management Act of 2007, which requires that environmental site design, through the use of nonstructural best management practices and other better site design techniques, be implemented to the maximum extent practicable (see Section 4.2 for details). Increases in surface stormwater runoff during construction and operation would be controlled by stormwater BMPs as well as the erosion and sediment controls to reduce potential impacts to surface and ground waters. Low Impact Development (LID) measures would be among those considered and implemented when practical. Runoff from already impermeable surfaces that are being affected by the proposed construction would be reduced by the controls implemented. Erosion and sediment control measures would also be required for the construction storage site to the west of Building 1 and the property would be restored to original conditions after construction is completed.

The construction is expected to avoid all floodplains. The only structure proposed under Alternatives One and Two in the vicinity of potential wetlands is the Southern Parking facility, which as currently proposed would be at least 75 feet from the stream and would not encroach on either the potential wetland or within the 25-foot buffer afforded to non-tidal wetlands by the State of Maryland.

Biological Resources: All the proposed projects under either alternative would convert lands with either existing development or landscaped areas into developed facilities and associated landscape vegetation. Impacts to vegetation could be adverse but not significant because areas considered for the projects are located in areas with existing structures or pavement, or in areas of grassy meadow and lawn with thinly scattered trees and shrubs commonly found within the region. No effects to rare, threatened, and endangered species would be expected under either of the action alternatives as there are no special-status species inhabiting the proposed project sites.

Air Quality: NNMC is in an air quality control region that is in moderate nonattainment for ozone and in nonattainment for particulate matter with diameter less than or equal to 2.5 micrometers ($PM_{2.5}$), and is in maintenance for carbon monoxide. It is also in an ozone

transport region. Federal actions located in nonattainment and maintenance areas are required to demonstrate compliance with the general conformity guidelines. The DEIS has completed a General Conformity Rule applicability analysis for the ozone precursor pollutants nitrogen oxides (NO_x) and volatile organic compounds (VOCs), for $PM_{2.5}$, and the $PM_{2.5}$ precursor pollutant sulfur dioxide (SO_2), and for carbon monoxide (CO) to analyze impacts to air quality. If annual project emissions are below ***de minimis*** values, a conformity determination is not required. The ***de minimis*** values for moderate nonattainment ozone areas in an ozone transport region, areas in nonattainment for $PM_{2.5}$, and CO maintenance areas are 100 tons per year (TPY) for NO_x, $PM_{2.5}$, SO_2, and CO and 50 TPY for VOCs.

Sources of CO, NO_x, VOCs, $PM_{2.5}$, and SO_2 associated with the proposed project would include emissions from construction equipment, fugitive dust ($PM_{2.5}$), painting of interior building surfaces and parking spaces (VOCs only), and emissions from stationary units (boilers and generators). The analysis indicates that estimated peak year emissions under Alternative One would be the second year of construction, 2010, for all pollutants except CO. The year 2010 would result in emissions of approximately 45.78, 22.16, 18.23, and 5.79 TPY for NO_x, VOCs, $PM_{2.5}$, and SO_2 respectively. Year 2011, with combined construction and operations, would be the peak year for CO with 20.33 TPY. Under Alternative Two, the analysis indicates that the estimated peak year is also 2010 for all pollutants except CO as for Alternative One, but with a slight decrease below Alternative One emissions to 43.93, 21.99, 16.71, and 5.51 TPY for NO_x, VOCs, $PM_{2.5}$, and SO_2 respectively. Year 2011, with combined construction and operations, would be the peak year for CO with 19.21 TPY. One reason that the emissions for Alternative Two are slightly less than Alternative One emissions is that the amount of demolition and resultant disposal is lower, resulting in lower construction emissions. These emissions do not exceed the ***de minimis*** levels for moderate ozone nonattainment, $PM_{2.5}$ nonattainment, or CO maintenance levels. Therefore, a full conformity determination is not required for Alternatives One and Two. A Record of Non-Applicability will be provided in the Final EIS.

An evaluation of mobile source (vehicle) CO emissions was also performed to determine CO concentrations caused by vehicles under the alternatives both in the parking garages and at the five intersections adjacent to NNMC. The analysis determined that CO concentrations remain below allowable ambient standards under both alternatives. Minor modifications to NNMC's Title V permit are expected.

Noise: Demolition, construction, and renovation noise would occur at NNMC under either Alternative One or Two. The noise would be short-term, typical of construction activities, and would be managed to meet State and Montgomery County criteria. Construction noise near sensitive receptors would require careful planning and potential implementation of noise reduction measures listed in the section on Potential Improvement Measures at the end of this Executive Summary. Sensitive receptors within the NNMC installation include the existing

medical facilities, which would be adjacent to construction for the medical care additions under both alternatives. On-base residential facilities, also sensitive, include the new BEQ(s) and two Fisher Houses, which would also be constructed near existing residential facilities under both alternatives. Sensitive receptors outside NNMC include the Stone Ridge School of the Sacred Heart and the residential housing, both adjacent to the northern property boundary. Alternative One would construct two BEQ structures: the BEQ to the west of Building 61 would be in the area of NNMC bordered by the school and the BEQ to the east of Building 60 would be in the area of NNMC bordered by the residential area. Under Alternative Two, only one large BEQ would be constructed; it would be located in the area east of Building 60 and in the area of NNMC bordered by the residential area. Residential areas on the east side of NNMC and across Jones Bridge Road are far enough from the construction sites that they are unlikely to be impacted by the noise from construction activities.

Noise caused by additional traffic under either alternative would be primarily from passenger cars and would not be expected to change existing noise levels noticeably to receptors along roadways. The potential increase in helicopter activities, primarily for medical emergencies, is expected to increase flights into NNMC by one to two flights per month, an increase of 8 percent to 16 percent. This noise, which is short-term and not predictable, is not considered a significant increase from existing conditions.

Infrastructure: Based on initial estimates of utility demands and provider capacity, no major issues are anticipated. As designs are finalized, additional utility studies will be conducted to identify whether improvements to any utility lines or pipes within NNMC are appropriate and these improvements would be implemented as part of the construction. The systems have adequate redundancy to assure an ability to provide continued service while any line is shut down. Implementation of controls necessary to comply with State stormwater requirements and the NNMC's stormwater management plans, approved by Maryland, during both construction and operation of these facilities would ensure that any impacts from the increased stormwater runoff would not be significant.

Transportation: The BRAC movement of added staff and patient workload to the existing NNMC campus to create the directed WRNMMC will occur in an already congested urban environment. Both local government and surrounding communities are focusing attention on the traffic in the vicinity of the existing NNMC campus and the mounting broad need for local improvements to key traffic arteries serving the Bethesda community in general. Results from the Traffic Study analysis show that the additional traffic expected during operation of the BRAC facilities would increase overall traffic in the vicinity of the future WRNMMC during peak hours. The analysis of peak hours provides the worst condition to be expected and includes both new employees and the 1,862 projected daily patients and visitors in its estimates of peak traffic. Construction traffic volumes are significantly lower

than the volumes expected during operations; therefore, construction traffic would be expected to have less of an impact on area roadways.

The Traffic Study employs Critical Lane Analysis, which generates an intersection Critical Lane Volume (CLV) that is then compared to the CLV standard for Montgomery County. The Traffic Study indicated that five intersections near the NNMC campus are projected to operate in excess of the Montgomery County (CLV) standards during peak hours. It also determined, however, that four of these five intersections would already operate in excess of County CLV standards under the No Action Alternative background in 2011, independent of any proposed change to the NNMC campus under the BRAC alternatives.

The only intersection projected to exceed County CLV standards specifically because of the additional traffic under either Alternatives One or Two is the intersection of Rockville Pike and North Drive, which increases from 1503 to 1605 in the AM period, where 1600 is maximum capacity.

The primary traffic impacts using critical lane volumes and projected growth in traffic volumes caused by Alternatives One or Two are shown below. Alternatives One and Two, with an equal number of staff, patients, and visitors, would have essentially identical traffic impacts. For all of these intersections, any volumes over 1600 indicate that the intersection is over capacity and conditions are unacceptable. Using the level of service (LOS) definitions in Section 3.7.4 for these intersections, over 1600 is LOS F and unacceptable; 1451-1600 is equivalent to LOS E and marginal; and values below 1450 would be LOS D or better and are acceptable.

- During the AM peak, two intersections would operate above capacity: Rockville Pike and West Cedar Lane (CLV: 2100) and Rockville Pike and North Drive (CLV: 1605).
    - Rockville Pike/West Cedar Lane would already be over capacity under the No Action Alternative; the BRAC Alternatives add 3% to peak No Action Alternative volumes.
    - BRAC Alternatives cause Rockville Pike/North Drive to exceed capacity by a slight margin (1605 versus 1,600); the BRAC Alternatives add 7% to peak No Action Alternative volumes.
- During the PM peak hour, four intersections operate above the County capacity standards under the BRAC Alternatives; all the intersections were already above capacity under the No Action Alternative:
    - Rockville Pike/West Cedar Lane (CLV: 1822); BRAC Alternatives add 2% to peak No Action Alternative volumes.

  - West Cedar Lane/Old Georgetown Road (CLV: 1857); BRAC Alternatives add 12% to peak No Action Alternative volumes.

  - Rockville Pike/Jones Bridge Road (CLV: 1722); BRAC Alternatives add 3% to peak No Action Alternative volumes.

  - Jones Bridge Road/Connecticut Avenue (CLV: 2078); BRAC Alternatives add 4% to peak No Action Alternative volumes.

- During the AM peak, three intersections operate at higher CLVs that approach capacity: Pooks Hill Road and Rockville Pike (CLV: 1562), Rockville Pike and Wilson Drive (CLV: 1446), and Jones Bridge Road and Connecticut Avenue (1559). These three intersections were already above CLV 1400 under the No Action Alternative and the BRAC Alternatives increase peak volumes by no more than 6%.

- During the PM peak, the intersections of Pooks Hill Road and Rockville Pike (CLV: 1430), Rockville Pike and North Wood Road (CLV: 1557), Rockville Pike and Wilson Drive (CLV: 1593) and Jones Mill Road and East-West Highway (CLV: 1535) would operate at a high CLV under the BRAC Alternatives. The BRAC Alternatives raise peak volumes compared to the No Action Alternative by 2%, 14%, 4%, and 3%, respectively.

In addition to the intersection results above, the traffic analysis indicates that several intersections have large percentage increases in peak volumes caused by the BRAC Alternatives that do not cause the intersection to exceed or approach capacity. In the AM, Jones Bridge Road & Gunnell Road peak volumes increase by 35% (CLV: 1093); Rockville Pike & North Wood Road peak volumes increase by 21% (CLV: 1401). In the PM peak hour, three intersections experience significant increases in the CLV: West Cedar Lane & West Drive increases 37% (CLV: 705), Jones Bridge Road & Gunnell Road increases 22% (CLV: 1170), and Jones Bridge Road & Grier Road increases 20% (CLV: 1319).

During construction, additional construction traffic would consist of delivery trucks with materials and equipment, dump trucks carrying any debris away needing off-site disposal, and construction crew commuters. The daily volumes for these construction vehicles carrying material and equipment are significantly smaller than the volumes estimated for commuters during operations in the transportation analysis. Likewise, the construction crew commuting will be constrained by limiting parking spaces (currently 200 spaces. Therefore, the impacts of construction vehicles to area traffic in terms of volumes would be much less than the impacts identified for the NNMC commuter traffic under the BRAC alternatives. With the area in front of Building 1 being provided for contactor use, contractors will be able to conduct their material staging on the NNMC campus. It is currently planned that North Gate would provide dedicated access and egress to the construction storage site and security checks in an

adjoining area to the entrance on NNMC would be managed to minimize any potential effects to Rockville Pike from queuing.

Cultural Resources: The construction of new buildings in the NNMC Bethesda Historic District, particularly the two Medical Additions, which impact on the setting of the historic Central Tower Block, its Front Lawn, and protected view shed, will be sensitive and technically qualify as adverse effects under Section 106 of the National Historic Preservation Act. There is considerable precedent, however, in the prior axial expansion of facilities at NNMC out from the Tower Block. Further formal consultation under Section 106 and through other design review processes on the design of these facilities will be conducted to minimize and mitigate as necessary any potential adverse impacts. The renovation of Building 17 has a potential positive impact on this unused historic resource. The demolition of historic Building 12, which takes place under Alternative One if adaptive reuse proves impractical, would have an adverse effect with limited potential for mitigation.

The construction contractors would take measures to control/minimize whatever the visual intrusion of the construction staging area on the viewshed.

The Navy will pursue formal Section 106 consultation with the goal of achieving a ratified agreement document to resolve all adverse effects to historic properties. The agreement document would be appended to the Record of Decision on the Final Environmental Impact Statement.

Land Use: All direct effects to land use are within NNMC. Land use is consistent with plans and precedence; proposed facilities within NNMC are compatible with adjacent facilities. No direct effects or significant indirect effects outside the NNMC boundaries to land use are expected.

Socioeconomics: Major beneficial economic effects to the surrounding economy would be expected under each action alternative resulting from the large investment in construction and renovation of facilities. Construction costs for Alternatives One and Two are estimated at $839 million and $856 million respectively. Alternative One would generate an increase in local sales volume of an estimated $1.32 billion, of which approximately 39 percent would result directly from the proposed action. Furthermore, an increase in local employment of approximately 5,500 would be expected to result from Alternative One construction, 39 percent of which would be the direct result of the proposed action. No relocation of off-base personnel is expected as a result of the proposed action since staff would be coming from WRAMC, located 6 miles away, within the Region of Influence (ROI). Therefore no significant effects on demographics resulting from Alternative One are expected.

Under Alternative Two there would be a prospective increase in sales volume in the ROI of an estimated $1.34 billion, 39 percent of which

would be a direct result from Alternative Two. The prospective increase in employment in the ROI from construction would be approximately 5,600, with approximately 39 percent of those jobs resulting directly from Alternative Two. No relocation of off-base personnel is expected as a result of the proposed action since staff would be coming from WRAMC, located 6 miles away, within the ROI. Therefore no significant effects on demographics resulting from Alternative Two are expected.

The increase in patients and visitors will increase the need for services within NNMC, but the patients and visitors are likely predominantly to go to and from NNMC for appointments directly from their place of residence without affecting the immediate local area off Base economically except indirectly as additional traffic. The additional patients and visitors have been incorporated into the analysis of peak hour traffic, which provides the most severe impact on area intersections and roadways. However, the patients and visitors are spread through the day and night, as well as on weekends, and would add a general increase to traffic levels experienced in non-peak hours. Local residents may notice the increased traffic during non-rush hours, although conditions will be within the capacity of the roadways.

Implementing either alternative is not expected to produce disproportionately high and adverse human health or environmental effects on minority, low-income or younger segments of the local population in the vicinity of NNMC.

Human Health and Safety: Hazardous material storage and use would have a minimal increase under both alternatives. The increases are not anticipated to have significant impacts, as adherence to the NNMC Hazardous Material Program, which includes standard operating procedures (SOPs) for proper control and management of hazardous material, would assure impacts are avoided. Likewise, hazardous waste would increase under both alternatives. The increases are not anticipated to have impacts, as hazardous waste at NNMC is regulated under the Resource Conservation and Recovery Act (RCRA) and Maryland Department of Environment (MDE). NNMC has a Controlled Hazardous Substances (CHS) permit from MDE. In addition, NNMC complies with the Navy and NNMC policies for handling hazardous waste.

Under Alternative One several buildings or areas proposed for construction, demolition, or renovation activities are designated as Solid Waste Management Units (SWMU) and Areas of Concern (AOC) under the RCRA Corrective Action Program (CAP). Renovation activities in Building 17 and demolition activities in Buildings 18 and 21 for a new parking structure would occur in an area designated as AOC 1 under the RCRA corrective action plan. The area has been remediated but has not been closed administratively by the EPA Region III Office. SWMU 18 and AOC 4 are located in Building 21, AOC 8 is located in Building 150, and SWMU 9 is located in an area immediately southeast of Building 150. SWMU 31 is located in Building 59. SWMU 5 is located in the area

along Taylor Road in the vicinity of Building 141. SWMU 13 and 14 are located in Buildings 2 and 8 respectively.

Similarly, under Alternative Two, SWMU 31 is located in Building 59 and SWMU 5 is located in the area along Taylor Road in the vicinity of Building 141. SWMU 13 and 14 are located in Buildings 2 and 8 respectively.

NNMC is a site where there are no unacceptable human exposures to contamination that can reasonably be expected under current land and groundwater use conditions (USEPA, 2004b). Development in or around AOCs or SWMUs under the RCRA CAP would occur only with concurrence from EPA.

There is known asbestos and lead based paint in many of the older buildings. It is standard practice to check for asbestos and lead based paint prior to demolition or renovation in any building. Under both alternative One and Two, if the presence of the contaminants is confirmed, proper procedures, practices and regulations would be followed to ensure public safety.

Regulated Medical Waste (RMW) could double the current NNMC output; the capacity of the Sterile Processing Department (SPD) would be adequate for this increase, but additional storage requirements could require a reconfiguration of existing space to support the increase in RMW. The additional RMW at NNMC would increase the amount of RMW shipped to the incinerating facility in Baltimore, which has an extended amount of capacity. It is currently operating at only 50 to 65 percent of its permitted capacity.

Cumulative Impacts: The conservative use of an estimated 2,500 new employees under the action alternatives versus 2,200 currently estimated is expected to address potential cumulative impacts for additional employees (currently estimated as 136) for other ongoing and foreseeable future on Base projects not associated with BRAC.

One ongoing project on Base is considered: the Academic Program Center for the USUHS Nursing School will add needed space at USUHS, but is not expected to add staff, students, visitors or other potential commuters. The foreseeable on-Base future projects not associated with BRAC include an expansion to the Navy Lodge, an expansion to the Navy Exchange (NEX), additional Senior Non-Commissioned Officers Quarters, two day care centers, improvements to Morale Welfare and Recreation Athletics Fields, access gate improvements at NNMC for all gates, the Grier Road Commercial Vehicle Inspection Facility, a planned Metrorail link in the southwest corner of the installation near the southern Rockville Pike security gate, and a pedestrian connection between the NIH campus and NNMC just south of the South Wood Road security gate.

Only three of these future projects would add staff; the child care centers and expansions of the NEX and Navy Lodge would add staff estimated as 136 (this will require verification/update when project

planning is conducted). Only the NEX expansion would add visitors; however, these would primarily access NNMC during non-peak hours.

The cumulative impacts analysis of this EIS also includes off Base projects in the vicinity of NNMC during the time period of the Proposed Action. These include implementation of the 2003 NIH Master Plan and the transportation analysis includes approved background development off-base. The actions of either action alternative are not expected to result in a significantly greater incremental impact when added to the actions of other projects than what has been estimated for the alternatives in Chapter 4.0.

Potential Improvement Measures

The EIS analysis has identified potential improvement measures to reduce impacts to surface waters from potential soil erosion and runoff, for control of fugitive emissions to air, for construction noise, for traffic impacts that will be generated by the action alternatives, and for potential impacts to cultural resources.

Sediment and Erosion Control Measures: Recommended measures to be considered include but are not limited to:

- Using erosion containment controls such as silt fencing and sediment traps to contain sediment onsite where necessary
- Covering disturbed soil or soil stockpiles with plastic sheeting, jute matting, erosion netting, straw, or other suitable cover material, where applicable
- Inspecting erosion and sediment control BMPs on a regular basis and after each measurable rainfall to ensure that they are functioning properly, and maintain BMPs (repair, clean, etc.) as necessary to ensure that they continue to function properly
- Sequencing BMP installation and removal in relation to the scheduling of earth disturbance activities, prior to, during and after earth disturbance activities
- Phasing clearing to coincide with construction at a given location to minimize the amount of area exposed to erosion at a given time.

Stormwater Management Measures: The following nonstructural stormwater management practices would be considered and applied according to the Maryland Stormwater Design Manual (MDE, 2000) to minimize increases in new development runoff: 1) natural area conservation, 2) disconnection of rooftop runoff, 3) disconnection of non-rooftop runoff, 4) sheet flow to buffers, 5) grass channels, and 6) environmentally sensitive development. Low Impact Development (LID) measures would be among those considered and implemented when practical.

The following structural stormwater management practices would be considered and designed according to the Design Manual (MDE, 2000) to

satisfy the applicable minimum control requirements established in Section 4.1 of the Guidelines: 1) stormwater management ponds, 2) stormwater management wetlands, 3) stormwater management infiltration, 4) stormwater management filtering systems, and 5) stormwater management open channel systems.

Areas disturbed outside of the footprints of the new construction would be aerated and reseeded, replanted, and/or re-sodded following construction activities, which would decrease the overall erosion potential of the site and improve soil productivity.

Air Quality Construction Measures: The NNMC air permit requires all reasonable precautions be taken to prevent particulate matter emissions during construction or demolition. During construction and demolition, fugitive dust would be kept to a minimum by using control methods. These precautions could include, but are not limited to, the following:

1) Use, where possible, of water or chemicals for dust control

2) Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials

3) Covering of open equipment for conveying materials

4) Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion

5) Employment of a vehicle wash rack to wet loads and wash tires prior to leaving the site.

Noise Reduction during Construction: Construction and demolition contractors would be expected to adhere to State of Maryland and Montgomery County requirements listed in Section 3.5. Potential measures to control airborne noise impacts that would be considered and implemented as appropriate include:

- Source Limits and Performance Standards to meet noise level thresholds for daytime, evening, and nighttime hours at sensitive land uses (Montgomery County Standards)
- Designated Truck Routes
- Establishment of noise monitoring stations for measuring noise prior to and during construction
- Design considerations and project layout approaches including measures such as construction of temporary noise barriers, placing construction equipment farther from noise-sensitive receptors, and constructing walled enclosures/sheds around especially noisy activities such as pavement breaking

- Sequencing operations to combine especially noisy operations to occur in the same time period
- Alternative construction methods, using special low noise emission level equipment, and selecting and specifying quieter demolition or deconstruction methods

Control measures for sensitive receptors include: sequencing operations, use of alternative construction equipment and methods and instituting other special control measures to reduce the transmission of high noise levels to noise-sensitive areas. A construction phasing plan would be coordinated with patient moves to avoid impacts to patients.

Compliance with the Occupational Safety and Health Administration (OSHA) standards for occupational noise exposure associated with construction (29 CFR 1926.52) would address the construction workers hearing protection.

Potential Measures to Address Traffic Impacts from NNMC Actions: The EIS identifies potential traffic improvement measures for the 2011 implementation of the alternatives. The first set of potential improvements below is within the purview of NNMC for implementation. Gate and other improvements would be expected to speed vehicle entry and egress, improve Base circulation, and reduce queuing at the gate.

North Wood Road Gate:

1) Expand the number of lanes from two lanes to three lanes, with two inbound lanes in the morning peak period and two outbound lanes in the evening peak period.

2) Conduct a study at North Wood Road and Rockville Pike to determine if a traffic signal is warranted and suitable for submission of a request to state and local transportation authorities for funding and implementation.

3) A safety and security analysis is being conducted by DOD to improve security, safety, improve queuing on-site and reduce Rockville Pike queuing, and reduce damage to gates and guard houses.

South Wood Road Gate: A safety and security analysis is being conducted by DOD to improve security, safety, improve queuing on-site and reduce Rockville Pike queuing, and reduce damage to gates and guard houses.

Gunnell Road Gate (Navy Exchange Gate): A safety and security analysis is being conducted by DOD to improve security, safety, allow egress of fire engines that cannot use this gate, and improve queuing.

Grier Road Gate (Navy Lodge Gate):

1) It is recommended that this gate serve inbound and outbound traffic throughout the day.

2) Provide for separate outbound right and left turn lanes. This approach would need to be widened to include a single receiving/inbound lane.

3) A safety and security analysis is being conducted by DOD to improve security, safety, improve queuing on-site and reduce Jones Bridge Road queuing, and reduce damage to gates and guard houses.

University Road Gate (USUHS Gate): A safety and security analysis is being conducted by DOD to improve security, safety, improve queuing on-site and reduce Jones Bridge Road queuing, and reduce damage to gates and guard houses.

Perimeter Road: Widen and improve Perimeter Road on NNMC.

NIH Commercial Vehicle Inspection Station: Conduct a study at the NIH commercial Vehicle Inspection Station on Rockville Pike to determine if a traffic signal is warranted and suitable for submission of a request to state and local transportation authorities for funding and implementation.

Each of the following projects is under the jurisdiction of either Montgomery County or the State of Maryland. As part of the BRAC law, the U.S. Navy cannot provide funding or management of road improvements outside its property, except under the Defense Access Roads (DAR) Program. The Defense Access Road (DAR) Program provides a means for the military to pay their fair share of the cost of public highway improvements necessary to mitigate an unusual impact of a defense activity. An unusual impact could be a significant increase in personnel at a military installation (currently defined as one that doubles existing traffic at the year of implementation), or one that requires relocation of an access gate, or the deployment of an oversized or overweight military vehicle or transporter unit. However, none of the off-base improvements meet the criteria for inclusion in the DAR Program.

As a consequence, each of the following projects would have to be funded and implemented through the appropriate Montgomery County or State of Maryland Transportation Organizations. This funding may include federal grants administered through these organizations. The Navy has coordinated the traffic analysis and potential improvements with these agencies. NNMC Bethesda has committed to cooperate fully with local agencies in the implementation of any or all of the proposed improvement measures. Refer to Tables 4-15, 4-16, 4-17, and 4-18 in Section 4.7.5 of the DEIS for roadway performance with the implementation of the improvements. Note: it is anticipated that pedestrian walkways would be improved as needed to meet code for any roadways that are widened.

Rockville Pike (MD 355) at Cedar Lane operates above capacity in both AM and PM peak hours:

1) Add a left-turn lane on the westbound and eastbound approach of the intersection.

2) Add an additional lane in each direction along Rockville Pike between Jones Bridge Road and Cedar Lane, per recommendation of the 1990 Bethesda Chevy Chase Master Plan. NNMC Bethesda will cooperate by providing frontage along MD 355 to accommodate the implementation of this measure if the State of Maryland and Montgomery County determine it appropriate to implement. Appropriate real estate easements would be coordinated and implemented to permit widening of Rockville Pike.

Old Georgetown Road (MD 187) at Cedar Lane operates above capacity in the PM peak hour:

1) Add another left-turn lane to the southbound approach of the intersection and eliminate parking along Cedar Lane eastbound to provide an additional receiving lane.

2) Provide an additional through lane in each direction along the Old Georgetown Road approaches to Cedar Lane, per recommendation of the 1990 Bethesda Chevy Chase Master Plan.

Rockville Pike (MD 355) at Jones Bridge Road operates above capacity in the PM peak hour.

1) Stripe the inner lane as a left-turn only lane and the right lane as shared through and right lane on the eastbound approach of the intersection.

2) Add an additional lane in each direction along Rockville Pike, per recommendation of the 1990 Bethesda Chevy Chase Master Plan. NNMC Bethesda will cooperate by providing frontage along MD 355 to accommodate the implementation of this measure if the State of Maryland and Montgomery County determine it appropriate to implement. Appropriate real estate easements would be coordinated and implemented to permit widening of Rockville Pike.

Connecticut Avenue (MD 185) at Jones Bridge Road operates near capacity in the AM peak hour and above capacity in the PM peak hour:

1) Provide an additional left-turn lane to the eastbound approach of the intersection.

2) Provide a separate right-turn lane along the southbound approach of the intersection.

Beltway Slip Ramps into NNMC Campus: No improvements recommended; capacity analysis shows that for both Alternatives One and Two, with and without Slip Ramps, the same intersections would operate near or above the County congestion standards.

To improve pedestrian safety at the Rockville Pike pedestrian crossing from NIH and the metro station to NNMC, a pedestrian connection and a Metrorail link are under consideration by the Suburban Hospital, NIH,

NNMC Consortium and WMATA, respectively. In addition, the pedestrian connection would allow transfer of casualties and emergency personnel during a mass casualty event. These off-base projects would enhance public safety. The projects would require easements and changes to fencing and security. They would require close cooperation with local and state agencies as well as with NIH and the Department of Homeland Security (DHS).

In addition to the measures listed above, other potential improvement measures outside the jurisdiction of the Navy that address existing and future regional transportation issues are discussed in Appendix C, Transportation Study. A Transportation Management Plan, also discussed in Appendix C, which is being prepared in conjunction with a master plan update, will include recommendations for such physical or operational changes as telecommuting, transit subsidies, shuttle bus services, pedestrian improvements, and bicyclist improvements.

Cultural Resources Measures: Further consultation under Section 106 and through other design review processes on the design of these facilities are ongoing to minimize and mitigate as necessary any potential adverse impacts. Due to the potential impacts on the historic and cultural resources around Building 1, the historic tower, the Navy has developed a concept plan of the proposed inpatient and outpatient facilities as well as the two proposed parking structures. These concept plans were coordinated with Maryland-National Capital Parks and Planning Commission (M-NCPPC) and Maryland State Historic Preservation Office (SHPO). After consultations, the Navy received approval to submit the concept plan to the National Capital Planning Commission (NCPC) meeting on 04 October 2007. The Commission adopted the Executive Director's Recommendation (EDR), which noted that "The Maryland Historical Trust (i.e. the Maryland SHPO) accepted the concept design with regard to location, footprint, and massing; and requested Section 106 consultation to move forward with fenestration design, materials selection, and other design and planning details." A copy of the Commission Action is included in Appendix A.

The Navy will pursue formal Section 106 consultation with the goal of achieving a ratified agreement document to resolve all adverse effects to historic properties. The agreement document would be appended to the Record of Decision on the Final Environmental Impact Statement.

Human Health and Safety Measures: By following NNMC SOPs and applicable regulations, no impacts are expected and no additional mitigation measures or improvement measures are required for human health and safety.

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1.0 PURPOSE, AND NEED

This Environmental Impact Statement (EIS) will examine the potential environmental impacts of the relocation of certain Walter Reed Army Medical Center (WRAMC) activities from Washington, DC to the National Naval Medical Center (NNMC) in Bethesda, Maryland per Public Law 101-510, the Defense Base Closure and Realignment Act of 1990 (BRAC Law) as amended in 2005. The specific BRAC recommendation is to:

> "Realign Walter Reed Army Medical Center, Washington, DC, as follows: relocate all tertiary (sub-specialty and complex care) medical services to National Naval Medical Center, Bethesda, MD, establishing it as the Walter Reed National Military Medical Center Bethesda, MD; relocate Legal Medicine to the new Walter Reed National Military Medical Center Bethesda, MD; relocate sufficient personnel to the new Walter Reed National Military Medical Center Bethesda, MD, to establish a Program Management Office that will coordinate pathology results, contract administration, and quality assurance and control of Department of Defense (DoD) second opinion consults worldwide; relocate all non-tertiary (primary and specialty) patient care functions to a new community hospital at Fort Belvoir, VA."

To comply with BRAC law, these actions must be accomplished on or before 15 September 2011 and require additional facilities and infrastructure to accommodate an increase of both inpatient and outpatient health care services provided at the NNMC campus.

The EIS is prepared pursuant to section (102)(2)(c) of the National Environmental Policy Act (NEPA) of 1969, the regulations implemented by the Council on Environmental Quality (CEQ) (40 CFR Parts 1500 – 1508), Department of the Navy NEPA implementing regulations at 32 C.F.R. Part 775, OPNAVINST 5090.1C, the Navy's Environmental Readiness Program Manual, and the Supplemental Environmental Planning Policy, 23 September 2004.

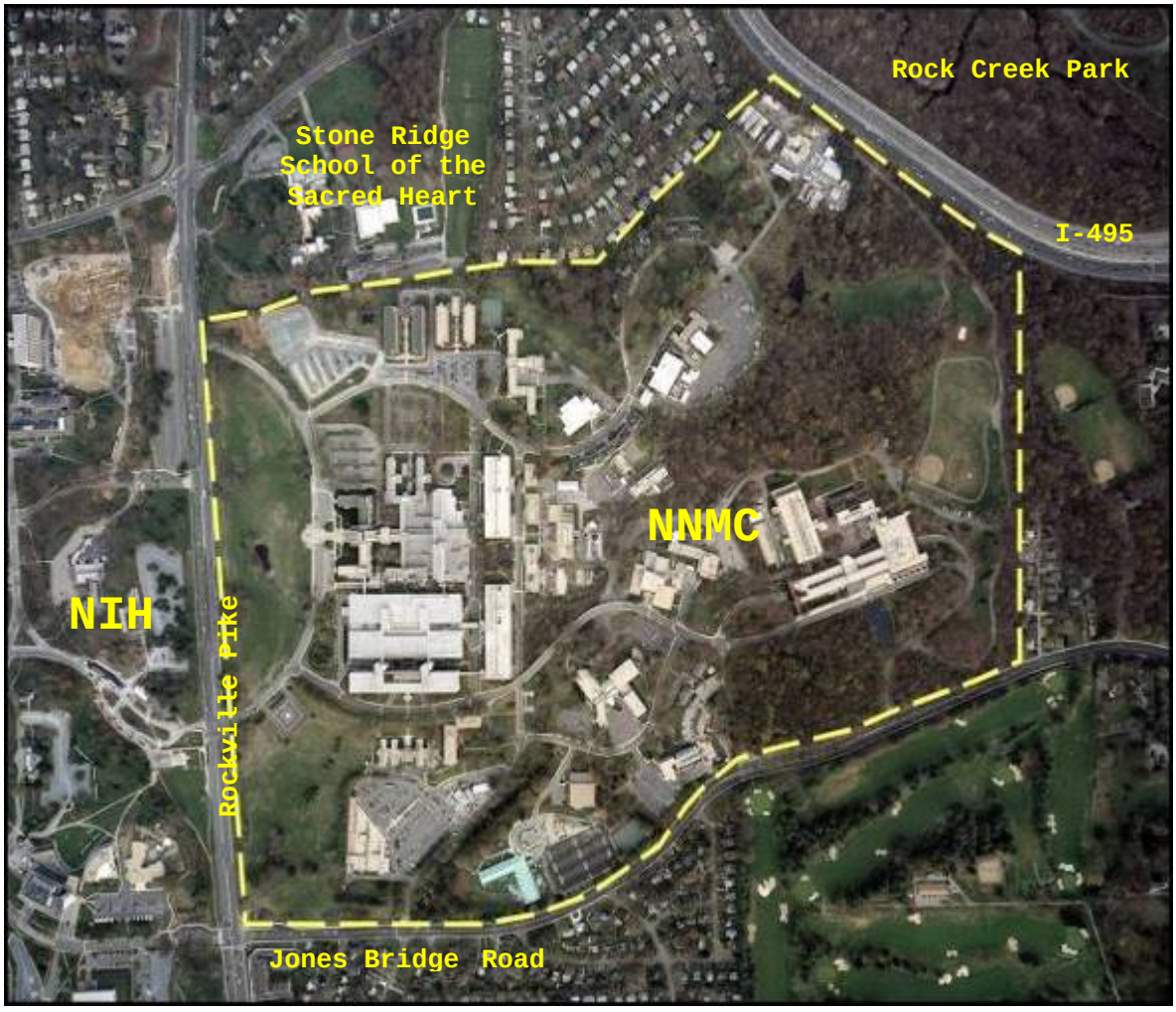
The following sections of Chapter 1.0 provide the background, purpose, and need to which the Navy is responding. The U.S. Navy, Bureau of Medicine and Surgery, Washington, DC is the action proponent for the proposed action. The Army is providing the funding for the majority of the BRAC actions and WRAMC and NNMC are integrating their clinical and command structures so that this is a joint military medical effort. Chapter 1.0 also describes public involvement in the NEPA process and the regulatory framework that guides the completion of the EIS.

1.1 Background

NNMC in Bethesda, Maryland was founded in 1940, and was originally composed of the Naval Hospital, the Naval Medical School, the Naval Dental School, and the Naval Medical Research Institute. It has

undergone many expansion and renovation projects over the years, to become one of the largest medical facilities in the country. NNMC has a campus that is surrounded by the National Institutes of Health (NIH) main campus to the west; Stone Ridge School of the Sacred Heart (Pre-K to 12 girls school) and residential housing to the north; North Chevy Chase Recreation Center, residential housing, and Rock Creek Park to the east, and Columbia Country Club, residential housing, parks, and a golf course to the south. Interstate 495 (I-495) is adjacent to the northeastern corner of the installation. Jones Bridge Road and Rockville Pike form the southern and western boundaries of the installation, respectively. NNMC base boundaries and immediate surroundings are shown in Figure 1-1.

Figure 1-1: Aerial View of NNMC and Surrounding Area



Under the BRAC law, the Army's flagship Medical Center at WRAMC will relocate all tertiary (sub-specialty and complex care) medical services to the NNMC campus in Bethesda from WRAMC. Tertiary care is treatment provided in a health center that includes highly trained specialists and often advanced technology. The term tertiary care is

most often associated with inpatient services of a complex nature involving very specialized fields of medicine, such as cardiology and neurology. In the military health care system, a tertiary care facility such as NNMC Bethesda also provides primary care services such as family health care services. The transfer and integration of these services with existing functions at NNMC will result by law in creation of a new premier military health care command to be named the Walter Reed National Military Medical Center (WRNMMC) at Bethesda. The BRAC law calls for completion of the merger, establishment of the WRNMMC, and closure of WRAMC to be accomplished by 15 September 2011.

WRNMMC will serve as the premier DoD medical center with the full range of intensive and complex specialty and subspecialty medical services, including specialized facilities for the most seriously injured service members. This facility will serve as the U. S. military's worldwide tertiary referral center for casualty and beneficiary care. As the U.S. military's premier teaching hospital, WRNMMC will continue to provide assigned medical staff with world class graduate and post-graduate medical education programs and training while also improving the health of DoD health care beneficiaries and patients through robust basic and applied medical research programs.

1.2 Purpose and Need

The purpose for the actions being evaluated is to establish a single premier military medical center at the NNMC Bethesda site in accordance with the BRAC legislation.

The need for the Proposed Action is to implement the BRAC law, which requires development of both new and improved facilities to accommodate the projected influx of patients and staff on account of the known shortfall of facility space and associated infrastructure to support them at the existing NNMC campus. The projected increase in staff is approximately 2,200 and additional visitors and patients entering NNMC could average approximately 1,862 on a typical weekday. The BRAC-directed relocations from WRAMC will result in movement of medical and medical support services to NNMC. Needed facilities would support additional inpatient and outpatient care; provide Traumatic Brain Injury (TBI) and Post Traumatic Stress Disorder (PTSD) care; provide additional medical administration space; provide transitional health care spaces for patients requiring aftercare following successful inpatient treatment to include appropriate lodging accommodations on campus for these patients and their supporting aftercare staff; provide a fitness center for patients and staff; and provide parking for the additional patients, staff, and visitors.

The BRAC-mandated movement of tertiary care requires the improvement of existing facilities and available treatment modalities supporting patients experiencing Traumatic Brain Injury (TBI) and Post-Traumatic Stress Disorders (PTSD). Delivery of appropriate tertiary care services for the TBI/PTSD patients will require provision of Intrepid

Center for Excellence (ICE) facilities to include new spaces for advanced diagnostics and short-term clinical rehabilitative care and patient training programs. Space requirements account for the need for family member participation and education as a vital element in the support and advocacy for TBI/PTSD patients. The ICE facilities will also include two Fisher Houses™ to provide TBI/PTSD patients with transitional home-like lodging to aid these patients and their families to functional reintegration as a vital ICE element of care.

The Notice of Intent (NOI), published in 21 November 2006, identified the following options to be under consideration in the Draft EIS: 1)Implement the BRAC recommendation; 2)Implement the BRAC recommendation and provide for future anticipated growth, support activities, and changes to the installation; 3) No action, with NNMC continuing to maintain and repair existing facilities without additional growth.

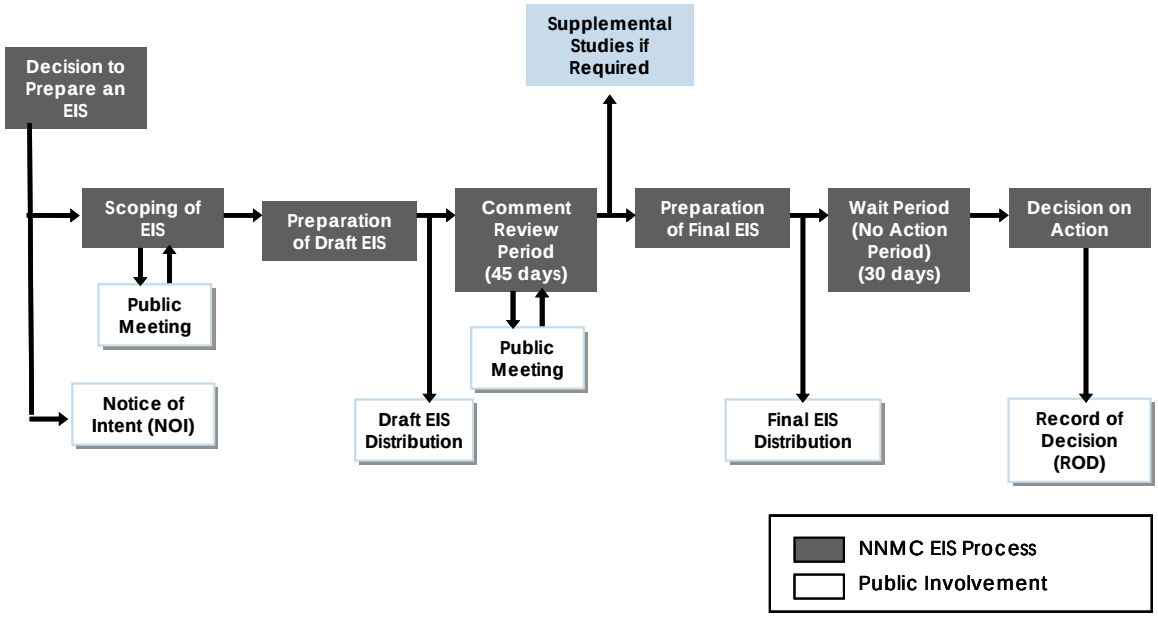
Since November 2006, a number of planning decisions have been made by DoD that have affected, but not substantially changed, the proposed NEPA analysis on the best way to ensure world-class care is provided for the Nation's wounded veterans both today and in the post-BRAC environment. Special housing, billeting, food service, medical support, and administrative support requirements were determined and then appropriately sited on the NNMC Bethesda campus. The decisions made by DoD resulted in a refocused effort in this Draft EIS to concentrate in the Proposed Action entirely on implementation of the BRAC mandate through Warrior Care. Any other non-BRAC related future growth, support activities, or changes to the installation are considered when reasonably foreseeable in the analysis of cumulative impacts.

1.3 The NEPA Process

NEPA, the basic national charter for inclusion of environmental considerations and for the protection of the environment in decision-making, is binding on all federal agencies. The Act created the CEQ, which published implementing regulations for NEPA in Title 40 CFR, Parts 1500-1508. The Navy has established particular NEPA requirements in 32 CFR 775 and provided additional guidance in OPNAVINST 5090.1C and Chief of Naval Operations (CNO (N45)) Supplemental Environmental Planning Policy of 23 September, 2004. These implementing regulations and guidance describe the NEPA process as intended to help public officials make decisions that are based on the understanding of environmental impacts, and identify and assess reasonable alternatives to proposed actions to avoid or minimize adverse environmental effects. Throughout the NEPA process, it is required that all federal agencies consider the impacts of their proposed activities, programs, and projects on the quality of the human and natural environment.

The NEPA processes are illustrated in Figure 1-2.

Figure 1-2: The EIS Process



1.3.1 Public Involvement

The implementing regulations for NEPA require public involvement in the preparation of the draft and final EIS. The NEPA decision-making process allows for disclosure of federal actions and alternatives to the public through the scoping process. Public involvement occurs through all stages of the NEPA process, including environmental analysis, EIS preparation, and revision. The white boxes in Figure 1-2 indicate the points at which public involvement occurs.

The Navy invites public participation in the NEPA process. Consideration of the views and information of all interested persons promotes open communication and enables better decision-making. All agencies, organizations, and members of the public having a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are urged to participate in the decision-making process.

In addition, Section 5(a) of the National Capital Planning Act of 1952, as amended (40 U.S.C. § 71d(a)), provides that each federal agency in the National Capital Region shall advise and consult with the National Capital Planning Commission (NCPC) in the preparation of plans and programs that affect the National Capital prior to preparation of construction plans. NNMC is in the Maryland portion of the National Capital Region, so the Maryland-National Capital Park and Planning Commission (M-NCPPC) acts in an advisory capacity to NCPC. The area master plans are combined to form a general plan for the county, which in turn, is an element in regional planning for the Washington Metropolitan Area.

The NNMC master planning process includes meetings with state and local agencies, planning organizations, and community groups to provide information for public comment on the NNMC Master Plan. NCPC will review the Master Planning documentation and will also hold one or more public meetings to receive comments.

1.3.2 Scoping Period

To ensure that the full range of issues related to the Proposed Action was addressed, the Navy published an NOI to prepare an EIS in the Federal Register on Tuesday, 21 November 2006. The Federal Register publication initiated a 45-day scoping period beginning on 21 November 2006 and ending on 4 January 2007. The Notice provided general information on the Navy's Proposed Action, an announcement of public scoping meetings concerning the action, and contact information for providing comments. A scoping notification letter was mailed to key federal, state, and local agencies and their representatives. The public was invited to make comments pertaining to environmental issues that should be considered in development and analysis of alternatives during the 45-day scoping period. The comments were accepted at the public scoping meetings or by mail, email, or telephone.

The Navy also placed a notice in the local newspapers: the Bethesda Gazette on Wednesday, 22 November 2006, and The Washington Post and The Washington Times on Sunday, 26 November 2006. In addition, notices of the public scoping meetings were mailed to 293 local community associations and 21 local government entities and posted on NNMC's website. Montgomery County separately distributed the notice of public scoping meetings to approximately 2,000 members on its distribution list by email and information was posted on Montgomery County's Website. Section 7.0 of this EIS includes the list of federal, state, and local agencies/representatives that were informed of the project prior to the scoping meetings and that are being provided a copy of this Draft EIS for their review.

Four Public Scoping Meetings were held at the Bethesda Marriott in Bethesda, Maryland on the following days:

- Tuesday, 12 December 2006, 7 PM to 9 PM.
- Tuesday, 19 December 2006, 6:30 PM to 10 PM.
- Thursday, 21 December 2006, 1 PM to 4 PM and 7 PM to 9 PM.

The public scoping meetings on 12 and 21 December 2006 were open houses, where the information on the Proposed Action was displayed on poster boards and knowledgeable representatives were available to answer questions.

The public scoping meeting on 19 December 2006 included, in addition to the poster displays, a presentation by the Navy and a public hearing session, which included a court reporter.

The scoping period ended on 4 January 2007. In response to a request from elected state and local officials, NNMC continued to accept comments until 3 February 2007 and held two public information meetings on 30 January and 01 February 2007. The purpose of the meetings was to provide the public another overview of the Proposed Action and the EIS and present a summary of the results of the scoping period. The two public information meetings were held at the Bethesda Marriott, Bethesda, Maryland.

A total of 54 persons attended the two public information meetings. Many provided comments during an impromptu Question and Answer period during the Navy presentation. A total of 11 comment cards were returned by the public at the two public information meetings. In addition, NNMC received comments via 38 emails, two by mail, and 15 phone calls, including voice messages and calls.

Supporting information and documents relevant to the conduct of the scoping period and subsequent public meetings are in Appendix A.

1.3.2.1 Results of Public Scoping Period

A total of 107 persons attended the four public scoping meetings. The attendees included representatives from federal, state, and local agencies, NIH, representatives of community organizations, neighborhood associations, schools, and residents of surrounding neighborhoods. Representatives of the offices of the United States Congress, Maryland General Assembly, Montgomery County Council, and Montgomery County Executive also attended the public scoping meetings. In addition, military and civilian personnel receiving care or working at NNMC and WRAMC were also present.

A total of 15 comment cards were submitted during the four public scoping meetings. A total of 10 attendees provided verbal comments during the 19 December 2006 meeting. In addition, 69 comments were received via email and 12 comments were received via mail. Additionally, NNMC received a total of 45 phone calls, including voice messages and calls inquiring about the meetings or comment submittal. Appendix A of this EIS includes a summary of the comments provided during the public scoping period.

The majority of the comments from the state and local agencies and the local residents reflected concerns for the potential traffic increase in an already highly congested area. The comments can be grouped into the following four major categories:

- Transportation
- External Coordination
- Compatibility with Other Community Planning Efforts
- Other Environmental Issues

1.3.2.2 Transportation Comments

The comments on transportation issues were further grouped into the following categories and subcategories:

- Roadway/Traffic
  - Congestion of main thoroughfares, which can affect adjoining neighborhoods
  - Potential road improvements for main thoroughfares (Rockville Pike, Jones Bridge Rd., or I-495)
  - Improvements to public transit system
  - Means to encourage use of public transit
- Pedestrian/Bicycle
  - Sidewalks
  - Road Crossings, including Rockville Pike bridge or tunnel
- Parking availability (long-term and short-term)
  - Adjoining/surrounding communities
  - Patients and staff

As a part of the Master Planning process, NNMC has been participating in a Transportation Advisory Committee (TAC), composed of affected state and local agencies and organizations. These include the Maryland Department of Transportation (MDOT), Maryland State Highway Administration (MSHA), Montgomery County Government, Montgomery County Department of Public Works, Washington Metropolitan Area Transit Authority (WMATA), and M-NCPPC. The TAC has collaborated on traffic analysis methods.

1.3.2.3 Other Comments

As listed previously, other comments addressed issues such as external coordination, compatibility with other community planning efforts, and other environmental concerns.

The comments on coordination/collaboration focused on the need for NNMC to communicate with community organizations, neighborhood associations and schools, NIH, other state and federal agencies, and local government.

Comments regarding compatibility with other planning efforts listed a number of planning initiatives underway such as the White Flint and Woodmont master plans, existing plans for Bethesda Central Business District, and NIH. The comments also emphasized the need to incorporate modern urban concepts in the implementation of the Proposed Action such as pedestrian and transit-oriented development, and highlighted keeping residents informed and involved in decisions

on any improvements being considered that would affect their neighborhoods.

Comments on other environmental issues included: noise from construction and helicopter operations, air pollution from traffic, Rock Creek and stormwater management, open space, cultural resources and National Historic Preservation Act (NHPA) Section 106, and utilities capacity. Appendix A, Correspondence and Public Involvement includes a summary of the comments and responses to them.

1.3.3 EIS Review

1.3.3.1 Draft EIS

The Draft EIS (DEIS) is filed with the United States Environmental Protection Agency (USEPA) and then distributed. Distribution is to cognizant Federal, State, local, and private agencies; organizations; and individuals for review and comment. A minimum of 45 days is allocated for agency/public review, beginning with the date on which Notice of Availability (NOA) of the DEIS and Notice of Public Hearing (NOPH) appear in the Federal Register. Public hearings are held as part of the public review process for the DEIS during the 45-day public review period. The Navy publishes the notice of a public hearing in the Federal Register at least 15 days prior to the event.

1.3.3.2 Final EIS

A Final EIS (FEIS) incorporates all comments and information resulting from review of the DEIS, including from the public hearing. All comments are addressed by an appropriate response. The FEIS is filed with USEPA and distributed to recipients of the DEIS. An NOA is published in the Federal Register and in the newspapers to inform the public that the FEIS has been released. A 30-day Wait Period (no action period) will start from the date of the FEIS NOA. Comments received during the FEIS 30-day Wait Period (no action period) will be considered in reaching the final decision on the proposed action.

1.3.3.3 Record of Decision

Following the 30-day Wait Period (no action period) from the date of the FEIS NOA, a Record of Decision (ROD) will be prepared and published in the Federal Register. The ROD is a concise summary of the decision made by the Secretary of the Navy or his/her designee from the alternatives presented in an FEIS. The ROD will state the decision, identify alternatives considered (including that which was environmentally preferable), and discuss other considerations (non-environmental) that influenced the decision identified. The ROD will also describe the intended implementation of all practical means to avoid impacts resulting from the chosen alternatives, and explain any decision behind the non-implementation of any of these means. Additionally, the ROD will address any monitoring associated with mitigation. Throughout this process, the public will be able to obtain

information on the status and progress of the Proposed Action and the EIS through the NNMC Public Affairs Office.

1.3.4 Agency Coordination

1.3.4.1 Department of Defense Inter-Service Coordination

Executive oversight for the BRAC-mandated consolidation and Executive oversight for the BRAC-mandated consolidation and integration of the tertiary care and related medical support activities currently performed at WRAMC to the NNMC campus is managed by the Commander Joint Task Force National Capital Area (JTF CapMed). Reporting directly to the Secretary of Defense, the Commander JTF CapMed is chartered to oversee, manage, and direct all inter-Service actions between the Navy, Army, and Air Force to accomplish the BRAC actions in the National Capital Area and implement an efficient, integrated, world-class health care delivery system bringing the 'best of the best' together to work in concert on behalf of warriors, retirees and their families.

The role of JTF CapMed in aligning the different Service resources is projected to optimize the availability of military health care in the National Capital Area, permitting the Services to efficiently consolidate and utilize available health care resources and personnel to eliminate redundancies, enhance clinical care, promote graduate education and joint training, and enhance research opportunities associated with the future WRNMMC at Bethesda. JTF CapMed was established on 14 September 2007 and the Commanders at the existing NNMC and WRAMC report to the JTF for all matters concerning BRAC implementation and establishment of the WRNMMC at Bethesda.

1.3.4.2 Other Agency Coordination

Data collection for this effort relies, in part, on federal, state, and local agencies and authorities having pertinent information and interest in the draft EIS process for this project. The Navy is committed to interagency coordination for this EIS. Navy representatives initiated coordination with government agencies to obtain: 1) the name and telephone number of an appropriate future contact in each organization regarding this project, and 2) a summary of potential concerns the organization might have as they relate to topics covered within the EIS, including: traffic, cultural and natural resources, socioeconomics, and community services. As discussed earlier, the Navy has enhanced communication by participating in a TAC consisting of Navy representatives and federal, state, regional, and local transportation agencies and groups. In addition, consultation has been established with the NCPC and with the Maryland State Historic Preservation Office (SHPO) and the M-NCPPC. It is anticipated that the majority of comments will be related to transportation or the historical and planning aspects of the proposed action. Established working arrangements with these groups are intended to promote quicker resolution and better evaluation of the

alternatives. These arrangements will also aid in meeting the timelines described in Section 2.0 of this document.

1.4 Regulatory Framework

In addressing environmental considerations, the Navy is guided by relevant statutes (and their implementing regulations) and Executive Orders that establish standards and provide guidance on environmental and natural resources management and planning. These include the Clean Air Act (CAA), Clean Water Act (CWA), Noise Control Act, Endangered Species Act, National Historic Preservation Act (NHPA), National Capital Planning Act (40 U.S.C. 8722), Archaeological Resources Protection Act, Resource Conservation and Recovery Act (RCRA), and Toxic Substances Control Act. Executive Orders (EOs) bearing on the Proposed Action include EO 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), EO 12088 (Federal Compliance with Pollution Control Standards), EO 12580 (Superfund Implementation), EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations), EO 13045 (Protection of Children from Environmental Health Risks and Safety Risks), EO 13423 (Strengthening Federal Environmental, Energy, and Transportation Management), EO 13175 (Consultation and Coordination with Indian Tribal Governments), and EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds). These authorities are addressed in various sections throughout the EIS when relevant to particular environmental resources and conditions. The full text of the laws, regulations, and EOs is available on the Defense Environmental Network and Information Exchange Web site at http://www.denix.osd.mil.

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2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

The specific BRAC 2005 recommendation is to:

> "Realign Walter Reed Army Medical Center, Washington, DC, as follows: relocate all tertiary (sub-specialty and complex care) medical services to National Naval Medical Center, Bethesda, MD, establishing it as the Walter Reed National Military Medical Center Bethesda, MD; relocate Legal Medicine to the new Walter Reed National Military Medical Center Bethesda, MD; relocate sufficient personnel to the new Walter Reed National Military Medical Center Bethesda, MD, to establish a Program Management Office that will coordinate pathology results, contract administration, and quality assurance and control of Department of Defense (DoD) second opinion consults worldwide; relocate all non-tertiary (primary and specialty) patient care functions to a new community hospital at Fort Belvoir, VA."

The Navy's Proposed Action is to provide necessary facilities to implement the BRAC 2005 realignment actions.

To implement the actions directed by the 2005 BRAC 2005 law, the Navy proposes to provide:

- Additional space for inpatient and outpatient medical care as well as necessary renovation of existing medical care space to accommodate the increase in patients
- An Intrepid Center of Excellence (ICE) to meet an urgent need for Traumatic Brain Injury (TBI) and Post Traumatic Stress Disorder (PTSD) care
- Medical administration space
- Clinical and administrative space for the Warrior Transition Unit to deliver transitional aftercare and associated patient education programs
- Bachelor Enlisted Quarters to accommodate the projected increase in permanent party enlisted medical and support staff as well as provide transitional lodging required to support aftercare patients receiving treatment on an extended basis
- A fitness center for staff as well as the rehabilitation of patients
- Parking for the additional patients, staff, and visitors

- Two Fisher Houses™ that would support short-term lodging and a home-like reintegration experience for the service members and their family member/care taker while they participate in education and treatment programs in the ICE. Fisher Houses™ are "family-style lodging" to address short-term lodging needs of patients and their families in hospital or requiring extended aftercare treatment.

2.2 Identification of Alternatives

To implement the Proposed Action, the Navy has identified two action alternatives. These alternatives are identified in the EIS as Alternative One and Alternative Two.

The two action alternatives differ in their siting of the required facilities within the installation and in their use of new construction versus renovation of existing buildings to obtain some of the needed administrative space.

The third alternative is the No Action Alternative, which is required by statute and will evaluate the impacts at NNMC in the event that additional growth from BRAC actions does not occur. NNMC would continue to maintain and repair facilities in response to requirements from Congressional action or revisions to building codes. Implementation of No Action Alternative would require the Congress to change the existing BRAC Law.

The following sections will discuss the two action alternatives in detail, followed by additional discussion of the No Action Alternative.

2.3 Facility Options to Accommodate Realigned Units

Relocation of staff and services and establishment of new health care services at NNMC involves ensuring that the installation has adequate physical accommodations for personnel and their operational requirements. In the mid-1990s the Navy and Army medical staff in the National Capital Area began integrating the operations of NNMC and WRAMC. This integration process was formalized in mid-2005 and is ongoing. The goal of integration is to ensure that the highest level of health care service is provided to the eligible beneficiaries in the National Capital Area. To ensure this, the Navy, Army, and Air Force are aligning the clinical areas in the same manner and agreeing on how to manage health care so that, for example, a Navy Corpsman could go to WRAMC and fit in and be immediately productive with little or no training or orientation.

Due to integration, the concept of separate Army and Navy hospitals at WRNMMC was dismissed as being counter-productive and not likely to provide the best service. The ideal solution would be to enlarge the existing facilities and reclaim spaces that had been used for other purposes (e.g., administrative, storage). It was quickly determined that the existing space in the NNMC hospital buildings is insufficient

to accommodate the expansion of clinical areas and the new clinical areas that would be relocating. Therefore, new construction, renovation, or demolition followed by construction would be required. Additionally, currently vacant spaces could be renovated to be adaptively reused.

Other requirements such as those for additional physical fitness and on-base housing are similarly faced with questions about how to provide the best, most cost-effective, and most timely delivery of the necessary resources. These needs could not be provided in the existing spaces at NNMC. In addition, the condition of the existing spaces would often require large expenditures of funds to bring buildings built in the 1940s up to current building, health, and fire codes and to meet energy-efficiency requirements. Many buildings at NNMC are further constrained because they are contributing buildings in an eligible historic district.

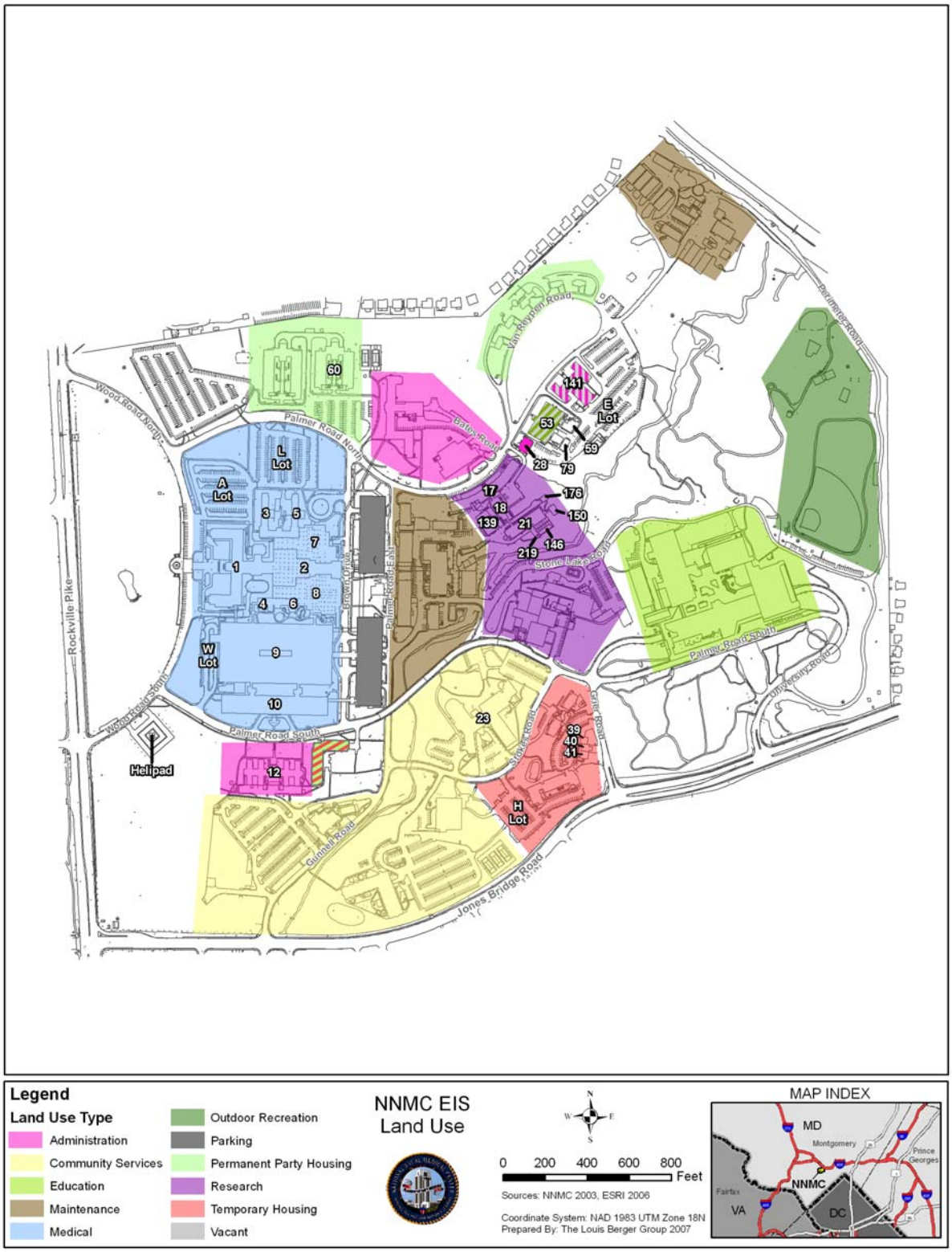
2.4 Siting of Required Facilities

The Navy considers both general and specific screening criteria when selecting alternative sites for new construction. General siting criteria include consideration of compatibility between the functions to be performed and the installation land use designation for the site, adequacy of the site for the function required, proximity to related activities, distance from incompatible activities, availability and capacity of roads, availability of parking, efficient use of property, development density, potential future mission requirements, and special site characteristics, including environmental and geotechnical incompatibilities. Specific siting criteria include location of the workforce and efficient, streamlined management of functions. Collocation of similar types of functions, as opposed to dispersion, permits more efficient accomplishment of the health care mission. Figure 2-1 presents the existing land uses at NNMC; buildings with numbers are those that are identified in the alternatives, discussed next in Section 2.5.

Table 2-1 provides a list of constraints and considerations for the evaluation of suitable sites. These must be considered for moving a clinic down a hall, evaluation of renovation projects, and selection of construction sites.

Table 2-2 provides a list of selection criteria that are derived from the relationship of the site with the environment and overall impact on the installation and community.

Figure 2-1: Existing Land Uses at NNMC



Source: Preliminary Draft NNMC Land Use Plan

Table 2-1: Site Constraints and Considerations

Constraints and Considerations		
• Mission needs and goals • Proximity to necessary related activities (e.g., Emergency room close to radiology) • Topography • Areas of non-constructability • Wetlands • Buffer zones • Drainage • Soil mechanics and geology • Orientation (Sun and wind exposure, visual appeal) • Accessibility • ADA* compliance • Utilities availability • Site work • Environmental aspects • Watershed	• Forest replenishment • Permitting • Historical and Archeological o Historic District o Protected view o Contextual (includes external to historic district) o Prehistoric o Historic artifact sites and high probability areas • Force Protection o Security o VIPs o Infants o Patients o Visitors and workforce o Information systems o Buildings	• Aircraft related: o Noise o Space o Clearance o Crash zones • Joint Commission on Accreditation of Healthcare Organization's criteria • Regional, state, and federal planning organization comments and criteria (e.g., NCPC) • Building codes • Fire codes • Availability of emergency response equipment and its accessibility • Parking requirements

* Americans with Disabilities Act

Table 2-2: Site Criteria

Criteria		
• Constraints and considerations • Acreage/height limitations • Land use • Waste management • Traffic (Pedestrian/Vehicular) o Congestion/delays o Emissions o Safety o Access controls o Flow patterns	• Public relations • Disruptions due to construction • Scale • Outdoor lighting • Phasing • Economics o Life cycle cost o Construction cost o Operation and maintenance costs	• Accommodating work patterns to improve "flow" and convenience • Impacts on utilities and resource capacity • Local/Regional planning regulations/guidelines

2.5 Alternatives and Options Considered in the EIS

Under both action alternatives, the proposed action would provide the new WRNMMC approximately 1,652,000 square feet (SF) or 153,476 square meters (m^2) of building construction and renovation, as well as approximately 824,000 SF (76,552 m^2) of parking facilities. The

alternatives add approximately 2,500 parking spaces and demolish approximately 700 spaces for a gain of approximately 1,800 spaces.

The current estimate of additional staff is 2,200; however, the EIS assumes 2,500 additional employees as a conservative estimate to insure any additional staff that are determined to be necessary are evaluated by the EIS, as well as to account for possible increases in staff at NNMC under other ongoing or future projects on Base, as discussed in Section 4.12 Cumulative Impacts. Other off-Base projects, also discussed under cumulative impacts, do not add staff to NNMC.

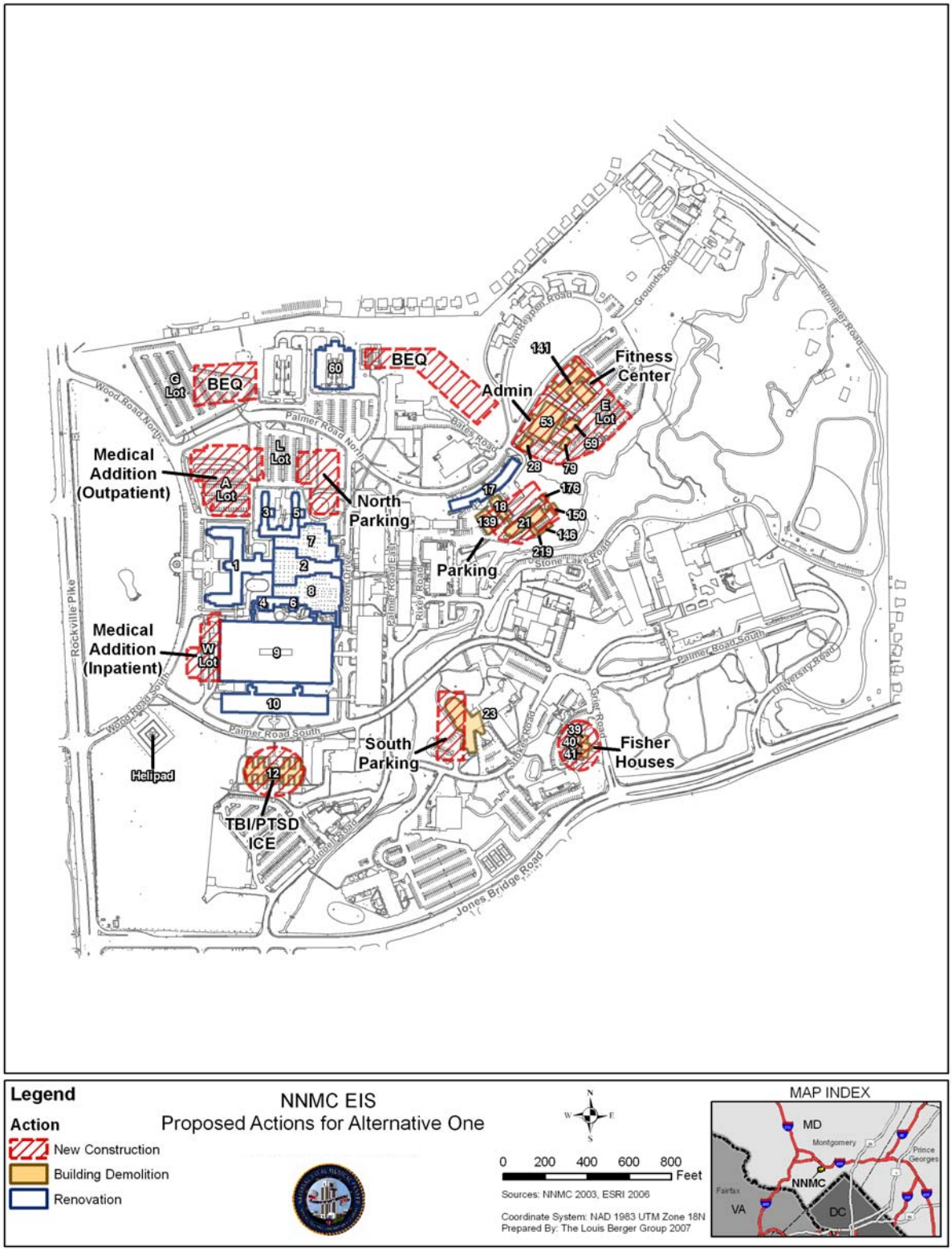
An additional 484,000 patients and visitors are expected each year at NNMC. Specifically, 484,000 annual patients and visitors, if assumed to come for medical care on the 260 weekdays in each year, equates to 484,000/260 or 1,862 additional patients/visitors daily on weekdays. Because some appointments and medical care occur on Saturday, an estimate that an additional half day each week should be considered yields a daily average of 484,000/286 or 1,692. So the 484,000 patients and visitors annually is 1,692 – 1,862 daily depending upon the assumption used. The EIS conservatively assumes 1,862 patients and visitors per weekday for its analyses.

Tables 2-3 and 2-4 in the final section of this chapter compare the requirements and impacts of the two action alternatives. The sections that follow provide detailed descriptions of the facilities for the two action alternatives, Alternative One and Alternative Two. They will also discuss the No Action Alternative, which is required under NEPA to provide a baseline for measurement of impacts.

2.5.1 Alternative One

Alternative One would add to NNMC approximately 1,144,000 SF (106,000 m^2) of building construction, provide approximately 508,000 SF (47,193 m^2) of renovation to existing building space, provide approximately 824,000 SF (76,552 m^2) of new parking facilities, accommodate approximately 2,500 additional staff, and accommodate approximately 1,862 patients and visitors per weekday. In order to provide an estimate of maximum potential traffic impacts, the additional staff personnel are all assumed to commute to and from NNMC from residences off-Base. The new construction or improvements to existing facilities would provide medical care and administration additions and alterations, a TBI/PTSD ICE facility, permanent and temporary lodging facilities (BEQs and Fisher Houses™), a new physical fitness center, additional parking, and road and utility improvements on the installation to support the new facilities. The facilities are discussed in the following sub sections and Figure 2-2 identifies the location of the proposed facilities.

Figure 2-2: Alternative One



2.5.1.1 Medical Care Space

Required medical care space would total approximately 638,000 SF (59,272 m^2) of new construction and approximately 322,000 SF (29,914 m^2) of renovation to existing medical care space. The new construction would consist of two new inpatient and outpatient additions. The addition to the outpatient space would be constructed to the north of Building 1 and to the east of Buildings 3 and 5, on A-Lot and on a portion of L-Lot. The addition to the inpatient space would be constructed south of Building 1 by expanding to the west of Building 9 of the existing Medical Center.

The expansion would provide symmetry to the new outpatient space to the north. The new outpatient and inpatient spaces would be designated as Building A and Building B, respectively. The buildings would be certified according to the US Green Building Council's Leadership in Energy and Environmental Design (LEED) program.

Renovation would occur internally in the existing medical center Buildings 1 through 10 and would include modifications to accommodate the new internal circulation patterns connecting the new and existing medical spaces. The location of the new medical space was determined following the Navy's siting criteria discussed in Section 2.4. The proposed locations of the new facilities would allow the collocation of similar types of functions, as opposed to dispersion, and would permit more efficient accomplishment of the health care mission.

To allow flexibility as designs progress, the EIS assumes that the medical addition footprint could vary somewhat from the specific footprint shown in Figure 2-2, but would remain in the area bounded by North Palmer Road, South Palmer Road, Wood Road, and Brown Drive. Any change within that area would not be expected to increase environmental impacts identified in the EIS.

2.5.1.2 TBI/PTSD ICE

A 50,000 SF (4,645 m^2) Traumatic Brain Injury and Post Traumatic Stress Disorder (TBI/PTSD) Intrepid Center of Excellence (ICE) would be constructed on the location of existing Building 12, which, if found unsuitable for adaptive reuse and following Section 106 consultation under the National Historic Preservation Act, would be demolished. Building 12 is currently providing administrative space that would be relocated to other administrative buildings, including potentially those being provided by this alternative, if demolished or adaptively reused for the TBI/PTSD. It is listed as potentially eligible for the National Register of Historical Places (NRHP). The condition of the building is fair but it may not be suitable to serve as a TBI/PTSD patient care facility due to such issues as the split-level nature of the building and the difficulty in addressing essential accessibility issues.

2.5.1.3 Administrative Space

Under Alternative One a new 114,000 SF (10,591 m^2) administrative building would be constructed in the area of existing buildings 53, 28, 59, and 79, which would be demolished. These buildings to be demolished support administrative and research functions and are underutilized or vacant; their functions can be relocated to existing space or the new space to be constructed. Research personnel in buildings to be demolished are separated from the main buildings with research at NNMC and they could easily be relocated. Approximately 85,000 SF (2,322 m^2) of the currently vacant Building 17, including the wings (17A and 17B), would also be renovated for additional administrative space.

2.5.1.4 BEQ Sites and Dining Facility

Under Alternative One two BEQ facilities would be constructed. One would be located east of Building 60. The new BEQ would start north of Building 11 and continue southeast towards Bates Road, east of the same building. The other BEQ would be located west of Building 61, on currently landscaped area and on a portion of Lot-G. The BEQ structures would provide a total of approximately 225,000 SF (20,903 m^2) with a footprint of 56,000 SF (5,203 m^2).

Building 60, an existing BEQ facility, would be renovated to bring the building up to applicable codes. Approximately 106,000 SF (9,848 m^2) and 5 stories comprise the building.

A 21,000 SF (1,951 m^2) dining structure would be added to one of the BEQ structures.

The proposed sites for BEQ housing were selected based on proximity to the existing structures serving similar functions and because of their compatibility with the land uses designated for the area.

2.5.1.5 Fisher Houses™

Under Alternative One two Fisher Houses™, each with up to 21 units, would provide a total of approximately 32,000 SF (2,972 m^2). They would be located close to the existing Fisher Houses™ (Buildings 24 and 25), at the current site of three sets of outdated quarters (Buildings 39, 40, and 41), which would be demolished. Fisher Houses™ are "family-style lodging" built on the grounds of major military and Veterans Affairs medical centers for military family members during hospitalization for an unexpected illness, disease, or injury. It is assumed that 16,000 SF (1,486 m^2) of parking area would be required for the proposed Fisher Houses™.

The proposed site for Fisher Houses™ was selected based on its proximity to the existing structures serving similar functions and because of its compatibility with the land uses designated for the area.

2.5.1.6 Fitness Center

A new 64,000 SF (5,946 m^2) fitness center would be located on the site of existing Building 141 and would require demolition of the building. Building 141 is used for training and administration, but is underutilized. The functions can easily be relocated. The site for a new fitness center is across Taylor Road from the Flag Houses in the northeast area of the installation and would allow easy access to the residential and administrative areas as well as the current athletic fields. The condition of Building 141 has been designated as poor and the proposed demolition and construction would place a new facility on currently developed area.

2.5.1.7 Parking

Additional parking for health care staff and patients under Alternative One would be constructed at three locations. Including the parking for the Fisher Houses™ of 16,000 SF (1,486 m^2), total new parking is estimated as 824,000 SF (76,552 m^2). The alternative adds approximately 2,500 parking spaces and demolishes approximately 700 spaces for a gain of approximately 1,800 spaces.

Approximately 324,000 SF (30,101 m^2) would be constructed as a new parking garage to the east of the new Medical Center Addition, adjacent to Brown Street (North Patient Parking), and approximately 284,000 SF (26,384 m^2) would be constructed in a new parking garage (South Staff Parking) at the intersection of Palmer Road East and Stokes Road. Both parking structures as planned would be seven-story buildings with 8-foot clearance on the first level and 7-foot clearance on remaining levels. The south parking structure would require demolition of the western portion of Building 23, which was formerly used as an officers club and is now vacant. The demolition of Building 23 would be conducted selectively so that fitness center facilities on its east side could be maintained until the new fitness center becomes available.

Access to the proposed North Patient Parking would be from Palmer Road North, within a short distance from the North Wood Road entrance off Rockville Pike. The site was selected because of its accessibility and adjacency to the new medical space. This previously developed site would accommodate patients and offset lost parking in the A and L lots.

Access to the proposed south parking structure would be from Palmer Road South, coming from the South Wood Road entrance off Rockville Pike and from Grier and Gunnell Roads off Jones Bridge Road. The site was selected because of its proximity to multiple entrances. The site is located in an already developed area and would be replacing a portion of a building with conditions rated as poor. It would not encroach on a nearby stream or its 25-foot buffer.

A third 200,000 SF (18,581 m^2) parking structure would be constructed behind Building 17, including wings 17A and 17B. Buildings 18, 21,

139, 150, 174, and 176 would be demolished to accommodate the new parking structure. These buildings formerly supported the research functions in now-vacant Building 17 and are all vacant in poor condition except Building 139, which is used for administration. The building 139 functions can be easily relocated.

Access to the third parking structure is planned from East Palmer Road, parallel to the road, in the area between Buildings 14, 15 and 13, 16. Egress from the third parking structure is planned to be via Taylor Road. The site is located in an already developed area. The parking structure would replace buildings rated to be in poor condition (with the exception of Building 139, which is rated to be in good condition). This parking structure would serve the new administrative spaces, including the Warrior Transition Unit, and the fitness center.

Surface parking of approximately 16,000 SF (1,486 m^2) would be constructed for the new Fisher Houses™.

2.5.1.8 Construction Material Storage

The space to the west of Building 1 has been provided for contractor material staging and use. Other space at NNMC would also be provided as required to accommodate construction materials and equipment on NNMC property. Erosion and sediment control measures would be required and the property would be restored to original conditions after construction is completed. The construction contractors would also take measures to control/minimize whatever the visual intrusion of the construction staging area on the viewshed. North Gate would be dedicated to access and egress to the construction storage site and security checks in an adjoining area to the entrance would be managed to minimize any potential effect from queuing on Rockville Pike.

2.5.2 Alternative Two

Alternative Two proposes facilities for the same requirements as for Alternative One. However, the location and the choice of new construction versus renovation of some facilities would differ from Alternative One.

Alternative Two would add to NNMC approximately 1,230,000 SF (114,271 m^2) of new building construction, approximately 423,000 SF (39,298 m^2) of building renovation to existing building space, and provide approximately 824,000 SF (76,552 m^2) of new parking facilities. The number of staff and patients would be the same as for Alternative One. The facilities are discussed in the following sub sections and Figure 2-3 identifies the location of the proposed facilities.

2.5.2.1 Medical Care Space

Under Alternative Two, the size (638,000 SF (59,272 m2)) and locations of the new medical care space would be the same as for Alternative One. Approximately 322,000 SF (29,914 m2) inside Buildings 1 through 10 would also be renovated. This is dictated by medical care

functional relationships and required adjacencies to existing facilities, as well as constraints posed by the historic Building 1 and its view shed.

2.5.2.2 TBI/PTSD ICE

Under Alternative Two, the 50,000 SF (4,645 m^2) TBI/PTSD ICE would be constructed in an open area east of Building 56 that has been previously disturbed and has stormwater management features in place. The new construction would require demolition of a portion of existing surface parking Lot-H. Under this alternative Building 12 would remain in use.

2.5.2.3 Administrative Space

Under Alternative Two, a new 200,000 SF (18,581 m^2) administrative building would be constructed in the area of existing Buildings 141, 53, 28, 59, 69, and 79, which would be demolished. These buildings to be demolished support administrative, research or training, and are underutilized. Personnel within can be relocated to existing space or the new space to be constructed. Research personnel in buildings to be demolished are separated from the main buildings with research at NNMC and can easily be relocated. Building 17 would not be renovated and Buildings 18, 21, 139, 150, 174, and 176 would not be demolished.

2.5.2.4 BEQ Sites and Dining Facility

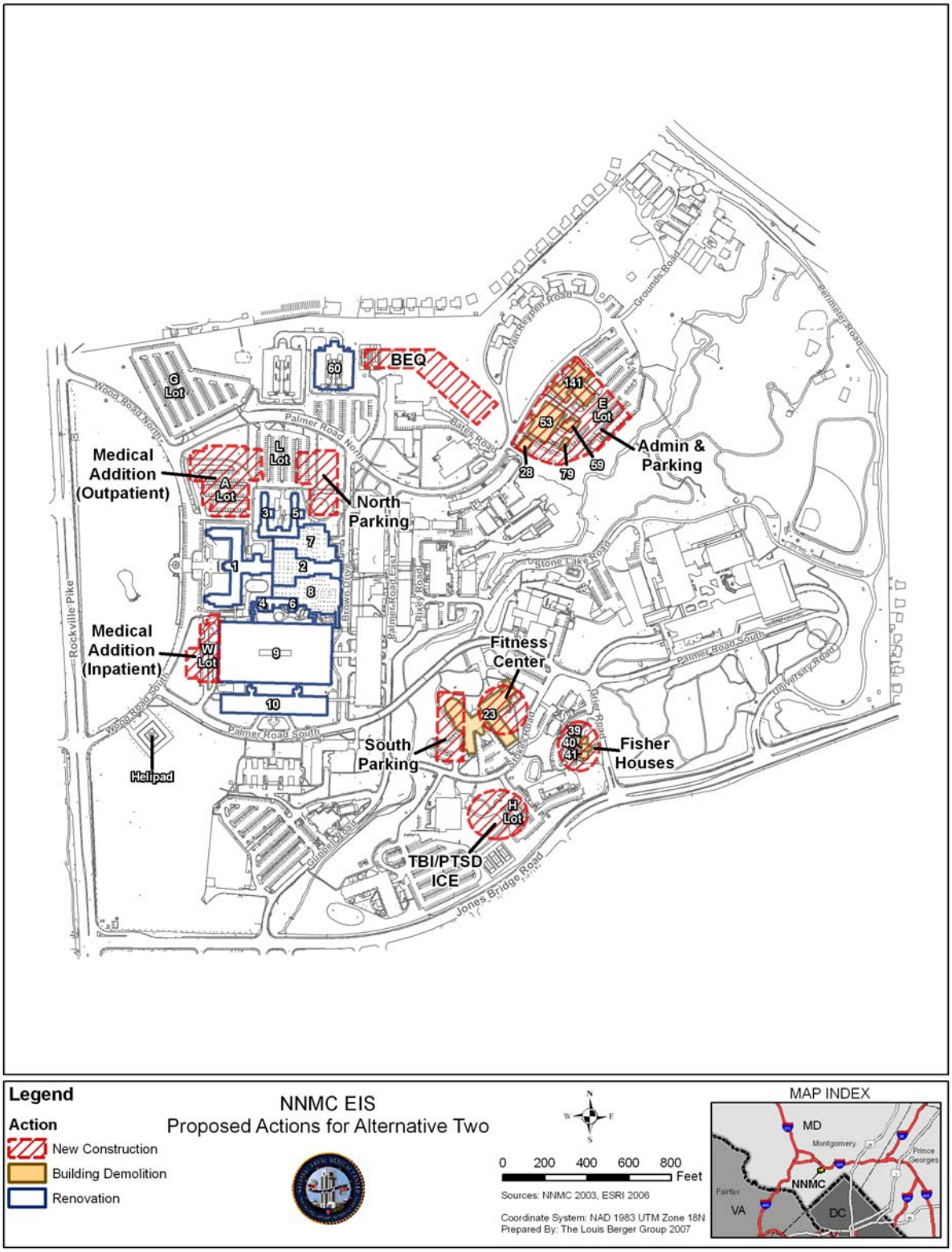
Under Alternative Two, only one larger BEQ facility would be constructed; it would be located east of Building 60. The new BEQ would start north of Building 11 and continue southeast towards Bates Road, east of the same building. The new BEQ structure would provide the same amount of space as the two BEQs under Alternative One, approximately 225,000 SF (20,903 m^2) with a footprint of 56,000 SF (5,203 m^2). A 21,000 SF (1,951 m^2) dining structure would be added to the BEQ structure.

As for Alternative One, Building 60, an existing BEQ facility, would be renovated under Alternative Two to bring the building up to applicable codes. Approximately 106,000 SF (9,848 m^2) and 5 stories comprise the building.

2.5.2.5 Fisher Houses™

Under Alternative Two, two Fisher Houses™, each with up to 21 units, would provide a total of approximately 32,000 SF (2,972 m^2). They would be located close to the existing Fisher Houses (Buildings 24 and 25), at the current site of three sets of outdated quarters (Buildings 39, 40, and 41), which would be demolished. It is assumed that 16,000 SF (1,486 m^2) of parking area would be required for the proposed Fisher Houses. This location and provided space is the same as for Alternative One.

Figure 2-3: Alternative Two



2.5.2.6 Fitness Center

A new 64,000 SF (5,946 m2) fitness center would be located on the eastern half of Building 23, which would require demolition of that side of the building. The new fitness center would replace the existing fitness center in the eastern side of the building being demolished.

2.5.2.7 Parking

Alternative Two, like Alternative One, would add approximately 2,500 parking spaces and demolish approximately 700 spaces for a net gain of approximately 1,800 spaces. Under Alternative Two, North and South Parking structures would remain the same as under Alternative One. Their location to support the medical units is also optimal.

The third 200,000 SF (18,581 m^2) parking structure would be constructed in the area of existing Buildings 141, 53, 28, 59, 69, and 79, which would be demolished to accommodate the new parking structure as well as new administrative space, discussed in Section 2.5.2.3. These buildings to be demolished support administrative, research or training, and are underutilized. Personnel within can be relocated to existing space or the new space to be constructed. Research personnel are separated from the main buildings with research and can easily be relocated. Two access points via Taylor Road are assumed for the third parking structure.

As for Alternative One, surface parking of approximately 16,000 SF (18,581 m2) would be constructed for the new Fisher Houses™ for Alternative Two.

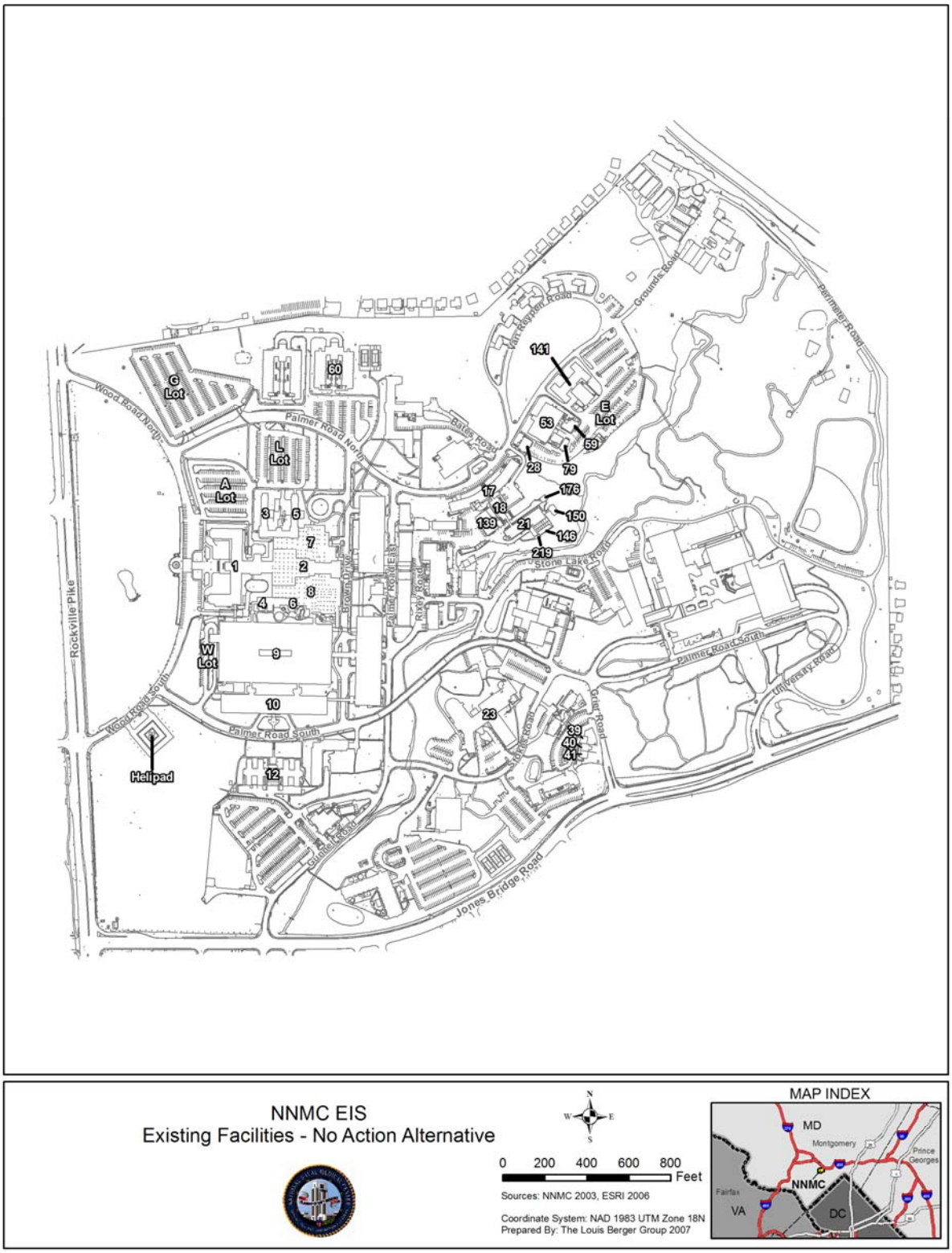
2.5.2.8 Construction Material Storage

The space to the west of Building 1 has been provided for contractor material staging and use. Other space at NNMC would also be provided as required to assure that construction materials and equipment can be accommodated on NNMC property. Erosion and sediment control measures would be required and the property would be restored to original conditions after construction is completed. The construction contractors would also take measures to control/minimize whatever the visual intrusion of the construction staging area on the viewshed. North Gate would be dedicated to access and egress to the construction storage site and security checks in an adjoining area to the entrance would be managed to minimize any potential effect from queuing on Rockville Pike.

2.5.3 No Action Alternative

For the purpose of this EIS, the No Action Alternative would maintain the status quo. The No Action Alternative would not allow the Navy to implement the 2005 BRAC-directed action. Figure 2-4 shows the existing facilities at NNMC under the No Action alternative; numbered buildings and lots are those referred to in the discussions of Alternatives One and Two (i.e., locations affected by Alternatives One and Two).

Figure 2-4: No Action Alternative Existing Facilities



In NEPA analysis, the No Action Alternative also performs the important function of acting as an environmental baseline against which the environmental consequences of the other alternatives are measured. Thus, the No Action Alternative has been considered in detail and provides the baseline conditions for considering the environmental consequences of the Proposed Action and the action alternatives. As the No Action Alternative would not permit the implementation of the BRAC-directed action, it would not be consistent with current law.

2.6 Alternatives Considered and Not Further Evaluated in the EIS

The following alternatives were considered and not carried forward for detailed evaluation in the EIS:

1. **Locating additional medical and clinical functions away from current hospital buildings**: This option would have located additional clinical and medical care functions in an area of NNMC that was not immediately adjacent to the current medical care buildings. This option was not carried forward into analysis because it was determined that co-located hospital functions are essential to the effective treatment of wounded warriors and the military community. Separating essential functions in newly constructed buildings from existing functions in currently operating medical facilities would have resulted in sub-par medical care. It would require patients and their families to travel around the Base outdoors exposed to existing weather to get from one specialist or appointment to another, and would cause delays and discomfort to the sick or wounded patients needing medical care. It was deemed unacceptable and unreasonable.

2. **Locating administrative and other non-clinical functions at the east end of the facility:** This option would have located administrative and other non-clinical functions at the far eastern end of the facility. This option was not carried forward into analysis because it would have put unreasonable limitations on administrative functions that are closely tied to medical care. As an example, the Warrior Transition Unit is proposed to be located within the non-clinical administrative space, but patients at this facility will have integrated care that includes clinical and non-clinical functions. Other non-clinical administrative functions also have close ties to medical functions in the main medical care facility. For example, it is essential that medical records, maintained as an administrative function, be readily available for medical personnel administering medical care and each patient receiving care. Making further appointments or receiving proper guidance on how to obtain further care, administrative functions, need to be reasonably near the area where the patient has just received treatment. Locating administration functions adjacent to the medical care facility was deemed an essential part of holistic

medical care for patients to the facility. To do otherwise would place unreasonable burdens on wounded warriors and other patients and were dismissed from further consideration.

3. **Alternate design for hospital renovation and new construction:** This option would have evaluated different permutations of demolition, renovation, and new construction at the existing medical care buildings to account for the additional requirements to comply with BRAC law. This option was not carried forward into analysis because preliminary coordination with the State Historic Preservation Office and the Maryland-National Capital Parks and Planning Commission identified that the present option shown in both Alternatives One and Two was the preferred alternative to minimize potential impacts to the historic Building 1 Tower and to the surrounding Historic District. Once this initial coordination was completed and concept design was approved by the National Capital Planning Commission in October, 2007, alternate design options were deemed unreasonable.

4. **Locating BRAC Facilities in Other Undeveloped Areas of NNMC:** Undeveloped Areas as defined by the EIS are those areas that have natural vegetation or woodlands. The sites chosen for BRAC development are landscaped lawn or have existing manmade features such as pavement, considered developed, and avoid the remaining undeveloped areas at NNMC. This selection was consistent with existing land use and maximized the retention of existing natural open space at NNMC. In addition to the obvious environmental benefits of selecting sites that avoid natural vegetation and woodlands, this approach also preserves natural amenities as an important element for the healing of our wounded warriors. The ability to spend time in natural areas has been shown to assist the healing process and NNMC promotes the concept of a "healing garden." Therefore, undeveloped areas were retained to the maximum extent possible.

2.7 Schedule

The schedule for implementation of the proposed action must balance facilities construction timeframes and patient care continuity. In accordance with BRAC law, all closures and realignments must be completed by 15 September 2011 (six years after the President submission of the BRAC Commission report to the Congress). For purposes of analysis, the bulk of construction is assumed to occur in calendar years 2009 – 2011. However, the majority of the design work and a substantial amount of renovation will occur in 2008.

2.8 Transition Plan

A transition plan will be established to minimize disruption to the services provided by NNMC and WRAMC during the construction and transfer of the services. The transition plan will address closing of roads or buildings for construction activities at NNMC and exchange of personnel between the two facilities. The plan would include

relocation of some NNMC clinical areas at NNMC, and possibly temporarily to WRAMC, and closing and relocation of administrative offices as buildings are closed for renovation or to accommodate utility outages. It is anticipated that the transition plan will be similar to the exchange of personnel and services that occur regularly between the two facilities.

2.9 Cumulative Impacts

The EIS analyzes cumulative impacts, which are the incremental impacts from the proposed action when added to actions of other past, current, or foreseeable future actions during the timeframe of the Proposed Action that are not associated with BRAC. Foreseeable future projects not associated with BRAC are listed below; additional staff or visitors are expected only at three projects as noted. Only the NEX expansion would be expected to add visitors, but these would be primarily during non-peak hours and weekends.

- Navy Lodge Expansion: The existing Navy Lodge, Building 52, could be expanded by an addition of 48,000 SF (4,459 m2), with 20 additional NNMC staff estimated.

- Navy Exchange (NEX): The existing Navy Exchange could be expanded with an addition of up to 100,000 SF (9,290 m^2) and 170,000 SF (15,793 m^2) of parking at its current site south of Building 12, adjacent to C Lot, with 95 additional NNMC staff estimated, and additional visitors.

- Senior Non-Commissioned Officers Quarters (SNCO): New housing for SNCOs could include four to eight townhouse units, each providing space of approximately 2,310 SF (214 m2). This would replace the three lost for construction of the Fisher Houses and add additional units.

- Day Care Centers: Two child care facilities are proposed with additional NNMC staff of 21 estimated. An hourly day care drop-off facility, estimated to occupy 9,000 SF on one level with an adjacent outdoor play area and a 24-hour facility of 4,000 SF on one level with adjacent play area could be constructed.

- Morale Welfare and Recreation (MWR) Athletics Fields: Additional MWR athletic fields are needed at NNMC.

- Security Gates: Access gate improvements for all gates are being studied. These would include construction of a new security facility with approximately 1,000 SF of interior space in the northwest corner of NNMC.

- The Grier Road Commercial Vehicle Inspection Facility would provide a commercial vehicle inspection station on NNMC.

- A planned Metrorail link in the southwest corner of the installation near the southern Rockville Pike security gate.

- A pedestrian connection between the NIH campus and NNMC just south of the South Wood Road security gate is also identified in the EIS.

The cumulative impacts analysis of this EIS also includes one NNMC project underway: the Academic Program Center for the Uniformed Services University of the Health Sciences (USUHS) Nursing School. It will add needed space at USUHS, but is not expected to add staff, students, visitors or other potential commuters.

The cumulative impacts analysis of this EIS also includes the implementation of the 2003 NIH Master Plan, which adds buildings but does not add traffic. The transportation analysis has included approved background development off-base. This is discussed under Future Background Conditions (Year 2011) in Appendix C, Transportation Study and is listed in Section 4.12, Cumulative Impacts.

2.10 Comparison of Alternatives

This section compares Alternatives One and Two and their options. It summarizes the environmental consequences by resource area, discusses proposed improvements or mitigation, summarizes estimated requirements for new construction, renovation, and demolition in Table 2-3 and provides a matrix comparison of the environmental consequences in Table 2-4. The No Action Alternative would not implement the realignment; neither BRAC construction nor renovation would occur and staffing at NNMC would not change. The No Action Alternative, therefore, would not cause impacts to the environment.

2.10.1 Environmental Consequences by Resource Area

Geology, Topography and Soils: Implementation of either of the action alternatives would not be expected to impact local geology. Site preparation under Alternatives One and Two would require excavation and grading and potential soil improvement as necessary to accommodate the proposed level of development. Approximately 13.2 acres (9.8 acres of construction on existing impermeable surfaces requiring demolition and 3.4 acres of new construction on open space) under Alternative One and up to 13.3 acres (8.5 acres of construction on existing impermeable surfaces requiring demolition and 4.8 acres of new construction on open space) under Alternative Two would be disturbed by the new facilities. Current impermeable surface area at NNMC is estimated as approximately 98 acres; Alternatives One and Two would increase impermeable surface area at NNMC by approximately 3.5 percent and 4.9 percent respectively. Construction projects with this amount of disturbance require an approved erosion and sediment control plan. This plan must comply with Maryland's environmental laws, including Environment Article, Title 4, Subtitle 1 and 2 for erosion and

sediment control and stormwater management (COMAR 26.17.01 and 26.17.02). Prior to construction at any site, a General Permit for Construction Activity would be obtained, which would include an approved sediment and erosion control plan. Planning would develop appropriate site-specific best management practices (BMPs) for controlling runoff, erosion, and sedimentation during construction and demolition activities. With soil erosion and sediment control measures, the actions proposed under this alternative would likely result in minor adverse impacts to soils from construction occurring on those previously open areas. No new impacts to soils are considered on those sites covered by with existing manmade structures such as pavement.

Water Resources: Under Alternative One approximately 3.4 acres of existing pervious soil surfaces would be converted to impervious development. Under Alternative Two approximately 4.8 acres of existing pervious soil surfaces would be converted to impervious development. Implementation of erosion and sediment control plans would be required and would reduce erosion of exposed soils, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before they enter downstream water flow. The new construction would also require a stormwater management plan that adheres to the 2000 Maryland Stormwater Design Manual and Maryland's Stormwater Management Act of 2007, which requires that environmental site design, through the use of nonstructural best management practices and other better site design techniques, be implemented to the maximum extent practicable (see Section 4.2 for details). Increases in surface stormwater runoff during construction and operation would be controlled by stormwater BMPs as well as the erosion and sedimentation controls to reduce potential impacts to surface and ground waters. Low Impact Development (LID) measures would be among those considered and implemented when practical. Runoff from already impermeable surfaces that are being affected by the proposed construction would be reduced by the controls implemented. Erosion and sediment control measures would also be required for the construction storage site to the west of Building 1 and the property would be restored to original conditions after construction is completed.

The construction is expected to avoid all floodplains. The only structure proposed under Alternatives One and Two in the vicinity of potential wetlands is the Southern Parking facility, which as currently proposed would be at least 75 feet from the stream and would not encroach on either the potential wetland or within the 25-foot buffer afforded to non-tidal wetlands by the State of Maryland.

Biological Resources: All the proposed projects under either alternative would convert lands with either existing development or landscaped areas into developed facilities and associated landscape vegetation. Impacts to vegetation could be adverse but not significant because areas considered for the projects are located in areas with existing structures or pavement, or in areas of grassy meadow and lawn with thinly scattered trees and shrubs commonly found within the

region. No effects to rare, threatened, and endangered species would be expected under either of the action alternatives as there are no special-status species inhabiting the proposed project sites.

Air Quality: NNMC is in an air quality control region that is in moderate nonattainment for ozone and in nonattainment for particulate matter with diameter less than or equal to 2.5 micrometers ($PM_{2.5}$), and is in maintenance for carbon monoxide. It is also in an ozone transport region. Federal actions located in nonattainment and maintenance areas are required to demonstrate compliance with the general conformity guidelines. The DEIS has completed a General Conformity Rule applicability analysis for the ozone precursor pollutants nitrogen oxides (NO_x) and volatile organic compounds (VOCs), for $PM_{2.5}$, and the $PM_{2.5}$ precursor pollutant sulfur dioxide (SO_2), and for carbon monoxide (CO) to analyze impacts to air quality. If annual project emissions are below ***de minimis*** values, a conformity determination is not required. The ***de minimis*** values for moderate nonattainment ozone areas in an ozone transport region, areas in nonattainment for $PM_{2.5}$, and CO maintenance areas are 100 tons per year (TPY) for NO_x, $PM_{2.5}$, SO_2, and CO and 50 TPY for VOCs.

Sources of CO, NO_x, VOCs, $PM_{2.5}$, and SO_2 associated with the proposed project would include emissions from construction equipment, fugitive dust ($PM_{2.5}$), painting of interior building surfaces and parking spaces (VOCs only), and emissions from stationary units (boilers and generators). The analysis indicates that estimated peak year emissions under Alternative One would be the second year of construction, 2010, for all pollutants except CO. The year 2010 would result in emissions of approximately 45.78, 22.16, 18.23, and 5.79 TPY for NO_x, VOCs, $PM_{2.5}$, and SO_2 respectively. Year 2011, with combined construction and operations, would be the peak year for CO with 20.33 TPY. Under Alternative Two, the analysis indicates that the estimated peak year is also 2010 for all pollutants except CO as for Alternative One, but with a slight decrease below Alternative One emissions to 43.93, 21.99, 16.71, and 5.51 TPY for NO_x, VOCs, $PM_{2.5}$, and SO_2 respectively. Year 2011, with combined construction and operations, would be the peak year for CO with 19.21 TPY. One reason that the emissions for Alternative Two are slightly less than Alternative One emissions is that the amount of demolition and resultant disposal is lower, resulting in lower construction emissions. These emissions do not exceed the ***de minimis*** levels for moderate ozone nonattainment, $PM_{2.5}$ nonattainment, or CO maintenance levels. Therefore, a full conformity determination is not required for Alternatives One and Two. A Record of Non-Applicability will be provided in the Final EIS.

An evaluation of mobile source (vehicle) CO emissions was also performed to determine CO concentrations caused by vehicles under the alternatives both in the parking garages and at the five intersections adjacent to NNMC. The analysis determined that CO concentrations remain below allowable ambient standards under both alternatives. Minor modifications to NNMC's Title V permit are expected.

Noise: Demolition, construction, and renovation noise would occur at NNMC under either Alternative One or Two. The noise would be short-term, typical of construction activities, and would be managed to meet State and Montgomery County criteria. Construction noise near sensitive receptors would require careful planning and potential implementation of noise reduction measures listed in the section on Potential Improvement Measures in Section 2.10.2 at the end of this chapter. Sensitive receptors within the NNMC installation include the existing medical facilities, which would be adjacent to construction for the medical care additions under both alternatives. On-base residential facilities, also sensitive, include the new BEQ(s) and two Fisher Houses, which would also be constructed near existing residential facilities under both alternatives. Sensitive receptors outside NNMC include the Stone Ridge School of the Sacred Heart and the residential housing, both adjacent to the northern property boundary. Alternative One would construct two BEQ structures: the BEQ to the west of Building 61 would be in the area of NNMC bordered by the school and the BEQ to the east of Building 60 would be in the area of NNMC bordered by the residential area. Under Alternative Two, only one large BEQ would be constructed; it would be located in the area east of Building 60 and in the area of NNMC bordered by the residential area. Residential areas on the east side of NNMC and across Jones Bridge Road are far enough from the construction sites that they are unlikely to be impacted by the noise from construction activities.

Noise caused by additional traffic under either alternative would be primarily from passenger cars and would not be expected to change existing noise levels noticeably to receptors along roadways. The potential increase in helicopter activities, primarily for medical emergencies, is expected to increase flights into NNMC by one to two flights per month, an increase of 8 percent to 16 percent. This noise, which is short-term and not predictable, is not considered a significant increase from existing conditions.

Infrastructure: Based on initial estimates of utility demands and provider capacity, no major issues are anticipated. As designs are finalized, additional utility studies will be conducted to identify whether improvements to any utility lines or pipes within NNMC are appropriate and these improvements would be implemented as part of the construction. The systems have adequate redundancy to assure an ability to provide continued service while any line is shut down. Implementation of controls necessary to comply with State stormwater requirements and the NNMC’s stormwater management plans, approved by Maryland, during both construction and operation of these facilities would ensure that any impacts from the increased stormwater runoff would not be significant.

Transportation: The BRAC movement of added staff and patient workload to the existing NNMC campus to create the directed WRNMMC will occur in an already congested urban environment. Both local government and surrounding communities are focusing attention on the traffic in the

vicinity of the existing NNMC campus and the mounting broad need for local improvements to key traffic arteries serving the Bethesda community in general. Results from the Traffic Study analysis show that the additional traffic expected during operation of the BRAC facilities would increase overall traffic in the vicinity of the future WRNMMC during peak hours. The analysis of peak hours provides the worst condition to be expected and includes both new employees and the 1,862 projected daily patients and visitors in its estimates of peak traffic. Construction traffic volumes are significantly lower than the volumes expected during operations; therefore, construction traffic would be expected to have less of an impact on area roadways.

The Traffic Study employs Critical Lane Analysis, which generates an intersection Critical Lane Volume (CLV) that is then compared to the CLV standard for Montgomery County. The Traffic Study indicated that five intersections near the NNMC campus are projected to operate in excess of the Montgomery County (CLV) standards during peak hours. It also determined, however, that four of these five intersections would already operate in excess of County CLV standards under the No Action background in 2011, independent of any proposed change to the NNMC campus under the BRAC alternatives.

The only intersection projected to exceed County CLV standards specifically because of the additional traffic under either Alternatives One or Two is the intersection of Rockville Pike and North Drive, which increases from 1503 to 1605 in the AM period, where 1600 is maximum capacity.

The primary traffic impacts using critical lane volumes and projected growth in traffic volumes caused by the Alternatives One or Two are shown below. Alternatives One and Two, with an equal number of staff, patients, and visitors, would have essentially identical traffic impacts. For all of these intersections, any volumes over 1600 indicate that the intersection is over capacity and conditions are unacceptable. Using the level of service (LOS) definitions in Section 3.7.4 for these intersections, over 1600 is LOS F and unacceptable; 1451-1600 is equivalent to LOS E and marginal; and values below 1450 would be LOS D or better and are acceptable.

- During the AM peak, two intersections would operate above capacity: Rockville Pike and West Cedar Lane (CLV: 2100) and Rockville Pike and North Drive (CLV: 1605).
    - Rockville Pike/West Cedar Lane would already be over capacity under the No Action Alternative; the BRAC Alternatives add 3% to peak No Action Alternative volumes.
    - BRAC Alternatives cause Rockville Pike/North Drive to exceed capacity by a slight margin (1605 versus 1,600); the BRAC Alternatives add 7% to peak No Action Alternative volumes.

- During the PM peak hour, four intersections operate above the County capacity standards under the BRAC Alternatives; all the intersections were already above capacity under the No Action Alternative:
  - Rockville Pike/West Cedar Lane (CLV: 1822); BRAC Alternatives add 2% to peak No Action Alternative volumes.
  - West Cedar Lane/Old Georgetown Road (CLV: 1857); BRAC Alternatives add 12% to peak No Action Alternative volumes.
  - Rockville Pike/Jones Bridge Road (CLV: 1722); BRAC Alternatives add 3% to peak No Action Alternative volumes.
  - Jones Bridge Road/Connecticut Avenue (CLV: 2078); BRAC Alternatives add 4% to peak No Action Alternative volumes.
- During the AM peak, three intersections operate at higher CLVs that approach capacity: Pooks Hill Road and Rockville Pike (CLV: 1562), Rockville Pike and Wilson Drive (CLV: 1446), and Jones Bridge Road and Connecticut Avenue (1559). These three intersections were already above CLV 1400 under the No Action Alternative and the BRAC Alternatives increase peak volumes by no more than 6%.
- During the PM peak, the intersections of Pooks Hill Road and Rockville Pike (CLV: 1430), Rockville Pike and North Wood Road (CLV: 1557), Rockville Pike and Wilson Drive (CLV: 1593) and Jones Mill Road and East-West Highway (CLV: 1535) would operate at a high CLV under the BRAC Alternatives. The BRAC Alternatives raise peak volumes compared to the No Action Alternative by 2%, 14%, 4%, and 3%, respectively.

In addition to the intersection results above, the traffic analysis indicates that several intersections have large percentage increases in peak volumes caused by the BRAC Alternatives that do not cause the intersection to exceed or approach capacity. In the AM, Jones Bridge Road & Gunnell Road peak volumes increase by 35% (CLV: 1093); Rockville Pike & North Wood Road peak volumes increase by 21% (CLV: 1401). In the PM peak hour, three intersections experience significant increases in the CLV: West Cedar Lane & West Drive increases 37% (CLV: 705), Jones Bridge Road & Gunnell Road increases 22% (CLV: 1170), and Jones Bridge Road & Grier Road increases 20% (CLV: 1319).

During construction, additional construction traffic would consist of delivery trucks with materials and equipment, dump trucks carrying any debris away needing off-site disposal, and construction crew commuters. The daily volumes for these construction vehicles carrying material and equipment are significantly smaller than the volumes estimated for commuters during operations in the transportation analysis. Likewise, the construction crew parking is being constrained

by limiting parking spaces (currently 200 spaces), necessitating greater reliance on mass transit. Therefore, the impacts of construction vehicles to area traffic in terms of volumes would be much less than the impacts identified for the NNMC commuter traffic under the BRAC alternatives. With the area in front of Building 1 being provided for contactor use, contractors will be able to conduct their material staging on the NNMC campus. It is currently planned that North Gate would provide dedicated access and egress to the construction storage site and security checks in an adjoining area to the entrance on NNMC would be managed to minimize any potential effects to Rockville Pike from queuing.

Cultural Resources: The construction of new buildings in the NNMC Bethesda Historic District, particularly the two Medical Additions, which impact on the setting of the historic Central Tower Block, its Front Lawn, and protected view shed, will be sensitive and technically qualify as adverse effects under Section 106 of the National Historic Preservation Act. There is considerable precedent, however, in the prior axial expansion of facilities at NNMC out from the Tower Block. Further formal consultation under Section 106 and through other design review processes on the design of these facilities will be conducted to minimize and mitigate as necessary any potential adverse impacts. The renovation of Building 17 has a potential positive impact on this unused historic resource. The demolition of historic Building 12 if adaptive reuse proves impractical, which takes place under Alternative One, would have an adverse effect with limited potential for mitigation.

The construction contractors would take measures to control/minimize whatever the visual intrusion of the construction staging area on the viewshed.

The Navy will pursue formal Section 106 consultation with the goal of achieving a ratified agreement document to resolve all adverse effects to historic properties. The agreement document would be appended to the Record of Decision on the Final Environmental Impact Statement.

Land Use: All direct effects to land use are within NNMC. Land use is consistent with plans and precedence; proposed facilities within NNMC are compatible with adjacent facilities. No direct effects or significant indirect effects outside the NNMC boundaries to land use are expected.

Socioeconomics: Major beneficial economic effects to the surrounding economy would be expected under each action alternative resulting from the large investment in construction and renovation of facilities. Construction costs for Alternatives One and Two are estimated at $839 million and $856 million respectively. Alternative One would generate an increase in local sales volume of an estimated $1.32 billion, of which approximately 39 percent would result directly from the proposed action. Furthermore, an increase in local employment of approximately 5,500 would be expected to result from Alternative One construction,

39 percent of which would be the direct result of the proposed action. No relocation of off-base personnel is expected as a result of the proposed action since staff would be coming from WRAMC, located 6 miles away, within the Region of Influence (ROI). Therefore no significant effects on demographics resulting from Alternative One are expected.

Under Alternative Two there would be a prospective increase in sales volume in the ROI of an estimated $1.34 billion, 39 percent of which would be a direct result from Alternative Two. The prospective increase in employment in the ROI from construction would be approximately 5,600, with approximately 39 percent of those jobs resulting directly from Alternative Two. No relocation of off-base personnel is expected as a result of the proposed action since staff would be coming from WRAMC, located 6 miles away, within the ROI. Therefore no significant effects on demographics resulting from Alternative Two are expected.

The increase in patients and visitors will increase the need for services within NNMC, but the patients and visitors are likely predominantly to go to and from NNMC for appointments directly from their place of residence without affecting the immediate local area off Base economically except indirectly as additional traffic. The additional patients and visitors have been incorporated into the analysis of peak hour traffic, which provides the most severe impact on area intersections and roadways. However, the patients and visitors are spread through the day and night, as well as on weekends, and would add a general increase to traffic levels experienced in non-peak hours. Local residents may notice the increased traffic during non-rush hours, although conditions will be within the capacity of the roadways.

Implementing either alternative is not expected to produce disproportionately high and adverse human health or environmental effects on minority, low-income or younger segments of the local population in the vicinity of NNMC.

Human Health and Safety: Hazardous material storage and use would have a minimal increase under both alternatives. The increases are not anticipated to have significant impacts, as adherence to the NNMC Hazardous Material Program, which includes standard operating procedures (SOPs) for proper control and management of hazardous material, would assure impacts are avoided. Likewise, hazardous waste would increase under both alternatives. The increases are not anticipated to have impacts, as hazardous waste at NNMC is regulated under the Resource Conservation and Recovery Act (RCRA) and Maryland Department of Environment (MDE). NNMC has a Controlled Hazardous Substances (CHS) permit from MDE. In addition, NNMC complies with the Navy and NNMC policies for handling hazardous waste.

Under Alternative One several buildings or areas proposed for construction, demolition, or renovation activities are designated as

Solid Waste Management Units (SWMU) and Areas of Concern (AOC) under the RCRA Corrective Action Program (CAP). Renovation activities in Building 17 and demolition activities in Buildings 18 and 21 for a new parking structure would occur in an area designated as AOC 1 under the RCRA corrective action plan. The area has been remediated but has not been closed administratively by the EPA Region III Office. SWMU 18 and AOC 4 are located in Building 21, AOC 8 is located in Building 150, and SWMU 9 is located in an area immediately southeast of Building 150. SWMU 31 is located in Building 59. SWMU 5 is located in the area along Taylor Road in the vicinity of Building 141. SWMU 13 and 14 are located in Buildings 2 and 8 respectively.

Similarly, under Alternative Two, SWMU 31 is located in Building 59 and SWMU 5 is located in the area along Taylor Road in the vicinity of Building 141. SWMU 13 and 14 are located in Buildings 2 and 8 respectively.

NNMC is a site where there are no unacceptable human exposures to contamination that can reasonably be expected under current land and groundwater use conditions (USEPA, 2004b). Development in or around AOCs or SWMUs under the RCRA CAP would occur only with concurrence from EPA.

There is known asbestos and lead based paint in many of the older buildings. It is standard practice to check for asbestos and lead based paint prior to demolition or renovation in any building. Under both alternative One and Two, if the presence of the contaminants is confirmed, proper procedures, practices and regulations would be followed to ensure public safety.

Regulated Medical Waste (RMW) could double the current NNMC output; the capacity of the Sterile Processing Department (SPD) would be adequate for this increase, but additional storage requirements could require a reconfiguration of existing space to support the increase in RMW. The additional RMW at NNMC would increase the amount of RMW shipped to the incinerating facility in Baltimore, which has an extended amount of capacity. It is currently operating at only 50 to 65 percent of its permitted capacity.

Cumulative Impacts: The conservative use of an estimated 2,500 new employees under the action alternatives versus 2,200 currently estimated is expected to address potential cumulative impacts for additional employees (currently estimated as 136) for other ongoing and foreseeable future on Base projects not associated with BRAC.

One ongoing project on Base is considered: the Academic Program Center for the USUHS Nursing School will add needed space at USUHS, but is not expected to add staff, students, visitors or other potential commuters. The foreseeable on-Base future projects not associated with BRAC include an expansion to the Navy Lodge, an expansion to the Navy Exchange, additional Senior Non-Commissioned Officers Quarters, two day care centers, improvements to Morale Welfare and Recreation

Athletics Fields, access gate improvements at NNMC for all gates, the Grier Road Commercial Vehicle Inspection Facility, a planned Metrorail link in the southwest corner of the installation near the southern Rockville Pike security gate, and a pedestrian connection between the NIH campus and NNMC just south of the South Wood Road security gate.

Only three of these future projects would add staff; the child care centers and expansions of the NEX and Navy Lodge would add staff estimated as 136 (this will require verification/update when project planning is conducted). Only the NEX expansion would add visitors; however, these would primarily access NNMC during non-peak hours.

The cumulative impacts analysis of this EIS also includes off Base projects in the vicinity of NNMC during the time period of the Proposed Action. These include implementation of the 2003 NIH Master Plan and the transportation analysis includes approved background development off-base. The actions of either action alternative are not expected to result in a significantly greater incremental impact when added to the actions of other projects than what has been estimated for the alternatives in Chapter 4.0.

2.10.2 Potential Improvement Measures

The EIS analysis has identified potential improvement measures to reduce impacts to surface waters from potential soil erosion and runoff, for control of fugitive emissions to air, for construction noise, for traffic impacts that will be generated by the action alternatives, and for potential impacts to cultural resources.

Sediment and Erosion Control Measures: Recommended measures to be considered include but are not limited to:

- Using erosion containment controls such as silt fencing and sediment traps to contain sediment onsite where necessary
- Covering disturbed soil or soil stockpiles with plastic sheeting, jute matting, erosion netting, straw, or other suitable cover material, where applicable
- Inspecting erosion and sediment control BMPs on a regular basis and after each measurable rainfall to ensure that they are functioning properly, and maintain BMPs (repair, clean, etc.) as necessary to ensure that they continue to function properly
- Sequencing BMP installation and removal in relation to the scheduling of earth disturbance activities, prior to, during and after earth disturbance activities
- Phasing clearing to coincide with construction at a given location to minimize the amount of area exposed to erosion at a given time.

Stormwater Management Measures: The following nonstructural stormwater management practices would be considered and applied according to the Maryland Stormwater Design Manual (MDE, 2000) to minimize increases in

new development runoff: 1) natural area conservation, 2) disconnection of rooftop runoff, 3) disconnection of non-rooftop runoff, 4) sheet flow to buffers, 5) grass channels, and 6) environmentally sensitive development. Low Impact Development (LID) measures would be among those considered and implemented when practical.

The following structural stormwater management practices would be considered and designed according to the Design Manual (MDE, 2000) to satisfy the applicable minimum control requirements established in Section 4.1 of the Guidelines: 1) stormwater management ponds, 2) stormwater management wetlands, 3) stormwater management infiltration, 4) stormwater management filtering systems, and 5) stormwater management open channel systems.

Areas disturbed outside of the footprints of the new construction would be aerated and reseeded, replanted, and/or re-sodded following construction activities, which would decrease the overall erosion potential of the site and improve soil productivity.

Air Quality Construction Measures: The NNMC air permit requires all reasonable precautions be taken to prevent particulate matter emissions during construction or demolition. During construction and demolition, fugitive dust would be kept to a minimum by using control methods. These precautions could include, but are not limited to, the following:

1) Use, where possible, of water or chemicals for dust control

2) Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials

3) Covering of open equipment for conveying materials

4) Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion

5) Employment of a vehicle wash rack to wet loads and wash tires prior to leaving the site.

Noise Reduction during Construction: Construction and demolition contractors would be expected to adhere to State of Maryland and Montgomery County requirements listed in Section 3.5. Potential measures to control airborne noise impacts that would be considered and implemented as appropriate include:

- Source Limits and Performance Standards to meet noise level thresholds for daytime, evening, and nighttime hours at sensitive land uses (Montgomery County Standards)
- Designated Truck Routes

- Establishment of noise monitoring stations for measuring noise prior to and during construction
- Design considerations and project layout approaches including measures such as construction of temporary noise barriers, placing construction equipment farther from noise-sensitive receptors, and constructing walled enclosures/sheds around especially noisy activities such as pavement breaking
- Sequencing operations to combine especially noisy operations to occur in the same time period
- Alternative construction methods, using special low noise emission level equipment, and selecting and specifying quieter demolition or deconstruction methods

Control measures for sensitive receptors include: sequencing operations, use of alternative construction equipment and methods and instituting other special control measures to reduce the transmission of high noise levels to noise-sensitive areas. A construction phasing plan would be coordinated with patient moves to avoid impacts to patients.

Compliance with the Occupational Safety and Health Administration (OSHA) standards for occupational noise exposure associated with construction (29 CFR 1926.52) would address the construction workers hearing protection.

Potential Measures to Address Traffic Impacts from NNMC Actions: The EIS identifies potential traffic improvement measures for the 2011 implementation of the alternatives. The first set of potential improvements below is within the purview of NNMC for implementation. Gate and other improvements would be expected to speed vehicle entry and egress, improve Base circulation, and reduce queuing at the gate.

North Wood Road Gate:

1) Expand the number of lanes from two lanes to three lanes, with two inbound lanes in the morning peak period and two outbound lanes in the evening peak period.

2) Conduct a study at North Wood Road and Rockville Pike to determine if a traffic signal is warranted and suitable for submission of a request to state and local transportation authorities for funding and implementation.

3) A safety and security analysis is being conducted by DOD to improve security, safety, improve queuing on-site and reduce Rockville Pike queuing, and reduce damage to gates and guard houses.

South Wood Road Gate: A safety and security analysis is being conducted by DOD to improve security, safety, improve queuing on-site and reduce Rockville Pike queuing, and reduce damage to gates and guard houses.

Gunnell Road Gate (Navy Exchange Gate): A safety and security analysis is being conducted by DOD to improve security, safety, allow egress of fire engines that cannot use this gate, and improve queuing.

Grier Road Gate (Navy Lodge Gate):

1) It is recommended that this gate serve inbound and outbound traffic throughout the day.

2) Provide for separate outbound right and left turn lanes. This approach would need to be widened to include a single receiving/inbound lane.

3) A safety and security analysis is being conducted by DOD to improve security, safety, improve queuing on-site and reduce Jones Bridge Road queuing, and reduce damage to gates and guard houses.

University Road Gate (USUHS Gate): A safety and security analysis is being conducted by DOD to improve security, safety, improve queuing on-site and reduce Jones Bridge Road queuing, and reduce damage to gates and guard houses.

Perimeter Road: Widen and improve Perimeter Road on NNMC.

NIH Commercial Vehicle Inspection Station: Conduct a study at the NIH Commercial Vehicle Inspection Station on Rockville Pike to determine if a traffic signal is warranted and suitable for submission of a request to state and local transportation authorities for funding and implementation.

Each of the following projects is under the jurisdiction of either Montgomery County or the State of Maryland. As part of the BRAC law, the U.S. Navy cannot provide funding or management of road improvements outside its property, except under the Defense Access Roads (DAR) Program. The Defense Access Road (DAR) Program provides a means for the military to pay their fair share of the cost of public highway improvements necessary to mitigate an unusual impact of a defense activity. An unusual impact could be a significant increase in personnel at a military installation (currently defined as one that doubles existing traffic at the year of implementation), or one that requires relocation of an access gate, or the deployment of an oversized or overweight military vehicle or transporter unit. However, none of the off-base improvements meet the criteria for inclusion in the DAR Program.

As a consequence, each of the following projects would have to be funded and implemented through the appropriate Montgomery County or State of Maryland Transportation Organizations. This funding may include federal grants administered through these organizations. The Navy has coordinated the traffic analysis and potential improvements with these agencies. NNMC Bethesda has committed to cooperate fully with local agencies in the implementation of any or all of the

proposed improvement measures. Refer to Tables 4-15, 4-16, 4-17, and 4-18 in Section 4.7.5 of the DEIS for roadway performance with the implementation of the improvements. Note: it is anticipated that pedestrian walkways would be improved as needed to meet code for any roadways that are widened.

Rockville Pike (MD 355) at Cedar Lane operates above capacity in both AM and PM peak hours:

1) Add a left-turn lane on the westbound and eastbound approach of the intersection.

2) Add an additional lane in each direction along Rockville Pike between Jones Bridge Road and Cedar Lane, per recommendation of the 1990 Bethesda Chevy Chase Master Plan. NNMC Bethesda will cooperate by providing frontage along MD 355 to accommodate the implementation of this measure if the State of Maryland and Montgomery County determine it appropriate to implement. Appropriate real estate easements would be coordinated and implemented to permit widening of Rockville Pike.

Old Georgetown Road (MD 187) at Cedar Lane operates above capacity in the PM peak hour:

3) Add another left-turn lane to the southbound approach of the intersection and eliminate parking along Cedar Lane eastbound to provide an additional receiving lane.

4) Provide an additional through lane in each direction along the Old Georgetown Road approaches to Cedar Lane, per recommendation of the 1990 Bethesda Chevy Chase Master Plan.

Rockville Pike (MD 355) at Jones Bridge Road operates above capacity in the PM peak hour.

1) Stripe the inner lane as a left-turn only lane and the right lane as shared through and right lane on the eastbound approach of the intersection.

2) Add an additional lane in each direction along Rockville Pike, per recommendation of the 1990 Bethesda Chevy Chase Master Plan. NNMC Bethesda will cooperate by providing frontage along MD 355 to accommodate the implementation of this measure if the State of Maryland and Montgomery County determine it appropriate to implement. Appropriate real estate easements would be coordinated and implemented to permit widening of Rockville Pike.

Connecticut Avenue (MD 185) at Jones Bridge Road operates near capacity in the AM peak hour and above capacity in the PM peak hour:

3) Provide an additional left-turn lane to the eastbound approach of the intersection.

4) Provide a separate right-turn lane along the southbound approach of the intersection.

Beltway Slip Ramps into NNMC Campus: No improvements recommended; capacity analysis shows that for both Alternatives One and Two, with

and without Slip Ramps, the same intersections would operate near or above the County congestion standards.

To improve pedestrian safety at the Rockville Pike pedestrian crossing from NIH and the metro station to NNMC, a pedestrian connection and a Metrorail link are under consideration by the Suburban Hospital, NIH, NNMC Consortium and WMATA, respectively. In addition, the pedestrian connection would allow transfer of casualties and emergency personnel during a mass casualty event. These off-base projects would enhance public safety. The projects would require easements and changes to fencing and security. They would require close cooperation with local and state agencies as well as with NIH and the Department of Homeland Security (DHS).

In addition to the measures listed above, other potential improvement measures outside the jurisdiction of the Navy that address existing and future regional transportation issues are discussed in Appendix C, Transportation Study. A Transportation Management Plan, also discussed in Appendix C, which is being prepared in conjunction with a master plan update, will include recommendations for such physical or operational changes as telecommuting, transit subsidies, shuttle bus services, pedestrian improvements, and bicyclist improvements.

Cultural Resources Measures: Further consultation under Section 106 and through other design review processes on the design of these facilities are ongoing to minimize and mitigate as necessary any potential adverse impacts. Due to the potential impacts on the historic and cultural resources around Building 1, the historic tower, the Navy has developed a concept plan of the proposed inpatient and outpatient facilities as well as the two proposed parking structures. These concept plans were coordinated with Maryland-National Capital Parks and Planning Commission (M-NCPPC) and Maryland State Historic Preservation Office (SHPO). After consultations, the Navy received approval to submit the concept plan to the National Capital Planning Commission (NCPC) meeting on 04 October 2007. The Commission adopted the Executive Director's Recommendation (EDR), which noted that "The Maryland Historical Trust (i.e. the Maryland SHPO) accepted the concept design with regard to location, footprint, and massing; and requested Section 106 consultation to move forward with fenestration design, materials selection, and other design and planning details." A copy of the Commission Action is included in Appendix A.

The Navy will pursue formal Section 106 consultation with the goal of achieving a ratified agreement document to resolve all adverse effects to historic properties. The agreement document would be appended to the Record of Decision on the Final Environmental Impact Statement.

Human Health and Safety Measures: By following NNMC SOPs and applicable regulations, no impacts are expected and no additional mitigation measures or improvement measures are required for human health and safety.

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Table 2-3: Comparison of Requirements* – Facilities Construction/Renovation/Renovation

Facility	Alternative One					Alternative Two				
	Construction		Demolition		Renovation	Construction		Demolition		Renovation
	Total Area (SF)	Footprint (SF)	Total Area (SF)	Footprint (SF)	Area (SF)	Total Area (SF)	Footprint (SF)	Total Area (SF)	Footprint (SF)	Area (SF)
Medical Outpatient/ Inpatient	638,000	160,000				638,000	160,000			
Building 1 through 10					317,000					317,000
Portion of A-Lot			78,924	78,924				78,924	78,924	
Portion of W-Lot			26,000	26,000				26,000	26,000	
Administrative	114,000	38,000				200,000	50,000			
Building 17, 17A, 17B					85,000					
Building 141								44,040	14,680	
Additional Surfaces								16,000	16,000	
Portion of E-Lot								56,000	56,000	
Building 28			5,796	2,898				5,796	2,898	
Building 49			364	364				364	364	
Building 53			32,509	16,255				32,509	16,255	
Building 59			5,036	2,518				5,036	2,518	
Building 69			1,344	1,344				1,344	1,344	
Building 79			960	960				960	960	
Additional Surfaces			30,000	30,000				30,000	30,000	
BEQ	225,000	56,000				225,000	50,000			
Building 60					106,000					106,000
Portion of G-Lot			37,600	37,600						
WTU Dining	21,000	21,000				21,000	21,000			

Facility	Alternative One					Alternative Two				
	Construction		Demolition		Renovation	Construction		Demolition		Renovation
	Total Area (SF)	Footprint (SF)	Total Area (SF)	Footprint (SF)	Area (SF)	Total Area (SF)	Footprint (SF)	Total Area (SF)	Footprint (SF)	Area (SF)
Fisher Houses™ (2)	32,000	32,000				32,000	32,000			
Buildings 39, 40, 41			4,100	2,050				4,100	2,050	
Fisher House Parking[a,b]	16,000	16,000				16,000	16,000			
TBI/PTSD ICE	50,000	50,000				50,000	50,000			
Building 12			52,601	17,534						
Additional Surface			28,000	28,000						
Portion of H-Lot								22,000	22,000	
Fitness Center	64,000	64,000				64,000	64,000			
Building 141			44,040	14,680						
Additional Surface			16,000	16,000						
Portion of Lot-E			56,000	56,000						
Building 23 (eastern half)								41,000	20,500	
Additional Surface								25,000	25,000	
North Parking[a,c]	324,000	47,000				324,000	47,000			
Portion of L-Lot			2,310	2,310				2,310	2,310	
Portion of Circle SE of L-Lot			32,088	32,088				32,088	32,088	

Facility	Alternative One					Alternative Two				
	Construction		Demolition		Renovation	Construction		Demolition		Renovation
	Total Area (SF)	Footprint (SF)	Total Area (SF)	Footprint (SF)	Area (SF)	Total Area (SF)	Footprint (SF)	Total Area (SF)	Footprint (SF)	Area (SF)
South Parking[a,d]	284,000	41,000				284,000	41,000			
Building 23 (Western Half)			41,000	20,500				41,000	20,500	
Additional Surface			12,000	12,000						
Third Parking[a,e,f]	200,000	50,000				200,000	50,000			
Building 18			13,535	4,512						
Building 21			38,400	12,800						
Building 139			6,760	6,760						
Building 150			1,550	1,550						
Building 174			1,008	1,008						
Building 176			800	800						
Total Space in SF	**1,968,000**	**575,000**	**568,725**	**425,455**	**508,000**	**2,054,000**	**581,000**	**460,471**	**370,391**	**423,000**
Total Space in Acres		**13.2**		**9.8**			**13.3**		**8.5**	

* SF = Square Feet. Estimates are rounded.
[a] Parking requirements assume 340 SF per space.
[b] Residential parking assumes one per Fisher House unit.
[c] Assumes 7-story parking structure for 954 patient and visitor parking spaces.
[d] Assumes 7-story parking structure for 937 staff parking spaces.
[e] Assumes 4-story parking structure for 565 staff parking spaces.
[f] Demolition for the third parking garage under Alternative Two is included in the Administrative Space demolition.
Note: The alternatives add approximately 2,500 parking spaces and demolish approximately 700 spaces for a gain of 1,800 spaces.

Table 2-4: Comparison of the Environmental Consequences by Alternative

Resource	Alternative One	Alternative Two	No Action Alternative
Geology, Topography and Soils	Would require cut and fill for building sites. Extent of cut and fill would depend on building design and location. General construction permit with Maryland approved erosion and sediment control plan would be obtained prior to construction and would reduce impacts from sedimentation using approved measures.	Impacts similar to Alt. One; however, slightly greater. General construction permit with Maryland approved erosion and sediment control plan would be obtained prior to construction to reduce impacts from sedimentation using approved measures.	No change.
Water Resources	Up to 3.4 acres of new impervious surface would increase stormwater runoff and pollutants. MD approved Stormwater Mgt. Plan and BMPs are required to control runoff. Avoids floodplain and wetlands; no wetland permit required. Groundwater not impacted.	Up to 4.8 acres of new impervious surface would increase stormwater runoff and pollutants. MD approved Stormwater Mgt. Plan and BMPs required to control runoff. Avoids floodplain and wetlands; no wetland permit required. Groundwater not impacted.	No change.
Biological Resources	Would convert lands w/existing development or landscaped areas into developed facilities and associated landscape vegetation. No T&E* impacts. No wetland permit required.	Would convert lands w/existing development or landscaped areas into developed facilities and associated landscape vegetation. No T&E* impacts. No wetland permit required.	No change.
Air Quality	Air pollutant emissions are below ***de minimis*** levels for general conformity. Mobile source emissions are within standards. Minor modifications to Title V air permit expected.	Same as Alt. One.	No change.
Noise	Short term construction noise would occur. Measures to minimize impacts to sensitive receptors would be employed, including phasing patient occupancy. Would comply with State and County noise criteria. Noise from new helicopter use (1-2 flights/month) is not a significant increase.	Same as Alt. One.	No change.
Utility Infra-structure	Does not add to regional demand. Providers indicate they can provide projected demand; however, detailed studies of distribution improvements will occur during facility design and improvements would be constructed as necessary.	Same as Alt. One.	No change.

Resource	Alternative One	Alternative Two	No Action Alternative
Transporta-tion	Staff, patients, and visitors add 2011 background traffic. Five intersections operate above county CLV standards at peak hours; however, four of these exceeded CLV standards under No Action. Alternative One changes only one intersection to unacceptable levels from acceptable levels (over CLV: 1600): Rockville Pike & North Drive from 1503 to 1605 in AM. Five additional intersections are closer to failure, two of which are during both AM and PM peak hours. Construction traffic is short term and managed by North Wood gate access to NNMC storage area.	Same as Alt. One.	No Action Alternative does not add to projected traffic growth in 2011.
Cultural Resources	Designs for changes in Historic District require Sec 106 consultation. Alternative potentially demolishes Historic Bldg. 12. Short-term impacts to Building 1 view shed caused by use for construction materials and equipment. Bldg. 17 renovation - potential to create adverse impacts due to meeting code requirements. May be able to restore altered roof terrace. Navy will pursue formal Sec. 106 consultation with SHPO with goal of ratified agreement for ROD.	Designs for changes in Historic District require Sec 106 consultation. Does not demolish Historic Bldg. 12. Short-term impacts to Building 1 view shed caused by use for construction materials and equipment. Bldg. 17 would not be renovated. Navy will pursue formal Sec. 106 consultation with SHPO with goal of ratified agreement for ROD.	No change.
Land Use	All direct effects to land use are within NNMC. Land use is consistent with plans and precedence; proposed facilities within NNMC are compatible with adjacent facilities. No direct effects or significant indirect effects to land use off Base are expected.	Same as Alt. One.	No change.
Socio-economics	Could add estimated $839 million in construction, resulting in $1.32 billion in sales and 5,500 in employment to local communities. No EJ*** impacts. Off-peak traffic would increase, likely to be noticeable to local residents.	Could add estimated $856 million in construction, $1.34 billion in sales, and 5,600 in employment to local communities. No EJ*** impacts. Off-peak traffic would increase, likely to be noticeable to local residents.	No change.

Resource	Alternative One	Alternative Two	No Action Alternative
Human Health and Safety	Increase in Hazmat/HW, RMW, Asbestos; adherence to SOPs and applicable regulations would avoid impacts. Activities at sites designated as SWMUs/AOCs would occur only with EPA concurrence. RMW increase can be handled on site with space reconfiguration; off-site incinerator has capacity for any increases in RMW.	Same as Alt. One.	No change.
Cumulative Impacts	Not expected to have incremental impacts significantly greater than those determined in the assessment of the alternative.	Not expected to have incremental impacts significantly greater than those determined in the assessment of the alternative.	No Effect.

* T&E: Threatened and Endangered, ** LOS: Level of Service, and *** EJ: Environmental Justice

3.0 EXISTING ENVIRONMENT

3.1 Geology, Topography, and Soils Existing Environment

3.1.1 Geology and Topography

NNMC Bethesda is located on the eastern side of the Piedmont physiographic province. The Piedmont lies between the Atlantic Coastal Plain, which begins about 5 miles to the southeast within Washington, DC, and the Blue Ridge province, beginning at Catoctin Mountain about 30 miles to the northwest. The Piedmont province extends from New York to Georgia and traverses a 30- to 45-mile wide swath through Maryland.

The Piedmont Plateau Province is composed of hard, crystalline igneous and metamorphic rocks. Bedrock in the eastern part of the Piedmont consists of schist, gneiss, gabbro, and other highly metamorphosed sedimentary and igneous rocks of probable volcanic origin. In several places these rocks have been intruded by granitic plutons and pegmatites. Deep drilling has revealed that similar metamorphic and igneous rocks underlie the sedimentary rocks of the Coastal Plain. Several domal uplifts of Precambrian gneiss mantled with quartzite, marble, and schist are present in Baltimore County and in parts of adjacent counties. Differential erosion of these contrasting rock types has produced a distinctive topography in this part of the Piedmont.

The Sykesville Formation and igneous rocks that flowed upward through the Sykesville Formation are the two geologic formations that underlie NNMC. The eastern half of NNMC is underlain by the rocks of the Sykesville Formation. These meta-sedimentary rocks were originally deposited as sediments, but have been transformed by high heat and pressure into crystalline rocks. The western half of NNMC is underlain by younger rocks that represent an igneous intrusion in the Sykesville Formation; that is, they flowed as molten material up through the already crystallized Sykesville (NNMC, 2000). No unique geological features occur within NNMC.

Soil and saprolite cover all of the bedrock except along the bed of the unnamed tributary to Stoney Creek and the very steep slopes beside the creek. Saprolites occur when the minerals within the local rock are soluble and are dissolved as water percolates through the soil. While the depth of soils and saprolite varies greatly, it can be more than 50 feet thick over the bedrock in places. Outside the stream valley, the bedrock may occur within three feet of the ground surface as suggested by the soil types mapped over the Sykesville rocks on the eastern half of the property (NNMC, 2000).

The topography of the NNMC Campus is generally rolling with the steepest slopes occurring along the unnamed tributary to Stoney Creek. The highest elevation on NNMC, 330 feet above mean sea level, is found

near the southwest corner of the property where Rockville Pike intersects Jones Bridge Road. The lowest elevation, 210 feet above mean sea level, is along the unnamed tributary to Stoney Creek where it leaves the property and passes into a culvert under Interstate 495. Net relief throughout the campus is approximately 120 feet (Figure 3-1) (NNMC, 2000).

3.1.2 Soils

The soil survey map for Montgomery County, Maryland confirms that the surface deposits within the NNMC campus are made up of a combination of urban land and native soils. Urban lands represent more than 50 percent of the NNMC campus and are made up of any area with development. The surface and subsurface layers of each of the native soils on NNMC Bethesda are silt loam in texture. This means that they have a high proportion of fine particles, silts and clays. All of the soils are rated as having either a moderate or severe hazard of erosion. Where these fine soils are disturbed or are not covered with sufficient vegetation, they are subject to excessive erosion (NNMC, 2000).

With the exception of soils in the floodplain of the unnamed tributary to Stoney Creek, all of the natural soils on NNMC Bethesda are residual soils, which were developed in place by weathering of the underlying rock or of saprolite. Saprolites contain predominantly quartz and a high percentage of kaolinite with other clay minerals that are formed by chemical decomposition of primary minerals (NNMC, 2000). Within the project area, there are twelve soil mapping units, representing seven different soil types. The predominant soil type on the property is Glenelg silt loam; it occupies almost 50 percent of the land area. Other soil types found include Gaila, Glenville, Baile, Brinklow, Blocktown, and Urban land. The distribution of these soils is represented in Figure 3-2, while descriptions of each soil mapping unit are found in Table 3-1 (USDA 2007).

Wet soils occur in the long swale that drains the front lawn between the hospital and Rockville Pike and on the banks of the unnamed tributary to Stoney Creek. These soils include Baile silt loam and Glenville silt loam. The swale is the more poorly drained soil because there is no channel to lower the water table, which remains within a depth of 6 inches or less during winter and spring (NNMC, 2000).

Figure 3-1: Topography in the Project Area

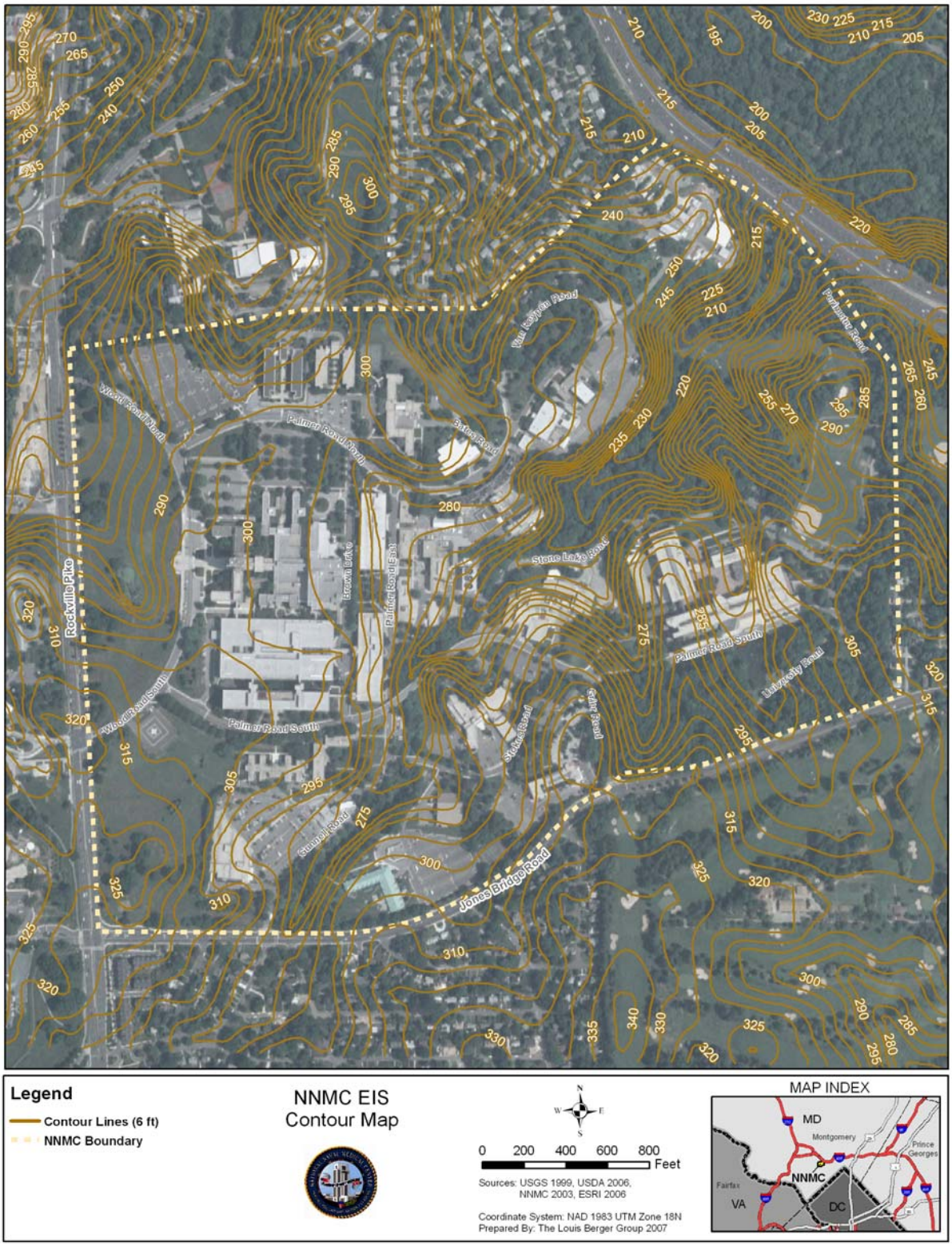


Figure 3-2: Soil Map Units within NNMC

Table 3-1: Description/Location of Soil Mapping Units

Map Symbol	Map Unit Name	Soil Map Unit Description
1B	Gaila silt loam 3 to 8 percent slopes	The Gaila component's depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches.
1C	Gaila silt loam 8 to 15 percent slopes	The Gaila component's depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches.
2B	Glenelg silt loam 3 to 8 percent slopes	The Glenelg component's depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.
2C	Glenelg silt loam 8 to 15 percent slopes	The Glenelg component's depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.
2UB	Glenelg/ Urban land complex 0 to 8 percent slopes	The Glenelg component's depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Generated brief soil descriptions are created for major soil components.
2UC	Glenelg/ Urban land complex 8 to 15 percent slopes	The Glenelg component's depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent.
5A	Glenville silt loam 0 to 3 percent slopes	The Glenville component's depth to a root restrictive layer is 60 to 99 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink swell potential is low. This soil is not flooded. It is not ponded. Organic matter content in the surface horizon is about 3 percent.
5B	Glenville silt loam 3 to 8 percent slopes	The Glenville component's depth to a root restrictive layer is 60 to 99 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is moderate. Shrink swell potential is low. This soil is not flooded. It is not ponded. Organic matter content in the surface horizon is about 3 percent.
6A	Baile silt loam 0 to 3 percent slopes	The Baile component is on flats. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in most restrictive layer is moderately low. Available water to a depth of 60 inches is high. Shrink swell potential is low. This soil is not flooded or ponded; it meets hydric criteria. Organic matter content in the surface horizon is about 2 percent.

Map Symbol	Map Unit Name	Soil Map Unit Description
7UC	Gaila/ Urban land complex 8 to 15 percent slopes	The Gaila component's depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches.
16D	Brinklow/ Blocktown channery silt loams 15 to 25 percent slopes	The Brinklow component's depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. The Blocktown component's depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low. Shrink swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches.
400	Urban land	These mapping units are formed in manmade cut and fill areas, which are generally near industrial sites, urban developments, or other construction sites. This unit is excessively-drained to moderately well-drained, with considerable variation in the depth to the seasonal high water table and permeability that is dependent on topography, degree of compaction, soil texture, and other related factors. The texture, stone content, soil pH, and depth to bedrock varies considerably from one area to another, but in general, bedrock is at depths greater than 60 inches. This unit is generally poorly suited for farming or recreation. Onsite investigation is needed to determine feasibility for any purpose.
Source: (USDA, 2007b)		

3.2 Water Resources Existing Environment

The following sections provide a summary of the general conditions and characteristics of water resources found in at NNMC. Types of water resources investigated include surface water, groundwater, potential wetlands, floodplains (see Figure 3-3), and current stormwater management. Each topic is discussed briefly in this section.

3.2.1 Surface Waters

The NNMC campus is located within the Lower Rock Creek Watershed in Montgomery County, Maryland in the Atlantic Coastal Plain Physiographic Province. Rock Creek is the second largest watershed in Montgomery County with a drainage area of approximately 60 square miles. Rock Creek begins as a small spring emerging from a spring house in the Laytonsville area, and flows approximately 21 miles before entering the District of Columbia. This urban watershed is highly developed and densely populated in the lower portion, while the upper portion is moderately developed, with some remaining agricultural and open areas (MDEP, 2001).

An unnamed stream traverses the NNMC campus in a northeasterly direction and crosses under Interstate 495. This is a tributary to

Stoney Creek, which ultimately flows into Rock Creek. Stoney Creek is designated as a Class I surface water by the Maryland Department of the Environment (MDE). Uses for Class I waters include water contact recreation, aquatic life, and water supply. The Stoney Creek watershed is approximately 565 acres and includes portions of NNMC, the Bethesda Central Business District, the National Institutes of Health, and residential areas. The 182 acres of the NNMC property within the Stoney Creek watershed comprise approximately 32 percent of the watershed (A. Morton Thomas Associates, Inc., 2007). Those portions of NNMC that do not drain into Stoney Creek drain into Rock Creek.

There are six freshwater ponds on NNMC Campus used for stormwater management, which include University Pond, Lake Eleanor, a pond by the Navy Lodge, one by the Child Development Center (CDC), one west of Building 61 and an in stream pond near the picnic pavilion (See Figure 3-3) (NNMC, 2007b). University Pond is located between USUHS and Jones Bridge Road. It is fed almost entirely by off campus surface runoff in a small intermittent stream that flows under Jones Bridge Road. Lake Eleanor is a spring fed pond located near the western edge of the property in the historically protected scenic view area. The in stream pond in the unnamed tributary to Stoney Creek is located near the northern border of the campus.

Coastal Zone Management Program

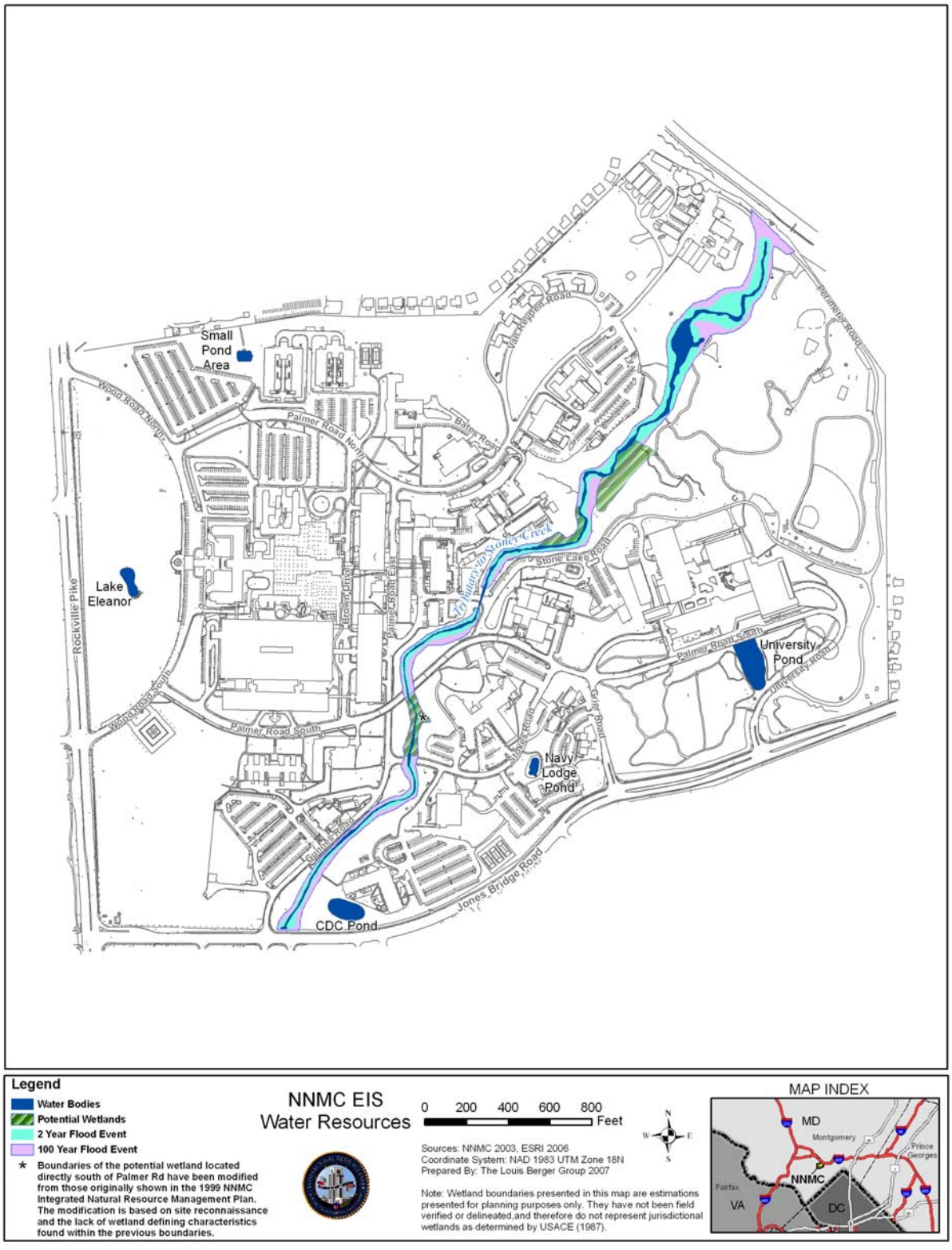
NNMC is in a county not governed by the Maryland Coastal Zone Management Program. No coastal zone impacts are expected (MDNR, 2007).

Water Quality

The Upper Rock Creek watershed contains many miles of small headwater streams unlike Lower Rock Creek, where prior development piped many headwater areas, impacting aquatic habitat and stream systems. The high level of development and lack of stormwater controls have led to unmitigated flows that have damaged Rock Creek and its tributaries, including Stoney Creek. MDE has identified the Rock Creek Watershed in Montgomery County in the State’s 303(d) regulation as impaired by nutrients, sediments, fecal bacteria, and impacts to biological communities (MDE, 2006). The District of Columbia has also established a fecal bacteria total maximum daily load (TMDL) for the portion of the Rock Creek within D.C.'s boundaries (USEPA, 2004a).

The majority of pollutants expected to be generated from areas within and around NNMC are those associated with urban runoff, such as oil and grease, heavy metals, nutrients (phosphorus and nitrogen), fecal bacteria (coliform), and trash. Pollutant sources include parking lots, paved areas, fueling and vehicle maintenance areas, building rooftops, maintained landscapes, and refuse containers. Pollutant loads are expected to be highest after a storm event.

Figure 3-3: Water Resources at NNMC



Urbanization and the overall increase in impervious surfaces within and around NNMC have also dramatically increased the peak flow rates in the unnamed tributary to Stoney Creek. Impervious surfaces decrease the amount of rainfall allowed to infiltrate into the soil and increase the volume and velocity of stormwater runoff entering surface drainages during storm events. The stormwater runoff causes excessive velocities in the stream channel, which in turn, result in erosion along the stream banks and excessive sedimentation downstream. Stream erosion activity widens the stream, reducing the depth of water during low flow periods and degrading the quality of the stream as aquatic habitat. At NNMC, erosion is primarily the result of bank destabilization along drainage ways and tributaries to the unnamed tributary to Stoney Creek. NNMC has taken efforts to stabilize portions of the stream banks through the use of gabions and armoring, which has decreased the overall amount of erosion to the unnamed tributary to Stoney Creek. In total, approximately 98 acres of a total of 243 acres on the campus are considered impervious. Surfaces considered impervious on NNMC are pavement, sidewalks, and rooftops.

Stormwater Management

Section 402 of the Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) to regulate the discharge of effluents into waters of the United States. The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. The NPDES program in Maryland is administered through MDE.

NNMC is currently authorized by general permit under Maryland's stormwater management program to address stormwater discharges (General Discharge Permit No. 03-DP-2537, General NPDES Permit No. MD0025670). Originally, there were 12 outfalls specifically listed under NNMC's NPDES permit. These 12 outfalls were listed as a result of unidentified flows that occurred during dry weather. As each outfall was investigated, the sources were found to be steam, sump pump water, or water infiltration from groundwater or potable water lines. As the source of each flow was identified and corrected, the listed outfall was removed from the NPDES permit. NNMC's current permit covers outfall 012, which discharges steam condensate (very pure, but warm water) to storm sewer systems. The only requirement for this outfall is to monitor the creek temperature 50 feet downstream from this outfall during the summer months (June to Sept) (NAVFAC, 2007f).

The stormwater drainage system for NNMC consists of several independent collection systems, the majority of which discharge into the unnamed tributary to Stoney Creek or one of its small tributaries. There are currently 85 outfalls that convey stormwater from the various catch basins on base to the unnamed tributary to Stoney Creek.

Stormwater control structures on NNMC include a small pond at the Navy Lodge that captures runoff from 1.5 acres, a dry pond that captures runoff from a parking lot south of the bowling alley, an infiltration system capturing water from buildings and parking lots near the drive through pharmacy, and a dry pond at the child development center that captures and treats runoff from this facility. University Pond and the pond created by a dam across the unnamed tributary to Stoney Creek also provide some attenuation of peak flows within the watershed. Outside of Stoney Creek watershed, Lake Eleanor provides some runoff detention for several acres of lawn between the hospital and Rockville Pike, and a dry pond captures runoff from a parking lot near Building 61, the Bachelor's Enlisted Quarters (A. Morton Thomas Associates, Inc., 2007).

3.2.2 Groundwater

Groundwater at NNMC occurs in the overlying saprolites, at a depth ranging from 10 to 50 feet below the natural ground surface. Boring data from properties adjacent to NNMC indicate that this most frequently occurs 20 to 30 feet below the surface (NIH, 2005). Soil and saprolite cover all of the bedrock except along the bed of the unnamed tributary to Stoney Creek and the very steep slopes beside the creek (NNMC, 2000). The saprolites collectively act as one uniform groundwater storage reservoir. The water table in the saprolites does not respond to precipitation events, and wells or excavations encountering the stored groundwater do not produce much drawdown (USGS, 2002).

3.2.3 Floodplains

A natural resource constraint found at NNMC that restricts development of buildings is the presence of floodplains. Executive Order 11988, Floodplain Management, instructs federal agencies to consider the risks, danger, and potential impacts of locating projects within floodplains. In situations where alternatives are impractical, the agency must minimize potential harm to or within the floodplain and take appropriate steps to notify the public. Floodplains are typically described as areas likely to be inundated by a particular flood. For example, a flood that has a one percent chance of occurring in any one year is the 100-year flood. The 100-year floodplain includes those lands that are flooded by small and often dry watercourses.

NNMC’s 100-year floodplain is regulated by Maryland’s COMAR 26.17.4 (Construction on Nontidal Waters and Floodplains) and the federal Executive Order 11988 Floodplain Management. The Maryland regulation requires a permit for changing the course, current, or cross-section of a stream, including any changes to the 100-year frequency floodplain of streams. There are no existing structures or major roadways in the 100-year floodplain (Figure 3-3); however, some structures could be flooded in a 100-year storm. These are Perimeter Road bridge, the East Rixey Road bridge, the dam that created the in-stream pond, and two footbridges, one above the stream weir and the other downstream of the culvert under Jones Bridge Road. In addition,

the Washington Suburban Sanitary Commission has wastewater lines that cross the unnamed tributary to Stoney Creek and are exposed or very shallowly buried.

3.2.4 Wetland Areas

Wetlands are jointly defined by the U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include "swamp marshes, bogs and similar areas" (40 CFR 230.3(t) and 33 CFR 328.3(b)). Freshwater wetlands in Maryland are protected by the Non-tidal Wetlands Protection Program, which sets a state goal of no overall net-loss of non-tidal wetlands acreage and functions. Activities in non-tidal wetlands require a non-tidal wetland permit or a letter of exemption, unless the activity is exempt by regulation. Any activity that involves excavating, filling, changing drainage patterns, disturbing the water level or water table, grading and removing vegetation in a non-tidal wetland or within a 25-foot buffer requires a permit. If the wetland is designated as a Special State Concern, the buffer is expanded to 100-feet (MDE, 2007a). Within the NNMC campus there are areas along the unnamed tributary to Stoney Creek that have the potential to be wetlands; only one of the potential wetland areas identified in NNMC's Draft Integrated Natural Resources Management Plan, southwest of Building 23, is in the general vicinity of any of the proposed facilities (the South Parking structure). However, the parking structure is well outside the 25-foot buffer (not within 75 feet) and does not encroach. To date, these potential wetland areas have not been delineated and no jurisdictional determination has been made (NNMC, 2000) (Figure 3-3).

3.3 Biological Resources Existing Environment

The core of the NNMC campus consists of developed land, which comprises approximately 80 percent or 195 acres of the total 243-acre property. Much of the developed areas are landscaped in lawn, individual trees and groves, and shrubbery that provide some wildlife habitat. Approximately 97 acres are pervious landscaped vegetation and 98 acres of the developed area are impervious due to buildings, parking lots, or other development. The remainder of the NNMC campus, 20 percent of the property or 48 acres, is undeveloped land. These lands generally include natural areas and bodies of water. At NNMC the unimproved lands include forested areas and aquatic areas. The forested areas can be further divided into forested buffers and mature, contiguous forests. Forested buffers occur along the stream and roads and account for about 20 acres. Aquatic resources consist of the unnamed tributary to Stoney Creek, Lake Eleanor, University Pond, and a small in stream pond fed by the unnamed tributary to Stoney Creek.

This section provides a summary of the general conditions and characteristics of natural resources found at NNMC, as well as more specific descriptions of the resources in the immediate vicinity of the proposed project sites.

The following documents were consulted for incorporation of applicable information: Draft Integrated Natural Resources Management Plan NNMC (NNMC, 2000); DD Form 1391 for proposed projects provided by Department of the Navy; and NNMC Geographic Information Systems (GIS).

3.3.1 Vegetation

NNMC has extensive landscaped lawns and plantings, in addition to naturally occurring woodland and wetland vegetated areas. These natural (unlandscaped) and landscaped vegetated areas provide aesthetic beauty to NNMC's campus, as well as habitat to wildlife occurring in the area. Surveys of the woodlands, in stream pond, and stream corridors were conducted by a professional botanist at four to six week intervals during the period of March through August, 1999 to identify plant species and habitats.

3.3.1.1 Natural Vegetation Areas

The largest natural area at NNMC is 24 acres of woodlands situated to the north and south of USUHS. Other smaller natural areas include the in stream pond, the two stream corridor areas, and an additional 20 acres of forested corridors along roads and the unnamed tributary to Stoney Creek (NNMC, 2000).

These wooded areas are generally the result of reforestation and planting following clearing for construction of NNMC or other construction. The wooded areas resemble many others in suburban Montgomery County, and are dominated by large, mature trees, such as yellow poplar (*Liriodendron tulipifera*), white oak (*Quercus alba*), and red oak (*Q. rubra*), with shrubs such as witchhazel (Hamamelis virginiana), spicebush (*Lindera benzoin*), and pinxterflower (*Rhododendron nudiflorum*). Native wildflowers and ferns are found in a few areas but are scarce due to the strong presence of invasive non-native plants. The bottomland along the unnamed tributary to Stoney Creek is completely carpeted with English ivy (*Hedera helix*), which shades out the native bottomland species. The shrub and herbaceous layer in upland areas are dominated by weedy non-native species such as multiflora rose (*Rosa multiflora*), wineberry (*Rubus phoenicolasius*), Japanese honeysuckle, (*Lonicera japonica*), bush honeysuckle (*L. morrowii*), and garlic mustard (*Alliaria petiolata*).

The woodland areas occurring at NNMC have similar species compositions; however, there are some differences among the areas. Therefore, the woodland areas have been divided into six sections (NNMC, 2000). Descriptions of the six woodland areas and the three additional natural area habitats (in stream pond and two stream corridors) that follow are from the NNMC Draft Integrated Natural Resources Management Plan (NNMC, 2000).

Woodland 1: This small triangular patch of woodland (4.8 acres) along the northeast boundary of NNMC is located between Perimeter Road and a former golf fairway, now a mowed field. Dominant tree species include large white oaks and red oaks. Shrubs and herbaceous species include spring beauty (*Claytonia virginica*), star chickweed (*Stellaria pubera*), cut-leaved toothwort (*Dentaria laciniata*), trout-lily (*Erythronium americanum*) and lady fern (*Athyrium filix-femina*). Invasive non-native species such as English ivy and creeping euonymous (*Euonymus obovatus*) are present in the area.

Woodland 2: This 1.6-acre area is an open wooded slope located above Stream Corridor 1 and below Woodland 3. This woodland area is dominated by large white oaks with several species of Pinxterflower and maple-leaved viburnum (*Viburnum acerifolium*) occurring in the shrub layer. Wildflowers include a large stand of Rue-anemone (*Anemonella thalictroides*), smooth Solomon's seal (*Polygonatum biflorum*), and white wood aster (*Aster divaricatus*).

Woodland 3: Woodland 3 consists of the 5.7-acre upland wooded area south of the picnic pavilion to Stone Lake Road. Several deep ravines cut through the uplands. The wooded areas and ravines are covered with invasive vines such as Japanese honeysuckle, multiflora rose, and wineberry. In addition, several species have escaped from cultivation and have naturalized in the woods, such as Japanese barberry (B*erberis thunbergii*), Creeping euonymus, and Jetbead (*Rhodoypos scandens*). Dominant trees include very large white oaks, red oak, and yellow poplar. The understory is composed of sassafras (*Sassafras albidum*) and red maple (*Acer rubrum*). Shrubs found in this area include Pinxterflower and mountain laurel (*Kalmia latifolia*). Spring beauty, bloodroot (*Sanguinaria canadensis*), star chickweed, black cohosh (*Cimicifuga racemosa*), smooth yellow violet (*Viola pensylvanica*), and common blue violet (*V. papilionacea*) are wildflowers occurring in this area.

Woodland 4: Woodland 4 is the 3.4-acre bottomland woods located below Woodland 5. The bottomland along the stream is carpeted with English ivy. Several large stumps and many mature trees including yellow poplar, white oak, pin oak (*Quercus palustris*), and black willow (*Salix nigra*) occur on the western slope.

Woodland 5: Woodland 5 is 2.6 acres of upland wood along the Vita Trail from Woodland 2 to Stone Lake Road. This area is completely overtaken by non-native species such as Multiflora rose, Japanese honeysuckle, Bush honeysuckle, Creeping euonymous, privet (*Ligustrum vulgare*), and periwinkle(*Vinca minor*).

Woodland 6: Woodland 6, containing 7.4 acres, is located south of the USUHS to Jones Bridge Road. This area contains mature woods with many large trees, including several yellow poplars that are over 100 feet tall and about three feet in diameter. Spicebush is the dominant native shrub, with bush honeysuckle crowding out the spicebush in many places. Several patches of wildflowers such as Jack-in-the-pulpit

(*Arisaema triphyllum*) and black cohosh and large colonies of sensitive fern (Onoclea sensibilis) and broad beech fern occur in the area.

Forest Buffers and Maintained Trees: In addition to the six forested woodland areas, 20 acres of forested buffer areas occur at NNMC. These edge habitats generally occur along fence rows, beside roadways, and generally follow the perimeter of the campus. The buffer areas contain a combination of the predominant hardwood tree types plus an abundance of shrubby vegetation, sometimes forming dense thickets.

Stream Corridor 1: This small area is dominated by American beech (*Fagus grandifolia*) and white oak with native shrubs of witch-hazel and black haw (*Viburnum prunifolium*). Many wildflowers occur on the slope including the native wild sarsaparilla (*Aralia nudicaulis*), spring beauty, false Solomon's seal (*Smilacina racemosa*), squawroot (*Conopholis americana*), spotted wintergreen (*Chimaphila maculata*), and bluestem goldenrod (*Solidago caesia*).

Stream Corridor 2: Stream Corridor 2 is located along the stream between Stone Lake Road and Jones Bridge Road. This area contains a diversity of native and naturalized plant species mixed in with cultivated plants. Species occurring in the overgrown thickets near the stream include poison ivy (*Rhus toxicodendron*), pokeweed (*Phytolacca americana*), common milkweed (*Asclepias syriaca*), black cherry (*Prunus serotina*), and American holly (*Ilex opaca*). The open grassy areas contain planted specimens of native trees such as yellow poplar, white oak, black walnut (*Juglans nigra*), black willow, and white pine (*Pinus strobus*), as well as non-native trees such as Norway spruce (*Picea abies*) and European larch (*Larix decidua*).

In Stream Pond: The in stream pond is located on the unnamed tributary to Stoney Creek at the bottom of the old fairway below the picnic pavilion area. Trees along the edge of the pond include sycamore (*Platanus occidentalis*), slippery elm, (*Ulmus rubra*), and a large Catalpa (*Catalpa speciosa*). With the exception of jewelweed (*Impatiens capensis*), pale smartweed (*Polygonurn lapathifolium*), and a small stand of broad-leaved cattail (*Typha latfolia*), very few wetland plants have colonized the edges of the pond (see discussion of Wetlands in Section 3.2.4) Miscanthus (*Miscanthus sinensis*), forget-me-not (*Myosotis scorpioides*) and wild blue phlox (*Phlox divaricata*) have been planted in this area. Other wildflowers growing naturally around the pond include common milkweed, common fleabane (*Erigeron philadelphicus*), tall goldenrod (*Solidago canadensis*), and hairy tick-trefoil (*Desmodium canescens*).

3.3.1.2 Landscaped Vegetation Areas

Landscaped areas at NNMC include turf lawns, flower beds, individual shrubs, hedges, groundcover areas, a Bay Scapes demonstration area, a formal community garden area, and landscaped trees. Presently, maintenance crews mow and trim the lawn throughout the growing season, apply a pre and post-emergent herbicide, and fertilize. Leaves are

raked and or blown. Roses are sprayed, fertilized, and pruned. Beds are weeded, planted, and mulched.

Large tracts of land at NNMC are maintained as turf lawns, and scattered lawn areas are located throughout the campus. Interspersed throughout the improved lawns and maintained areas at NNMC are numerous individual landscape trees, including cedar (*Chamaecyparis sp.*), red oak, willow oak (*Quercus phellos*), yellow poplar, white pine, red pine (*Pinus resinosa*), southern magnolia (*Magnolia grandiflora*), Saucer magnolia (*Magnolia soulangiana*), maple (*Acer sp.*), cypress, larch (*Larix sp.*), and spruce (*Picea sp.*). The largest open lawn is in front of the main hospital tower along Rockville Pike.

The mowed open field along the northern edge of Woodland 3, between the in stream pond and the picnic area contains mostly planted grasses and trees, with the woodland edges of the field containing several native species. Native trees along the edge of the mowed area include red maple, pignut hickory (*Carya glabra*), black walnut, black locust (*Robinia pseudoacacia*), eastern cottonwood (*Populus deltoides*), and sassafras. Herbaceous species found along the edge include sweet ciceley (*Osmorhiza claytonii*), common blue violet, mayapple (*Podophyllum peltatum*), and Indian hemp (*Apocynum cannibinum*).

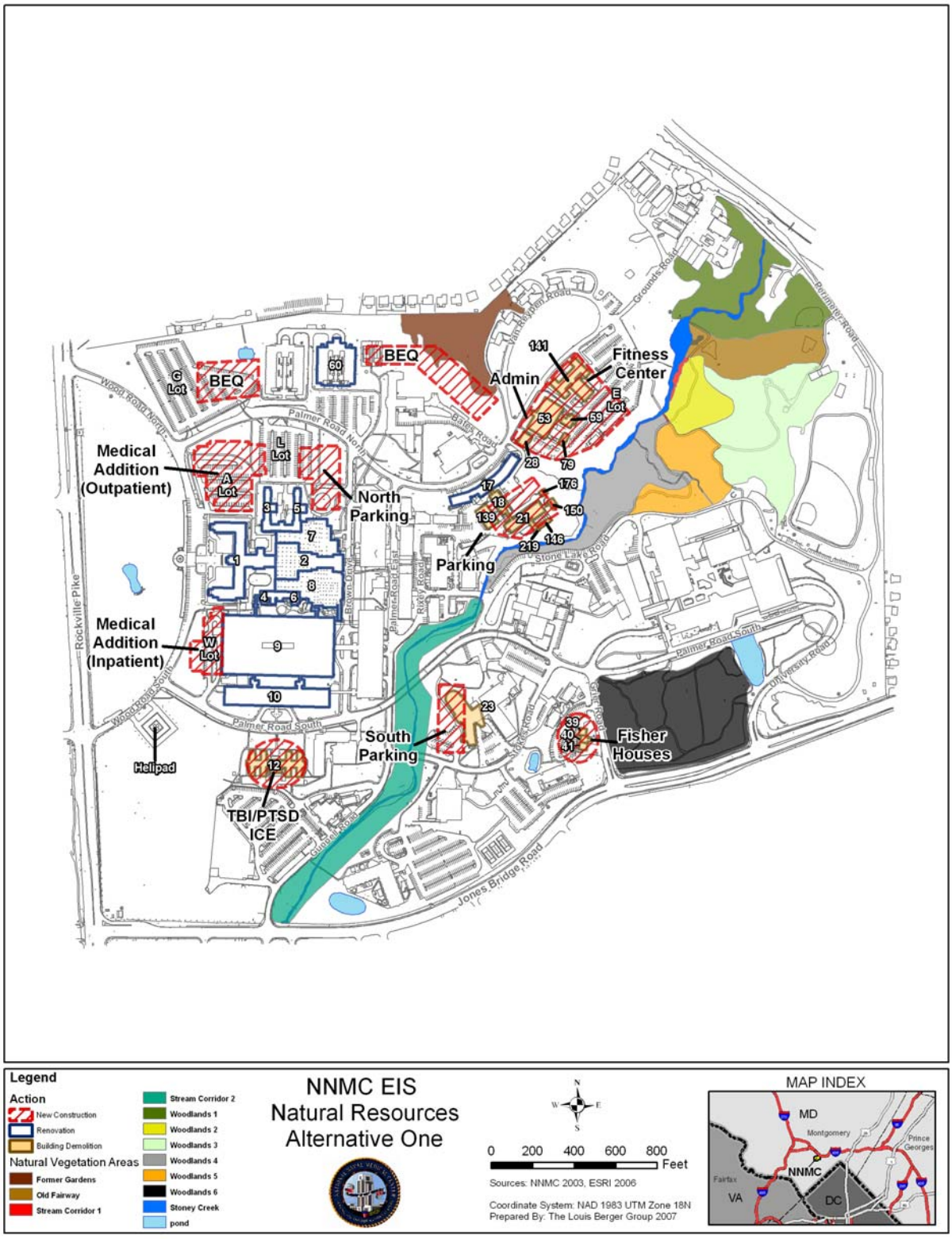
Exotic invasive species occur throughout the landscaped areas of NNMC. Exotic species include common mulberry (*Morus nigra*), Japanese honeysuckle, Amur honeysuckle (*Lonicera maackii*), Porcelain-berry vine (*Ampelopsis brevipedunculata*), English ivy, and euonymus.

As shown in Table 3-2, all proposed project sites under Alternatives One and Two would occur in areas that are developed or have been previously developed with landscaped vegetation. None of the proposed project sites, under both alternatives, would require development of forest areas or areas with natural vegetation. It must also be noted that forested areas at NNMC were previously disturbed and have been reforested. Figures 3-4a and 3-4b show the proposed project sites under each alternative in relation to NNMC's natural resources. The pond to the north of the western BEQ site in Alternative One is a stormwater management feature that is not considered a wetland.

Table 3-2: Description of Terrestrial Vegetation for Proposed Project Sites

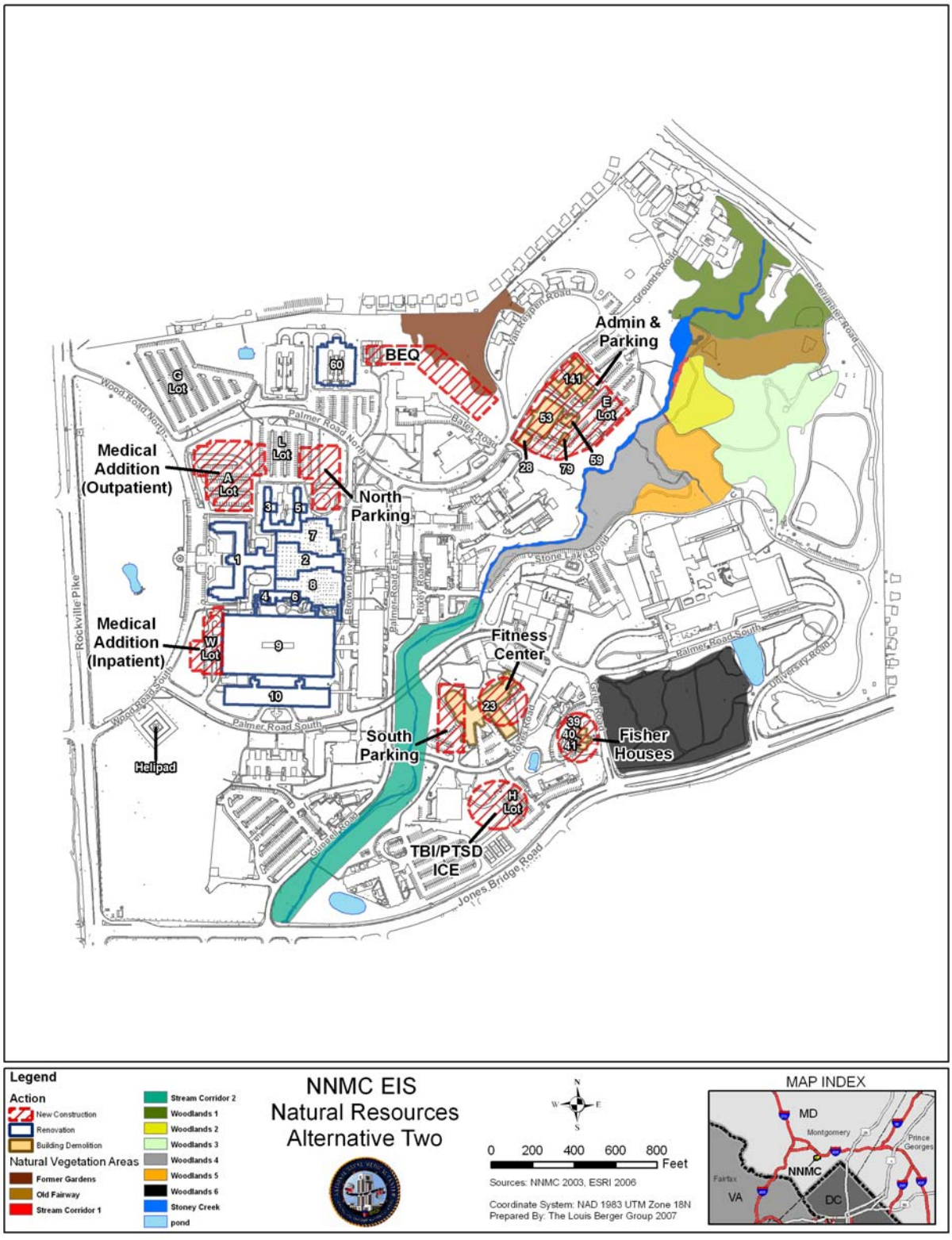
FACILITY	Alternative 1	Alternative 2
Structures		
Medical Addition (Outpatient)	Developed area, currently parking lot, north of Bldg 1, and west of Bldg 3.	Same as Alternative 1.
Medical Addition (Inpatient)	Landscaped area within a developed site west of Bldg 9.	Same as Alternative 1.
Clinical Space Renovation	Internal renovation of Buildings 1-10.	Same as Alternative 1.
Fisher Houses	Developed area on site of Bldgs. 39, 40, and 41	Same as Alternative 1.
BEQ Renovation	Renovation of Building 60.	Same as Alternative 1.
New BEQ space	West of Building 61 (developed area) and east of Building 60 (maintained lawn area with scattered trees) and adjacent to former gardens.	East of Building 61 and Building 11 (maintained lawn area with scattered trees) and adjacent to the formal gardens.
WTU Dining Facility	Located within the new BEQ space.	Same as Alternative 1.
Administrative	Renovation of Building 17	Developed area, Buildings 28, 53, 59, 79, and 141, and parking lot to the east.
Administrative	Developed area, on site of Buildings 28, 53, 59, 79, and 141, and parking lot to the southeast.	Developed area, on site of Buildings 28, 53, 59, 79, and 141, and parking lot to the southeast.
TBI/PTSD ICE	Developed area, on site of Building 12.	Developed area, east of Building 56.
Fitness Center	Developed area, on the site of Bldg 141.	Developed area, on the site of Bldg 23.
Parking		
North Parking Structure	Partially located on existing L-Lot Parking and partially located on landscaped area.	Same as Alternative 1.
South Parking	Developed area, on the site of Bldg 23.	Same as Alternative 1.
Fisher House Parking	Developed area, adjacent to Bldgs. 39, 40, 41.	Same as Alternative 1.
Additional Parking	Developed area, on site of Bldgs. 18, 21, 139, 146, 150, 174, 176, and 219.	Developed area, on site of Buildings 28, 53, 59, 79, and 141, and parking lot to the southeast.

Figure 3-4a: NNMC Natural Resources: Alternative One



Source: NNMC, 2000.

Figure 3-4b: NNMC Natural Resources: Alternative Two



Source: NNMC, 2000.

Maryland Forest Conservation Act

NNMC strives to comply with the principles of the Maryland Forest Conservation Act (Natural Resources Article 5-1601–1612, Annotated Code of Maryland) to the maximum extent practicable and manages its forestry resources to minimize the loss of forest resources during land development by making the identification and protection of forests and other sensitive areas an integral part of the site planning process. Although NNMC is not subject to the Forest Conservation Act, it would develop the components of a Forest Conservation Plan when woodlands are affected that may include tree protection components and a mitigation planting plan.

Forested buffer areas on NNMC, found along the roads and installation boundary, are informally designated as Forest Conservation Areas. These areas are those where tree replanting can be sited to mitigate the effects of project noise and visual impacts and to comply with the Forest Conservation Act's intent.

3.3.2 Wildlife

Natural and landscaped vegetated areas on NNMC provide habitat to a number of wildlife occurring in the area. A terrestrial vertebrate faunal survey was conducted in 1999 to document wildlife species that inhabit NNMC. The complete list of species observed during the 1999 survey is found in Appendix C of the NNMC Draft Integrated Natural Resources Management Plan (NNMC, 2000).

Hardwood Forest Community

Hardwood forest communities, such as the naturally vegetated woodland areas found on NNMC, provide food and cover for both game and non-game species, including: mammals such as white-tailed deer (*Odocoileus virginianus*), eastern cottontail (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), gray squirrel (*Sciurus niger*), beaver (*Castor canadensis*), red fox (*Vulpes vulpes*) and gray fox (*Urocyon cinereargenteus*); birds such as hairy and downey woodpecker (*Picoides villosus, P. pubescens*), wood thrush (*Hylocichla mustelina*), and Carolina chickadee (*Poecile carolinensis*); amphibians such as eastern spadefoot toad (*Scaphiopus holbrookii*) and red backed salamander (*Plethodon cinereus*); and reptiles such as eastern hognose snake (*Heterodon platirhinos*) and copperhead (*Agkistrodon contortrix*). The grey fox has not been observed recently, but is indigenous to this area of Maryland.

Edge Habitat

A number of species use or require shrub habitat. The shrub habitat found on NNMC includes both those shrubby areas of the mature contiguous forests (Woodlands 1-6), and the riparian buffer areas. It also includes ornamental and maintained shrubs and hedgerows. Wildlife utilize these areas for shelter and protection, as well as for nesting

among bird species. Shrub areas also provide foraging areas for many species that eat insects, or berries or seeds. Wildlife occurring in this habitat include, mammals such as white-footed mouse (*Peromyscus leucopus*), meadow vole (*Microtus pennsylvanicus*), red fox, and shorttail shrew (*Blarina brevicauda*); birds such as American robin (*Turdus migratorius*), dark-eyed junco (*Junco hyemalis*), goldfinch (*Carduelis tristis*), and eastern bluebird (*Sialia sialis*); amphibians such as American toad (*Bufo americanus*), green frog (*Rana clamitans*), and spotted salamander (*Ambystoma maculatum*), and reptiles such as eastern mud turtle (*Kinosternon subrubrum*), six-lined racerunner (*Cnemidophorus sexlineatus*), and Eastern banded water snake (*Nerodia fasciata*).

Developed Community

Many wildlife species use the lawns, gardens, and a variety of ornamental trees and shrubs within the developed areas on NNMC. These species include mammals such as opossum, gray squirrel, and raccoon; birds such as house sparrow (*Passer domesticus*), common grackle (*Quiscalus quiscula*), European starling (*Sturnus vulgaris*), and northern cardinal (*Cardinalis cardinalis*); amphibians such as chorus frog (*Pseudacris triseriata*) and Fowler's toad (*Bufo fowleri*); and reptiles such as eastern box turtle (*Terrapene carolina*), and black rat snake (*Elaphe obsoleta*). The developed areas are in close proximity to the forested and landscaped areas, lending to a situation in which wildlife species occurring on the site are in close proximity to humans on a regular basis.

Neotropical Migratory Birds and Forest Interior Dwelling Species

Migratory birds are those species that migrate south each fall for the winter and return north in the spring to their breeding grounds. During the 1999 survey of NNMC's fauna, a limited number of neotropical migrants were observed including: wood thrush (*Hylocichla mustelina*), Eastern kingbird (*Tyrannus tyrannus*), chimney swift (*Chaetura pelagica*), gray catbird (*Dumetella carolinensis*), and Eastern phoebe (*Sayornis phoebe*), however; numerous additional species may visit or breed at NNMC (NNMC, 2000). The NNMC Campus does attract Canada geese (*Branta canadensis*). Approximately 100 geese are resident, while 20-30 each year are migratory. Approximately 155 neotropical and short-term migratory birds have been identified at the larger and ecologically more diverse Patuxent Wildlife Research Center located approximately 16 miles northeast of NNMC (NNMC, 2000).

Many neotropical migrants are also forest interior dwelling species (FIDS) and require relatively large contiguous forest areas (greater than 100 acres) to sustain viable breeding populations. There is a low possibility that some of these species could nest at NNMC, due to the fact that FIDS require mature forests with a closed canopy that remain fairly undisturbed (NNMC, 2000), although a formal survey for FIDS has not been conducted on the installation. The forested areas at NNMC are not contiguous and are further fragmented by asphalt paths. In addition, human activity in the wooded areas and in their immediate

vicinity might discourage birds in need of interior forest conditions from nesting there.

Migratory birds are protected under the Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712; 40 Stat. 755) as amended, prohibits, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." (16 U.S.C. 703). NNMC has a permit from U.S. Fish and Wildlife Service (USFWS) that allows eggs or nests of resident geese to be destroyed to prevent overpopulation.

3.3.3 Aquatic and Wetland Habitat

Aquatic habitat on NNMC consist of the unnamed tributary to Stoney Creek, University Pond, the in stream pond on the unnamed tributary to Stoney Creek, and Lake Eleanor (see Section 3.2 Water Resources). None of the proposed project sites are located in areas that provide habitat for aquatic species.

Within the NNMC campus there are four areas along the unnamed tributary to Stoney Creek that have the potential to be wetlands. To date, these potential wetland areas have not been delineated and no jurisdictional determination has been conducted (NNMC, 2000). Only one project site is near a wetland area, but it is not within the 25-foot buffer for non-tidal wetlands, as required by Maryland law (see Section 3.2 Water Resources).

3.3.4 Threatened & Endangered Species and Species of Special Concern

Flora and fauna surveys conducted in 1999 identified no federally-listed endangered or threatened species at NNMC. There is no designated critical habitat on NNMC. The Navy has made an information request to USFWS for their concurrence on the federally-listed endangered or threatened species information at NNMC. Likewise, the Navy has also requested information from MDNR on local species of special concern. The correspondence with the agencies is included in Appendix A. Three (3) species of birds inhabiting NNMC lands are of Maryland State Species of Special Concern - great blue heron (*Ardea herodias*), red-shouldered hawk (*Buteo lineatus*), and the eastern bluebird.

3.4 Air Quality Existing Environment

The USEPA defines ambient air in 40 CFR Part 50 as “that portion of the atmosphere, external to buildings, to which the general public has access.” In compliance with the 1970 Clean Air Act (CAA) and the 1977 and 1990 Clean Air Act Amendments (CAAA), the USEPA has promulgated National Ambient Air Quality Standards (NAAQS). The NAAQS were enacted

for the protection of the public health and welfare, allowing for an adequate margin of safety. To date, the USEPA has issued NAAQS for six of the most prevalent air pollutants, these are known as the criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM) with a diameter less than or equal to a nominal 10 micrometers (PM_{10}), particulate matter with a diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$), ozone (O_3), nitrogen oxides (NO_x which consists of NO_2 and NO_3), and lead (Pb). Federal regulations designate Air-Quality Control Regions (AQCRs) in violation of the NAAQS as nonattainment areas. According to the severity of the pollution problem, nonattainment areas can be categorized as marginal, moderate, serious, severe, or extreme. Severity categories have not yet been applied to $PM_{2.5}$ nonattainment areas. The USEPA has classified the Metropolitan Washington, DC area (AQCR 47), which includes Montgomery County and NNMC, as in moderate nonattainment for the 8-hour ozone NAAQS and in nonattainment for particulate matter of 2.5 microns or smaller ($PM_{2.5}$), and as in maintenance (previously, nonattainment) for carbon monoxide. AQCR 47 is in the ozone transport region; it is in attainment for all other criteria pollutants. The ozone transport zone is the Northeastern section of the U.S. where ozone is transported by air currents into the regions from other sections of the U.S.

In December 2006, a federal appellate court remanded the USEPA's 8-hour ozone standard. No final decision has been reached on the outcome for this decision; USEPA has not issued guidance to address the court decision. On 3 October, 2007, the EPA issued a memorandum stating that for New Source Review, AQCRs will be held to the 1-hour ozone standard regulations (USEPA, 2007d). This ruling does not affect the General Conformity Analysis at this time.

3.4.1 Air Quality General Conformity

NNMC is located in Montgomery County, Maryland. The county is in nonattainment for $PM_{2.5}$ and in moderate nonattainment for ozone under the 8-hour NAAQS. The county was previously in nonattainment for CO, and is currently in maintenance for that pollutant to ensure the AQCR remains in attainment. Table 3-3 presents the NAAQS for these pollutants.

Table 3-3: Ambient Air Quality Standards for Ozone, $PM_{2.5}$, and CO

Pollutant	Federal Standard	Maryland Standard
Ozone (O_3)* 8-Hour Average	0.08 ppm	0.08 ppm
Particulate Matter ($PM_{2.5}$)*		
24-Hour Average	35 µg/m^3	65 µg/m^3
Annual Geometric Mean	15 µg/m^3	15 µg/m^3
Carbon Monoxide (CO)**		
1-Hour Average	35 ppm	35 ppm
8-Hour Average	9 ppm	9 ppm

* Federal primary and secondary standards for this pollutant are identical.
** There are no secondary standards for this pollutant. ppm = parts per million.
Sources: USEPA, 2007; MDE, 2007b

Effective December 18, 2006, the final rule issued by EPA lowered the NAAQS for $PM_{2.5}$. Specifically, the 24-hour standard was lowered to 35 ug/m^3 from the previous standard of 65 ug/m^3 and this is reflected in Table 3-3.

To regulate the emission levels resulting from a project, federal actions located in nonattainment or maintenance areas are required to demonstrate compliance with the general conformity guidelines established in 40 CFR Part 93 Determining Conformity of Federal Actions to State or Federal Implementation Plans (the Rule). Section 93.153 of the Rule sets the applicability requirements for projects subject to the Rule through the establishment of ***de minimis*** levels for annual criteria pollutant emissions. These ***de minimis*** levels are set according to criteria pollutant nonattainment area designations. For projects below the ***de minimis*** levels, a full conformity determination is not required. Those at or above the levels are required to perform a conformity analysis as established in the Rule. The ***de minimis*** levels apply to emissions that can occur during the construction and operation phases of the action.

NNMC has completed a General Conformity Rule applicability analysis in order to analyze any impacts to air quality. Results are in Section 4.4 and Appendix B. Emissions have been estimated for the ozone precursor pollutants NO_x and volatile organic compounds (VOCs), as well as CO and $PM_{2.5}$ with its precursor SO_2. Annual emissions for these compounds were estimated for each of the project actions (construction and operations) to determine if they would be below or above the ***de minimis*** levels established in the Rule. The ***de minimis*** values for a moderate ozone nonattainment area within the ozone transport zone are 100 tons per year (TPY) for NO_x and 50 TPY for VOCs. The ***de minimis*** values for nonattainment areas for $PM_{2.5}$ and maintenance for CO are 100 TPY for $PM_{2.5}$, SO_2, and CO. Sources of NO_x, VOCs, $PM_{2.5}$, SO_2, and CO associated with the proposed project would include emissions from construction, demolition, and renovation equipment, construction, fugitive dust ($PM_{2.5}$), painting of interior building surfaces and parking spaces (VOCs only), and emissions from stationary units (boilers and generators).

3.4.2 Air Permit Requirements

3.4.2.1 Title V Permit

NNMC operates under a Title V permit (Part 70 Permit No. 24-031-01124; issued 02 May 2007, expires 30 June 2011). There are significant emission sources within the installation: 4 large industrial boilers, 1 gas-fired chiller, 4 large emergency generators, 10 smaller registered emergency generators, and one 10,000-gallon and two 20,000-gallon gasoline tanks. The addition of any new boilers or generators would require a modification to this permit. Additionally, NNMC cannot directly emit more than 50 TPY of NO_x during any rolling 12-month period (MDE, 2007c).

The permit also requires that the installation must take reasonable precautions to prevent PM from becoming airborne due to construction and demolition activities (MDE, 2007c)

3.4.2.2 Prevention of Significant Deterioration (PSD) Permits

The Maryland Department of the Environment also requires PSD approval for major modifications to an existing major facility that will result in a net operating emissions increase above the following levels: CO, 100 TPY; NO_x, 40 TPY; SO_2, 40 TPY; PM_{10}, 15 TPY; VOCs, 40 TPY; Lead, 0.6 TPY.

3.4.3 Existing Ambient Air Quality Concentrations

Ambient air quality is monitored in Montgomery County by a station meeting USEPA's design criteria for State and Local Air Monitoring Stations (SLAMS) and National Air Monitoring Stations (NAMS). The monitoring station, located at the Lothrop E Smith Environmental Education Center in Rockville, Montgomery County, Maryland, has been in operation for measuring ozone, $PM_{2.5}$ and meteorological conditions in the county. The highest and second highest values recorded at these stations during the period 2002 through 2006 are presented in Table 3-4. There are three CO monitors within the state, none of which are in the vicinity of Montgomery County (MDE, ND).

Table 3-4: Two Highest Ozone and $PM_{2.5}$ Values, 2002 to 2006

Monitoring Station	Year				
	2002	2003	2004	2005	2006
#240313001 – Lothrop E Smith Environmental Education Center, Montgomery County – $PM_{2.5}$ ($\mu g/m^3$) 24-hour (1^{st} / 2^{nd} Maximum)	49/39	53/32	41/34	38/35	32/31
#240313001 – Lothrop E Smith Environmental Education Center, Montgomery County – $PM_{2.5}$ ($\mu g/m^3$) Annual Average Concentrations	13.0	11.9	12.6	13.6	11.4
#240313001 – Lothrop E Smith Environmental Education Center, Montgomery County – Ozone (ppm) 8-hour (1^{st} / 2^{nd} Maximum)	0.099/ 0.096	0.115/ 0.100	0.094/ 0.086	0.100/ 0.087	0.101/ 0.091

Source: U.S. USEPA 2007b

3.4.4 Meteorology/Climate

Temperature is a parameter used in calculations of emissions for air quality applicability. Climate at NNMC can be characterized as a humid, continental climate with a mean high temperature of 89°F in July and a mean low temperature of 24°F in January. The average temperature is 56.5 °F. Summers are warm with periods of high humidity and winters are cold, with periods of snow cover (City-Data, ND).

3.4.5 Air Pollutant Emissions at Installation

Total emissions at NNMC in 2003, 2004, and 2005 are in Table 3-5.

Table 3-5: Criteria Air Pollutant Emissions at NNMC, 2003 to 2005

	NO_x (TPY)	SO_x (TPY)	PM_{10} (TPY)	CO (TPY)	VOCs (TPY)	HAPS (TPY)
2005	6.93	3.55	2.21	22.66	4.37	.064
2004	6.51	6.70	2.06	20.11	5.18	.052
2003	8.62	14.06	2.46	23.66	5.08	.051
Source: (MDE, 2007c)						

3.4.6 Regional Air Quality Index Summary

The USEPA calculates the Air Quality Index (AQI) for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. The Metropolitan Washington Council of Governments (MWCOG) collects data daily to determine air quality for the region and releases it in the form of the AQI. The AQI ranges from zero to 300, with zero being no air pollution and 300 representing severely unhealthy air pollution levels. An AQI value between 101 and 150 indicates that air quality is unhealthy for sensitive groups, who may be subject to negative health effects. Sensitive groups may include those with lung or heart disease, who will be negatively affected by lower levels of ground level ozone and particulate matter than the rest of the general public. An AQI value between 151 and 200 is considered to be unhealthy, and may result in negative health effects for the general public, with more severe effects possible for those in sensitive groups. AQI values above 200 are considered very unhealthy (CAP, ND).

According to the USEPA's Air Quality Index Report for Montgomery County, Maryland, in 2002 the County experienced 11 days where air quality was considered unhealthy for sensitive groups. In 2003, there were 2 unhealthy days for sensitive groups and 1 unhealthy day. In 2004, the area experienced 3 days that were unhealthy for sensitive groups, and in 2005 there were 3 days considered unhealthy for sensitive groups. In 2006, there were 4 days recorded as unhealthy for sensitive groups. The data indicate that air quality classified as unhealthy has improved since 2002 in the region, but still fluctuates from year to year (USEPA, 2007a).

3.5 Noise Existing Environment

Noise is generally perceived as unwanted sound that interferes with normal activities or in some way reduces the quality of the environment. It may consist of intermittent or continuous sources. Noise can be nondescript, involving a broad range of sound sources and frequencies, or it can have a specific, clearly identifiable sound source. The characteristics of sound include such physical parameters as intensity, frequency, and duration.

The Noise Control Act of 1972 was enacted to establish noise control standards and to regulate noise emissions from commercial products

such as transportation and construction equipment. In 1981 the EPA concluded that noise issues were best handled at the state or local government level and in the early 1980s the primary responsibility of regulating noise was transferred to the to state and local governments. However, the Noise Control Act of 1972 and the Quiet Communities Act of 1978 remain in effect today.

The standard measurement unit of noise is the decibel (dB), which represents the acoustical energy present. Noise levels are measured in A-weighted decibels (dBA), a logarithmic scale that approaches the sensitivity of the human ear across the frequency spectrum. A 3-dB increase is equivalent to doubling the sound pressure level, but is barely perceptible to the human ear.

Noise levels vary continuously with time and various measurable descriptions of noise are used to account for this variance with time. Leq is the average mean square sound level measured in decibels over a time period of consideration, usually one hour. Ldn is the 24-hour average sound level for the period from midnight to midnight obtained after adding a 10 decibel "penalty" to sound levels recorded or computed for the period from midnight to 7 AM and from 10 PM to midnight. L_{10}, L_{50}, and L_{90} are sound pressure levels that are exceeded 10, 50, and 90 percent of the time, respectively.

According to their regulatory setting, many federal agencies have developed their own standards, which are often used to determine acceptable noise levels. For example, the USEPA has established both indoor and outdoor levels, which aim to protect public health and welfare by taking into account levels that will prevent hearing damage, sleep disturbance, and communication disruption. An outdoor limit of 55 decibels (dB) and an indoor limit of 45 dB will protect against speech interference and sleep disturbance for residential, educational, and health care areas, which are considered as noise sensitive receptors. The Occupational Safety and Health Administration (OSHA) has developed a noise exposure standard in the workplace of 90 dBA for the duration of an 8-hour period, with a maximum of 140 dBA for impulsive noise, such as a siren or gunshot. The Navy has set a noise standard of 84 dBA for 8 hours of constant noise (Navy, 2005(OPNAVINST 5100.23G)).

Traffic noise impact criteria have been established by the Federal Highway Administration (USDOT, 1995). Impacts are expected to occur if the peak hour Leq exterior noise level exceeds 67 dBA for activity areas such as residences, schools, churches, libraries, hospitals, hotels, motels, parks, playgrounds, and recreation areas, or if there is an increase of 5 dBA or more. Other federal agencies define noise criteria in terms of Ldn (FICUN, 1980).

State noise level criteria are given in COMAR 26.02.03.03, Control of Noise Pollution, and Montgomery County criteria are in the Montgomery County Noise Ordinance. The State and County have the same daytime and nighttime noise criteria, but apply them to different day and night

hour intervals. The maximum allowable Leq or time averaged noise criteria for the State and County are:

Table 3-6: Maximum Leq for the State and County

	DAYTIME	NIGHTTIME
Commercial	67 dBA	62 dBA
Residential	65 dBA	55 dBA
(Sources: COMAR 26.02.03.03, Control of Noise Pollution. Montgomery County criteria are in the Montgomery County Noise Ordinance)		

The Maryland regulations define daytime hours as the period between 7 AM and 10 PM. A person may not cause or permit noise levels emanating from construction or demolition site activities that exceed:

(a) 90 dBA during daytime hours;

(b) The levels specified for nighttime hours.

The Montgomery County ordinance defines daytime as the period between 7 AM and 9 PM on weekdays, and 9 AM and 9 PM on weekends. According to its Noise Level and Noise Disturbance Standards for Construction, the maximum allowable noise levels for construction from 7 AM to 5 PM on weekdays are:

(a) 75 dBA if the Department had not approved a noise-suppression plan for the activity

(b) 85 dBA if the Department has approved a noise-suppression plan for the activity

For all other times the maximum levels listed above for commercial and residential land uses are applicable.

The Ordinance also requires construction noise levels be measured at the location, at least 50 feet from the source, on a receiving property where noise from the source is greatest.

3.5.1 Existing Noise Conditions at NNMC

3.5.1.1 Traffic Noise Levels

NNMC is located in a highly developed urban area near major transportation routes. The principal and most pervasive contributor to ambient noise levels in the vicinity of NNMC is due to the high speed and high traffic volume experienced on I-495 and to a lesser extent Rockville Pike. In addition, there are a number of other noise sources in the area such as aircraft servicing regional airports, including Baltimore Washington International (BWI) and Ronald Reagan Washington National Airport. The hospital facility at NNMC also receives emergency vehicles and patient-transport helicopters 24 hours a day,

which contribute to ambient noise levels. Other sources of noise include sirens from other emergency vehicles and localized construction activities and other helicopters transiting the area.

The 2005 EIS for the NIH Master Plan included noise measurements for 2003 and future conditions with and without the Master Plan, which were analyzed for the year 2020. The NIH EIS noise analysis was conducted based on the future traffic projections, which were determined following the M-NCPPC Local Area Transportation Review (LATR) procedural guidelines (NIH, 2005). The projections included both NIH and background traffic and it assumed that NNMC would maintain the 2003 trip generation level (NIH, 2005).

Table 3-7 shows a selection of intersections for which noise levels 2003 were presented in the 2005 NIH EIS.

Table 3-7: 2003 Noise Levels (Leq) in the Vicinity of NNMC

Measurement Location	2003 Noise Levels (dBA)
Stone Ridge School of the Sacred Heart	59
Locust Hill Estates (East Side of Rockville Pike)	68
East Bethesda Residence Wisconsin Avenue	68
East Bethesda Residence Jones Bridge Road	68
Source: NIH, 2005.	

A comparison of the 2003 traffic volumes used for the noise measurements and the 2007 traffic volumes identified in the 2007 NNMC Transportation Study shows that there is an overall 1.94 annual percent growth in the traffic volumes in the vicinity of the locations where the noise measurements were taken. Traffic volumes must double or halve to produce a 3 dBA increase or decrease, respectively. Generally, a one or two dBA increase or decrease in noise level is not readily perceptible to the human ear. Therefore, based on the traffic level changes, it can be assumed that the noise levels at the locations of the 2003 noise measurements have not increased sufficiently to be discernible to human ear. Noise from traffic increases rapidly with vehicle speed. Traffic speeds on local roads are not believed to have changed.

Internally within NNMC, numerous sources contribute to the overall noise environment. It is assumed that, similar to the NIH campus, the noise from traffic exterior to the campus would dominate noise levels on the campus for a distance extending 500 feet into the campus (NIH, 2005). Other noise sources that are heard within and near the NNMC campus are human activities such as military ceremonies, mechanical equipment, and grounds maintenance.

3.5.1.2 Helicopter Noise

NNMC has a helicopter landing pad in the southwest area of the installation. Helicopter operations at NNMC are related to emergency services. The total number of requests for helicopter landings at NNMC in the first five months in 2007 were 63, which is an average of 12.6 requests monthly (McGrew, 2007). The monthly average before the ongoing Iraq and Afghanistan conflicts was approximately four times per month (NNMC, 2007b).

3.6 Utility Infrastructure Existing Environment

This section presents current status of utilities at NNMC. Further discussion of the adequacy of the utilities to support the BRAC actions are in Section 4.6.

3.6.1 Fiber Optic/Telecommunications

Telephone service is provided to the installation by Verizon via ten voice-provisioned T1 lines. The installation phone service is run on copper frames and the main telecommunication equipment is furnished by Nortel. The distribution system within the installation is via an underground duct bank and manhole system (NAVFAC, 2007a).

3.6.2 Electrical

Potomac Electric Power Company (PEPCO) supplies electric power to NNMC via four high-voltage (3-phase, 13.2 kilovolt) feeders from its Woodmont substation located due west of NNMC on Rockville Pike. The PEPCO service enters the installation via one underground duct located just north of the southernmost intersection of Wood Road and Rockville Pike. PEPCO indicated to the Navy in January 2007 that current demand is 18 mega volt-ampere (MVA) max demand on the four feeders.

NNMC owns and operates the distribution system within the installation via a network of underground duct banks. The Navy also owns and operates four 750-kilowatt (kW) emergency generators that provide emergency power for the hospital facilities. The central plant and USUHS are the two largest users of power at the installation. Buildings 9, 10, 18 and Armed Forces Radiobiology Research Institute (AFRRI) are also substantial users.

3.6.3 Natural Gas

Washington Gas supplies and distributes natural gas to the installation. A 6-inch, 20 pounds per square inch (psi) natural gas line enters the installation from Rockville Pike and serves numerous buildings on the western portion of the installation. A separate 8-inch, 50-psi line was added in 1990 to serve the boilers in the central plant (Building 16). This line enters the installation from Rockville Pike south of the 6-inch line. The 8-inch line has interruptible service and carries a majority of the overall gas load for the installation. The central plant boilers are duel fuel and can operate on either natural gas or fuel oil. Fuel oil serves as the backup in the event that Washington Gas needs to interrupt service on

the 8-inch line due to high peak winter demands. The 6- and 8-inch lines are fed from two different Washington Gas regulator stations. Two additional small-diameter, low-pressure lines enter the installation from the north and the south and serve the housing units on Van Reypen Road (Buildings 34-38) and the Child Development Center (Building 26), respectively (Washington Gas, 2007).

There are five buildings at the installation that use individual gas furnaces for heat and/or hot water, the remaining buildings are provided with heat/hot water from the central plant. Other buildings with direct gas connections utilize natural gas for kitchen services, laundry and laboratory functions.

The capacity of the natural gas supply is adequate to meet existing demands, but a detailed evaluation of the supplier's capability to meet significant increases in future demands has not been performed at this time. No pressure or supply problems have been reported, and current user demands have been met without problems (Washington Gas, 2007).

According to Navy utility records, the installation utilized on average approximately 40,000 therms (4,000 million BTU) per month during the period of June 2006 through May 2007 (NAVFAC 2007b, 2007). The most natural gas was consumed in January (61,600 therms/month) and the least was consumed in July (22,500 therms/month).

3.6.4 Water

Water to meet NNMC's potable and fire flow demands is supplied to the complex by Washington Suburban Sanitary Commission (WSSC) through four metered connections. WSSC's supply lines in the area consist of a 12-inch line within Rockville Pike, a 12-inch line along Jones Bridge Road and a 10-inch line that traverses the southern portion of the installation from Rockville Pike to Perimeter Road. NNMC has four metered connections to WSSC's system and these are located at Rockville Pike (between the northern and southern intersections of Wood Road), at Building 12, at Building 26 (Child Development Center), and at Jones Bridge Road (near USUHS) (Earth Tech, 2003).

No water storage or booster pumping is provided by NNMC (except within tall buildings such as the Building 1 tower), although several buildings are equipped with fire pumps. Numerous buildings at the installation have full sprinkler systems and the existing water system includes over 80 fire hydrants. Twelve flow and pressure tests were conducted on select hydrants throughout the installation on February 21, 2007. Of the hydrants tested, generally acceptable static pressures ranged from 54 to 95 psi and residual pressures ranged from 40 to 84 psi (Flow Tests, 2007).

According to Navy utility records, the installation utilized an average of approximately 20 million gallons of water per month or approximately 653,000 gallons per day (gpd) during the period of June

2006 through May 2007 (NAVFAC, 2007b). Highest water use was realized during the warmest months of the year and on average approximately 81 percent of water supplied to the installation was returned to WSSC as wastewater.

3.6.5 Wastewater

Wastewater generated at the NNMC complex is discharged to the Washington Suburban Sanitary Commission's (WSSC) collection system for treatment at the Blue Plains Treatment Plant. The NNMC portion of the gravity collection system consists of approximately 15,235 linear feet of piping ranging from 4 to 15 inches in diameter. In addition, the NNMC system includes a pumping station with 145 linear feet of force main and four detention structures, including a drop tank, an acid-neutralization tank, and two grease interceptors. WSSC's sewer collection system on the grounds of NNMC consists of approximately 12,525 linear feet of gravity sewer lines ranging in size from 8 to 24 inches in diameter.

A Sanitary Sewer Capacity Analysis of the NNMC system was performed in April 2000. (WSSC's sanitary sewer system on the grounds of NNMC was not included in the analysis). This detailed capacity analysis was intended to provide information on the (then) current capacity of the NNMC collection system and to determine the impact of future growth at the installation. (It is noted that this analysis assumed a 12-percent population growth across NNMC; the BRAC-related expansion was not included as part of this analysis and would be closer to 50-percent). As part of the capacity analysis, a hydraulic model of the collection system was developed utilizing existing data, contribution per capita estimates and actual flow monitoring data. The results of the capacity analysis identified eleven sanitary sewer sections that were found to decrease the performance and capacity of the system under wet weather conditions (Sewer Analysis, 2000). Improvements to the sanitary sewer sections have not been constructed to date (NAVFAC, 2007c).

According to Navy utility records, the installation discharged on average over 16 million gallons of wastewater per month or approximately 530,000 gallons per day (gpd) during the period of June 2006 through May 2007 (NAVFAC, 2007b). An average of 81 percent of water supplied to the installation was returned to WSSC as wastewater. This percentage varied throughout the year from approximately 54 percent in July to 94 percent in December.

3.6.6 Stormwater

A majority of the stormwater runoff from the installation is collected by a series of inlets and catch basins that convey stormwater through a pipe network to the unnamed tributary to Stoney Creek. The unnamed tributary to Stoney Creek flows in a northeast direction across the installation and discharges into Stoney Creek, which discharges into Rock Creek, which in turn discharges into the Potomac River. The storm drainage system is separate from the sanitary sewer collection system and was originally designed to accommodate a 10-year storm event

(Master Plan, 1990). Some stormwater is discharged to lines along Rockville Pike or a line that goes through the Stone Ridge School of Sacred Heart to the north. Some surface runoff flows directly to the unnamed tributary to Stoney Creek and runoff from a few areas is directed to onsite stormwater detention basins.

NNMC Environmental Programs Division oversee the stormwater management program for the installation. The installation is covered by two different state stormwater permits. One permit covers stormwater discharges associated with industrial activity (Individual Permit MD0025670) and the second covers all other stormwater discharges associated with municipal activities (General Permit for Discharges from State and Federal Small Municipal Separate Storm Sewer Systems (MS4)). All new development and redevelopment at NNMC must meet the construction requirements of the general permit and if the planned development meets the definition of "industrial activity", then additional operation and maintenance requirements of the individual permit would also apply (MDE, 2005).

3.6.7 Solid Waste Management

Solid waste generated at NNMC is collected and disposed through a contract with a private waste hauler, Eastern Trans Waste of Maryland (ETW). NNMC has policies and programs in place that address integrated solid waste management, recycling and green procurement. NNMC currently recycles: office paper, aluminum, steel, plastic and glass containers, toner cartridges, cooking oil, motor oil, car/truck batteries, wood pallets and yard debris (Solid Waste Report, 2007). Burnable solid waste generated in Montgomery County is transported to the County's Resource Recovery Facility (RRF), which received the Solid Waste Association of North America's 2005 Gold Excellence Award in the Waste-to-Energy Division. The ash produced from the RRF and nonrecyclable rubble delivered to the Solid Waste Transfer Station are transported via rail and truck to the Brunswick Waste Management Facility, Inc. (BWMF) landfill, located in Brunswick County, Virginia. The County's contract with BWMF is for 15 years with an option for a 5-year extension. Rubble such as clean asphalt, dirt, and concrete that cannot be recycled on site is taken to local rubble recycling facilities such as Clean Earth in Hagerstown, Maryland.

3.6.8 Steam/Chilled Water Systems

Steam is generated at the central plant (Building 16) for domestic hot water and heating of approximately 60 buildings at the installation. The boilers are duel fuel and are capable of burning either natural gas or No. 2 fuel oil. The steam distribution system is composed of a variety of underground conduits that vary in size from 1.5 inches up to 10 inches in diameter. All condensate returns are pumped back to the central plant via pumps located in building mechanical rooms or in manholes at low points in the piping system. The largest consumers of steam on an annual basis are Buildings 1 through 10 and the USUHS complex. These areas account for over 60 percent of the steam demand.

Chilled water for air conditioning is also produced at the central plant. The main refrigeration units are powered by electricity with reserve units that utilize low-pressure steam from the boilers. The distribution system for chilled water consists of underground conduit varying in size from 10 to 24 inches in diameter (Master Plan, 1990; NAVFAC, 2007d).

3.7 Transportation Existing Environment

This section describes the existing transportation system serving NNMC, including the regional and local roadway network, traffic conditions, pedestrian and bicycle circulation, parking, transit facilities and services and helicopter operations.

3.7.1 Roadway Network

NNMC is situated just south of the Capital Beltway (I-495) within the Bethesda area of Montgomery County, Maryland. The western and southern boundaries of the center are formed by Rockville Pike (MD 355) and Jones Bridge Road, respectively. The roadway network providing immediate regional and local access to the campus is illustrated in Figure 3-5.

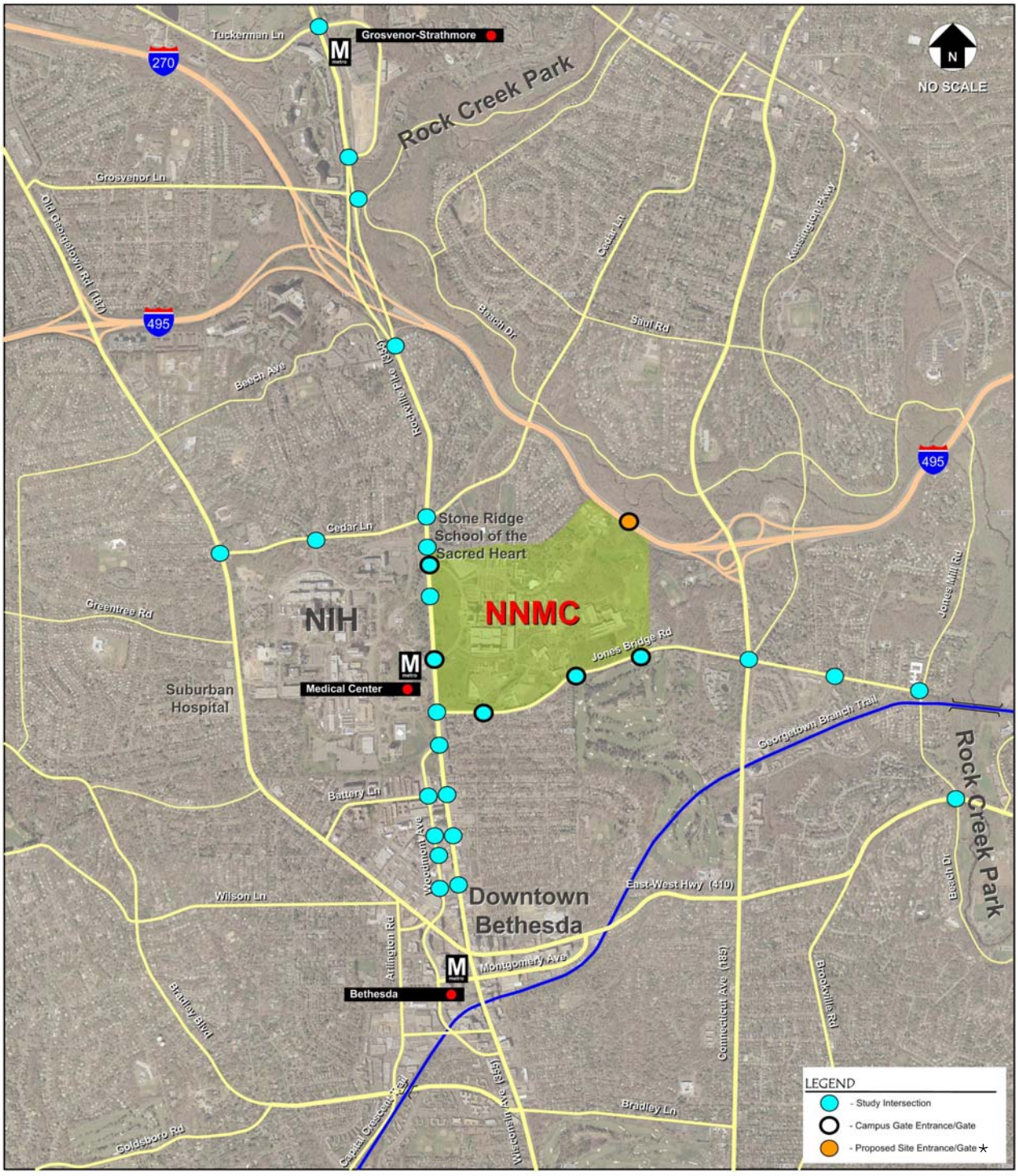
The principal roadways involved include the following:

Rockville Pike (MD 355): This State-owned six-lane divided highway is classified as a Major Highway by the County. It runs north-south along the western edge of the campus, connecting the site with Washington, DC to the south and the City of Frederick, Maryland to the north. This roadway also provides connections to other regional areas via an interchange with the I-270/I-495 Freeway system situated just to the north, and intersections with major east-west arterials along other segments to the north and south of the campus. MD 355 is a major regional and commuter route that also carries several bus routes operated by the Washington Metropolitan Area Transit Authority (WMATA) and the Montgomery County Ride-On transit systems.

MD 355 provides direct access to the campus via two intersections /access points. The northern entrance (North Wood Drive) is unsignalized. The southern entrance, South Wood Drive, is the eastern leg of the signalized MD 355/South Drive intersection. South Drive provides access to the National Institutes of Health Complex and Washington Metropolitan Area Transit Authority (WMATA) Medical Center Metrorail Station.

Jones Bridge Road: This county-owned four-lane divided roadway is classified as an Arterial Road between Rockville Pike and Connecticut Avenue by the County. It runs east-west along the southern edge of the NNMC Campus and intersects with Connecticut Avenue (MD 185) to the east. Jones Bridge Road provides direct access to NNMC via three entrances/intersections: Gunnell Road, Grier Road, and University Road.

Figure 3-5: NNMC Region Roadway Network



Source: Appendix C, Transportation Study.
* A site entrance directly from I-495 does not currently exist, but direct access from a potential I-495 ramp at this point was evaluated in Appendix C, Transportation Study.

Cedar Lane: This is a four-lane undivided roadway that is classified as an Arterial Road by the County. It runs east-west just north of the NNMC campus. There is no entrance to the NNMC campus from Cedar Lane.

Connecticut Avenue (MD 185): This six-lane divided roadway is classified as a Major Highway by the County. It runs north-south just to the east of NNMC, and extends from Washington, DC to Aspen Hill, east of the Rockville area in Montgomery County. MD 185 interchanges with I-495 to the northeast of the site. This roadway serves regional/commuter traffic and is traversed by several WMATA and County bus routes.

3.7.2 Key Analysis Locations

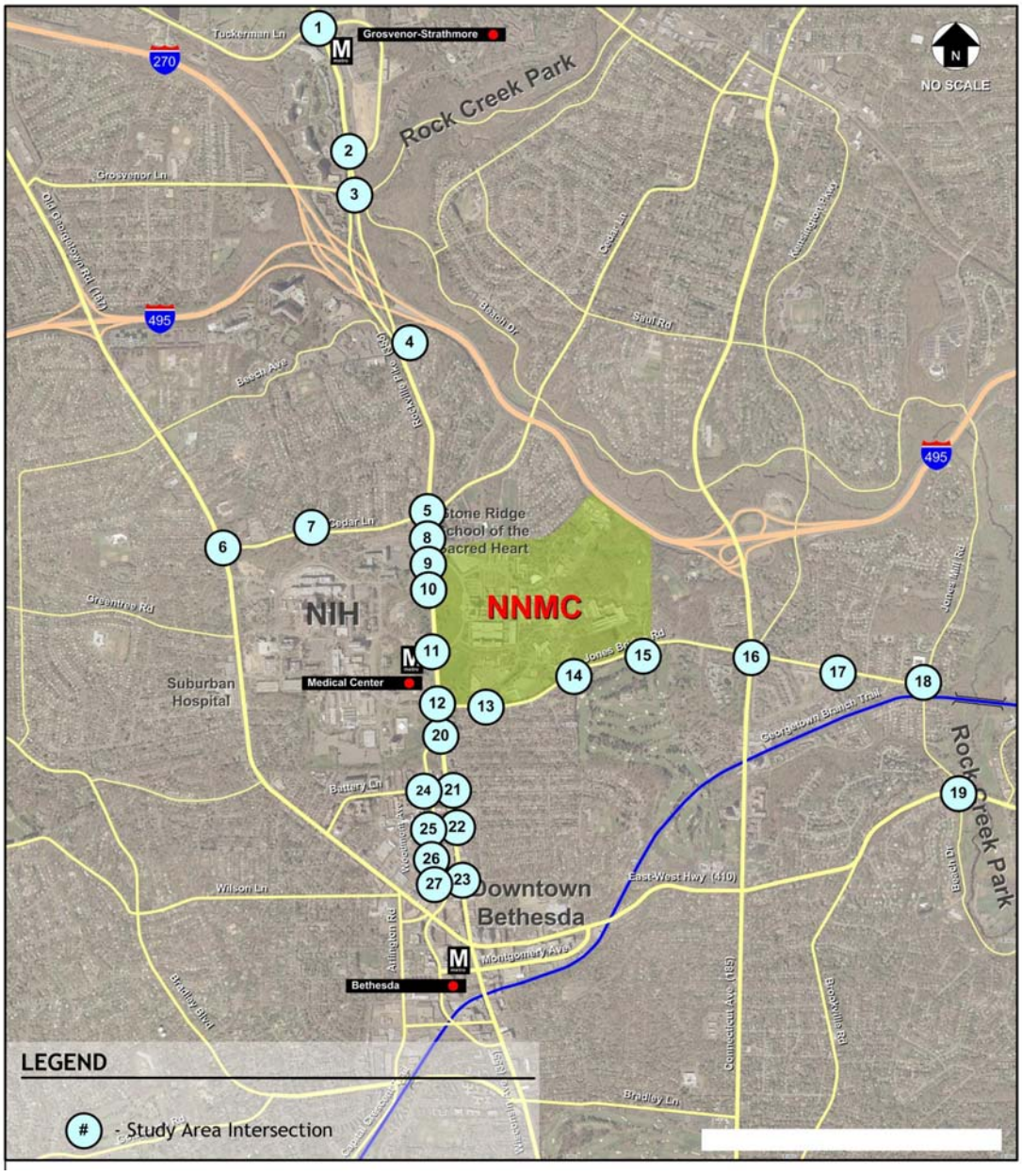
The study area for transportation consists of 27 intersections located in the vicinity of NNMC (Table 3-8).

Table 3-8: Study Intersections

No.	Intersection Locations	Signalized	Unsignalized
1	Tuckerman north & Rockville Pike	X	
2	Tuckerman south & Rockville Pike	X	
3	Grosvenor Lane & Rockville Pike	X	
4	Pooks Hill Road & Rockville Pike	X	
5	Rockville Pike & West Cedar Lane	X	
6	West Cedar Lane & Old Georgetown Road	X	
7	West Cedar Lane & West Drive	X	
8	Rockville Pike & North Drive		X
9	Rockville Pike & North Wood Road		X
10	Rockville Pike & Wilson Drive	X	
11	Rockville Pike & South Wood Road	X	
12	Rockville Pike & Jones Bridge Road	X	
13	Jones Bridge Road & Gunnell Road	X	
14	Jones Bridge Road & Grier Road	X	
15	Jones Bridge Road & University Drive		X
16	Jones Bridge Road & Connecticut Avenue	X	
17	Jones Bridge Road & Manor Road	X	
18	Jones Bridge Road & Jones Mill Road	X	
19	Jones Mill Road & East - West Highway	X	
20	Wisconsin Avenue & Woodmont Avenue	X	
21	Rockville Pike & Battery Lane	X	
22	Rockville Pike & Cordell Avenue	X	
23	Rockville & Cheltenham Drive	X	
24	Woodmont Ave & Battery Lane	X	
25	Woodmont Ave & Cordell Avenue	X	
26	Woodmont Ave & St. Elmo Drive	X	
27	Woodmont Ave & Cheltenham Drive	X	
Source: Appendix C, Transportation Study.			

Five intersections are located with gates to NNMC. Of the intersections to be analyzed, twenty-four are signalized and three are unsignalized. These locations were selected for traffic analysis based upon their proximity to the proposed development parcels, roadway traffic volumes, potential effect of the development scenarios on each location, and requirements from the M-NCPPC. The analysis locations within the project study area are listed in Table 3-8; locations corresponding to intersection number are in Figure 3-6.

Figure 3-6: Study Intersection Locations



Source: Appendix C, Transportation Study.

3.7.3 Traffic Volume Development

In order to assess traffic conditions within the study area, a comprehensive traffic data collection program was performed during the weekday morning and evening peak periods. The traffic data were used as the basis for analyzing the existing operating conditions at the key intersections within the study area. The traffic data collected consisted of manual turning movement counts, automatic traffic recorder (ATR) counts, and physical inventories of the key intersections within the study area.

3.7.3.1 Traffic Counts

The traffic counts used for this study were collected in September 2006 and March and April of 2007. The traffic counts were collected from 6:30 to 9:30 AM and from 4:00 to 7:00 PM, which are the two periods that are typically analyzed in transportation studies to determine AM and PM peak hours. Analyzing peak hours provides the most severe traffic conditions expected. The counts are summarized every 15 minutes and the four consecutive 15-minute periods in the AM and PM with highest total volumes are the AM and PM peak hours respectively.

The initial traffic count scope only included intersections in the immediate vicinity of NNMC; however, the scope was expanded as required by the Countywide Planning Division of the Maryland-National Capital Park & Planning Commission. Because of this expanded scope, the additional traffic counts of March and April 2007 were required.

In addition to the traffic counts, truck and pedestrian counts were also collected.

3.7.3.2 Peak Hour Traffic Volumes

Peak period traffic volumes were estimated from the traffic counts. Two different types of peak hours were found, one for the traffic entering NNMC and another for the background traffic. The AM and PM peak hours for NNMC traffic were found to be 6:30-7:30 AM and 4:15-5:15 PM, respectively. The AM and PM peak hours for the background traffic are 7:45–8:45 AM and 5:00–6:00 PM, respectively.

Field reconnaissance surveys were conducted at each of the key intersections to establish the existing physical characteristics including roadway and lane widths, the number of travel lanes, lane utilization (turn prohibitions), and signal timing and phasing data. Together with the field reconnaissance surveys, the peak hour volumes were used in the development of a traffic simulation model prepared to conduct the capacity analysis.

3.7.4 Capacity Analysis

The purpose of the capacity analysis is to determine the operational characteristics of key intersections (signalized and unsignalized) and interchange ramps within the study area. The peak hour capacity analysis follows the Montgomery County Local Area Transportation Review (LATR) guidelines (M-NCPPC 2004). In these guidelines the

capacity analysis is based on the Critical Lane Volumes (CLV) and their standards (maximum permissible volumes).

Level of service (LOS) is another common way of defining intersection capacity, provided by the Transportation Research Board. In this approach, LOS ratings range from A to F, where A represents minimal delays and F represents roadways that are over capacity and excessive delays with longer queues are common as a result of over-saturated conditions. Generally LOS ratings of A – D are acceptable while E, which is approaching capacity, is either acceptable or not depending on the jurisdiction. Level F, over capacity, is always unacceptable. Approximate level of service ranges are defined by the University of Maryland to correlate with the critical lane volumes observed at each intersection as defined by M-NCPPC in the LATR guidelines. Table 3-9 shows the level of service ranges when 1,600 vehicles represents maximum lane capacity per hour.

Table 3-9: Intersection Level of Service / CLV Ranges

LOS	CLV Range
A	0 - 1,000
B	1,001 – 1,150
C	1,151 – 1,300
D	1,301 – 1,450
E	1,451 – 1,600
F	Over 1,600
Source: (MSHA, 2007).	

Based on the jurisdiction of the intersection, 17 of the 27 intersections evaluated in the EIS – those in Bethesda/Chevy Chase – have maximum lane capacities of 1,600; the seven in Bethesda CBD have capacities of 1,800, and three in North Bethesda have capacities of 1,550. All of the intersections with impacts from the BRAC alternatives that are specifically noted in Section 4.7 are in Bethesda/Chevy Chase and have maximum lane capacities of 1,600.

3.7.5 Existing Intersection Level of Service

Detailed capacity analyses were conducted at the 27 key intersections during weekday daily AM and PM peak operating conditions. Traffic volumes, intersection geometry (lane utilization, lane widths, etc.), and signal timing data were collected in the field during the critical peak hours and used in the analysis. The results of the analysis (Table 3-10) reflect existing AM and PM peak hour LOS for intersections within the immediate area of NNMC.

Three intersections experience congestion and LOS that exceed the acceptable values (LOS F), one in both the AM and PM peak hours and two intersections in the PM peak hour. These values are highlighted in the table.

Table 3-10: Existing LOS at Study Intersections

No.	Intersection Locations	AM Peak Hour	PM Peak Hour
1	Tuckerman north & Rockville Pike	C	C
2	Tuckerman south & Rockville Pike	A/B	A
3	Grosvenor Lane & Rockville Pike	C	A/B
4	Pooks Hill Road & Rockville Pike	E	D
5	Rockville Pike & West Cedar Lane	F	F
6	West Cedar Lane & Old Georgetown Road	C	E
7	West Cedar Lane & West Drive	A	A
8	Rockville Pike & North Drive	E	C
9	Rockville Pike & North Wood Road	B/C	D
10	Rockville Pike & Wilson Drive	D	E
11	Rockville Pike & South Wood Road	B/C	B/C
12	Rockville Pike & Jones Bridge Road	D	E/F
13	Jones Bridge Road & Gunnell Road	A	A
14	Jones Bridge Road & Grier Road	A	B
15	Jones Bridge Road & University Drive	A	A/B
16	Jones Bridge Road & Connecticut Avenue	D/E	F
17	Jones Bridge Road & Manor Road	A	A
18	Jones Bridge Road & Jones Mill Road	C	A
19	Jones Mill Road & East - West Highway	B/C	D/E
20	Wisconsin Avenue & Woodmont Avenue	B	B
21	Wisconsin Avenue & Battery Lane	A	A
22	Wisconsin Avenue & Cordell Avenue	A	A
23	Wisconsin Avenue & Cheltenham Drive	A	A
24	Woodmont Ave & Battery Lane	A	A
25	Woodmont Ave & Cordell Avenue	A	A
26	Woodmont Ave & St. Elmo Drive	A	A
27	Woodmont Ave & Cheltenham Drive	A	A

Source: Appendix C, Transportation Study. Intersections above/close to capacity are shaded.

3.7.6 Pedestrian and Bicycle Facilities and Circulation

Figure 3-7 shows the pedestrian controls at study area intersections. The campus land uses are connected by a network consisting of sidewalks, crosswalks and other pedestrian amenities. There are no exclusive bicycle travel facilities on the campus.

The primary pedestrian flow occurs among three land use categories, namely the Metro transit center across Rockville Pike from the South Gate of NNMC, the parking lots and campus building facilities. The building facilities can be divided into five broad categories, namely Medical, Research, Education (USUHS), Community Services, and Residential. Secondary pedestrian flow occurs between two interactive facility land uses like the Medical facilities and the Community Services (which include employee amenities like gym/day care and restaurants) or between Research and Medical facilities. All the major

land uses are within a five-minute walking distance from the center of the campus (See Figure 2-1).

An inventory of the pedestrian and bicycle facilities was conducted in the vicinity of the NNMC campus and downtown Bethesda. The findings indicate that the facilities in downtown Bethesda have generally good quality (See Figure 3-8). Sidewalks generally have widths greater than 5 feet (minimum recommended by FHWA and ITE), are in good condition, have a good buffer zone between pedestrians and vehicles (4 to 6 feet is desirable), are American with Disabilities Act (ADA) compliant, have good crosswalk markings, and have good pedestrian signage.

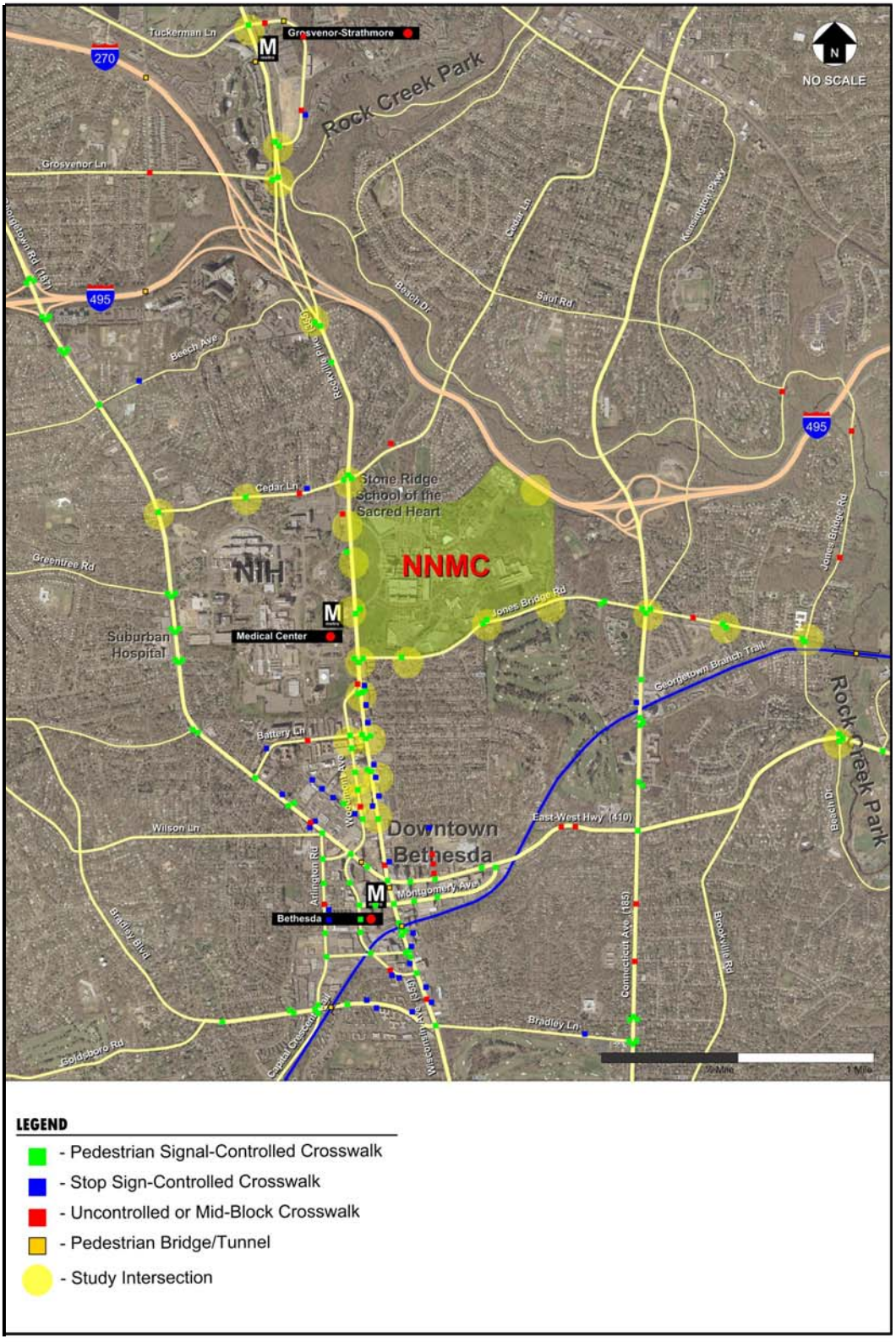
When considering the facilities near the NNMC campus the findings are different. There are instances where the sidewalks are overly narrow, have mid-path obstructions, and are not adequately separated from adjacent vehicle traffic. There are also poorly marked crosswalks and curb-ramps that aim the pedestrians into the center of an intersection (for more detail, refer to Appendix C, Transportation Study). Sections that local government might consider for improvement include (see Figure 3-8):

- East side of Wisconsin Avenue (between Battery Lane and Jones Bridge Road)
- East side of Rockville Pike (between Jones Bridge Road and Cedar Lane)
- Both sides of Rockville Pike (between Cedar Lane and Pooks Hill Road)
- Cedar Lane (between I-495 and Rockville Pike)

There are two intersections that in the past have had several pedestrian accidents; however, the accident rate for these intersections is below the maximum acceptable rate of 1 accident per million entering vehicles. These intersections are:

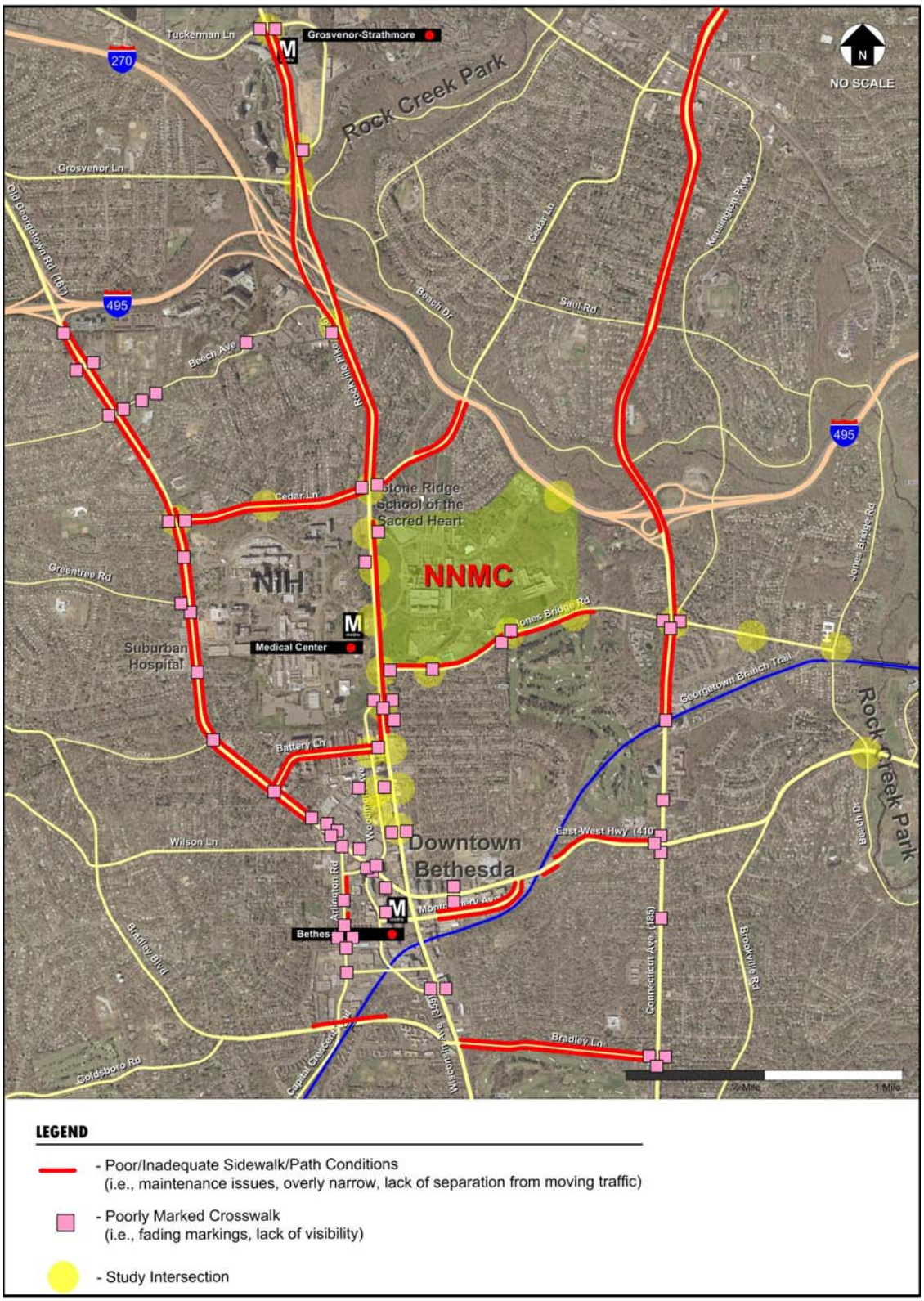
- South Drive and Rockville Pike with an accident rate of 0.44 per million entering vehicles and
- Jones Bridge Road and Rockville Pike with an accident rate of 0.36 per million entering vehicles.

Figure 3-7: Study Intersection Pedestrian Controls



Source: Appendix C, Transportation Study.

Figure 3-8: Existing Condition of Pedestrian Facilities

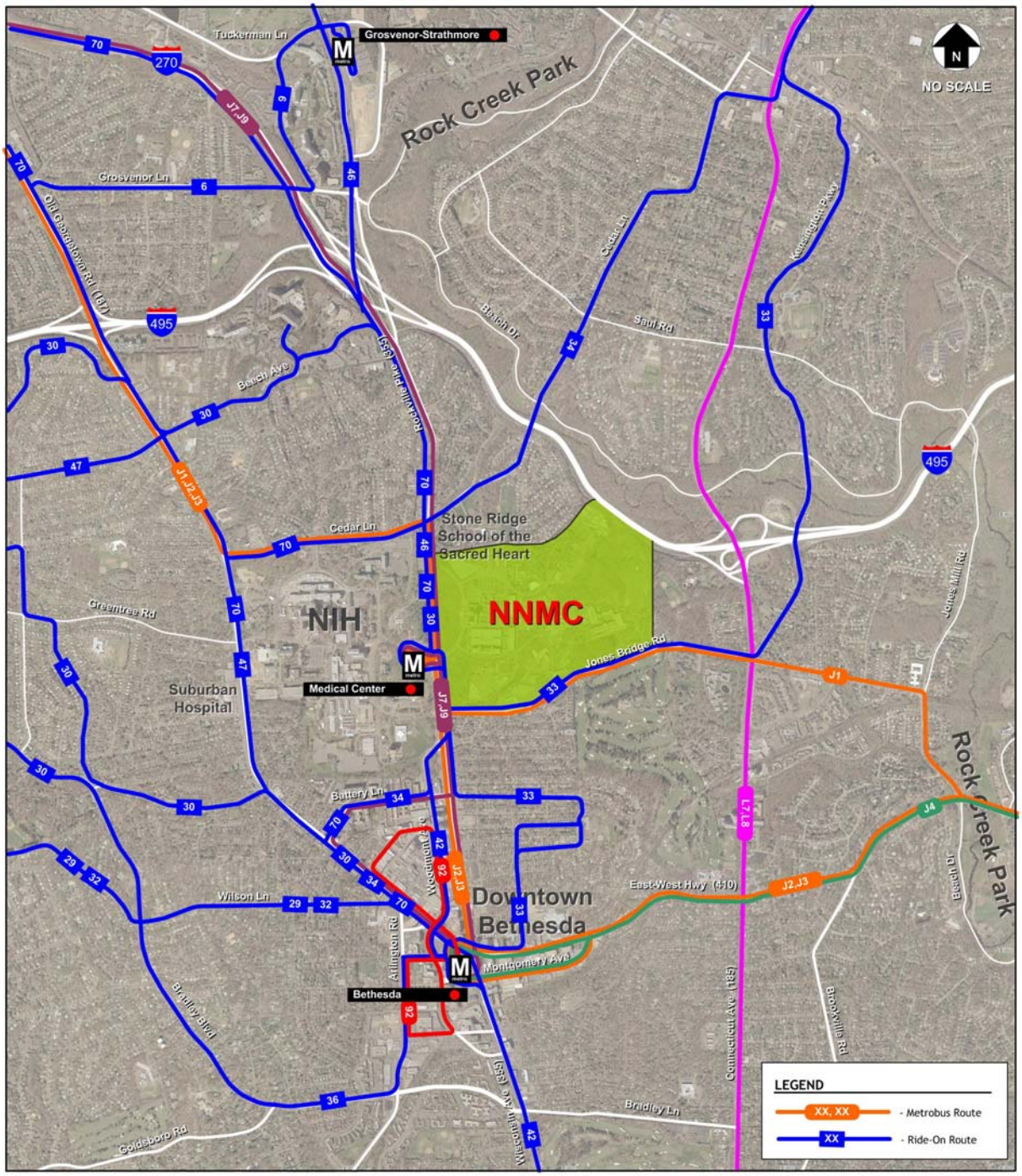


Source: Appendix C, Transportation Study.

3.7.7 Transit

NNMC is well served by public transportation facilities as shown in Figure 3-9. NNMC also financially supports its military and civilian employees' use of transit through the Mass Transportation Fringe Benefit (MTFB) Program.

Figure 3-9: Transit Serving NNMC Area



Source: Appendix C, Transportation Study.

3.7.7.1 Rail

The campus is located at the Medical Center Metrorail Station on the Red Line of the Washington Metropolitan Area Transit Authority (WMATA) Metrorail system. The station opens at 5:00 AM on weekdays and at 7:00 AM on weekends. It closes at 12:30 AM from Sunday through Thursday, and at 3:30 AM on Friday and Saturday. The trains operate with headways of 3 to 6 minutes during the peak weekday morning and afternoon periods, and with headways of 6 to 15 minutes during the weekday off-peak periods. The current number of weekday boardings/alightings at this station is 5,100, representing an 88-percent increase since the opening of the station in 1985. During the weekday morning peak period (5:30 AM – 9:30 AM), approximately 2,845 riders use this station. A significant number (1,780 or 63 percent) of the riders arriving at the station have work as their destination.

3.7.7.2 Bus

The Medical Center Metrorail Station is a major stop/transfer point for several WMATA and Montgomery County Ride-On bus routes. Metrobus routes serving the Station and the campus are as follows:

- J1 route provides rush hour only service between the Metro stations between Silver Spring and NIH Medical Center via Jones Bridge Road with 20 to 30 minute headways.

- J2 and J3 routes offer through service between the Silver Spring Metrorail Station and Montgomery Mall with intermediate stops in the Bethesda Central Business District (CBD) and at the NIH Medical Center Metro Station. These operate at 7-minute headways during peak hours and 20-minute headways during off-peak hours.

Routes J7 and J9 are two relatively new lines that comprise the "I-270 Express". They run between the Lake Forest Transit Center Station and the Bethesda Metro Station. The J7 also serves Rockville Park and Center Drive/Wood Road, while the J9 also serves the Route 124 Park and Ride lot in Montgomery Village and Battery Lane in Bethesda.

There are six Ride-On Routes serving the Medical Center Metro Station, as follows:

Route 30 is a local collector route that circles through neighborhoods between the NIH and the Bethesda Metro Stations. It operates Monday through Saturday with approximately 30 minute headways.

- Route 33 serves the communities of Kensington and Layhill and the Glenmont, Medical Center and Bethesda Metro Stations. It operates Monday through Friday only during peak hours.

- Route 34 serves the communities of Aspen Hill and Bel Pre and the Wheaton, Medical Center and Bethesda Metro Stations. It operates

7 days per week with 15 to 30 minute headways on weekdays and approximately 30 minute headways on weekends.

- Route 42 provides service between the Medical Center Metro and the Friendship Heights Metro stations via Woodmont and Wisconsin Avenues. It operates 7 days per week with approximately 30 minute headways.

- Route 46 connects NNMC with Rockville and Montgomery College-Rockville, serving as a feeder to Metrorail stations along the route (Rockville, Twinbrook, White Flint, Grosvenor and Medical Center). It operates 7 days a week, with 15 to 20 minutes headways on weekdays and 20 to 30 minute headways on weekends.

- Route 70 Express is a relatively new express service between the Germantown Milestone park-and-ride lot (near I-270 Exit 15) and Bethesda. It operates Monday through Friday, peak hours only, with headways of approximately 15 to 25 minutes.

3.7.7.3 Commuter Rail

Commuter rail service is available via the Maryland Rail Commuter (MARC) "Brunswick" line. Trains originate in Martinsburg, West Virginia or Brunswick and Frederick in Maryland, and travel to Union Station in Washington, DC in the AM hours with reverse movements occurring in the evening. All trains stop in Rockville about six miles to the north of the NNMC Bethesda campus, where a connection can be made to the Metro Red Line. MARC currently operates nine (9) trains inbound to Washington in the morning and ten (10) trains outbound in the evening.

MARC service from Baltimore to Union Station is available on both the "Camden" and "Penn" lines. The "Camden" line has an interim stop at Greenbelt and the "Penn" line has an interim Metro stop at New Carrollton, but this does not offer the same convenience and time savings as an interim Red line stop near NNMC. Similarly, the Virginia Railway Express (VRE) operates service from Fredericksburg and Manassas, Virginia with interim stops along the Metro line, but no direct connection to the Red Line until Union Station.

3.7.7.4 Employee Commuter Support

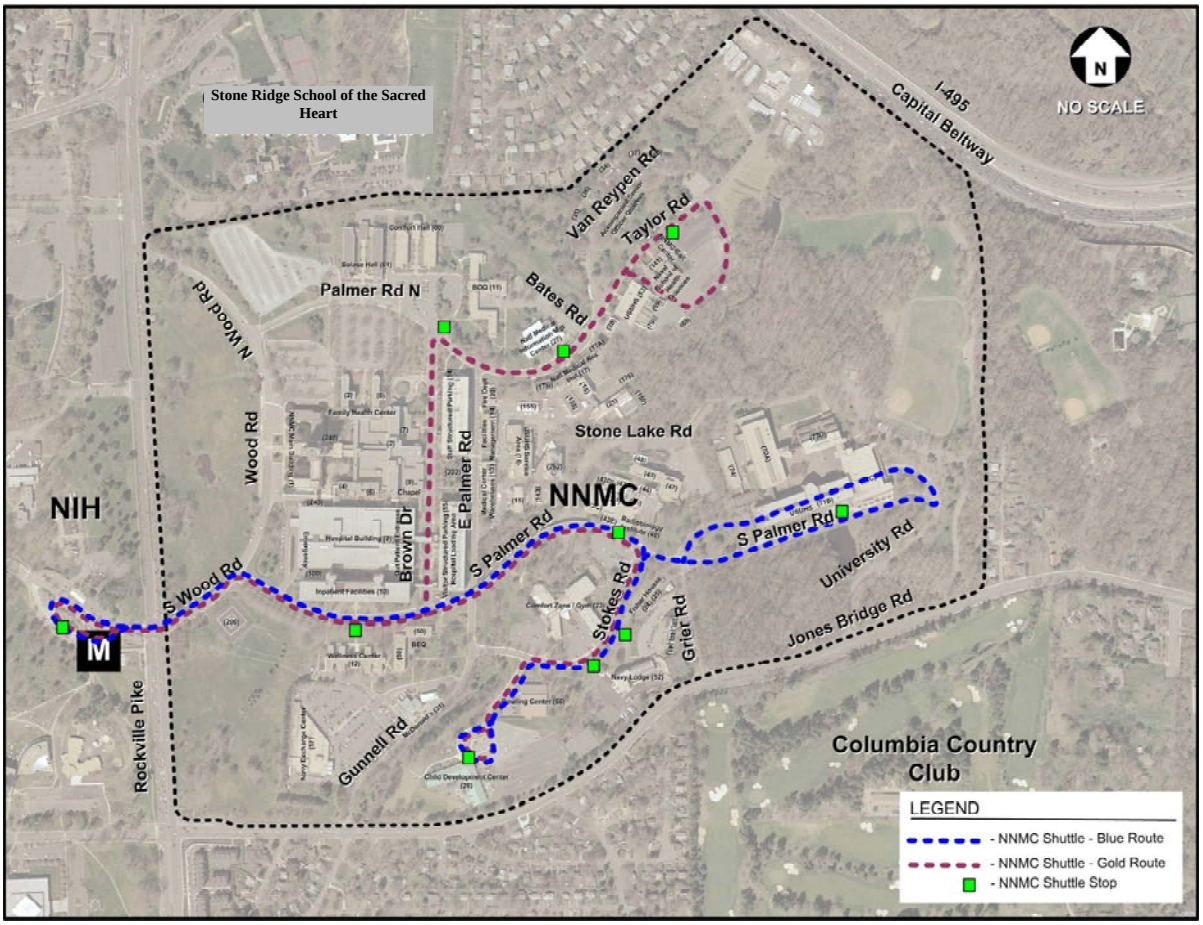
NNMC provides Metrochecks to its military and civilian employees under the MTFB Program. The DOT-sponsored Metrochecks up to a maximum value of $110 per month are provided to each employee registered for the program. As of November 1, 2006, 1,923 NNMC employees (24 percent of 8,000 employees) and 1,410 Walter Reed employees were registered in this program. The Metrochecks can be used towards expenses incurred in any mass transit to and from work such as the Metrorail, Metrobus, MARC Train, and registered van pools. An MTFB program member is not permitted to park any car in the NNMC campus and is instructed to remove any previously-held parking sticker from the vehicle.

3.7.7.5 NNMC Shuttle Services

NNMC operates two shuttle bus lines from the Medical Center Station, the Blue Line and the Gold Line as shown in Figure 3-10. They run approximately every 15 minutes from 6:10 AM until about 9:00 AM and from 2:45 PM until about 5:30 PM. Both serve the Hospital and the Child Development Center. The Blue Line also serves the AFRRI, Fisher Houses, Navy Lodge and USUHS, while the Gold Line also serves the Satellite Pharmacy. The average monthly and daily ridership during a seven-month period in 2004 was 3,000 and 143, respectively. These shuttle buses are used by patients, visitors, and staff.

NNMC is also accessed by shuttle bus services operated by other DoD Agencies. These include the Annapolis Naval Station (two daily trips each way), BUMED complex (four daily trips each way), Patuxent River Naval Air Station (one trip out, two trips back each day), Marine Corps Base Quantico (one trip out, two trips back each day), and Walter Reed Army Medical Center (approximately 15 round trips each day). Approximately 280 people (primarily staff) use the shuttle service on a daily basis.

Figure 3-10: NNMC Shuttle Bus Routes



Source: Appendix C, Transportation Study.

3.7.8 Parking

Inventories and occupancy surveys were conducted during the late September-October 2006 period to assess the existing campus parking situation. The NNMC campus has a total of 6,123 parking spaces, which are distributed among several surface lots, garages and on-street areas. The locations of the campus parking facilities and a numerical breakdown of the parking by facility type are provided by Appendix C, Figure 13 and Table 7, respectively.

3.7.9 Helicopter Operations

Refer to Section 3.5.1.2.

3.8 Cultural Resources Existing Environment

Potential impacts to cultural resources include impacts on buildings, sites, structures, districts, and objects eligible for or included in the National Register of Historic Places (NRHP); cultural items as defined in the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990; American Indian sacred sites for which access is protected under the American Indian Religious Freedom Act (AIRFA) of 1978; archaeological resources as defined by the Archaeological Resources Protection Act of 1979; and archaeological artifact collections and associated records as defined by 36 CFR Part 79.

The affected environment for cultural resources is potentially the entire 243-acre installation plus any adjacent off base resources on or eligible for the NRHP that may be impacted by development or operations at NNMC Bethesda. The identification of significant cultural resources depends upon professional cultural resource surveys carried out with reference to established contexts and the official criteria for NRHP eligibility.

Eligibility for the NRHP is established according to the official Criteria of Evaluation issued by the Department of the Interior. In broad terms, evaluation criteria are based on the following factors:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> 1. That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> 2. That are associated with the lives of persons significant in our past; or
>
> 3. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a

significant and distinguishable entity whose components may lack individual distinction; or

4. That have yielded or may be likely to yield, information important in prehistory or history.

The information immediately below is largely excerpted from the October 2002 ***National Naval Medical Center, Bethesda, Maryland Integrated Cultural Resource Management Plan (***ICRMP, 2002***)***. It has been updated, where necessary, by personal communication with NNMC Bethesda Facilities Management personnel.

3.8.1 Prehistoric and Historic Background

The 12,000 years of human occupation of northeastern North America prior to the sustained arrival of the Europeans begin in 10,000 B.C.E. with the Paleo-Indian Period characterized by hunter/gatherers living in seasonal camps near streams and other sources of fresh water. In the Archaic Period, from 8,000 to 1,000 B.C.E., subsistence from hunting and gathering may have been supplemented by horticulture toward the later part of the period as seasonal villages began to appear. The Woodland Period, which occurs after 1,000 B.C.E., was marked by the appearance of ceramics as American Indians continued to live in seasonal campsites and villages and subsist through hunting, gathering, and horticulture.

Limited investigations indicate that human activity at the future NNMC occurred from the Early Archaic to the Early Woodland periods. Pottery and artifacts from around 3,000 B.C.E. have been found at a site on the nearby NIH property. Three locations at NNMC have yielded groupings of prehistoric artifacts; other "isolates" have been found. It is believed by archaeologists that Native American families may have camped along tributary streams such as Stoney Creek in the autumn and winter during their seasonal migration for subsistence.

The European American history of the site began when Thomas Fletchall purchased the property containing the future NNMC. He later sold it to Thomas Clagett, a member of the prominent Southern Maryland landholding family. Presumably it would have been used primarily for tobacco cultivation in the early 18th century, as this monoculture dominated the rural landscape in Maryland prior to its exhaustion of the soil in many areas. The location of the property along the road between Georgetown and Rockville tied it into the developing economic network of the region. A major plantation house called "Green Sod" occupied the current site of the hospital in the mid-19th century. The property continued to be used for farming through the early 20th century despite the growth of the villages and towns connected by the Rockville Pike.

In the 1930s, the Roosevelt Administration, and President Franklin D. Roosevelt himself (a former Assistant Secretary of the Navy), began to look into the state of medical care for naval personnel in the United

States. The early "marine hospitals" in the major ports had been replaced by an assortment of naval hospitals along the coasts at which standards of care and specialties varied. Washington alone had five. Training, medical research, and patient care all had to be accommodated.

Legislation passed by Congress in 1930 to improve naval medical care did not immediately lead to the construction of new facilities. Many functions continued to be housed in buildings at the Old Naval Observatory at 23rd and E Streets N.W. in Washington. In addition to the office of the Surgeon General of the Navy, a naval medical school, and a hospital, related activities such as a dental school, a medical research institute, and a medical library crowded into the limited space at 23rd and E. An ambitious plan for redeveloping the site at a greater density was thwarted by concern for its impact on the surroundings, particularly the nearby Lincoln Memorial.

In 1937 Congress specifically authorized and funded the construction of a new naval medical complex, but a new site had to be selected. By this time, the requirements were not just for a medical school and hospital of the highest quality, but for the Naval Dental School, the Naval Medical Research Institute, and a Hospital Corps School for the WAVES (Women Accepted for Volunteer Emergency Services), and facilities for various occupational and recreational activities. Residential and support facilities for doctors, nurses, and corpsmen were also needed.

President Roosevelt assumed an active role in both the conceptual design and the site selection for the complex. In 1937, Roosevelt, impressed by the modernist design of the 1924 Nebraska State Capitol designed by Bertram Goodhue, sketched out a rough sketch on White House stationary of a plan and elevation for a building of similar architectural character. When the selection of a site for the new naval medical center bogged down in controversy, Roosevelt invested his own time visiting many potential sites and made the selection himself. The farmstead on the road to Rockville in rural Montgomery County, Maryland proved salubrious in aspect, convenient to the capital and spacious enough for new building with room for expansion.

The realization of Roosevelt's notional design was assigned to the Navy's Bureau of Yards and Docks (BuDocks). Fortunately, the execution of the design was supervised by the distinguished consulting architect Paul Philippe Cret working in cooperation with BuDock's Frederick Southworth. The scale of the central building increased but followed Roosevelt's basic plan. The core complex of buildings was built between 1939 and 1941 and dedicated by President Roosevelt on August 31, 1942. Obviously, the timing of its completion was fortuitous in that World War II was then well underway.

Over time the Bethesda complex acquired new tenant commands, often geared to the particular requirements of military medicine. The Naval School of Hospital Administration, the Naval Toxicology Unit and the

Armed Forces Radiobiology Research Institute were among them. One example of the focus on medical care that related to the circumstances of naval service is the research carried out at the Naval Medical Research Institute on decompression making use of hyperbaric chambers. In 1973, the hospital and the tenant commands were combined in one organizational structure called the National Naval Medical Center. Also during this period, a single armed services medical school, the USUHS was built at the southeastern corner of the NNMC property.

The historic significance of NNMC Bethesda lies in many areas. First, it has provided care to thousands of American service personnel over a 60-year period stretching from World War II through the Korean Conflict, the Vietnam War, and today's wars in Iraq and Afghanistan. It has also served as the "hospital of Presidents", and maintains a medical suite for the President of the United States in the Central Tower Block. Research carried out at NNMC Bethesda has contributed to many medical achievements such as blood vessel and bone grafting techniques, radioactive treatment of tumors, and improved prostheses. The architectural distinction of its original Art Deco and then "Stripped Classical" buildings has been joined by a mature designed landscape that contributes to an ambience of calm and healing. Lastly, as the facility at the apex of the Navy's medical practice, it has diffused developments in the best practices of military health care throughout the Navy's medical system.

3.8.2 Status of Cultural Resource Inventories and Section 106 Consultations

NNMC Bethesda is in compliance with the mandate of Section 110 of the NHPA to survey, inventory and evaluate NRHP eligibility for all cultural resources under its control. This has been accomplished through cultural resources surveys carried out by professionally qualified consultants, whose conclusions, once endorsed by the Navy, have been reviewed and confirmed by the Maryland SHPO. Section 106 of NHPA, as set out in the procedures of 36 CFR Part 800, requires that federal agencies such as the Navy/NNMC Bethesda take into account the effect of any undertaking upon NRHP eligible resources and allow the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment upon the adequacy of that consideration. With recent revisions to ACHP's procedures, this consultation process has become, more than ever, a dialogue delegated to the cognizant SHPO and the public, except in exceptional circumstances of national significance or the setting of new precedents. In the National Capital Region, the NCPC is also frequently a participant. As with NEPA, the obligation of the federal agency under NHPA is one of taking into account and incorporating into its project planning certain values, such as historic preservation. However, the federal agency retains the final decision in balancing these values with its mission imperatives.

3.8.3 Built Environment

The 243-acre NNMC campus contains 90 buildings. The pattern of development has been determined by several factors:

1. the prominence of the original Central Tower Block (Building 1) with its 20-story tower and flanking pavilions on a rise of land overlooking a semi-elliptical greensward sloping down to Rockville Pike,

2. the logical ramification of additional buildings to the rear and then to the north and south of Building 1,

3. the supplementary access provided by Jones Bridge Road along the southern perimeter (the only other border not blocked by private property), and

4. the less buildable uneven terrain of the rear or eastern half of the installation due to the unnamed tributary to Stoney Creek and its drainage system.

Since the passage of the NHPA in 1966, the standards for documenting resources eligible for the NRHP have become more professional and systematic. The history of cultural resource surveys at NNMC reflects this evolution in that it began with a National Register nomination of the installation's major landmark, the Central Tower Block, in 1975 and only achieved a systematic evaluation of the NRHP eligibility of all buildings and structures in 1998. Because of the general rule that resources must be at least 50 years old to qualify for eligibility unless they are of outstanding significance, 100 percent completion in buildings surveyed is necessarily a moving target.

As indicated above, the first action to comply with NHPA Section 110 survey requirements for NNMC Bethesda was the drafting of a nomination to the NRHP of the Central Tower Block by Chesapeake Division, Naval Facilities Engineering Command (CHESDIV) of the Central Tower Block also known as Building 1. The NRHP form referenced architecture, science, military, and education as "areas of significance" and gave the dates of 1939 to 1942. It was accepted for listing on the National Register in March, 1977.

In 1996, a Phase I Historic and Archaeological Resources Protection Plan (HARP Plan) was drawn up by Baker Associates for the installation. This document, a management plan rather than a survey, did however incorporate a working inventory of potentially NRHP eligible resources that included the later buildings designed under the overall direction of Paul P. Cret, which were stylistically similar to Building 1. It was followed in 1998 by a comprehensive survey, also prepared by Baker Associates, which documented the architectural development of the medical complex during the period 1940 to 1945 and proposed a 131-acre historic district. The historic district contains 18 buildings and 1 landscape feature, (the lawn between Building 1 and Wisconsin Avenue) that are deemed contributing and 18 buildings that are non-contributing. The survey indicated that the district was eligible for the NRHP under Categories A, B, and C, and particularly for its association with Franklin D. Roosevelt and Paul Philippe Cret. The historic district was accepted as NRHP

eligible by a consensus determination between the Navy and the Maryland SHPO. Figure 3-11 shows the NNMC Bethesda Historic District.

The 2002 ICRMP for NNMC is primarily a comprehensive update of the earlier HARP Plan, i.e. the latest cultural resources management plan for the installation. It incorporates the prior architectural and archaeological surveys. It does not contain any evaluation of buildings that may have crossed the fifty-year threshold since 1998.

3.8.4 Archaeology

In general, the potential for archaeological resources at NNMC Bethesda has been limited by the extensive ground disturbance from farming prior to Navy acquisition and coverage in hardstand and building footprints due to the construction of the hospital complex and later buildings, especially in the western, more developed section of the installation. In the northeast area of the installation, the low rising landforms above the streambeds of the unnamed tributary to Stoney Creek and its tributaries have a greater potential for archaeology.

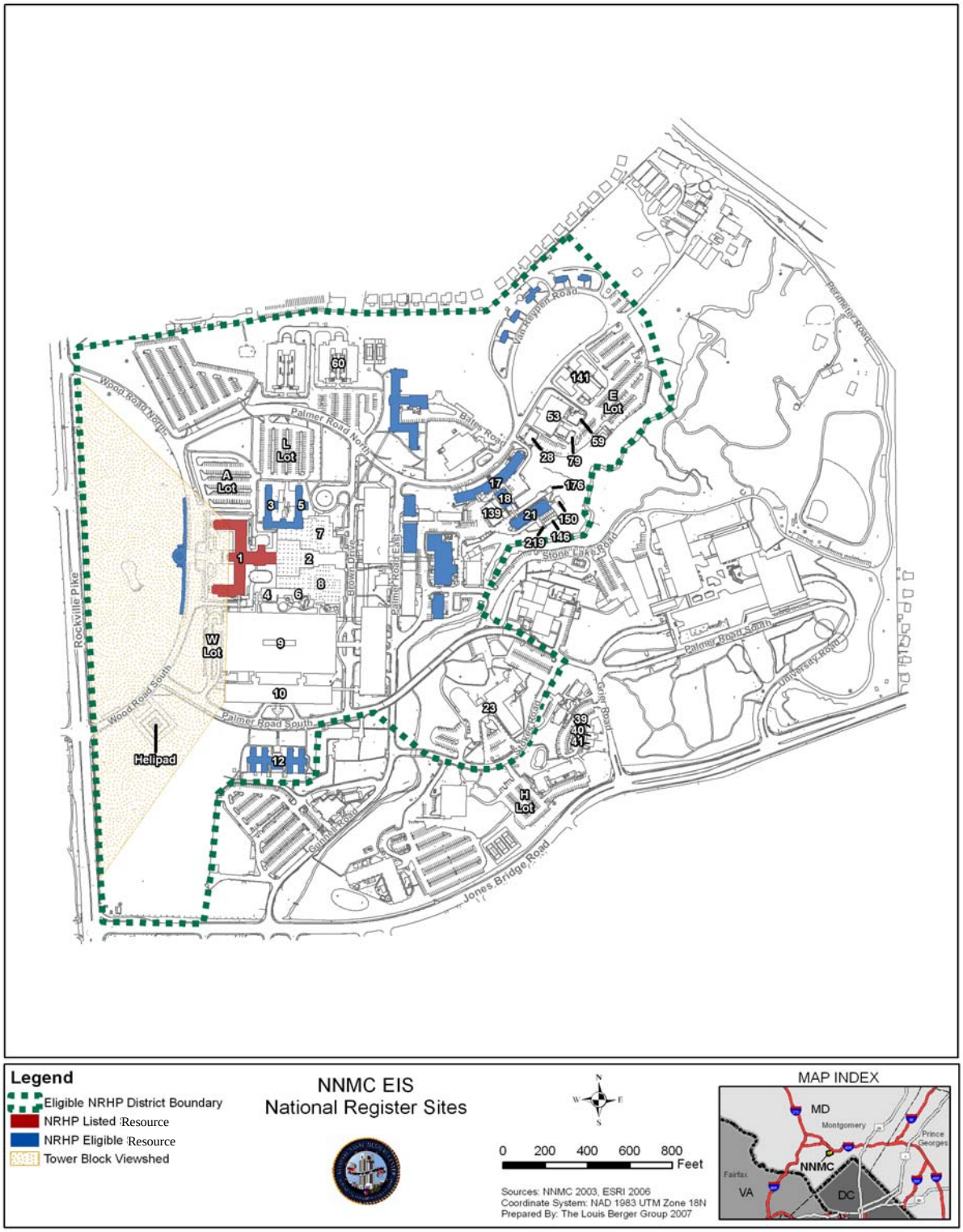
No archaeological survey involving fieldwork was done until 2001 when John Milner Associates carried out an Intensive Phase I Archaeological Survey on 36 acres deemed to have moderate to high probability for archaeological resources. Three prehistoric sites were identified, all in the northeastern corner of the base, and given the site numbers 18MO555, 18MO556, and 18MO557. Three isolates given the collective site number 18MOX101 were also found.

The report concluded that 18MO555 and 18MO556 had been adequately defined spatially but their NRHP eligibility could only be determined with further research; therefore they should be avoided. 18MO557 was deemed not NRHP eligible. The report also indicated that no further work on 18MOX101 was warranted. Because it is Navy policy, in keeping with NHPA, to restrict access to information on the location and nature of archaeological sites to avoid facilitating vandalism, Figure 3-12 shows only the general location of these sites.

3.8.5 Native American Resources/Sacred Sites

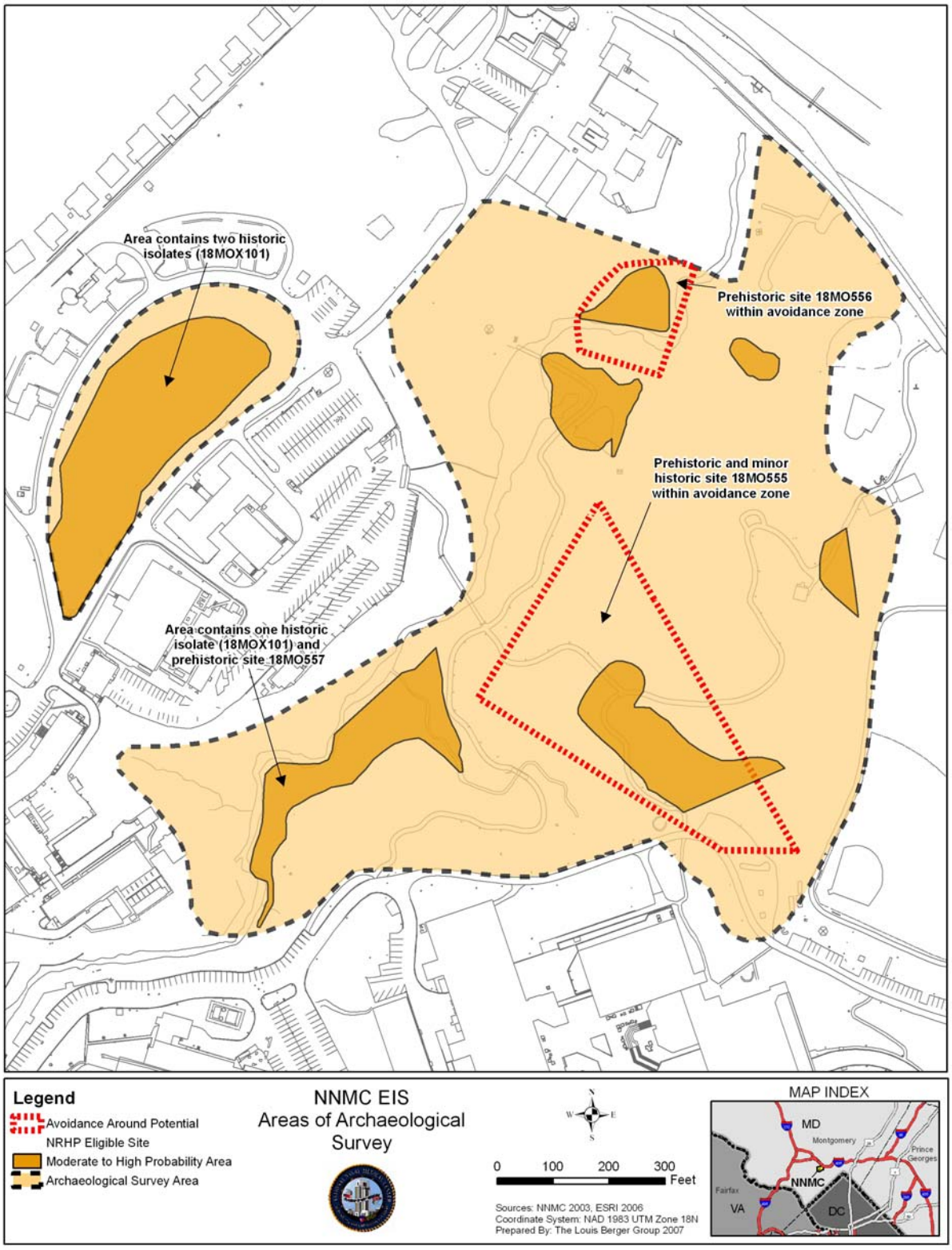
To date, no traditional cultural properties or American Indian sacred sites have been recorded at NNMC Bethesda. There are no federally recognized Indian tribes present in Maryland. However, some federally recognized tribes elsewhere in the United States may have a historical affiliation with the site due to past occupancy by their ancestors. The current NNMC ICRMP contains a complete list of laws and procedures relating to American Indian patrimony which would be implemented in the event of an unanticipated discovery. This issue will not be discussed further in the Cultural Resources sections in the EIS.

Figure 3-11: NNMC Historic District



Note: In Figure 3-11, numbered buildings and lots are those affected by Alternatives One or Two as discussed in Section 2.5; not all historic buildings above are numbered and not all numbered buildings are historic.

Figure 3-12: Archaeological Areas



Source: John Milner Assocs., Inc., 2001.

3.9 Land Use and Zoning Existing Environment

3.9.1 Geographic Setting and Adjacent Land Uses

NNMC is located in Bethesda, just outside Washington, D.C., in Montgomery County, Maryland. The 243-acre NNMC campus comprises the Navy's third-largest health care delivery system, and serves as the headquarters for its regional Health Care System. Its 90 buildings serve a wide variety of functions, from its primary mission of providing medical care to research and development, to buildings associated with the physical plant, community services, education, and residences, both temporary and long-term.

NNMC is surrounded by diverse land uses. NIH is located to the west, on the other side of Rockville Pike (MD 355). NIH is bounded on its western side by Suburban Hospital, with which it is affiliated. The close proximity of NNMC, NIH, and Suburban Hospital has led to collaboration between the three institutions to prepare a response in the event of a mass casualty event. NNMC is bounded to the east by the Capital Beltway (I-495) and the Columbia Country Club, which curves around to the south side as well. The Stone Ridge School of the Sacred Heart lies north of NNMC, between the Medical Center and Cedar Lane. The remaining land uses surrounding NNMC are characterized primarily by suburban residential development.

3.9.2 Installation Land Uses

Ten land uses are designated at NNMC: Medical, Administrative, Permanent Party Housing, Research, Education, Community Services, Maintenance, Parking, Outdoor Recreation, and Temporary Housing (Refer to Figure 2-1).

The primary focal point when looking east onto the campus from Rockville Pike is the historic tower that serves as the central hub of the medical facilities at NNMC, located just east of the ellipse, with permanent party housing to the north, and administrative and community facilities such as the Navy Exchange and Fitness Center located to the south. Maintenance and physical plant facilities are located directly east of the medical area, with more administrative facilities due north. The research area is located east of the maintenance facilities, bordered to the south by temporary housing, such as the Navy Lodge and Fisher House™. The eastern part of the installation is occupied by USUHS and ball fields, with another maintenance area in the northeast corner.

Similar or dependent uses have been collocated on campus to the extent possible, with medical facilities adjacent to permanent party housing and the main visitor parking garage, and administrative functions located centrally in the campus in an easily accessible location. Community facilities are collocated with temporary housing, to provide support and community for those staying on-base to be with recuperating family members.

3.9.3 Relevant Plans, Policies, and Land Use Regulations

NNMC is located within the area planned by M-NCPPC, which was created in 1972 to operate park systems and provide planning for most of Montgomery and Prince George's Counties in Maryland, as well as the District of Columbia. Montgomery County is divided into 37 planning areas; NNMC is located in Planning Area 35, Bethesda-Chevy Chase. The Mid-Bethesda sector of Planning Area 35 is described in the 1990 Bethesda-Chevy Chase Master Plan as a mature, stable area with little opportunity for redevelopment. It also notes that any actions at NNMC should be assessed for impacts to surrounding communities as well as to ensure that development is within guidelines of the master plan for the federal facilities. It also states that the landscaped buffer zones along NNMC's borders with neighboring communities should be reconfirmed so as to preserve the open space character of the site as development in the Central Business District (CBD) of Bethesda intensifies (M-NCPPC, 1990).

The 1990 Master Plan is currently being updated. The Bethesda-Chevy Chase Master Plan established seven goals and objectives for the planning area:

1. Perpetuate and enhance the high quality of life that exists in the Bethesda-Chevy Chase Planning Area.
2. Achieve a level of future employment development that is in balance with a high quality of life and the transportation capacity of the Planning Area.
3. Provide for a balanced housing supply so that persons of varying income levels, ages, backgrounds, and household characteristics may find suitable housing appropriate to their needs.
4. Protect the high quality residential communities throughout the Planning Area as well as the services and environmental qualities that enhance the area.
5. Achieve a significant shift of new travel from auto to transit and other mobility alternatives.
6. Protect the natural resources and environmental qualities of the Planning Area.
7. Contribute to a strong sense of community and help reinforce community cohesion (M-NCPPC, 1990).

The plan recommended maintaining the existing residential nature of the planning area, and did not put forth proposed changes in zoning. The plan also sanctioned a moderate level of future development, and supported moderate expansion of federal facilities, with the desire for growth to be able to be accommodated in the existing transportation infrastructure.

Three levels of future development, low, moderate, and high, were assessed with the assumption of moderate improvements to the road system. The result of the assessment indicated that only low or moderate growth would allow the road system to maintain an acceptable LOS for the planning area. These results were integral in the formation of the recommendations for moderate growth that would not exceed the capacity of the road system. The proposed level of development may be implemented through a variety of means, including:

1. Maintain or possibly increase the relative level of households compared to jobs.
2. Locate new employment and residential development in existing centers near Metro stations.
3. Recognize the importance of biomedical development in [the planning] area, but place less emphasis on large-scale office projects.
4. Support existing businesses, including those that meet community retail and service needs.
5. Support increasing housing densities and types, where compatible with nearby properties. (M-NCPPC, 1990).

The assumed transportation improvements were composed of moderate improvements to the highway system. Furthermore, it was assumed that future job development should be shared primarily between those areas specified in the Sector Plan, and federal employment centers, such as NNMC and NIH. This growth was intended to be coupled with efforts to increase the use of public transit and lower the level of traffic congestion.

The 1990 Bethesda-Chevy Chase Master Plan recommends that the existing zoning surrounding the NNMC campus remain unchanged. It does not recommend redevelopment, but does recognize that large lots and special exception sites may be developed in the next 20 years. For Old Georgetown Road and adjacent communities, the objective is to maintain the residential character, preserve neighborhood stability, and discourage further special zoning or land use exceptions, except for those that serve the community. If development of large lots and special exception sites should occur in the future, the plan recommends that the new land use be residential. The NNMC campus helps serve as a buffer between residential neighborhoods located north of the CBD and increasingly dense and urbanized development of the CBD.

The Bethesda CBD Sector Plan

The Bethesda CBD lies southwest of the NNMC campus, and covers 405 acres. The CBD contains a wide variety of shops, restaurants, apartments, and hotels, in addition to commercial office space. Development is concentrated primarily around the Bethesda Metro station, and surrounded by lower density development that transitions gradually to surrounding residential areas. Many of the restaurants

and retail stores that characterize much of Bethesda's CBD are located in Woodmont Triangle, in the northern part of the Bethesda CBD between Old Georgetown Road and Wisconsin Avenue (M-NCPPC, 1994). Figure 3-13 shows the location of the Bethesda CBD.

The 1994 Bethesda CBD Sector Plan was updated in 2006 with the Woodmont Triangle Amendment, which was written to address the fact that development in the Woodmont Triangle area did not proceed in accordance with the vision of the 1994 Plan. While the original Sector Plan recommended a range of densities for the various components of the business district, it concentrated the highest densities on the Metrorail Station and the immediate vicinity. It called for gradually decreasing densities between the core and the CBD fringe, as well as buffers between the CBD and the different adjacent uses on the fringe.

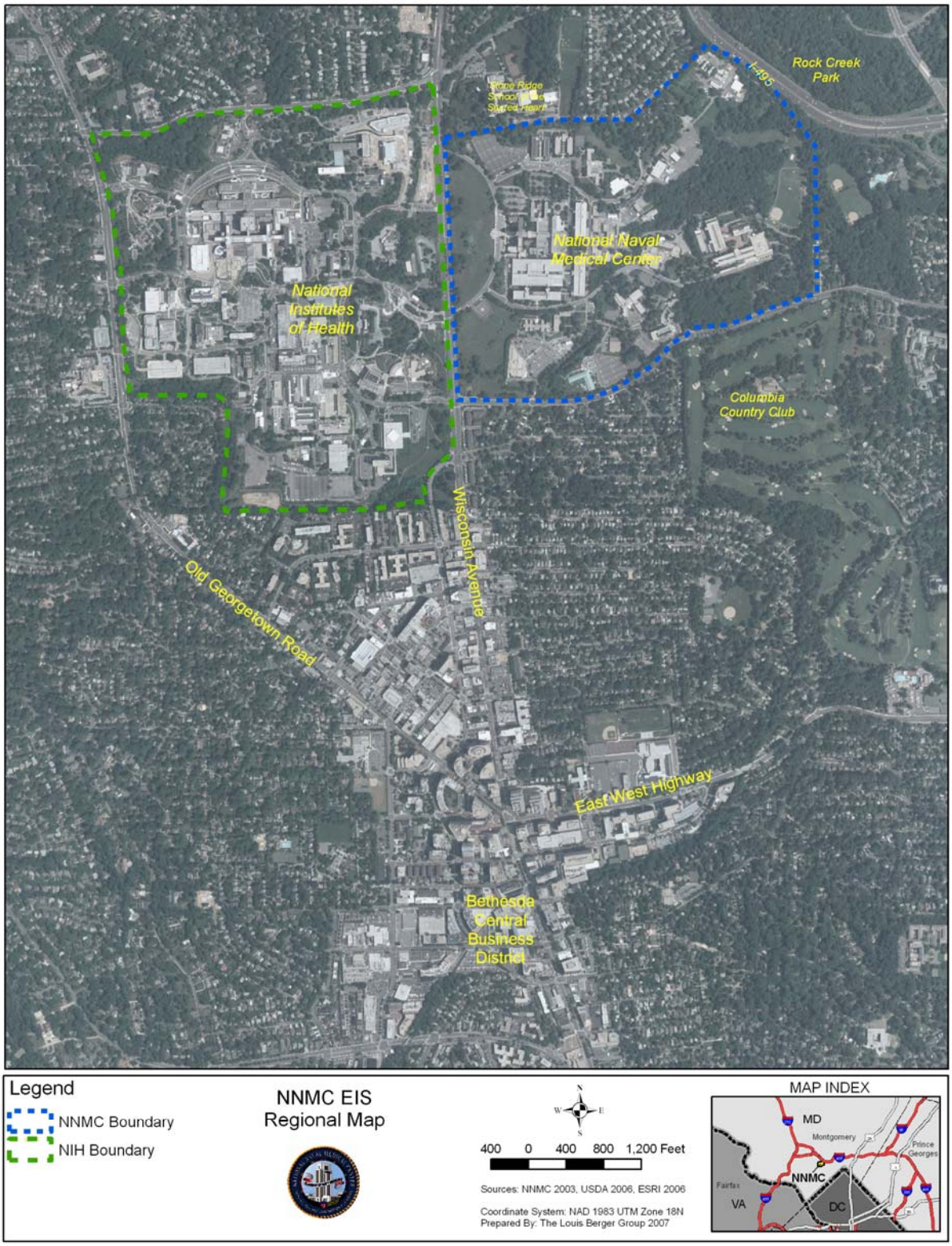
The building height and density limits in the 1994 Sector Plan were found to have inhibited redevelopment in the Woodmont Triangle, therefore they were reevaluated in the 2006 amendment. It focused on improving the supply of multi-income housing, encouraging small-scale retail, encouraging the establishment of the Bethesda CBD as an arts and entertainment district, promoting safe and attractive streets, and providing increased public amenities.

The primary focus is on increasing the amount of allowable residential development and decreasing the amount of future commercial development, with an increase in the allowable residential floor area ratio (FAR), and a recommendation for the implementation of a transfer of density program. The amendment also recommends a continuation of the present transit-oriented development. These recommendations are designed to foster growth, primarily residential growth, in the Woodmont Triangle area of the Bethesda CBD.

2003 NIH Master Plan Update

In 2003, NIH undertook an update of its 1996 Master Plan. The plan update and accompanying EIS, both completed in March 2005, examined the changes to the original Master Plan for any environmental impacts to the surrounding communities. The Master Plan update was found to have no significant impacts on surrounding land use. Furthermore, it was determined that it was compatible with the land use recommendations of the BCC Sector Plan, and provided a valuable buffer to residential areas to the north, which might otherwise have to deal with encroaching development from the Bethesda CBD (NIH, 2005).

Figure 3-13: Bethesda Central Business District



3.10 Socioeconomics Existing Environment

NNMC is located in Montgomery County, Maryland, which along with Prince George's County, Maryland and Washington, DC, comprises the socioeconomic ROI for this EIS. The geographical extent of the ROI is based on residential distribution of the installation's military, civilian, and contracting personnel and the location of businesses that provide goods and services to the installation and its employees. Although NNMC may draw personnel and patients from a larger geographic area, the ROI represents the area where the predominant socioeconomic effects of the proposed alternatives would take place. The area continues to undergo rapid growth, resulting in increased density and continued development pressure throughout the region.

The baseline year for the socioeconomic analysis is 2006, although much of the economic and demographic data for the ROI are available only through the year 2005. Wherever possible, the most recent data available are presented so that the affected environment descriptions are reflective of current conditions in the ROI.

3.10.1 Population Characteristics

NNMC is contained entirely within Montgomery County, Maryland, which has a population of 932,131 and has experienced rapid growth in recent years. The population was 757,027 in 1990 and is expected to grow to 990,000 by 2010, as shown below in Table 3-11, which also provides a breakdown of population for each county in the ROI.

Table 3-11: Population for ROI and Percent Change between Decades

Location	Year 1990	Pct Change	Year 2000	Pct Change	Year 2010	Pct Change	Year 2020
Montgomery County, MD	757,027	15.3%	873,341	13.3%	990,000	8.5%	1,075,000
Prince George's County, MD	729,268	9.9%	801,515	8.2%	867,650	4.6%	908,000
Washington, D.C.	606,900	-5.7%	572,059	-7.3%	529,785	-9.3%	480,540

Source: MSDC, 2006; CDC, 2006; U.S. Census, 2000.

Although growth is expected to slow, from 15.3 percent between 1990 and 2000 to 13.3 percent between 2000 and 2010, and then further to 8.5 percent between 2010 and 2020, the county is expected to remain the most populous in the ROI. Montgomery County is not the most densely populated area in the ROI, however. The District of Columbia (the District) has an estimated population density of 9,471 persons per square mile, as compared with 1,881 for Montgomery County. The population of the District, currently at 581,530, has been declining historically as residents have moved to surrounding counties in Maryland and Virginia. The District's population was 606,900 in 1990, marking a 5.7 percent decline in population between 1990 and 2000. Prince George's County, one of the most affluent predominantly

African-American counties in the United States, has a population of 841,315 with a population density of 1,651 persons per square mile, making it the least densely populated county in the ROI (US Census, 2000; MSDC, 2006; CDC, 2006).

Population breakdown by race is shown in Table 3-12. Percentage age distribution in the ROI is shown below in Table 3.13. The percentage of the population between the ages of 0 and 18 in Montgomery and Prince George's Counties is comparable to that of the State of Maryland, and slightly higher than the United States as a whole. The District of Columbia has a substantially lower percentage of population between the ages of 0 and 18, lower than the national percentage by four percentage points. The percentage of the population over the age of 65 in Washington and Montgomery County is comparable to Maryland and national figures, at 12.2 percent, 11.2 percent, 11.3 percent, and 12.4 percent respectively. However, Prince George's County, Maryland has an over-65 population of 7.7 percent, well below the state and national figures (US Census, 2000).

Table 3-12: Population Characteristics, 2005

	Total Population	% Race in Population					% Below Poverty	% Below 18
		White	African American	American Indian	Asian/ Pacific	Hispanic (of any race)**		
National*	299,398,484	80.2%	12.8%	1.0%	4.5%	14.4%	12.4%	24.6%
Maryland*	5,615,727	64.0%	29.3%	0.3%	4.9%	5.7%	9.2%	25.1%
Montgomery County, MD*	932,131	67.9%	16.4%	0.3%	13.2%	13.6%	6.5%	25.4%
Prince George's County, MD*	841,315	27.7%	66.1%	0.4%	4.0%	10.7%	9.3%	26.8%
District of Columbia*	581,530	38.0%	57.0%	0.3%	3.2%	8.6%	18.3%	20.5%

Source: US Census Bureau, 2000, 2007. *Totals may not add to 100 due to rounding. **Included in totals of other races.

Table 3-13: Percent Age Distribution in ROI

	2000		2010 Projection	
	0 to 18	65 and Over	0 to 18	65 and over
United States	24.6%	12.4%	26.9%	13.0%
Maryland	25.6%	11.3%	26.6%	12.2%
ROI	**0 to 18**	**65 and Over**	**0 to 18**	**65 and over**
Montgomery County	25.4%	11.2%	26.4	12.6
Prince George's County	26.8%	7.7%	28.7	9.9
Washington, D.C.	20.1%	12.2%	25.2%	11.5%

Source: U.S. Census, 2000.

As can be seen in Table 3-13, the percentage of the population over 65 in the majority of the ROI is projected to increase by 2010, which is consistent with national projections that show an overall aging population.

3.10.2 Economic Characteristics

Maryland's economy is expected to remain strong in the coming years, and the ROI is expected to likewise experience robust economic growth and continued development opportunities. Montgomery and Prince George's County, Maryland, have median household incomes that are substantially higher than the state and national averages, while Washington, D.C. falls far behind the rest of the ROI with a median household income at $46,211, slightly greater than the national average of $44,334. The median household income in Montgomery County, Maryland in 2000 was $71,551, as compared to the state median household income of $52,868 and the national median household income of $41,994. The poverty level in Montgomery County is among the lowest in the ROI at 6.5 percent for individuals, and is substantially lower than the state and national figures of 8.5 percent and 12.4 percent for individuals, respectively. Prince George's County's median household income was $55,256, and its poverty levels were also below state and national numbers at 7.7 percent for individuals.

3.10.3 Housing Characteristics

The ROI contains many contrasts in its housing profile, with large variations in ownership rates and median home values. Table 3-14 tabulates housing units in the ROI as of 2000.

Table 3-14: Housing Units in the ROI, 2000

ROI	Total Units	Percent Change 1990-2000	Occupied Units	
			Number	% Owner Occupied
Montgomery County, MD	334,632	13.1	324,565	68.7
Prince George's County, MD	302,378	11.9	286,610	61.8
Washington, D.C.	274,845	-1.3	248,338	40.8
United States	115,904,641	13.3	105,481,101	66.2
Maryland	2,145,283	13.3	1,980,859	67.7

Source: U.S. Census, 2000.

The ROI is characterized primarily by heavy suburban and urban development, with development constraints in place such as the Transfer of Development Rights (TDR) program in Montgomery County, which limits the amount of land available for future development in the County. Increases in housing units are not as dramatic between census years simply because the amount of available and buildable land is not plentiful.

Montgomery County is the only area in the ROI with a homeownership rate higher than that of the national average of 66.2 percent. Montgomery County has a homeownership rate of 68.7 percent, with a median home value of $221,800, far above the national median of $119,600. Prince George's County has a homeownership rate of 61.8 percent with a median home value of $145,600. Washington, D.C. lags behind in homeownership with a rate of 40.8 percent; however median home values are $157,200.

Multifamily housing and row houses are the predominant form of housing in Washington, D.C., comprising 26 percent and 31 percent of total housing units, respectively. By contrast, in Montgomery and Prince George's Counties, single unit detached housing accounts for more than 50 percent of all housing available.

3.10.4 Community Services and Facilities

3.10.4.1 Schools

Each county in the ROI operates its own independent school system to serve the students in its area. The Montgomery County Public School system (MCPS) is the 16th largest system in the United States and the largest in the state of Maryland. The county operates 129 elementary schools, 38 middle schools, 25 high schools, and seven alternative schools. The total enrollment in MCPS is 137,798 (MCPS, 2007). Prince George's County operates 138 elementary schools, 32 middle schools, and 24 high schools, inclusive of public charter schools, as well as nine special schools and two vocational schools (PGCPS, 2006). District of Columbia Public Schools operates 101 elementary schools, 20 middle/junior high schools, 20 high schools, six education centers, and 20 specialty schools. Enrollment data for the 2005-2006 school year show a total enrollment of 52,000, representing a sharp decline in enrollment in recent years, from more than 65,000 in 2003 (DCFPI, 2007; DCPS, 2004). Public charter school enrollment has been increasing, and is expected to continue to do so, with a 2005-2006 enrollment of 19,300 and a projected increase of 3,000 students next year (DCFPI, 2007).

3.10.4.2 Fire and Rescue Services

NNMC has its own fire department and has an agreement with NIH for first assistance, as well as assistance with hazardous waste and hazardous materials spill incidents. In addition, NNMC has a mutual aid agreement with the Montgomery County Fire and Rescue Department. The three fire and rescue departments perform drills together twice per year. The Montgomery County Fire and Rescue Department is composed of 1,100 career firefighters and approximately 1,100 volunteers who work out of 40 sites and 19 Local Fire and Rescue Departments (MCFRS, 2007). The Prince George's County Fire/EMS Department is composed of 720 uniformed personnel divided among seven battalions, as well as 48 community-based fire and rescue stations. They also work with a volunteer force of approximately 1,100 firefighters and offer both Basic Life Support (BLS) and Advanced Life Support (ALS) emergency

medical services (EMS), through 40 ambulances and 12 paramedic units (PGCFED, 2006). The District of Columbia Fire Department operates 33 engine companies, 16 truck companies, and three heavy-duty rescue vehicles. They also offer 33 EMS BLS units, 15 EMS ALS units, and two rapid response units. Furthermore, the department also offers the services of a HAZMAT unit and two fire boats, among other specialized units (DCFD, 2007).

3.10.4.3 Police Protection

Security on base is provided both by Military Police and private security firms, with any traffic tickets received on base treated as a county fine.

The Montgomery County Department of Police (MCDP) is comprised of 1,050 sworn officers and numerous civilian support staff. The department is divided geographically into six districts, each with a Field Service Bureau; NNMC is located in District 2, Bethesda. MCDP also has a Special Investigative Services Bureau comprised of nine divisions (MCDP, 2007).

The Prince George's County Police Department is comprised of 1,420 sworn officers, and operates 871 patrol cars, and more than 600 unmarked or special purpose vehicles (PGPD, 2006).

The District of Columbia Metropolitan Police Department (MPD) is one of the largest police departments in the United States. Approximately 3,800 officers serve as the primary law enforcement body in Washington, D.C. MPD has multiple specialized units to deal with myriad issues, ranging from sexual assault to fraud to units specializing in working with minorities or the disabled (MPDC, ND).

3.10.4.4 Medical Facilities

NNMC provides primary and secondary care along with multiple specialty and subspecialty medical services for military patients. Fort Belvoir also has a hospital that provides medical care to military patients and will offer additional services being transferred there from WRAMC. There are many other hospitals in the ROI. They include in Montgomery County, Maryland: Suburban Hospital, Shady Grove Adventist Hospital, Montgomery General Hospital, and Holy Cross Hospital. Prince George's County hospitals include Doctor's Community Hospital, Laurel Regional Hospital, Prince George's Hospital Center, and Bowie Health Center. Hospitals in the District of Columbia include Georgetown University Hospital, George Washington University Hospital, Howard University Hospital, Washington Hospital Center, and Sibley Memorial Hospital.

3.10.5 Environmental Justice and Protection of Children

3.10.5.1 Environmental Justice

On 11 February 1994, President Clinton issued EO 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-

Income Populations. EO 12898 directs agencies to address environmental and human health conditions in minority and low-income communities so as to avoid the disproportionate placement of any adverse effects from federal policies and actions on these populations. The general purposes of this EO are as follows:

- To focus the attention of federal agencies on human health and environmental conditions in minority communities and low-income communities with the goal of achieving environmental justice.
- To foster nondiscrimination in federal programs that substantially affect human health or the environment.
- To give minority communities and low-income communities greater opportunities for public participation in, and access to, public information on matters relating to human health and the environment.

As defined by the "Environmental Justice Guidance Under NEPA" (CEQ, 1997), "minority populations" include persons who identify themselves as Asian or Pacific Islander, Native American or Alaskan Native, black (not of Hispanic origin), or Hispanic. Race refers to census respondents' self-identification of racial background. Hispanic origin refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, and Central or South American. A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population. Low-income populations are identified using the Census Bureau's statistical poverty threshold, which is based on income and family size. The Census Bureau defines a "poverty area" as a census tract with 20 percent or more of its residents below the poverty threshold and an "extreme poverty area" as one with 40 percent or more below the poverty level. Although there are poverty tracts within the ROI, none of the tracts surrounding NNMC qualify as poverty or extreme poverty areas.

3.10.5.2 Protection of Children

EO 13045, Protection of Children from Environmental Health and Safety Risk, requires federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that might disproportionately affect children. This EO, dated 21 April 1997, further requires federal agencies to ensure that their policies, programs, activities, and standards address these disproportionate risks. EO 13045 defines environmental health and safety risks as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink and use for recreation, the soil we live on and the products we use or are exposed to)."

3.11 Human Health and Safety Existing Environment

This section describes the human health and safety concerns at NNMC, including hazardous material, hazardous and medical wastes.

3.11.1 Underground and Aboveground Storage Tanks

At NNMC, Oil Operations Permit (NNMC Oil Program) No. 2005-OPT-3360 authorizes storage of oil per Title IV of the Oil Pollution Act and other applicable regulations in above ground storage systems.

Underground storage systems are operated according to COMAR 26.10.02, underground storage tanks (USTs) and 40 CFR 279, Standards for the Management of Used Oil. NNMC maintains the tanks and inspects them monthly for leaks or damage.

Of Buildings 1 through 10 of the medical care facilities that will be subject to construction or renovation activities, only one building has fuel storage tanks. Building 7 has a 2,500-gallon fuel UST and a 40-gallon day tank for an emergency generator that is located in the basement. The other buildings receive their emergency service from a generator located at Building 55, the parking garage, or two emergency generators associated with Building 1.

3.11.2 Hazardous Materials/Hazardous Waste

NNMC is a hospital and also houses research facilities that use hazardous materials for their specialized functions as well as regular operations of the facilities. NNMC has a Hazardous Materials (Hazmat) Management Plan to ensure proper handling, storage and disposal of hazardous materials. Incoming hazmat is primarily handled through warehousing at Building 54; however, it is also delivered via express mail carrier to other buildings. An authorized user list (AUL) exists and there is an annual inspection for hazardous material in every space within the installation. Use of any new or unauthorized chemical requires permission from the NNMC Environmental Programs Department.

Hazardous Material Certificate (NNMC Hazardous Materials (Hazmat) Program) No. 2006-0400 registers NNMC as a hazardous material use site with the Montgomery County Fire and Rescue Service. NNMCINST 5090.6A establishes a Hazmat program specific to NNMC and includes an emergency procedure and all SOPs required for proper Hazmat control and management.

NNMC is classified as a large quantity hazardous waste generator and maintains a permitted Transportation, Storage, and Disposal (TSD) facility at Building 256, where hazardous waste can be stored for up to one year. NNMC operates under MDE Hazardous Waste Program, Controlled Hazardous Substances Permit A-221 (EPA ID No. 4170024687). However, the majority of hazardous waste handled by NNMC personnel consists of small quantities of chemicals generated by medical laboratory testing, research experiments, and expired shelf life stocks. The majority of the hazardous waste from the hospital comes from the anatomic pathology or hematology facilities. The other three

noticeable sources of hazardous waste are medical equipment repair (batteries and lead), dental, and pharmacy. The hazardous waste from the pharmacy includes the expired and spilled medications.

Hazardous wastes are picked up from the generating locations that regularly generate hazardous waste and as requested for all sources. Information on hazardous wastes is entered into a computerized management system and labels are prepared prior to removing the hazardous wastes from the satellite area. The hazardous wastes are usually taken to the storage building where they are maintained until ready for shipment. The Defense Reutilization and Marketing Office (DRMO) validates all shipping and labeling information and waste is sent out by a transporter contracted by DRMO.

The applicable regulations, permits, and guidance include: 40 CFR 261-270; 49 CFR 172, 173, 178, 179; COMAR 26.13, Disposal Of Controlled Hazardous Substances; OPNAVINST 5090.1C, Environmental Readiness Program Manual; NNMCINST 5090.7A, Environmental Management System Implementation Manual; NNMCINST 5090.1D, Hazardous Waste Management Program; NNMCINST 5090.3B, Oil and Hazardous Substance Spill Contingency Plan; NNMCINST 5090.6A, Hazardous Material Control and Management Program; NNMCINST 11350.1D, Infectious Waste Management Program; Integrated Pollution Prevention Management Plan, April 2001; NNMC Asbestos Operations and Maintenance Program, August 1993; NPDES; Sanitary Sewer Industrial Discharge Authorization Permit 06501, 31 May 2001; Title V Operating Permit, 14 Oct 2003, and NNMCINST 4010.1B, and Precious Metal Program.

USUHS is a large quantity hazardous waste generator and operates under its own permit.

Solid Waste Management Unit/Area of Concern

Under RCRA, the corrective action program (CAP) is a cleanup program designed to ensure the remediation of hazardous releases and contamination associated with RCRA-regulated facilities. Under RCRA CAP, several areas of NNMC have been designated as a Solid Waste Management Unit (SWMU) or an Area of Concern. An SWMU is a discernible unit where solid or hazardous wastes have been placed at any time, or any area where solid wastes have been routinely and systematically released. An AOC includes non-SWMU area(s) of potential or suspected contamination, as well as actual contamination.

The following SWMUs or Areas of Concern (AOC) are in the facilities and/or areas identified for projects under the proposed action.

- Building 59: SWMU 31, Metal Storage Yard
- Area on Taylor Road (near Building 141): SWMU 5, Roadside Laboratory Waste Disposal
- Building 17: AOC 1, Mercury Removal Action

- Building 21: SWMU 18, AFRRI Site Accumulation and AOC 4, Building 21 UST

- Building 150: AOC 8, NMRC Radioactively Contaminated Building

- Area immediately adjacent to Building 150 (southeast): SWMU 9, NMRC Xylene disposal area

- Building 2: SWMU 13, Dental Lab Temporary Storage Area

- Building 8: SWMU 14, National Cancer Institute Temporary Storage Area

Remediation of these sites involves numerous steps and often takes years; therefore, to stabilize them prior to a final remedy, the CAP created two Environmental Indicators (EIs):

- The Human Exposures EI ensures that people near a particular site are not exposed to unacceptable levels of contaminants.

- The Groundwater EI ensures that contaminated groundwater does not spread and further contaminate groundwater resources.

Currently, USEPA lists NNMC as a site where there are no unacceptable human exposures to contamination that can reasonably be expected under current land and groundwater use conditions (USEPA, 2004b).

The five-building complex of Building 17, 17A, 17B, 18, and 21 designated as AOC 1 has been remediated. In 2003 the USEPA approved the Interim Measures Implementation Report for the AOC (USEPA, 2003). The site is in the process of being closed administratively by the USEPA Region III.

3.11.3 Asbestos Containing Material, Lead and Lead-Based Paint, and Other Concerns

Table 3-15 lists the construction and previous renovation dates of the facilities that would undergo construction and/or renovation. Given the fact that many of the buildings were constructed in the 1940s and early 1950s, asbestos and lead paint is of concern. The Asset Detail Report conducted in 2007 identified asbestos tiles in Building 23.

It is standard practice to check for asbestos, lead based paint and mold prior to demolition or renovation in any building and NNMC has procedures in place to manage the substances to identify problem areas, protect and inform affected persons, remediate as necessary, and comply with the applicable standards. This requires coordination between facilities management, environmental programs, Industrial Hygiene, Safety, and (medical) environmental health.

The applicable regulations and guidance include: Toxic Substances Control Act (TSCA), Title II and IV, Asbestos Hazard Emergency

Response and Lead Exposure Reduction; 40 CFR Part 61 Subpart M (NESHAP) National Emissions Standards for Hazardous Air Pollutants; 40 CFR Part 141 National Primary Drinking Water Standards; 40 CFR Part 763 Subpart E Asbestos Hazard Emergency Response Act-AHERA (Asbestos-Containing Materials in Schools) and Asbestos School Hazard Abatement Reauthorization Act-ASHARA; 40 CFR Part 763 Subpart G Worker protection Rule, 29 CFR Part 1926.1101 Construction Industry Standards for Asbestos, 49 CFR Chapter 1 Department of Transportation (DOT) Regulations for Asbestos Containing Material (ACM), 29 CFR Part 1910.1025 Lead; 29 CFR Part 1926.62 Lead in Construction; COMAR 26.11.21 Control of Asbestos; COMAR 26.11.23 Asbestos Accreditation of Individuals and Approval of Training Courses; COMAR 26.11.15, Toxic Air Pollutants; COMAR 26.16, Lead; COMAR Title 26.02.01, Blood Lead Reporting; COMAR 26.02.06, Reporting of Heavy Metal Poisoning; COMAR 26.02.07, Procedures for Abating Lead Containing Substances from Buildings; OPNAVINST 5100.23G, Navy Safety and Occupational Health Program Manual and Interim Technical Guidance FY 2003-2004 NAVFAC Mold Response Manual.

Table 3-15: Building Construction and Renovation Dates

Building	Construction Year	Renovation Year
1	1941	1988
2	1941	1987
3	1943	None
4	1941	1987
5	1943	None
6	1942	1987
7	1963	1987
8	1963	1987
9	1980	1987
10	1980	2000
12	1941	1987
11	1941	2000
17, 17A and 17B	1942	1987
18	1942	None
21	1946	1987
23	1945	1994
28	1952	None
39, 40, and 41	1951	None
49	1980	None
53	1976	1989
57	1979	1987
59	1989	1994
60	1986	1988
69	N/A	
139	1945	1989
141	1944	None
146	1945	None
150	N/A	
174	1950	None
176	N/A	
219	1945	None
Source: (NNMC, 2007a).		

3.11.4 Regulated Medical Waste

In the state of Maryland, Regulated Medical Waste (RMW) includes fluid blood, blood-soiled articles, anatomical material, microbiological waste, waste from isolation rooms, and all sharps and syringes. The majority of medical waste at NNMC comes from inpatient isolation wards (NNMC, 2007b). In 2006 NNMC generated 651,257 pounds of RMW (Brandt, 2007c).

RMW must be separated from other waste at the point of origin. Strict packaging and labeling procedures exist for RMW and must be adhered to before RMW is moved to the Sterile Processing Department (SPD). SPD takes the containers (from Buildings 1-10) to the Medical Waste Cage located on the loading dock of Building 55. From there the sterilized RMW is sent off-site for incineration to Curtis Bay Energy, which operates a commercial medical waste incinerator that takes medical and other waste from hospitals and other medical facilities for disposal. The facility, formerly known as Phoenix Services, is located in south Baltimore. The ash from the incineration is trucked offsite to a Subtitle D landfill.

The applicable regulations and guidance include: 29 CFR 1910.1030, Bloodborne Pathogens; 40 CFR 261.1 et seq.; 42 U. S. C. 6901-69992k, OSHA Instruction CPL 2-2.44c; Center for Disease Control, Guidelines for Isolation Precautions in Hospitals; OPNAVINST 5090.1C Environmental Readiness Program Manual; OPNAVINST 5100.23F Navy Occupational Safety and Health Manual; BUMEDINST 6280.1A, Infectious Waste Management; NNMCINST 11350.1D, Regulated Medical Waste (RMW) Management Program; NNMCINST 5090.7, Environmental Management System Implementation Manual; NNMC Regulated Medical Waste Environmental Management System Program Manual, 2005; NNMC Infection Control Manual 2002, Chapter 02; COMAR 10.06.06 Communicable Disease Prevention—Handling, Treatment, and Disposal of Special Medical Waste; COMAR 26. 13.11-13 (11 Air Quality, 12 Radiation Management, and 13 Disposal Of Controlled Hazardous Substances); and Joint Commission on Accreditation of Healthcare Organizations EC. 2.3.

3.11.5 Anti-Terrorism/Force Protection

New facilities must comply with United Facilities Criteria contained in UFC 4_010_01 ***DOD Minimum Antiterrorism Standards for Buildings***, dated 8 October 2003, updated 22 January 2007. Compliance would require all new buildings to meet the minimum standoff distances from roadways and parking, as well as from the NNMC perimeter, and could include building hardening measures.

4.0 ENVIRONMENTAL CONSEQUENCES

The implementation of Alternative One or Alternative Two has the potential to affect various environmental resources within NNMC, as well as the potential to affect certain resources beyond the boundaries of the installation. This section identifies and evaluates the anticipated environmental consequences/impacts associated with each alternative. It also evaluates the No Action Alternative. The terms "impact" and "effect" are used interchangeably in this EIS to refer to the consequences of the alternatives.

4.1 GEOLOGY, TOPOGRAPHY, AND SOILS CONSEQUENCES

Due to similarities in potential impacts and limitations on geology, topography, and soils, the environmental consequences of implementing each alternative are considered together in this section. Potential impacts are assessed based on limitations associated with the geology and the extent of disturbance to natural geologic features, slopes and gradients, and limitations associated with the soil type and potential extent of soil disturbance.

4.1.1 Geology

This section assesses the potential effects of the proposed alternatives on geologic resources and features at NNMC and the potential for geologic characteristics to affect proposed uses.

4.1.1.1 Geology Impacts: Alternative One

Depth to bedrock varies throughout the area of the proposed development. Implementation of Alternative One is in areas of previous development and would not be expected to impact local geology.

4.1.1.2 Geology Impacts: Alternative Two

Depth to bedrock varies throughout the area of the proposed development. Implementation of Alternative Two is also in areas of previous development and would not be expected to impact local geology.

4.1.1.3 Geology Impacts: No Action Alternative

Implementation of the No Action Alternative would not alter the current characteristics of geologic resources on NNMC and therefore, there would be no adverse effect.

4.1.2 Topography

Topography in the majority of the proposed development areas is generally flat, as a result of past development, with the exception of a few of the areas proposed for development near the unnamed tributary to Stoney Creek and open landscaped areas, where the topography is generally rolling to moderately steep. Elevations in the area range

from 210 to 330 feet above sea level. This section assesses the potential effects of the alternative development scenarios on the existing topographic characteristics of NNMC and the potential for topographic characteristics to affect proposed uses.

4.1.2.1 Topography Impacts: Alternative One

The majority of land proposed for development or redevelopment has either been previously graded for development or has topography suitable for new development. Alteration of existing topography would be expected as a result of grading and associated cut and fill necessary to accommodate building sites. The extent of cut and fill would be localized and dependent on the building design and location.

The area east of Building 60 proposed for the BEQ, and the area to the west of Building 23 proposed for the South Parking Structure contain slopes ranging from approximately 10 to 15 percent, which do not pose an unusual construction challenge, but could require stabilization, such as retaining structures for their development.

4.1.2.2 Topography Impacts: Alternative Two

The sites delineated for Alternative Two are constrained by the same topographic limitations as described under Alternative One.

4.1.2.3 Topography Impacts: No Action Alternative

Because no ground disturbing activity to implement BRAC would occur, the No Action Alternative would not impact the topography within the study area.

4.1.3 Soils

This section assesses the potential effects of the alternatives on soil resources at NNMC and the potential for soil characteristics to affect proposed uses. Impacts to soils within areas proposed for renovation are not considered, because there would be little or no soil disturbance.

4.1.3.1 Soils Impacts: Alternative One

Project development would be expected to directly affect soils as a result of construction/demolition activities (i.e., grading, excavation, placement of fill, compaction, mixing, and augmentation) on approximately 13.2 acres from demolition and construction activities proposed under this Alternative (9.8 acres of construction on existing impermeable surfaces requiring demolition and 3.4 acres of new construction on open space) (Table 2-3). Renovation proposed under this alternative would have little to no adverse impacts to soils. Additional effects could result from erosion and associated sedimentation, especially on steeper slopes if vegetative cover was removed during construction.

The total amount of open space proposed for development under Alternative One is approximately 3.4 acres. This acreage was

calculated by taking the area of proposed new construction and subtracting the area of those current buildings proposed for demolition (Table 2-3). The 3.4 acres of development in open space includes approximately 1.8 acres for the proposed BEQ, approximately 0.5 acres for the proposed south parking facility, and approximately 1.1 acres for the remainder of all proposed new construction. Heavy machinery would be used to remove vegetative cover to prepare open sites for construction of the proposed facilities and for digging trenches for utility lines. As a result, soils would be compacted, soil layer structure would be disturbed and modified, and soils would be exposed, increasing the overall potential for erosion. Soil productivity, (i.e., the capacity of the soil to produce vegetative biomass), would decline in disturbed areas and be completely eliminated for those areas within the footprint of building structures and parking facilities.

Potential building limitations for soils occurring in the proposed development areas include a relatively shallow depth to the water table throughout the majority of undeveloped soils within NNMC. These limitations can affect the load-supporting capacity and the ease and amount of excavation required for the proposed development. Appropriate soil engineering studies prior to construction would be conducted at the project site to assure proper design and building location. Highly erodible soils do not preclude development, but can increase the cost of land development and may require continuing expenses for maintenance once development is completed. No building limitations are expected to occur on those areas proposed for redevelopment, because these soils have previously been disturbed, and generally consist of non-native fill. Redevelopment refers to any reconstruction of, or new construction on, existing impervious area.

Construction projects with this amount of disturbance require an approved erosion and sediment control plan, consistent with Maryland’s Environment Article, Title 4, Subtitle 1 and 2 for erosion and sediment control and stormwater management (COMAR 26.17.01 and 26.17.02). Prior to construction at any site, a General Permit for Construction Activity would be obtained, which would include an approved sediment and erosion control plan. This plan would develop appropriate site-specific BMPs for controlling runoff, erosion, and sedimentation during construction and demolition activities. Site-specific BMPs would be developed based on proper design, run-off calculations, slope factors, soil type, topography, construction activities involved, and proximity to water bodies. As part of these BMPs, NNMC would implement sedimentation and erosion control measures to retain sediment generated by land-disturbing activity within the boundaries of the construction area. BMPs could include, but are not limited to, protective devices preventing surface drainage flows, erosion control matting, rip-rap, and sediment traps. The application of any or all of these BMPs, or other appropriate BMPs, would depend upon precise, specific ground conditions in the areas disturbed by construction.

The following nonstructural stormwater management practices would be considered and applied according to the Maryland Stormwater Design Manual (MDE, 2000) to minimize increases in new development runoff:

- natural area conservation
- disconnection of rooftop runoff
- disconnection of non-rooftop runoff
- sheet flow to buffers
- grass channels
- environmentally sensitive development

This requirement has recently been made more stringent by Maryland's Stormwater Management Act of 2007 (MDE, 2007d), which requires that environmental site design, through the use of nonstructural best management practices and other better site design techniques, be implemented to the maximum extent practicable. Low Impact Development (LID) measures would be among those considered and implemented when practical.

The following structural stormwater management practices would be considered and designed according to the Design Manual (MDE, 2000) to satisfy the applicable minimum control requirements established in Section 4.1 of the Guidelines:

- stormwater management ponds
- stormwater management wetlands
- stormwater management infiltration
- stormwater management filtering systems
- stormwater management open channel systems

Areas disturbed outside of the footprints of the new construction would be aerated and reseeded or replanted with native vegetation, and/or re-sodded following construction activities, which would decrease the overall erosion potential of the site and improve soil productivity.

With soil erosion and sediment control measures, the actions proposed under this alternative would likely result in minor adverse impacts to soils from construction occurring in open areas. No new impacts to soils would be considered on those sites being renovated.

4.1.3.2 Soils Impacts: Alternative Two

As in Alternative One, project development would be expected to directly affect soils as a result of construction/demolition activities (i.e., grading, excavation, placement of fill, compaction, mixing, and augmentation). Under Alternative Two, however, the total

area affected from demolition/construction activities is approximately 13.3 acres (8.5 acres of construction on existing impermeable surfaces requiring demolition and 4.8 acres of new construction on open space) (Table 2-3).

Potential building limitations for soils occurring in the proposed development areas would be the same as those described under Alternative One. As with Alternative One, appropriate soil engineering studies would be conducted at the project site to assure proper design and building location.

Impacts to soils in open areas from the construction activities proposed under Alternative Two would also be similar to those described under Alternative One. Heavy machinery would be used to remove vegetative cover to prepare open sites for construction of the proposed facilities and for digging trenches for utility lines. As a result, soils would be compacted, soil layer structure would be disturbed and modified, and soils would be exposed, increasing the overall potential for erosion. Soil productivity, (i.e., the capacity of the soil to produce vegetative biomass), would decline in disturbed areas and be completely eliminated for those areas within the footprint of building structures and parking facilities.

An approved erosion and sediment control plan, consistent with Maryland's Environment Article, Title 4, Subtitle 1 and 2 for erosion and sediment control and stormwater management (COMAR 26.17.01 and 26.17.02) would be developed in the same manner as described under Alternative One, and all management measures to reduce impacts to soils described under Alternative One, or other appropriate measures, would be implemented for all earth disturbing activities proposed under this Alternative. Prior to construction at any site, a General Permit for Construction Activity would be obtained, which would include an approved sediment and erosion control plan.

With planning and mitigation, the actions proposed under this alternative would likely result in minor adverse impacts to soils from construction occurring in open areas. No new impacts to soils would be considered on those sites being redeveloped.

4.1.3.3 Soils Impacts: No Action Alternative

Implementation of the No Action Alternative would not alter the soil resources of NNMC; therefore, no adverse impacts would occur.

4.2 WATER RESOURCES CONSEQUENCES

The construction/demolition/renovation activities proposed under either action alternative would fall under the permitting and regulatory requirements of Maryland's Environment Article, Title 4, Subtitle 1 and 2 for erosion and sediment control and stormwater management (COMAR 26.17.01 and 26.17.02); Environment Article, Title 9, Subtitle 3 (COMAR 26.08.04); Environment Article, Title 5, Subtitle 05 (COMAR 26.17.04); Maryland's stormwater management program to

address stormwater discharges (General Discharge Permit No. 03-DP-2537, General NPDES Permit No. MD0025670); the Federal Clean Water Act Section 402; and the Code of Federal Regulations (40 CFR 122.26). Erosion and Sediment Control Plans would meet the 1994 Maryland Standards and Specifications for Soil Erosion and Sediment Control (MDE, 1994). Stormwater management plans would follow the 2000 Maryland Stormwater Design Manual (MDE, 2000) and the 2001 Stormwater Management Guidelines for State and Federal Projects, which supplement the Stormwater Management Regulations and the Design Manual (MDE, 2001). They would also follow Maryland's Stormwater Management Act of 2007 (MDE, 2007d), which emphasizes nonstructural measures. A General Permit for Construction Activity would be obtained where required, which would include an approved sediment and erosion control plan.

These regulations require that any proposed development project that disturbs more than 5,000 square feet of land and 100 cubic yards of earth include a stormwater management plan and/or waiver application, to be submitted to MDE, Water Management Administration for review and approval, before construction commences, unless otherwise exempted. The stormwater management plan must contain supporting computations, drawings, and sufficient information describing the manner, location, and type of measures by which stormwater runoff will be managed from the entire project, and serves as the basis for all subsequent construction. Also, for redevelopment projects exceeding 5,000 square feet, there is an objective for the total amount of runoff from impervious surface to be reduced by at least 20 percent. Redevelopment refers to any reconstruction of, or new construction on, existing impervious area. Where site conditions prevent the reduction of impervious area, then stormwater management practices are to be implemented to provide qualitative control for at least 20 percent of the site's impervious area. When a combination of impervious area reduction and stormwater practice implementation is used, the combined area must equal or exceed 20 percent of the site. NNMC adheres to these requirements (NNMC, 2000). Site conditions will determine which of these requirements will be used prior to construction.

Potential impacts to the existing water resources are considered to occur to hydrology and water quality if the limitations established by the CWA are exceeded. Potential impacts to water quality include an increase in sediment or pollutants discharged into receiving waters as a result of the implementation of either alternative.

4.2.1 Surface Water Impacts

This section assesses the potential effects of the alternatives on surface water resources both on and downstream of NNMC. This section considers the effects of construction and operation of the alternatives on surface water characteristics and considers potential effects of increased impervious surfaces and stormwater flows and their potential effects on surface water quality.

4.2.1.1 Surface Water Impacts: Alternative One

Alternative One would affect approximately 13.2 acres of the NNMC Campus from the demolition and construction activities proposed under this Alternative (9.8 acres of construction on existing impermeable surfaces requiring demolition and 3.4 acres of new construction on open space); renovation proposed under this alternative would have no adverse impacts to surface water (Table 2-3). During demolition or construction, soils would be exposed, creating an increased potential for erosion and/or transport of surface pollutants into adjacent water bodies. Prior to construction at any site, a General Permit for Construction Activity would be obtained, which would include an approved sediment and erosion control plan. Appropriate site specific erosion and sediment control plans would be prepared to reduce surface erosion and control runoff of pollutants. Implementation of erosion and sediment control plans would reduce erosion of exposed soils, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before they enter downstream water flow. Site conditions will determine which of these requirements will be used prior to construction. Increases in surface stormwater runoff during construction and operation would be controlled by stormwater BMPs as well as erosion and sedimentation controls to reduce potential impacts to adjacent land and waters. BMPs could include, but are not limited to:

- Using erosion containment controls such as silt fencing and sediment traps to contain sediment onsite where necessary;
- Covering disturbed soil or soil stockpiles with plastic sheeting, jute matting, erosion netting, straw, or other suitable cover material, where applicable.
- Inspecting erosion and sediment control BMPs on a regular basis and after each measurable rainfall to ensure that they are functioning properly, and maintain BMPs (repair, clean, etc.) as necessary to ensure that they continue to function properly.
- Sequencing BMP installation and removal in relation to the scheduling of earth disturbance activities, prior to, during and after earth disturbance activities; and
- Phasing clearing to coincide with construction at a given location to minimize the amount of area exposed to erosion at a given time.

In addition, to reduce the risk of adverse impacts to water quality from the use of construction vehicles and equipment, the contractor would submit a hazardous spill plan, stating the protocols to be taken in the event of a fuel leak or spill. This plan would incorporate preventative measures to be implemented such as the placement of refueling facilities, storage, and handling of hazardous materials,

and notification procedures for a spill. Construction staging areas within NNMC would be located on impervious surfaces where refueling or construction vehicle and equipment maintenance could be performed. Containment devices and absorbent pads or other materials would be available to ensure that any spills that do occur are contained and do not enter any surface waters via either overland flows or stormwater conveyance systems.

With the planning and management measures implemented during and after construction proposed under this alternative, adverse impacts to the water quality of Stoney Creek and Rock Creek are expected to be minor and of short duration, occurring primarily during storm events. The actions proposed under this alternative would be implemented in compliance with MDE regulations and the applicable requirements of the MDE Stormwater Design Manual (MDE, 2000). Prior to construction, a stormwater management plan must be implemented by NNMC and approved by MDE. This plan would address the increase in impervious surfaces and subsequent increases in overland runoff by incorporating stormwater control designs into the project to manage the rate at which runoff and associated nutrients leave the site. This requirement has recently been made more stringent by Maryland's Stormwater Management Act of 2007 (MDE, 2007d), which requires that environmental site design, through the use of nonstructural best management practices and other better site design techniques, be implemented to the maximum extent practicable.

The following nonstructural stormwater management practices would be considered and applied according to the Maryland Stormwater Design Manual (MDE, 2000) to minimize increases in new development runoff: 1) natural area conservation, 2) disconnection of rooftop runoff, 3) disconnection of non-rooftop runoff, 4) sheet flow to buffers, 5) grass channels, and 6) environmentally sensitive development. Low Impact Development (LID) measures would be among those considered and implemented when practical.

The following structural stormwater management practices would also be considered and designed according to the Design Manual (MDE, 2000) to satisfy the applicable minimum control requirements established in Section 4.1 of the Guidelines: 1) stormwater management ponds, 2) stormwater management wetlands, 3) stormwater management infiltration, 4) stormwater management filtering systems, and 5) stormwater management open channel systems.

The total net increase of impervious surfaces would be approximately 3.4 acres under this alternative (Table 2-3). This increase in impervious surface could increase both the volume of stormwater runoff and the amount of sediments and pollutants transported to both Stoney Creek and Rock Creek during storm events. Specific stormwater controls for the proposed projects that could be incorporated into the project design, where applicable, include, but are not limited to:

- Increasing the capacity of NNMC's current stormwater detention ponds;

- Increasing the storage capacity of the grassed swale that parallels the unnamed tributary to Stoney Creek near Building 141 to help supplement the storage capacity of the in stream pond;

- Installing grassed swales within the general vicinity of the proposed BEQ;

- Adding additional underground storage where possible; and

- Utilizing "green engineering" in the design of the structures and parking facilities proposed such as green roofs, parking lot filter strips, and pervious pavements.

The increased parking expected under this alternative would increase the potential for the runoff of oil, grease, and antifreeze, which could affect the water quality of both Stoney Creek and Rock Creek if not controlled. However, parking has been concentrated in multi-story garages that minimize the parking footprint and maximize the potential to manage runoff (Table 2-3). Appropriate stormwater management measures will be considered during the design phase to address this potential for pollution as part of the required stormwater management plan. Typical measures for this site would include filtration /pollutant removal systems, which could be incorporated into NNMC's current stormwater conveyance system and into overall design of Alternative One. Such systems can focus on removing pollutants from "hot spots" on the campus, such as areas around the new parking facilities, and, where applicable, could include the installation of infiltration trenches, underground sand filters, Delaware Sand Filters, stormceptors, and/or surface sand filters.

Overall, by following BMPs and SOPS with planning and stormwater management improvements, the actions proposed under this alternative would likely result in minor direct impacts to both Stoney Creek and Rock Creek. These impacts would be minor because proposed demolition and construction activities, the increase in impervious surfaces, and the expected increases in traffic all generate pollutants, but not in large quantities when proper controls are implemented. Both Stoney and Rock Creek are 303(d) listed streams due to nutrients, sediments, fecal bacteria, and impacts to biological communities, and therefore strict adherence to sediment and erosion control plans and implementation of appropriate stormwater controls would be necessary to minimize any additional adverse impacts on these streams.

4.2.1.2 Surface Water Impacts: Alternative Two

Under Alternative Two, the total amount of land within NNMC proposed for development/redevelopment is approximately 13.3 acres (8.5 acres of construction on existing impermeable surfaces requiring demolition and 4.8 acres of new construction on open space) (Table 2-3). Overall

impacts to water quality resulting from construction/demolition activities proposed under Alternative Two would be similar to those described under Alternative One.

During construction/demolition, vegetation would be removed and soils would be exposed, creating an increased potential for erosion and/or transport of surface pollutants into adjacent water bodies. Alternative Two would disturb 1.4 additional acres compared to Alternative One. Impacts to water quality would be reduced in the same manner as described under Alternative One. Project contractors would be responsible for obtaining a General Construction Permit with an approved soil erosion and sedimentation plan to minimize surface erosion and runoff of pollutants. In addition, all management measures to reduce impacts to water quality described under Alternative One, or other appropriate measures, would also be implemented for all earth disturbing activities proposed under this Alternative.

As discussed under Alternative One, prior to construction, NNMC would also implement a stormwater management plan. This plan would address the increase in impervious surfaces and subsequent increases in overland runoff by incorporating stormwater control designs into the project to manage the rate at which runoff and associated nutrients leave the site. The total net increase of impervious surfaces would be approximately 4.8 acres under this alternative (Table 2-3). Stormwater control designs that could be incorporated into Alternative Two's final design are the same as those described in Alternative One.

Impacts to water quality resulting from expected increases in traffic volumes would be similar to those described in Alternative one. Increases in parking would increase the amount of oil, grease, and antifreeze that could be carried into the watershed through runoff, affecting the water quality of both Stoney and Rock Creek. Measures considered to reduce this impact would be the same as those described under Alternative One.

Overall, with planning and management measures, the actions proposed under this alternative would likely result in minor direct impacts to both Stoney and Rock Creeks as a result of the scale of the proposed demolition and construction activities, the increase in impervious surfaces, and the expectant increases in traffic. Both Stoney and Rock Creek are 303(d) listed streams due to nutrients, sediments, fecal bacteria, and impacts to biological communities, and therefore strict adherence to sediment and erosion control plans and implementation of appropriate stormwater controls would be necessary to minimize any additional adverse impacts on these streams.

4.2.1.3 Surface Water Impacts: No Action Alternative

Implementation of the No Action Alternative would not alter the current condition of surface water resources on NNMC, and no additional effects to the resource would occur.

4.2.2 Groundwater Impacts

Groundwater is an accumulation of water within geologic strata below the ground surface. Recharge occurs through infiltration of surface water, often an accumulation of precipitation, through surface layers and into underlying aquifers. Recharge can be affected by a variety of factors such as rainfall, topography, soil types, geologic structure, and ground surface cover.

This section assesses the potential effects of the alternative development scenarios on groundwater resources at NNMC by considering the effects of increased impervious surfaces on groundwater recharge and the potential for impacts to groundwater quality associated with implementing Alternatives One or Two.

4.2.2.1 Groundwater Impacts: Alternative One

Alternative One would convert approximately 3.4 acres of pervious soil surfaces to impervious development (Table 2-3). Precipitation and runoff from impervious surfaces would be conveyed through stormwater control structures to the natural drainage system, and manmade bio-filtration systems (i.e., grassed swales) within the watershed allowing infiltration and groundwater recharge to continue to occur.

No significant effects to groundwater quality would be expected. NNMC would comply with the Spill Prevention, Control & Countermeasures Rule (40 CFR 112) and existing groundwater protection protocols as required under the Safe Drinking Water Act (1974, with amendments 1986). Pursuant to these directives, during the construction of the proposed facility, the contractor would incorporate specific mitigation measures and construction protocols aimed at minimizing the overall potential for groundwater contamination from hazardous materials associated with construction activities (i.e., oils, lubricants, antifreeze, and fuels), and the overall future operations of the facility. As a result, groundwater contamination within the proposed project site would not likely occur, and groundwater quality would not likely degrade beyond its current condition. The replacement of pervious ground cover with impervious surfaces would not be expected to have major impacts on groundwater recharge in the area of proposed development, as the increase in impervious surface represents only a 3.5-percent increase from the 98 acres that are currently impervious within NNMC.

4.2.2.2 Groundwater Impacts: Alternative Two

Alternative Two would convert approximately 4.8 acres of pervious soil surfaces to impervious development (Table 2-3). Precipitation and runoff from impervious surfaces would be conveyed through stormwater control structures to the natural drainage system and manmade bio-filtration systems within the watershed, allowing infiltration and groundwater recharge to continue to occur. The replacement of pervious ground cover with impervious surfaces would not be expected to have major impacts on groundwater recharge in the area of proposed

development, as the increase in impervious surface represents only a 4.9-percent increase from the 98 acres that are currently impervious within NNMC.

No significant effects to groundwater quality would be expected. NNMC would comply with the Spill Prevention, Control & Countermeasures Rule (40 CFR 112) and existing groundwater protection protocols as required under the Safe Drinking Water Act (1974, with amendments 1986). Pursuant to these directives, during the construction of the proposed facility, the contractor would incorporate specific mitigation measures and construction protocols aimed at minimizing the overall potential for groundwater contamination from hazardous materials associated with construction activities (i.e., oils, lubricants, antifreeze, and fuels), and the overall future operations of the facility. As a result, groundwater contamination within the proposed project site would not likely occur, and groundwater quality would not likely degrade beyond its current condition.

4.2.2.3 Groundwater Impacts: No Action Alternative

Implementation of the No Action Alternative would not change the current situation at NNMC regarding groundwater resources and would not impact groundwater resources.

4.2.3 Floodplain Impacts

Potential impacts to the floodplains were assessed based on criteria established by the Federal Emergency Management Agency (FEMA).

4.2.3.1 Floodplain Impacts: Alternative One

NNMC would not site any new development proposed under this Alternative within the designated 100-year floodplain along the unnamed tributary to Stoney Creek. As a result, no adverse impacts to floodplains would occur from the actions proposed under this alternative.

4.2.3.2 Floodplain Impacts: Alternative Two

NNMC would not site any new development proposed under this Alternative within the designated 100-year floodplain along the unnamed tributary to Stoney Creek. As a result, no adverse impacts to floodplains would occur from the actions proposed under this alternative.

4.2.3.3 Floodplain Impacts: No Action Alternative

Implementation of the No Action Alternative would not alter the current condition or alter the current delineation of the 100-year floodplain on NNMC. No impacts would occur.

4.2.4 Wetland Impacts

Executive Order (EO) 11990 requires federal agencies to minimize the loss or degradation of wetlands. The Department of the Navy has also

established a policy of no net loss of wetlands. The policy requires that impacts to wetlands be avoided if possible and if unavoidable that impacts be minimized. If wetlands are impacted, Department of the Navy policy is for mitigation that involves wetland replacement to be at a ratio of 1:1 (1 acre replaced for every acre lost); however, regulatory agencies could require a greater ratio, dependent on wetland type and function. A Department of the Army, Section 404 Clean Water Act, Individual Permit or Nationwide Permit issued by USACE would be required for unavoidable impacts to jurisdictional wetlands.

Wetlands are defined by the USACE as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Three criteria are used to determine the occurrence of jurisdictional wetlands, including: 1) hydric soils, 2) wetland hydrology, and 3) hydrophytic vegetation.

4.2.4.1 Wetland Impacts: Alternative One

Wetland habitats would not be affected as a result of implementing Alternative One. Sites currently proposed under this Alternative do not contain wetlands. NNMC has identified several areas adjacent to the unnamed tributary to Stoney Creek where wetlands may exist; however, areas have not been delineated and no jurisdictional determination has been made.

The only structure proposed under Alternatives One in the vicinity of a potential wetland is the Southern Parking facility. Its current placement, however, would not encroach on this potential wetland or within the 25-foot buffer allotted to non-tidal wetlands in the State of Maryland. It is over 75 feet from the tributary and any vegetation in the bank.

During construction at this site, as well as the other sites that are not near the tributary, vegetation would be removed and soils would be exposed, creating an increased potential for erosion and/or transport of surface pollutants into adjacent water bodies affecting aquatic habitat quality. Prior to construction at any site, a General Permit for Construction Activity would be obtained, which would include an approved sediment and erosion control plan. Implementation of erosion and sediment control plans would reduce erosion of exposed soils, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before they enter the downstream water flow. Increase in surface runoff during construction and operation would also be controlled by stormwater BMPs as well as erosion and sedimentation controls to reduce potential impacts to adjacent land and waters.

The pond north of the potential site of the BEQ is a stormwater pond and not considered a wetland. The pond on the front lawn within the contractor staging area would be avoided.

4.2.4.2 Wetland Impacts: Alternative Two

The only structure proposed under Alternative Two in the vicinity of a potential wetland is the Southern Parking facility. Its current placement, however, would not encroach on this potential wetland or within the 25-foot buffer allotted to non-tidal wetlands in the State of Maryland. It is over 75 feet from the tributary and any vegetation in the bank. The BEQ site under Alternative Two is not near any ponds; the pond on the front lawn within the contractor staging area would be avoided. As for Alternative One, prior to construction at any site, a General Permit for Construction Activity would be obtained, which would include an approved sediment and erosion control plan. This and stormwater BMPs would reduce runoff and potential pollutants carried to the unnamed tributary to Stoney Creek and would ensure minimal impacts to any wetlands.

4.2.4.3 Wetland Impacts: No Action Alternative

There would be no encroachment on wetlands or their buffers and therefore no impacts to wetlands would occur as a result of implementing the No Action Alternative.

4.3 BIOLOGICAL RESOURCES CONSEQUENCES

The following section describes the effects on vegetation, wildlife, threatened and endangered species, and aquatic and wetland habitat from implementation of proposed new construction and redevelopment. There would be no impacts to biological resources from proposed renovation due to the fact that renovation activities would occur within the existing buildings.

4.3.1 Vegetation

4.3.1.1 Vegetation Impacts: Alternative One

The proposed new construction projects would convert lands with either existing development or landscaped (lawn) areas into developed facilities and associated landscape vegetation. Approximately 3.4 acres of existing landscaped areas would be converted to impervious surfaces. Impacts to vegetation would be adverse but not significant because the project areas considered for the proposed actions are located in predominantly developed areas, or in areas of grassy meadow and lawn with thinly scattered trees and shrubs commonly found within the region. Natural plant communities in these areas have rather low vegetative diversity. Landscaping would provide a positive impact on vegetation. Native shrub and tree species would be planted where possible to provide habitat. None of the proposed projects require development of forested areas.

One of the two sites considered for development of the new BEQ space, east of building 60 is in the maintained lawn area with scattered planted trees. Once construction is complete, new vegetation would be planted around the new building.

No impacts to forests or areas with natural vegetation would occur from new construction projects. No significant adverse effects to vegetation would be expected from new construction of the proposed facilities.

4.3.1.2 Vegetation Impacts: Alternative Two

Impacts to vegetation under this alternative would be similar to, but slightly greater than, those described under Alternative One. Approximately 4.8 acres of existing landscaped areas would be converted to impervious surfaces. The footprint of the new, single BEQ structure would encompass 50,000 SF of the maintained lawn area east of Building 60. Specific details regarding the layout of the proposed facility have not yet been determined, although it is anticipated that the project footprint would remain within the maintained lawn area. Should the few scattered trees be removed, NNMC would replace the trees.

4.3.1.3 Vegetation Impacts: No Action Alternative

No adverse effects would be expected to flora. Under the No Action Alternative, NNMC would not implement the proposed BRAC actions or projects. Proposed BRAC facilities would not be constructed on the proposed sites and no adverse impacts to flora would occur.

4.3.2 Wildlife

4.3.2.1 Wildlife Impacts: Alternative One

None of the proposed project areas is considered to have important wildlife habitat values, due to the fact that these areas have been previously developed or altered. Approximately 3.4 acres of existing landscaped areas would be developed. It is expected that the few urbanized birds and small mammals that can be found on the proposed project sites would be temporarily displaced from areas within or immediately surrounding construction areas. After construction is completed, it is expected that some of the displaced species, particularly birds, would return and use the open areas adjacent to the developed areas.

None of the proposed projects require development of forested or natural areas on NNMC. Since there would be no loss of natural habitat, impacts to migratory birds and FIDS are not expected. Some positive impacts on wildlife habitat would be expected from replanting and landscaping efforts post construction. Native shrub and tree species would be planted where possible to provide habitat. The decision on which stormwater BMPs to use would include consideration of the attraction of wet ponds to waterfowl.

4.3.2.2 Wildlife Impacts: Alternative Two

Impacts under Alternative Two would be the similar as described for Alternative One.

4.3.2.3 Wildlife Impacts: No Action Alternative

No adverse effects would be expected to wildlife. Under the No Action Alternative, NNMC would not implement the proposed actions. New BRAC facilities would not be constructed on the proposed sites and no adverse impacts to wildlife would occur.

4.3.3 Aquatic and Wetland Habitat

4.3.3.1 Aquatic and Wetland Habitat Impacts: Alternative One

No significant adverse impacts associated with Alternative One would be expected to aquatic and wetland habitat. The proposed project sites would not develop areas that provide habitat for aquatic species nor are they located within the 25-foot buffer for non-tidal wetlands, as required by Maryland law.

However, implementation of the actions proposed under Alternative One would increase impervious surfaces by 3.4 acres from 98 acres, which is an approximate 3.5-percent increase in impervious surface area at NNMC. This increase in impervious surface could increase both the speed and volume of stormwater runoff and the amount of sediments and pollutants transported to both Stoney Creek and Rock Creek during storm events. During construction, vegetation would be removed and soils would be exposed, creating an increased potential for erosion and/or transport of surface pollutants into adjacent water bodies affecting aquatic habitat quality.

Implementation of erosion and sediment control plans under a General Construction Permit, however, would reduce erosion of exposed soils, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before they enter downstream water flow. Increase in surface runoff during construction and operation would be controlled by stormwater BMPs as well as erosion and sedimentation controls to reduce potential impacts to adjacent land and waters (see Section 4.2, Water Resources Consequences). A net decrease in the speed and volume of stormwater would be expected after construction because 20-percent of the stormwater flow from areas that were previously impervious as well as the new impervious area would now be managed with BMPs in a stormwater management plan approved by the State; Maryland's recommended BMPs are listed in Section 4.2.1.1. The decision on which stormwater BMPs to use would include consideration of the attraction of wet ponds to waterfowl.

4.3.3.2 Aquatic and Wetland Habitat Impacts: Alternative Two

No significant adverse impacts associated with Alternative Two would be expected to aquatic habitat. The proposed projects sites would not be located in aquatic habitat or within a wetland area or its required 25-foot buffer. Overall impacts to aquatic habitat under all options of this alternative would be similar to, but slightly greater than, those described under Alternative One due to the overall increase of 4.8 acres in impervious surface (1.4 acres more than for Alternative

One). The measures discussed under Alternative One above would also be applied under Alternative Two to reduce impacts. Implementation of erosion and sediment control plans under a General Construction Permit would reduce erosion of exposed soils, slow the rate at which water leaves the site, and capture eroded soils and concentrated nutrients before they enter downstream water flow. A net decrease in the speed and volume of stormwater would be expected after construction because 20-percent of the stormwater flow from areas that were previously impervious as well as the new impervious area would now be managed with BMPs in a stormwater management plan approved by the State; Maryland's recommended BMPs are listed in Section 4.2.1.1. The decision on which stormwater BMPs to use would include consideration of the attraction of wet ponds to waterfowl.

4.3.3.3 Aquatic and Wetland Habitat Impacts: No Action Alternative

No adverse effects would be expected to the aquatic and wetland habitat. Under the No Action Alternative, NNMC would not implement the proposed actions. New BRAC facilities would not be constructed on the proposed sites and no adverse impacts would occur.

4.3.4 Rare, Threatened, and Endangered Species

The Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.) mandates that all federal agencies consider the potential effects of their actions on species listed as threatened or endangered (T&E). If NNMC determines that an action may adversely affect a federally listed species, consultation with the USFWS is required to ensure that the action will not jeopardize the species' continued existence or result in the destruction or adverse modification of critical habitat.

4.3.4.1 T&E Impacts: Alternative One

No effects to rare, threatened, and endangered species would be expected under Alternative One because there are no-special status species inhabiting the proposed project sites.

4.3.4.2 T&E Impacts: Alternative Two

No effects to rare, threatened, and endangered species would be expected under Alternative Two because there are no-special status species inhabiting the proposed project sites.

4.3.4.3 T&E Impacts: No Action Alternative

Under the No Action Alternative, NNMC would not implement the proposed actions. New BRAC facilities would not be constructed on the proposed sites and no adverse impacts would occur.

4.4 AIR QUALITY CONSEQUENCES

An impact study was performed to assess air quality effects resulting from construction and operation of the proposed actions, including stationary sources, mobile sources and parking facilities. This study provides findings on ambient air quality concentrations and compliance

with the regulations and standards promulgated under the Clean Air Act and Amendments (CAAA), and regulations found in the COMAR. The project design, build scenario and traffic data utilized in air analysis are consistent with the information used in the transportation study for the proposed project.

NNMC is located in Montgomery County, Maryland. The county is in nonattainment for $PM_{2.5}$ and in moderate nonattainment for ozone under the 8-hour NAAQS. It is also in an ozone transport region. The county was previously in nonattainment for CO, and is currently in maintenance for that pollutant to ensure the AQCR remains in attainment.

To regulate the emission levels resulting from a project, federal actions located in nonattainment or maintenance areas are required to demonstrate compliance with the general conformity guidelines established in 40 CFR Part 93 Determining Conformity of Federal Actions to State or Federal Implementation Plans (the Rule). Section 93.153 of the Rule sets the applicability requirements for projects subject to the Rule through the establishment of ***de minimis*** levels for annual criteria pollutant emissions. These ***de minimis*** levels are set according to criteria pollutant nonattainment area designations. For projects below the ***de minimis*** levels, a full conformity determination is not required. Those at or above the levels are required to perform a conformity analysis as established in the Rule. The ***de minimis*** levels apply to emissions that can occur during the construction and operation phases of the action.

A project construction-related and operations-related General Conformity Rule applicability analysis has been performed that evaluated the proposed facility development under both alternatives. The applicability analysis estimated the level of potential air emissions for the ozone precursor pollutants nitrogen oxides (NO_x) and volatile organic compounds (VOCs), for $PM_{2.5}$, and the $PM_{2.5}$ precursor pollutant sulfur dioxide (SO_2), and for carbon monoxide (CO) to analyze impacts to air quality. The ***de minimis*** values for moderate nonattainment ozone areas in an ozone transport region, areas in nonattainment for $PM_{2.5}$, and CO maintenance areas are 100 tons per year (TPY) for NO_x, $PM_{2.5}$, SO_2, and CO and 50 TPY for VOCs.

A separate analysis was performed for each alternative based on the average level of construction-related activities and for the average level of operations-related activities. It is assumed that the No Action Alternative would have no impact to air quality other than that which currently exists; therefore, it was not included in the analysis. Appendix B contains a detailed description of the assumptions and methodology used to estimate potential emissions for each alternative.

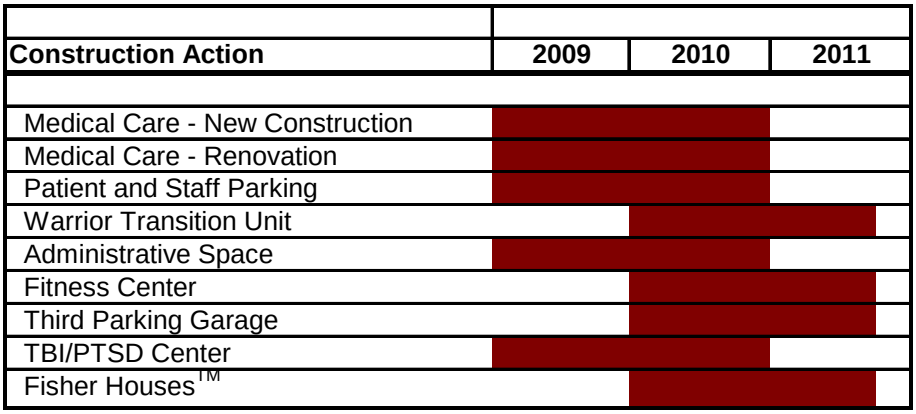
Alternatives One and Two consist of all BRAC-related construction. The two alternatives only vary the location of each project, not the

overall square footage of construction; however, demolition and renovation differs between the two alternatives.

Both alternatives also follow the same construction schedule. The construction schedule for each project is depicted in Figure 4-1. It assumes that equipment is used over a compressed period that combines their emissions for most severe effect; it may vary somewhat from published schedules.

Emissions have been estimated based on square footage for construction, demolition, and operations and are based on an assumed construction schedule. All projects follow a two-year schedule, except the north and south parking garages and renovation, which are assumed to require one year each. During the first year of any given two-year project, relevant demolition and ground surfacing equipment would be used. During the second year, heavy equipment related to raising the structures would be implemented in combination with delivery trucks and other equipment used to complete the interior of the buildings. North parking and the south parking garage each have demolition and construction in one year, while the third parking garage has its demolition in one year followed by erection in the following year. Clinical space-related renovation is broken out into two years, while BEQ and administrative renovation is assumed to occur in the final year of their respective projects.

Figure 4-1: Construction Timeline – Alternatives One & Two



4.4.1 Air Impacts from Construction and Operations

4.4.1.1 Construction and Operations: Alternative One

Construction varies over three years from late 2008 to fall 2011, with occupancy beginning in 2011 in completed buildings. Operations and construction emissions overlap in 2011. The peak year for construction was determined to be 2010, when construction emissions would be the highest. All construction emissions would be short-term. Table 4-1 shows the total Alternative One construction emissions over the 3-year construction period as well as the operations emissions, which would be long-term. The analysis indicates that estimated peak year emissions under Alternative One would be the second year of

construction, 2010, for all pollutants except CO. The year 2010 would result in emissions of approximately 45.78, 22.16, 18.23, and 5.79 TPY for NO_x, VOCs, $PM_{2.5}$, and SO_2 respectively. Year 2011, with combined construction and operations, would be the peak year for CO with 20.33 TPY. They are below ***de minimis*** levels in every year. Appendix B has supporting calculations and the draft Record of Non-Applicability (RONA).

Table 4-1: Total Annual Emissions, Alternative One

Activity	Total Annual Emissions (TPY)				
	NO_x	VOCs	$PM_{2.5}$	SO_2	CO
***de minimis* standards**	**100**	**50**	**100**	**100**	**100**
2009 – Construction	30.80	2.78	9.73	4.04	9.86
2010 – Construction	45.78	22.16	18.23	5.79	13.26
2011 – Construction and Operations	40.58	10.55	11.86	5.50	20.33
2012 – Full Operation	**4.165**	**0.552**	**0.356**	**0.847**	**9.715**

4.4.1.2 Construction and Operations: Alternative Two

Alternative Two construction follows the same timeline as Alternative One, (Figure 4-1). Table 4-2 shows the total Alternative Two construction emissions for each year. Operation and construction emissions would overlap in 2011, when a portion of the buildings would be operational. Under Alternative Two, the analysis indicates that the estimated peak year is also 2010 for all pollutants except CO as for Alternative One, but with a slight decrease below Alternative One emissions to 43.93, 21.99, 16.71, and 5.51 TPY for NO_x, VOCs, $PM_{2.5}$, and SO_2 respectively. Year 2011, with combined construction and operations, would be the peak year for CO with 19.21 TPY. All emissions are below ***de minimis*** levels in every year. Supporting calculations and the draft Record of Non-Applicability (RONA) are available in Appendix B.

Table 4-2: Total Annual Emissions – Alternative Two

Activity	Total Annual Emissions (TPY)				
	NO_x	VOCs	$PM_{2.5}$	SO_2	CO
***de minimis* standards**	**100**	**50**	**100**	**100**	**100**
2009 – Construction	29.57	2.63	9.46	3.75	9.15
2010 – Construction	43.93	21.99	16.71	5.51	12.50
2011 – Construction and Operations	37.49	10.26	10.54	5.03	19.21
2012 – Full Operation	**4.683**	**0.586**	**0.356**	**0.847**	**9.715**

4.4.1.3 Air Permit

Most of the new projects are expected to be heated by the central plant. The central heating plant is operating well below maximum capacity (See Appendix B for current boiler capacities and gas usage in the plant). If additional boilers are added to provide a safety factor during peak usage, the permit would need to be modified; however, the current boilers operate well below permitted limits and additional boiler capacity is unlikely to be a serious issue.

Information on the current permits at NNMC is available in Section 3.4.2 of this document. Given the current annual emissions in Table 3-5, Section 3.4, it is expected that under Alternative Two, NNMC would continue to emit under 50 TPY NO_x, as is required by the Title V permit. New generators, which are anticipated for the new medical care facility, would require a modification to the permit either as permitted sources if over 500 brake horsepower or as registered sources if smaller. While the boiler specifications for the BEQ housing are not yet available, preliminary potential to emit (PTE) calculations for this facility are provided in Appendix B.

4.4.1.4 Regional Significance

Air emissions were also evaluated to determine regional significance. The *Plan to Improve Air Quality in the Washington, DC-MD-VA Region: State Implementation Plan (SIP), "Severe Area SIP" Demonstrating Rate of Progress for 2002 and 2005; Revision to 1990 Base Year Emissions; and Severe Area Attainment Demonstration for the Washington DC-MD-VA Non-attainment Area* (MWCOG, 2004) sets forth daily target levels of 16 tons per day of VOCS and 109 tons per day of NO_x for point sources within the Washington Metropolitan ozone nonattainment region. Additionally, daily target levels of 82 tons per day (TPD) NO_x and 68 TPD VOCs were set for nonroad sources and 234 TPD NO_x and 97 TPD VOCs for mobile or on-road sources. Although the 8-hour ozone standard has been approved for use instead of the 1-hour ozone standard, the 8-hour SIP has not yet been finalized. Therefore, pursuant to USEPA regulations and in accordance with the Metropolitan Washington Air Quality Committee, the 1-hour SIP remains valid as a basis for comparison of emissions (MWCOG, 2005). A draft 8-Hour SIP, while not yet approved, has been written and prescribes emissions budgets for 2008 for point, nonroad, and on-road sources. The 8-Hour ozone SIP for AQCR 47 was written by the Metropolitan Washington Council of Governments and no final approval date has been made available.

Additionally, there is no SIP in place for the newly promulgated $PM_{2.5}$ regulations. The DC-MD-VA region has 3 years to implement a SIP that will create a regional emission inventory for the pollutant $PM_{2.5}$. All daily target levels are presented below in Table 4-3.

Table 4-3: Regional Emissions Inventory - SIP

Source of Emissions	1-Hour Attainment Year: 2005 (TPY)		8-Hour Rate-of-Progress Year: 2008 (TPY)	
	NO_x	VOCs	NO_x	VOCs
Point	109	16	229	14
Non-Road	82	68	77	92
On-Road	234	97	160	71

Source: MWCOG, 2007

4.4.2 Construction and Operations Air Impact Conclusions for Alternatives One and Two

The increase in annual emissions from each alternative would not make up 10 percent or more of the available regional emission inventory for

VOCs or NO_x and would not be regionally significant. Air quality impacts are therefore not considered to be significant. The emissions associated with constructing and operating under Alternatives One or Two, when compared to the ***de minimis*** values for VOCs, NO_x, $PM_{2.5}$, SO_2, and CO fall below the ***de minimis*** values. Therefore, a full conformity determination is not required for Alternative One. The Department of the Navy will provide a Record of Non-Applicability.

4.4.3 Mobile Sources Air Quality Impacts

Ambient air quality impacts resulting from mobile sources related to the proposed project activities were also assessed. The analysis followed 40 CFR 93.123(b)(1) (March 10, 2006), and a Memorandum of Reflecting the Revised PM2.5 NAAQS in NEPA Evaluations, (June 25, 2007, Office of Enforcement and Compliance, USEPA), and Revision to Maryland's Transportation Conformity State Implementation Plan, (November 9, 2006, MDE). In light of the current state of the ambient air quality in the study area and project activities relevant to mobile sources, the two pollutants: carbon monoxide (CO) and ground-level ozone (O_3) are of prime concerns. $PM_{2.5}$ is not a concern for the proposed project because the project does not and will not have 8 percent or more projected traffic volumes comprised of diesel trucks as defined by MDE per USEPA's recommendation. The mobile sources impact analysis methodologies are provided in Appendix B, Section 6.0.

4.4.3.1 Mobile Sources Analysis Results

Existing and future mobile sources air quality impacts were evaluated and are outlined below.

Parking Garages Impacts

Impacts of air pollutants associated with the proposed North and South Parking Garages were evaluated based on the MOBILE6.2 emission factors calculation program, and USEPA's dispersion formula as formatted in SCREEN3 model, as an area source for these naturally ventilated multilevel facilities. These two would have a more severe consequence than the third parking garage of 565 spaces. The maximum hourly emissions generated by vehicular parking activities would include CO pollutants released from vehicles idling for departure, traveling in the garage for departing or arriving, and excess traveling between floors. These emissions were estimated for all seven levels of parking garages. By using emission strengths identified, the indoor CO concentrations were calculated respectively for air quality levels. In summary, the predicted worst peak-hour CO emission rates and 1-hour CO concentrations within the North and South Parking Garages are presented in Table 4-4. Table 4-5 displays the maximum 8-Hour emission concentrations.

The predicted maximum CO indoor concentrations on each floor of the two garages are below the NAAQS of 35 ppm, and will be within an MWCOG preferred 25 ppm level at maximum hourly vehicular operation in the garage. The average 8-hour CO concentrations in the North and South

Garages are also estimated as 6.60 ppm and 6.83 ppm, respectively; and are below the NAAQS of 9 ppm. Therefore, the indoor CO concentrations are not significant.

Table 4-4: Maximum Hourly Emissions and Indoor CO Concentrations – North and South Parking Garages

Floor	North Parking Garage		South Parking Garage	
	Total Maximum Hourly CO Emissions	Predicted Maximum Hourly Indoor CO Concentrations*	Total Maximum Hourly CO Emissions	Predicted Maximum Hourly Indoor CO Concentrations*
	(g/hour)	(ppm**)	(g/hour)	(ppm**)
1st	116.68	10.22	122.97	10.56
2nd	106.74	9.69	112.89	10.02
3rd	96.79	9.16	102.82	9.48
4th	86.85	8.63	92.74	8.94
5th	76.91	8.10	82.66	8.41
6th	66.96	7.57	72.58	7.87
7th	57.01	7.04	59.95	7.03
All	**607.94**	**8.63**	**646.61**	**8.90**
	NAAQS Standard	**35.00**		**35.00**

*: Including 1-hour CO background concentration 4.0 ppm
**: ppm = parts per million, (For CO, 1 ppm = 1,150 ug/m^3)

Table 4-5: Maximum Eight-Hour Average Emissions and Indoor CO Concentrations – North and South Parking Garages

Floor	North Parking Garage		South Parking Garage	
	Total Maximum Eight-Hour Average CO Emissions	Predicted Maximum Eight-Hour Average Indoor CO Concentrations*	Total Maximum Eight-Hour Average CO Emissions	Predicted Maximum Eight-Hour Average Indoor CO Concentrations*
	(g/hour)	(ppm**)	(g/hour)	(ppm**)
1st	81.68	7.75	86.08	7.99
2nd	74.72	7.38	79.02	7.61
3rd	67.75	7.01	71.97	7.24
4th	60.80	6.64	64.92	6.86
5th	53.84	6.27	57.86	6.49
6th	46.87	5.90	50.81	6.11
7th	39.91	5.53	41.97	5.52
All	**425.56**	**6.60**	**452.63**	**6.83**
	NAAQS Standard	**9.00**		**9.00**

*: Including 8-hour CO background concentration 3.4 ppm
**: ppm = parts per million, (For CO, 1 ppm = 1,150 ug/m^3)

By using USEPA's dispersion formula established in SCREEN3 model, the outdoor CO impact concentrations resulting from the garages at the nearby receptors and intersections were calculated. The predicted maximum total hourly impacts of parking garages are 0.17 ppm and 0.14 ppm respectively at the garage entrance and the closest roadway intersection, while the predicted total 8-hourly impacts of parking garages are 0.12 ppm and 0.10 ppm respectively at the garage entrance

and the closest roadway intersection. These impacts were added to the impacts of roadway vehicular emissions to obtain the total microscale impacts, as described below.

Mobile Source Microscale Impacts

Vehicular emissions on the roadway system were determined mathematically as a function of route speed, vehicle classification, ambient temperature and other factors. A dispersion model was then employed to simulate mathematically how traffic, meteorology, and geometry combine to affect pollutant concentrations. The 1-hour and 8-hour CO concentrations resulting from vehicular emissions were calculated for the existing, No Action (2011 future no build) Alternative, and Action (build) alternatives at five (5) major intersections (Refer to Appendix C for additional details on these alternatives and background conditions):

- Rockville Pike (MD 355) & Cedar Lane / North Drive
- Rockville Pike (MD 355) & Wilson Drive / North Wood Road
- Rockville Pike (MD 355) & South Drive / South Wood Road
- Rockville Pike (MD 355) & Jones Bridge Road
- Connecticut Ave (MD 185) & Jones Bridge Road

These intersections are adjacent to the development sites and would receive the highest impacts from the proposed projects. The receptor locations within the NNMC campus near North Wood Road and South Wood Road were also placed. The receptor locations for each microscale analysis site were placed on the intersection corners and mid-block locations along the sidewalks where the general public has continuous access. These receptors were selected because they are the locations where the traffic analysis indicated that the greatest air impacts and maximum changes in the air pollutant concentrations could be expected.

The CO predictions were performed for the peak hour traffic conditions. The impacts resulting from the roadway emissions and garage pollutants were added to the background concentrations to predict total CO pollutant concentrations. The impacts of the parking garage on the analyzed intersection(s) were also included in the total CO concentration calculation under the future build condition. The total 1-hour and 8-hour CO levels were then compared to their respective NAAQS thresholds of 35 ppm and 9 ppm.

As shown in Table 4-6, the maximum 1-hour and 8-hour CO concentrations predicted for existing conditions analysis scenarios at the worst-case receptor location among all intersection sites, are 8.8 ppm and 6.80 ppm, respectively. The predicted 1-hour and total ambient maximum 1-hour and 8-hour CO concentrations for future no-build conditions analysis scenarios at the worst-case receptor location among all intersection sites, are 8.3 ppm and 6.4 ppm, respectively. All ambient concentrations predicted for future no-build conditions are lower than

the existing ambient concentrations due to the improvement of vehicle engines. The worst-case traffic among Build Alternatives One and Two options and measures was evaluated to predict total ambient CO concentrations for the future Build Alternatives, including impacts resulting from CO emissions of roadways and new parking garages, and regional backgrounds at the worst-case receptor location. The predicted total ambient maximum 1-hour and 8-hour CO concentrations for future Build Alternative One and Two are 8.44 ppm and 6.50 ppm respectively. The NAAQS standards for 1-hour and 8-hour ambient CO concentrations are 35 ppm and 9 ppm respectively. Other options and traffic mitigations would result in even lower CO ambient concentrations. By comparing build and no-build concentrations, the predicted worst-case 8-hour impact is 0.20 ppm, and therefore is not significant.

Table 4-6: Predicted Ambient Total CO Concentrations - Future No-Build Condition

Site	Ambient Concentrations					
	Existing		2011 No Action		Alt. 1 & 2	
	1-Hour (ppm)*	8-Hour (ppm)*	1-Hour (ppm)*	8-Hour (ppm)*	1-Hour (ppm)*	8-Hour (ppm)*
NAAQS Standard	**35**	**9**	**35**	**9**	**35**	**9**
Rockville Pike (MD 355) & Cedar Lane/North Drive	8.8	6.8	8.3	6.4	8.44	6.5
Rockville Pike (MD 355) & Wilson Drive/North Wood Road	7.9	6.1	7.3	5.7	7.54	5.8
Rockville Pike (MD 355) & South Drive/South Wood Road	6.7	5.3	6.3	5.0	6.44	5.1
Rockville Pike (MD 355) & Jones Bridge	8.2	6.3	8.0	6.2	8.14	6.3
Connecticut Ave (MD 185) & Jones Bridge Road	6.7	5.3	6.2	4.9	6.44	5.1

Notes: 1-hour ambient concentration includes background of 4.0 ppm in existing and 2011 No Action conditions. It also includes garage impacts for Alternatives 1 and 2.

8-hour ambient concentration includes background of 3.4 ppm in existing and 2011 No Action conditions. It also includes garage impacts for Alternatives 1 and 2.

*ppm = parts per million, (For CO, 1 ppm = 1,150 ug/m^3)

4.4.3.2 Project Compliance with Regulations

Air quality impacts are evaluated against the NAAQS, local requirements, and the rules for conformity. For determining whether a project conforms to the regulations, a proposed project shall not cause or contribute to any new violation of the standard; as well as shall not increase the frequency or severity of any existing violation; and shall not delay timely attainment of the standards.

As described above, all estimated concentrations for the No Action (no-build) and Action (build) alternatives are well below the NAAQS standards, and thus no violations were predicted of 1-hour or 8-hour NAAQS at any sites. The predicted maximum project impact on 8-hour CO concentration, including effects of garages emissions, is 0.2 ppm which is also not significant.

Thus, it is projected that the proposed projects will not create any new violation, nor increase the frequency or severity of any existing violations of the NAAQS standards. Therefore, the proposed projects would not delay the timely attainment of the NAAQS, and would comply with the conformity rules and the requirements of the Clean Air Act.

4.4.4 Air Impacts: No Action Alternative

There would be no construction or change in the emissions from NNMC under the No Action Alternative. Therefore, no impacts to air quality resources would be expected to occur from implementation of the No Action Alternative.

4.5 NOISE CONSEQUENCES

The impacts from changes in noise levels from the implementation of the proposed projects as well as the impacts of the noise levels of the surrounding areas and activities to the proposed development are discussed in this section.

4.5.1 Noise Impacts: Alternative One

4.5.1.1 Construction Noise

Typical Construction Noise Levels

Alternative One construction activities would involve the use of heavy equipment such as backhoes and trucks. These activities typically generate a noise level of 80 dBA 50 feet (15 meters) from the source, as shown in the table below. Typical construction equipment noise levels are provided in Table 4-7. As a general rule for estimating noise emission, sound from a stationary source will diminish approximately 6 dBA with each doubling of distance. For example, if a noise from a source reaches 75 dBA at 25 feet, it will be 69 dBA at 50 feet and 63 dBA at 100 feet, and so on (Montgomery County, 2007).

Under Alternative One construction, renovation and demolition activities would generate noise levels associated with the equipment in Table 4-7 that is deployed on that project. These impacts would be typical of those experienced in the vicinity of construction areas, would be temporary, and would end when construction is complete. The majority of construction under this alternative is scheduled to occur from the end of 2008 to the middle of 2011.

Refer to Section 3.5 for permissible noise levels for construction in Maryland and Montgomery County. Construction and demolition contractors would be expected to adhere to State of Maryland and Montgomery County requirements. Essentially, noise levels of 75 dBA to 85 dBA are permissible during the construction weekday and these are reduced to 55 dBA to 67 dBA at other times, depending upon the surrounding land use.

Table 4-7: Typical Construction Noise Levels

No of Items	Equipment Type	Maximum Equipment Noise Level at 15 m, (50 feet) dBA	Hourly Equivalent Noise Levels at 15 m (50 feet), dBA[1]	Hourly Equivalent Noise Levels at 30 m (100 feet), dBA[1]
Clear and Grub				
1	Excavator	81	78	72
1	Backhoe	78	75	69
4	Heavy Dump Trucks	76	73	67
	Overall L_{eq} (h)		**83**	**77**
Pavement Demolition				
1	Front Loader	79	76	70
1	Hoe Ram	90	87	81
4	Heavy Dump Trucks	76	73	67
	Overall L_{eq} (h)		**88**	**82**
Retaining walls				
1	Backhoe	78	75	69
1	Bormag BMP 851	80	77	71
1	Concrete Pump	81	78	72
1	Compressor	78	75	69
3	Ready Mix Trucks	79	76	70
4	Heavy Dump Trucks	76	73	67
2	Flatbed Truck	75	72	66
	Overall L_{eq} (h)		**86**	**80**
Paving				
1	Grader	85	82	76
1	Water Truck	76	73	67
1	Vibratory Roller	80	77	71
1	Compactor	80	77	71
1	Concrete Pump	81	78	72
3	Ready Mix Trucks	79	76	70
1	Asphalt Paver	77	74	68
1	Asphalt Roller	80	77	71
1	Sweeper	79	76	70
4	Heavy Dump Trucks	76	73	67
2	Flatbed Truck	75	72	66
	Overall L_{eq} (h)		**89**	**83**

No of Items	Equipment Type	Maximum Equipment Noise Level at 15 m (50 feet), dBA	Hourly Equivalent Noise Levels at 15 m (50 feet), dBA[1]	Hourly Equivalent Noise Levels at 30 m (100 feet), dBA[1]
Earthwork				
1	Excavator	81	78	72
1	Backhoe	78	75	69
1	Front Loader	79	76	70
1	Dozer	82	79	73
1	Trencher	80	77	71
4	Heavy Dump Trucks	76	73	67
	Overall L_{eq} (h)		**86**	**80**
Structures				
1	Excavator	81	78	72
1	Backhoe	78	75	69
1	Compactor	80	77	71
1	Crane	81	78	72
1	Concrete Pump	81	78	72
1	Compressor	78	75	69
1	Bridge Deck Paver	77	74	68
2	Flatbed Truck	75	72	66
4	Heavy Dump Trucks	76	73	67
3	Ready Mix Trucks	79	76	70
	Overall L_{eq} (h)		**88**	**82**
Miscellaneous				
1	Front Loader	79	76	70
1	Dozer	82	79	73
2	Heavy Dump Trucks	76	73	67
	Overall L_{eq} (h)		**82**	**76**

Notes: Calculated construction noise levels assume that all equipment operates for six hours per eight hour day and that all equipment is operated at full load 70 percent of the time. Predicted noise levels are from the center of the construction activity.
Source: Federal Highway Administration RCNM 1.0 User Guide, Jan. 2006 (USDOT, 2006).

Table 4-7 shows that the hourly equivalent noise levels for demolition, earthwork, and structures, all of which would occur at NNMC, are 88-89 dBA at 15 meters/50 feet from typical construction activities and equipment. Therefore, such items could require noise reduction measures to meet the County standards.

Potential Noise Reduction Measures

Potential measures have been identified to control airborne noise impacts. Typical measures that would be considered and implemented as appropriate include:

- Source Limits and Performance Standards to meet noise level thresholds for daytime, evening, and nighttime hours at sensitive land uses (Montgomery County Standards)
- Designated Truck Routes
- Establishment of noise monitoring stations for measuring noise prior to and during construction
- Design considerations and project layout approaches including measures such as construction of temporary noise barriers, placing construction equipment farther from noise-sensitive receptors, and constructing walled enclosures/sheds around especially noisy activities such as pavement breaking
- Sequencing operations to combine especially noisy operations to occur in the same time period
- Alternative construction methods, using special low noise emission level equipment, and selecting and specifying quieter demolition or deconstruction methods

Control measures for sensitive receptors include: sequencing operations, use of alternative construction equipment and methods and instituting other special control measures to reduce the transmission of high noise levels to noise-sensitive areas. A construction phasing plan would be coordinated with patient moves to avoid impacts to patients.

Compliance with the Occupational Safety and Health Administration (OSHA) standards for occupational noise exposure associated with construction (29 CFR 1926.52) would address the construction workers hearing protection.

Noise Receptors and Potential Impacts from Construction

Noise receptors – inhabited buildings – for each of the proposed projects and potential impacts are discussed below. Sensitive receptors are also identified that require particular care to minimize impacts. The noise reduction measures listed above would all be considered and applied as appropriate.

Inpatient Addition: Noise generated by the construction activities for the inpatient medical addition and the internal renovation and alteration would be near or within Building 9, which is a sensitive receptor. However, appropriate measures would be implemented during the construction activities to avoid noise impacts to the patients and operations at the medical care facilities during these activities. The construction will be phased and patients would be evacuated from areas with unacceptable conditions, to be transferred to completed areas when conditions allow. Likewise, appropriate measures would be implemented to address the noise that would be generated from renovation activities in Buildings 1 through 10.

Outpatient Addition: The outpatient medical addition and the North Parking Garage would be located in the vicinity of Buildings 1, 3, 5, and 7, on parking lots A and L, respectively. Appropriate measures would be employed during the construction activities to avoid noise impacts to those facilities.

BEQ: The BEQ facilities would be located close to existing buildings, one west of Building 61 and the other east of Building 60 and along the northeast of Building 11. North of the area proposed for the BEQ on the west of Building 61, some buildings of the Stone Ridge School of the Sacred Heart are located along the fence line. A building located in that area was observed as currently being used for child care and another building for administrative purposes. Other buildings are designated as maintenance and shop areas. Applicable measures would be employed during the construction activities to avoid noise impacts to the child care and administrative buildings. In addition, it is anticipated that the minimum AT/FP setback required from the fence line for the building would attenuate the construction noise to those facilities.

The area proposed for the BEQ to the east of Building 60 and along the northeast of Building 11 is in proximity to the residential area to the northeast. Construction activities would increase the ambient noise levels in the area. Applicable measures would be employed during the construction activities to avoid noise impacts to the residential area and Building 11. In addition, it is anticipated that the minimum AT/FP setback required from the fence line for the building would attenuate the construction noise to the residential area. Although Building 60 is an existing BEQ facility, it would undergo renovation in the same timeframe as the new BEQ construction and therefore, noise impacts to the building are not anticipated.

Fitness Center: A new fitness center would be constructed on the Building 141 site and a new administrative use building would be located in the area of Building 53, 28, 59, 69, and 79. Flag Houses are located northeast of the area, with the nearest Flag House at a distance of approximately 300 feet from the Building 141 area. Although demolition and construction activities would disturb the residential area, the distance from the Flag Houses would attenuate the noise levels. Building 17, located immediately east of the

Building 28, is currently empty and would be renovated during the same timeframe as the new construction. Therefore, no impacts would be anticipated.

South Parking: Demolition of the western half of Building 23 and construction of South Parking would generate noise impacts to the existing fitness center in the remaining eastern half of the building.

Fisher Houses: Similarly, demolition of Buildings 39, 40, and 41 and construction of new Fisher Houses would generate noise impacts to the residents of the Navy Lodge. Applicable measures would be employed during the construction activities to avoid noise impacts to the residential area.

TBI/PTSD ICE: Demolition of Building 12 and construction of a TBI/PTSD ICE building would generate noise impacts to Building 50, a BEQ. Applicable measures would be employed during the construction activities to avoid noise impacts to this residential facility.

Building 17: Building 17 would undergo renovation and Buildings 18, 21, 139, 150, 174 and 176 would be demolished for a new parking structure. All those buildings are currently vacant. The facilities closest to the buildings to be demolished are to the west and are used for maintenance purposes. Therefore, any noise impacts would be minor.

Compliance with OSHA standards for occupational noise exposure associated with construction (29 CFR 1926.52) would address construction workers' hearing protection.

4.5.1.2 Vehicle Noise

Noise impacts related to traffic under Alternative One would occur in areas already experiencing vehicular noise and would not be expected to cause additional impacts. The traffic levels projected under the alternative are not anticipated to double the levels used for the 2003 noise levels measurements for the NIH Master Plan Update EIS. The results from the comparison between No Action Alternative traffic and Alternative One traffic indicate that the intersection with the highest traffic increase is West Cedar Lane and West Drive with a 37-percent increase in the afternoon peak hours. The second highest increase was observed at Jones Bridge Road and Gunnell Road with a 35-percent increase in the morning peak hour (refer to Tables 4-11 and 4-12 in Section 4.7). Traffic volumes must double or halve to produce a three dBA increase or decrease, respectively. A change of 3 dBA is the level discernable to the human ear.

Temporary increases in truck traffic (e.g., dump trucks, material transports) within and near the construction corridor would produce localized noise for brief periods, but would not create any long-term, adverse noise impacts to the neighboring community.

4.5.1.3 Helicopter Noise

Given the nature of the situations that would require helicopter operations, it is not possible to predict the time of their landing. However, as discussed in Section 3.5, the number of flights is infrequent, even with the increase due to the ongoing conflicts.

Currently, the Emergency Room at the Walter Reed Army Medical Center receives one to two helicopter flights per month (NNMC, 2007b). Those flights are generally not trauma, but are transfers from other hospitals in the region. Patients are primarily elderly and children. The hospital does get occasional MEDSTAR and State Trooper helicopters with accident victims.

The increase in emergency helicopter flights at NNMC would be the same for Alternatives One and Two, estimated as one to two additional flights per month, which is the reported average at Walter Reed Army Medical Center. This would represent an approximate 8 to 16 percent increase over the current average of 12.6 per month. Resultant noise would be temporary and does not represent a significant change from existing conditions.

4.5.2 Noise Impacts: Alternative Two

4.5.2.1 Construction Noise

The same noise reduction measures discussed for Alternative One would be considered and applied where appropriate for Alternative Two. Construction and demolition contractors would be expected to adhere to State of Maryland and Montgomery County requirements.

For the medical care addition and renovation, the construction of a new BEQ to the east of Building 60, construction of the new Fisher Houses, and the demolition and construction of a new administrative building and a parking structure in area of Buildings 53, 28, 59, 69, 79, and 141, the noise impacts from the activities under Alternative Two would be the same as under Alternative One. The following discusses the Alternative Two noise impacts that are different from Alternative One.

TBI/PTSD ICE: Under Alternative Two, a TBI/PTSD ICE facility would be constructed east of Building 56 and on a portion of H-Lot. Building 56 is a bowling alley. Therefore, construction activities related noise impacts in the area are not anticipated to be significant.

Fitness Center: Under Alternative Two, all of Building 23 would be demolished. As there are no other buildings in the area, construction activities related noise impacts are not anticipated to be significant.

Compliance with OSHA standards for occupational noise exposure associated with construction (29 CFR 1926.52) would address construction workers' hearing protection.

4.5.2.2 Vehicle Noise

Traffic related noise impacts would be the same as for Alternative One.

4.5.2.3 Helicopter Noise

Helicopter noise impacts would be the same as for Alternative One.

4.5.3 Noise Impacts: No Action Alternative

Implementation of the No Action Alternative would not change the noise levels at NNMC. Therefore, no impacts related to noise would be expected to occur from implementation of the No Action Alternative.

4.6 UTILITY INFRASTRUCTURE CONSEQUENCES

4.6.1 Utility Infrastructure Impacts: Alternative One

4.6.1.1 Telecommunications Impacts: Alternative One

The proposed BRAC Actions would increase the demand for telecommunication services at the installation. More hardware and services will be required to serve the new and expanded buildings. New and expanded ducts/conduits could be required in certain portions of the installation. The existing ducts and conduits would be expanded as necessary as part of the construction program, is routinely implemented in such facility expansions, and is not expected to pose significant problems or impacts.

4.6.1.2 Electric Power Impacts: Alternative One

The proposed BRAC Actions are expected to increase the current electric demand of 18 MVA by approximately 7.03 MVA to 25.03 MVA. It is reported that the four existing PEPCO feeders cannot safely handle this increase in load in their current configuration. The NAVFAC manager of high voltage systems and NAVFAC's electrical engineering consultant (NAVFAC, 2007e) believe doubling the capacity of two of the existing feeders would provide adequate power for the large BRAC project additions. A new primary switchgear arrangement would be required and the existing four feeder arrangement would have to be reconfigured with two feeders having their capacity doubled via adding two parallel feeders. PEPCO is capable of adding up to four parallel feeders to NNMC (NAVFAC, 2007e).

The electrical distribution system within the installation is comprised of wires contained within a network of underground duct banks. Further analysis of the individual building loads and existing wire capacities is required to determine what improvements to the installation distribution system may be required to support the additional building loads. This analysis would be performed during the design phase of the project. It is expected that up to two additional 750 kW emergency generators would also be required to provide adequate emergency power for the proposed new facilities.

4.6.1.3 Natural Gas Impacts: Alternative One

The proposed BRAC Actions would increase the demand for natural gas at NNMC for heating of the proposed new buildings and building additions, and for laundry functions, kitchen facilities and laboratory functions at the medical facilities. The increase in demand at NNMC is offset by the decrease in demand at WRAMC; therefore there is no increase in regional demand caused by the BRAC alternatives. Some of the new buildings under Alternative One, including the BEQs and Fisher Houses™, would require natural gas for direct heating. The remaining buildings would be most likely to increase the demand for natural gas at the central plant, as they are expected to obtain steam and chilled water from the central plant for heating and cooling.

The demand for natural gas for the new BRAC facilities would be approximately 72 percent of the current NNMC demand of 475,000 therms per year, if the assumption used to project demand is that the average energy intensity for new space would be approximately the same as that for typical administrative office buildings from a Department of Energy survey (CBECS, 2003). Using the much more conservative energy intensity assumption that was used for air emission calculations in Appendix B, which assumes the medical care space of 638,000 SF has an energy intensity equal to that of typical hospitals, which is more than three times greater than that of an office building, and assuming typically higher intensities for residential space, results in natural gas demand for the BRAC facilities that is 75 percent greater than existing demand at NNMC (CBECS, 2003). Actual demand is likely to be closer to the low values because of energy efficiency improvements since the survey of energy intensities was performed prior to 2003.

Washington Gas is not able to define specific improvements that may be required to serve the build out without knowing specific demands (in terms of therms) and seasonal peak demands for the new buildings. Their 6-inch (non-interruptible) line feeding the buildings and 8-inch (interruptible) line feeding the boilers could handle increased demand, but detailed modeling of their system with accurate thermal and equipment loading data would be required to determine exactly how much of an increase could be handled (Washington Gas, 2007).

NNMC has fuel oil as a backup to natural gas in the central plant and either electrical or fuel oil backup elsewhere. Both existing boilers in the central plant and any individual systems to be designed for the alternatives would have adequate fuel oil or electrical systems to sustain their loads when an interruption in the supply of natural gas occurs.

4.6.1.4 Water Impacts: Alternative One

The proposed BRAC Actions would increase the amount of water needed at NNMC for employees, patient care at the medical inpatient and outpatient facilities, guests/residents of the proposed housing facilities, an expanded fitness center, and increased water use due to heating/cooling of the new structures. The increase in demand at NNMC

is offset by the decrease in demand at WRAMC; therefore there is no increase in regional demand caused by the BRAC alternatives. Overall water demand data for the installation was available, but it was not available on a per-building or per-function basis. Therefore, the increase in water use due to BRAC actions was estimated utilizing published average per capita flows for similar functions and supplemented with information generated from existing water consumption data for functions for which published flow data was not available. The average daily demand increase in water for the BRAC actions is estimated to be approximately 340,000 gpd. This is approximately a 50-percent increase over the current average daily demand of approximately 653,000 gpd.

WSSC officials have indicated (NAVFAC, 2007c) that WSSC is willing and able to provide additional water supply to the installation. From the existing utility plans, it appears that WSSC has substantial supply lines in the area that are well looped. It is likely that the increase in water demand could be served using WSSC's existing infrastructure. This would have to be confirmed with WSSC officials during preliminary design when specific building water demand peaks and fire flows have been determined.

Distribution of water to the new structures could be accomplished through numerous different connection configurations. Both WSSC and NNMC own and operate lines within the installation. Most planned buildings have a water line relatively near the building footprint, and a few building locations have several. Modeling of the existing NNMC distribution system with input from WSSC regarding their specific line capacities and tapping preferences would be required to determine the most cost effective connection configurations. The modeling would require specific building water demand peaks and fire flows typically determined during the design phase.

Minor extensions from existing NNMC water lines and potentially additional taps to WSSC's water lines would likely be required to provide water, to the proposed project sites. Systems are generally looped, allowing supply to continue while one line is being shut down for any needed upgrades. These would result in short-term minor adverse impacts caused by trenching and burial along and potentially in/across roadways; however, no significant impacts are expected.

4.6.1.5 Wastewater Impacts: Alternative One

The proposed BRAC Actions would increase the amount of wastewater discharged at NNMC from the new buildings for employees, patient care at the medical inpatient and outpatient facilities, an expanded fitness center, and guests/residents of the proposed housing facilities. The increase in discharge at NNMC is offset by the decrease in demand at WRAMC; therefore there is no increase in regional wastewater discharge caused by the BRAC alternatives. Overall wastewater discharge data for the installation was available, but it was not available on a per-building or per-function basis. Therefore,

the increase in wastewater discharge due to BRAC actions was estimated utilizing published average per capita flows for similar functions and supplemented with information generated from existing discharge data for functions for which published flow data was not available. The average daily increase in wastewater discharge for the BRAC action is estimated to be approximately 288,000 gpd. This is approximately a 50-percent increase over the current average daily demand of approximately 530,000 gpd.

WSSC officials have indicated that WSSC can provide additional wastewater collection and treatment services to the installation (NAVFAC, 2007c). Based on the hydraulic model results contained within the Sanitary Sewer Capacity Analysis, the following observations have been made about the potential capacity of the NNMC collection system. It appears that the NNMC sewer lines in the vicinity of the following proposed building locations would have sufficient capacity to serve the new buildings based upon the volume assumptions utilized for: Inpatient Hospital facility, TBI/PTSD ICE, Fisher Houses, New Administration, and fitness center. The sewer lines in the vicinity of the following proposed building locations will likely require improvements to serve the additional flows: Outpatient Hospital facility and BEQs. It is noted that the Sanitary Sewer Capacity Analysis was limited to the NNMC system only. Capacity availability within the WSSC lines onsite should be confirmed with WSSC officials during preliminary design when specific building demand peaks have been determined.

4.6.1.6 Stormwater Impacts: Alternative One

The proposed BRAC Actions would increase the amount of impervious area and could cause an increase in the amount of stormwater runoff generated at NNMC, especially during storm events. Adverse impacts due to this development could be minimized by incorporating appropriate stormwater best management practices into the design of the new facilities, as required by law, in order to minimize the volume of surface runoff discharged from the building sites.

The Environmental Article, Title 4, Subtitle 2, Annotated Code of Maryland requires stormwater management implementation for earth disturbances greater than 5,000 square feet. The Navy must provide a list of any such ongoing construction/land disturbance projects to MDE with their annual stormwater report under the general MS4 permit. Soil and erosion control plans for federal developments are approved and enforced by MDE. The 2000 MDE Stormwater Design Manual (MDE, 2000) must also be followed during the design (or redesign) of any new facilities. This manual guides the selection of stormwater BMPs that must be incorporated into the design and provides sizing criteria for these BMPs based on: water quality, recharge, channel protection, overbank flood control, and extreme flood management in the State of Maryland.

The 2000 MDE Stormwater Design Manual encourages innovative site planning including disconnection of rooftop runoff and other impervious surface runoff, sheet flow to buffer areas, open channel use, and environmentally sensitive development (MDE, 2000). Implementation of controls necessary to comply with State stormwater requirements and NNMC's stormwater pollution prevention plans during both construction and operation of these facilities would ensure that any impacts from the increased stormwater runoff would not be significant.

4.6.1.7 Solid Waste Management Impacts: Alternative One

The proposed BRAC Actions would increase the amount of solid waste generated onsite, but this increase could be handled by the private solid waste hauler and is not expected to have any long-term adverse impacts on the capacity of the receiving landfill. NNMC would also expand its recycling program to ensure that materials currently recycled onsite are also recycled at the new facilities. Regulated medical Waste (RMW) is discussed in Section 4.11.

4.6.2 Utility Infrastructure Impacts: Alternative Two

Impacts to utility infrastructure under Alternative Two would be the same as stated for Alternative One.

4.6.3 Utility Infrastructure Impacts: No Action Alternative

No effects would be expected. Implementation of the No Action Alternative would not alter the existing utility/infrastructure at the sites being considered under the proposed action.

4.7 TRANSPORTATION CONSEQUENCES

The transportation section of this document summarizes traffic operations and travel characteristics for roadways affected by the proposed development alternatives at NNMC. To implement the Proposed Action, the Navy has identified two action alternatives that differ for traffic analysis in their siting of the required facilities and parking within the installation. However, they are essentially the same in their impacts to traffic and roadways outside the installation. The alternatives currently assume approximately 2,200 new employees at NNMC by 2011. However, the EIS assumes approximately 2,500 additional employees as a conservative estimate to insure any additional staff determined necessary have been evaluated in the EIS, as well as to account for possible increases in staff at NNMC under other ongoing or future projects on Base being addressed under cumulative impacts. The traffic analysis thus uses this conservative assumption on growth by analyzing the potential transportation impacts of accommodating 2,500 new employees at NNMC by 2011.

The traffic impacts were estimated for each of the three alternatives analyzed following the guidelines set forth by the local authorities and described in Section 3.7.4 of the DEIS. The year 2011 was used as the future year for the analysis considering that the BRAC action is

required to be implemented by then. Transportation analyses were prepared for the calculated peak periods for the future 2011 condition scenarios both with and without the development scenarios (Action Alternatives and the No-Action Alternative, respectively). The analysis scenarios are summarized in Table 4-8.

The No Action Alternative (referred to as No-Build by transportation planners) was evaluated and used as a baseline for comparison to the Action Alternatives One and Two (referred to as the Build Alternatives by transportation planners) to measure relative impacts to the transportation network in the study area in 2011. Transportation analyses were prepared for the calculated peak periods for the future 2011 condition scenarios both with and without the Proposed Action (Alternatives One and Two and the No-Action Alternative, respectively). The analysis scenarios are summarized in Table 4-8.

Table 4-8: Scenario Analysis Summary

Description	Components	Analysis Year	Analysis Detail	Potential Improvement Measures Analyzed
Existing	Existing conditions See Section 3.7	2007	AM, PM Peak Volume, LOS, CLV	
No Action (No-Build) Alternative	Existing + Background Growth	2011	AM, PM Peak Volume, LOS, CLV	
Alternatives One & Two	Existing + Background Growth + BRAC 2,500 Staff, 1,862 Patients & Visitors	2011	AM & PM Peak Volume, LOS, CLV	Slip ramps, additional lanes, spot improvements

4.7.1 No Action Alternative

4.7.1.1 2011 Traffic Volume Development

The No Action Alternative, which represents the 2011 background traffic situation, represents future traffic levels without the BRAC action. This serves as the basis for comparison for Alternative One and Alternative Two.

In transportation analysis, it is the industry standard to analyze as part of the No-Action alternative the impacts caused by future growth, which includes future projects or empirical growth data as appropriate. In Montgomery County, approved projects are used to predict growth. County officials provided a list of approved development in the area that is anticipated to be built by the year 2011. These are listed in Section 4.12 Cumulative Impacts, Table 4-19. The background traffic is then a composite of existing traffic and traffic generated by the approved development in the area.

The background developments considered in the traffic forecasts were identified by the M-NCPPC Transportation Planning Division as part of the study scoping process. The peak hour trip generation for these developments was calculated based on the Montgomery County Local Area

Transportation Review (LATR) guidelines (M-NCPPC, 2004) and the trip rates and equations published by the Institute of Transportation Engineers (ITE), Trip Generation Manual, 7th Edition. Transit usage rates based on observations and surveys are approximately 30 percent, but it was agreed with M-NCPPC staff to use a more conservative "discount" of 15 percent. Because the ITE method generated more trips, yielding a more conservative forecast, it was agreed to use the ITE rates and 15 percent reduction for transit mode share.

Finally, based on the future background volumes and other field observations collected, the capacity of the intersections was evaluated for both the AM and PM peak hours, using the CLV Analysis technique, as stipulated by the LATR Guidelines. The analysis methodology and specific development assumption details are included in Appendix C, Transportation Study. M-NCPPC in their LATR defines the maximum acceptable CLV to be 1,600 vehicles. Based on this, Level of Service (LOS) F, which is defined as volumes greater than 1,600, represents unacceptable conditions.

The No Action Alternative background scenario also investigated planned and programmed roadway improvements that can influence the capacity of study area intersections and/or influence travel route and time of day patterns, but it was determined that none of the approved and funded roadway improvements would directly influence the capacity of intersections in the study area. See Appendix C, Transportation Study for the detailed analysis.

4.7.1.2 2011 No Action Alternative Traffic Impacts

The LOS resulting from the capacity analysis of the 2011 No Action Alternative are presented in Table 4-9. According to the LATR guidelines the following intersections are above capacity:

- Rockville Pike & West Cedar Lane – above capacity in both AM and PM peak hours
- West Cedar Lane & Old Georgetown Road – above capacity in PM peak hour
- Rockville Pike & Jones Bridge Road – above capacity in PM peak hour
- Jones Bridge Road & Connecticut Avenue – above capacity in PM peak hour

The following intersections are close to capacity:

- Pooks Hill Road & Rockville Pike – close in the AM peak hour
- Rockville Pike & North Drive – close in the AM peak hour

Table 4-9: Intersection LOS, 2011 No Action Alternative

Number	Intersection	AM CLV	LOS	PM CLV	LOS	LATR STD	Policy Area
1	Tuckerman North & Rockville Pike	1235	C	1283	C/D	1550	North Bethesda
2	Tuckerman South & Rockville Pike	1076	B	1030	B	1550	North Bethesda
3	Grosvenor Lane & Rockville Pike	1308	C/D	1073	B	1550	North Bethesda
4	Pooks Hill Road & Rockville Pike	1539	E	1407	D	1600	Bethesda/ Chevy Chase
5	Rockville Pike & West Cedar Lane	2048	F	1784	F	1600	Bethesda/ Chevy Chase
6	West Cedar Lane & West Dr.	549	A	513	A	1600	Bethesda/ Chevy Chase
7	West Cedar Lane & Old Georgetown Road	1324	D	1660	F	1600	Bethesda/ Chevy Chase
8	Rockville Pike & North Drive	1503	E	1269	C	1600	Bethesda/ Chevy Chase
9	Rockville Pike & North Wood Road	1154	B/C	1366	D	1600	Bethesda/ Chevy Chase
10	Rockville Pike & Wilson Drive	1432	D/E	1536	E	1600	Bethesda/ Chevy Chase
11	Rockville Pike & South Wood Road	1167	B/C	1146	B/C	1600	Bethesda/ Chevy Chase
12	Rockville Pike & Jones Bridge Road	1351	D	1680	F	1600	Bethesda/ Chevy Chase
13	Jones Bridge Road & Gunnell Road	808	A	956	A	1600	Bethesda/ Chevy Chase
14	Jones Bridge Road & Grier Road	728	A	1101	B	1600	Bethesda/ Chevy Chase
15	Jones Bridge Road & University Drive	743	A	1031	B	1600	Bethesda/ Chevy Chase
16	Jones Bridge Road & Connecticut Avenue	1476	E	1994	F	1600	Bethesda/ Chevy Chase
17	Jones Bridge Road & Manor Road	713	A	823	A	1600	Bethesda/ Chevy Chase
18	Jones Bridge Road & Jones Mill Road	1268	C	878	A	1600	Bethesda/ Chevy Chase
19	Jones Mill Road & East - West Highway	1190	C	1496	E	1600	Bethesda/ Chevy Chase
20	Wisconsin Ave. & Woodmont Ave.	1071	B	1097	B	1600	Bethesda/ Chevy Chase
21	Rockville Pike & Battery Lane	915	A	888	A	1800	Bethesda CBD
22	Wisconsin Ave. & Cordell Ave.	752	A	655	A	1800	Bethesda CBD
23	Wisconsin Ave. & Cheltenham Dr.	972	A	760	A	1800	Bethesda CBD
24	Woodmont Ave & Battery Lane	776	A	623	A	1800	Bethesda CBD
25	Woodmont Ave & Cordell Ave	583	A	531	A	1800	Bethesda CBD
26	Woodmont Ave & St. Elmo Dr.	569	A	548	A	1800	Bethesda CBD
27	Woodmont Ave & Cheltenham Dr.	577	A	555	A	1800	Bethesda CBD

Notes: Ref. = Reference and LATR STD. = Standard. Yellow shade indicates intersections above capacity.
Source: Appendix C, Transportation Study.

- Rockville Pike & Wilson Drive – close in the AM and PM peak hours
- Jones Bridge Road & Connecticut Avenue – close in AM peak hour
- Jones Mill Road & East West Highway - close in PM peak hour

4.7.1.3 Helicopters

Current helicopter activity is approximately 12.6 flights per month. Under the No Action Alternative, no change would occur and no additional impacts would be expected. Noise impacts are discussed in Section 4.5.

4.7.2 Traffic Volumes for Alternatives One and Two

4.7.2.1 Trip Generation

To estimate the number of trips generated by the proposed alternatives, two distinct methodologies were evaluated. The first involved the use of trip generation rates estimated from the current land uses. The second considered the use of trip generation rates from the ITE Trip Generation Manual, which relies on extensive research on commuter patterns for employment associated with various land uses. The second method was selected for an assumed population of 2,500 commuters to NNMC that would follow the commuter patterns of employees associated with the land uses shown in Table 4-10 (Hospital, Research and Development, and Military Base).

Table 4-10: Trip Generation for both Alternatives using the ITE Trip Generation Manual

Land Use	Employees	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Hospital	*1,000*	252	103	355	110	246	356
Research and Development*	*900*	316	52	368	37	332	369
Military Base	*600*	149	149	298	174	174	348
Alternative Mode Reduction		(108)	(46)	(154)	(48)	(113)	(161)
Total		**609**	**258**	**867**	**273**	**639**	**912**

Source: ***Trip Generation Manual, 7th Edition***. Institute of Transportation Engineers. 2003. Note: data for AM Peak Hour and PM Peak Hour show data for Peak Hour of Adjacent Street Traffic between, respectively, 7-9 AM and 4-6 PM, when provided.
* Research and Development was used originally in trip generation input and although no longer considered in the alternatives, results in a conservative (high side) or equivalent trip generation result because the rates for this use are higher than those for the hospital and equivalent to military or other administrative uses. Therefore its trips have been retained to provide a conservative estimate.

In comparing to actual peak hour counts that would be used with the first method, the ITE Manual provided a greater percentage of trips during peak hours and was judged to be more conservative – to provide a more severe impact (Refer to Appendix C for more discussion).

The ITE Trip Generation Manual not only provides the average percent of employees that arrive or depart during the peak hour, it also includes the number of additional trips per employee that the land use generates. This EIS must evaluate traffic associated with an estimated 484,000 annual patients and visitors as well as employees and the ITE Manual includes the additional trips in the projected peak hour traffic. Specifically, 484,000 annual patients and visitors, if assumed to come for medical care on the 260 weekdays in each year, equates to 484,000/260 or 1,862 additional patients/visitors daily on weekdays. Because some appointments and medical care occur on Saturday, an estimate that an additional half day each week should be considered yields a daily average of 484,000/286 or 1,692. So the 484,000 patients and visitors annually is 1,692 – 1,862 daily depending upon the assumption used.

The combination of land use categories in Table 4-10 generates 1,880 additional trips in and a like number out each day in addition to the trips of the 2,500 employees. Using the ITE-generated trips to cover the additional patients and visitors is also very conservative, however, because a large percentage of these trips are patients with accompanying family members or friends. So the 1,692-1,862 patients and visitors estimated daily for the EIS, most of which involve medical care, actually would come in significantly fewer vehicles – perhaps half the number being estimated. In addition, the visitors actually would come throughout the weekend for visits as well, although in much smaller numbers, reducing the allocation made to weekdays.

The research and development category, which involves technical administration and operations, was originally selected when that was included in the alternatives. When NNMC functions being evaluated by the EIS eliminated research and development and added other functions related to medical care, including more administration, the potential substitute land uses were evaluated and found to provide equivalent or less severe traffic estimates. The combination in Table 4-10 matched closely the requirements for the additional patient/visitor trips evaluated ion this EIS. So the trips generated by research and development were retained.

4.7.2.2 Trip Distribution

Once the trips generated from the proposed alternatives are estimated, these trips are then distributed. The distribution of new trips generated by the development alternatives was derived from LATR Guidelines, July 2004 Edition Appendix E, Table E-1 (M-NCPPC, 2004). Additionally, the distribution of trips at five NNMC gates was based on existing trip patterns. The total future traffic volumes are then

the sum of the trips generated by the proposed alternatives and the 2011 No Action volumes (background traffic).

4.7.2.3 2011 Alternative One and Two Traffic Impacts

As noted earlier, Alternatives One and Two vary primarily with respect to the location of proposed land uses within NNMC; therefore, The EIS assumes that the trips and resultant impacts for both alternatives are essentially the same.

Based on the total future volumes for Alternatives One and Two and other field observations from the data collection effort, the capacity of the intersections was evaluated for both the AM and PM peak hours, using the Critical Lane Analysis Technique, as stipulated by the LATR Guidelines (M-NCPPC, 2004) in Section 3.7.4 of this EIS. The Critical Lane Volume (CLV) at an intersection calculated following the guidelines is then compared against the CLV standard for Montgomery County (third column, LATR STD, on Tables 4-11 and 4-12). These values represent the threshold above which M-NCPPC considers that an intersection has failed. The Critical Lane Analysis outputs an intersection CLV, which is then compared against the CLV standard for Montgomery County. The AM Peak and PM Peak capacity analysis results are summarized in Tables 4-11 through 4-14. The capacity analysis worksheets and LOS figures are included in the Attachments to Appendix C, Transportation Study.

The following discusses primary impacts using critical lane volumes and projected growth in traffic volumes caused by the BRAC Alternatives compared to the No Action Alternative, as shown in Tables 4-11 and 4-12. For all of these intersections, any volumes over 1600 indicate that the intersection is over capacity and conditions are unacceptable. Using the level of service (LOS) definitions in Section 3.7.4 for these intersections, over 1600 is LOS F and unacceptable; 1451-1600 is equivalent to LOS E and marginal; and values below 1450 would be LOS D or better and are acceptable.

- During the AM peak, two intersections would operate above capacity: Rockville Pike and West Cedar Lane (CLV: 2100) and Rockville Pike and North Drive (CLV: 1605).
    - Rockville Pike/West Cedar Lane would already be over capacity under the No Action Alternative; the BRAC Alternatives add 3% to peak No Action Alternative volumes.
    - BRAC Alternatives cause Rockville Pike/North Drive to exceed capacity by a slight margin (1605 versus 1,600); the BRAC Alternatives add 7% to peak No Action Alternative volumes.
- During the PM peak hour, four intersections operate above the County capacity standards under the BRAC Alternatives; all the intersections were already above capacity under the No Action Alternative:

  - Rockville Pike/West Cedar Lane (CLV: 1822); BRAC Alternatives add 2% to peak No Action Alternative volumes.

  - West Cedar Lane/Old Georgetown Road (CLV: 1857); BRAC Alternatives add 12% to peak No Action Alternative volumes.

  - Rockville Pike/Jones Bridge Road (CLV: 1722); BRAC Alternatives add 3% to peak No Action Alternative volumes.

  - Jones Bridge Road/Connecticut Avenue (CLV: 2078); BRAC Alternatives add 4% to peak No Action Alternative volumes.

- During the AM peak, three intersections operate at higher CLVs that approach capacity: Pooks Hill Road and Rockville Pike (CLV: 1562), Rockville Pike and Wilson Drive (CLV: 1446), and Jones Bridge Road and Connecticut Avenue (1559). These three intersections were already above CLV 1400 under the No Action Alternative and the BRAC Alternatives increase peak volumes by no more than 6%.

- During the PM peak, the intersections of Pooks Hill Road and Rockville Pike (CLV: 1430), Rockville Pike and North Wood Road (CLV: 1557), Rockville Pike and Wilson Drive (CLV: 1593) and Jones Mill Road and East-West Highway (CLV: 1535) would operate at a high CLV under the BRAC Alternatives. The BRAC Alternatives raise peak volumes compared to the No Action Alternative by 2%, 14%, 4%, and 3%, respectively.

- In addition to the intersection results above, the traffic analysis indicates that several intersections have large percentage increases in peak volumes caused by the BRAC Alternatives that do not cause the intersection to exceed or approach capacity. In the AM, Jones Bridge Road & Gunnell Road peak volumes increase by 35% (CLV: 1093); Rockville Pike & North Wood Road peak volumes increase by 21% (CLV: 1401). In the PM peak hour, three intersections experience significant increases in the CLV: West Cedar Lane & West Drive increases 37% (CLV: 705), Jones Bridge Road & Gunnell Road increases 22% (CLV: 1170), and Jones Bridge Road & Grier Road increases 20% (CLV: 1319).

Table 4-11: AM Peak CLV by Alternative

No.	INTERSECTION	LATR STD.	AM PEAK CLV			
			Existing	No Action Alternative (Background)	Alternatives I and II (BRAC)	Traffic Growth*
1	Tuckerman north & Rockville Pike	1550	1216	1235	1245	1%
2	Tuckerman south & Rockville Pike	1550	1017	1076	1099	2%
3	Grosvenor Lane & Rockville Pike	1550	1256	1308	1331	2%
4	Pooks Hill Road & Rockville Pike	1600	1489	1539	1562	1%
5	Rockville Pike & West Cedar Lane	1600	2011	2048	2100	3%
6	West Cedar Lane & Old Georgetown Rd	1600	1189	1324	1324	0%
7	West Cedar Lane & West Drive	1600	448	549	626	14%
8	Rockville Pike & North Drive	1600	1486	1503	1605	7%
9	Rockville Pike & North Wood Road	1600	1137	1154	1401	21%
10	Rockville Pike & Wilson Drive	1600	1415	1432	1446	1%
11	Rockville Pike & South Wood Road	1600	1150	1167	1187	2%
12	Rockville Pike & Jones Bridge Road	1600	1347	1351	1365	1%
13	Jones Bridge Road & Gunnell Road	1600	801	808	1093	35%
14	Jones Bridge Road & Grier Road	1600	721	728	844	16%
15	Jones Bridge Road & University Drive	1600	736	743	859	16%
16	Jones Bridge Road & Connecticut Ave.	1600	1437	1476	1559	6%
17	Jones Bridge Road & Manor Road	1600	694	713	804	13%
18	Jones Bridge Road & Jones Mill Road	1600	1245	1268	1335	5%
19	Jones Mill Road & East - West Highway	1600	1163	1190	1211	2%
20	Wisconsin Ave. & Woodmont Ave.	1600	1054	1071	1104	3%
21	Wisconsin Ave. & Battery Lane	1800	886	915	921	1%
22	Wisconsin Ave. & Cordell Ave	1800	737	752	759	1%
23	Wisconsin Ave. & Cheltenham Drive	1800	957	972	979	1%
24	Woodmont Ave. & Battery Lane	1800	762	776	814	5%
25	Woodmont Ave & Cordell Ave.	1800	582	583	594	2%
26	Woodmont Ave. & St. Elmo Drive	1800	568	569	580	2%
27	Woodmont Ave. & Cheltenham Drive	1800	576	577	589	2%

Note: Yellow shade indicates intersections above or close to capacity.
*Growth = Alternative I and II Volumes/No Action Alternative Volumes
Source: Appendix C, Transportation Study.

Table 4-12: PM Peak CLV by Alternative

No.	INTERSECTION	LATR STD.	PM PEAK CLV			
			Existing	No Action Alternative (Background)	Alternatives I and II (BRAC)	Traffic Growth*
1	Tuckerman north & Rockville Pike	1550	1255	1283	1307	2%
2	Tuckerman south & Rockville Pike	1550	965	1030	1054	2%
3	Grosvenor Lane & Rockville Pike	1550	1002	1073	1097	2%
4	Pooks Hill Road & Rockville Pike	1600	1348	1407	1430	2%
5	Rockville Pike & West Cedar Lane	1600	1702	1784	1822	2%
6	West Cedar Lane & Old Georgetown Rd	1600	1496	1660	1857	12%
7	West Cedar Lane & West Drive	1600	438	513	705	37%
8	Rockville Pike & North Drive	1600	1240	1269	1375	8%
9	Rockville Pike & North Wood Road	1600	1337	1366	1557	14%
10	Rockville Pike & Wilson Drive	1600	1502	1536	1593	4%
11	Rockville Pike & South Wood Road	1600	1135	1146	1244	9%
12	Rockville Pike & Jones Bridge Road	1600	1598	1680	1722	3%
13	Jones Bridge Road & Gunnell Road	1600	926	956	1170	22%
14	Jones Bridge Road & Grier Road	1600	1071	1101	1319	20%
15	Jones Bridge Road & University Drive	1600	1002	1031	1167	13%
16	Jones Bridge Road & Connecticut Ave.	1600	1927	1994	2078	4%
17	Jones Bridge Road & Manor Road	1600	795	823	919	12%
18	Jones Bridge Road & Jones Mill Road	1600	854	878	945	8%
19	Jones Mill Road & East - West Highway	1600	1452	1496	1535	3%
20	Wisconsin Ave. & Woodmont Ave.	1600	1067	1097	1115	2%
21	Wisconsin Ave. & Battery Lane	1800	846	888	895	1%
22	Wisconsin Ave. & Cordell Ave.	1800	621	655	662	1%
23	Wisconsin Ave. & Cheltenham Drive	1800	725	760	767	1%
24	Woodmont Ave. & Battery Lane	1800	592	623	655	5%
25	Woodmont Ave & Cordell Ave.	1800	528	531	559	5%
26	Woodmont Ave. & St. Elmo Drive	1800	544	548	575	5%
27	Woodmont Ave. & Cheltenham Drive	1800	552	555	575	4%

Note: Yellow shade indicates intersections above or close to capacity.
*Growth = Alternative I and II Volumes/No Action Alternative Volumes
Source: Appendix C, Transportation Study.

Table 4-13: AM LOS by Alternative

No.	INTERSECTION	AM PEAK LOS		
		Existing	No Action Alternative (Background)	Alternatives I and II (BRAC)
1	Tuckerman north & Rockville Pike	C	C	C
2	Tuckerman south & Rockville Pike	A/B	B	B
3	Grosvenor Lane & Rockville Pike	C	C/D	D
4	Pooks Hill Road & Rockville Pike	E	E	E
5	Rockville Pike & West Cedar Lane	F	F	F
6	West Cedar Lane & Old Georgetown Road	C	D	D
7	West Cedar Lane & West Drive	A	A	A
8	Rockville Pike & North Drive	E	E	E/F
9	Rockville Pike & North Wood Road	B/C	B/C	D
10	Rockville Pike & Wilson Drive	D	D/E	D/E
11	Rockville Pike & South Wood Road	B/C	B/C	C
12	Rockville Pike & Jones Bridge Road	D	D	D
13	Jones Bridge Road & Gunnell Road	A	A	B
14	Jones Bridge Road & Grier Road	A	A	A
15	Jones Bridge Road & University Drive	A	A	A
16	Jones Bridge Road & Connecticut Ave.	D/E	E	E
17	Jones Bridge Road & Manor Road	A	A	A
18	Jones Bridge Road & Jones Mill Road	C	C	D
19	Jones Mill Road & East - West Highway	B/C	C	C
20	Wisconsin Ave. & Woodmont Ave.	B	B	B
21	Wisconsin Ave. & Battery Lane	A	A	A
22	Wisconsin Ave. & Cordell Ave.	A	A	A
23	Wisconsin Ave. & Cheltenham Drive	A	A	A/B
24	Woodmont Ave. & Battery Lane	A	A	A
25	Woodmont Ave & Cordell Ave.	A	A	A
26	Woodmont Ave. & St. Elmo Drive	A	A	A
27	Woodmont Ave. & Cheltenham Drive	A	A	A

Note: Yellow shade indicates intersections above or close to capacity.
Source: Appendix C, Transportation Study.

Table 4-14: PM LOS by Alternative

No.	INTERSECTION	PM PEAK LOS		
		Existing	No Action Alternatve (Background)	Total Alternatives I and II (BRAC)
1	Tuckerman north & Rockville Pike	C	C/D	C/D
2	Tuckerman south & Rockville Pike	A	B	B
3	Grosvenor Lane & Rockville Pike	A/B	B	B
4	Pooks Hill Road & Rockville Pike	D	D	D/E
5	Rockville Pike & West Cedar Lane	F	F	F
6	West Cedar Lane & Old Georgetown Road	E	F	F
7	West Cedar Lane & West Dr.	A	A	A
8	Rockville Pike & North Drive	C	C	D
9	Rockville Pike & North Wood Road	D	D	E
10	Rockville Pike & Wilson Drive	E	E	E/F
11	Rockville Pike & South Wood Road	B/C	B/C	C
12	Rockville Pike & Jones Bridge Road	E/F	F	F
13	Jones Bridge Road & Gunnell Road	A	A	B/C
14	Jones Bridge Road & Grier Road	B	B	C/D
15	Jones Bridge Road & University Drive	A/B	B	B/C
16	Jones Bridge Road & Connecticut Ave.	F	F	F
17	Jones Bridge Road & Manor Road	A	A	A
18	Jones Bridge Road & Jones Mill Road	A	A	A
19	Jones Mill Road & East - West Highway	D/E	E	E
20	Wisconsin Ave. & Woodmont Ave.	B	B	B
21	Wisconsin Ave. & Battery Lane	A	A	A
22	Wisconsin Ave. & Cordell Ave	A	A	A
23	Wisconsin Ave. & Cheltenham Drive	A	A	A
24	Woodmont Ave. & Battery Lane	A	A	A
25	Woodmont Ave & Cordell Ave.	A	A	A
26	Woodmont Ave. & St. Elmo Drive	A	A	A
27	Woodmont Ave. & Cheltenham Drive	A	A	A

Note: Yellow shade indicates intersections above or close to capacity.
Source: Appendix C, Transportation Study.

4.7.2.4 *Construction*

During construction, additional construction traffic would consist of delivery trucks with materials and equipment, dump trucks carrying any debris away needing off-site disposal, and construction crew commuters. The relative daily volumes for these construction vehicles carrying material and equipment are significantly smaller than daily the volumes estimated for commuters in the transportation analysis. The daily vehicle trip totals to NNMC each way for employees, patients, and visitors during full operation of the BRAC facilities exceed 3.000, while daily construction vehicle trips including workers commuting to NNMC would be expected in the mid-hundreds during the heaviest construction. The construction crew commuting will be constrained by limited parking spaces on NNMC (currently 200 spaces). Therefore the impacts of construction vehicles to area traffic in

terms of volumes would be much less than the impacts identified for the NNMC commuter traffic under the BRAC alternatives.

It is planned that the area in front of Building 1 would be provided for contactor use, allowing contractors to conduct their material staging on the NNMC campus. It is also currently planned that North Gate would provide dedicated access and egress to the construction storage site and security checks in an adjoining area to the entrance on NNMC would be managed to minimize any potential effect from queuing on Rockville Pike.

4.7.2.5 Parking

For the BRAC alternatives, some of the existing parking lots will be demolished either completely or partially. These include, Lot A, Lot W, Lot G or Lot H (varies between the two alternatives), Lot E and Lot L. These demolished lots, as all well as parking potentially being demolished near new buildings that are not defined as lots, would lead to a loss of approximately 700 parking spaces. This loss of parking spaces together with new developments would generate a demand for new parking lots and garages. The BRAC alternatives add a total of approximately 2,500 spaces in the three parking garages under the alternatives, resulting in a net addition of approximately 1,800 parking spaces when parking spaces lost are considered. As the operation of the medical care facility is 24 hours per day, with changing shifts, and with the nearby mass transit, it can be concluded that sufficient parking will be available within the NNMC campus to accommodate the alternatives.

4.7.2.6 Helicopters

Refer to section 4.1.5.3.

4.7.3 Potential Measures to Address Impacts from NNMC Actions

4.7.3.1 Recommended Improvements for NNMC

The EIS identifies potential traffic improvement measures for the 2011 implementation of the alternatives. These potential improvements are within the purview of NNMC for implementation. Gate and other improvements would be expected to speed vehicle entry and egress, improve circulation, and reduce queuing at the gate.

North Wood Road Gate:

1) Expand the number of lanes from two lanes to three lanes, with two inbound lanes in the morning peak period and two outbound lanes in the evening peak period.

2) Conduct a study at North Wood Road at Rockville Pike to determine if a traffic signal is warranted and suitable for submission of a request to state and local transportation authorities for funding and implementation.

3) A safety and security analysis is being conducted by DOD to improve security, safety, improve queuing on-site and reduce Rockville Pike queuing, and reduce damage to gates and guard houses.

South Wood Road Gate: A safety and security analysis is being conducted by DOD to improve security, safety, improve queuing on-site and reduce Rockville Pike queuing, and reduce damage to gates and guard houses.

Gunnell Road Gate (Navy Exchange Gate): A safety and security analysis is being conducted by DOD to improve security, safety, allow egress of fire engines that cannot use this gate, and improve queuing.

Grier Road Gate (Navy Lodge Gate):

1) It is recommended that this gate should serve inbound and outbound traffic throughout the day.

2) Provide for separate outbound right and left turn lanes. This approach would need to be widened to include a single receiving/inbound lane.

3) A safety and security analysis is being conducted by DOD to improve security, safety, improve queuing on-site and reduce Jones Bridge Road queuing, and reduce damage to gates and guard houses.

University Road Gate (USUHS Gate): A safety and security analysis is being conducted by DOD to improve security, safety, improve queuing on-site and reduce Jones Bridge Road queuing, and reduce damage to gates and guard houses.

Perimeter Road: Widen and improve Perimeter Road on NNMC.

NIH Commercial Vehicle Inspection Station: Conduct a study at the NIH Commercial Vehicle Inspection Station on Rockville Pike to determine if a traffic signal is warranted and suitable for submission of a request to state and local transportation authorities for funding and implementation.

4.7.3.2 Potential Roadway and Intersection Improvements

Potential improvement measures were identified for those intersections that would operate close to or above the intersection capacity under both Alternatives One and Two. The improvements that result from their implementation are shown in Tables 4-15 through 4-18 in Section 4.7.5. It is anticipated that pedestrian walkways could be improved if necessary to meet code for any roadways that are widened.

Each of the following projects is under the jurisdiction of either Montgomery County or the State of Maryland. As part of the BRAC law, the U.S. Navy cannot provide funding or management of road improvements outside its property, except under the Defense Access Roads (DAR) Program. The Defense Access Road (DAR) Program provides a

means for the military to pay their fair share of the cost of public highway improvements necessary to mitigate an unusual impact of a defense activity. An unusual impact could be a significant increase in personnel at a military installation (currently defined as one that doubles existing traffic at the year of implementation), or one that requires relocation of an access gate, or the deployment of an oversized or overweight military vehicle or transporter unit. However, none of the off-base improvements meet the criteria for inclusion in the DAR Program.

As a consequence, each of the following projects would have to be funded and implemented through the appropriate Montgomery County or State of Maryland Transportation Organizations. This funding may include federal grants administered through these organizations. The Navy has coordinated the traffic analysis and potential improvements with these agencies. NNMC Bethesda has committed to cooperate fully with local agencies in the implementation of any or all of the proposed improvement measures. Refer to Tables 4-15, 4-16, 4-17, and 4-18 in Section 4.7.5 for roadway performance with the implementation of the improvements. Note: it is anticipated that pedestrian walkways would be improved as needed to meet code for any roadways that are widened.

Rockville Pike (MD 355) at Cedar Lane operates above capacity in both AM and PM peak hours:

1) Add a left-turn lane on the westbound and eastbound approach of the intersection.

2) Add an additional lane in each direction along Rockville Pike between Jones Bridge Road and Cedar Lane, per recommendation of the 1990 Bethesda Chevy Chase Master Plan. NNMC Bethesda will cooperate by providing frontage along MD 355 to accommodate the implementation of this measure if the State of Maryland and Montgomery County determine it appropriate to implement. Appropriate real estate easements would be coordinated and implemented to permit widening of Rockville Pike.

Old Georgetown Road (MD 187) at Cedar Lane operates above capacity in the PM peak hour:

1) Add another left-turn lane to the southbound approach of the intersection and eliminate parking along Cedar Lane eastbound to provide an additional receiving lane.

2) Provide an additional through lane in each direction along the Old Georgetown Road approaches to Cedar Lane, per recommendation of the 1990 Bethesda Chevy Chase Master Plan.

Rockville Pike (MD 355) at Jones Bridge Road operates above capacity in the PM peak hour.

1) Stripe the inner lane as a left-turn only lane and the right lane as shared through and right lane on the eastbound approach of the intersection.

2) Add an additional lane in each direction along Rockville Pike, per recommendation of the 1990 Bethesda Chevy Chase Master Plan. NNMC Bethesda will cooperate by providing frontage along MD 355 to accommodate the implementation of this measure if the State of Maryland and Montgomery County determine it appropriate to implement. Appropriate real estate easements would be coordinated and implemented to permit widening of Rockville Pike.

Connecticut Avenue (MD 185) at Jones Bridge Road operates near capacity in the AM peak hour and above capacity in the PM peak hour:

1) Provide an additional left-turn lane to the eastbound approach of the intersection.

2) Provide a separate right-turn lane along the southbound approach of the intersection.

For these improvements, Tables 4-15 through 4-18 evaluate three different improvement measures separately. Implementation of additional lanes refers to an additional lane in each direction and a reversible lane along approaches of Old Georgetown Road at Cedar Lane and Connecticut Avenue at Jones Bridge Road. Implementation of slip ramps refers to an evaluation of a right in and right out slip ramp entrance/exit off I-495 (beltway). Implementation of spot improvements includes adding a left-turn lane on eastbound and westbound approaches of Cedar Lane at Rockville Pike, replacing the eastbound right-turn only lane at Jones Bridge Road and Rockville Pike with a left-only lane, adding a left-turn lane in the southbound approach of Old Georgetown Road and Cedar Lane, and making the eastbound approach of Connecticut Avenue and Jones Bridge Road a shared left and through lane.

By implementing either additional lane improvements or spot improvements, the impacts of additional trips generated by the proposed BRAC action would be reduced. It should be noted that these improvements would not bring the intersections into an acceptable Level of Service, but would instead bring the intersections into the same Level of Service as the local background traffic would create under the No Action Alternative conditions.

4.7.4 Potential Measures to Address Existing and Future Regional Transportation Issues

The previous section identified measures to address only those additional trips generated by the proposed BRAC action. This does not account for the regional traffic congestion issues reflected in the existing conditions analysis and the background 2011 analysis. Through cooperation with local transportation agencies, other potential improvements to the regional transportation network are recommended to address existing and future regional transportation issues.

4.7.4.1 Pedestrian Access Improvements

To improve pedestrian safety at the Rockville Pike pedestrian crossing from NIH and the metro station to NNMC, a pedestrian connection and a

Metrorail link are under consideration by the Suburban Hospital, NIH, NNMC Consortium and WMATA, respectively. In addition, the pedestrian connection would allow transfer of casualties and emergency personnel during a mass casualty event. These off-base projects would enhance public safety. The projects would require easements and changes to fencing and security. They would require close cooperation with local and state agencies, the NIH and the Department of Homeland Security.

4.7.4.2 Beltway Slip Ramps into NNMC Campus

It was anticipated that direct access via slip ramps between NNMC and the Beltway would divert significant traffic from major access roads onto the campus, and would thereby presumably have a positive effect on intersection performance. Full alternative scenarios were developed with alternative trip distribution and analysis (with 25 percent each of inbound and outbound trips using the ramps), as shown in Figures 4-15, 4-16, 4-17, and 4-18 and documented in Appendix C, Transportation Study. Capacity analysis results for total future conditions show that for both Alternatives One and Two, with and without slip ramps, the same intersections would operate near or above the County capacity standards.

In addition to having limited effectiveness at improving regional traffic, the limited distance between the adjacent interchanges creates safety concerns for merging traffic from a potential NNMC on-ramp. Federal Highway Administration policy would likely preclude the addition of an intersection according to Title 23, Chapter 1, Sub-Chapter G Part 625. Creating only an off-ramp from the beltway to NNMC would create an unacceptable security concern as there would be no "turnaround" from a beltway gate. Considering the immense cost to state and federal transportation agencies, the limited effectiveness of direct ramps on local traffic congestion and several identified safety concerns, the Navy is not recommending the installation of Beltway Slip ramps to or from the NNMC campus.

4.7.4.3 Additional Measures

In addition to the measures listed above, other potential improvement measures outside the jurisdiction of the Navy that address existing and future regional transportation issues are discussed in Appendix C, Transportation Study. A Transportation Management Plan, also discussed in Appendix C, is being prepared in conjunction with a master plan update. It will include recommendations for such physical or operational changes as telecommuting, transit subsidies, shuttle bus services, pedestrian improvements, and bicyclist improvements.

4.7.5 Intersection Performance with Improvements

Tables 4-15 through 4-18 compare the intersections before and after implementing the potential improvements. The details of these improvements are included in the footnotes of the tables. Improvements are not combined with one another for the analysis; results are only for the specific improvement in each column heading in the table.

Table 4-15: Comparison of AM CLV with Improvements – Alternatives One and Two

No.	INTERSECTION	LATR STD.	AM PEAK CLV					
			Existing	No Action Alternative (Background)	Alternatives I and II (BRAC)	Total Alternatives I and II (with Addi. Lane) *	Total Alternatives I and II (with Slip Ramps) **	Total Alternatives I and II (with spot improvements) ***
1	Tuckerman north & Rockville Pike	1550	1216	1235	1245	1245	1240	1245
2	Tuckerman south & Rockville Pike	1550	1017	1076	1099	1099	1087	1099
3	Grosvenor Lane & Rockville Pike	1550	1256	1308	1331	1331	1320	1331
4	Pooks Hill Road & Rockville Pike	1600	1489	1539	1562	1562	1551	1562
5	Rockville Pike & West Cedar Lane	1600	2011	2048	2100	1881	2079	1698
6	West Cedar Lane & Old Georgetown Road	1600	1189	1324	1324	1212	1324	1324
7	West Cedar Lane & West Drive	1600	448	549	626	626	588	626
8	Rockville Pike & North Drive	1600	1486	1503	1605	1301	1494	1605
9	Rockville Pike & North Wood Road	1600	1137	1154	1401	1299	1164	1401
10	Rockville Pike & Wilson Drive	1600	1415	1432	1446	1220	1443	1446
11	Rockville Pike & South Wood Road	1600	1150	1167	1187	1005	1187	1187
12	Rockville Pike & Jones Bridge Road	1600	1347	1351	1365	1205	1365	1371
13	Jones Bridge Road & Gunnell Road	1600	801	808	1093	1093	1047	1093
14	Jones Bridge Road & Grier Road	1600	721	728	844	844	844	844
15	Jones Bridge Road & University Drive	1600	736	743	859	859	859	859
16	Jones Bridge Road & Connecticut Ave.	1600	1437	1476	1559	1392	1543	1563
17	Jones Bridge Road & Manor Road	1600	694	713	804	804	804	804
18	Jones Bridge Road & Jones Mill Road	1600	1245	1268	1335	1335	1330	1335
19	Jones Mill Road & East - West Highway	1600	1163	1190	1211	1211	1203	1211
20	Wisconsin Ave. & Woodmont Ave.	1600	1054	1071	1104	1104	1104	1104
21	Wisconsin Ave. & Battery Lane	1800	886	915	921	921	921	921
22	Wisconsin Ave. & Cordell Ave	1800	737	752	759	759	759	759
23	Wisconsin Ave. & Cheltenham Drive	1800	957	972	979	979	979	979
24	Woodmont Ave. & Battery Lane	1800	762	776	814	814	814	814
25	Woodmont Ave & Cordell Ave.	1800	582	583	594	594	594	594
26	Woodmont Ave. & St. Elmo Drive	1800	568	569	580	580	580	580
27	Woodmont Ave. & Cheltenham Drive	1800	576	577	589	589	589	589

Note: Yellow shade indicates intersections above or close to capacity.
Source: Appendix C, Transportation Study.
* Refers to additional lane in each direction and a reversible lane along approaches of Old Georgetown Road at Cedar Lane and Connecticut Avenue at Jones Bridge Road.
** Slip ramps refers to an evaluation of a right in and right out slip ramp entrance/exit off – I-495 (beltway).
*** Spot Improvements include adding a left turn lane on eastbound and westbound approaches of Cedar Lane at Rockville Pike, replacing the eastbound right turn only lane at Jones Bridge Road and Rockville Pike with a left only lane, adding a left turn lane in the southbound approach of Old Georgetown Road and Cedar Lane and making the eastbound approach of Connecticut Avenue and Jones Bridge Road a shared left and through.

Table 4-16: Comparison of PM CLV with Improvements – Alternatives One and Two

No.	INTERSECTION		PM PEAK CLV					
		LATR STD.	Existing	No Action Alternative (Background)	Alternatives I and II (BRAC)	Total Alternatives I and II (with Addi. Lane) *	Total Alternatives I and II (with Slip Ramps) **	Total Alternatives I and II (with spot improvements) ***
1	Tuckerman north & Rockville Pike	1550	1255	1283	1307	1307	1295	1307
2	Tuckerman south & Rockville Pike	1550	965	1030	1054	1054	1042	1054
3	Grosvenor Lane & Rockville Pike	1550	1002	1073	1097	1097	1085	1097
4	Pooks Hill Road & Rockville Pike	1600	1348	1407	1430	1430	1442	1430
5	Rockville Pike & West Cedar Lane	1600	1702	1784	1822	1546	1841	1735
6	West Cedar Lane & Old Georgetown Road	1600	1496	1660	1857	1671	1706	1653
7	West Cedar Lane & West Drive	1600	438	513	705	705	609	705
8	Rockville Pike & North Drive	1600	1240	1269	1375	1115	1344	1375
9	Rockville Pike & North Wood Road	1600	1337	1366	1557	1329	1494	1557
10	Rockville Pike & Wilson Drive	1600	1502	1536	1593	1397	1581	1593
11	Rockville Pike & South Wood Road	1600	1135	1146	1244	1095	1215	1244
12	Rockville Pike & Jones Bridge Road	1600	1598	1680	1722	1580	1722	1669
13	Jones Bridge Road & Gunnell Road	1600	926	956	1170	1170	1111	1170
14	Jones Bridge Road & Grier Road	1600	1071	1101	1319	1319	1232	1319
15	Jones Bridge Road & University Drive	1600	1002	1031	1167	1167	1106	1167
16	Jones Bridge Road & Connecticut Ave.	1600	1927	1994	2078	1877	2038	1992
17	Jones Bridge Road & Manor Road	1600	795	823	919	919	887	919
18	Jones Bridge Road & Jones Mill Road	1600	854	878	945	945	756	945
19	Jones Mill Road & East - West Highway	1600	1452	1496	1535	1535	1518	1535
20	Wisconsin Ave. & Woodmont Ave.	1600	1067	1097	1115	1115	1115	1115
21	Wisconsin Ave. & Battery Lane	1800	846	888	895	895	895	895
22	Wisconsin Ave. & Cordell Ave.	1800	621	655	662	662	662	662
23	Wisconsin Ave. & Cheltenham Drive	1800	725	760	767	767	767	767
24	Woodmont Ave. & Battery Lane	1800	592	623	655	655	655	655
25	Woodmont Ave & Cordell Ave.	1800	528	531	559	559	559	559
26	Woodmont Ave. & St. Elmo Drive	1800	544	548	575	575	575	575
27	Woodmont Ave. & Cheltenham Drive	1800	552	555	575	575	575	575

Note: Yellow shade indicates intersections above or close to capacity.
Source: Appendix C, Transportation Study.
* Refers to additional lane in each direction and a reversible lane along approaches of Old Georgetown Road at Cedar Lane and Connecticut Avenue at Jones Bridge Road.
** Slip ramps refers to an evaluation of a right in and right out slip ramp entrance/exit off – I-495 (beltway).
*** Spot Improvements include adding a left turn lane on eastbound and westbound approaches of Cedar Lane at Rockville Pike, replacing the eastbound right turn only lane at Jones Bridge Road and Rockville Pike with a left only lane, adding a left turn lane in the southbound approach of Old Georgetown Road and Cedar Lane and making the eastbound approach of Connecticut Avenue and Jones Bridge Road a shared left and through.

Table 4-17: Comparison of AM LOS with Improvements – Alternatives One and Two

No.	INTERSECTION	AM PEAK LOS					
		Existing	No Action Alternative (Background)	Alternatives I and II (BRAC)	Total Alternatives I and II (with Addi. Lane) *	Total Alternatives I and II (with Slip Ramps) **	Total Alternatives I and II (with Spot improvements) ***
1	Tuckerman north & Rockville Pike	C	C	C	C	C	C
2	Tuckerman south & Rockville Pike	A/B	B	B	B	B	B
3	Grosvenor Lane & Rockville Pike	C	C/D	D	D	C/D	D
4	Pooks Hill Road & Rockville Pike	E	E	E	E	E	E
5	Rockville Pike & West Cedar Lane	F	F	F	F	F	F
6	West Cedar Lane & Old Georgetown Road	C	D	D	C	D	D
7	West Cedar Lane & West Drive	A	A	A	A	A	A
8	Rockville Pike & North Drive	E	E	E/F	C/D	E	E/F
9	Rockville Pike & North Wood Road	B/C	B/C	D	C/D	B/C	D
10	Rockville Pike & Wilson Drive	D	D/E	D/E	C	D/E	D/E
11	Rockville Pike & South Wood Road	B/C	B/C	C	A/B	C	C
12	Rockville Pike & Jones Bridge Road	D	D	D	C	D	D
13	Jones Bridge Road & Gunnell Road	A	A	B	B	B	B
14	Jones Bridge Road & Grier Road	A	A	A	A	A	A
15	Jones Bridge Road & University Drive	A	A	A	A	A	A
16	Jones Bridge Road & Connecticut Ave.	D/E	E	E	D	E	E
17	Jones Bridge Road & Manor Road	A	A	A	A	A	A
18	Jones Bridge Road & Jones Mill Road	C	C	D	D	D	D
19	Jones Mill Road & East - West Highway	B/C	C	C	C	C	C
20	Wisconsin Ave. & Woodmont Ave.	B	B	B	B	B	B
21	Wisconsin Ave. & Battery Lane	A	A	A	A	A	A
22	Wisconsin Ave. & Cordell Ave.	A	A	A	A	A	A
23	Wisconsin Ave. & Cheltenham Drive	A	A	A/B	A/B	A/B	A/B
24	Woodmont Ave. & Battery Lane	A	A	A	A	A	A
25	Woodmont Ave & Cordell Ave.	A	A	A	A	A	A
26	Woodmont Ave. & St. Elmo Drive	A	A	A	A	A	A
27	Woodmont Ave. & Cheltenham Drive	A	A	A	A	A	A

Note: Yellow shade indicates intersections above or close to capacity.
Source: Appendix C, Transportation Study.
* Refers to additional lane in each direction and a reversible lane along approaches of Old Georgetown Road at Cedar Lane and Connecticut Avenue at Jones Bridge Road.
** Slip ramps refers to an evaluation of a right in and right out slip ramp entrance/exit off – I-495 (beltway).
*** Spot Improvements include adding a left turn lane on eastbound and westbound approaches of Cedar Lane at Rockville Pike, replacing the eastbound right turn only lane at Jones Bridge Road and Rockville Pike with a left only lane, adding a left turn lane in the southbound approach of Old Georgetown Road and Cedar Lane and making the eastbound approach of Connecticut Avenue and Jones Bridge Road a shared left and through.

Table 4-18: Comparison of PM LOS with Improvements – Alternatives One and Two

No.	INTERSECTION	PM PEAK LOS					
		Existing	No Action Alternatve (Background)	Total Alternatives I and II (BRAC)	Total Alternatives I and II (with Addi. Lane) *	Total Alternatives I and II (with Slip Ramps) **	Total Alternatives I and II (with Spot improvements) ***
1	Tuckerman north & Rockville Pike	C	C/D	C/D	C/D	C/D	C/D
2	Tuckerman south & Rockville Pike	A	B	B	B	B	B
3	Grosvenor Lane & Rockville Pike	A/B	B	B	B	B	B
4	Pooks Hill Road & Rockville Pike	D	D	D/E	D/E	D/E	D/E
5	Rockville Pike & West Cedar Lane	F	F	F	E	F	F
6	West Cedar Lane & Old Georgetown Road	E	F	F	F	F	F
7	West Cedar Lane & West Dr.	A	A	A	A	A	A
8	Rockville Pike & North Drive	C	C	D	B	D	D
9	Rockville Pike & North Wood Road	D	D	E	C/D	E	E
10	Rockville Pike & Wilson Drive	E	E	E/F	D	E/F	E/F
11	Rockville Pike & South Wood Road	B/C	B/C	C	B	C	C
12	Rockville Pike & Jones Bridge Road	E/F	F	F	E/F	F	F
13	Jones Bridge Road & Gunnell Road	A	A	B/C	B/C	B	B/C
14	Jones Bridge Road & Grier Road	B	B	C/D	C/D	C	C/D
15	Jones Bridge Road & University Drive	A/B	B	B/C	B/C	B	B/C
16	Jones Bridge Road & Connecticut Ave.	F	F	F	F	F	F
17	Jones Bridge Road & Manor Road	A	A	A	A	A	A
18	Jones Bridge Road & Jones Mill Road	A	A	A	A	A	A
19	Jones Mill Road & East - West Highway	D/E	E	E	E	E	E
20	Wisconsin Ave. & Woodmont Ave.	B	B	B	B	B	B
21	Wisconsin Ave. & Battery Lane	A	A	A	A	A	A
22	Wisconsin Ave. & Cordell Ave	A	A	A	A	A	A
23	Wisconsin Ave. & Cheltenham Drive	A	A	A	A	A	A
24	Woodmont Ave. & Battery Lane	A	A	A	A	A	A
25	Woodmont Ave & Cordell Ave.	A	A	A	A	A	A
26	Woodmont Ave. & St. Elmo Drive	A	A	A	A	A	A
27	Woodmont Ave. & Cheltenham Drive	A	A	A	A	A	A

Note: Yellow shade indicates intersections above or close to capacity.
Source: Appendix C, Transportation Study.
* Refers to additional lane in each direction and a reversible lane along approaches of Old Georgetown Road at Cedar Lane and Connecticut Avenue at Jones Bridge Road.
** Slip ramps refers to an evaluation of a right in and right out slip ramp entrance/exit off – I-495 (beltway).
*** Spot Improvements include adding a left turn lane on eastbound and westbound approaches of Cedar Lane at Rockville Pike, replacing the eastbound right turn only lane at Jones Bridge Road and Rockville Pike with a left only lane, adding a left turn lane in the southbound approach of Old Georgetown Road and Cedar Lane and making the eastbound approach of Connecticut Avenue and Jones Bridge Road a shared left and through.

4.8 CULTURAL RESOURCES CONSEQUENCES

4.8.1 Cultural Resources Impacts: Alternative One

As indicated in the description of the Alternatives (but not including the No Action Alternative) several of the projects do not vary in size or location from one alternative to the other. Therefore, to avoid repetition, a full discussion of the impacts on cultural resources of a project will be given under Alternative One only when it is the same for Alternative Two.

4.8.1.1 Built Environment

Medical Additions: Inpatient and Outpatient Buildings

Construction of the Medical Additions would impact the Central Tower Block, Building 3, and Building 5. The Central Tower Block or Building 1 is the prime landmark structure of National Naval Medical Center due to its architectural distinction and association with President Franklin D. Roosevelt, as well as with achievements in the practice of military medicine. Buildings 3 and 5 are slightly later ancillary structures in a similar architectural style, also designed under the supervision of the Tower Block's architect, Paul Philippe Cret and drawing significance from the same contexts. In terms of their status under surveys carried out in accordance with Section 110 of the NHPA, Building 1 is listed on the NRHP, while the other two have been determined contributing elements of an historic district eligible for the NRHP. In practice, all three are given equal standing under Section 106 of NHPA, the part that requires federal agencies to take into account the effect of their undertakings on NRHP resources. Under 36 C.F.R. Part 800, the implementing regulations for NHPA Sec. 106, consultation with the cognizant Maryland SHPO is required to determine whether the effects, once identified, are adverse or not adverse.

As not only the demolition of historic buildings but the substantial alteration of their setting may be considered to have an adverse effect under the regulations (36 C.F.R. 800) implementing Section 106 of the NHPA, the insertion of new buildings into the core complex of the Central Tower Block and its neighboring structures is a sensitive matter. The current project description calls for an additional 638,000 SF of new construction for medical space consisting of Outpatient care (Building A) to the north of Building 1 on the current "A" Parking Lot and Inpatient care (Building B), an expansion of Building 9 to the west. A new North Parking Structure is to be built to the east of Buildings 3 and 5; it would require a portion of "L" Parking Lot. Alterations would also occur within the existing medical center buildings.

The development of a Concept Design for the Medical Additions has already taken place. The Navy worked with the staffs of the MD SHPO and NCPC prior to officially submitting a Design Concept for the facilities to the NCPC at its October 4, 2007 meeting. Although the formal Section 106 consultation had not yet been initiated, the

informal discussions and revisions that took place prior to its review and favorable comment by NCPC constitute a first step toward resolving issues connected with the impact of these planned facilities on the most sensitive historic properties.

The Executive Director's Recommendation (EDR), which was adopted by the Commission, noted: "The Maryland Historical Trust (i.e. the Maryland SHPO) accepted the concept design with regard to location, footprint, and massing; and requested Section 106 consultation to move forward with fenestration design, materials selection, and other design and planning details." A copy of the Commission Action is included in Appendix A.

The background information included in the EDR also detailed several design parameters that evolved from the discussions by NCPC and Maryland SHPO staffs:

- The buildings must be symmetrical around Building 1
- The adjacent front planes of Building A (Outpatient Care Pavilion) and Building B (Inpatient Addition) cannot be forward (west) of the front of the wings of Building One.
- The view shed west of Building 1 is to remain unobstructed. The west footprints of Buildings A and B, along Wood Drive, are to step away from the wings of Building 1.
- The front walls of Buildings A and B cannot be higher than the wings of Building 1.
- Building heights may be permitted to be higher than the wings of Building 1 provided that their front walls are set back to minimize visibility from within the site.
- The overall heights of Buildings A and B are to be the same.
- New construction should respect, and enhance where possible, the historical importance of the other buildings and courtyards on the site.

The Concept Design is the first step in the design process and may be modified by future developments. However it appears that there is a nascent consensus as to how any adverse effects of the project upon historic buildings can be mitigated. The Navy will pursue formal Section 106 consultation with the goal of achieving a ratified agreement document to resolve all adverse effects to historic properties. The agreement document would be appended to the Record of Decision on the Final Environmental Impact Statement.

Front Lawn and View Shed from Building 1

Both the addition to the north of Building 1 and the extension of the nonhistoric Building 9 to the west have the potential to impact the framing of Cret's lawn and terraces, which are contained by the semi-circular Wood Road — even though the new buildings would not physically encroach upon them. The proposed buildings would not block the designated view shed. Landscape and view shed issues have been addressed in the consultations prior to formulation of the Concept Design, which only addresses the medical additions, commented upon favorably by NCPC.

North and South Parking Structures

Additional parking to serve the Medical Additions is a related project. In keeping with the split siting of the medical facilities to be served, two garages of around 940 spaces are planned, one to the north (Outpatient Facility) and one to the south (Inpatient Addition and present hospital).

The former, seven stories with a footprint of 47,000 SF, would be located directly east and north of historic Building 5 in the core of the NNMC Historic District. It was represented in the Concept Design, although the NCPC review did not appear to address its design specifically. Most of the concern expressed in the review of the Concept Design has centered on the view to and from Building One as well as the impact of new flanking Medical Additions. Views of the North Parking Structure from Rockville Pike or the NNMC Front Lawn would be largely or completely blocked by the new Inpatient Facility. The Navy will have to make a formal determination of the effect of this project element under Section 106 either as a part of the Medical Additions as a whole or as an individual project.

The latter or South Parking Structure would be located more to the periphery but still within the NNMC Bethesda Historic District. It would follow the demolition of either all or part of nonhistoric Building 23 (depending upon the need for the site by another project). The rolling terrain of this area of the installation would mitigate the visual impact of this structure on the NNMC Bethesda Historic District (reference Figure 3-11).

Building 60 BEQ Renovation

Building 60 is located within the NNMC Historic District but has been determined noncontributing to the district. Renovations would not significantly alter the exterior appearance of bldg 60. Therefore, its renovation would have no effect upon historic properties.

Administrative Space

This project would renovate Building 17, an elongated curving three-story Art Deco building, which formerly housed the Naval Medical Research Institute and has been vacant for several years. It would

also construct additional administrative space in a new building on the site of nonhistoric Buildings 28, 53, 59, 69, and 79 (which would be demolished). Building 17 is contributing to the NNMC Historic District. Its attractive design has led the installation to place it in its highest category for preservation management. Under Alternative One, renovation has the potential to have a positive impact upon this historic building, which is currently vacant and in poor condition.

Third Parking Garage

Behind Building 17, the nonhistoric buildings 139, 146, 150, 174, 176, and 219 would be demolished along with Buildings 18 and 21 (that are contributing to the NNMC Bethesda Historic District, are vacant, and are in poor condition) to clear a site for 565 spaces of parking. Demolition of historic buildings is an "adverse effect" under Section 106. Issues of building condition and suitability for reuse would enter into any consultation under Section 106 by the Navy with the Maryland SHPO on the loss of these buildings as well as the possibly counterbalancing contribution to the feasibility of reusing Building 17.

New BEQ Including WTU Dining

Two new BEQ buildings would be constructed on either side of Buildings 60 and 61, currently BEQs (See Figure 2-2, Chapter 2). The BEQ building to the east is close to historic Building 11 and could be viewed as affecting its setting. The western BEQ is even more sensitive as it would be a further extension of new buildings flanking the Central Tower Block (to the north of the Inpatient Facility, albeit pulled back further to the west). It is not possible at this stage to precisely assess the visual impact of the two BEQ buildings; however, SHPO consultation will assure impacts are acceptable.

Fisher Houses;

The location for these two facilities and their associated parking is outside of NNMC Bethesda Historic District. The project requires the demolition of the nonhistoric Buildings 39, 40, and 41. Therefore it should have no effect upon historic resources.

TBI/PTSD ICE

This project would demolish Building 12, which contributes to the NNMC Bethesda Historic District, for a new facility. Demolition of historic buildings is an "adverse effect" under Section 106. Building 12 is in fair condition, but its suitability for reuse is questionable due to such issues as the split-level nature of the building and the difficulty in addressing essential accessibility. These issues would enter into any consultation under Section 106 by the Navy with the Maryland SHPO on the loss of this building.

Fitness Center

The nonhistoric Building 141 is to be demolished to clear a site for a new Fitness Center. There would be no effect upon historic properties.

4.8.1.2 Archaeology

All projects for Alternative One would be constructed in the previously developed, low probability portions of NNMC. In these areas standard operating procedures for consultation with the Maryland SHPO as detailed in the 2002 ICRMP such as Procedure 8 "Emergency Procedures for Unexpected Discovery of Archaeological Deposits" would be followed throughout project implementation. For example, under Procedure 8, upon discovery of an archaeological deposit, all work must stop and all reasonable efforts must be made to avoid, minimize, or mitigate any adverse effects while contacting the cultural resources manager. In turn, the cultural resources manager would pursue further options in coordination with appropriate agencies. Projects that are sited just beyond areas of archaeological sensitivity should be closely followed so that design changes do not change their potential to impact archaeology.

4.8.2 Cultural Resources Impacts: Alternative Two

As indicated above, many of the major projects are the same in both Alternatives One and Two. The following projects, discussed under "Built Environment, have different locations under Alternative Two.

4.8.2.1 Built Environment

Administrative Space, Additional Parking

Both the Administrative Space and Additional Parking projects would be new construction on the sites of Buildings 28, 53, 59, 69, 79, and 141 (all nonhistoric) which are to be demolished. Under Alternative Two, Building 17 is not affected. Therefore, there is no effect to historic properties, although an opportunity for a reuse of Building 17 is foregone.

New BEQ Including WTU Dining

Under Alternative Two the new BEQ would be one building only to the east of Building 60, larger than in Alternative One. The scale of this building may have a greater impact on historic Building 11 and even on the historic Flag Row quarters, although this may be mitigated by design and landscaping. Unlike the project under Alternative One, it would have no impact on the view from Rockville Pike and the extended Building 1/Front Lawn core complex. It is not possible at this stage to precisely assess the visual impact of the BEQ building; however, SHPO consultation will assure impacts are acceptable.

TBI/PTSD ICE

The facility would be built outside the NNMC Bethesda Historic District and require no demolition. It would have no effect upon historic properties.

Fitness Center

The facility would be built outside the Bethesda NNMC Historic District. It would be built on part of the demolished nonhistoric Building 23. It would have no effect upon historic properties.

4.8.2.2 Archaeology

All projects for Alternative Two would be constructed in the previously developed, low probability portions of NNMC. In these areas standard operating procedures for consultation with the Maryland SHPO as detailed in the 2002 ICRMP such as Procedure 8 "Emergency Procedures for Unexpected Discovery of Archaeological Deposits" would be followed throughout project implementation. Projects that are sited just beyond areas of archaeological sensitivity should be closely followed so that design changes do not change their potential to impact archaeology.

4.8.3 Cultural Resources Impacts: No Action Alternative

Under the No Action Alternative, the proposed BRAC relocation would not be conducted, no BRAC construction or renovation would occur, and there would be no impacts to cultural resources.

4.9 LAND USE AND ZONING CONSEQUENCES

4.9.1 Land Use Impacts: Alternative One

4.9.1.1 Land Use Impacts to Local Community

Alternative One would not alter, and therefore would have no direct effect on land use or zoning in adjacent off Base areas, as all project components are proposed to be constructed on the campus of NNMC proper. The proposed BRAC actions are consistent with the fundamental medical care land use designated for NNMC. They are also consistent with the purposes of NIH, across Rockville Pike.

Alternative One would increase traffic in the area adjacent to NNMC; however, as shown in Section 4.7, additional NNMC traffic under the BRAC Alternatives are not a large percent of total traffic. Therefore the traffic would not be expected to be the cause of indirect adverse land use effects that are significant.

Personnel from WRAMC currently living in the region that are being reassigned to NNMC, whose jobs would move only six miles, would not be expected to change their residences. Therefore no influx of new population around NNMC would be expected from the BRAC actions or effect to local housing or community services and there would not be a

resultant direct or indirect effect on land use locally. To the extent that the additional staff or visitors under Alternative One use services off Base, such as retail or restaurants, it would be a small incremental addition to existing use and would not be expected to contribute to a change in land use off Base.

Therefore, as the proposed BRAC actions are consistent with the medical purposes for land use within NNMC and are not expected to have indirect effects of significance on community land use, they do not cause significant adverse effects to land use in the surrounding community.

4.9.1.2 Installation Land Use Impacts

All proposed facilities realigning from WRAMC to NNMC are proposed in locations that would present either a consistent or compatible land use on Base. Facilities were sited using Navy siting criteria, which emphasizes co-location of functions. The Medical Center additions are proposed adjacent to existing medical facilities to minimize the distance between care facilities for patients and family, and implementing a consistent land use. Fisher Houses™ are also proposed adjacent to existing facilities. For those instances where the proposed land use is different from the existing land use, such as the siting of the south parking garage next to the current Fitness Center and the siting of the new Fitness Center near flag housing, the two land uses are not incompatible. The proposed location for the south parking garage provides improved access to major installation entrances, and it does not necessitate a change in the land uses into which it is being placed. Therefore, impacts under Alternative One would be limited to a relatively small change in land use that is still consistent with the existing or planned surrounding land uses.

4.9.2 Land Use Impacts: Alternative Two

4.9.2.1 Land Use Impacts to Local Community

Land use impacts to the surrounding community under Alternative Two would be the same as those described for Alternative One. Significant adverse effects to land use in the surrounding community are not expected.

4.9.2.2 Installation Land Use Impacts

All components of the Proposed Action for Alternative Two would have the same impacts to installation land use as Alternative One. A primary difference between the two alternatives is in the choice between new construction or renovation and reuse to meet the needs of the proposed action. Changes in the general location of facilities also occur, but the sites are compatible with existing land use at NNMC. Therefore, the impacts would be the same as for Alternative One: land use that is either fully consistent with or compatible with existing land use within NNMC.

4.9.3 Installation Land Use Impacts: No Action Alternative

Under the No Action Alternative, current land uses at NNMC and master planning to determine future land use would continue, without the need to accommodate the BRAC facilities. Therefore no impacts would occur under the No Action Alternative.

4.10 SOCIOECONOMICS CONSEQUENCES

In order to analyze the effects of the Proposed Action Alternatives on socioeconomic resources in the Region of Influence (ROI), a model was used that allows for the evaluation of the significance of the impact to the ROI. The result of construction spending in the ROI was examined for both direct effects, such as employment and the salaries that employment provides to construction workers, and indirect effects, or the effect of those salaries and associated spending on the larger economy in the ROI. Subsequent changes in local economic activity are computed as the product of initial changes in sales volume, either increases or decreases, and a local impact multiplier. In total, the model examines changes in sales volume, income, employment, and population in the ROI, accounting for the direct and indirect effects of the action. Appendix D discusses this methodology in more detail and presents the model input and output tables developed for this analysis.

To determine the historical range of economic variation, the model calculates a rational threshold value (RTV) profile for the ROI. This analytical process uses historical data for the ROI and calculates fluctuations in sales volume, income, employment, and population patterns. The historical extremes for the ROI become the thresholds of significance (i.e., the RTVs) for social and economic change. If the estimated effect of an action falls above the positive RTV or below the negative RTV, the effect is considered to be significant.

The model was run using total construction dollars, even though expenditures are scheduled to take place in installments over the BRAC timeline and run through 2011. Therefore, the model presents the "worst case scenario", in that it looks at the ROI's ability to absorb the maximum impact of spending associated with the Proposed Action. In reality, effects are likely to be less significant on a year-to-year basis. Impacts to socioeconomics were identified using the following model criteria:

No Effects – No change to socioeconomic conditions.

No Significant Effect – A change that does not fall outside the historic range of ROI economic variation.

Significant Effect – A change is considered significant if it falls outside the historical range of ROI economic variation.

4.10.1 Socioeconomic Impacts: Alternative One

4.10.1.1 Economic Development

Since no off-base personnel are assumed to relocate as part of Alternative One, due to the close proximity of WRAMC to NNMC, no new personnel and accompanying salaries were included in the model to determine the impacts of Alternative One on the ROI. The additional patients and visitors will increase the need for services within NNMC, but are likely to predominantly go to and from NNMC for appointments directly from their place of residence without affecting the immediate local area off Base economically except indirectly as additional traffic. However, the number of these trips is relatively small compared to traffic volumes on local roadways and the nearby beltway; therefore, indirect economic effects would be considered negligible. For the ROI, the new patients and visitors at NNMC previously were patients and visitors at WRAMC, 6 miles away. Therefore they are not a change to the ROI.

Construction costs for Alternative One are estimated at $839 million. Alternative One would generate an increase in local sales volume of approximately $1,317,230,000, of which approximately 39 percent would result directly from the proposed action. Furthermore, an increase in local employment of approximately 5,515 would be expected to result from Alternative One construction, 39 percent of which would be the direct result of the proposed action in the form of short-term construction-related jobs.

Although these prospective increases in local employment and sales volume would be beneficial to the ROI, they would not produce any significant effects to economic development. The model inputs and outputs are available in Appendix D.

4.10.1.2 Impacts to Demographics

There would be no significant effects on demographics resulting from Alternative One. No relocation of off-base personnel is expected as a result of the proposed action since staff would be coming from WRAMC, located 6 miles away, within the ROI. The new patients and visitors at NNMC previously were patients and visitors at WRAMC; therefore, they are not a change to the ROI. There is, therefore, no expected increase in population associated with Alternative One.

4.10.1.3 Impacts to Housing

There would be no significant effects on housing off Base resulting from Alternative One. As stated previously, there is no relocation of off-base personnel expected, therefore an increased demand for housing within the ROI is not expected, and any changes would have no significant effects.

4.10.1.4 Impacts to Quality of Life, Public Services

There would be no significant effect on public services resulting from Alternative One. No in-migration to the ROI is expected, therefore there would be no significant additional burden expected on schools, hospitals, fire and rescue services, and police services. The additional patients and visitors have been incorporated into the analysis of peak hour traffic, which provides the most severe impact on area intersections and roadways. However, the patients and visitors are spread through the day and night, as well as on weekends, and would add a general increase to traffic levels experienced in non-peak hours. Local residents may notice the increased traffic during non-rush hours, although conditions will be within the capacity of the roadways.

4.10.1.5 Environmental Justice

There would be no effect on environmental justice or protection of children as a result of Alternative One. All construction would take place on NNMC proper and NNMC geographically is within Montgomery County. As noted in Section 3.10, the median household income in Montgomery County in 2000 was $71,551, as compared to the state median household income of $52,868 and the national median household income of $41,994. The poverty level in Montgomery County is 6.5 percent for individuals and is substantially lower than the state and national figures of 8.5 percent and 12.4 percent for individuals, respectively. None of the tracts surrounding NNMC qualify as poverty or extreme poverty areas. Therefore there would be no potential to impact a poverty or severe poverty area. Furthermore, Alternative One by the nature of the actions proposed would not disproportionately affect the health of children in the ROI.

4.10.2 Socioeconomic Impacts: Alternative Two

4.10.2.1 Economic Development Impacts: Alternative Two

As with Alternative One, no off-base personnel are assumed to relocate as part of Alternative Two, due to the close proximity of WRAMC to NNMC, no new personnel and accompanying salaries were included in the model to determine the impacts of Alternative Two on the ROI. The economic effects to the immediate local area off Base from an increase in patients and visitors under Alternative Two would be negligible, as discussed for Alternative One. For the ROI, the new patients and visitors at NNMC previously were patients and visitors at WRAMC, 6 miles away. Therefore they are not a change to the ROI.

Construction costs for Alternative Two are estimated at $856 million. There would be a prospective increase in sales volume in the ROI of approximately $1,343,920,000, 39 percent of which would be a direct result from Alternative Two. The prospective increase in employment in the ROI would be approximately 5,626, with approximately 39 percent of those jobs resulting directly from Alternative Two in the form of short-term construction-related jobs.

As with Alternative One, this alternative would contribute positively to the ROI; however, those contributions in terms of increased sales volume and employment would be a significant impact to the economic development of the ROI.

4.10.2.2 Impacts to Demographics

There would be no significant effects on demographics resulting from Alternative Two. As previously stated, no relocation of off-base personnel is expected as a result of the proposed action since staff would be coming from WRAMC, located 6 miles away, within the ROI. The new patients and visitors at NNMC previously were patients and visitors at WRAMC; therefore, they are not a change to the ROI. There is, therefore, no expected increase in population associated with Alternative Two.

4.10.2.3 Impacts to Housing

There would be no significant effect on housing off Base resulting from Alternative Two. Because there is no relocation of off-base personnel associated with this action, there would be no significant change in the supply of or demand for housing in the ROI.

4.10.2.4 Impacts to Quality of Life, Public Services

There would be no significant effects on public services resulting from Alternative Two. No in-migration is expected in conjunction with Alternative Two, therefore no additional capacity would be required in any public service sector within the ROI. As for Alternative One, the additional patients and visitors would add a general increase to traffic levels experienced in non-peak hours. Local residents may notice the increased traffic during non-rush hours, although conditions will be within the capacity of the roadways.

4.10.2.5 Environmental Justice

There would be no effects on environmental justice resulting from Alternative Two, as all development would take place within the NNMC boundary. Therefore, no surrounding census tracts would be affected. Furthermore, there are no poverty or extreme poverty areas adjacent to NNMC. The construction and operation of Alternative Two at NNMC would also not significantly impact the protection of children, as it would not disproportionately affect the health and well-being of children.

4.10.3 Socioeconomic Impacts: No Action Alternative

4.10.3.1 Economic Development Impacts

Under the No Action Alternative, the installation working population and installation expenditures would remain unchanged from baseline levels. No new construction would take place. Therefore, economic activity levels would be the same as under the baseline conditions. There would be no effect on economic development in the ROI under the No Action Alternative.

4.10.3.2 Impacts to Demographics

Under the No Action Alternative, the installation working population would remain unchanged from baseline levels and no BRAC construction would take place. Therefore, the ROI population growth would be the same as under baseline conditions and there would be no effect on demographics in the ROI under the No Action Alternative.

4.10.3.3 Impacts to Housing

Under the No Action Alternative, the installation working population would remain unchanged from baseline levels. Therefore, the demand for housing units in the ROI would be the same as under baseline conditions and there would be no effect on housing in the ROI under the No Action Alternative.

4.10.3.4 Impacts to Quality of Life and Public Services

Under the No Action Alternative, the installation working population would remain unchanged from baseline levels and there would be no effect on public services in the ROI under the No Action Alternative.

4.10.3.5 Environmental Justice

Under the No Action Alternative, the installation working population would remain unchanged from baseline levels. Therefore, there would be no change in any impacts to any demographic group residing or working in the economic ROI or any effect on protection of children in the ROI under the No Action Alternative.

4.11 HUMAN HEALTH AND SAFETY CONSEQUENCES

4.11.1 Health/Safety Impacts: Alternative One

4.11.1.1 Underground and Aboveground Storage Tanks

Under Alternative One renovation activities in Building 7 would not have the potential to impact the fuel tanks in that building, which are in the basement and not affected.

It is assumed that the proposed facilities would have two backup generators. An enclosure will cover the entire system. The tanks would be designed to meet the applicable state/federal requirements listed in Section 3.11.1 for accidental spill prevention, detection, and containment and therefore, impacts are not anticipated.

4.11.1.2 Hazardous Materials/Hazardous Waste

Hazardous Materials

Under Alternative One the Authorized User List (AUL) of hazardous materials would be anticipated to grow. However, the increase would be managed in compliance with applicable regulations discussed in Section 3.11.2 and in adherence to the NNMC Hazardous Materials Program, which includes SOPs required for proper hazardous materials control and

management. Therefore, significant impacts from the increase of hazardous material are not anticipated.

Hazardous Waste

It is anticipated that the largest increase of hazardous waste would be associated with laboratory analysis of samples from medical tests. Other activities such as medical equipment repair would also increase in proportion to the increased staff and the amount of spilled medications would increase in proportion to the number of prescriptions. It is anticipated that with an increased patient load the amount of expired medications discarded would be reduced, as they are more likely to be used(NNMC, 2007b).

The potential increase in medical requirements discussed above would result in increased production and management of hazardous waste; however, NNMC will comply with the applicable regulations and adhere to the guidance listed in Section 3.11.2. The increase is also expected to provide opportunities for more cost-effective recycling. Therefore, significant impacts from the increase are not anticipated.

Solid Waste Management Units and Areas of Concern

Under Alternative One renovation activities for administrative space in Building 17, 17A, and 17B and demolition activities in Buildings 18, 21 for a new parking structure would occur in an area designated as AOC 1 under RCRA CAP. The area has been remediated but has not been closed administratively by the EPA Region III Office. Demolition and construction activities for the additional new parking structure would occur in areas or facilities with the following SWMUs or AOCs: SWMU 18 and AOC 4 in Building 21, AOC 8 in Building 150, and SWMU 9 in an area immediately southeast to Building 150.

Likewise, demolition and construction activities for the administrative space would occur in areas or facilities with the following SWMUs or AOCs: SWMU 31 in Building 59 and SWMU 5 in the area along Taylor Road in the vicinity of Building 141. Buildings 2 and 8 include the areas designated as SWMUs 13 and 14, respectively. Those buildings are proposed for some of the medical care space renovation.

Development in or around AOCs or SWMUs under the RCRA CAP would occur only with concurrence from EPA.

4.11.1.3 Asbestos-Containing Material, Lead and Lead-Based Paint, and Other Concerns

Given the fact that many of the buildings were constructed in the 1940s and early 1950s, asbestos and lead paint is of concern during demolition and renovation activities.

Under Alternative One demolition activities would occur in the western half of Building 23, where the 2007 Asset Detail Report identified asbestos prone tiles. Similarly, Building 141, where transite

(asbestos-containing material) and lead paint have been identified would be demolished for the construction of the new fitness center. It is standard practice to check for asbestos, lead based paint and mold prior to demolition or renovation in any building and NNMC has procedures in place to manage the substances to identify problem areas, protect and inform affected persons, remediate as necessary, and comply with the applicable standards. This requires coordination between facilities management, environmental programs, Industrial Hygiene, Safety, and (medical) environmental health. NNMC would comply with applicable regulations and adhere to the guidance listed in Section 3.11.3. Therefore, impacts are not anticipated.

4.11.1.4 Regulated Medical Waste

The EIS assumes that under Alternative One, regulated medical waste (RMW) would increase the current NNMC output by as much as double, which was at 651,257 pounds in 2006. This assumption is based on the current NNMC output and is a conservative estimate, as the number of inpatients (who generate the majority of RMW) is not projected to double from the current levels.

The capacity of the Sterile Processing Department (SPD) is adequate to process this increase; however, additional storage space would likely be needed. This space would be provided by reconfiguring current uses of existing space. The increase would increase the amount of RMW shipped to the incinerating facility. The incinerator has an extended amount of capacity; it is currently only operating between 50 and 65 percent of its permitted capacity. Therefore, there should be adequate capacity for the RMW.

4.11.1.5 Anti-Terrorism/Force Protection

The new facilities would comply with United Facilities Criteria contained in United Facilities Criteria (UFC) 4_010_01 ***DOD Minimum Antiterrorism Standards for Buildings***, dated 8 October 2003 and updated 22 January 2007. Compliance would require all new buildings to meet the minimum standoff distances from the base perimeter, roadways, and parking, and could include building hardening measures. Improvements at gates to enhance security and more efficiently process visitors are needed to improve overall security under both options.

4.11.2 Health/Safety Impacts: Alternative Two

4.11.2.1 Underground and Aboveground Storage Tanks

Impacts would be the same as under Alternative One; the same tanks would be affected.

4.11.2.2 Hazardous Materials/Hazardous Waste

Hazardous Materials

Under Alternative Two, impacts would be the same as under Alternative One.

Hazardous Waste

Impacts would be the same as under Alternative One.

Solid Waste Management Units and Areas of Concern

Under Alternative Two, demolition and construction activities for the administrative space and additional new parking structure would occur in areas that include facilities with the following SWMUs or AOCs: SWMU 31 in Building 59 and SWMU 5 in the area along Taylor Road in the vicinity of Building 141. Buildings 2 and 8 include the areas designated as SWMUs 13 and 14, respectively. Those buildings are proposed for some of the medical care space renovation.

Development in or around AOCs or SWMUs under the RCRA CAP would occur only with concurrence from EPA.

4.11.2.3 Asbestos-Containing Material, Lead and Lead-Based Paint and Other Concerns

Impacts and requirements would be similar to Alternative One; however, under Alternative Two demolition activities would occur in all of Building 23, where the 2007 Asset Detail Report identified asbestos prone tiles. It is standard practice to check for asbestos, lead based paint and mold prior to demolition or renovation in any building and NNMC has procedures in place to manage the substances to identify problem areas, protect and inform affected persons, remediate as necessary, and comply with the applicable standards. This requires coordination between facilities management, environmental programs, Industrial Hygiene, Safety, and (medical) environmental health. NNMC will comply with the applicable regulations and adhere to the guidance listed in Section 3.11.3. Therefore, impacts are not anticipated.

4.11.2.4 Regulated Medical Waste

The changes in RMW under Alternative Two would be the same as under Alternative One.

4.11.2.5 Anti-Terrorism/Force Protection

The new facilities would comply with United Facilities Criteria contained in UFC 4_010_01 *DOD Minimum Antiterrorism Standards for Buildings*, dated 8 October 2003 and updated 22 January 2007. Compliance would require all new buildings to meet the minimum standoff distances from the base perimeter, roadways, and parking, and could include building hardening measures. Improvements at gates to enhance security and more efficiently process visitors would improve overall security under all three options.

4.11.3 Health/Safety Impacts: No Action Alternative

Under the No Action Alternative, there would be no change to the condition or existence of USTs. Hazardous waste generation would not change from baseline conditions and exposure to hazardous materials would not change because construction for BRAC facilities would not occur. There would be no change in the generation of medical waste or

the anti-terrorism force protection posture of NNMC. Therefore, impacts to human health and safety would not be anticipated under the No Action Alternative.

4.12 CUMULATIVE IMPACTS

A ***cumulative impact*** is defined in the CEQ NEPA regulations as "the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future action regardless of what agency (federal or non-federal) or person undertakes such other actions" (see 40 CFR 1508.7). This section goes on to note that "such impacts can result from individually minor but collectively significant actions taking place over a period of time." Implementation of the No Action Alternative would not involve any BRAC actions onsite and therefore would not result in any additional cumulative environmental impacts. Alternatives One or Two would involve ***actions*** and therefore, would have the potential for adding to cumulative impacts through their impacts to the environmental resources examined in this EIS.

Cumulative impacts evaluation for the alternatives analyzed in this EIS involves examining the impacts from the new development outlined above within the context of other relevant past, present, and reasonably foreseeable future actions. Time interval and physical distance between all of the actions considered would be important in determining the potential for such interaction. The EIS analyzes incremental impacts from the proposed action when added to actions from other NNMC ongoing and foreseeable future projects on Base that are not associated with BRAC, as well as projects off Base not being implemented by NNMC, during the timeframe of the Proposed Action.

There is one ongoing project at NNMC considered by the cumulative impacts analysis. A new Academic Program Center containing 41,000 SF (3,809 m^2) for the USUHS Nursing School is being constructed in the middle of the USUHS campus in the southeast section of NNMC. It would not add staff or visitors; however, 40 to 60 additional parking spaces could be added.

Foreseeable future projects, listed below, are projected to add up to 136 new employees at NNMC. (The estimate of 136 new staff is preliminary; it will require verification as planning progresses).

- Navy Lodge Expansion: The existing Navy Lodge, Building 52, could be expanded by an addition of 48,000 SF (4,459 m^2) adding staff of 20. It would add lodging for existing visitors.

- Navy Exchange (NEX): The existing Navy Exchange could be expanded with an addition of up to 100,000 SF (9,290 m^2) and 170,000 SF (15,793 m^2) of parking with 95 additional staff at its current site south of Building 12, adjacent to C Lot. This would be likely to attract additional visitors, particularly on weekends.

- Senior Non-Commissioned Officers Quarters (SNCO): New housing for SNCOs could include four to eight townhouse units, each providing space of approximately 2,310 SF (214 m2). This would replace the three lost for construction of the Fisher Houses™ and add additional units. Most probable location would be near the site for proposed BRAC BEQs.

- Child Care Centers: Two child care facilities to serve existing visitors and staff could be constructed with additional staff of 21. An hourly day care drop-off facility, estimated to occupy 9,000 SF on one level with an adjacent outdoor play area and a 24-hour facility of 4,000 SF on one level with adjacent play area could be constructed.

- Morale Welfare and Recreation (MWR) Athletics Fields: Additional MWR athletic fields are needed at NNMC.

- Security Gate: Access gate improvements for all gates are needed and are being studied. These would include construction of a new security facility with approximately 1,000 SF of interior space in the northwest corner of NNMC.

- The Grier Road Commercial Vehicle Inspection Facility would provide a commercial vehicle inspection station on NNMC.

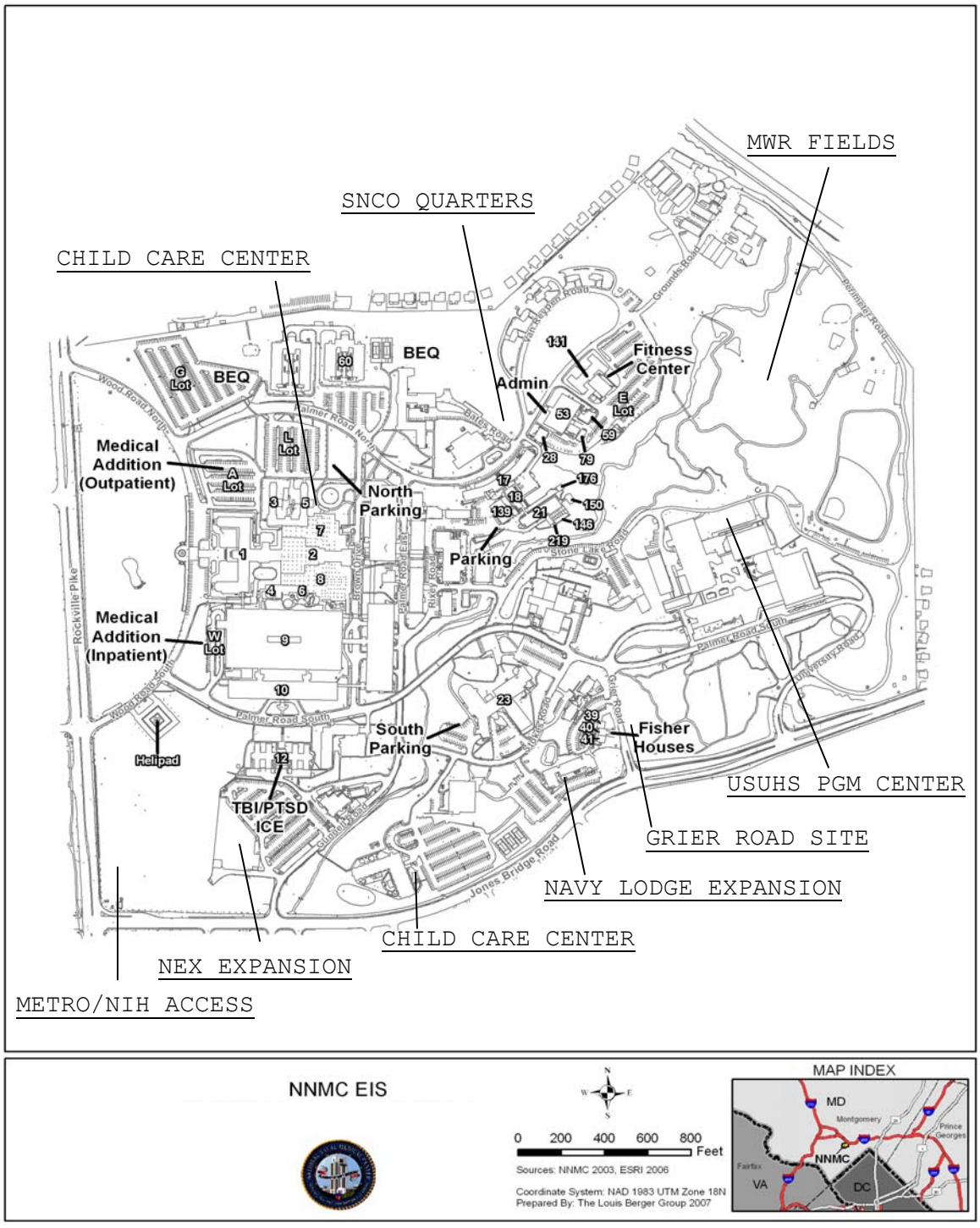
- A planned Metrorail link in the southwest corner of the installation near the southern Rockville Pike security gate.

- A pedestrian connection between the NIH campus to NNMC just south of the South Wood Road security gate is being considered.

Figure 4-2 shows the general area where ongoing and foreseeable future projects on Base at NNMC are anticipated to be located. Note, these locations are preliminary and subject to change.

The cumulative impacts analysis of this EIS has also considered off-Base projects in the vicinity of NNMC, to include the implementation of the 2003 NIH Master Plan. The NIH Master Plan 2003 would guide and coordinate physical development of the NIH Bethesda campus in terms of buildings, utilities, roads and streetscape, landscapes, and amenities over the next 20 years in response to projected NIH administrative, research, and infrastructure support needs. It upgrades and adds facilities to meet needs for the next 20 years. NIH may deviate from the plan to satisfy ongoing exigencies. The Master Plan does not commit NIH to implementing specific projects indicated or illustrated in the plan. Implementation of any feature or project in the Master Plan is dependent on Congressional funding.

Figure 4-2: NNMC Ongoing and Foreseeable Future Projects



Note: Locations are preliminary and subject to change. Ongoing and foreseeable future projects are underlined; projects not underlined are the proposed BRAC projects (Alternative One). Gate security projects are not shown but are at every entrance.

All projects at NIH are across Rockville Pike from NNMC and the current intent is to keep the number of parking spaces at NIH equal to the current number of parking spaces. Therefore, commuter traffic would not increase.

Also off Base, the approved development projects shown in Table 4-19 are part of the traffic baseline. Their location and resultant contribution to peak trips in the area are provided in Section 3.0 of Appendix C, Transportation Study. In addition, the transportation analysis lists funded projects in planning/engineering or construction phases from the Maryland Consolidated Transportation Program (2007 to 2012) that could influence NNMC transportation conditions in the long-term. They are described in Section 3.2, Appendix C, Transportation Study.

Table 4-19: Approved Off-Base Background Development

Ref.	Background Developments	Land Use	Size (SF)	Units
1	Woodmont Corner	Multi-Family Residential	---	253
2	Duball Woodmont LLC	Retail	16,595	---
2	Duball Woodmont LLC	Multi-Family Residential	---	158
3	4933 Fairmont Avenue	Office	1,489	---
3	4933 Fairmont Avenue	Retail	1,090	---
3	4933 Fairmont Avenue	Multi-Family Residential	---	2
4	West Virginia Avenue	Single Family Detached	---	4
5	8400 Wisconsin Avenue	Multi-Family Residential	---	198
6	Town at Rosedale Park	Townhouse	---	6
7	Goodwill Property	Townhouse	---	28
8	FASEB	Office	40,000	---
9	Georgetown Prep School /Inigos Crossing	Multi-Family Residential	---	473
10	Howard Hughes Medical Center	Office	75,000	---
11	Chevy Chase Lake East	Office	100,000	---
11	Chevy Chase Lake East	Retail	74,016	---

Source: Appendix C, Transportation Study.

4.12.1 Cumulative Impacts to Geology, Topography, and Soils

Geology, topography, and soil impacts are site-specific and are not affected by cumulative development in the region, except where soil erosion may contribute to degradation of water quality. Refer to Section 4.12.2 below for a discussion of potential sediment and erosion impacts. Cumulative impacts would only occur if development immediately adjacent to the site affected these resources on the site, or if development on the site affected geologic resources of the site where other development may occur. No ongoing or reasonably foreseeable future projects on or off Base are in the vicinity of actions under Alternatives One or Two and therefore there are no incremental impacts to add to impacts already discussed in Section 4.1, except as noted in Section 4.12.2 below.

The No Action Alternative does not involve BRAC construction or change by BRAC implementation to current operations and therefore, would not cause cumulative impacts to geology, topography, or soils.

4.12.2 Cumulative Impacts to Water Resources

Under each of the alternatives considered, development would increase the percentage of impervious surfaces, which would increase stormwater runoff having potential to carry pollutants, including sediment, to streams. It would also decrease infiltration for groundwater recharge. Other related actions within and adjacent to the NNMC Campus include construction activities (ongoing and foreseeable future projects on Base and the off Base NIH expansion). While all of this development would be conducted in accordance with all applicable regulatory requirements for erosion and sediment control and stormwater management, the overall development associated with these proposed projects would also increase the percentage of impervious surfaces within the Stoney Creek drainage area, including the unnamed tributary to Stoney Creek that traverses NNMC. This in turn would increase the overall potential for stormwater runoff to carry pollutants to both Stoney and Rock Creeks.

The overall increase in impervious surfaces associated with the proposed action, when combined with the increase in impervious surfaces associated with these proposed future actions could result in increases in stormwater runoff. However, the relatively small increase in impervious acres under either Alternative One or Two (approximately 3.4 to 4.8 acres), for this already heavily developed urban area, with attention to appropriate BMPs under the required stormwater management and erosion and sediment control plans, is expected to avoid significant additive effects from the NNMC new construction. The implementation of stormwater controls in NNMC, in fact, has the potential to improve overall runoff management at NNMC. A net decrease in the speed and volume of stormwater would be expected after construction because 20-percent of the stormwater flow from areas that were previously impervious as well as the new impervious area will now be managed with BMPs.

The No Action Alternative does not involve BRAC construction or change by BRAC implementation to current operations and therefore, would not cause cumulative impacts to water resources.

4.12.3 Cumulative Impacts to Biological Resources

Cumulative impacts to biological resources would not be significant. Scattered landscape vegetation would be removed or existing development would be demolished and new facilities erected on top for the construction of Alternatives One or Two. Direct loss of vegetated areas that currently provide habitat for wildlife would not occur as a result of clearing for development. It is not known whether the future projects listed for the cumulative impacts analysis would remove habitat of a more valuable nature, such as forest land, but because Alternatives One and Two do not disturb habitat or vegetation of any

significance, neither Alternative One nor Two would add adverse impacts to any other of projects being addressed under cumulative impacts. There are no rare, threatened, or endangered species present on NNMC, as discussed in Section 3.3.4; therefore, significant impacts to rare, threatened, or endangered species would not occur.

The No Action Alternative does not involve BRAC construction or change by BRAC implementation to current operations and therefore, would not cause cumulative impacts to biological resources.

4.12.4 Cumulative Impacts to Air Quality

The applicability analysis determined that peak year combined emissions due to construction and operations for either alternative are all below the appropriate ***de minimis*** values for areas in nonattainment or maintenance for ozone and $PM_{2.5}$, demonstrating that a full conformity determination is not required for Alternatives One and Two. The Department of the Navy will prepare a Record of Non-applicability. Air emissions were also evaluated to determine regional significance and found not to be regionally significant. Mobile (vehicle) source emissions were also within ambient standards.

The analysis conducted takes the overall health of the airshed into consideration and is conducted by regulation separately for each proposed project. By demonstrating that the emissions for either alternative are below stated ***de minimis levels*** or thresholds, the EIS also demonstrates that cumulative air quality effects are not significant and would not pose a significant incremental effect to any other projects, which must be separately evaluated by applicability analyses.

The No Action Alternative does not involve BRAC construction or change by BRAC implementation to current operations and therefore, would not cause cumulative impacts to air quality.

4.12.5 Cumulative Impacts from Noise

Noise associated with the operation of heavy equipment would be generated during, and within the immediate vicinity of, construction activities. It is anticipated that under both alternatives, the increase in personnel would increase traffic generated noise levels. However, the increase in traffic already accounts for the cumulative traffic and levels increased would not result in a 3 dBA increase in noise levels. Projects on Base could interact; however, by adhering to state and county guidelines and OPNAVINST 5100.23G Navy Occupational Safety and Health Program Manual, the Proposed Action and additional projects addressed for cumulative impacts would not cause significant incremental effects. Off Base projects are sufficiently distant that the noise would not combine with on-Base projects to produce adverse effects.

The No Action Alternative does not involve BRAC construction or change by BRAC implementation to current operations and therefore, would not cause cumulative impacts to noise.

4.12.6 Cumulative Impacts to Utility Infrastructure

Provision of services for telecommunications, water, wastewater, natural gas, and electric power is not expected to have an impact on regional supplies or projects on or outside the Base. The on-Base projects being considered under cumulative impacts would add an estimated 12 to 18 percent in utility demand above the projects of the Proposed Action, based on very preliminary assumptions that correspond to the square footage and number of people involved. Therefore, incremental effects are not expected to be significant. However, the SNCO housing would be in a wastewater basin that could experience sewer capacity shortfalls and any upgrades for the Proposed Action projects sharing the sewer lines (BEQs) should take the SNCO housing requirements into consideration.

Because the new BRAC projects that add to utility demands at NNMC reduce demands at WRAMC by a like amount, the NNMC projects do not incrementally increase regional demand. Locally, utility providers have indicated that the NNMC demands for BRAC can be met; therefore, the incremental effect of adding these demands to those of other off-Base projects are not considered to be significant.

The No Action Alternative does not involve BRAC construction or change by BRAC implementation to current operations and therefore, would not cause cumulative impacts to utility infrastructure.

4.12.7 Cumulative Transportation Impacts

The analysis of transportation for Alternatives One and Two considered the projected growth in the region as well as approved future roadway projects as part of the No Action Alternative. Impacts for each alternative were assessed with projected growth and roadway improvements for 2011 included in the baseline. The conservative use of an estimated 2,500 new employees for traffic analysis under the action alternatives versus 2,200 currently estimated incorporates the 136 additional commuters for the other ongoing and foreseeable future projects for assessment of cumulative impacts. No other NNMC projects add staff or visitors except the possible NEX expansion. The NEX expansion would be likely to add visitors; however, on weekdays these visitors would not be likely to add significant traffic during peak rush hour. Few people select weekday rush hour to make a trip to NNMC strictly to access the NEX. On weekends, there could be visitors caused by Alternatives One or Two that would add to the visitors attracted to an expanded NEX. The total resulting traffic would not cause the more severe conditions/impacts assessed by the EIS for peak weekday rush hours, but the incremental effect could add to a general level of traffic that would be noticeable and inconvenience other motorists.

Access gate improvements would have a beneficial impact on traffic, as would the Grier Road inspection facility, by providing access to NNMC that is more efficient and less likely to cause lines and queues than would result without the facilities. As such, they would tend to provide mitigation for the traffic impacts expected under Alternatives One and Two.

For the NIH master plan implementation, there are no unbuilt master-planned buildings that would generate significant additional traffic. Toward the end of the Master Plan build out, there are plans for several buildings to be replaced with newer facilities. The overall growth of the MP is from approximately 18,000 employees to approximately 22,000. However, parking is intended to remain at existing levels (which is in keeping with NCPC requirements). Therefore the incremental effect of the BRAC traffic when added to the NIH Master Plan traffic is not significant.

The NIH projects include a commercial vehicle inspection station on Rockville Pike. This station will not increase the number of commercial vehicles requiring inspection and is not expected to significantly change peak hour conditions on Rockville Pike. Therefore the BRAC projects do not add traffic to that of the station in a way that would cause a significant cumulative impact.

To summarize, the greatest cumulative impacts for Alternatives One and Two were considered as part of the basic traffic analysis, which includes growth from other projects, and are therefore already identified in the impact assessments in Section 4.7.

4.12.8 Cumulative Impacts to Cultural Resources

Cultural resources impacts are specific to resources on NNMC and are fully covered by the discussion of potential impacts in Section 4.8. There is no incremental effect when the proposed BRAC projects are added to these other actions.

The No Action Alternative does not involve BRAC construction or change by BRAC implementation to current operations and therefore, would not cause cumulative impacts to cultural resources.

4.12.9 Cumulative Impacts to Land Use

The land use direct effects under the proposed action are within the property boundaries of NNMC and are consistent with the fundamental medical care land use designated for NNMC. They are also consistent with the purposes of NIH, across Rockville Pike. Therefore they are consistent with land use within the region. They are also compatible building by building with existing functions on Base. Other ongoing or foreseeable future projects on Base are also compatible with existing land use.

The Proposed Action would increase traffic in the area adjacent to NNMC; however, as shown in Section 4.7, additional NNMC traffic under

the BRAC Alternatives are not a large percent of total traffic. Therefore the traffic would not be expected to cause indirect adverse land use effects of significance. To the extent that the additional staff or visitors under the BRAC Alternatives use services off Base, such as retail or restaurants, it would be small incrementally to existing use and would not contribute to a change in land use off Base.

Therefore, as the proposed alternatives are consistent with the medical purposes for land use within NNMC and are also consistent with land use for the area, they do not cause significant adverse effects or adverse cumulative impacts.

The No Action Alternative does not involve BRAC construction or change by BRAC implementation to current operations and therefore, would not cause cumulative impacts to land use.

4.12.10 Cumulative Socioeconomic Impacts

Alternatives One or Two construction would add to the growth and need for services in the ROI. Section 4.10 addresses these regional effects and concludes that the impacts are not significant. Since implementation of either alternative is not expected to have a disproportionately high and adverse human health or environmental effect on minority, low-income or younger segments of the local population, they do not cause cumulative impacts for purposes of environmental justice when considered with any other actions in the area.

The additional patients and visitors would add a general increase to traffic levels experienced in non-peak hours. If the NEX is expanded, it would be likely to do likewise. The incremental effect of traffic under Alternatives One and Two would add to traffic and local residents are likely to notice this traffic although conditions will be within the capacity of the roadways.

The No Action Alternative does not involve BRAC construction or change by BRAC implementation to current operations and therefore, would not cause cumulative socioeconomic impacts.

4.12.11 Cumulative Impacts to Human Health and Safety

Effects to human health and safety are specific to NNMC and are fully covered by the discussion of potential impacts in Section 4.11. The ongoing and foreseeable future projects on Base are unlikely to produce hazardous material in quantities that would have any effect in combination with that likely to be generated under Alternatives One and Two. The potential implementation of the Grier Road Commercial Vehicle Inspection Facility, a planned Metrorail link in the southwest corner of the base, and a pedestrian connection between the NIH campus to NNMC just south of the South Wood Road security gate, would have positive effects at NNMC. The NIH projects are separated by distance

and would not interact with projects at NNMC from the perspective of human health and safety impacts.

The No Action Alternative does not involve BRAC construction or change by BRAC implementation to current operations and therefore, would not cause cumulative impacts to human health or safety.

4.13 SHORT-TERM USE OF THE ENVIRONMENT VERSUS LONG-TERM PRODUCTIVITY

Regulations for the preparation of an EIS require that the relationship between short-term use of the environment and the maintenance and enhancement of long-term productivity be addressed. Implementation of either alternative would result in new development requiring various services, depending on the alternative chosen.

Long-term benefits under implementation of either of the alternatives would occur at the expense of short-term impacts in the vicinity of the project sites. These short-term impacts would occur during the period of construction for the alternative chosen. Implementation of Alternative One or Two would require an estimated 3-year construction period. During the construction period, the following types of construction activities would occur: demolition, a combination of clearing and grubbing, excavating, surfacing, road and parking paving, erecting structures, and landscaping. Short-term impacts to the local noise, air quality, and natural resources, as well as possible traffic detours and delays, could occur at NNMC. The use of the front lawn for construction materials and equipment would also impair the view shed of Building 1. However, these impacts would be temporary and the implementation of proper controls would be utilized to prevent these effects from having significant impacts on the environment.

Additionally, short-term gains to the local economy would occur if local workers are hired and if local businesses provide services and supplies during the construction of the chosen alternative. Upon completion of the project, the gains to the local economy would evolve into long-term benefits for the operation of NNMC and employee spending in the region. Furthermore, the completion of the Proposed Action would introduce a long-term increase in the efficiency of NNMC and regional military medical operations and long-term benefits.

4.14 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Regulations for the preparation of an EIS require that irreversible and irretrievable commitments of resources associated with the Proposed Action be addressed. The construction of the Proposed Action addressed by this EIS would result in direct and indirect commitments of resources. In some cases, the resources committed would be recovered in a relatively short period of time. In other cases, resources would be irreversibly or irretrievably committed by virtue of being consumed or by the apparent limitlessness of the period of their commitment to a specific use. The provision of similar resources with substantially the same use or value can sometimes compensate for irreversible and irretrievable commitments of resources.

In this instance, only 3.4 to 4.8 net acres are estimated to be rendered impervious, depending on alternative and option selected. The remainder of the area would be landscaped. Resources consumed as a result of either alternative would be offset by the creation of needed facilities and the resulting operational benefits to NNMC. The use of the developed portion of the land, which is minimal for the alternatives, could be considered irretrievably committed.

Biological resources that would be lost during development are minimal. The alternatives would also require the commitment of various construction materials, including cement, aggregate, steel, asphalt, lumber, and other building materials. However, much of the material dedicated to construction may be recycled at some future date. Additionally, the proposed development would require the use of an amount of fossil fuel, electrical energy, and other energy resources during the construction and operation of the facilities. These should be considered irretrievably committed to the development.

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Bethesda, MD 20814

7.9 TRANSPORTATION ADVISORY COMMITTEE - STATE, LOCAL, REGIONAL

One individual from each agency/group will be provided a copy of the EIS for their agency review.

Name	**Organization**
Scott Peterson	Washington Metropolitan Area Transit Authority
Margret Schwartz	North Bethesda
Richard Grant	Maryland Department of Economic Development
Richard Hawthorne	M-NCPPC

Name	Organization
Rob Klien	Montgomery County Department of Economic Development
Michael Madden	MDOT Maryland Transit Administration
Sarah Miller	Montgomery County Department of Economic Development
David Moss	Montgomery County Department Public Works
Paul Oberle	Maryland Department of Transportation
Lisa Rother*	Montgomery County Department of Economic Development
Leslie Hamm*	Bethesda-Chevy Chase Regional Services Center (Montgomery County)
Ron Spalding	Maryland Department of Transportation
Daniel Weissbein	Montgomery County Department of Economic Development Workforce Consultant
Jeff Wentz	SHA District 3, Engineer
Julie Woepke	Maryland Department of Business & Economic Development
Sandra Brecher	Montgomery County Transportation
Linda Provost	Montgomery County Transportation
Stephanie Yanovitz	Maryland State Highway Administration

* Also listed previously.

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8.0 ACRONYMS

ACHP	Advisory Council on Historic Preservation
ACM	Asbestos-containing material
ACPS	Alexandria City Public Schools
AFRRI	Armed Forces Radiobiology Research Institute
AIRFA	American Indian Religious Freedom Act
ALS	Advanced Life Support
AOC	Area of Concern
APS	Arlington Public Schools
AQCRs	Air-quality Control Regions
AQI	Air Quality Index
AT/FP	Anti-terrorism/Force Protection
ATR	Automatic Traffic Recorder
AUL	Authorized User List
BCC	Bethesda-Chevy Chase
BEQ	Bachelor Enlisted Quarters
BLS	Basic Life Support
BMPs	Best Management Practices
BRAC	Base Realignment and Closure
BuDocks	Navy's Bureau of Yards and Docks
BUMED	Bureau of Medicine and Surgery
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CBD	Central Business District
CDC	Child Development Center
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CHESDIV	Chesapeake Division, Naval Facilities Engineering Command
CNO	Chief of Naval Operations
CO	Carbon monoxide
COMAR	Code of Maryland Regulations
CLV	Critical lane volumes
CWA	Clean Water Act
DHS	Department of Homeland Security
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EIS	Environmental Impact Statement
EMS	Emergency Medical Services
EO	Executive Order
ESA	Endangered Species Act
EJ	Environmental Justice

FAR	Floor Area Ration
FEMA	Federal Emergency Management Agency
FCA	Forest Conservation Act
FCPS	Fairfax County Public Schools
FHWA	Federal Highway Administration
FIDS	Forest interior dwelling species
GIS	Geographic Information Systems
gpd	Gallons per day
HARP Plan	Historic and Archaeological Resources Protection Plan
HAZMAT	Hazardous Materials
ICE	Intrepid Center of Excellence
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
ITE	Institute of Transportation Engineers
JTF	Joint Task Force
kW	Kilowatt
LATR	Local Area Transportation Review
LEED	Leadership in Energy and Environmental Design program
LID	Low Impact Development
LOS	Level of Service
MARC	Maryland Rail Commuter
MCDP	Montgomery County Department of Police
MCPS	Montgomery County Public Schools
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MDOT	Maryland Department of Transportation
M-NCPPC	Maryland-National Capital Parks and Planning Commission
MPD	District of Columbia Metropolitan Police Department
MSHA	Maryland State Highway Administration
MTFB	Mass Transportation Fringe Benefit
MVA	Mega Volt-ampere
MWCOG	Metropolitan Washington Council of Governments
MWR	Morale Welfare and Recreation
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAMS	National Air Monitoring Stations
NAVFAC	Naval Facilities Engineering Command
NCPC	National Capital Planning Commission
NEPA	National Environmental Policy Act
NEX	Navy Exchange
NEXCOM	Navy Exchange Service Command
NHPA	National Historic Preservation Act
NIH	National Institutes of Health
NNMC	National Naval Medical Center

NOI	Notice of Intent
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSR	New Source Review
OPNAVINST	Chief of Naval Operations Instructions
PCB	Polychlorinated biphenyl
PEPCO	Potomac Electric Power Company
PM	Particulate Matter
ppm	Parts per million
PSD	Prevention of Significant Deterioration
psi	Pounds per square inch
PTSD	Post Traumatic Stress Disorder
RCRA	Resource Conservation and Recovery Act
RCRA CAP	RCRA Corrective Action Program
RMW	Regulated Medical Waste
ROD	Record of Decision
ROI	Region of Influence
RTV	Rational Threshold Value
SF	Square Feet
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring Stations
SNCO	Senior noncommissioned officers
SOP	Standard operating procedures
SPD	Sterile Processing Department
SWMU	Solid Waste Management Unit
T&E	Threatened and Endangered
TBI	Traumatic Brain Injury
TDR	Transfer of Development Rights
TPD	Tons per Day
TPY	Tons per Year
TSCA	Toxic Substance Control Act
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USUHS	Uniformed Services University of the Health Sciences
UST	Underground storage tank
VOCs	Volatile Organic Compounds
WMATA	Washington Metropolitan Area Transit Authority
WRAMC	Walter Reed Army Medical Center
WRNMMC	Walter Reed National Military Medical Center
WSSC	Washington Suburban Sanitary Commission

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