PROPOSED
902ND MILITARY INTELLIGENCE (MI) GROUP
ADMINISTRATIVE AND OPERATIONS CENTER

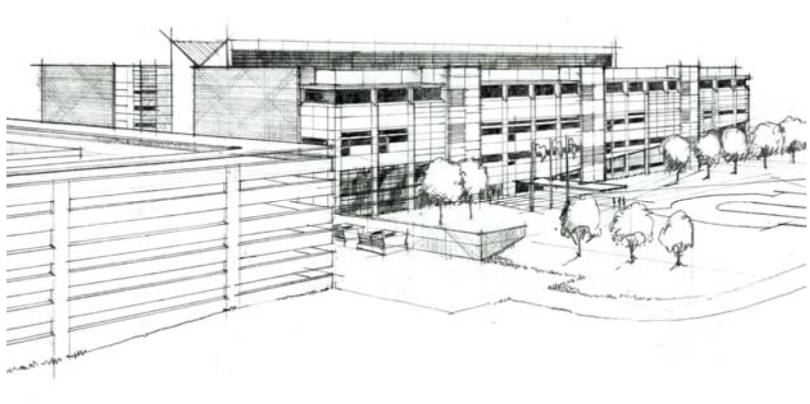
Fort George G. Meade, Maryland

FINAL
ENVIRONMENTAL ASSESSMENT

December 14, 2007

Prepared for:
U.S. Army Garrison
Fort George G. Meade, Maryland

Prepared by:
U.S. Army Intelligence and Security Command
Fort Belvoir, Virginia



COVER PAGE

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Proposed Action: Construct a new facility to house the U.S. Army Intelligence and Security Command (USAINSCOM) 902nd Military Intelligence (MI) Group Administrative and Operations Center at Fort George G. Meade, Maryland.

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FINDING OF NO SIGNIFICANT IMPACT

PROPOSED
902nd MILITARY INTELLIGENCE (MI) GROUP ADMINISTRATIVE AND OPERATIONS CENTER
Fort George G. Meade, Maryland

Headquarters
U.S. Army Garrison
Fort George G. Meade, Maryland

Headquarters
U.S. Army Intelligence and Security Command
Fort Belvoir, Virginia

December 12, 2007

FINDING OF NO SIGNIFICANT IMPACT

INTRODUCTION

This document updates the previously prepared environmental assessment (EA) titled "Proposed 902nd Military Intelligence (MI) Group Administrative and Operations Center: Environmental Assessment" which was signed in 2003 following a 30-day public comment period. This revised EA, which addresses the same project on a new site, is a site-specific analysis of the potential effects of relocating the 902nd MI Group Administrative and Operations Center from its existing facilities to a proposed new facility to be constructed on Fort George G. Meade (hereafter "Fort Meade" or FGGM). This document is being prepared in coordination with and is consistent with the *Base Realignment and Final Environmental Impact Statement for Implementation of Base Realignment and Closure 2005 and Enhanced Use Lease Actions at Fort George G. Meade, Maryland*.

The Headquarters, US Army Intelligence and Security Command (HQUSAINSCOM) has contracted with the US Army Corps of Engineers to provide overall project management for the proposed action. The US Army Corps of Engineers has in turn contracted with an architectural and engineering firm to begin design of the proposed facility. Procedures outlined by the National Environmental Policy Act of 1969 (NEPA) must be followed in order for federal funding to be approved to construct this facility. The NEPA process provides a mechanism to identify: 1) issues and concerns from the public, 2) reasonable and prudent alternatives for the proposed action, 3) potential environmental impacts of the alternatives, and 4) appropriate mitigation measures. In addition to the EA and this Decision Notice and Finding of No Significant Impact, HQUSAINSCOM and the US Army Corps of Engineers require that all required permits and an Environmental, Health and Safety Work Plan be approved before the project can be implemented.

SUMMARY OF PROPOSED ACTION

The U.S. Army Intelligence and Security Command (INSCOM) has identified a requirement to construct a new 902nd MI Group Administrative and Operations Center. Current 902nd MI Group operational and administrative activities are performed in three converted three-story brick buildings with full basement, and one concrete block one story building on Fort Meade, Maryland. The brick buildings were constructed for use as Army barracks in 1929 and 1940. The concrete block building was constructed in 1990 as a Sensitive Compartmented Information Facility (SCIF). The proposed new facility would occupy 420,114 Gross Square Feet, GSF (128,051 gross square meters, GSM) for the 902nd MI Group Administrative and Operations Center, including a SCIF, associated parking, and anti-terrorism/force protection (AT/FP) measures. This project has been expedited as a portion of the existing structure was severely damaged in a fire that occurred on 20 October 2006. One of the 902nd MI Group buildings, Building 4554, is in a failed condition due to fire and water damage sustained as a result of fire fighting operations. The fire destroyed a substantial portion of the 4th floor along with the entire roof and the office space contained in the attic.

DECISION

As a result of an evaluation of alternatives, INSCOM proposes to construct a new 902nd Military Intelligence Group Administrative and Operations Center on FGGM. The proposed facility would include a SCIF and other associated and supporting activities. This would be a two-phase project with Phase 1 accommodating 517 personnel, and an additional 429 personnel and 150 students going into Phase 2 (PN 58726). This facility would provide the unit with modern facilities suitable for their mission of providing multi-discipline counter-intelligence, force protection, electronic warfare and information warfare support to the Army, joint and combined commanders at all levels across the operational continuum. In addition the military intelligence center has been augmented with a new homeland defense activity. These missions will be enhanced with consolidation of staff and various subordinate elements into a single facility location, thereby affording efficient and expedient command and control coupled with enhanced communication capabilities.

RATIONALE FOR DECISION

The EA discusses five alternatives that were evaluated for meeting the requirements of the proposed action. The EA includes a site-specific discussion of:

1. Delineation of Need for the Project
2. Description of the Proposed Project
3. Description of the Affected Environment
4. Environmental Consequences
5. Evaluation of Alternatives
6. Mitigation and Environmental Monitoring
7. Supporting Documentation and Calculations

The five alternatives that were considered in detail in this analysis were:

1. No action alternative – remain in existing facilities
2. Renovate/construct addition to existing facilities at FGGM
3. Use other government facilities
4. Lease off-post facilities in the general vicinity of FGGM
5. Construct a new facility on FGGM

The alternative to construct a new facility on FGGM was determined to be the most feasible, cost effective alternative for providing operational shops, covered storage, and administrative space for this activity, due to the unavailability of suitable vacant space for renovation/consolidation as described in paragraph 7.2.5 to this document. From an environmental standpoint, this is the preferred alternative for the following reasons:

- It utilizes a developed area, eliminating the need to remove trees and vegetative soil cover.
- It results in the replacement of old facilities with new, more environmentally sustainable, energy efficient facilities.
- It consolidates 902nd MI Group operations in a single, efficient facility that minimizes travel between separate facilities.

FINDING OF NO SIGNIFICANT IMPACT

The project will have no significant cumulative impacts to the geology, groundwater, surface waters, noise, aesthetics, cultural resources, or natural resources at the proposed site. Long-term environmental effects will not change since construction will be performed on the same installation as the existing facility and in a previously developed area. The new facility will eliminate current negative impacts to human health and the environment from existing substandard facilities. It will incorporate state of the art water and energy conservation fixtures and equipment and will utilize construction materials made from recycled material to the maximum extent possible. Because no relocation of personnel or unit missions will occur, there will be no socioeconomic impacts. Short-term impacts to transportation resources will result from construction of the new facility, but these impacts will have little impact off of FGGM.

MITIGATION OF SHORT TERM ENVIRONMENTAL IMPACTS

Short-term environmental impacts will occur from construction at the site. Appropriate mitigation measures, as outlined in the environmental assessment, will ensure that these environmental effects are minimal and temporary.

CONSTRUCTION TIMELINE

If approved, this will be a two-phase project. The phases are scoped such that the two buildings are connected in a secure manner but each could function as a stand alone building for another purpose in the event that only one project is funded. The first phase, Fiscal Year 2008 (FY08, Project No. 68172) is $42M and builds 128,257 GSF (39,093 GSM) while the second phase, to be constructed at a future date (FY15 or later), is $70M and builds 291,857 GSF (88,958 GSM).

ENVIRONMENTAL JUSTICE

This analysis was performed in compliance with Executive Order 12898 (Environmental Justice, February 11, 1994). This project may be implemented after this document has been signed.

DEC 12 2007
Date

KENNETH O. McCREEDY
COLONEL, U.S. ARMY
COMMANDING

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1.0 EXECUTIVE SUMMARY

1.1 Requirement for a new or renovated facility

The U.S. Army Intelligence and Security Command (INSCOM) has identified a requirement to construct a new 902nd MI Group Administrative and Operations Center. Current 902nd MI Group operational and administrative activities are performed on Fort George G. Meade (FGGM), Maryland in three converted three-story brick buildings with full basement, and one concrete block one story building. The brick buildings were constructed for use as Army barracks in 1929 and 1940. The concrete block building was built in 1990 as a Secure Compartmented Information Facility (SCIF). The proposed new facility would consolidate staff, subordinate, and supporting elements into a single facility with adequate circulation and infrastructure to support intelligence operations critical to national security. This project has been expedited because one of the 902nd MI Group buildings, Building 4554, was severely damaged in a fire that occurred on October 20, 2006. Fire destroyed a substantial portion of the fourth floor along with the entire roof and the office space contained in the attic. This facility is now in a failed condition due to fire and water damage sustained as a result of the fire fighting operations.

1.2 Five Alternatives evaluated

INSCOM evaluated various alternatives to meet requirements for the proposed 902nd MI Group Administrative and Operations Center. As detailed in this document, alternatives included a no action alternative, renovation of existing facilities, use of other government facilities, off-post leased facilities, and new construction on FGGM. Each alternative was evaluated for mission support, economic, environmental, and security considerations. This document focuses primarily on the environmental effects that were evaluated.

1.3 Preferred alternative – construction of new facility on Fort Meade

As a result of this evaluation of alternatives, INSCOM proposes to construct a new facility in a previously developed area on FGGM. The proposed new facility would occupy a total of 420,114 gross square feet, GSF (128,051 gross square meters, GSM) for the 902nd MI Group Administrative and Operations Center, including a Sensitive Compartmented Information Facility (SCIF), associated parking, and anti-terrorism/force protection (AT/FP) measures. The first phase, Fiscal Year 2008 (FY08, Project No. 68172) is $42M and builds 128,257 GSF (39,093 GSM) while the second phase, to be constructed at a future date (FY15 or later), is $70M and builds 291,857 GSF (88,958 GSM).

This alternative is a best value alternative that minimizes environmental impacts by utilizing an existing developed area on FGGM. Additionally, this alternative eliminates the relocation of civilian and military personnel and associated socioeconomic impacts.

1.4 Compliance with NEPA and U.S. Army Environmental Regulations

This Environmental Assessment (EA) has been performed in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321) and Army Regulation 200-2

(Environmental Effects of Army Actions). Direct, indirect, and cumulative environmental effects of the proposed project have been evaluated.

1.5 No Significant Impacts

As indicated in Table 1 on the following page, the preferred alternative for the proposed project will have no significant impacts to the geology, groundwater, surface waters, noise, aesthetics, cultural resources, or natural resources at the proposed site. However, the first phase of the 902nd MI GP project will occur concurrently with construction of the new Defense Information Systems Agency (DISA) facility. The influx of construction vehicles and construction workers traveling to and from FGGM could result in significant short-term impacts to transportation systems. FGGM will work with DISA, HQINSCOM (parent command of the 902nd MI GP), and with local transportation officials to adjust construction work hours, access roads and FGGM access gates to minimize the impact of on- and off-post transportation systems by construction vehicles.

Long-term environmental effects of the new 902nd MI GP facility will not be significant since the 902nd MI GP personnel on FGGM will occupy a new facility to be constructed on the same installation as the existing facility and in a previously developed area. The new facility will eliminate negative impacts to human health and the environment from existing substandard facilities. It will incorporate state of the art water and energy conservation fixtures and equipment and will utilize construction materials made from recycled material to the maximum extent possible. Because no relocation of personnel or unit missions will occur, there will be no significant socioeconomic impacts.

1.6 Mitigation of Short Term Environmental Impacts

Short-term environmental impacts will occur from construction at the site. Appropriate mitigation measures (see Section 8.0, Mitigation and Environmental Monitoring, to this document) will ensure that these environmental effects are minimal and temporary.

1.7 Construction Timeline

If approved, this will be a two-phase project. The phases are scoped such that the two buildings are connected in a secure manner but each could function as a stand alone building for another purpose in the event that only one project is funded. Construction during the first phase will take place from about March 2008 to September 2009. Phase 1 of this project (Project No. 68172) will cost about $42M and will build 128,257 GSF (39,093 GSM). The second phase, to be constructed at a future date (2015 or later), is estimated to cost $70M and builds 291,857 GSF (88,958 GSM).

Figure 1: Proposed new 902nd MI Group HQs Location, Fort Meade, Maryland

1.8 Comparison of Effects of Project Alternatives

The following table provides a summary of potential environmental effects of each alternative considered in this environmental assessment document.

Table 1: Comparison of Effects of Project Alternatives

Resource	Alternative 1: No action alternative – remain in existing facility	Alternative 2: Renovate/construct addition to existing facilities at Fort Meade, MD	Alternative 3: Lease facilities in the general vicinity of Fort Meade, MD	Alternative 4: Construct a new facility at another Defense installation	PROPOSED ACTION Alternative 5: Construct a new facility on Fort Meade
General Comparison	This is not a feasible alternative. The unit has been occupying three converted three-story brick buildings with full basement, and one concrete block one story building. The brick buildings were constructed for use as Army barracks in 1929 and 1940, one of which is failed due to smoke, fire and water damage. The concrete block building was constructed in 1990 as a SCIF. These four buildings are within the FGGM historic district. Continued use of these buildings is not feasible as these facilities cannot support additional new personnel and new communications infrastructure requirements.	By memo dated 24 October 2000, FGGM real property/master planning personnel indicated that all avenues to identify suitable existing facilities on FGGM to meet unit requirements as contained on DA Form 1450 have been exhausted. Since there are no suitable permanent facilities available for consolidation or renovation, this alternative is considered infeasible.	Due to the highly classified nature of the unit's mission, commercial facilities provide neither adequate nor economical security arrangements. This alternative is also considered infeasible.	The closest military installations to FGGM are Bolling AFB, Washington, D.C. and Andrews AFB, Maryland. Both installations are located approximately 30 miles distant in the congested D.C metropolitan area, with commuting time typically 45 minutes or more. For reasons of management and supervision described in Alternative 3, this alternative is not feasible. Unnecessary transportation of classified materials and equipment is also highly undesirable. From an environmental standpoint, this is a poor choice since it increases the daily mileage driven by Group personnel, adding to the severe ozone levels in the region.	This alternative is the most feasible, cost effective alternative. It is the preferred alternative because: • It utilizes a previously developed area, eliminating the need to remove trees and vegetative soil cover. • It moves personnel out of old facilities and infrastructure that negatively impact human health and the environment. • It results in construction of environmentally sustainable, energy efficient facilities.
Topography, Geology, and Soils	Status quo. No new impacts to topography, geology, or soils.	Potential to impact topography, geology, or soils in order to construct building additions within space-constrained areas. Significant site grading and cut/fill could be required for buildings, parking areas, and infrastructure.	No impact to topography, geology, or soils.	Potential to impact topography, geology, or soils due to space constraints at the other proposed installations. Significant site grading and cut/fill could be required for buildings, parking areas, and infrastructure.	Apart from minor landscaping, the proposed project will not change the topography of the site. The geology of FGGM will not be impacted. Soils have been impacted by previous construction and demolition, and consist primarily of engineered fill material. Possible erosion and sedimentation during construction will be mitigated.

Table 1: Comparison of Effects of Project Alternatives (continued)

Resource	Alternative 1: No action alternative – remain in existing facility	Alternative 2: Renovate/construct addition to existing facilities at Fort Meade, MD	Alternative 3: Lease facilities in the general vicinity of Fort Meade, MD	Alternative 4: Construct a new facility at another Defense installation	PROPOSED ACTION Alternative 5: Construct a new facility on Fort Meade
Vegetation, Wildlife and Aquatic Life	Status quo. No new potential to impact vegetation, wildlife, or aquatic life.	Potential to impact vegetation, wildlife, or aquatic life in order to construct facilities within space-constrained areas. Existing forested and grassy areas would be impacted by construction of buildings, parking areas, and infrastructure.	No potential to impact vegetation, wildlife, or aquatic life.	Potential to impact vegetation, wildlife, or aquatic life due to space constraints at the other proposed installations. Existing forested and grassy areas would be impacted by construction of buildings, parking areas, and infrastructure.	Minimal impacts to vegetative resources. The proposed new facility will be constructed in a previously developed area. Some mature trees on the site will need to be felled. New trees will be planted per provisions of the FGGM reforestation plan. No rare, threatened or endangered plant species occur in or near the proposed project area. No surface waterways are located on the proposed site. Erosion, sedimentation, and storm water will be controlled to prevent indirect impacts to aquatic species. Runoff from the project site will be controlled by both construction-phase and permanent BMPs.
Hydrology, Water Quality and Wetlands	Status quo. No new potential to impact hydrology, water quality, or wetlands.	Potential to impact hydrology, water quality, or wetlands in order to construct facilities within space-constrained areas. Construction of new buildings, parking areas, and storm water systems will increase surface water runoff to drainage systems and receiving surface waters.	No potential to impact hydrology, water quality, or wetlands.	Potential to impact hydrology, water quality, or wetlands due to space constraints at the other proposed installations. Construction of new buildings, parking areas, and storm water systems will increase surface water runoff to drainage systems and receiving surface waters.	No significant impacts to surface water from the proposed project. No lakes or ponds are on the proposed project site. A buffer of trees, vegetation and new storm water pond will protect Franklin Branch and wetlands east of the project site. Site grading will not alter the existing surface water hydrology. Construction-phase and permanent storm water BMPs will protect aquatic life in Franklin Branch and Burba Lake downstream.

Table 1: Comparison of Effects of Project Alternatives (continued)

Resource	Alternative 1: No action alternative – remain in existing facility	Alternative 2: Renovate/construct addition to existing facilities at Fort Meade, MD	Alternative 3: Lease facilities in the general vicinity of Fort Meade, MD	Alternative 4: Construct a new facility at another Defense installation	PROPOSED ACTION Alternative 5: Construct a new facility on Fort Meade
Climate and Air Quality	Status quo. No new potential to impact climate or air quality.	No potential to increase impacts climate or air quality.	No potential to impact climate or air quality.	Potential to impact climate or air quality. The proposed installations are in non-attainment air emissions regions. Increased emissions from new facilities and increased transportation requirements could exceed *de minimus* levels.	The proposed facility will not use structures, chemicals, or thermal pollution that would impact the climate. Short-term and long-term impacts to air quality will be *de minimus*. Facility will not have any significant air emissions producing equipment that changes the Installation's Synthetic Minor Air Permit status.
Noise	Status quo. No new potential to impact noise.	There will be short-term impacts from noise resulting from use of machinery for construction-related activities, but these will be mitigated. There will be no long-term noise impacts.	There will be short-term impacts from noise resulting from use of machinery for construction-related activities, but these will be mitigated. There will be no long-term noise impacts.	There will be short-term impacts from noise resulting from use of machinery for construction-related activities, but these will be mitigated. There will be no long-term noise impacts.	There will be short-term impacts from noise resulting from use of machinery for construction-related activities, but these will be mitigated. Emergency generators will There will be no long-term noise impacts.
Socioeconomics and Land Use	Status quo. No new potential to impact socioeconomics or land use.	Potential to impact land use in order to construct facilities within space-constrained areas.	No potential to impact socioeconomics or land use.	Potential to impact socioeconomics or land use due to high-density population areas on and near the proposed installations.	Short-term socioeconomic impacts will not be significant since construction of this facility will not result in an influx of construction-related businesses and workers to the region. There will be no long-term socioeconomic impacts since the same employees at the existing facility will occupy the new one. There will be no changes to land use. The proposed project is consistent with land use and development in the FGGM Master Plan.

Table 1: Comparison of Effects of Project Alternatives (continued)

Resource	Alternative 1: No action alternative – remain in existing facility	Alternative 2: Renovate/construct addition to existing facilities at Fort Meade, MD	Alternative 3: Lease facilities in the general vicinity of Fort Meade, MD	Alternative 4: Construct a new facility at another Defense installation	PROPOSED ACTION Alternative 5: Construct a new facility on Fort Meade
Environmental Justice	Status quo. No new potential to Environmental Justice.	No potential to impact Environmental Justice.	No potential to impact Environmental Justice.	Potential to impact Environmental Justice due to space constraints at the other proposed installations.	No minority or low-income communities will be impacted; there will be no relocation of personnel out of or into the FGGM area. No minority or low-income communities are located on or near the proposed site.
Utilities: Sewer	Status quo. No new potential to impact sewer utilities infrastructure.	Potential to impact sewer utilities infrastructure in order to construct facilities within space-constrained areas.	No potential to impact sewer utilities infrastructure.	Potential to impact sewer utilities infrastructure due to constraints of sewer infrastructure at the other proposed installations.	Existing sewage collection and treatment systems can accommodate the proposed facility. Wastewater will decrease as a result of water-conserving fixtures in the new facility and a decrease in infiltration and inflow after removal of old sewer pipes.
Utilities: Storm water	Status quo. No new potential to impact storm water quality and quantity.	Potential to impact storm water quality and quantity in order to construct facilities within space-constrained areas. Construction of new buildings, parking areas, and storm water systems existing built-up areas will increase surface water runoff to drainage systems and receiving surface waters.	No potential to impact storm water quality and quantity.	Potential to impact storm water quality and quantity due at the other proposed installations. Construction of new buildings, parking areas, and storm water systems will increase surface water runoff to drainage systems and receiving surface waters.	Short-term construction impacts to storm water will not be significant and will be mitigated. Long-term storm water quality should improve due to the use of storm water Best Management Practices (BMPs). There will be only a slight increase of impervious surfaces associated with the proposed project. The demolition of existing facilities and return of those sites to grassy areas would result in a slight decrease in pervious areas installation wide, resulting in no net increase in storm water.

Table 1: Comparison of Effects of Project Alternatives (continued)

Resource	Alternative 1: No action alternative – remain in existing facility	Alternative 2: Renovate/construct addition to existing facilities at Fort Meade, MD	Alternative 3: Lease facilities in the general vicinity of Fort Meade, MD	Alternative 4: Construct a new facility at another Defense installation	PROPOSED ACTION Alternative 5: Construct a new facility on Fort Meade
Utilities: Solid Waste	Status quo. No new potential to impact solid waste utilities infrastructure.	No potential to impact solid waste utilities infrastructure.	No potential to impact solid waste utilities infrastructure.	Some potential to impact solid waste management systems at the other proposed installations. The proposed facility would increase waste generation at the other installations, requiring increased solid waste disposal transportation requirements in high-density urban areas.	No significant impacts from the generation or disposal of solid waste. Solid waste generation would increase as construction and demolition (C&D) debris from the existing buildings and asphalt parking areas are disposed. Long-term solid waste generation for the existing facility should not increase from current generation rates. Periodic pollution prevention opportunity assessments will identify opportunities for source reduction.
Utilities: Electric	Status quo. No new potential to impact electric utilities infrastructure.	Potential to impact electric utilities infrastructure in order to construct facilities within space-constrained areas. New power lines, transformers, and related electrical systems may be required.	No potential to impact electric utilities infrastructure.	Potential to impact electric utilities infrastructure due to constraints of electric utilities at the other proposed installations. New power lines, transformers, and related electrical systems may be required.	No adverse impacts from electricity consumption since post-construction power consumption should decrease slightly from current usage. The existing electrical distribution system can accommodate the proposed facility. The new facility will increase use of natural lighting, energy efficient lighting, computerized power management systems, and the possible use of geothermal heating and cooling and/or solar energy (photovoltaic) panels to reduce energy consumption.

Table 1: Comparison of Effects of Project Alternatives (continued)

Resource	Alternative 1: No action alternative – remain in existing facility	Alternative 2: Renovate/construct addition to existing facilities at Fort Meade, MD	Alternative 3: Lease facilities in the general vicinity of Fort Meade, MD	Alternative 4: Construct a new facility at another Defense installation	PROPOSED ACTION Alternative 5: Construct a new facility on Fort Meade
Utilities: Natural Gas	Status quo. No new potential to impact natural gas utilities infrastructure.	Potential to impact natural gas utilities infrastructure in order to construct facilities within space-constrained areas. New gas lines and related natural gas systems may be required.	No potential to impact natural gas utilities infrastructure.	Potential to impact natural gas utilities infrastructure due to constraints of natural gas utilities at the other proposed installations. New gas lines and related natural gas systems may be required.	No adverse impacts from the use of natural gas by the proposed facility. The natural gas distribution system is adequate for the proposed facility and FGGM. Use of natural gas rather than diesel fuel or coal for the hot water generators and boilers will reduce air pollutants discharged to the atmosphere.
Utilities: Telecommunications	Status quo. No new potential to impact telecommunications utilities infrastructure.	Potential to impact telecommunications utilities infrastructure in order to construct facilities within existing built-up areas. New telecommunications lines and related systems may be required.	No potential to impact telecommunications utilities infrastructure.	Potential to impact telecommunications utilities infrastructure due to constraints of telecommunications utilities at the other proposed installations. New telecommunications lines and related systems may be required.	No adverse impacts to the telecommunication infrastructure. The existing telecommunication service is adequate for the proposed facility.

Table 1: Comparison of Effects of Project Alternatives (continued)

Resource	Alternative 1: No action alternative – remain in existing facility	Alternative 2: Renovate/construct addition to existing facilities at Fort Meade, MD	Alternative 3: Lease facilities in the general vicinity of Fort Meade, MD	Alternative 4: Construct a new facility at another Defense installation	PROPOSED ACTION Alternative 5: Construct a new facility on Fort Meade
Utilities: Potable Water	Status quo. No new potential to impact potable water utilities infrastructure.	Potential to impact potable water utilities infrastructure in order to construct facilities within existing built-up areas. New potable water lines and related systems may be required.	No potential to impact potable water utilities infrastructure.	Potential to impact potable water utilities infrastructure due to constraints of potable water utilities at the other proposed installations. New potable water lines and related systems may be required.	Additional potable water will be required for mixing of cement, mortar, washing, and dust suppression during the construction phase. However, this usage is well within the capabilities of the existing water supply, treatment, and distribution infrastructure. Long-range potable water requirements should remain the same as the current facility, with a potential decrease in water consumption due to the installation of water-saving fixtures. Consequently, there will be no long-term adverse impacts to the local drinking water system.
Traffic and Transportation	Status quo. No new potential to impact traffic and transportation.	Potential to impact traffic and transportation in order to construct facilities within space-constrained areas. New or expanded access roads and related traffic control systems may be required.	Some increase in potential to impact traffic and transportation on- and off-post due to increased travel between off-post leased facilities and on-post headquarters.	Potential to impact traffic and transportation infrastructure due to congestion of road networks at the other proposed installations. New or expanded access roads and related traffic control systems may be required.	Short-term impacts to traffic will result from construction vehicle traffic. There will be no increase of employees from the proposed project, thus no long-term increase in traffic or traffic patterns.

Table 1: Comparison of Effects of Project Alternatives (continued)

Resource	Alternative 1: No action alternative – remain in existing facility	Alternative 2: Renovate/construct addition to existing facilities at Fort Meade, MD	Alternative 3: Lease facilities in the general vicinity of Fort Meade, MD	Alternative 4: Construct a new facility at another Defense installation	PROPOSED ACTION Alternative 5: Construct a new facility on Fort Meade
Hazardous Materials and Hazardous Waste	Status quo. No new potential to impact hazardous or hazardous waste management.	Some potential to increase hazardous material and hazardous waste incidents. Locating the proposed facility in an existing built-up area is less preferable than transporting, handling, and storing hazardous materials and hazardous wastes at a more isolated site.	No potential to impact hazardous or hazardous waste management.	Some potential to impact hazardous waste management at the other proposed installations. The proposed facility would increase hazardous material transportation, handling, and storage at the other installations. Hazardous waste generation, storage, transportation and disposal will also increase at the other installations, requiring increased hazardous waste disposal transportation through high-density urban areas.	No adverse impacts resulting from hazardous material usage or hazardous waste disposal. Minimal quantities of hazardous materials stored and used at the proposed facility (cleaning supplies, small quantities of cleaning solvents, small quantities paints and lacquers). Quantities of hazardous waste generated by the unit are minimal. Hazardous waste storage and disposal would be in accordance with FGGM waste disposal regulations.
Cultural Resources	Status quo. No new potential to impact cultural resources.	Potential to impact cultural resources in order to construct facilities within space-constrained areas. Further archaeological and historical resource surveys will be required.	No potential to impact cultural resources.	Potential to impact cultural resources at the other proposed installations. Further archaeological and historical resource surveys will be required.	A previously disturbed site (wood construction troop barracks) will be used for the new facility; surveys have already determined that there are no cultural resources at the site.
Cumulative Impacts	Status quo. No cumulative impacts to existing situation.	Not feasible to construct additions to existing facility.	Increased traffic due to increased transportation requirements to/from a new facility location and their HQs on FGGM; increased socioeconomic impacts in the vicinity of the leased facilities.	Will reduce impacts on FGGM but increase impacts to the receiving installations in urban areas; inadequate housing at the other installations and increased cost of living expenses.	Cumulative impacts due to pending BRAC actions, but minimal contribution since: 1) new facility will be built on a previously disturbed site; 2) no new personnel or missions will be relocated to/from FGGM.

2.0 INTRODUCTION

2.1 INSCOM Mission and Organization

The U.S. Army Intelligence and Security Command (INSCOM), a Major Army Command (MACOM), conducts dominant intelligence, security, and information operations for military commanders and national decision-makers. The INSCOM headquarters, located at Fort Belvoir, Virginia, commands units at over 180 locations worldwide, including four brigade-sized groups, a battalion, and one detachment. The 902nd Military (MI) Intelligence Group is an INSCOM unit that supports the vital, worldwide missions of major intelligence activities of the Army.

2.2 Project Overview

The proposed project consists of construction of a new 902nd MI Group Administrative and Operations Center. Five alternatives were considered: (1) no action alternative – remain in existing facilities, (2) renovate existing facilities at Fort George G. Meade (FGGM), (3) use other government facilities, (4) lease facilities in the general vicinity of FGGM, or (5) construct a new facility on FGGM.

2.3 Environmental Impact Assessment Process and Criteria

This environmental assessment document updates the previously prepared environmental assessment (EA) titled "Proposed 902nd Military Intelligence (MI) Group Administrative and Operations Center: Environmental Assessment" which was signed in 2003 following a 30-day public comment period. This revised EA, which addresses the same project on a new site, is a site-specific analysis of the potential effects of relocating the 902nd MI Group Administrative and Operations Center from its existing facilities to a proposed new facility to be constructed on Fort George G. Meade (hereafter "Fort Meade" or FGGM).

This Environmental Assessment (EA) has been prepared pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR Parts 1500-1508), and U.S. Army Regulation 200-2, *Environmental Effects of Army Actions* (AR 200-2; see also Figure 2, page 2-3 to this document). This EA has been prepared to determine whether the proposed action will have potentially significant effects on the environment, in which case a full Environmental Impact Statement (EIS) would need to be prepared, or whether the impacts of the proposed action after mitigation are less than significant, in which case a Finding of No Significant Impact (FONSI) may be prepared. The scoping process for this EA took into account user requirements, existing baseline data for FGGM, input from coordinating agencies, and on-site assessment of the affected environment, to include natural, cultural, and socioeconomic resources. This project conforms to the State Implementation Plan (SIP) for the State of Maryland in accordance with Section 176(c) of the Federal Clean Air Act Amendments.

2.4 Summary of Proposed Action

The U.S. Army Intelligence and Security Command (INSCOM) has identified a requirement to construct a new 902^{nd} MI Group Administrative and Operations Center. Current 902^{nd} MI Group operational and administrative activities are performed in three converted three-story brick buildings with full basement, and one concrete block one story building on FGGM, Maryland. The brick buildings were constructed for use as Army barracks in 1929 and 1940. The concrete block building was constructed in 1990 as a Sensitive Compartmented Information Facility (SCIF). The proposed new facility would occupy 420,114 Gross Square Feet, GSF (128,051 gross square meters, GSM) for the 902^{nd} MI Group Administrative and Operations Center, including a SCIF, associated parking, and anti-terrorism/force protection (AT/FP) measures. This project has been expedited as a portion of the existing structure was severely damaged in a fire that occurred on 20 October 2006. One of the 902^{nd} MI Group buildings, Building 4554, is in a failed condition due to fire and water damage sustained as a result of fire fighting operations. The fire destroyed a substantial portion of the 4th floor along with the entire roof and the office space contained in the attic. This facility would consolidate staff, subordinate, and supporting elements into a single facility with adequate circulation and infrastructure to support intelligence operations critical to national security.

2.5 Proposed Timeline for Construction

If approved, this will be a two-phase project. The phases are scoped such that the two buildings are connected in a secure manner but each could function as a stand alone building for another purpose in the event that only one project is funded. Construction during the first phase will take place from about March 2008 to September 2009. Phase 1 of this project (Project No. 68172) will cost about $42M and will build 128,257 GSF (39,093 GSM). The second phase, to be constructed at a future date (2015 or later), is estimated to cost $70M and builds 291,857 GSF (88,958 GSM).

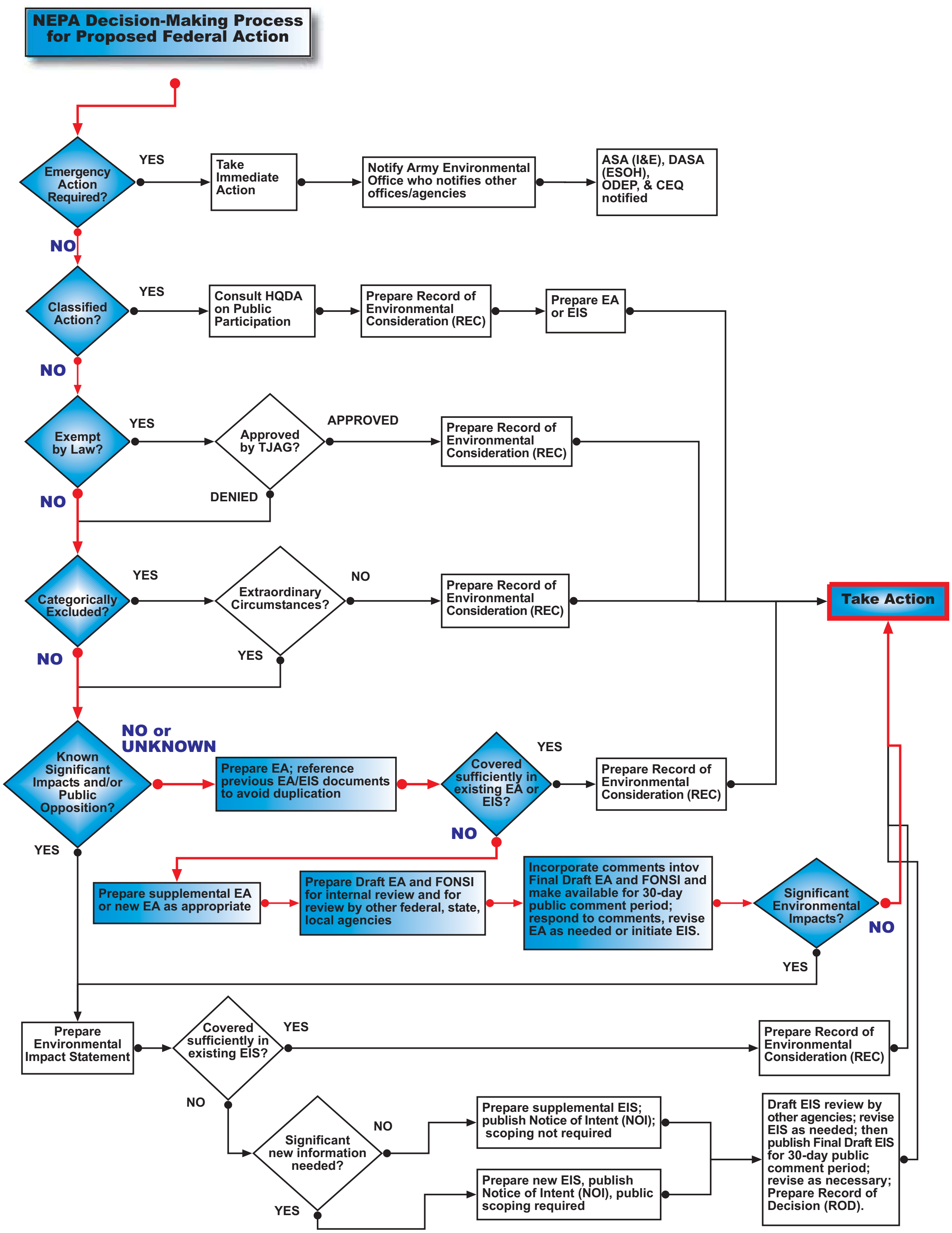

Figure 2: NEPA Decision-Making Process Flow Chart[1]

[1] Colored nodes indicate decision points and actions taken to prepare this environmental assessment.

3.0 DELINEATION OF NEED FOR PROJECT

3.1 Purpose of and Need for Proposed Action

3.1.1 Purpose of Proposed Action

The purpose of the proposed action is to provide an efficient, consolidated 902nd Military Intelligence Group Administrative and Operations Center with adequate work areas for personnel engaged in military intelligence activities critical to national security. Existing facilities are inadequate to support the new technologies and increased space requirements of the 902nd MI Group.

3.1.2 Need for Proposed Action

This project is vital to missions of major Army intelligence activities, including a new mission to support the 902nd MI Group. The 902nd MI Group provides multi-discipline counter-intelligence, force protection, electronic warfare, and information warfare support to Army, Joint, and Combined commanders. The proposed 902nd MI Group facility will be equipped to support the unit's 24 hour per day, seven days a week operations, which began after the terrorist attacks on September 11, 2001. The proposed facility includes space for support activities that work closely with the 902nd MI Group HQ and Operations Center. These include Foreign Counterintelligence Activity (FCA), Central Clearance Facility (CCF), G2 and G3 elements of the Intelligence and Security Command (INSCOM), and Department of Army Military Intelligence-Information Management (DAMI-IM).

3.2 Current Situation

The Military Intelligence Administrative and Operations Center was augmented with a new homeland defense activity shortly after September 11, 2001. These operations are currently hampered because unit personnel are split among multiple facilities inadequate to support the mission and mission equipment. The pending increase of personnel and associated missions will also require construction of new SCIF areas. Construction of additional SCIF space in existing facilities is practically cost prohibitive. The ability to perform critical upgrades to secure communication capabilities is also hindered in existing facilities.

Furthermore, this project has been expedited as a portion of the existing structure was severely damaged in a fire that occurred on 20 October 2006. One of the 902nd MI Group buildings, Building 4554, is in a failed condition due to fire and water damage sustained as a result of fire fighting operations. The fire destroyed a substantial portion of the 4th floor along with the entire roof and the office space contained in the attic. This masonry structure, constructed circa 1929, suffered extensive to the basement, second, third, fourth floors, roof structure and roofing. Sever smoke and water damaged was sustained throughout the building. All surfaces; walls, floors, ceilings have some degree of damage ranging from sever on the upper floors to heavy damage on the first floor. This facility is necessary for the 902nd MI Group to adequately meet the mission requirement.

The proposed action will provide for short term resolution of this shortfall with the construction of a facility in Fiscal Years (FY) 07-08 to accommodate personnel and mission space displaced by the fire. The remainder of the facility will be constructed some time after FY14 and will complete construction of this administrative and operations facility. Once completed, this facility will enhance mission performance and command and control, enabling the unit to conduct new and more sophisticated counter-intelligence and personnel missions using advanced technological systems.

All avenues have been exhausted to identify suitable existing permanent facilities on FGGM to meet 902nd MI Group facility requirements based on their DA Form 1450 listed space requirements. There are no other adequate facilities available to provide space for this operational and administrative mission.

Current operational and administrative activities are performed in three converted three-story brick buildings with full basement, and one concrete block one-story building. The brick buildings were constructed for use as Army barracks in 1929 and 1940. The concrete block building was constructed in 1990 as a SCIF. These four buildings are within the FGGM historic district. The three-story buildings were converted to administrative space and air-conditioned in 1971. Key constraints associated with these facilities include:

- The buildings are narrow, with a corridor running down the center of each floor, barracks rooms on each side, and concrete porches to the rear of each building.
- Many of the porches have been walled in to provide more operational space. The porches are sloped, placing people and equipment in an awkward, slightly leaning condition.
- Attics and basements, which were originally designed for storage and mechanical equipment, have also been converted to provide more operational space. In these areas, some ceilings and headroom are below minimum standards.
- Windows in two buildings have been bricked over to provide more secure space.
- Various areas have been converted and certified for SCIF operations in all three buildings, as required to support the mission. However, this has resulted in disjointed work spaces and blocked hallways, limiting operational capabilities. Indoor air quality is also adversely impacted by the disruption of design airflow of heating, ventilation, and air conditioning ductwork.
- While the three buildings have some limited internal access between each other, much of the circulation must go outside and re-enter through multiple entrances, all of which have to be guarded or otherwise secured with restricted access.

The following is a detailed list of the deficiencies in 902nd MI Group facilities:

- Infrastructure upgrades and facility modifications to meet tenant requirements have created a “labyrinth” complex that is inefficient, confusing, and difficult to navigate.
- Insufficient space results in crowded, substandard conditions. Operating out of three separate buildings results in inefficiencies and security risks as employees travel between facilities throughout the day, sometimes transporting classified materials.
- The awkward facility layout results in multiple entrances, increasing the number of military and civilian security personnel required to guard the facility.
- There is no direct route to go from one place to another. In numerous cases, access between offices on the same floor is through a different floor.

- SCIF space is fragmented throughout the facilities.
- Coordination between activities is made difficult by unclassified and classified communications infrastructure that is inefficient and difficult to maintain.
- Infrastructure is failing and does not meet current building construction, fire protection, or electrical code requirements.
- New and changing missions require new or modified equipment. The existing facilities and infrastructure are not adequate to support state-of-the-art mission equipment.
- There is no space to support recent increases in personnel.
  - Existing facilities and utility systems cannot support the activation of a 902nd MI Group activity.
  - The elements that comprise the 902nd MI Group HQ and Operations Center occupied 335,800 gross square feet (31,197 gross square meters) prior to the fire.
- Heating, ventilating, and air conditioning (HVAC) systems are inadequate and failing. Outdated and deteriorating HVAC systems cause insufficient ventilation and poor indoor air quality, resulting in numerous employee complaints.
- Indoor Air Quality (IAQ) is a concern in the existing buildings and is a source of employee complaints. The following deficiencies exist:
  - The existing HVAC system does not meet BOCA or American Society of Heating, Refrigerator, and Air Conditioning Engineers (ASHRAE) standards for supplying fresh outdoor air into the building.
  - The existing HVAC system dumps conditioned air into the ceiling plenum, pushing it through either slot diffusers or slots in the ceiling tile, causing:
    - The potential spread of toxic smoke throughout the facility if a fire were to occur above the ceiling, a serious life-safety fire code violation.
    - Increased air contamination as air travels through spaces that cannot be cleaned and which contain molds, mildew, asbestos tiles, and other unhealthy constituents.
    - Inadequate fresh air supply to locations distant from air handler units.
    - Inefficient, uneven heating and cooling throughout the building.
    - Unhealthy, uncomfortable work areas since the lack of individual room and space controls makes it impossible to provide adequate climate control in all work areas.
  - Existing ductwork is fabric-lined for soundproofing and is a potential source for dust, pollen, mites, molds, mildews, and other bacteriological contamination.
  - Bird droppings, nests and feathers are present in and near mechanical rooms and may be contributing to IAQ health problems. Annually, four to six bats infiltrate into the third and fourth floors through damaged and rotted soffits.
- Old underground grease traps in the sewer lines, (leftover from when mess halls were in use) are full and periodically back up in basement workshops during heavy rainfall.
- Asbestos Containing Material (ACM) has been identified in all three buildings, to include vinyl asbestos tiles, acoustical and ceiling panels, mastic (for ceiling and floor tiles), and pipe insulation. The cost of most facility repairs and renovations is increased 30 to 40% since ACM requires evacuation/seclusion of the immediate area and encapsulation or removal/disposal of the ACM. Complete abatement would be cost prohibitive and would all but shut down unit operations.
- Lead paint is present on handrails, walls, ceilings, doors, and windows. Costs of facility repairs or renovations are increased 30 to 40% because of lead-based paint present throughout the complex, requiring proper removal or encapsulation. It is not feasible to

remove all lead-based paint since nearly all of the facility (walls, ceilings, baseboards, stairwell railings, structural steel, steel caging) is coated with lead-based paint.

- Old galvanized water pipes that service existing facilities are subject to severe rust, corrosion, and obstruction. Leaking underground pipe joints can result in contaminated water supply, particularly if surrounding soils are contaminated. Consequently, filtered drinking water fountains have been installed.
- Old polychlorinated biphenyl (PCB)-containing fluorescent lamps have been abandoned in place above dropped ceilings. Were a fire to occur, the abandoned PCB ballasts present an increased threat to human health and release of contaminants to the environment.
- Multiple utility upgrades have been piecemealed throughout the years to meet requirements for new operational missions.
  - Portions of utilities are old and deteriorating rapidly, requiring considerable resources and effort to keep running.
    - The HVAC system in each building is antiquated and beyond repair.
    - A hot water boiler heats through radiators and cooling is accomplished through a forced air supply in the plenum in ceilings.
    - Mildew is in ductwork throughout the complex.
    - Older systems have difficulty achieving the newer ASHRAE standards.
    - Air circulation is difficult to balance throughout the buildings, resulting in some areas that are too hot or too cold, jeopardizing sensitive electronic equipment, loss of critical mission data, and exposing personnel to uncomfortable working conditions.
  - The sanitary sewer system has failed.
    - Lead and oakum joints are dried out and leak.
    - Old sanitary pipes are clogged and beyond repair.
    - Grease traps, used when mess halls were part of the original barracks complex, have been abandoned in place. In wet weather sewage backs up into basements from the clogged traps.
  - Ground water seeps into basements.
- Efforts have been made to install and/or repair the fire alarm system for the Complex, but the system does not function as a fully integrated system.
  - Response teams cannot determine where in the Complex an alarm was initiated.
  - Basements are not wired with alarms, so persons working in basements are not alerted when an alarm is activated.
  - Sprinkler systems are not within National Fire Protection Association (NFPA) codes for windowless buildings.
  - Fire egress routes are insufficient and exceed the distance limitations in accordance with life safety codes.
- All buildings need major roof repairs. Gaps in roofs and soffits have allowed the attics to become homes for birds and bats.
- The 4500 Complex (4552, 4553, 4554, and 4555) does not meet Americans with Disabilities Act (ADA) requirements for the disabled/handicapped.
  - There is one elevator which does not provide ADA access to all the facilities in the four buildings.
  - Renovations have made entrances/exits in all buildings handicapped accessible, but access continues to be difficult and barriers continue to exist within the buildings.

3.3 Impact if Not Provided

Specific impacts if this project is not approved include:

- Lack of space needed to activate the 902^{nd} MI Group Administrative and Operations Center.
- Advanced, state-of-the-art technical mission systems will be subject to failure for lack of infrastructure capacity (i.e., electrical, HVAC), or may not be capable of being installed.
- Some 902^{nd} MI operation will continue to be suspended for the portion of their activity damaged by fire.
- Mission accomplishment will be jeopardized as existing inadequate facilities continue to deteriorate.
- The 902^{nd} Military Intelligence Group will be unable to field state-of-the-art technical mission systems/upgrades; operational systems will fail due to lack of reliable infrastructure capacity.
- Access to work spaces for handicapped personnel in even more space-constrained facilities will be expensive and nearly impossible to achieve.
- Continued unhealthy conditions, lost man-hours, and potential long-term health effects.
    - Indoor air quality will worsen as presently cramped space is altered to fit new missions and associated technologies.
    - Further modifications to facilities containing asbestos and lead-based paint will:
        - Increase health and safety risks from accidental exposure to these contaminants.
        - Increase loss of man-hours and limit some missions as portions of the facility are closed down during facility renovations to prevent accidental exposure.
- Increased expenditure of funds to maintain facilities and infrastructure that have exceeded their useful life cycle.
    - Increased demand on aging HVAC and utility systems will increase outages and associated maintenance costs.
    - Installation of new HVAC, communications, and utilities to accommodate increasingly sophisticated mission equipment will be cost prohibitive in the converted, pre-World War II barracks currently occupied by the unit.
    - Continued unsafe conditions due to electrical, mechanical, and fire safety violations.

3.4 Other Considerations

The following is a list of Code and Regulatory violations that need be corrected by means of facility renovation or construction of the proposed facility:

- National Electrical Code (NEC) wiring violations throughout the facility.
- ASHRAE violations in the number of air changes and in the function and layout of existing heating, ventilation, and air conditioning systems.
- Plumbing code violations.
- NFPA code violations due to the lack of a sprinkler system and lack of adequate protected egress routes.

4.0 DESCRIPTION OF PROPOSED PROJECT

4.1 Project Intent

The intent of this project is to provide new or renovated facilities that enable the 902nd Military Intelligence Group and Operations Center to meet its new and increasing mission requirements and to replace facilities destroyed in the October 2006 fire.

4.2 Project Requirements

The proposed facilities must:

- Meet the increased space requirements of the 902nd Military Intelligence Group Administrative and Operations Center.
- Be capable of incorporating new intelligence systems and communications systems.
- Provide special work areas suitable to military intelligence activities.
- Comply with FGGM Installation Design Guidelines (IDGs).
- Incorporate raised flooring throughout the facility to allow for flexibility in reconfiguring work areas, communications, and power to meet current and future mission requirements.
- Incorporate sustainable design concepts in accordance with federal Executive Order 13123 (June 3, 1999), "Greening the Government through Efficient Energy Management," to include:
  - Optimize site potential
  - Reduce energy demand and minimize nonrenewable energy consumption
  - Use environmentally friendly products
  - Protect and conserve water
  - Enhance indoor air and environmental quality
  - Optimize operational and maintenance practices

The proposed project will consist of two phases:

- Phase 1: Fiscal Year 2007 (Project Number 68172) builds 128,257 GSF (39,093 GSM)
- Phase 2: Fiscal Year 2014+ (Project Number 58726) builds 291,857 GSF (88,958 GSM) and includes an atrium to join both buildings.

4.3 Other Supporting Facilities

The following supporting facilities are also included in this project:

- Electric, water, sewer, and gas service to the site
- Mechanical, electrical, fire protection systems
- Storm water drainage and Best Management Practice (BMP) systems
- Site improvements
- Intrusion Detection System (IDS)
- ADA-compliant handicap access and facilities
- Heating and air conditioning (1,600 tons refrigeration capacity)
- Antiterrorism/Force Protection

4.4 Alternatives

The following five alternatives were evaluated:

1. No action alternative – remain in existing facilities
2. Renovate/construct addition to existing facilities at FGGM
3. Use other government facilities
4. Lease off-post facilities in the general vicinity of FGGM
5. Construct a new facility on FGGM

4.5 Evaluation of Alternatives

Alternative 5 is the preferred alternative. An in-depth evaluation of these alternatives is provided at Paragraph 7 to this document.

4.6 Location and Project Site Maps

FGGM encompasses approximately 5,067 acres and is a permanent US Army installation located in the northwest corner of Anne Arundel County, Maryland. The installation is located 17 miles southwest of downtown Baltimore, Maryland, and 24 miles northeast of Washington, DC. The city of Annapolis, which serves as both the Anne Arundel county seat and the Maryland State Capital, is approximately 14 miles southeast of the installation. The southeastern part of Howard County extends within 2 miles of FGGM. Figure 4 depicts the regional location of FGGM.

As shown in Figure 4, FGGM is bounded by the Baltimore-Washington Parkway (MD 295) to the northwest, Annapolis Road (MD 175) to the east, Patuxent Freeway (MD 32) to the south and west, and the MARC Penn Line and AMTRAK Line to the southeast. Other significant nearby transportation arteries include US Route 1 and Interstate 95, which run parallel to and just to the north of the Baltimore-Washington Parkway. Interstate 97, which connects Baltimore and Annapolis is located several miles east of FGGM and can be reached by taking MD 175 or MD 32 east.

The installation is predominately surrounded to the north, west, and east by residential areas, commercial centers, a mix of light industrial uses, and open space and undeveloped areas. Directly to the south of FGGM are the 12,750-acre Patuxent Wildlife Research Center and the Tipton Airport. To the southwest of FGGM is the 800 acre parcel that houses the District of Columbia (DC) Oak Hill juvenile detention facility.

Major regional geographic features include the Chesapeake Bay approximately 12 miles to the east and the Little Patuxent River that runs along a part of the southwest corner of the installation. Two of the river's tributaries, Midway Branch and Franklin Branch, also flow south through the FGGM. Fort Meade is a part of the Chesapeake Bay watershed.

Within the Fort Meade installation, there is a main administrative area, several Army family housing areas, the National Security Agency (NSA) complex, an industrial/maintenance area, the exchange mall complex, a 36 hole golf course, and the Kimbrough Ambulatory Care Center. In 1992, the 8,100-acre range and training area south of MD 32 was transferred to the Department of the Interior's U.S. Fish and Wildlife Service, as part of the first round of closures under the Defense Authorization Amendments and Base Closure Act of 1988 (Public Law 100-526) (Fort

Meade, 1999). This is currently a part of the Patuxent Wildlife Research Center. Tipton Airport is a former Army airfield designated for privatization under the Defense Authorization Amendments and Base Closure Act of 1988 (Public Law 100-526). The airport closed in 1995 and reopened November 1, 1999 and is operated today by the Tipton Airport Authority, which is a state-chartered public corporation. The 366-acre facility is bordered by FGGM and the Patuxent National Wildlife Refuge.

The proposed site for the new 902nd MI GP facility is located in an area bounded on the north by Mapes Road, on the south by Llewellyn Avenue, on the east by Ernie Pyle Street, and on the west by the Franklin Branch stream. This project is in accordance with the approved master plan and consistent with, but not part of, upcoming BRAC realignment actions for FGGM. The installation commander has approved the use of this site.

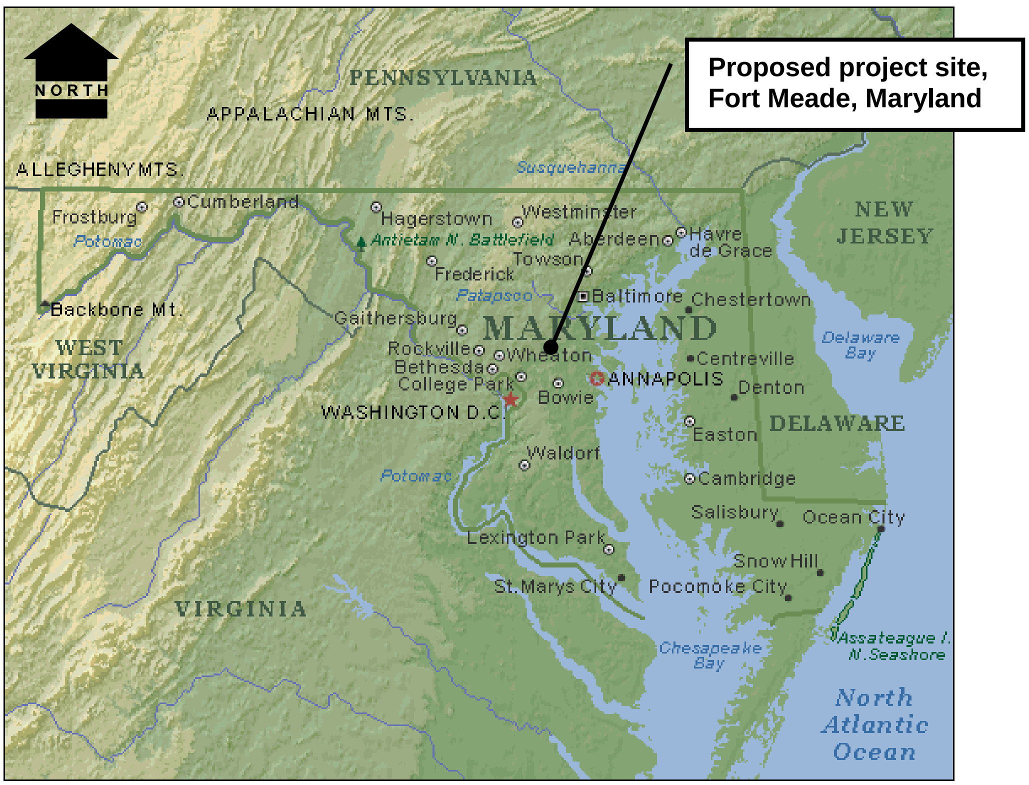

Figure 3: Location of Fort Meade, Maryland

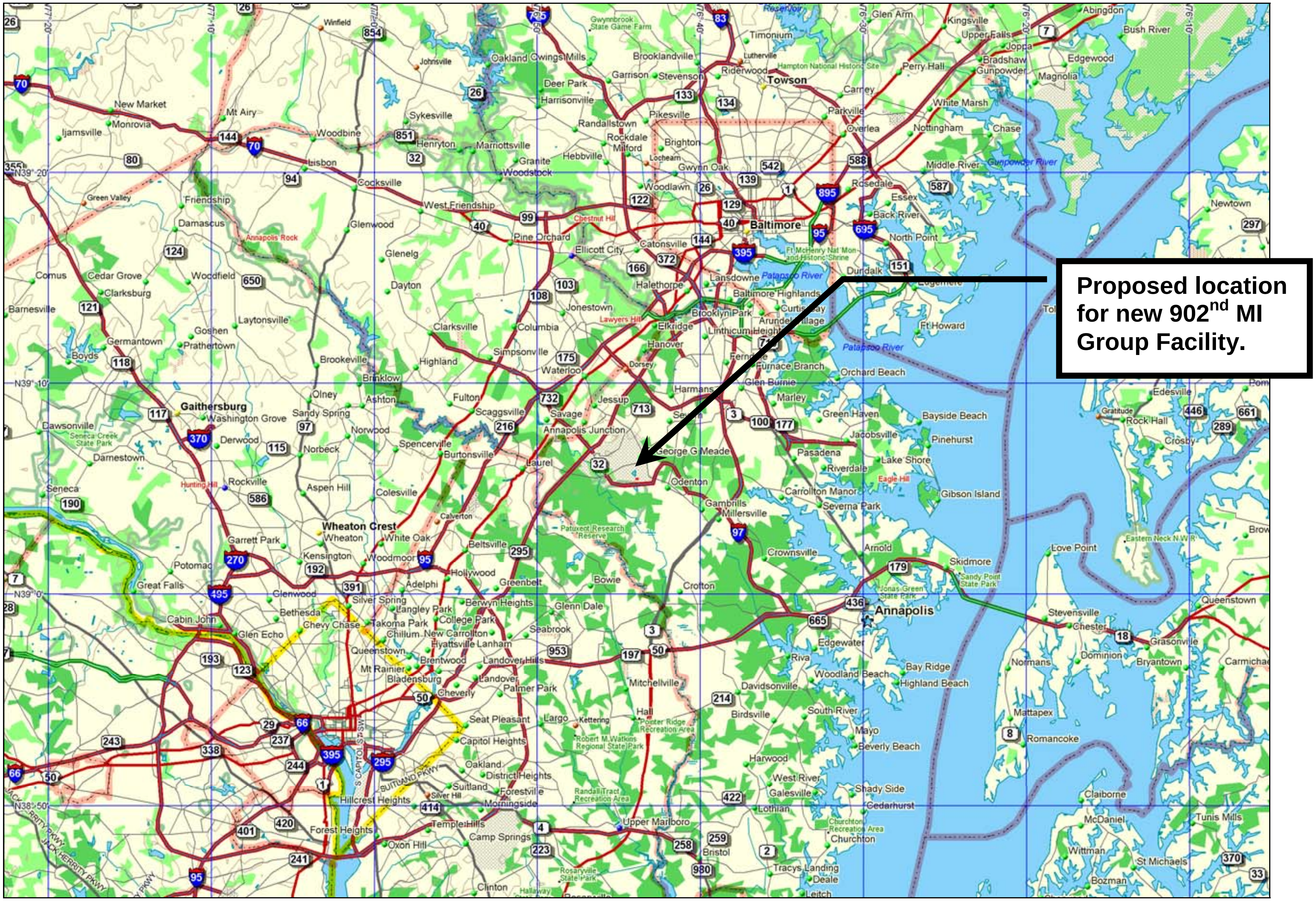

Figure 4: Vicinity Map - Fort Meade, Maryland

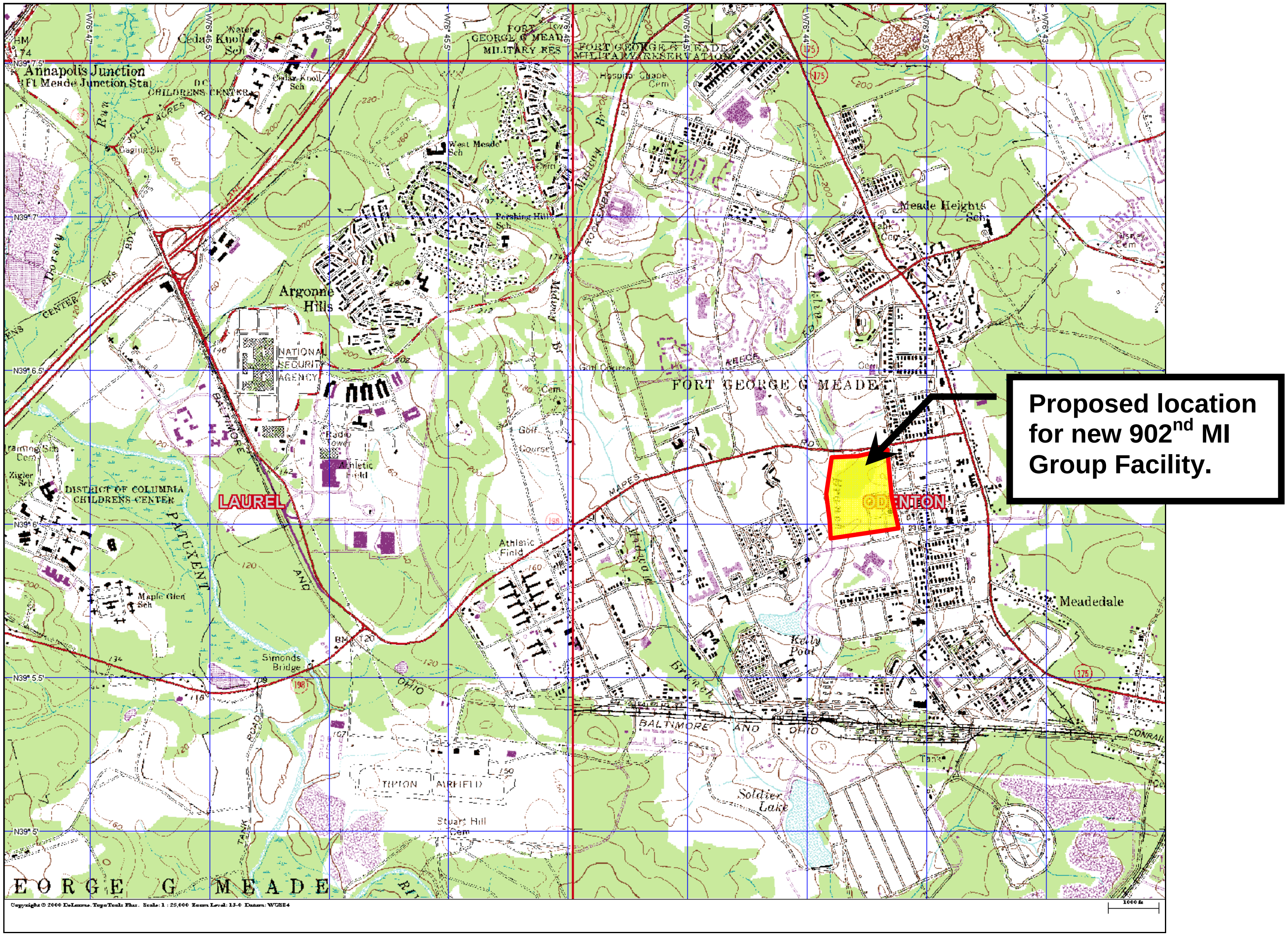

Figure 5: USGS 7.5' Quadrangle (Odenton) Map of Fort Meade

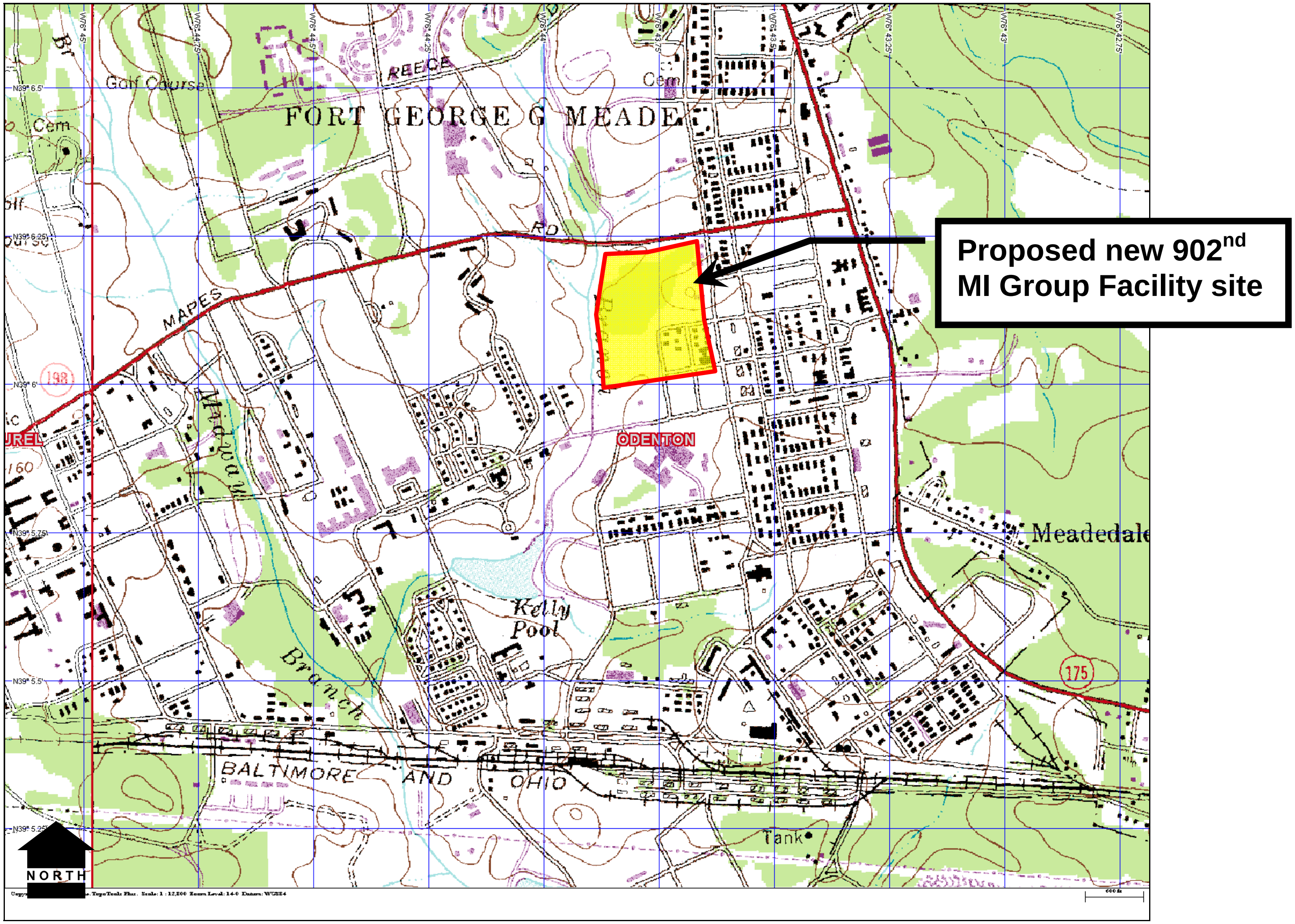

Figure 6: Topographic Map (USGS Quadrangle) of Proposed Project Site

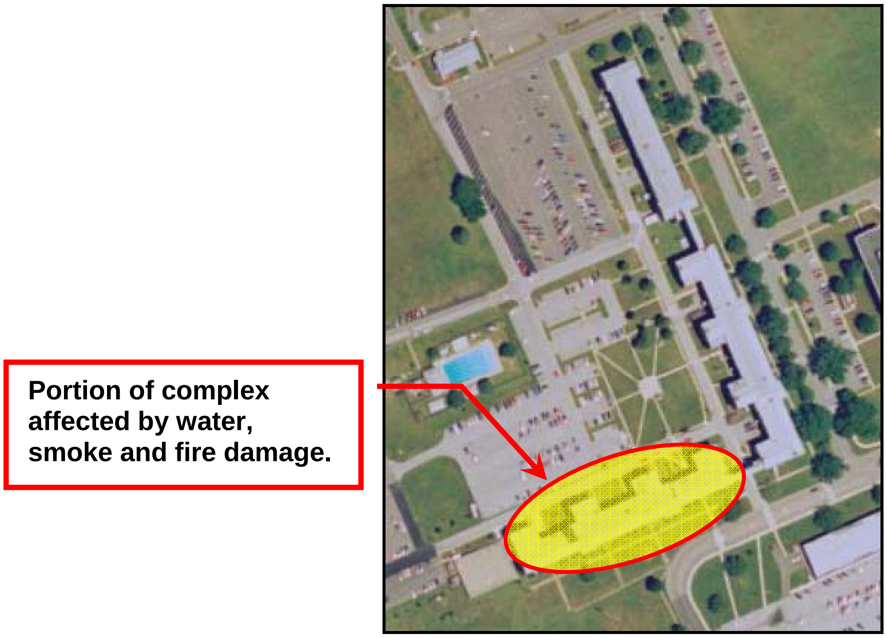

Figure 7: Aerial view of existing facilities destroyed in fire

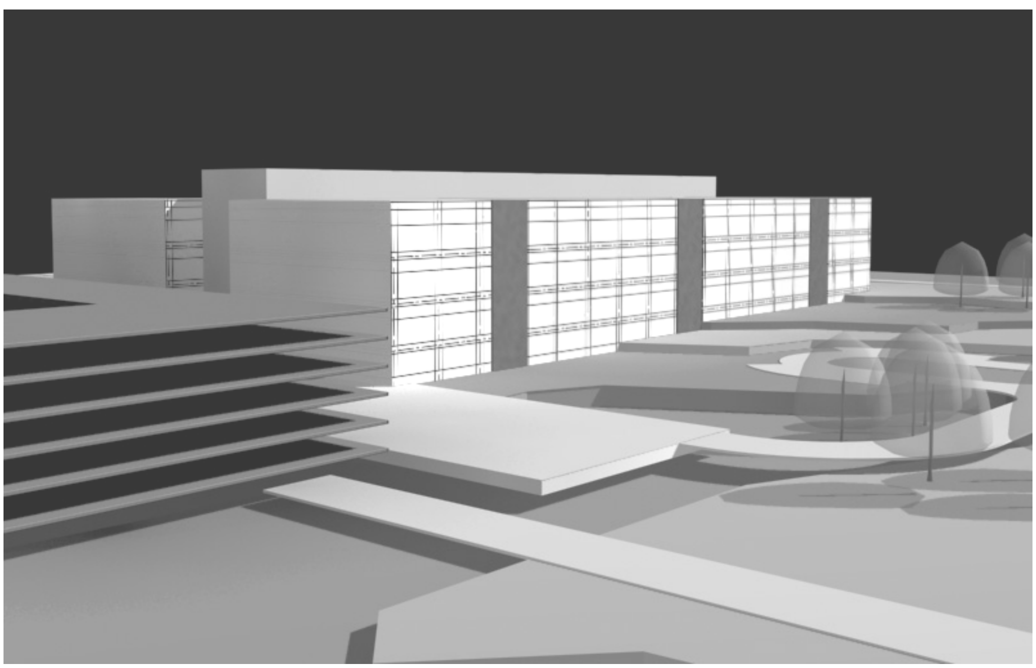

Figure 8: Computer rendering of proposed new facility (right) and parking garage (left)

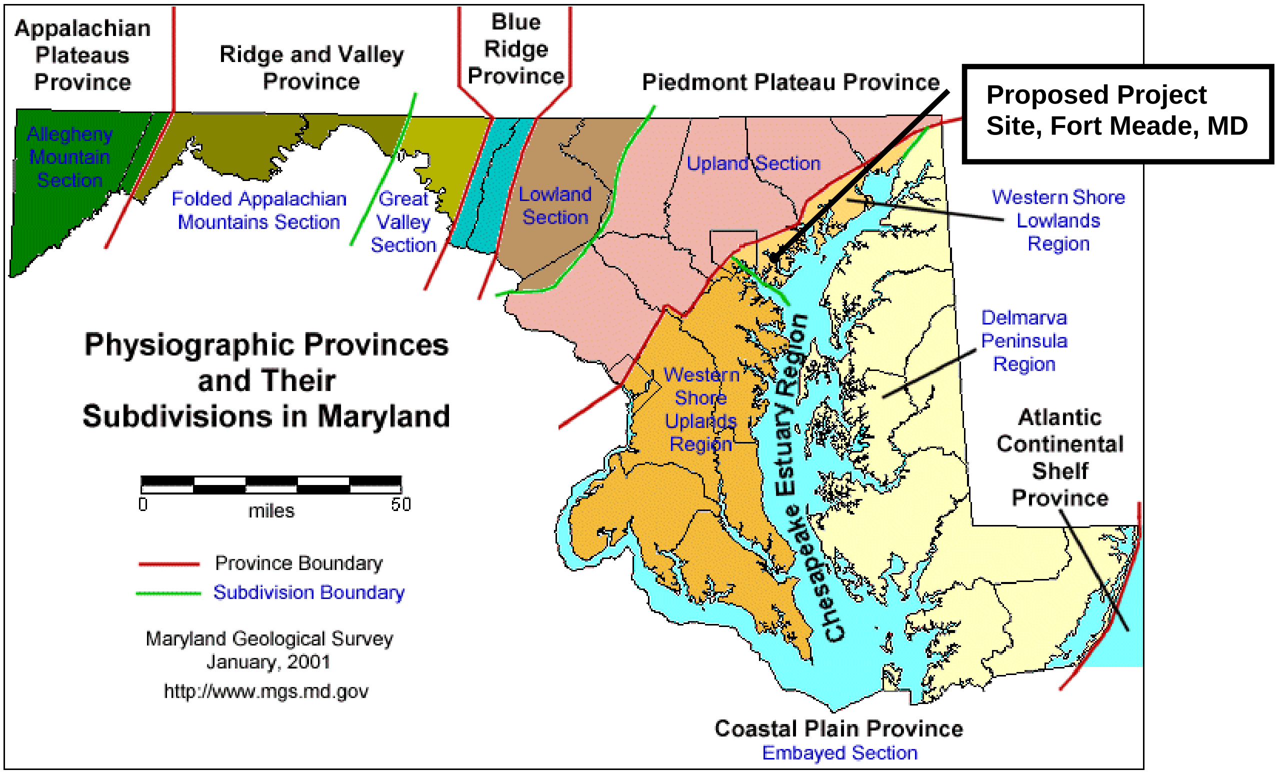

Figure 9: Physiographic Provinces of Maryland

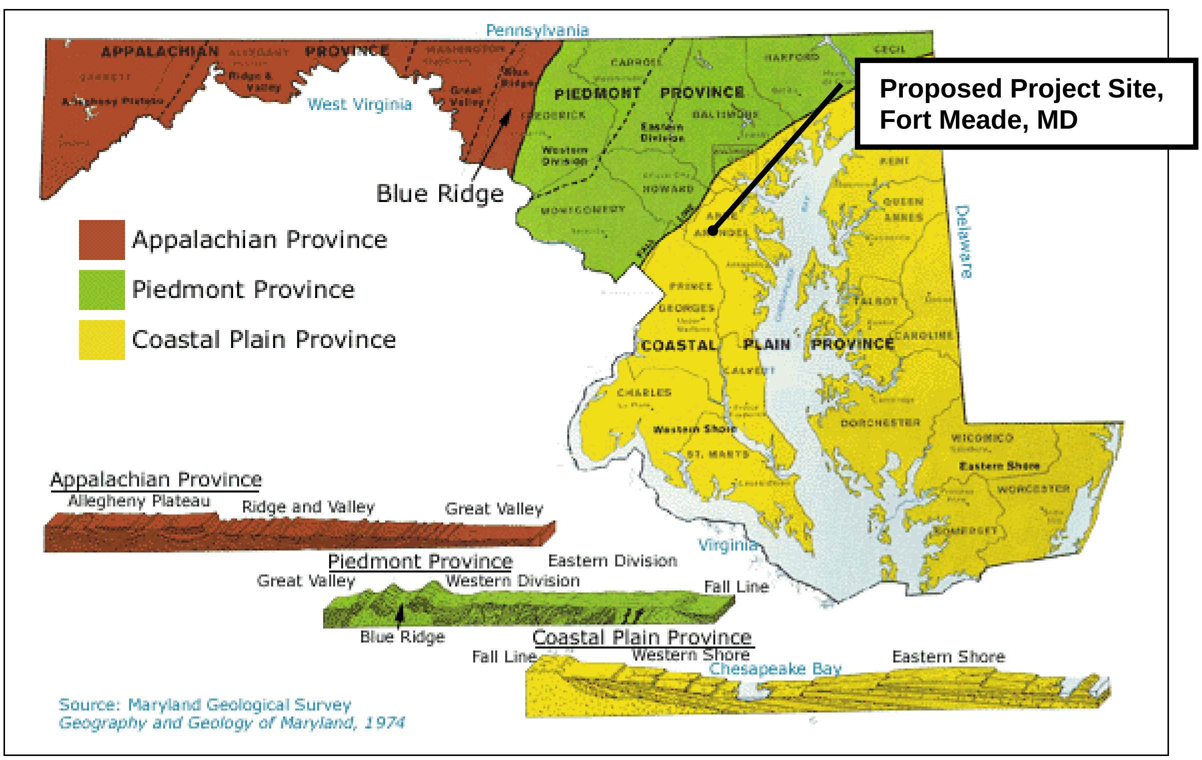

Figure 10: Geologic Cross-sections of Maryland Physiographic Provinces

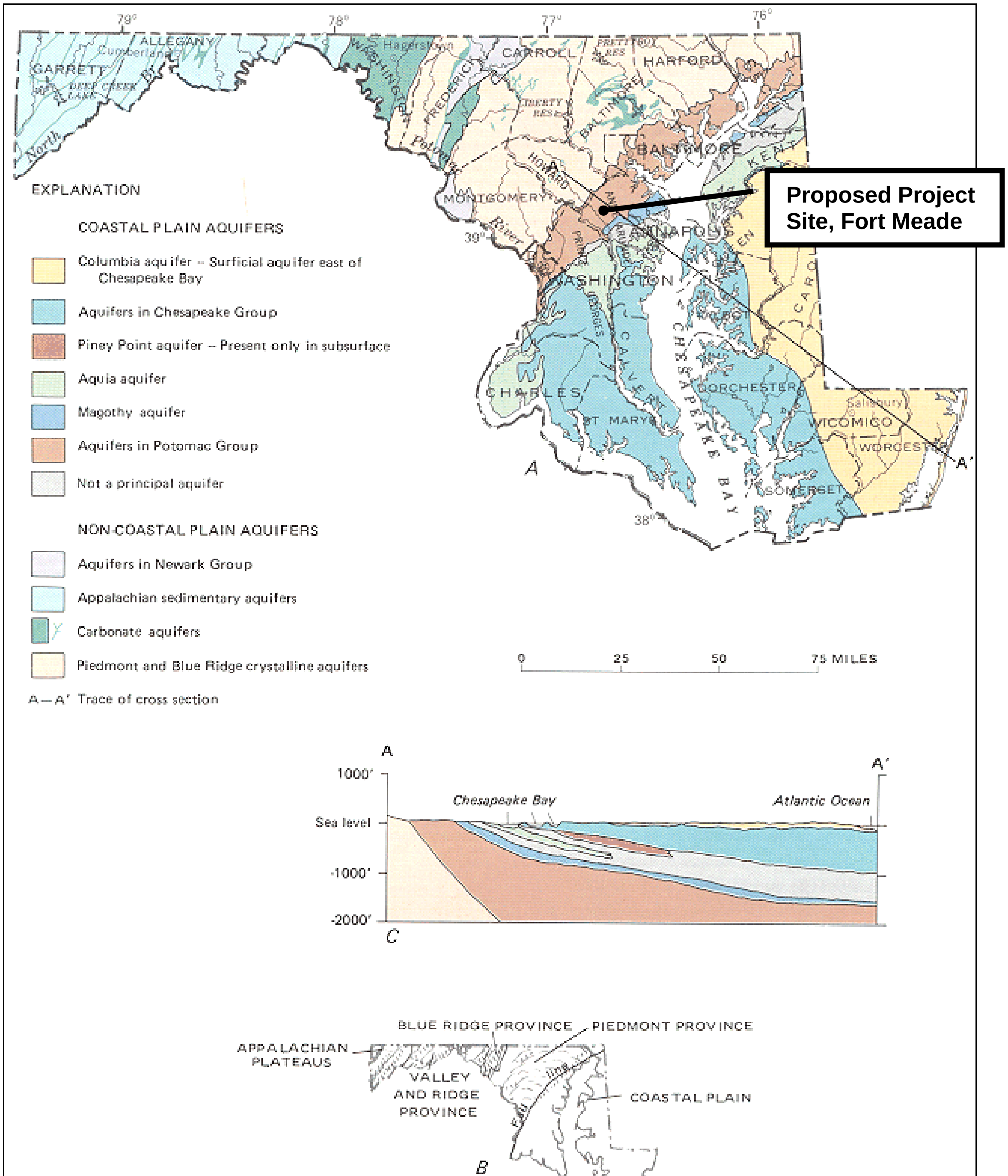

Figure 1. Principal aquifers in Maryland and the District of Columbia. *A*, Geographic distribution. *B*, Physiographic diagram and divisions. *C*, Generalized cross section (A-A'). (See table 2 for a more detailed description of the aquifers. Sources: *A*, Otton and Richardson, 1958; Maryland Geological Survey, 1967; Cleaves and others, 1968; and Hansen, 1972. *B*, Raisz, 1954. *C*, compiled by L. J. McGreevy from U.S. Geological Survey files.)

Figure 11: Principal Aquifers of Maryland

Source: http://www.usgs.gov (wsp-2275/md-dc-fig1.gif)

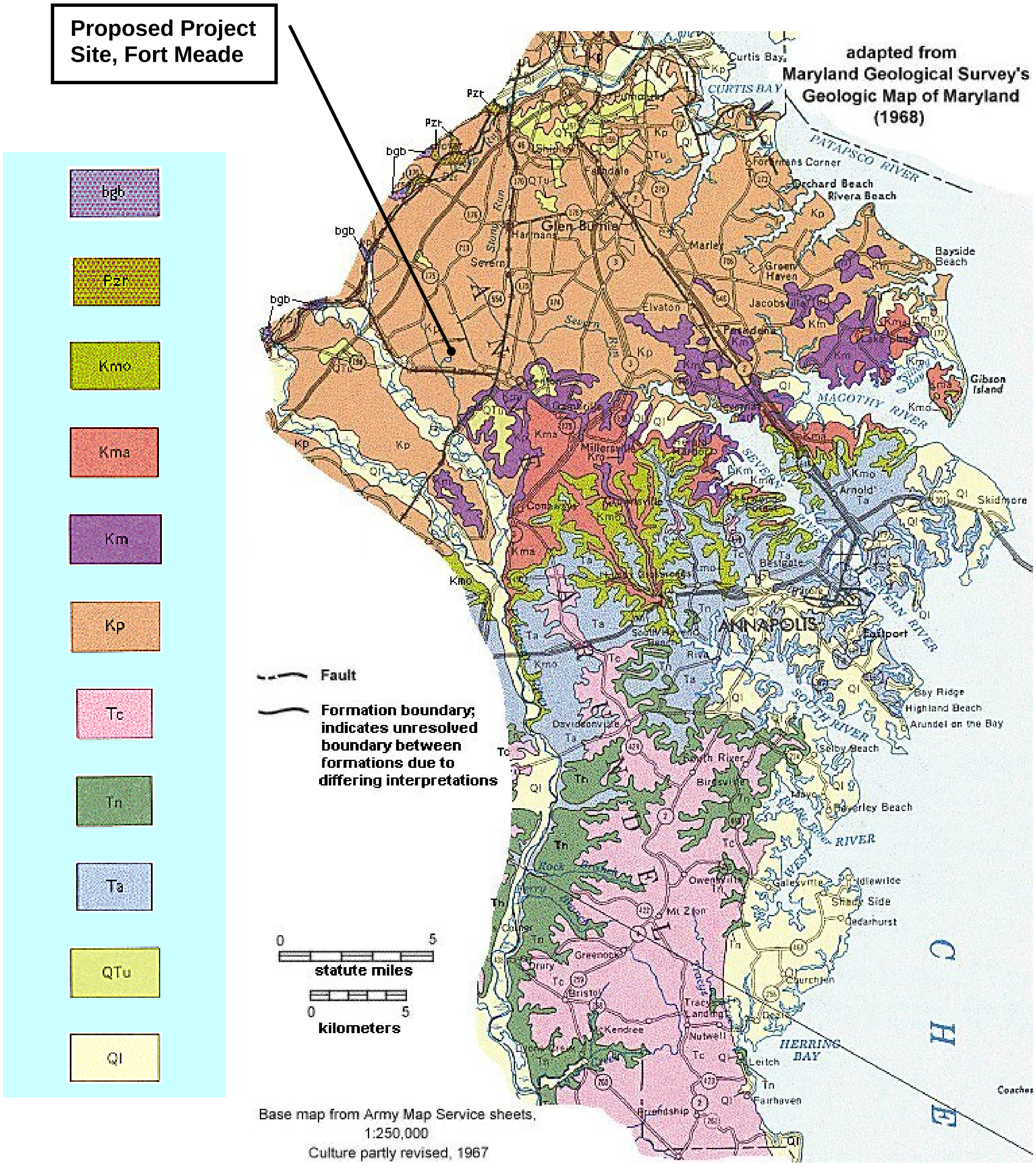

Figure 12: Geologic Map - Anne Arundel County

(Source: http://www.mgs.md.gov/esic/geo/ann.html and http://www.mgs.md.gov/esic/geo/lgcp.html for legend information)

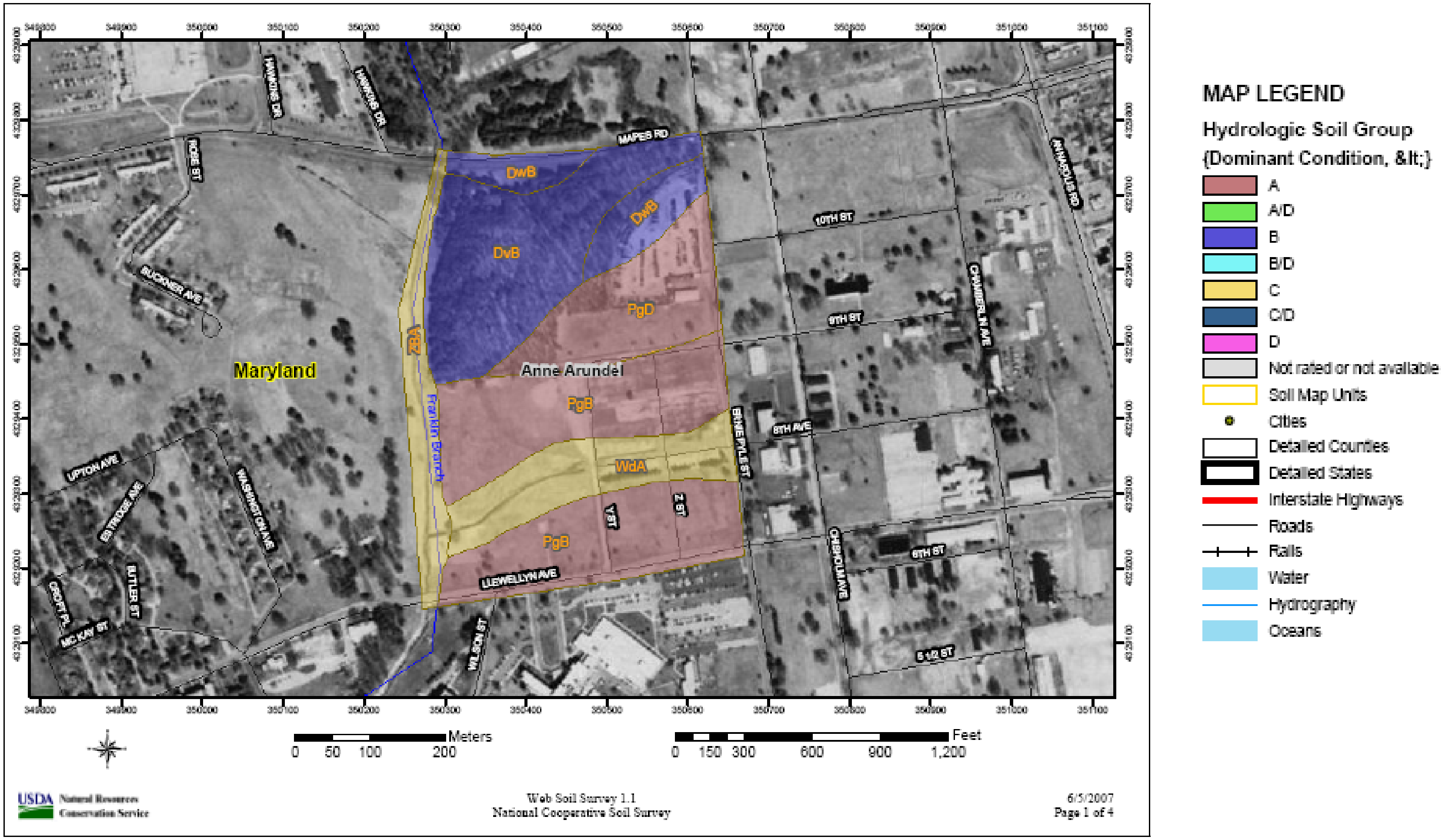

Figure 13: Soil types vicinity the proposed 902nd MI Group project site [2]

[2] Source of Map: Natural Resources Conservation Service, Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov ; Coordinate System: UTM Zone 18. Soil Survey Area: Anne Arundel County, Maryland, Spatial Version of Data: 3. Soil Map Compilation Scale: 1:12000. Map comprised of aerial images photographed on these dates: 4/4/1994. The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Soil Survey Area Map Unit Symbol	Map Unit Name	Soil Group	Total Acres in AOI	% of AOI	Description
DvB	Downer-Hammonton complex, 2 to 5 percent slopes	B	13.7	22.8	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
DwB	Downer-Hammonton-Urban land complex, 0 to 5 percent slopes	B	4.9	8.2	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
PgB	Patapsco-Fort Mott-Urban land complex, 0 to 5 percent slopes	A	21.3	35.4	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
PgD	Patapsco-Fort Mott-Urban land complex, 5 to 15 percent slopes	A	8.4	13.9	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
WdA	Woodstown sandy loam, 0 to 2 percent slopes	C	7.1	11.8	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
ZBA	Zekiah and Issue soils, 0 to 2 percent slopes, frequently flooded	C	4.8	8.0	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Table 2: Soils map legend and engineering index properties

Hydrologic Soil Groups

Hydrologic soil groups, labeled A through D, are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms. Soils identified at the project site are listed above. No Group D soils were identified at the site. Group D soils have a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

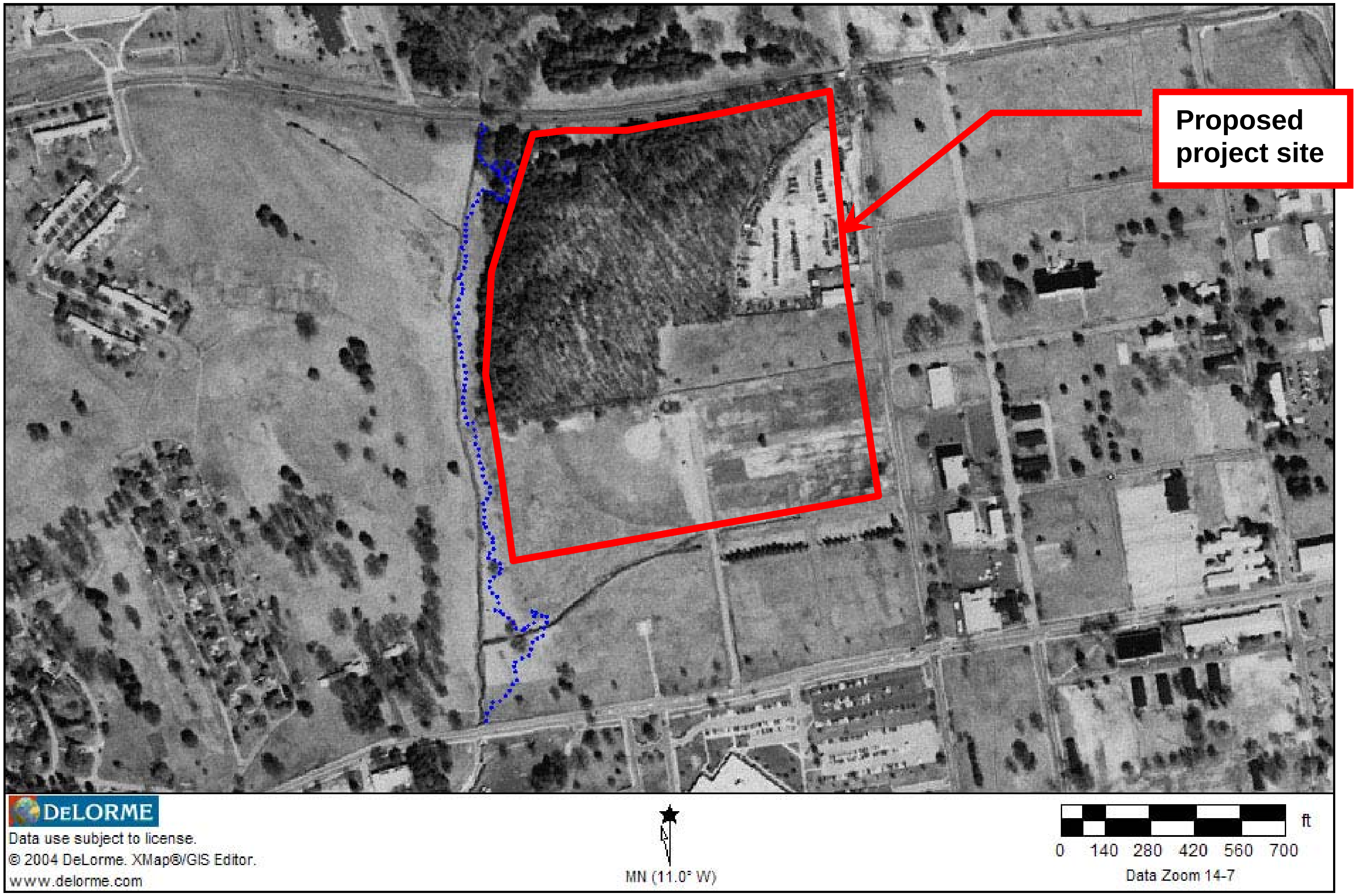

Figure 14: Trace of Wetlands Boundary Delineation West of Proposed Project Site

Table 3: Descriptive wetlands legend for Figure 12

PEM1 [P] Palustrine, [EM] Emergent, [1] Persistent
PEM2 [P] Palustrine, [EM] Emergent, [2] Nonpersistent
PFO1 [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous
PFO4 [P] Palustrine, [FO] Forested, [4] Needle-Leaved Evergreen
PFO5 [P] Palustrine, [FO] Forested, [5] Dead
POW [P] Palustrine, [OW] Open Water/Unknown Bottom (obs)
PSS1 [P] Palustrine, [SS] Scrub-Shrub, [1] Broad-Leaved Deciduous
PUB [P] Palustrine, [UB] Unconsolidated Bottom
PUS [P] Palustrine, [US] Unconsolidated Shore
R1EM2 [R] Riverine, [1] Tidal, [EM] Emergent, [2] Nonpersistent
R1UB [R] Riverine, [1] Tidal, [UB] Unconsolidated Bottom
R1US [R] Riverine, [1] Tidal, [US] Unconsolidated Shore
R2US [R] Riverine, [2] Lower Perennial, [US] Unconsolidated Shore
R3US [R] Riverine, [3] Upper Perennial, [US] Unconsolidated Shore
Upland [U] Upland

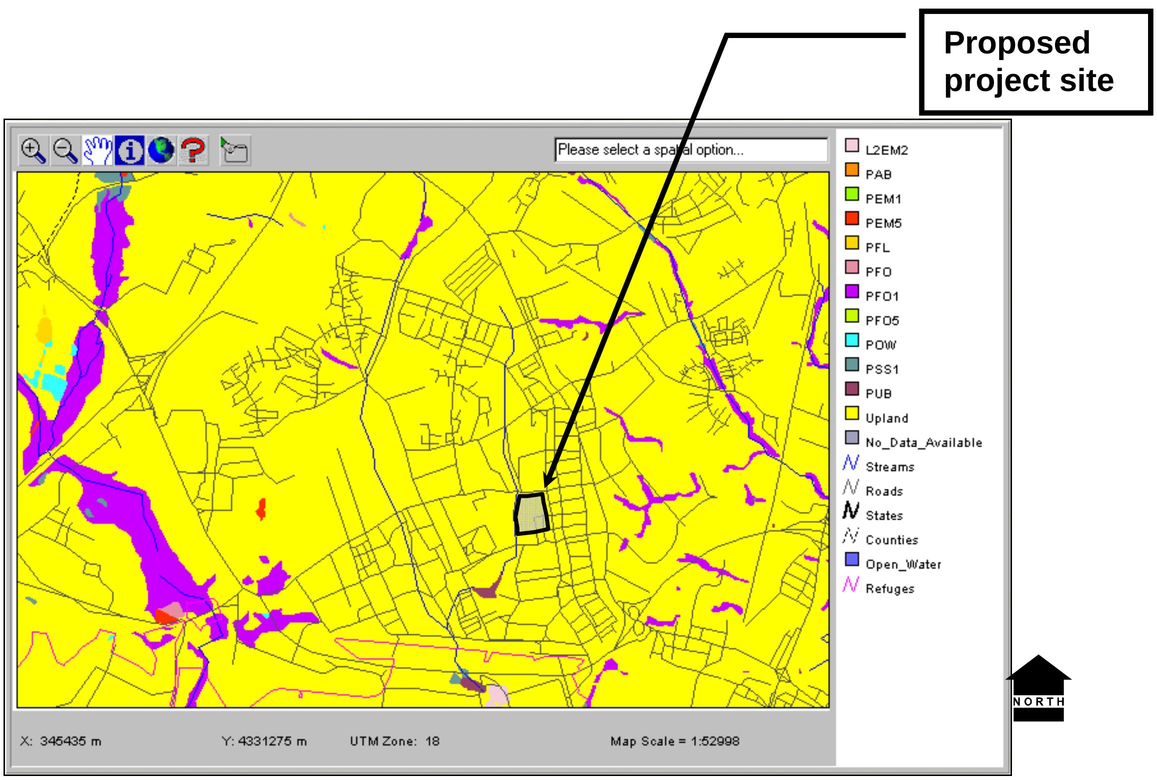

Figure 15: National Wetlands Inventory Map for Project Site

(Map source: **http://wetlands2.nwi.fws.gov/**)

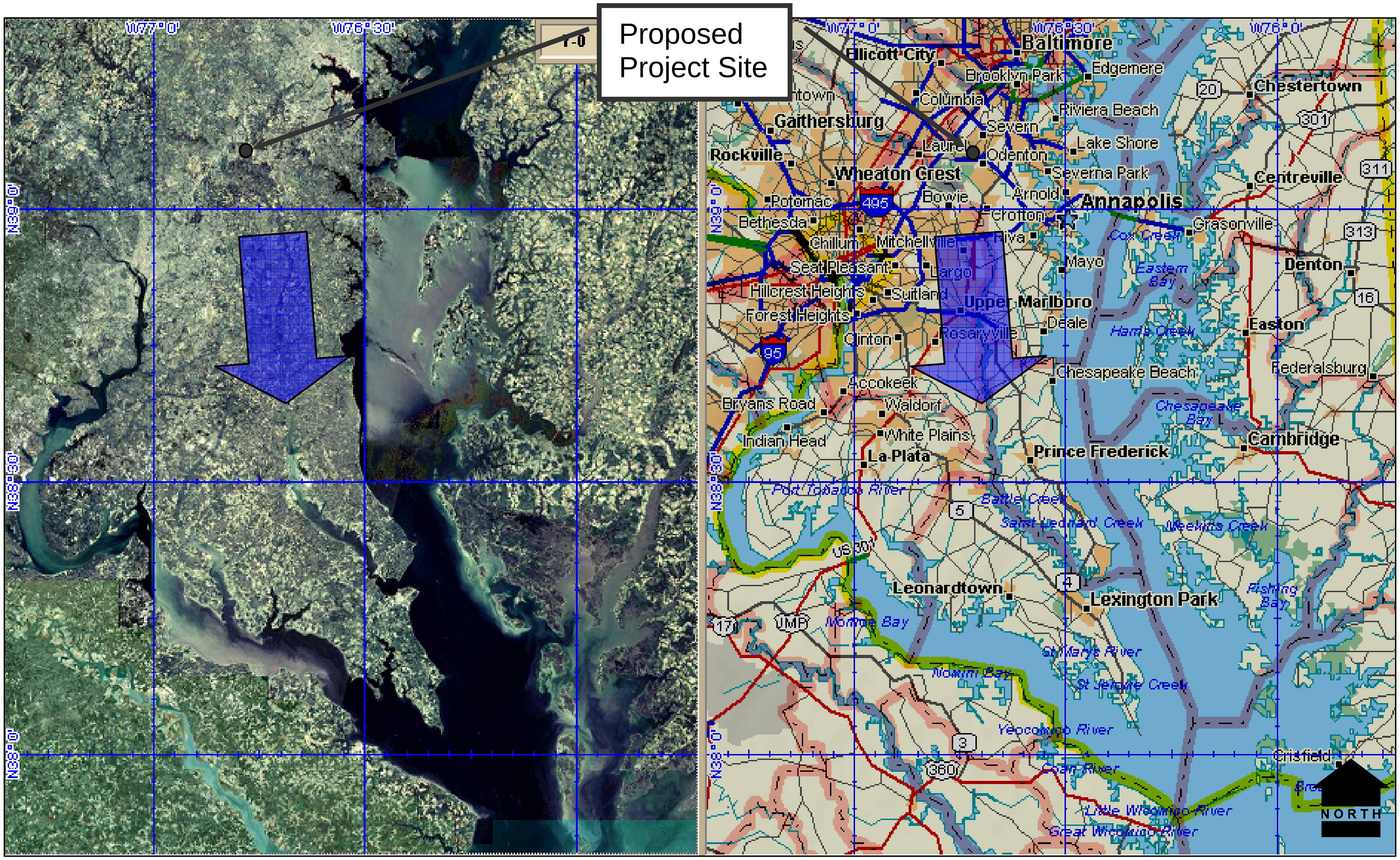

Figure 16: SAT10 Satellite Imagery and Map of Fort Meade Area Surface Drainage

(Blue arrows indicate general direction of regional surface water drainage)

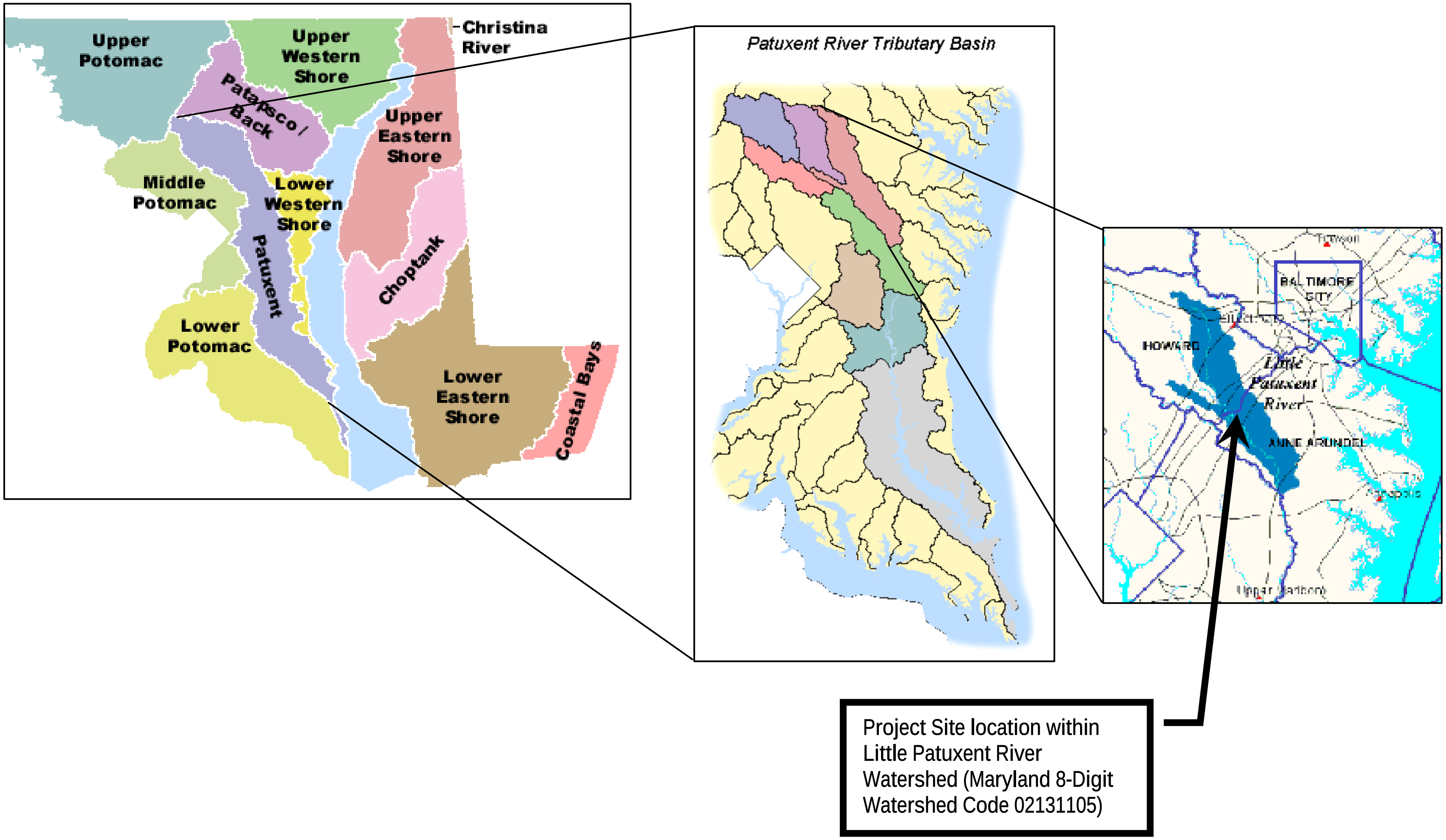

Figure 17: Patuxent Watershed Boundaries and Patuxent River Tributary Basin

(Source: http://mddnr.chesapeakebay.net/wsprofiles/surf/prof/prof.html)

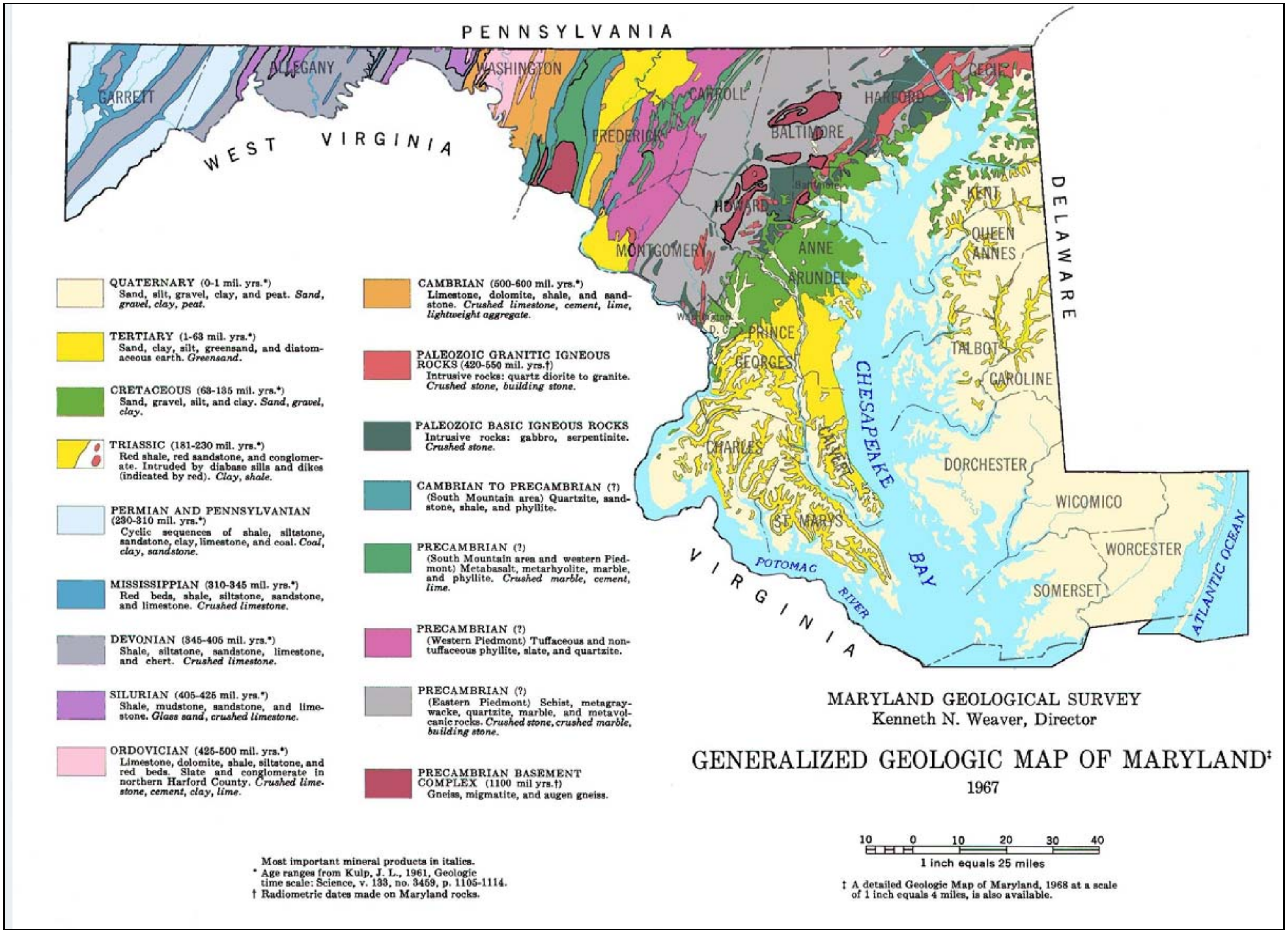

Figure 18: Generalized Geologic Map of Maryland

(Source: http://www.mgs.md.gov/coastal/maps/g2.html)

5.0 DESCRIPTION OF AFFECTED ENVIRONMENT

5.1 Topography and Geology

5.1.1 Topography

FGGM has approximately 210 feet of topographic relief. The highest point reaches 310 feet mean sea level (msl) and occurs at the 1st Army Radio Station Tower in the northern-most central part of the installation. The lowest elevation, under 100 feet msl, occurs in the southwestern corner of FGGM, along the Little Patuxent River (USACE, 1997).

Most of the installation slopes gradually to the south and southwest. Slopes exceeding 10 percent are rare and occur primarily in pockets in the north-central and central parts of the installation and along stream corridors. These steep slopes usually occur in natural wooded areas and are ideally suited as vegetated buffer zones for more developed areas.

The majority of the land at FGGM is suitable for building, having gradual slopes, generally less than six percent (USACE, 1997).

5.1.2 Geology

FGGM is located in the Atlantic Coastal Plain Physiographic Province (Figure 9, Figure 10, and Figure 12). It is underlain by a wedge-shaped mass of unconsolidated sediments that thickens to the southeast. The unconsolidated sediments overlie crystalline rock. The crystalline bedrock underlying FGGM consists of gabbro, diorite, and other igneous and metamorphic rocks. The surface of these rocks dips to the southeast and acts as a lower confining layer for the Potomac Group (USACE, 1997).

The series of thick, unconsolidated sediments underlying Anne Arundel County are subdivided into the Potomac Group, the Magothy Formation, and the Patuxent River terraces and associated alluvium. The Potomac Group contains five geologic units, three of which underlie FGGM: the Arundel Clay, the Patuxent Aquifer, and the Lower Patapsco Aquifer (Figure 11). The Arundel Clay is a unit with low vertical hydraulic conductivity and is the confining layer between the Patuxent and Lower Patapsco aquifers. It is visible in northern Anne Arundel County and consists of red, brown, and gray clay with some ironstone nodules and plant remains (USACE, 1997).

Above the Lower Patapsco Aquifer is an unnamed confining layer composed of tough variegated clay that separates it from the Upper Patapsco Aquifer. Alluvium underlies all of the rivers, streams, and marshes of FGGM and consists of interbedded sand, silt, and clay with small gravel inclusions (USACE, 1997).

5.1.2.1 Seismic Activity

FGGM is located in a zone of low seismic activity. There are no important folds, faults, or joint systems that would indicate recent structural disturbances.

5.1.2.2 Soils

The Natural Resources Conservation Service (NRCS) and *Fort George G. Meade Soil Survey* (USDA, 1995) identify 39 distinct soil mapping units on FGGM. Although not present at the proposed project site, most FGGM soils are part of the Evesboro complex. Evesboro is described as a very deep, excessively-drained, sandy loam soil found in upland areas. None of the soils on FGGM are used for agricultural purposes, and there are no farmsteads contiguous with installation areas.

The NRCS Web Soil Survey (http://websoilsurvey.nrcs.usda.gov) identifies six soil map units within the proposed project site (see Table 2). As shown in Figure 13, the major soil types found at the proposed project site are *Downer-Hammonton Complex* and *Patapsco-Fort Mott-Urban Land Complex*. The original soil profile at the northeast quarter of the site has been excavated and graded to the point that it is no longer recognizable and, in some locations, impervious and semi-impervious engineered fill material has impeded the original drainage pattern. Soils at the site are gently sloping to moderately sloping (0 – 15%). Soils at the southern half of the site have also been excavated to create a baseball field. The original soils at both of these sites have been cut away or covered with engineered construction fill material and loamy fill material. These areas have been graded to a smooth surface with an estimated 4 to 10 inches of topsoil. See soils summary at Table 2.

5.1.2.2.1 Downer-Hammonton Complex soils

Downer-Hammonton Complex soils are Hydrologic Soil Group B soils having mixed characteristics of the *Downer* and *Hammonton* soils. *Downer* soils consist of: (1) Surface layer: dark grayish brown loamy sand; (2) Subsurface layer: grayish brown sandy loam; (3) Subsoil – upper: yellowish brown gravelly sandy loam; (4) Subsoil - lower: yellowish brown sand and coarse sand. *Hammonton* soils consist of: (1) Surface layer: dark grayish brown loamy sand; (2) Subsurface layer: yellowish brown loamy sand; (3) Subsoil – upper: yellowish brown sandy loam; (4) Subsoil - lower: yellowish brown loamy sand.

5.1.2.2.2 Patapsco-Fort Mott-Urban Land Complex

Patapsco-Fort Mott-Urban Land Complex soils are Hydrologic Soil Group A soils having mixed characteristics of the *Patapsco*, *Fort Mott* and *Urban Land* soils. The *Patapsco* component of these soils consists of: (1) Surface layer: olive brown loamy sand; (2) Subsurface layer – upper: yellowish brown loamy sand; (3) Subsurface layer – middle: light yellowish brown sand; (4) Subsurface layer – lower: light yellowish brown sand; (5) Subsoil – upper: brownish yellow sandy clay loam; (6) Subsoil – middle: 40 percent yellow, 30 percent reddish yellow, and 30 percent white sandy clay loam; (7) Subsoil – lower: 45 percent white, 30 percent strong brown silty clay loam, and 15 percent strong brown sandy loam. The *Fort Mott* component of these soils consists of: (1) Surface layer: dark grayish brown loamy sand; (2) Subsurface layer: pale brown loamy sand; single grain; (3) Subsoil – upper: pale brown loamy sand; (4) Subsoil - middle: yellowish brown sandy loam; (5) Subsoil - lower: strong brown weakly stratified loamy sand. *Urban Land* soils are found in the developed areas and consist of areas where the soil surface is covered by buildings, streets, parking lots and other impervious surfaces which obscure soil identification. Soil characteristics of urban land soils vary greatly as to depth to bedrock, slope, and depth to water table. These soils generally have very low permeability and high runoff of rainwater. However, *Urban Land* soils are considered to be well-drained since storm water drainage from these sites are controlled.

5.1.2.2.3 Woodstown sandy loam

Woodstown sandy loam soils are classified as Hydrologic Soil Group C soils. *Woodstown sandy loam* soils consist of: (1) Surface layer: dark grayish brown sandy loam; (2) Subsurface layer – upper: light yellowish brown sandy loam; (3) Subsurface layer – middle: light olive brown sandy clay loam; (4) Subsurface layer – lower: light olive brown sandy clay loam; (5) Subsoil – upper: light brownish gray sandy loam; (6) Subsoil – lower: light gray loamy sand.

5.1.2.2.4 Zekiah and Issue Soils

Zekiah and *Issue* soils are classified as Hydrologic Soil Group C soils having mixed characteristics of the *Zekiah* and *Issue* soils. These are silty loam soils and areas of the project site where these hydric soils are found are considered to be wetlands as indicated by periods of lengthy or continuous soil saturation during the growing season.

5.1.2.3 Soil Characteristics Pertinent to Construction

Soils at the proposed project site may have high erosion potential, so construction should avoid creating or using areas of steep slope when comprised of native soils. Soils at this site should not be left in an unvegetated state, where wind and water can easily strip the soil. Once cleared, these soils should be conserved through practices approved by the Soil Conservation District, such as covering during periods of inactivity with temporary seed mixtures.

Although soil characteristics at the proposed project site can be quite variable with depth, they are generally well suited to building sites except in wetland areas. Layers that restrict permeability and buried objects may hinder deep excavations. Soils at the site are fairly suited to lawns and landscaping. A geo-technical site investigation will be performed prior to detailed design of the proposed facility. In accordance with construction best management practices, construction contractors will be instructed to halt work should they encounter suspected soil or groundwater contamination so that appropriate soil/groundwater sampling, analysis, and remediation may be performed.

5.1.2.4 Groundwater

Three Coastal Plain aquifers – the Patuxent Aquifer, the Lower Patapsco Aquifer, and the Upper Patapsco Aquifer – underlie FGGM. The aquifers are separated by the Arundel Clay Formation. As depicted in Figure 11, the unconsolidated deposits underlying the Coastal Plain form a southeastwardly thickening sequence that consists of sand-and-gravel aquifers interlayered with silt and clay confining beds. These deposits are underlain by consolidated rock similar to that of the Piedmont, at depths ranging from zero at the Fall Line to about 8,000 feet at Ocean City. With the exception of the Columbia aquifer, the Coastal Plain aquifers generally are confined except where exposed or where overlain only by permeable surficial sediments.

The Columbia aquifer, which is the uppermost hydrogeologic unit of the Coastal Plain in most of Maryland east of Chesapeake Bay, is used as a principal water supply throughout that area. The approximate western limit of the aquifer is shown on the map in Figure 11, and the relation of the aquifer to other Coastal Plain aquifers is indicated on the cross section. The aquifer generally is unconfined, but deeper zones locally are confined by clay layers. Thin surficial alluvium and terrace gravels are present elsewhere in Maryland, but these are not commonly used for water supply and, thus, are not shown in Figure 11.

The aquifers in the Chesapeake Group are used mostly east of the Chesapeake Bay. These include the Cheswold, Federalsburg, and Frederica aquifers, which are used from Dorchester to Queen Annes Counties, and the Manokin, Ocean City, and Pocomoke aquifers, which are used in Somerset, Worcester, and Wicomico Counties. The Piney Point aquifer, which does not crop out, is tapped by wells in an area about 40 miles (mi) wide between Caroline and St. Marys Counties. The Aquia aquifer supplies water to an area about 50 mi wide between Kent and Queen Annes Counties in the northeast and Charles and St. Marys Counties in the southwest. The Magothy aquifer is used in a triangular area with corners in Cecil, Charles, and Dorchester Counties. Aquifers in the Potomac Group are used for water supply primarily north and west of Chesapeake Bay from Cecil to Charles Counties. From Baltimore County to Charles County, the group includes the Patuxent and Patapsco aquifers. In Cecil and Harford Counties, the aquifers are not differentiated and are called the Potomac aquifer. The Patuxent and Patapsco aquifers are the only Coastal Plain aquifers used for water supply in the District of Columbia.

Well yields of Coastal Plain aquifers depend on thickness and intergranular permeability of the sand and gravel layers and on well construction. Where permeable layers are sufficiently thick, well fields may produce several million gallons per day. Most Coastal Plain aquifers contain saltwater in downdip areas. Natural water quality generally is suitable for most uses; locally, however, excessive concentration of iron [0.3 milligrams per liter (mg/L)] may exist and the water can be hard (120 mg/L as calcium carbonate). The water may also be acidic in some areas with pH values as low as 5. In a few locations, aquifers have been contaminated from surface sources. The presence of saltwater in the Coastal Plain aquifers is discussed by Meisler (1981), Gushing and others (1973), and Hansen (1972).

5.1.2.5 Radon

The Army has adopted US EPA’s recommended remedial action level as its indoor radon standard. Levels of radon exceeding 4 picoCuries per liter (pCi/l) of air require mitigation efforts. Radon monitoring at FGGM is complete. The results from the survey have found that indoor air radon concentrations are within US EPA acceptable levels, and therefore, require no further action.

5.2 Vegetation and Wildlife

This section describes the general conditions and characteristics of biological resources found on and adjacent to the proposed project site. Information presented in here is drawn from following documents: *Final Integrated Natural Resources Management Plan 1999-2004, Fort George G. Meade, Maryland* (Fort Meade, 1999); *Integrated Pest Management Plan, Fort George G. Meade, Maryland* (Fort Meade, 2005b); DD Form 1391 for proposed project provided by the US Army Intelligence and Security Command, Fort Belvoir, VA; Planning Charrette reports; Section 7, Endangered Species Act (ESA) consultation with U.S. Fish and Wildlife Service (see paragraph 13.0, page 13-1 to this document); *Fort Meade Tree Management Policy*; *Fort Meade Forest Conservation Act Policy*; Fort Meade Geographic Information Systems (GIS) data.

5.2.1 Vegetation

Previous development at FGGM has been extensive, and few areas currently retain their native vegetation. In general, the developed parts of FGGM have been landscaped with turf grasses and native or exotic trees and shrubs, including: elm, maple, flowering cherry, weeping willow, flowering dogwood, and an assortment of holly cultivars. FGGM guidelines recommend preserving mature trees and wooded buffers during future development. The proposed site for the new 902nd MI Group facility is a mix of open grassy areas and forested area. Existing planted areas will be evaluated for additional plantings, and more street trees and storm water BMPs will be added at the site where appropriate. In accordance with the FGGM reforestation plan, twenty percent of the site will be remain forested and felled trees will be replaced at a ratio of two new trees planted for each felled tree.

5.2.1.1 Forested Areas

The undeveloped southeast portion of FGGM consists of dense secondary tree growth, principally hardwoods. Indigenous Maryland pine, pitch pine, and short-leaf pine forests cannot compete with hardwoods due to poor soil conditions, steep topography, and infrequent forest management. The Maryland pine is one of the few species suitable for the soil conditions at FGGM, and should be considered for reforestation adjacent to the proposed new facility. Hardwoods are also recommended since they provide excellent visual screening as well as an attractive setting.

5.2.1.2 Prime and Unique Farmlands[3]

Within Fort Meade, the only soil type considered to be a prime farmland soil is *Woodstown Sandy Loam*, which covers approximately 1.8 percent of the Installation, though not located on the proposed project site. A description of soils at the proposed 902nd MI Group facility site is provided in Paragraph 5.1.2.2 of this document.

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. The land must also be available for these uses (cropland, pasture land, forestland, or other land, but not water on urban built-up land). Prime farmland has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods (NRCS, 2005). Prime farmland does not include land already in or committed to urban development or water storage; however, land utilized or designated for commercial, industrial or residential purposes is therefore, categorically excluded from consideration. While there are soils within Fort Meade classified as Prime Farmland soils, because no land within the installation is available for agricultural production, it is not regarded as prime farmland (U.S. Army Corps of Engineers, Mobile District Affected Environment and Environmental Consequences, Final Environmental Impact Statement – Fort Meade, MD).

Unique Farmland is land other than prime farmland that is used for production of specific high value food and fiber crops. It has the special combination of soil quality, location, growing

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[3] U.S. Army Corps of Engineers, *Base Realignment and Final Environmental Impact Statement for Implementation of Base Realignment and Closure 2005 and Enhanced Use Lease Actions at Fort George G. Meade, Maryland*

season, and moisture supply needed to economically produce sustained high quality or yields of specific crops (NRCS 2005). Because there is no agricultural production within Fort Meade, no land within the installation is considered Unique Farmland.

5.2.2 Wildlife[4]

Wildlife species found here are typical of those found in most urban-suburban areas. White-tail deer and groundhogs occur frequently on the installation, particularly along the Little Patuxent River. Other mammals that may be found on the installation include, gray squirrel (*Sciurus carolinensis*), raccoon (*Procyon lotor*), opossum (Didelphis virginiana), eastern chipmunk (*Tamias striatus*), field mouse and vole (*Microtu*s sp.), mole (*Scalopus aquaticus*), and fox (*Vulpes vulpes*).

Birds common to the installation are limited to those species that have adapted to an urban-suburban habitat, such as American robin (*Turdus migratorius*), catbird (*Dumetella carolinensis*), mockingbird (*Mimus polyglyottos*), Carolina chickadee (*Poecile carolinensis*), Carolina wren (*Thryothorus ludovicianus*), house wren (*Troglodytes aedon*), downy woodpecker (*Picoides pubescens*), common flicker (*Colaptes auratus*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), rock dove (*Columba livia*), mourning dove (*Zenaida macroura*) , and song sparrow (*Melospiza melodia*). A complete listing of avian species observed at Fort Meade is provided in the recently prepared *Base Realignment and Final Environmental Impact Statement for Implementation of Base Realignment and Closure 2005 and Enhanced Use Lease Actions at Fort George G. Meade, Maryland* which is available for review on line at:
http://www.hqda.army.mil/acsim/brac/eis_docs/FortMeadeMD%20Final%20EIS.pdf

5.2.2.1 Rare, Threatened, and Endangered Species

Plants and animals federally classified as endangered or threatened are protected under the Endangered Species Act (ESA) of 1973, as amended. The U.S. Fish and Wildlife Service (USFWS) is responsible for the listing of endangered species under the ESA. Federally listed species are afforded legal protection under the Act; therefore, sites supporting these species need to be identified.

Lists of flora, fauna and avian (plant, animal, bird) species identified on Fort Meade are provided at Appendix B to this document. Except for occasional transient individuals, no federally-listed or proposed endangered or threatened species are known to occur on Fort Meade (Fort Meade, 1999; Marquardt, 2006). Areas where state-listed species have been found are mostly in designated habitat protection areas (see Figure 19). The proposed project site is not located on or adjacent to these protected habitat areas. As of September 2005, only three plants and one animal are state-listed (Marquardt, 2006). The *Roughish panicgrass*, state status uncertain, is also found in areas other than designated Habitat Protection Areas. The "Rare, Threatened, and Endangered Species Habitat search, Fort Meade, 2001" states that *Roughish panicgrass* is present at site just south of 4th Street between Wilson Street and Ernie Pyle Street (Marquardt, 2007a), which is not located on the proposed project site.

[4] U.S. Army Corps of Engineers, *Base Realignment and Final Environmental Impact Statement for Implementation of Base Realignment and Closure 2005 and Enhanced Use Lease Actions at Fort George G. Meade, Maryland*

A Rare, Threatened, and Endangered (RTE) Species Habitat Search were conducted in 2001 (Eco-Science Professionals, 2001). Field surveys conducted in 2001 by Fort Meade indicate that vegetative cover at the installation has changed little since the previous field survey conducted in 1993-1994. The primary purpose of the field surveys was to verify that RTE flora identified during the1993-2994 study were still present at Fort Meade. Table 4 on page 5-7 below presents the State List of rare, threatened, and endangered species in the vicinity of Fort Meade.

Table 4: State List of Rare, Threatened, and Endangered Species Found at FGGM, MD

Scientific Name	Common Name	Maryland Natural Heritage Program Rank
Flora		
Aronia prunifolia	Purple chokeberry	Watch list
Lespedeza stuevei	Downy bushclover	Watch list
Panicum leucothrix	Roughish panicgrass	Possibly rare, but status uncertain
Fauna		
Etheostoma vitreum	Glassy darter	Threatened

(Source: MDNR, 2004; Frye, 2007)

In accordance with the requirements of the ESA, agency coordination with the USFWS and the MDNR Natural Heritage Program to identify state and federally-list species was conducted. Response letters from USFWS and the MDNR Natural Heritage Program are included in Paragraph 13.0, Interagency Coordination and Correspondence, to this document.

5.2.2.2 Aquatic Resources

The Patuxent River and its associated tributaries and small streams that flow though Fort Meade provide habitat for a number of aquatic organisms. A list of species found in the surface waters on the installation is listed in Table 5 on page 5-10.

Potential aquatic habitats were identified using MDE database mapping and mapping provided by Fort Meade (Figure 20). It should be noted that aquatic habitats identified in Figure 20 should be considered "potential habitat areas" since they are largely identified without field verification of conditions or extent. The proposed project site is not located in or adjacent to these potential habitat areas, nor does it contain areas of aquatic habitat that could support seasonal populations of aquatic or semi-aquatic organisms. Vegetated areas along the nearby Franklin Branch west of the project site contain a seasonally wet environment which may potentially offer habitat to certain macro invertebrates and/or amphibians. These will be protected from construction at the proposed project site by a vegetated buffer and by Maryland Department of the Environment permitted stormwater best management practice (BMP) systems.

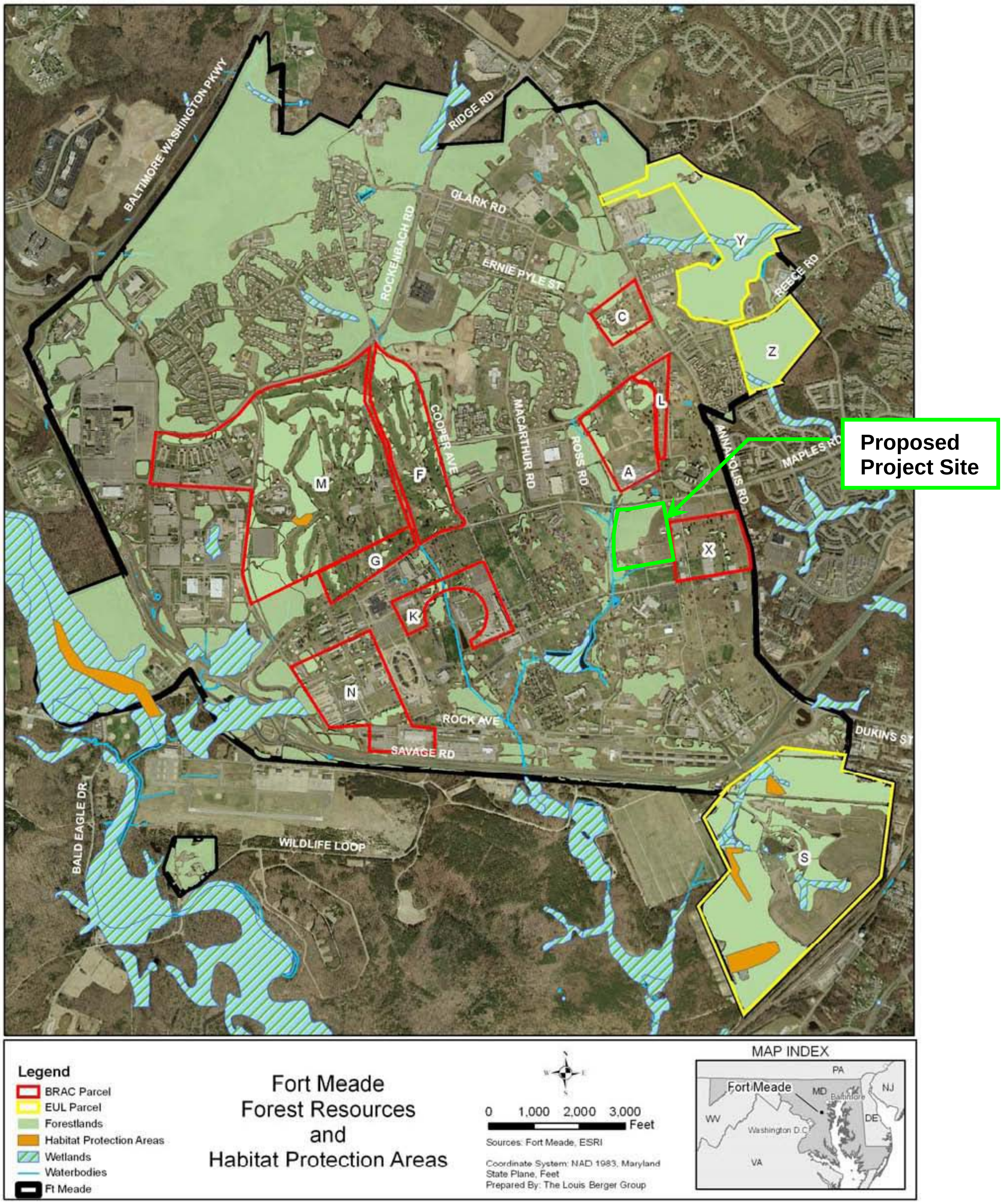

Figure 19: Forest Resources and Habitat Protection Areas

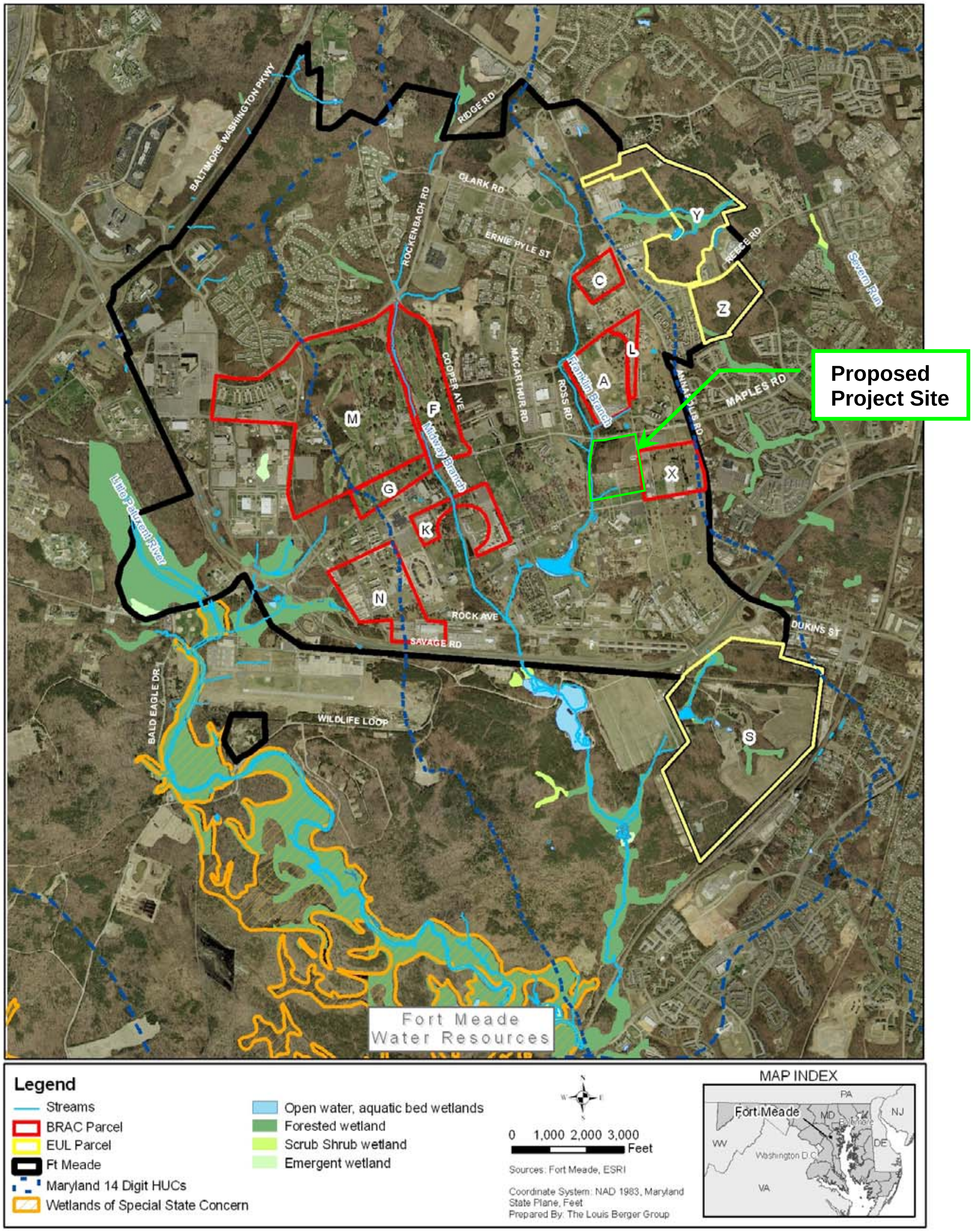

Figure 20: Fort Meade Water Resources

Table 5: Fish Species Found at Fort Meade, Maryland

Scientific Name	Common Name
Alosa aestivalis	Blueback herring
Anguilla rostrata	American eel
Catostomus commersoni	White sucker
Cyprinella analostana	Satinfin shiner
Dorosoma cepedianum	Gizzard shad
Enneacanthus gloriosus	Bluespotted sunfish
Erimyzon oblongus	Creek chubsucker
Etheostoma olmstedi	Tessellated darter
Etheostoma vitreum	Glassy darter
Fundulus heteroclitus	Mummichog
Exoglossum maxillingua	Cutlips minnow
Hypentelium nigricans	Northern hogsucker
Lampetra aepyptera	Least brook lamprey
Lampetra appendix	America brook lamprey
Lepomis auritus	Redbreast sunfish
Lepomis gibbosus	Pumpkinseed
Lepomis macrochirus	Bluegill
Micropterus dolomieu	Smallmouth bass
Micropterus salmoides	Largemouth bass
Notropis amoenus	Comely shine
Notropis procne	Swallowtail shiner
Percina peltata	Shield darter
Rhinichthys atratulus	Blacknose dace
Rhinichthys cataractae	Longnose dace
Semotilus corporalis	Fallfish
Umbra pygmaea	Eastern mudminnow

(Source: Fort Meade, 1999)

5.3 Hydrology and Water Quality

5.3.1 Surface Water

The majority of FGGM lies within the 160 square-mile Little Patuxent River Drainage Basin (Figure 17). Near the installation, the river averages 30 feet wide and 2 feet deep. Two tributaries drain most of the installation: Midway Branch and Franklin Branch. Surface flow on the installation is primarily south-southwest (Fort Meade, 1998a).

Midway Branch drains the center of the installation and flows southeast, then south to a confluence with Franklin Branch, where it is renamed Rogue Harbor Branch. Its watershed comprises approximately 1,860 acres, located almost entirely within the installation (USACE, 1997). Rogue Harbor Branch empties into Allen Lake, a 19.7 acre man-made lake used for storm water management, flood control, and limited recreational purposes. South of Allen Lake, the tributary drains directly into the Little Patuxent River.

Franklin Branch, which runs along the west side of the proposed project site, originates in the northeastern portion of FGGM, just south of MacArthur Road, and flows south into Burba Lake. Burba Lake is a 7.9-acre man-made recreational lake on the southeast side of the installation. The watershed of Franklin Branch covers approximately 1,130 acres and is contained primarily within FGGM (USACE, 1997). South of Burba Lake, the stream flows a short distance southeast to its confluence with Midway Branch.

There are a large number of drainage swales, ditches, and natural streams and brooks traversing FGGM. Some of them flow into Burba Lake; others drain into Rogue Harbor Branch, which feeds Soldier's Lake south of the former installation stable area.

The Patuxent River and its associated tributaries and small streams that flow through FGGM provide habitat for many aquatic organisms. A list of fish species found in the surface waters on the installation is listed in Table 5 on page 5-10 above.

5.3.2 Wild and Scenic Rivers

The Maryland Scenic and Wild Rivers Act established state policy to protect the water quality of designated scenic rivers and fulfill vital conservation purposes of wise use of resources within the scenic and wild rivers system. The Patuxent and Severn Rivers have been designated as Maryland Scenic Rivers.

- In the Odenton Town Plan, the Patuxent River Policy Plan of 1984 outlines the policy direction for local and state agencies that carry out programs and make regulatory decisions for the Patuxent River Watershed where pollution is most likely to be transported into the river (1/4 mile along mainstem, 1/8 mile tributaries).
- Programs for providing best management practices and vegetative buffers immediately adjacent to the river and its tributaries will be developed.
- The state, in conjunction with local governments, will survey the watershed and identify major nonpoint source pollution sites.
- The state will develop a cost-sharing program to aid local governments in correcting and managing storm water pollution from existing developed areas.
- Future development will be accommodated in ways to minimize impact on water quality and maximize existing protection opportunities.
- Additional recreation and open space land will be acquired.
- Existing forest cover will be retained and important sensitive areas will be reforested to protect water quality.
- Prime and productive agricultural land will be preserved.
- Sand and gravel activities will be managed to allow extraction of the resource without damage to the river.
- The Patuxent River Commission will develop and adopt an action program to implement these strategies.

To provide for a National Wild and Scenic River System, Congress enacted the Wild and Scenic Rivers Act (P.L. 90-542, as amended) (16 U.S. C 1271-1287) in 1968. The Act pronounced:

> *"It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish*

and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The Congress declares that the established national policy of dams and other construction at appropriate sections of the rivers of the United States need to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes."

To date, there are no Maryland Rivers so designated under this Federal Act.

5.3.3 Wetlands

Of the approximately 5,400 acres on FGGM, only 154 acres have been designated as wetlands. The majority of these wetlands are situated in the floodplain of the Little Patuxent River, in the southwestern section of the installation. Information concerning the potential nature and extent of wetlands at the project site was obtained by performing a routine wetlands jurisdictional delineation of the project site, from nontidal wetlands maps included in the National Wetlands Inventory Map (Figure 15) and geographic information systems data drawn from the *Wetlands Mapping Report for the United States Army, Fort Meade* (Geonext, 1997).

Wetlands were identified from photographs based on vegetation, visible hydrology, and geography, in accordance with Classification of Wetlands and Deepwater Habitats of the United States (FWS/OBS-79/31) (December 1979). There were no attempts in the above-mentioned Fort Meade Wetlands Mapping Report to define Federal, state or local jurisdiction (Geonex, 1996). These maps were used in conjunction with field reconnaissance to determine the proximity of potential wetlands to the proposed 902nd MI Group Administrative and Operations Center construction site. As described in detail in the jurisdiction wetlands delineation of the project site, a narrow band of emergent wetlands (see Figure 14) exists along the Franklin Branch west of the project site. The proposed project will not encroach upon these wetlands and they will be protected by a 100-foot vegetated buffer and MDE-permitted stormwater systems.

5.3.4 Water Quality

The MDE designates the segments of the Little Patuxent River and its tributaries that are upstream from a point one mile south of the Route 198 Bridge, as Use I-P Waters. Use I-P Waters are protected for water contact recreation, aquatic life, and public water supply. The area of concern is located within the Department of Interior property near the Patuxent Environmental Science Center bordering FGGM to the south (Fort Meade, 1998a). Use I-P Waters must be suitable for the following activities:

- Water contact sports
- Play and leisure-time activities where individuals may come into contact with the surface water
- Fishing
- The growth and propagation of fish (other than trout), other aquatic life, and wildlife
- Agricultural water supply
- Industrial water supply
- Public water supply

Section 303(d) of the CWA directs each State to identify and list waters, known as water quality limited segments (WQLSs), in which current required controls of a specified substance are inadequate to achieve water quality standards. This list of impaired waters is commonly referred to as the “303(d) list”. For each WQLS, the State is to establish a Total Maximum Daily Load (TMDL) of the specified substance that the waterbody can receive without violating water quality standards. Prior to the development of a TMDL, government decisions must ensure no net increase of impairing substances or stressors from permitted activities. Following the development of a TMDL, government decisions must ensure that loads of impairing substances or stressors are consistent with allocations reflected in the TMDL.

The Antidegradation Policy Implementation Procedures, Code of Maryland Regulation (COMAR) 26.08.02.04-1, protect waters with higher water quality than required for that water’s designated use. These high quality waters are referred to as Tier II waters. Antidegradation policies protect Tier II waters from actions that may impact this high quality. All activities subject to an NPDES permit or a water and sewer plan amendment are subject to State review and approval under the Antidegradation Policy Implementation Procedures.

Less than half a mile from FGGM’s eastern boundary lie tributaries of the Severn River, which are designated as Use IV Recreational Trout Waters. These waters have the potential for, or are currently:

- Capable of holding or supporting adult trout for put-and-take fishing
- Being managed as a special fishery by periodic stocking and seasonal catching

The northeast portion of the proposed project site drains predominantly east-southeast onto Ernie Pyle Boulevard, then overland to the south into the first of two large overland east-west drainage culvert that parallel each other along the southern portion of the project site. These drainage culverts both flow into the Franklin Branch and on to Burba Lake. The southern culvert is mostly concrete lined until it approaches the Franklin Branch at which point it enters emerging wetlands area adjacent to Franklin Branch. The remainder of the project site drains overland to the west into the Franklin Branch and on to Burba Lake (Figure 21 below).

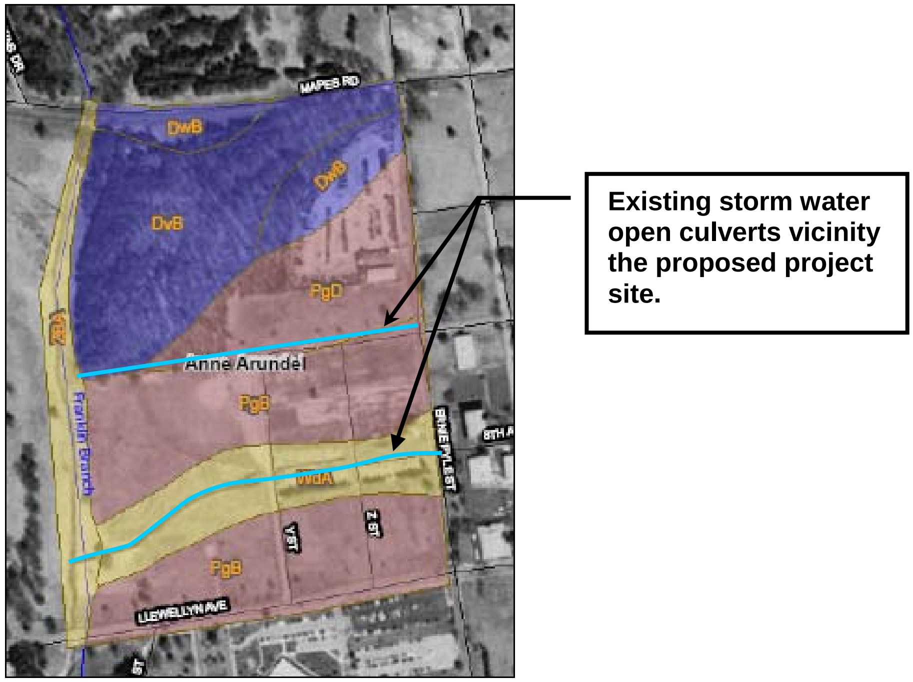

Figure 21: Existing Storm water Drainage Culverts

5.4 Climate and Air Quality

5.4.1 Climate

FGGM is located in the continental climate zone of the eastern United States, where general atmospheric flow is from west to east. This climate regime is characterized by summers that are long, warm, and often humid owing to the persistence of maritime tropical air. However, frequent air mass exchanges result from the influence of either maritime tropical air or continental polar air. Temperate weather prevails in the spring and autumn.

The annual mean temperature at FGGM is 61° Fahrenheit (F), with an average daily maximum of 72°F and a minimum of 45°F. Annual temperature extremes range from -6°F to 100°F (U.S. Army Toxic and Hazardous Materials Agency [USATHAMA], 1989).

Precipitation averages 41 inches annually, including 22 inches of snow. Rainfall occurs throughout the year, but the greatest amounts occur in the summer (peaking in August) as a result of strong thunderstorms. The region has moderate to high humidity levels throughout the year. Prevailing winds are from the south. The windiest period is late winter and early spring. The annual average wind speed is 9.3 mph (Gale Research Company, 1985).

5.4.2 Air Quality[5]

Ambient air quality is protected by federal and state regulations. The U.S. EPA has developed National Ambient Air Quality Standards (NAAQS) for six air pollutants, with the NAAQS

[5] U.S. Army Corps of Engineers, *Base Realignment and Final Environmental Impact Statement for Implementation of Base Realignment and Closure 2005 and Enhanced Use Lease Actions at Fort George G. Meade, Maryland*

setting concentration limits that determine the attainment status for each of these six "criteria pollutants", which are:

- carbon monoxide (CO),
- sulfur dioxide (SO2),
- particles with a diameter less than or equal to a nominal 10 micrometers (PM_{10}),
- particles with a diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$),
- ozone (O3),
- nitrogen dioxide (NO2), and
- lead (Pb).

To rate the severity of the pollution problem, U.S.EPA categorizes non-attainment areas as:

- marginal,
- moderate,
- serious,
- severe,
- or extreme.

Federal actions occurring in non-attainment areas are required to demonstrate compliance with the U.S.EPA general conformity guidelines established in 40 CFR Part 93. In Maryland, the Maryland Department of the Environment (MDE) carries out mandates from the *Federal Clean Air Act* and administers air pollution monitoring, planning, and control programs to improve and maintain air quality. Maryland's air quality plans, called State Implementation Plans (SIP), are designed to achieve and maintain the NAAQS, and to prevent significant deterioration of air quality in areas cleaner than the standards. Federal agencies are required to ensure that their actions conform to the SIP.

Conformity, as defined in the Clean Air Act (CAA), means reducing the severity and number of violations of the NAAQS to achieve attainment of the standards for nonattainment regions. U.S.EPA has developed two distinctive sets of conformity regulations: one for transportation projects and one for non-transportation projects. Non-transportation projects are governed by general conformity regulations (40 CFR Parts 6, 51, and 93), described in the final rule for *Determining Conformity of General Federal Actions to State or Federal Implementation Plans*, published in the Federal Register on November 30, 1993. The general conformity rule became effective January 31, 1994.The 902nd MI GP project addressed in this document is considered a non-transportation project.

The federally designated Baltimore Metropolitan Planning Organization (MPO) is responsible for air and water quality programs, transportation planning, and emergency preparedness and public safety in a six-jurisdiction region, including Anne Arundel, Baltimore, Carroll, Harford, and Howard Counties, and Baltimore City (BMC, 2007). The Baltimore region, which includes the 902nd MI GP project area, does not currently meet federal standards for 8-hour ground-level ozone and fine particulate matter (or fine soot). Ground-level ozone (commonly known as smog) is formed by the combination of nitrogen oxides, volatile organic compounds, and sunlight. Fine particulate matter is a complex mixture of extremely small particles and liquid droplets. It is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. Fine particles, such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller ($PM_{2.5}$). These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air.

The proposed 902nd MI GP project at Fort Meade occurs within a moderate non-attainment area for ozone and non-attainment for $PM_{2.5}$. Fort Meade is located in the Baltimore 8-hour Ozone Nonattainment Area (BNAA). The BNAA is classified as a moderate area under the 8-hour ozone standard and the entire state of Maryland is located within the Ozone Transport Region (Maryland Department of the Environment, 2007). The Ozone Transport Region (OTR) is composed of 11 states in the Northeast, including Pennsylvania, and the Washington, D.C., metropolitan area. According to U.S.EPA's general conformity regulations, the VOC *de minimis* threshold for projects in the OTR is 50 tons per year. The NOx *de minimis* threshold for projects in the OTR is 100 tons per year. The *de minimis* phrase is applied to describe the estimated emission determinations that are below the U.S.EPA's established thresholds for air emissions caused by federally sponsored approved or funded activities in areas that do not meet the NAAQS. When federal actions are expected to produce emissions greater than the *de minimis* levels, the federal agency is required to show that emissions would not interfere with the goals of the SIP or the state's ability to attain and maintain the NAAQS.

For $PM_{2.5}$, the final rule established by the U.S.EPA is 100 TPY as the *de minimis* emission levels in areas under nonattainment for directly emitted $PM_{2.5}$. This 100 TPY emissions level is applicable separately to each of the precursors that form $PM_{2.5}$, such as sulfur dioxide (SO_2), NO_x, VOC, and ammonia. This means that if an action's direct or indirect emissions of $PM_{2.5}$, SO_2, NO_x, VOC, or ammonia exceed 100 TPY, a General Conformity determination is required. Neither the U.S.EPA nor State of Maryland, however, has found $PM_{2.5}$ problems in the Baltimore airshed to be caused by VOC or ammonia. Therefore, ammonia is not further addressed by the environmental assessment; while the VOC emissions are addressed (VOC is addressed as an ozone precursor).

5.4.2.1 Ambient Air Quality Conditions

Current ambient air quality standards applicable to FGGM and the proposed project area are listed in Table 6 below. The US EPA has designated Anne Arundel County as a moderate non-attainment area for the pollutant ozone and non-attainment for the pollutant $PM_{2.5}$. The county is in attainment for all other criteria pollutants (Table 7). Specific sources on FGGM include vehicle exhaust from traffic on site as well as from military equipment. Since the proposed project is located in an ozone and $PM_{2.5}$ non-attainment area, conformity to the State Implementation Plans (SIPs) is required and has been determined.

Table 6: Ambient Air Quality Standards for Ozone and Particulate Matter (2.5)

Pollutant		Federal Standard	Maryland Standard
Ozone (O3)*			
	8-Hour Average:	0.08 ppm	0.08 ppm
Particulate Matter ($PM_{2.5}$)*			
	24-Hour Average:	35 µg/m3	35 µg/ m3
	Annual Geometric Mean:	15 µg/ m3	15 µg/ m3

* Federal primary and secondary standards for this pollutant are identical.
(Sources: U.S.EPA, 2007; MDE, 2002)

Table 7: Existing Eight-Hour Ozone / $PM_{2.5}$ Monitoring Data – Anne Arundel County

Monitoring Station – Pollutant	Year				
	2001	2002	2003	2004	2005
#240030014 – Queen Anne and Wayson Roads: • Ozone • Particulate Matter 2.5	0.11/0.101 47/37	0.119/0.112 64/44	0.122/0.112 60/36	0.102/0.091 42/37	0.094/0.094 36/34
#240030019 – 9001 Y street, Ft Meade: • Ozone • Particulate Matter 2.5	0.110/0.108 51/47	0.119/0.109 57/45	0.117/0.115 61/37	0.107/0.090 41/35	No Data
#240031003 – 7409 Balto and Annapolis Blvd: • Particulate Matter	48/41	60/46	61/39	43/38	40/39
#240032002 – 8515 Jenkins Rd: • Particulate Matter - #1 • Particulate Matter - #2	54/46 43/38	54/45 55/45	64/39 63/32	43/41 42/35	40/40 46/39

Values are in parts per million (ppm); 1st /2nd highest recorded data.
NAAQS: Ozone – Eight-hour average = 0.08 ppm (0.085 is an exceedance)
PM – 24 hour average = 65 ($\mu g/m^3$)
(Source: USEPA, 2006c)

5.4.2.2 Air Conformity Analysis

No new personnel or missions will relocate to Fort Meade as a result of the proposed 902nd MI GP action. Air emissions sources in the new (replacement) facility will be limited to hot water generation boilers and emergency standby power generators. Construction of the new 902nd MI GP facility would generate additional air emissions during the period of construction. Because the proposed 902nd MI GP project is located on FGGM which is within non-attainment areas for ozone and $PM_{2.5}$ (Table 6 above), a *General Conformity Rule* applicability analysis is warranted.

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 non-attainment area designations. Projects below the *de minimis* levels are not subject to the Rule. Those at or above the levels are required to perform a conformity analysis as established in the Rule. The *de minimis* levels apply to direct and indirect sources of emissions that can occur during the construction and operational phases of the action.

To determine the applicability of the Rule to this action, emissions were estimated for the ozone precursor pollutants NO_x and volatile organic compounds (VOC), and for $PM_{2.5}$. The US EPA states that NO_x is the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts (EPA, 2006). NO_x is not a criteria pollutant but NO_2, a subset of NO_x, is a NAAQS criteria pollutant. Annual emissions for these compounds were estimated for each of the project actions (construction and operation) to determine if they would be below or above the *de minimis* levels established in the Rule. The *de minimis* for moderate ozone areas is 100 tons per year (TPY) for NO_x and for locations within the Northeast Ozone Transport Region, 50 TPY for VOCs. Sources of NO_x and VOC associated with the proposed project include emissions from construction equipment, construction crew commuting vehicles, painting of interior building surfaces and parking spaces (VOC only), stationary heating units (boilers, generators, and water heaters), and daily commuter traffic. There will be no increase in FGGM employment as a result of this proposed project and therefore no increase in daily commuter traffic, except during the period of construction.

On July 11, 2006 U.S.EPA established *de minimis* levels for $PM_{2.5}$. The final rule established 100 TPY as the *de minimis* emission level under nonattainment for directly emitted $PM_{2.5}$ and each of the precursors that form it (SO_2, NOx, VOC, and ammonia). This 100 TPY threshold applies separately to each precursor. This means that if an action's direct or indirect emissions of $PM_{2.5}$, SO_2, NOx, VOC, or ammonia exceed 100 TPY, a General Conformity determination would be required. However, neither U.S.EPA nor Maryland have found $PM_{2.5}$ problems to be caused by VOC or ammonia and ammonia is not further addressed by the environmental assessment (VOC is addressed as an ozone precursor).

In addition to the evaluation of air emissions against *de minimis* levels, emissions are also evaluated for regional significance. A federal action that does not exceed the threshold emission rates of criteria pollutants may still be subject to a general conformity determination if the direct and indirect emissions from the action exceed ten-percent of the total emissions inventory for a particular criteria pollutant in a non-attainment or maintenance area. If the emissions exceed this ten-percent threshold, the federal action is considered to be a "regionally significant" activity, and thus, the general conformity rules apply.

5.4.2.3 General Conformity Rule Determination

In 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) as well as the Maryland State Implementation Plan, calculation of direct and indirect air emissions for the construction and operations phases of this project are provided in Appendix E to this document.

It has been determined that direct and indirect air emissions resulting from the construction and operational phases of this project fall below *de minimus* levels and therefore this project is not subject to the air conformity determination rule. Additionally, direct and indirect emissions for construction-phases 1 and 2 and for long-term operations for this project were determined not to have regional significance. See Appendix E to this document for detailed calculations.

5.5 Noise

The U.S. Army has an Army-wide noise impact management program to minimize any adverse impacts resulting from its operations. The U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) serves as the center of excellence for the noise program and provides expertise, studies and consultations for the unique noise generated in the course of military operations, testing and training, to protect the health and welfare of soldiers, civilians and surrounding communities.

Vehicular traffic is the main source of noise at FGGM and its surrounding areas. Other sources of noise include the normal operation of heating, ventilation, and air conditioning systems; lawn maintenance; snow removal; and general maintenance of buildings and infrastructure. None of these operations produces excessive levels of noise or noise complaints.

Tipton Airfield previously served military units stationed at FGGM. Closed under the BRAC 95 Program, Tipton Army Airfield has been reopened as a civilian airfield. No noise study is known to have been prepared prior to its reactivation (USACE, 2000).

The new 902nd MI GP facility is an administrative facility. Noise generated by this facility will be limited to automobile traffic and periodic operation of emergency stand-by power generators (average generator operations of about 10 hours per month).

5.6 Socioeconomics and Land Use[6]

5.6.1 Socioeconomics

The socioeconomic Region of Influence (ROI) for Fort Meade consists of Anne Arundel County, Howard County, Montgomery County, and Prince George's County in Maryland. These counties comprise the area in which the predominant socioeconomic effects of the Proposed Action would take place. 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.

The baseline year for the socioeconomic analysis is 2005, although much of the economic and demographic data for the ROI are only available through 2004. The descriptions of the affected environment are based on the most recent data available to most accurately reflect the current economic and social conditions of the ROI.

5.6.1.1 Economic Development

5.6.1.1.1 Regional Economic Activity

The ROI's regional economy is dominated by non-farm industries such as government and government enterprises, retail trade, professional and technical services, and health care. These sectors provide about 44 percent of jobs in the four counties. The agricultural sector contributed only 2,219 out of the 1,545,450 jobs recorded in ROI during 2004 (USBEA, 2004).

With an average annual rate of 3.5 percent in 2005, the unemployment rate for the ROI was below that of the national unemployment rate of 5.1 percent. That rate was also slightly below Maryland's unemployment rate of 4.1 percent.

5.6.1.1.2 Installation Contribution to the Local Economy

Fort Meade employs a total of 30,742 personnel including 5,441 military personnel, 17,256 civilian employees, and 7,775 contractor personnel. The installation workforce accounts for approximately 2 percent of all ROI employment. In 2005, installation expenditures in the ROI totaled $4,000,000,000 of which $1,500,000,000 were for payroll expenditures, 2,200,000,000 for contracts, and $300,000,000 for other expenditures (Hartman, 2006). The average annual

[6] U.S. Army Corps of Engineers, *Base Realignment and Final Environmental Impact Statement for Implementation of Base Realignment and Closure 2005 and Enhanced Use Lease Actions at Fort George G. Meade, Maryland*

salary for civilian workers at Fort Meade is $80,425. Salaries for permanent military personnel at Fort Meade averaged approximately $66,000 in 2007. Relative to size of the ROI, Fort Meade's overall contribution to the regional economy is modest. Fort Meade provides only 2 percent of the ROI total employment, although the Fort's activities likely generate a substantial number of additional indirect and induced jobs. Given the large size and stability of Fort Meade's workforce over time, the installation is well-integrated into the local economy.

5.6.1.2 Region of Influence

FGGM is located in the northwestern corner of Anne Arundel County, less than two miles from the Howard County border and slightly farther from the Prince Georges County border. Anne Arundel and Howard Counties are located in the Baltimore Primary Metropolitan Statistical Area (PMSA), while Prince Georges County is part of the Washington, D.C. PMSA. The Baltimore PMSA includes Anne Arundel County, Baltimore, Carroll, Harford, Howard, and Queen Anne's Counties, and the City of Baltimore. Both PMSA's are part of the larger Washington-Baltimore Consolidated Metropolitan Statistical Area (CMSA). The CMSA consists of 33 counties in three states.

The region of influence (ROI) describes the area potentially subject to direct demographic and economic impacts. The ROI is determined by identifying the counties that will likely: (1) provide the construction workers, and (2) experience the primary expenditures for goods and services during construction of the proposed INSCOM 902nd MI Group and Operations Facility. Based on these criteria, the ROI for the Proposed Action consists of Anne Arundel and Howard Counties. The City of Annapolis is both the state capital of Maryland and the Anne Arundel County seat. The Howard County seat is Ellicott City.

5.6.1.3 Demographics

The most recent Census Bureau estimates indicate that the ROI's population reached 2,554,041 inhabitants in 2005. Montgomery County is the most populous county within the ROI as well as the state, but Howard County (the least populated county in the ROI) has experienced the fastest rate of population growth in the ROI since 1980. (Stats Indiana, 2006b). Population data for the ROI counties, Maryland, and the United States are presented in Table 8 for comparison purposes.

Table 8: ROI Population Growth 1980 - 2005

Location	1980	1990	2000	(Estimated) 2005
Montgomery County	579,053	762,875	873,341	927,583
Anne Arundel	370,775	427,239	489,656	510,878
Prince George's	665,071	722,705	801,515	846,123
Howard County	118,572	187,328	247,842	269,457
Maryland	4,216,975	4,781,468	5,296,486	5,615,727
United States	226,542,250	248,790,925	281,421,906	296,410,404

Source: Stats Indiana, 2006b

5.6.1.4 Housing

Housing characteristics for the ROI are presented in Table 9 for the year 2005, as well as median housing values by county for the year 2000. The majority of housing units in the ROI are owner-occupied, although Ann Arundel and Howard Counties have significantly fewer rental units than the other two counties. The housing units identified in the table include all structure types (e.g., single-family homes, apartments, and mobile homes).

Table 9: ROI Housing Characteristics (2005 Census estimates)

	Montgomery County	Anne Arundel County	Prince George's County	Howard County
Total Housing Units	356,603	199,398	314,221	101,136
Occupied Housing Units	324,565	178,670	286,610	90,043
Owner-occupied	223,017	143,921	177,177	66,479
Renter-occupied	101,548	43,749	109,433	23,564
Vacant Housing Units	10,067	8,267	15,768	2,775
Vacant for Seasonal, Recreational, or Occasional Use	1,707	325	533	325
Median Home Value (2000, Owner-occupied)	210,600	156,500	143,700	198,600

Source: Stats Indiana, 2006c and US Census, 2000

As shown in Table 9, the 2000 median value of owner-occupied housing units in all counties exceeded the national median value of $119,600, although the median home values for Montgomery County were almost 50 percent greater than for Prince George's County (US Census, 2000). It should be noted that within Anne Arundel County, there are plans to construct an additional 6,600 homes in the near future, which would increase the overall vacancy rate and available housing in that county.

5.6.1.5 Public Health and Safety

5.6.1.5.1 Police Services

The FGGM Provost Marshall Office (PMO), with a staff of about 84 persons, provides oversight of Military Police functions on the installation. The PMO resides in the Emergency Services Center, Building 6619, located between Taylor Avenue and York Road, south of Mapes Road. County and state police provide service to the off-post communities surrounding FGGM. The nearest county police station is on the east side of the installation on Annapolis Road, near the Odenton Shopping Center. Eighty-eight officers are assigned to the station and they respond to approximately one-third of the calls for assistance in the Severn-Odenton area. The Military Police at FGGM do not have formal agreements for assistance with either the county or the Maryland State Police and they have limited contact with those police jurisdictions.

5.6.1.5.2 Fire and Emergency Services

The Emergency Services Center also houses the FGGM Directorate for Public Works' (DPW) Fire Protection and Prevention Division. The Fire Protection and Prevention Division has a staff of 42 people, including 2 chiefs and 3 inspectors. Firefighting equipment operates from two stations. The main station is located in Building 4230 at Rock and Roberts Avenues and houses two engine companies. The second station is located at Tipton Airport. This station houses the hazardous materials response unit and a ladder truck.

5.6.1.5.3 Medical Facilities

On FGGM, the Kimbrough Ambulatory Care Center provides outpatient services only. Patients are transported to other hospitals and medical centers near FGGM, as necessary. Civilian facilities include the North Arundel Hospital in Glen Burnie (6 miles east), Laurel Regional Hospital in Princes Georges County (6 miles west), and Anne Arundel Medical Center in Annapolis (12 miles southeast). Military hospitals include the Walter Reed Army Hospital in northwest Washington, DC (30 miles) and the National Naval Medical Center in Bethesda (24 miles).

FGGM provides dental care at three clinics: Epes Dental Clinic, Kimbrough Dental Clinic, and Dental Clinic #2. The U.S. Army Dental Clinic Command operates all three clinics. Veterinary care is provided at the FGGM Veterinary Treatment Facility on an outpatient basis and by appointment.

5.6.1.5.4 Hazardous Material/Waste, Contaminated Sites, and Spill Response

Installation storage, use and disposal of HAZMAT pose a potential threat to public health and safety at FGGM. Although access onto FGGM is restricted, military personnel, visitors, civilian workforce personnel, and nearby residents could be potentially exposed to HAZMAT from an accidental release. No munitions storage or training activities are known to pose a threat to public safety. FGGM is a Superfund site, but the proposed project site is not on or adjacent to known or potentially contaminated sites.

FGGM has prepared a Spill *Prevention, Control, and Countermeasures Plan (SPCCP) / Installation Spill Contingency Plan (ISCP)* (Versar, 2002). In accordance with state and Federal law and Army regulations, the SPCCP/ISCP is updated at least every 3 years, or when significant changes in operations occur that could impact the likelihood of a spill. FGGM has also prepared a *Installation Hazardous Waste Management Plan* (U.S. Army Center for Health Promotion and Preventive Medicine, December 2001). Those who handle or manage HAZMAT or hazardous waste are trained in accordance with Federal, state, local and Army requirements. Each facility has appointed an emergency management coordinator, who is responsible for emergency response actions until relieved by HAZMAT spill response personnel.

No installation-wide evacuation plan exists; however, the ISCP provides emergency response instructions for spills and uncontrolled releases of HAZMAT. Instructions include notification, probable spill routes, control measures, exposure limits, and evacuation guidelines. Material Safety Data Sheets (MSDS) that provide information about health hazards and first-aid procedures are included in the ISCP.

5.6.1.6 Family Support Services

FGGM provides extensive family support services to both military and civilian personnel and their families. In addition, Federal, state, and local public services offer many services, including family counseling, financial assistance, employment referrals, and emergency relief. Further, local school systems, religious and civic organizations, and community volunteer programs provide family support services.

5.6.2 Land Use, Zoning, and Buffers

5.6.2.1 Regional Geographic Setting and Location

Fort Meade encompasses approximately 5,067 acres and is a permanent U.S. Army installation located in the northwest corner of Anne Arundel County, Maryland. The installation is located 17 miles southwest of downtown Baltimore, Maryland, and 24 miles northeast of Washington, DC. The city of Annapolis, which is both the Anne Arundel county seat and the Maryland state capital, is 14 miles southeast of the installation. The southeastern part of Howard County extends within 2 miles of Fort Meade. Figure 1-1 depicts the regional location of Fort Meade.

Fort Meade is bounded by the Baltimore-Washington Parkway (MD 295) to the northwest, Annapolis Road (MD 175) to the east, Patuxent Freeway (MD 32) to the south and west, and the MARC Penn Line and AMTRAK Line to the southeast. Other significant nearby transportation arteries include US Route 1 and Interstate 95, which run parallel to and just to the north of the Baltimore-Washington Parkway. Interstate 97, which connects Baltimore and Annapolis is located several miles east of Fort Meade and can be reached by taking MD 175 or MD 32 east.

To the north, west, and east, the installation is predominately surrounded by residential areas, commercial centers, a mix of light industrial uses, and open space and undeveloped areas. Directly to the south of Fort Meade are the Tipton Airport and 12,750-acre Patuxent Research Refuge, part of the U.S. Fish and Wildlife Service's National Wildlife Refuge System. To the southwest of Fort Meade is the 800 acre parcel that houses the District of Columbia (DC) Oak Hill juvenile detention facility.

The Chesapeake Bay is approximately 12 miles to the east and the Little Patuxent River runs along a part of the southwest corner of the installation. Two of the river's tributaries, Midway Branch and Franklin Branch, also flow south through the Fort Meade. Fort Meade is a part of the Chesapeake Bay watershed.

The proposed 902nd MI Group project site is located in the southeast corner of FGGM bounded to the west by Ernie Pyle Street, to the east by Chamberlin Avenue, 6th Street to the north, and 4th Street to the south (Figure 13). This is consistent with land use classifications in the *Fort Meade Property Management Plan and Master Plan* (Fort Meade, 1998a). This site is within a previously developed area classified as "Administrative Area Expansion" The installation commander has approved the siting of the proposed facility.

5.6.2.2 Installation Land

Table 10 below provides the total number of acres by land use category. Figure 22 on the following page shows current Fort Meade land use.

Table 10: Land Use at Fort Meade

Land Use	Acres	Percent
Operations	458	9%
Tenant Agency	429	8%
Housing	1,119	22%
Community	137	3%
School (County)	156	3%
Open Space	2,768	55%
Total	**5,067**	**100%**

Land use categories at Fort Meade include operations, tenant agency, housing, community, school (Anne Arundel County), and open space. The land use categories are summary and further described as follows:

- Operations – Land use that facilitates installation and tenant operations including administrative, training and education, and industrial operations. Includes those areas used by the Environmental Protection Agency (U.S.EPA) and Architect of the Capitol.
- Tenant Agency – Not available.
- Housing – Land use that includes family housing, unaccompanied troop housing, and troop dining, and personnel support.
- Community – Land use that accommodates morale, welfare, and recreation (MWR) and related functions such as retail, recreation, fitness, and school age services.
- School – Land use that includes Anne Arundel County elementary, middle, and high schools.
- Open Space – Land use that includes undeveloped areas, forested areas, the golf courses, and the three EUL sites. Roads, paved areas (including parking), and small structures may be included.

5.6.2.3 Surrounding Land Use

The area around Fort Meade that was once mostly expansive farmland and open space is now characterized as a suburban area supporting Baltimore, Maryland and Washington, DC. Significant commercial, residential, and industrial growth has occurred in the area, and is projected to continue into the near future (Fort Meade, 2005a).

Fort Meade is surrounded to the north, west, and east by residential areas with low-medium density (2 to 5 dwellings per acre), medium density (5 to 10 dwellings per acre), and high density (10 or more dwellings per acre); commercial centers; a mix of industrial uses; and open space and undeveloped areas. Areas along transportation routes such as MD 198, MD 32, and MD 175 are moderately developed with mixed-uses, many of which cater to Fort Meade personnel and dependents. The majority of the Patuxent National Wildlife Refuge remains undeveloped and devoted to wildlife research and protection. To the southwest of Fort Meade adjacent to the western edge of NSA is 800 acres that houses the DC Oak Hill juvenile detention facility, which is characterized by an abundance of open space and undeveloped land surrounding clustered development.

Towns near Fort Meade include Odenton to the east, Jessup to the north, and Laurel to the west. Other significant developments within a few miles of the installation include the Maryland House of Corrections to the north; the Arundel Mills Mall Outlet and surrounding mixed-use developments to the northwest; and the Baltimore/Washington International Thurgood Marshall Airport to the northeast.

5.6.3 Regional Land Use Planning

Anne Arundel, Howard, Montgomery, and Prince George's Counties are defined as the Region of Influence (ROI) for Fort Meade. All four counties are located within the State of Maryland. This section provides a brief summary of current planning efforts and land use regulations by county, as well as the State of Maryland. Particular focus is given to proposed and on-going development in Anne Arundel County near the installation.

At a state level, Maryland has taken a leadership role in land use management and future development. The state has established a goal of restoring and protecting quality of life in established communities by addressing issues of state investment, economic growth, community revitalization, and resource conversion. Focus is placed on the following areas of smart growth:

- **Community Revitalization.** Protect older communities and direct new investment to these established areas.
- **Brownfields.** Increase efforts to cleanup and redevelop underused industrial sites.
- **Transit-oriented Development.** Build livable communities that provide more transportation choices, reduce congestion, and maximize transit investments.
- **Priority Funding Areas.** Streamline state regulations to make well-designed development easier to build inside the state's designated growth areas.
- **Local Government Involvement.** Respect the local role of jurisdictions in land-use planning.

All counties within Maryland and the Fort Meade ROI have adopted general plans that guide their land use and zoning policies and ordinances. The Annotated Code of Maryland, Article 25A, provides the authority for counties within the state to plan and zone property.

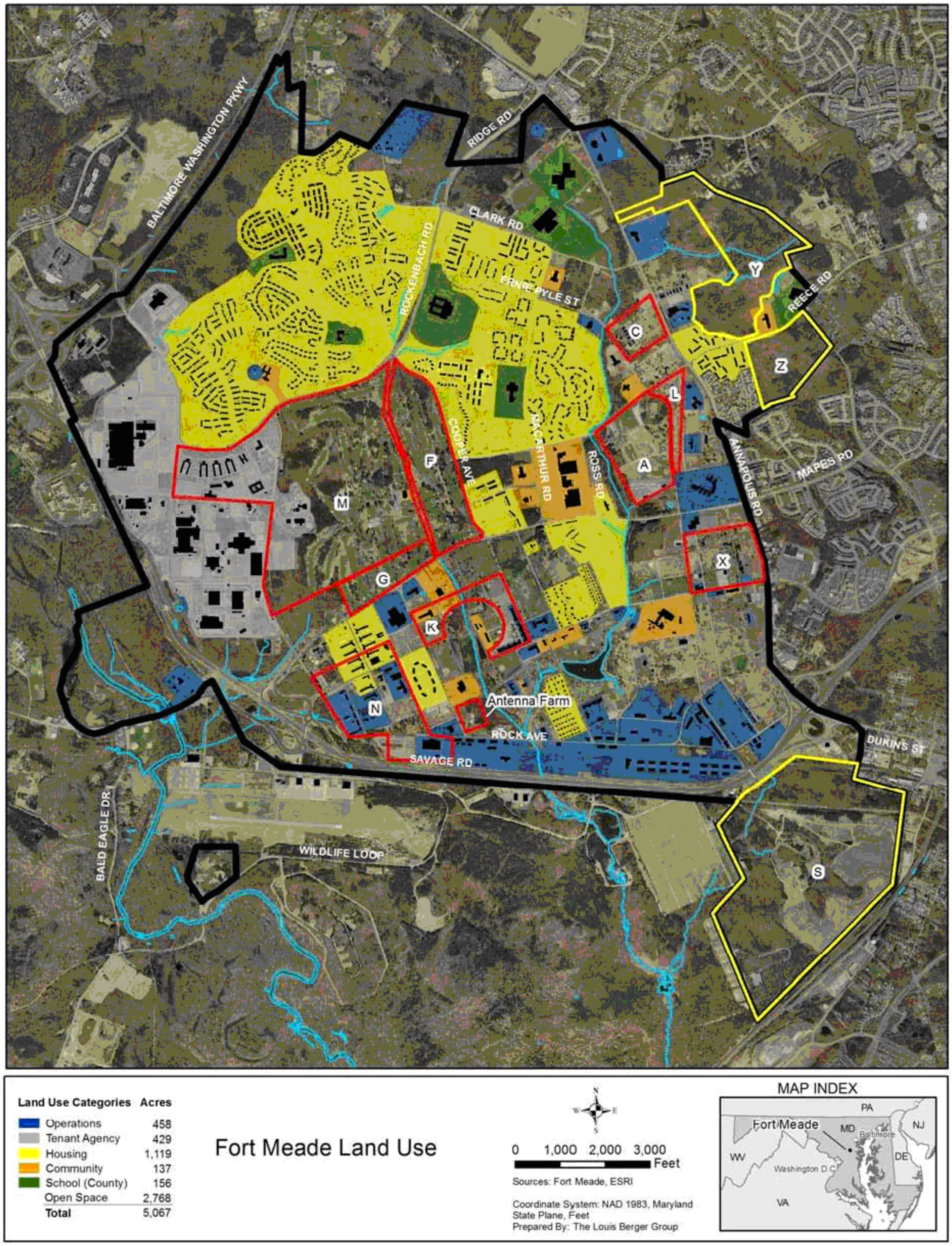

Figure 22: Land Use Categories on Fort Meade

Anne Arundel County Planning. The county adopted its latest General Development Plan (GDP) in 1997. The 1997 GDP helps guide development, preservation and the location of public facilities in the county. Among the recommendations on how the county might better manage growth, conserve the environment, and meet residents' needs over the next 25 years, the plan suggests that the county direct its efforts on improvements such as sidewalks, roads, and schools within existing neighborhoods before building new facilities elsewhere. It encourages development within three town centers (known as the Glen Burnie Urban Renewal Area, Odenton Growth Management Area, and Parole Growth Management Area), around key MARC and Central Light Rail stations, and near existing commercial and employment centers (Anne Arundel County, 2006a).

Of particular relevance to Fort Meade is the amount and type of development occurring adjacent to the installation perimeter. The 1997 GDP projects that the majority of 55,000 new jobs generated over a 25-year period would be located in the western part of the county near Fort Meade, and Baltimore/Washington International Thurgood Marshall Airport.

Anne Arundel County has also developed localized plans and the county's Odenton Small Area Plan has the most relevance with respect to Fort Meade and is summarized as follows (Fort Meade, 2005a):

> Odenton is and would continue to be one of the prime economic development regions of the county. Odenton lies within a strategic transportation corridor southwest of Fort Meade, a factor that has guided its historical development. It has abundant pedestrian, greenway, road, and rail connections. Odenton has 37,916 residents or 7.74 percent of the total population in Anne Arundel County. From 1990 to 2000, Odenton's population increased by 34 percent. This population growth rate was significantly above the County's overall rate of 14.6 percent. By 2010, Odenton's population is projected to increase to 44,400. Between 1990 and 2000, the area's housing inventory increased by 5,132 units (61 percent). From 2000 through 2010, households in Odenton are projected to grow by another 2,920 units (23 percent). Most of the employment growth is projected to take place at Fort Meade and the Odenton Town Center Area. Future growth, with a concentration in the Odenton Town Center, Fort Meade, and two Planned Unit Developments (Seven Oaks and Piney Orchard areas), would continue to pose challenges to traffic (both vehicular and pedestrian), adequacy of public services, neighborhood conservation, and preservation of environmental resources. Highlights of this plan include the following items that would have a direct impact on the installation:
>
> - Preservation of Streams and River
> - Hiker/Biker Trail Connection
> - Public Transit
>
> Within the Odenton Small Area Plan, several sub-areas have been identified and have a direct impact on Fort Meade with respect to future development and planning.
>
> - The Odenton Town Center is a 1,620 acre area located adjacent to and south of Fort Meade, which has an important economic influence on the area along MD 175. Odenton is one of three designated "Town Centers," in Anne Arundel County. Building heights are up to eight stories in the main area of retail and mixed use spaces southeast of the installation, with three to four story buildings comprising the Town Center along MD 175 across from the installation.
> - The North Odenton Development Area immediately adjacent to Fort Meade along MD 175 is targeted for retail and office redevelopment and improvements with buildings limited in height to four stories. The expansion of MD 175 could increase traffic, impacting daily access to Fort Meade. However, additional retail and commercial development would increase the convenience to Fort Meade personnel and for industries that directly support the installation.

- The Village at Odenton Station area, adjacent to the proposed Fort Meade Golf Course south of MD 32, is a transit oriented development (TOD) featuring apartments and condos built over retail and restaurant space.

Other planned developments in or near Odenton include Parkside and Arundel Preserve. Parkside is being planned primarily as a residential community with limited office and retail space. Plans for this 210 acre development call for 80 percent residential development, which equates to approximately 1,000 townhouse, condo and single-family units, with 15 percent office and 5 percent retail. The 270 acre Arundel Preserve adjacent to Arundel Mills Boulevard will feature 1,170 residential units, including single-family homes, town-homes, and apartments. In addition, a 140-room hotel (from a brand to-be-named), a bank, an inline 10,000-square-foot strip retail center with a restaurant and one more pad site "that will probably be a gas station" is also part of the mix (The Business Monthly, 2006).

5.6.3.1 Aesthetics

The *Fort Meade Installation Design Guide* identifies specific visual zones on the installation, defined by location, character, assets, and liabilities. The proposed 902nd MI Group Administrative and Operations Center has been appropriately sited in the “Administrative Area Expansion” land use zone. World War II wooden structures existed previously on this site, but they have been demolished and the area now consists of open grass space (Figure 5).

5.7 Utilities

5.7.1 Water Supply, Treatment and Distribution

5.7.1.1 Supply

FGGM obtains its potable water from a combination of groundwater wells. The installation uses approximately 3.3 million gallons per day (mgd) of water on average. Peak summer demand rarely exceeds 6 mgd. FGGM also maintains approximately 3.475 million gallons of water for emergency use in eight on-post storage tanks (USACE, 1997).

Daily demands are met by three or four of the six groundwater supply wells. The installation operates the withdrawal of water under a Water Appropriation and Use permit from the Maryland DNR, Water Resources Administration. The permit allows an average of 2 mgd of water to be withdrawn annually from each of the installation’s groundwater supply wells.

The groundwater supply wells have static water levels ranging between 80 and 120 feet below ground surface (bgs). The individual well capacities vary from 300 to 1,000 gallons per minute (gpm). Total capacity of the six wells is 5,000 gpm or 7,200,000 gallons per day (gpd).

5.7.1.2 Treatment and Distribution

FGGM operates its own water treatment plant (WTP) located in the southwest quadrant of the installation cantonment area near the intersection of Mapes and O’Brien roads. The WTP, a multimedia filtration plant with a clearwell capacity of 2 million gallons, receives raw water from the wells. The treatment capacity of the plant is 8.2 million gallons. The water is treated for turbidity, iron, and manganese. Fluoride is added to the water before it is distributed (USACE, 1997).

FGGM's average water treatment (consumption) for the FY 94-96 period was approximately 3.3 mgd. Using the FGGM's installation population figures per the Army Stationing and Installation Plan, the average per capita FGGM water consumption is approximately 90.0 gallons per capita per day (gpcd). This consumption figure is consistent with normal planning figures used in the engineer plan books "Civil Engineering Reference Manual" and "Standard Handbook for Engineering Calculations." The existing water treatment and distribution system can support a population range of approximately 54,000 to 91,000 persons (Fort Meade, 1998a).

5.7.2 Wastewater Collection and Treatment

The FGGM wastewater treatment plant is a modified activated sludge wastewater treatment plant. The plant is located adjacent to the Little Patuxent River near the intersection of MD 198 and MD 32 in Anne Arundel County, Maryland. The plant includes a headworks, chemical flocculation, primary clarification, activated sludge process with nitrification/denitrification, tertiary filtration, chlorination/de-chlorination, re-aeration tanks, sludge storage, and surge basins. The plant differs from a traditional activated sludge process in that lime, coagulant, and polymer are added upstream of the clarifiers to increase efficiency in removing biological oxygen demand (BOD) and total suspended solids (TSS). In addition, the modification of the second stage aeration basins to mix, but not aerate, allows for the denitrification of the oxidized nitrogen compounds. Another difference is that filtering the effluent in the tertiary filtration process results in a lower TSS concentration compared to most conventional plants (Fort Meade, 2006. Wastewater Systems Fort George G. Meade Draft Planning Charrette Report December 5, 2006).

The wastewater treatment plant has been operating for about 16 years and has undergone numerous upgrades since its inception. A capacity analysis conducted in 2002 by URS, indicated that the current flow to the treatment plant is 2.2 million gallons per day (mgd), which is approximately 50 percent of the original design capacity of 4.6 mgd. Similarly, the maximum observed flow was 4.18 mgd compared to the maximum design result flow of 12.3 mgd.

5.7.3 Storm Water Collection

The Environment Article Title 4, Subtitle 2, Annotated Code of Maryland states that "…the management of storm water runoff is necessary to reduce stream channel erosion, pollution, siltation and sedimentation, and local flooding, all of which have adverse impacts on the water and land resources of Maryland" (MDE, 1998). Code of Maryland Regulations (COMAR) 260901-260902 also require that all jurisdictions within the state implement a storm water management (SWM) program to control the quality and quantity of storm water runoff from new development. Storm water management at FGGM adheres to these principles and has based its management plans and procedures on state and county guidelines. FGGM currently operates under National Pollutant Discharge Elimination System (NPDES) Storm water Discharge Permit 97-SW-0700.

Since new mission and realignment activities recently implemented at FGGM have increased the development on post, FGGM planners follow the installation's Comprehensive Watershed Management Plan developed by the U.S. Army Corps of Engineers that addresses storm water runoff issues within a larger context. Emphasis has been placed on devising more effective SWM techniques. All planned and newly constructed FGGM SWM structures are based on designs following the MDE's guidance, published in the 1998 Maryland Storm water Design Manual (MDE, 1998). On-post SWM features are incorporated as necessary to comply with state and county regulations.

Currently, on-post storm water runoff is routed directly to surface water streams or to existing SWM ponds through a combination of pipe and inlet systems and open ditches. Built-up areas are generally equipped with pipe and inlet systems. Because these areas typically contain small, isolated systems, conveyances pipes usually do not exceed 30 inches in diameter (Fort Meade, 1998a).

For the most part, storm water runoff from FGGM is conveyed into three different drainage areas on the installation:

- West Area is generally west of O'Brien Road (including NSA), the 8500 and 8600 Areas, and Tipton Army Airfield, which eventually discharge into the Little Patuxent River.
- Central Area is east of O'Brien Road and west of MacArthur Road, which drains into the Midway Branch.
- East Area is east of MacArthur Road to MD Route 175 that includes Burba Lake and drains into the Franklin Branch.

5.7.4 Electrical Supply

Baltimore Gas and Electric (BG&E) provides electricity to FGGM and the surrounding off-post area. A 115-kilovolt (kV) transmission line brings electricity to government-owned master substations on the post. The primary electrical power source for FGGM (non-NSA) is a 110-kV (3 phase-4 wire) redundant feeder pair from the BG&E Waugh Chapel Power Station that runs along the south and east sides of the installation (along MD Route 32) on steel towers and terminates at Substation #3 (USACE, 1999). Studies using FY 93 and FY 94 data revealed an August 1993 peak of 22,800 kV. This represents 76 percent of the Substation #3 rated capacity. These studies suggest that, given the energy saving measures applied at FGGM, Substation #3 should be able to handle typical growth of installation activities without impacting power supply redundancy (Fort Meade, 1998a).

5.7.5 Natural Gas

FGGM is supplied with natural gas by BG&E. The natural gas distribution system at FGGM is extensive and includes primary mains and service connections throughout the installation. Natural gas is supplied via high pressure (100 pounds per square inch) mains, which form a loop around the installation. The proposed 902nd MI Group facility will use natural gas as a heating source.

5.7.6 Diesel Fuel

The 902nd MI Group facility emergency backup power generators will operate on diesel fuel. Fuel will likely be stored in a below-ground storage tank due to space constraints on the site.

5.7.7 Solid Waste Collection and Disposal

FGGM's *Integrated Solid Waste Management* (ISWM) Plan defines procedures for disposal of solid waste on the installation including municipal solid waste and recyclables. In accordance with the Federal Facilities Compliance Act of 1992 (FFCA), FGGM's ISWM Plan complies with the Solid Waste Disposal Act (SWDA) amended to included federal installations.

FGGM generates approximately 21,772.57 tons per year of solid waste or 59.65 tons per day (Marquart 1999; Fort Meade 1998b). Approximately 20.74 tons of municipal solid waste per day are disposed of through the Annapolis Junction Transfer facility. FGGM's solid waste is ultimately transported to the King George Landfill in King George, Virginia for disposal. The existing capacity of the King George Landfill is 29,839,405 tons. Between 3,500 and 4,000 tons are received daily at the facility (USACE, 2000). Any solid waste that is not accepted through the Annapolis Junction Transfer facility is disposed of at the Millersville Sanitary Landfill in Anne Arundel County; the amount is negligible (Fort Meade, 1998b).

According to the most recent information, a total of 38.91 tons per day of recyclable materials are collected on post. Aluminum and paper products comprise approximately 2.29 tons of the daily recyclable materials; and they are collected at the FGGM Recycling Center. The remaining 36.62 tons of recyclable materials generated per day are comprised of sewage (5.85 tons), yard waste (15.13 tons), scrap metal (15.15 tons), used tires (0.32 tons), and waste oil (0.17 tons). These materials are recycled through FGGM's DRMO Recycling and AAFES Recycling Programs (Fort Meade, 1998b).

5.8 Traffic and Transportation

5.8.1.1 Surrounding Roadways

FGGM is located in the western part of Anne Arundel County and is served by the surrounding roadway network:

- Baltimore-Washington Parkway (MD Route 295), located west of FGGM, provides north-south access to the installation between Baltimore and Washington, D.C. No trucks are permitted on the parkway south of MD Route 175.
- Interstate 95, located west of FGGM, provides north-south access to the installation for all vehicular traffic.
- MD Route 175, located along the eastern boundary of FGGM, provides access from Interstate 95 and MD Route 295, west of FGGM, and from MD Route 3, east of FGGM.
- MD Route 32 (Patuxent Freeway) is located along the southern boundary of FGGM and provides access to FGGM and Odenton from the Baltimore-Washington Parkway and Interstate 97, east of FGGM.

5.8.1.2 Access to Fort Meade

Access to Fort Meade is obtained through ten control points, eight of which are open and staffed on a regular basis. The intersections and interchanges are presented in Table 11 below. At each control point, security guards check identification and inspect vehicles before allowing access into the installation (except at the closed gate(s)). Guards at MD 175 and Reece Road are authorized to issue one-day visitor permits after reviewing personal identification and vehicle registration, and searching the vehicle.

Table 11: Fort Meade Access Control Points

Description	Interchange or Intersection	Comment
BW Parkway – NSA	Interchange with gate	Restricted entry- authorized personnel only
MD 32 & Canine Road – NSA	Interchange with gate	Public access to Cryptologic Museum, visitor access to facility
MD 32 & Samford Road – NSA	Interchange with gate	Restricted entry
MD 32 & Mapes Road	Interchange then intersection and gate	Restricted entry
Truck Gate @ MD 32	Interchange then intersection and gate	Truck entry only
MD 175 & Rockenbach Road	Intersection with gate	Restricted entry
MD 175 & Reece Road	Intersection with gate	Visitor access to facility through control gate with search
MD 175 and Mapes Road	Intersection with gate	Restricted entry
MD 175 and Llewellyn Avenue	Intersection with gate	Restricted entry, temporarily closed at time of study6
Rock Avenue and Baldwin Road – Left of "T" from Pepper near Salt Dome	Intersection with gate	Presently closed but can be opened in case of emergency

5.8.1.3 Existing Traffic

The State Highway Administration (SHA) has permanent traffic counters throughout the state, and performs periodic traffic counts on other roads. For the purpose of this analysis, major roadways are defined as those providing direct access to Fort Meade, while minor roadways are defined as roads near Fort Meade, not providing direct access. Based on SHA traffic counts on major and minor roadways near Fort Meade, traffic volumes increased by up to four percent from 2001 to 2005. The highest increase in traffic volume occurred on MD 32, west of the intersection of MD 32 and I-95; on MD 170 Telegraph Road, 0.1 mile north of MD 175; on MD 170, 0.1 mile south of MD 174; and on MD 175, 0.2 mile north of MD 3. Further details on traffic volumes at specific roadways are provided in Table 11 and Table 12 below.

Table 12: Roadway Traffic Volumes and Trends: Major Roadways

			Annual Average Daily Traffic					Average Annual Change: 2005-2001
County	**ID #**	**Description**	**2001**	**2002**	**2003**	**2004**	**2005**	
Howard	ATR#69	MD 32 west of intersection with I-95	85,348	87,081	93,111	91,486	102,875	4%
Howard	B2580	MD 32 between I-95 and Route 1	69,175	71,350	72,125	75,675	74,250	1%
		MD 32 between Route 1 and						
Howard	B2586	BW Parkway .10 M E US 1	63,675	65,650	66,325	65,475	64,250	0%
Anne Arundel	B0807	MD 32 between Route 1 and BW Parkway	58,775	60,550	61,225	63,375	62,150	1%
Anne Arundel	B0797	MD 32 between BW Parkway and Mapes Road	51,675	53,250	53,825	49,775	48,850	-1%
Anne Arundel	B0798	MD 32 between Mapes Road and intersection with MD 175	45,575	46,950	47,425	51,675	50,650	2%
Anne Arundel	B0844	MD 32 between MD 175 and Telegraph Road	38,975	40,150	40,625	42,075	41,250	1%
Anne Arundel	B0845	MD 32 between Telegraph Road and	37,675	38,850	39,225	40,575	39,850	1%
Anne Arundel	B20013	MD 32 between and merge with I-97	39,475	40,750	41,225	41,375	40,550	1%
Howard	B2593	MD 175 west of intersection with I-95	61,925	58,575	59,250	59,825	61,075	0%
Howard	B2562	MD 175 between I-95 and Route 1	48,900	44,275	44,750	45,225	43,875	-2%
Howard	B2561	MD 175 between Route 1 and BW Parkway .5 M S of US1	20,100	16,675	16,850	17,025	19,975	0%
Anne Arundel	BO 813	MD 175 between Route 1 and BW Parkway .1 M S How Co line	21,275	21,950	22,225	19,375	19,050	-2%
Anne Arundel	BO 677	MD 175 between BW Parkway and Mapes Road - .2 M S of 295	28,775	2,950	29,925	26,475	25,950	-2%
Anne Arundel	BO 676	MD 175 between Ridge Road and Reece Road -.3 M N of 174	21,375	22,050	22,325	22,775	22,350	1%
Anne Arundel	BO 674	MD175- .2 M N of MD 3	8,875	9,150	9,225	10,275	10,150	3%
Anne Arundel	ATR #25	I-295 South of MD 100	83,955	89,675	92,275	92,575	91,975	2%
Anne Arundel	BO 716	I-295 South of MD 175	80,575	83,050	83,925	82,975	81,350	0%
Anne Arundel	BO 715	I-295 South of MD 32	82,175	84,650	85,525	86,075	84,450	1%
Anne Arundel	B020010	MD100 E of MD295	77,875	80,250	81,125	77,275	75,750	-1%
Anne Arundel	B020011	MD100 E of Harmans RD	66,775	68,850	69,525	72,975	71,550	1%

Table 13: Roadway Traffic Volumes and Trends: Minor Roadways

			Annual Average Daily Traffic					Average Annual Change
County	**ID #**	**Description**	**2001**	**2002**	**2003**	**2004**	**2005**	
Minor Roads								
Anne Arundel	BO 747	Reece Road MD 174 .10 M E of Jacobs Rd W	8,950	9,225	10,075	10,250	10,025	2%
Anne Arundel	BO 748	Reece Road MD 174 .10 M W of MD 170	16,250	16,725	16,675	16,850	16,525	0%
Anne Arundel	BO 785	Ridge Road MD 713 .10 M S of MD 176	15,450	15,925	15,775	15,950	15,625	0%
Anne Arundel	BO 784	Ridge Road N of 175	14,750	15,225	15,975	16,150	15,835	1%
Anne Arundel	BO 783	Ridge Road S of 175	11,750	12,125	8,575	8,750	8,625	-5%
Anne Arundel	BO 697	Route 198 .30 M E of BW Parkway - I 295	27,475	28,350	28,625	26,175	25,750	-1%
Anne Arundel	BO 815	Route 198 W of BW Parkway.10 M E of Pr. Georges Co Line	41,475	42,750	43,225	43,375	42,550	1%
Anne Arundel	BO 656	MD 170 Telegraph Road .1 M	12,300	14,875	15,050	15,225	14,775	4%
Anne Arundel	BO 811	MD 170 Telegraph Road .1 M S of MD 174	20,500	21,375	21,650	21,925	24,575	4%

Source: Maryland Department of Transportation, State Highway Administration, Highway Information Services Division's AADTS Report by Station, 2001-2005

5.8.1.4 Transit

Although it lacks direct access, Fort Meade is relatively close to several major intermodal transportation air and rail hubs including:

- Air: Baltimore Washington International - Thurgood Marshall Airport is approximately 10 miles7 from Fort Meade.
- Metro (Baltimore): Maryland Transit Administration's (MTA) Metro heavy rail system provides high-speed transit service in a 15.5 mile corridor from Owings Mills in western Baltimore County through downtown Baltimore to Johns Hopkins Hospital. With the potential to transfer to light rail or MARC service (on the Camden line), additional portions of Baltimore City and Baltimore County may be considered as having potential transit access to Fort Meade.
- Light Rail (Baltimore): MTA's Central Light Rail Line provides high-frequency, medium-speed transit service along a north-south 30-mile corridor from Baltimore County to Anne Arundel County. It intersects with the Metro (less than 1 block separation) and connects with many local bus routes. Near Fort Meade, it can be accessed at either the Cromwell/Glen Burnie station or the BWI Business District station, both less than nine miles from the Fort.
- Intercity and Commuter Rail: MTA's Maryland Commuter Rail (MARC) service provides high-speed, medium-frequency commuter rail service in the Baltimore-Washington region and beyond. In the Baltimore region, MARC trains operate in two existing rail corridors totaling 77 miles, with stations in all jurisdictions except Carroll County. The Penn Line runs between Perryville in Cecil County and Union Station in Washington DC and stops at eight stations in the region. The Camden Line runs from Camden Station in Baltimore to Union Station and stops at six stations in the region. Several MARC stations are near Fort Meade; it is approximately 3.5 miles to the Odenton

MARC station (Penn line), (1.5 miles from the nearest access gate), approximately 8 miles to the BWI MARC station (Penn line), less than eight miles to the Laurel MARC station (Camden line), and less than seven miles to the Jessup MARC station, also on the Camden line. Currently MARC service on the Penn Line provides 38 stops per day at the Odenton MARC station. This station records the highest usage of any suburban station on the MARC system with 2,100 average daily boardings.

- Amtrak: With Amtrak stations in Washington, DC, Baltimore and BWI, connections can be made throughout the country.
- Metro (Washington): The Washington Metropolitan Area Transportation Authority (WMATA) Metro system can be accessed at the New Carrollton station, approximately 19 miles from the post, and at the Greenbelt station – almost 25 miles by road because of the orientation of the access roads to the station. Bus service connections to Metro stations are included in Table 4-23 below.
- Bus Service: MTA, WMATA, and Corridor Transportation Corporation (CTC) Connect-A-Ride (sponsored by Anne Arundel and Howard Counties) provide a variety of bus services in the vicinity of Fort Meade. Only one route, however, (K Route) currently directly serves Fort Meade. Similarly, the F Route is the only route that serves NSA. Table 14 on the following page summarizes the services currently provided.

5.8.1.5 Aviation

Three major commercial airports, four small airfields, and one military airfield are located near FGGM. The commercial airports are in Anne Arundel County, Maryland (Baltimore-Washington International Airport); Alexandria, Virginia (Ronald Reagan National Airport); and Loudoun County, Virginia (Washington-Dulles International Airport). Andrews Air Force Base in Prince Georges County, Maryland, provides air cargo and military transportation. Three of the small airfields are located in southern Anne Arundel County and one is located in western Prince Georges County. Tipton Army Airfield, a small airfield located in the southwest section of FGGM, formerly served the military units stationed at FGGM. Under the BRAC Program, DoD closed Tipton Army Airfield in September 1995. In the fall of 1999, the property was leased to Anne Arundel County, which now operates Tipton as a general aviation airport.

5.9 Hazardous Waste

FGGM's Department of Public Works, Environmental Management Office (DPW-EMO) coordinates inventories of hazardous materials and the disposal of hazardous waste. Emergency response to spills of hazardous materials and hazardous waste is conducted through onsite coordinators, the installation fire department, and the installation hazardous material (HAZMAT) team.

Table 14: Bus Service Summary

Service Provider	Route Number/ Name	Main or Most Pertinent Origin	Main or Most Pertinent Destination(s)	Weekday Frequency (approx.)	Comment
MTA	17	Patapsco Light Rail Stop	Arundel Mills Mall	22	Also Saturday, Sunday service
CTC	M	Overflow Parking Lot	Odenton MARC Station	Every 10 minutes	Peak hours Monday thru Friday
CTC	Purple	Elkridge	Laurel Mall	12	Mon-Fri
CTC	Red Express	Columbia Mall	Arundel Mills & BWI	16	Hourly service 6:30 am – 9:30 pm weekdays, some Sat / Sun svc.
CTC	Blue	Columbia Mall	Savage MARC Station, National Business Park	3	Mon-Fri
CTC	B	Laurel Mall	MD 198 & Laurel Racetrack	25	Service every 30 minutes from 6 am to 6 pm Mon-Fri
CTC	F	Laurel	NSA Bus Shelters	2	2 am peak (arrive at NSA at 6:46 and 7:46) and 2 pm peak trips weekdays
CTC	J	Laurel	Arundel Mills, Glen Burnie	16	Hourly service 6:00 am -10:00 pm weekdays, some Sat / Sun svc.
CTC	K	Arundel Mills	Odenton	16	Hourly service 6:30 am – 10:40 pm weekdays, some Sat / Sun svc. Circuitous route, has stop at Reece Road gate
WMATA	B27	Bowie	New Carrollton Metro Station	13	AM peak, PM peak and evening service Mon - Fri
WMATA	B29	Crofton	New Carrollton Metro Station	Approx. 4	AM, PM peak service Mon - Fri
WMATA	B30	Greenbelt Metro Station	BWI Airport, Light Rail Station	25	Approx. every 40 minutes weekday, some Sat / Sun svc.
WMATA	87, 88	Laurel	Greenbelt (87), New Carrollton (88) Stations	15 (87) and 3 (88)	Peak express service; Rt. 89 provides midday service to Greenbelt
WMATA	89, 89M	Laurel	Greenbelt Metro Station	16	Approx. 6:00 am to 7 pm Mon - Fri

5.9.1 Storage and Management of Hazardous Materials and Waste

Procedures for handling, storage, transportation, and disposal of hazardous wastes are outlined in the *Installation Hazardous Waste Management Plan* (U.S. Army Center for Health Promotion and Preventive Medicine, December 2004). The plan also outlines command responsibilities, identification procedures, inspections, personnel training, and spill response and emergency procedures. No treatment of hazardous waste is conducted on the installation, and an outside hazardous waste contractor transports hazardous waste to approved disposal facilities.

The Hazardous Substances Management System (HSMS) is being implemented in order to track all hazardous substances from purchase, issue, and use to turn-in for disposal. All sites that maintain stocks of hazardous materials are instructed by the DPW to submit their inventories to the DPW-EMO. Hazardous material safety data sheets (MSDS) and appropriate Installation Spill Contingency Plan emergency response instructions are based at each site.

All hazardous materials will be catalogued through a HAZMAT facility and checked out on an as-needed basis in small quantities. Unused portions of these quantities are to be turned in to the HAZMAT facility where trained personnel will handle all disposal, storage, and transportation of hazardous materials.

In the event of a spill, the unit first attempts to control and clean up the spill. If the spill exceeds the unit's capabilities, they are to contact the fire department. Once the fire department and HAZMAT team have controlled the situation, the Directorate of Public Works and, if necessary, contract site remediation firms, will complete spill containment, cleanup and waste disposal.

FGGM generates relatively small quantities of a variety of hazardous wastes. The *Hazardous Waste Minimization Assessment: Fort Meade, Maryland* (USACE, 1991) identified 21 categories of waste generators on the installation. An analysis of annual waste disposal data indicated that FGGM generates more than 50 tons of regulated hazardous waste annually. The Directorate of Logistics generates the most waste (14,146 pounds per year [lb/yr]), followed by the Department of Public Works (2,661 lb/yr), hospitals, clinics, and laboratories (2,340 lb/yr), and motor pools (1,736 lb/yr). Approximately 70 percent of the total waste generated consists of paint-related materials and paint thinner waste.

Hazardous wastes are maintained at satellite accumulation areas. After these facilities have reached regulated capacities (55-gal drum for hazardous waste, 1 quart for acutely hazardous waste), the hazardous waste is transported to the Controlled Hazardous Substance Storage Facility (Building 2250). In accordance with US EPA and MDE regulations, a running inventory of hazardous waste is maintained at the storage facility.

5.9.2 Contaminated Areas

The Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA) commonly referred to as Superfund, as enacted by Congress on December 11, 1980. This act is targeted at the cleanup of areas contaminated by releases of hazardous substances into the environment. CERCLA assigns accountability for cleanup costs of contaminated areas by providing federal authority to respond directly to the hazardous substance releases that may endanger public health or the environment. This act created a tax on the chemical and petroleum industries that formed a trust fund used for cleaning up abandoned or uncontrolled hazardous waste site. CERCLA also requires the US EPA to establish and maintain a National Priorities List (NPL) of the most serious uncontrolled or abandoned hazardous waste sites requiring long-term remedial response actions (USEPA 1999; US EPA 1999).

5.9.2.1 FGGM Superfund Site

FGGM was placed on the NPL on July 28, 1998. The U.S. EPA placed FGGM on the NPL based on the evaluation of four sites that had been identified as past storage and disposal sites of hazardous materials and waste that contained hazardous substances: the Defense Reutilization and Marketing Office (DRMO), a Closed Sanitary Landfill (CSL), a Clean Fill Dump (CFD), and the Post Laundry Facility (PLF). Additional sites on FGGM are being addressed through CERCLA, and Remedial Investigations/Feasibility Studies (RI/FS) are currently in process. These sites include:

- Motor pools
- Battery shops
- Industrial areas
- Maintenance shops

Environmental cleanup of potentially contaminated sites on FGGM has consisted of a combination of "removal actions" eliminating the threat to public health and the environment by removing hazardous substances from the site, and "remedial actions" that permanently clean up contaminated sites. Removal actions have been completed at the DRMO site and the Tipton Army Airfield parcel. The Fire Training Area and Post Laundry facility (Building 2250) both have well monitoring activities being conducted on site. Areas along MD Route 32 corridor which has petroleum constituents in the groundwater have well monitoring in place and are undergoing further investigation to recommend cleanup procedures (USACE, 2000).

5.9.2.2 Solid Waste Management Units

In order to comply with obligations under CERCLA (based on known contaminant types and releases), the Army has placed 11 sites into a Performance Based Contract to accelerate investigation and cleanup of these sites. Contaminated areas are generally located along the southern border of the installation and all are undergoing investigative or remediation activities at this time. Areas of industrial contamination are generally located along Route 32 and are not near the proposed 902nd MI Group Headquarters facility site.

The installation's CERCLA initiative is currently operating concurrent with investigative procedures for this environmental assessment. As part of the CERCLA process, contaminated areas are being sampled to determine the extent of contamination. Treatment systems are currently in place, and monitoring is being conducted to determine further courses of action. Investigative procedures and remediation activities continue to be performed concurrent with this assessment, but none of those sites are located in or adjacent to the proposed project site.

5.9.2.2.1 Vehicle Wash Rack on Project Site

A vehicle wash rack and associated oil-water separator are located on the proposed project site adjacent to Building 2630. This wash rack is for use only by emergency vehicles that are parked and maintained in this building. The Fort George G. Meade (Ft. Meade), Environmental Management Office (EMO), retained Versar, Inc. to prepare a Site Investigation (SI) Report for this wash rack.[7] Visual inspections of the site and surrounding area did not identify any evidence of releases of hazardous materials or hazardous wastes associated with current or past operations at the site. Visual (e.g., staining) and olfactory evidence of impacted soil was not observed at any of the soil sampling locations. Soil samples collected at the site were analyzed for gasoline diesel range total petroleum hydrocarbons, volatile organic compounds (VOCs), semi-VOCs (SVOCs), Resource and Conservation Recovery Act (RCRA) metals, herbicides, and pesticides. With the

[7] Site Investigation Report, Wash Rack at Building 2630, Solid Waste Management Unit (SWMU) 78, Ernie Pyle Street, Fort George G. Meade, MD, July 13, 2001.

exception of arsenic, all of the target constituents detected in the samples were below soil Risk-Based Concentration (RBC) values and current Maryland Department of the Environment (MDE) soil cleanup and groundwater protection standards. Arsenic was detected in one of the samples at a concentration exceeding the residential soil RBC; however, the concentration of arsenic detected in this sample was below the industrial soil RBC and MDE soil cleanup standards. A MDE groundwater protection standard has not been established for arsenic. The concentration of arsenic detected in the soil was also within its expected background range for the Ft. Meade area, as well as, anticipated typical concentrations for eastern Maryland. No further investigation or actions were required for the wash rack and oil water separator site.

5.9.3 Permits and Regulatory Authorizations

FGGM operates under a number of permits from various state and Federal agencies. Table 15 following lists the primary permits and authorizations issued to FGGM.

5.10 Cultural Resources

The Fort George G. Meade Cultural Resources Management Plan (Goodwin et al., 1994) and the Fort George G. Meade Phase II Architectural Summary Report (Goodwin et al., 1996) have together identified and evaluated all architectural resources built prior to 1953 at FGGM and determined two resources eligible for the National Register of Historic Places (NRHP): the Post Core Historic District and Building 8688, a water treatment plant.

5.10.1 Historical Resources

WWII temporary frame buildings and their status as cultural resources are addressed under the 1986 and 1988 Programmatic Memoranda of Understanding. The proposed site is not within or adjacent to the FGGM historic district. A review of the FGGM *Cultural Resource Management Plan* (CRMP) did not identify any cultural resources sites in the vicinity of the planned construction area. Also, no structures in the vicinity of the proposed 902nd MI Group Headquarters facility project were determined to be eligible for inclusion on the NRHP.

Table 15: Permits and Regulatory Authorizations at Fort Meade, Maryland

Permit Name or Authorization	Permit Number	Date Issued	Date Expires	Building or Location	Issuing Authority	Authorized Activity
National Pollutant Discharge of Elimination System (NPDES) Groundwater Discharge Permit	00-DP-2634	9-01-06	9-01-11	Golf course	MDE	FGGM is authorized to discharge 133,000 gallons per day of final effluent to irrigate the golf course.
NPDES Wastewater Treatment Plan Permit	01-DP-2533	3-1-02	2-28-07	Advanced Wastewater Treatment Plant (AWTP)	MDE	FGGM is authorized to use the outfall to the Little Patuxent River.
NPDES Storm water Discharge Permit	97-GP-0700	12-1-97	11-30-02	Various	MDE	Allows discharge of storm water from industrial facilities.
NPDES General Discharge Permit	06HT	2-17-06	2-17-11	Various	MDE	Allows discharge of storm water from maintenance and repair activities, water main flushing from tanks and pipes, etc.
General Oil Operations Permit	99-OPT-3191	4-29-99	4-29-04	Various tanks	MDE	FGGM is authorized to receive oil deliveries by truck to any tank on post. No. 2 fuel oil may be used on post.
Medical Waste Incinerator Permit (KACH)	02-0322-2-0117	3-1-99	2-28-04	Kimbrough Army Hospital	Air Management Administration, Maryland Department of Health and Mental Hygiene	Incineration of infectious and potentially infectious waste is authorized. The incinerator is rated at 300 pounds per hour. The permit conditions do not require monitoring. However, ash is sampled quarterly for metals using Toxicity Characteristic Leaching Procedures (TCLP).
Water Appropriations and Use	AA69S021 and AA69G021	2-1-03	2-1-09	Groundwater Wells and the Little Patuxent River	Maryland DNR	Withdrawals of potable water of 2 mgd from each of six wells and 5.25 mgd from the Little Patuxent River is authorized.
Landfill Operations	1992-WSF-0022-0	11-2-95	11-1-00 (Landfill closed – not renewing permit)	FGGM	MDE	Landfill operations contingent upon certain best management practices and conditions.
Secondary Scrap Tire Collection Facility License	1999-RSC-0097	9-30-99	9-30-04	DRMO Recycling	MDE	Collect and store up to 1,500 scrap tires at each of the two sites, prior to their disposal.
Secondary Scrap Tire Collection Facility License	1999-RSC-0099	9-30-99	9-30-04	Army and Air Force Exchange Services (AAFES)	MDE	Collect and store up to 1,500 scrap tires at each of the two sites, prior to their disposal.

* According to Angelo Coliani, FGGM has paid the fee for permit removal and is continuing to operate under the existing permit. MDE is currently reissuing it (in the state permit) and modifications are being made to the requirements (Coliani, 1999).

5.10.2 Archaeological Resources

Prior to the preparation of the 1994 CRMP, limited archaeological investigations were conducted on case by case project driven basis. For the 1994 CRMP, R Christopher Goodwin & Assocs. developed an archaeological sensitivity model to identify low and high probability areas for archaeological sites as well as disturbed areas with no potential. Survey of 2,719.6 acres was recommended, and no survey for 1,825.9 acres. A testing of the sensitivity model on 407.7 acres by means of a Phase I or Reconnaissance Survey yielded six sites. (USACE, 2001) Additional Phase I testing was done on 2,210 acres in 1995. Additional survey work has been done subsequent to the 2001 ICRMP. The net result has been the identification of a total of 36 archaeological with assigned site numbers (not including four cemeteries which have also been assigned site numbers). (Di Giovanni, 2006a) They represent a mix of pre-contact and historic sites, while some have components of both. Examples include a Late Archaic/Early Woodland base camp with lithic material, a late 19th/early 20th century domestic site with nails and ceramic, and a military training landscape with trenches from World War I.

Archaeological sites are typically evaluated for NRHP eligibility based on whether they have yielded, or may be likely to yield, information important in prehistory or history.. They must retain considerable integrity and be a source of important scientific or historical knowledge. In many cases, they can only be evaluated after an additional level of archaeological investigation known as Phase II or Evaluation Testing. At present all identified archaeological sites at Fort Meade have been evaluated for the NRHP. Only one, 18AN1240, has been determined NRHP eligible; all others are not. This finding has been concurred in by the Maryland SHPO. (Di Giovanni 2006b) Therefore, only 18AN1240 is accorded protection under NHPA, protection which would typically require it to be kept undisturbed or, if absolutely necessary, further researched in a Phase III Survey, sometimes called "data recovery" in which all significant information was harvested. Again, cemeteries are subject to other legal mandates, regardless of whether or not they are NRHP eligible. It is Army policy to avoid publicizing the location of archaeological sites to protect them from vandalism.

5.10.3 Native American Resources and Sacred Sites

To date, no traditional cultural properties or American Indian sacred sites have been recorded at Fort Meade. There are no federally recognized Indian tribes present in Maryland. Some federally recognized tribes elsewhere in the United States, however, may have a historical affiliation with the state due to past occupancy by their ancestors. The Cultural Affairs Manager for Fort Meade, with the advice of the Maryland coordinator for Indian affairs, has initiated consultation in accordance with AIRFA and NAGPRA with the seven tribes believed to have a past presence in the state to ascertain their interest in Fort Meade matters. (Di Giovanni, 2006a)

The current Fort Meade 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.

6.0 ENVIRONMENTAL CONSEQUENCES

6.1 Topography and Geology

6.1.1 Topography

As shown in the topographic map at Figure 6, the project site ranges from 161 to 157 feet. Slopes at the proposed 902nd MI Group Headquarters project area are less than five percent and do not preclude construction. Apart from minor landscaping, the proposed project will not change the topography of the site.

6.1.2 Geology

The proposed project consists of only a small facility built on a concrete pad with shallow footings (3 to 5 feet deep), thus having no impact on the geology of FGGM.

6.1.3 Soils

6.1.3.1 Short-term (construction phase) effects

Short-term, direct impacts to soil, as a result of construction, would not be significant. Short-term impacts to soils from the proposed project could result erosion and sedimentation during construction. Mitigating actions to preclude these effects are described in Section 8 to this document. Construction and demolition activities for the proposed project would follow all Federal, State, and local regulations regarding the use of BMPs for sediment and erosion control. A soil erosion control plan will be prepared prior to the commencement of any construction.

6.1.3.2 Long-term effects

No long-term effects to soils will result from this project. This is a previously disturbed cantonment area and engineered fill material is already in place at the site.

6.1.4 Groundwater

Since this project will not include drilling or emplacement of deep wells or foundations, neither groundwater quality nor supply will be impacted. Additionally, the proposed project site is at a location and elevation away from a known contaminated water plume.

6.1.5 Radon

If constructed, the new facility should be assessed for radon in order to control radon exposures and prevent possible adverse health effects to 902nd MI Group Headquarters personnel. If excessive radon levels are detected, mitigation measures will be taken in accordance with current building construction guidelines. However, the proposed site is located in an area of low radon potential.

6.2 Vegetation and Wildlife

6.2.1 Vegetation, plant species, and forested areas

No significant impacts to vegetative resources will occur from the proposed project since the proposed new facility will be constructed in a previously developed cantonment area. No mature trees (6 inch diameter or larger) will be felled for the purpose of providing area for construction of the project. No rare, threatened or endangered plant species were found in or near the proposed project area. Mitigation will be required in accordance with the FGGM reforestation plan and as described in paragraph 8.0 of this document.

6.2.2 Prime and Unique Farmlands

There will be no impacts to prime and unique farmlands. The project site does not contain areas that qualify for protection as prime or unique farmlands.

6.2.3 Wildlife

FGGM has many areas similar to that proposed for the 902nd MI Group Headquarters scattered throughout the installation. As these are generally maintained as grassy areas, mowed meadows, or golf courses, their value as wildlife habitat is limited. Therefore, construction of the 902nd MI Group Headquarters should not significantly impact wildlife resources.

6.2.3.1 Land species

Because the proposed project site is located in a previously developed cantonment area, construction and operation of the proposed facility will not result in adverse effects to wildlife. Wildlife roaming near the proposed project site could be dispersed during the construction phase due to noise and construction activity; however, the impact is short term and not expected to be significant. Construction contracts will include provisions that require contractors to be alert for the presence of wildlife and to advise the FGGM environmental staff if wildlife is observed on or near the construction site.

6.2.3.2 Aquatic species

There are no surface waterways located on the proposed site, and no indirect impacts to aquatic species are expected from erosion, sedimentation, or other storm water contamination into nearby waterways. Runoff from the project site will be controlled by both construction-phase and also permanent storm water best management practices (BMPs).

6.3 Hydrology and Water Quality

6.3.1 Surface Water

No impacts to surface water from the proposed project are anticipated. There are no surface water features (lakes, ponds, streams) on the proposed project site. Some site grading may be necessary, but will not alter the existing surface water hydrology, which drains north-northwest towards Burba Lake (see Figure 6). Storm water runoff calculations are provided at Appendix D to this document.

6.3.2 Wild and Scenic rivers

There will be no impacts to waterways protected under the Wild and Scenic Rivers program since none occur in the vicinity of the proposed project site.

6.3.3 Wetlands

No impacts to wetlands are anticipated from the proposed action. There are no wetlands located within or affected by the proposed project area. Site construction will not encroach upon the narrow band of wetland areas bordering Franklin Branch west of the project site. These wetlands will be protected by implementation of permitted storm water best management practice facilities and by a 100-foot buffer in which native vegetation will remain intact. Maintaining these wetland areas will provide water quality benefits, attenuate flooding and provide important habitat for plants and wildlife.

6.4 Climate and Air Quality

The proposed administrative facility will not use structures, chemicals, or thermal pollution that would impact the climate. Short-term and long-term impacts to air quality will be minor and are classified as *de minimus* as described below. 902^{nd} MI Group Headquarters will not have any significant air emissions producing equipment that changes the Installation's Synthetic Minor Air Permit status.

6.4.1 Short-term (construction phase)

Short-term impacts to air quality will not be significant as delineated in Appendix E to this document. Localized impacts to air quality would result from construction of the proposed facility. Construction vehicles and equipment will generate dust and exhaust emissions. Impacts to air quality would occur primarily during initial site excavation and then later during final site grading and landscaping. These short-term effects will be managed by watering roads/area to minimize dust and other mitigating actions as described in Section 8 – *Mitigation and Environmental Monitoring*, to this document.

6.4.2 Long-term

Long-term impacts to air quality will be insignificant. These emissions will result from vehicle (mobile source) emissions and emissions from combustion sources within the facility. Mobile source emissions result from personnel traveling to and from work and transportation of materials and equipment to and from the facility. Combustion emissions will result from a natural gas fired boiler for building heat and a natural-gas fired hot water generator. Total emissions will decrease slightly from current emissions since the proposed facility will incorporate newer, more energy efficient technologies. Estimated air emissions calculations are provided at Appendix E to this document.

6.5 Noise

There will be short-term impacts from noise resulting from use of machinery for construction-related activities, but these will be mitigated as described in Section 8 of this document. There will be no long-term noise impacts from this facility.

6.6 Socioeconomic Affects, Land Use, and Aesthetics

6.6.1 Socioeconomic Affects

6.6.1.1 Population

Short-term socioeconomic impacts of the proposed project will not be significant since construction of this small facility will not result in an influx of construction-related businesses and workers to the region. There will be no long-term socioeconomic impacts from the proposed action because the same employees at the existing 902nd MI Group Headquarters will occupy the new one.

6.6.1.2 Housing

Since there will be no increase or decrease of FGGM employees from the proposed project, there will be no adverse impacts to housing from this project.

6.6.1.3 Emergency and Medical Services

Since there will be no increase or decrease of FGGM employees from the proposed project, there will be no adverse impacts from an increase or decrease in emergency and medical service requirements. The 902nd MI Group Headquarters receives its police, fire, and emergency medical protection through an intraservice support agreement with FGGM.

6.6.1.4 Schools

Since there will be no increase or decrease of FGGM employees (and dependents) from the proposed project, there will be no adverse impacts to schools in the FGGM area.

6.6.1.5 Recreational Facilities

Since there will be no increase or decrease of FGGM employees from the proposed project, there will be no adverse impacts to recreational facilities in the area.

6.6.2 Land Use, Zoning, and Buffers

The proposed projects are consistent with Anne Arundel County land use as well as land use development identified in the *Fort Meade Master Plan*. Consequently, there will be no impacts to land use resulting from the proposed project.

6.6.3 Aesthetics

Since the proposed 902nd MI Group Headquarters will be constructed in an existing developed area zoned for administrative land use, there will be no alteration to the overall aesthetics of the site. The new facility would be a modern, more aesthetically pleasing facility in accordance with local ordinances and *Fort Meade Installation Design Guide*.

6.7 Utilities

6.7.1 Wastewater Collection and Treatment

There will be no significant impacts to the collection or treatment of sewage from the proposed facility. Existing sewage collection and treatment systems have sufficient capacity to accommodate the proposed facility. Wastewater discharge would decrease as a result of the installation of water-conserving fixtures in the new facility and a decrease in infiltration and inflow after removal of old sewer pipes. Wastewater from the proposed facility will have essentially the same characteristics as domestic sewage. The proposed 902nd MI Group facility would not significantly change sewage treatment volumes on FGGM as shown in calculations at Appendix C.

6.7.2 Storm water Collection and Treatment

6.7.2.1 Short-term affects

Short-term impacts to storm water could result from construction activities, to include erosion and sedimentation. These impacts will not be significant and will be mitigated as described in Section 8 to this document.

6.7.2.2 Long-term affects

Long-term storm water quality will improve from existing conditions due to the use of storm water best management practices (BMPs) and increased pervious area.

Improved storm water quality. Storm water BMPs associated with the new facility will enable pre- and post-construction water quality to remain unchanged. In accordance with Maryland storm water design guidelines, storm water BMPs for the proposed project would be constructed to decrease: (a) the amount of contaminants transported by storm water runoff to include soil erosion sediments; (b) oxygen-demanding substances (organic matter); (c) nutrients (e.g., high concentrations of nitrogen and phosphorous from fertilizers); (d) floatables (trash and debris; (e) bacteria; (f) toxic substances to include chlorides (road salts applied in winter), pesticides, herbicides, hydrocarbons (derived from oil and grease, and gasoline runoff), and heavy metals (lead, zinc, cadmium, copper); (g) thermal impacts to aquatic life.

No increase in storm water quantity. Portions of the proposed project site was formerly a cantonment area (see Figure 5 and also Figure 23). These cantonment facilities, which lacked modern storm water management systems, have been demolished (Figure 14). Proposed new construction at the site will include modern, permitted storm water management systems that comply with the Code of Maryland Storm water Regulations (COMAR 26.17.02). These regulations mandate no increase in the quantity of storm water runoff. See also Appendix D for storm water calculations.

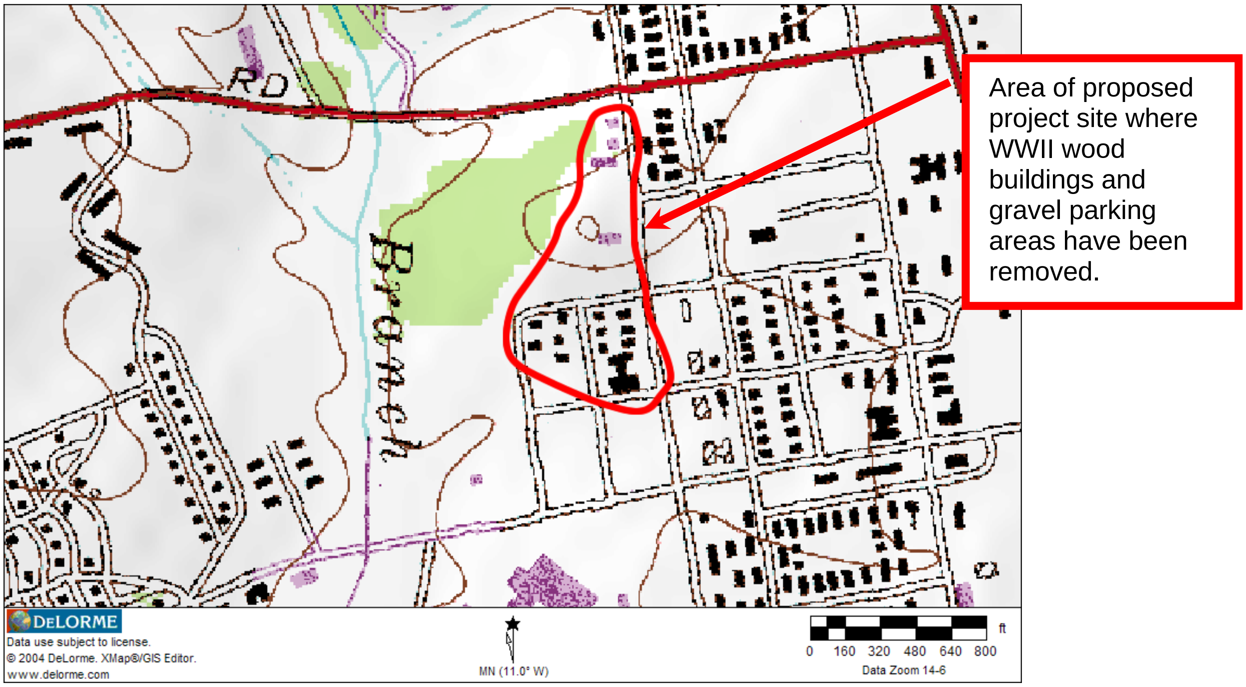

Figure 23: USGS topographic map showing buildings since removed from project site

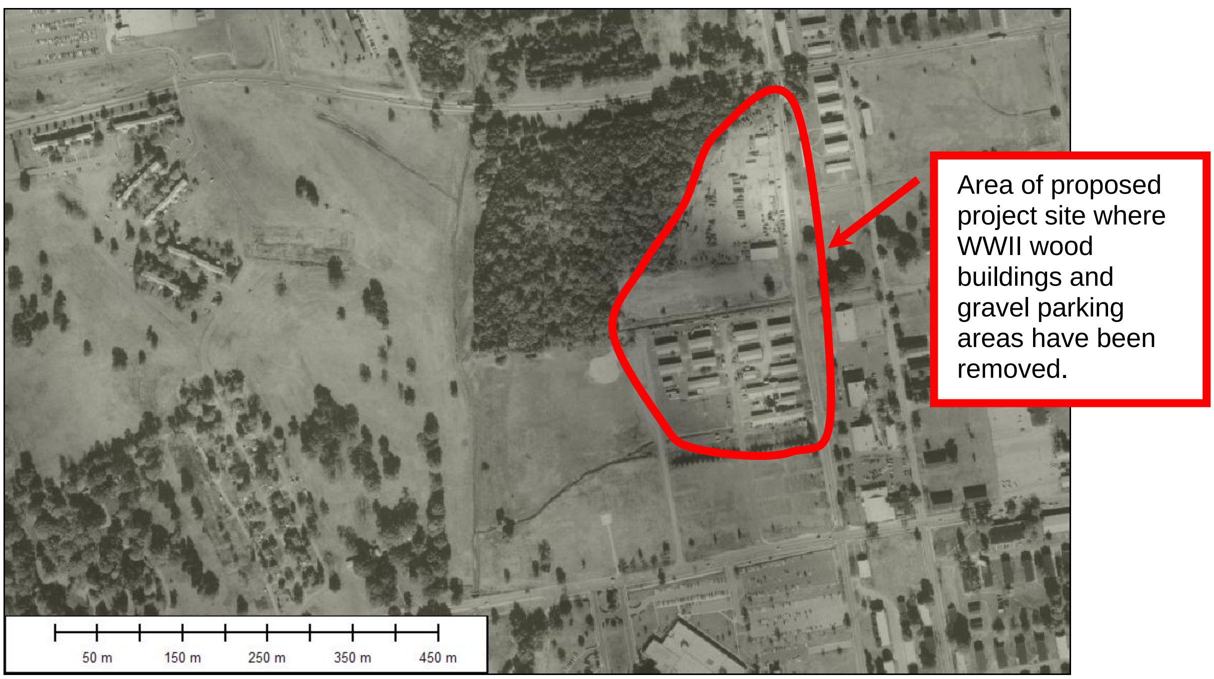

Figure 24: Aerial photo taken in 1988 showing buildings since removed from project site

6.7.3 Solid Waste

No significant impacts from the generation or disposal of solid waste are expected. In the short term, solid waste generation would increase as construction and demolition (C&D) debris from the existing buildings and asphalt parking areas are disposed of at permitted solid waste acceptance facility, and recycled whenever possible. Long-term solid waste generation for the existing facility (see calculations at Appendix C) should not increase from current generation rates. Periodic pollution prevention opportunity assessments are conducted at the facility to help identify opportunities for source reduction.

6.7.4 Electricity

No adverse impacts are anticipated from electricity consumption at the proposed facility. The proposed 902nd MI Group facility would not significantly increase electricity usage on FGGM. The existing electrical distribution system is capable of accommodating power requirements for the proposed facility. To help reduce energy consumption, the proposed facility will increase its use of natural lighting and will incorporate energy efficient lighting, computerized power management systems, and more energy efficient systems than existing facilities.

6.7.5 Natural Gas

No adverse impacts are expected from the use of natural gas by the proposed facility. The natural gas distribution system is adequate for the proposed facility. Use of natural gas for boilers and hot water generators will reduce air pollutants discharged to the atmosphere.

6.7.6 Telecommunications

The existing telecommunication service is adequate for the proposed facility. Thus there will be no impacts to the telecommunication systems due to the proposed projects.

6.7.7 Water Supply, Treatment and Distribution

In the short term, additional potable water will be required for mixing of cement, mortar, washing, and dust suppression during the construction phase of the proposed project. However, this usage is well within the capabilities of the existing water supply, treatment, and distribution infrastructure. The long-range potable water requirement for the 902nd MI Group facility (see estimated quantities at Appendix C) should remain the same as the current facility, with a potential decrease in water consumption due to the installation of water-saving fixtures. The proposed 902nd MI Group facility would not significantly change water usage on FGGM. Consequently, there will be no adverse impact to the local drinking water system.

6.8 Traffic and Transportation

There will be no increase of employees from the proposed project. Consequently, there will be no increase in traffic or resultant mobile source (vehicle) emissions to impact air quality.

6.9 Hazardous Waste

Minimal quantities of hazardous materials stored and used at the proposed facility include cleaning supplies, small quantities of cleaning solvents, and small quantities paints and lacquers.

Hazardous waste storage and disposal would be in accordance with FGGM and Maryland waste disposal regulations. The Maryland Hazardous Waste Program will be contacted prior to construction activities to ensure that the treatment, storage or disposal of any hazardous wastes identified at the facility will be conducted in compliance with applicable State and federal laws and regulations. Consequently, there will be no adverse impacts resulting from hazardous material usage or hazardous waste disposal.

6.9.1 Petroleum Products/Storage Tanks

There are no known underground storage tanks that will have to be removed as part of this project. The new 902nd MI Group facility will utilize either an above or an underground storage tanks to support new emergency back up generators. Any above ground or underground petroleum storage tanks that may be utilized will be installed and maintained in accordance with applicable State and federal laws and regulations.

6.10 Cultural Resources

The proposed site will be located over an area that was previously a cantonment area of World War II-era (WWII) wood construction. No historical or archaeological resources have been identified at the site. Consequently, there will be no adverse impacts to historical or archaeological resources. Per mitigating actions listed in Section 8 to this document, construction contractors will be informed to cease work and immediately notify the FGGM Environmental Management Office should any potential artifacts be unearthed.

6.11 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires Federal agencies to adopt strategies to address environmental justice concerns on the human health and environmental conditions in minority communities and low-income communities. The US EPA's document, Environmental Justice Strategy: Executive Order 12898, established Agency-wide goals and defined the approaches by which US EPA will ensure that disproportionately high and adverse human health or environmental effects on minority communities and low-income communities are identified and addressed. There are no minority or low-income communities located at or near the proposed 902nd MI Group Administrative and Operations Center site. Consequently, no minority or low-income communities will be adversely impacted by the proposed project.

6.12 Cumulative Impact Assessment

As indicated in Table 1, the preferred alternative for the proposed project will have not result in significant cumulative impacts to the geology, groundwater, surface waters, noise, aesthetics, cultural resources, or natural resources at the proposed site. This project replaces older facilities with new, environmentally sustainable facilities and is consistent with ongoing BRAC realignment actions for the installation (see Fort George G. Meade BRAC FEIS at http://www.hqda.army.mil/acsimweb/brac/eis_docs/FortMeadeMD%20Final%20EIS.pdf) as well as with the earlier evaluations and findings of the June 2001 *Final Environmental Impact Statement – Future Development and Operations, Fort George G. Meade, Maryland*. No personnel or military missions will be moved from or relocated to FGGM as a result of the proposed 902nd MI GP action.

7.0 EVALUATION OF ALTERNATIVES

The five alternatives listed below were evaluated in accordance with Army Regulation 200-2, *Environmental Effects of Army Actions*, NEPA, and Council on Environmental Quality (CEQ) guidelines for assessment of potential environmental impacts potentially resulting from proposed major federal policies, projects, and actions. This evaluation represents the initial scoping of environmental effects that was performed for each alternative. An in-depth environmental assessment of the preferred alternative was addressed in paragraphs 5 and 6 preceding.

7.1 Description of Alternatives

This preliminary analysis was reduced to the following five major alternatives as described below:

1. No action alternative – remain in existing facilities
2. Renovate/construct addition to existing facilities at FGGM
3. Use other government facilities
4. Lease facilities in the general vicinity of FGGM
5. Construct a new facility on FGGM

<u>Alternative A - Status Quo</u>. The current facility in the 4500 complex is not suitable and not large enough for current and future mission requirements. Facilities and functions are scattered. Current facilities do not meet building construction, fire protection and electrical code requirements. The existing facilities and systems are old, inadequate or failing, under capacity, and maintenance intensive. Industrial hygiene studies indicate poor indoor air quality. This is not a viable option.

<u>Alternative B - Renovation of the Existing</u>. Existing infrastructure capacity will not support expanded mission requirements. The buildings were designed as barracks and cannot be expanded or renovated to meet the open architecture required by this unique mission. Needed are large open spaces that provide an intelligence collaboration environment to support state of the art technologies. The associated building infrastructures, especially redundant and high-capacity electrical and mechanical systems, are unique and specialized. This is not a viable option.

<u>Alternative C - Use of other Government Facilities</u>. Mission requirements, operational security, and command and control necessitates that all the 902nd MI Group spaces be collocated, thereby making the leased space option or multiple buildings not a feasible alternative. There are no other spaces available at or near the existing facility. This is not a viable option.

<u>Alternative D - Off-post Lease</u>. Due to Sensitive Compartmented Information Facility (SCIF) requirements and the highly classified nature and OPSEC requirements of the mission, no commercial facility is available which could provide adequate security arrangements. This is not a viable option.

<u>Alternative E - New Construction</u>. This alternative will construct a new Group Administrative and Operations Center and is the only feasible alternative. A new facility is essential to the unit

in order to demonstrate the value of maintaining information superiority while planning and executing operations against emerging and transnational threats.

7.1.1 No action alternative – remain in existing facilities

In this status quo alternative, the unit would continue to operate in the current facilities without modifications other than routine maintenance and repairs.

7.1.2 Renovate/construct addition to existing facilities at Fort Meade

This alternative would require facilities compatible with 902nd MI Group Headquarters to be located and renovated. Facilities would have to be upgraded sufficiently in order to be approved for the level of classified operations and materiel storage of the existing 902nd MI Group Headquarters.

7.1.3 Use other government facilities

A new 902nd MI Group Headquarters facility would be constructed at a neighboring Defense installation.

7.1.4 Lease facilities in the general vicinity of Fort Meade

This alternative would require relocation of all 902nd MI Group Headquarters personnel, equipment, and functions to leased commercial facilities near FGGM. These facilities would have to meet the security requirements of classified 902nd MI Group Headquarters operations, or capable of being upgraded to meet those standards.

7.1.5 Construct a new facility on Fort Meade

A new 902nd MI Group Headquarters would be constructed on FGGM in a previously developed administrative land use area.

7.2 Selection method and results leading to proposed action

Alternative five, construct a new facility on FGGM, was selected as the preferred alternative for the reasons described below.

7.2.1 No action alternative – remain in existing facility

This is not a feasible alternative. The unit has been occupying three converted three-story brick buildings with full basement, and one concrete block one story building. The brick buildings were constructed for use as Army barracks in 1929 and 1940. The concrete block building was constructed in 1990 as a SCIF. These four buildings are within the FGGM historic district. Continued use of these buildings is not feasible as they lack adequate space for newly assigned personnel and cannot support new communications infrastructure requirements.

7.2.2 Renovate/construct addition to existing facilities at Fort Meade

By memo dated 24 October 2000, FGGM real property/master planning personnel indicated that all avenues to identify suitable existing facilities on FGGM to meet 902nd MI Group Headquarters requirements as contained on DA Form 1450 have been exhausted. Since there are no suitable permanent facilities available for consolidation or renovation, this alternative is considered infeasible.

7.2.3 Use other government facilities

There are no existing facilities on FGGM suitable to meet the needs of the expanded 902nd MI Group mission. The closest military installations to FGGM are Bolling AFB, Washington, D.C. and Andrews AFB, Maryland. Both installations are located about 30 miles distant in the congested D.C metropolitan area. These installations are already heavily utilized, and adequate military housing will not be available without additional construction (which has not been programmed). The relocation of over one thousand 902nd MI Group personnel to these high cost of living areas would be costly and will reduce quality of life, particularly for junior enlisted personnel who will be forced to live off-post. From an environmental standpoint, this is a poor choice since it increases the daily mileage driven by 902nd MI Group Headquarters personnel in the severe ozone region of the D.C. metropolitan area. Consequently, this alternative is not deemed feasible.

7.2.4 Lease facilities in the general vicinity of Fort Meade

Due to the highly classified nature of the 902nd MI Group Headquarters mission, commercial facilities do not provide adequate and/or economical security arrangements. Also, at this time there are no locally available leased facilities large enough to accommodate the requirement. This alternative is also considered infeasible.

7.2.5 Construct a new facility on Fort Meade

This alternative is determined to be the most feasible, cost effective alternative for providing operational shops, covered storage, and administrative space for this activity, due to the unavailability of suitable vacant space for renovation/consolidation as described in 7.1.2 above. From an environmental standpoint, this is the preferred alternative for the following reasons:

- It does not necessitate socioeconomic impacts of relocating over a thousand military and civilian personnel to a new location.
- It utilizes a previously developed administrative expansion area on FGGM, eliminating the need to remove trees and vegetative soil cover.
- It results in the discontinued use of old facilities and infrastructure that negatively impact human health and the environment.
- It results in the demolition of older facilities (Buildings 393, 398; Figure 13) to accommodate a newer, more environmentally sustainable facility.
- It results in the construction of new, environmentally sustainable, energy efficient facilities.

8.0 MITIGATION AND ENVIRONMENTAL MONITORING

In accordance with NEPA regulations at 40 CFR 1508.20, mitigating actions for this project follow a step-down approach for establishing project planning and development. The following steps, in order of importance, have been and will be followed for this project:

1. Avoid specific environmental impacts by not undertaking certain activities or portions of the proposed action.
2. Minimize specific environmental impacts by limiting the degree or magnitude of the action and its implementation.
3. Should impacts occur, rectify or eliminate the impacts by repairing, rehabilitating, or restoring the affected environment.
4. Reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action.
5. Compensate for impacts by replacing or providing substitute resources or environments.

The following specific mitigation and environmental monitoring actions are designated for the proposed project.

8.1 Air

8.1.1 Short Term (Construction Phase):

- Prohibit any open burning of brush, tree limbs, and other debris created from initial site clearing, stripping, and excavation. These items may either be mulched for use on site or hauled to approved construction and demolition (C&D) debris landfills.
- Use watering, chemical stabilizers, windbreaks to limit wind erosion from open land.
- Where appropriate, install and use hoods, fans, and fabric filters to enclose and vent the handling of dusty materials.
- Control fugitive dust emissions from unpaved construction roads by surface treatment with penetration chemicals, soil stabilization chemicals, watering, and traffic-control regulations.
- Cover open equipment (e.g., dump trucks) when conveying materials.
- Promptly remove spilled or tracked dirt or other materials from paved streets and remove dried sediments resulting from soil erosion.
- Utilize fugitive-dust-control measures for open-waste piles and staging areas, dry surface impoundments, storage piles, and construction-demolition activities.
- Suspend construction activities during periods of high wind conditions to control wind erosion and fugitive dust emissions.
- Specify in construction contracts that construction equipment be properly tuned and possess required exhaust emission control technologies to minimize the generation of ozone precursors such as volatile organic compounds and nitrogen oxides.
- Promptly stabilize and reseed disturbed soil at the construction site.
- If asbestos containing material (ACM) is encountered in facilities to be renovated or demolished, prevent ACM from becoming airborne. ACM is to be isolated, removed, packaged, transported and disposed of in accordance with US EPA 40 CFR Part 61

(NESHAP); OSHA 29 CFR 1910.1001 (general industry), 1926.1101 (construction); and applicable state and local ordinances.

8.1.2 Long Term:

- Perform routine maintenance of unit vehicles to ensure they are properly tuned and possess required exhaust emission control technologies.
- Perform routine maintenance of emergency backup power generators to insure they are properly tuned and possess required exhaust emission control technologies.
- Install proper pollution control technologies to facility boilers, generators, incinerators, and other potential sources of emissions as required.

8.2 Water Quality & Water Supply

8.2.1 Short Term (Construction Phase):

- Minimize erosion during the construction phase by use of sediment-retention basins and by planting rapidly growing vegetation.
- Obtain Maryland Pollutant Discharge Elimination System (MPDES) permits for temporary construction of storm water management systems.
- Require inclusion of storm water management and erosion control measures in engineering design specifications.
- Require contractors to maintain hazardous-waste spill cleanup plan and cleanup equipment at construction site as appropriate.

8.2.2 Long Term:

- Minimize erosion during the operational phase by use of sediment-retention basins and by planting rapidly growing vegetation.
- Obtain Maryland Pollutant Discharge Elimination System (MPDES) permits for permanent storm water management systems as required. Manage nonpoint-source pollution by applying Best Management Practices (BMPs) as determined by Maryland or Anne Arundel County planning agencies to be the most effective practicable means of achieving pollutant levels compatible with water quality goals.
- Perform land contouring, construct retention dams, and reseed 902nd MI Group Headquarters facility site to retard flow of surface water and promote recharge of surface and groundwater.
- Reseed project site using drought tolerant plant species native to the local environment.
- Periodically sample storm water to insure compliance with NPDES storm water permit requirements.
- Require installation of water conserving toilets and plumbing fixtures in new 902nd MI Group Headquarters facility facilities.

8.3 Soils/Geological

- If known or suspected hazardous materials are encountered, coordination will be made with the installation environmental office to perform soil or groundwater sampling and analysis.

- Design facilities to withstand Seismic Zone 1 episodes.
- Perform geotechnical studies of the project site as needed to determine appropriate foundation and slope design parameters.

8.4 Wetlands Avoidance and Impact Minimization

Neither project construction areas nor the post-construction site footprint will encompass or impact wetlands areas. Additionally, storm water runoff from the site during and after construction will incorporate BMPs, to include a new storm water pond, to avoid a change in pre- and post-construction storm water quantity and quality.

8.4.1 Short Term (Construction Phase):

- Ensure that the proposed site, including construction areas, is outside the 100-year floodplain
- Minimize clearing and disturbance of soil and groundcover
- Maintain vegetative buffers and install stacked hay bales and siltation curtains
- Use geotextile fabrics if need to control erosion and sedimentation
- Require prompt reseeding/revegetation and implement dust control procedures
- Use temporary settling basins to prevent siltation of wetlands areas
- Construct or utilize existing storm water retention ponds as appropriate
- Protect catch basins and storm drains from erosion, sedimentation, and contamination from hazardous materials/waste
- Implement proper material handling techniques to preclude hazardous material spills and damage to storm water management systems
- Implement a construction-phase spill control and countermeasure plans to minimize impacts of spills, to on-site include spill cleanup kits
- The construction contractor(s) for the project will be responsible for developing and implementing a sedimentation and erosion control plan
- The construction contractor(s) for the project will ensure that quality assurance/quality control checks include proper installation and maintenance of temporary and permanent storm water management systems

8.4.2 Long Term:

- Ensure that the proposed project site, including the toe of any sloped area, is outside of and does not restrict surface water flows within the 100-year floodplain
- Maintain vegetative buffers and grassy areas to minimize erosion/siltation and to allow "treatment" of storm water
- Implement permanent storm water BMPs, to include constructing storm water detention or retention ponds and/or utilizing existing storm water retention ponds on FGGM
- Protect storm water catch basins and storm drains from erosion, sedimentation, and contamination from hazardous materials/waste
- Implement proper material handling techniques to preclude hazardous material spills and damage to storm water management systems
- Implement spill control and countermeasure plans to minimize impacts of spills, to on-site include spill cleanup kits

- The facility user will ensure that operations and maintenance plans and budgets include monitoring and maintenance of permanent storm water management systems

8.5 Noise

Since the proposed facility does not operate high noise equipment, no mitigating measures for noise outside the facility are necessary.

8.6 Solid and Hazardous Waste

8.6.1 Short Term (Construction Phase):

- Any solid waste including construction, demolition, and land clearing debris, generated from the project, will be properly disposed of at a permitted solid waste acceptance facility, or recycled if possible.
- Mandatory removal and disposal procedures will be followed in accordance with federal, state and local laws and ordnances if hazardous wastes (e.g., lead-based paints; asbestos containing materials, ACM) are encountered during demolition.
- If known or suspected hazardous materials are encountered during excavation, coordination will be made with the installation environmental office to perform soil or groundwater sampling and analysis.
- To the extent possible, any solid or hazardous wastes generated by this project will be reduced at the sources, re-used, or recycled.

8.6.2 Long Term:

The INSCOM Environmental Management System and Pollution Prevention Plan will be implemented throughout the life-cycle of this facility to minimize environmental impacts of this facility and achieve improvements in its environmental performance. These actions include:

- Environmental attributes will be considered when purchasing materials (e.g., extent of recycled material content, toxicity level, and amount of packaging).
- Contractors' commitments to the environment will be considered when choosing contractors. Also, specifications regarding raw material selection (alternative fuels and energy sources) and construction practices may be included in contract documents and requests for proposals.
- Solid waste produced at the new facility, including construction, demolition and land clearing debris generated during facility renovations, must be properly disposed of at a permitted solid waste acceptance facility, or recycled if possible.
- Sustainable practices and materials will be chosen in infrastructure and building construction and design (e.g., asphalt and concrete containing recycled materials and integrated pest management in landscaping).
- Pollution prevention techniques will be integrated into the facility maintenance and operation to include: inventory control (record keeping and centralized storage for hazardous materials); product substitution (use of low toxic cleaners); source reduction (fixing leaks, energy efficient products).
- Pollution prevention measures will be considered in order to minimize employees' exposure to chemicals, reduce potential environmental impacts, and reduce costs for material purchasing and waste disposal.

- The proposed facility will comply with the following plans: *Fort Meade Hazardous Waste Management Plan; Spill Prevention, Control and Countermeasure Plan (SPCCP); Installation Spill Control Plan (ISCP).*

8.7 Energy Conservation

The new facility will be planned and designed to comply with state and federal guidelines and industry standards for energy conservation and efficiency, to include:

- Thermally-efficient building shell components (roof, wall, floor, and insulation).
- High efficiency heating, ventilating, air conditioning systems.
- High efficiency lighting systems.
- Energy-efficient office and data processing equipment.

8.8 Biological/Ecological

8.8.1 Short Term (Construction Phase):

- Minimize clearing of trees and stripping of naturally occurring vegetation at the construction site.
- Inform contractors of locations of potential habitats of candidate species and constraints to construction operations in these areas if required.
- If required by the Maryland Department of Natural Resources (DNR), prior to start of construction, be prepared to conduct a final screening for threatened or endangered species that may have occupied the site following preparation of this environmental assessment. Specifically, this site investigation should include a survey for *Roughish Panicgrass*. The Wildlife and Heritage Service's Natural Heritage database indicates that there is a recent record for Roughish Panicgrass (*Patiicum Ieucothrix*), a species with uncertain status in Maryland, known to occur within the vicinity of the project site. This species could potentially occur on the project site, especially in areas of appropriate habitat. Habitat for *Roughish Panicgrass* is described as: Pinelands, savannahs and low woods (Radford et al 1968), damp sandy pine-barrens (Fernald 1950). The population of native plants mentioned here has declined historically and the DNR encourages efforts to help conserve it across the state.

8.8.2 Long Term:

- In accordance with the *Fort Meade Reforestation Plan*, properly manage natural resources at the site in order to minimize loss of trees and vegetative cover due to erosion, fires, or other impacts.
- Continue to monitor potential habitats at the site for appearance of protected species. Modify operations and future construction as required.

8.9 Cultural

8.9.1 Short Term (Construction Phase):

Specify in construction contracts that work is to be suspended upon discovery of archaeological/historical artifacts until appropriate disposition is accomplished.

8.9.2 Long Term:

Evaluate any newly discovered artifacts for eligibility for National Register status.

8.10 Visual/Aesthetics

Specify in design and construction contracts that the proposed new facility and new signage will comply with any applicable supporting Installation Design Guides, and Installation Master Plans.

8.11 Safety

8.11.1 Short Term (Construction Phase)

Pedestrian and traffic safety will be maintained by judicious use of positive control measures to include fences, barriers, warning signs, traffic control personnel, and guards.

8.11.2 Long Term

Because this facility is an administrative office building, safety concerns to employees and the surrounding public are minimal. However, environmental, health, and safety coordinators assigned to this facility and its parent headquarters are responsible for maintaining safe and healthy work areas and protect against environmental contamination.

8.12 Transportation

FGGM will work with DISA, HQINSCOM (parent command of the 902nd MI GP), and with local transportation officials to adjust construction work hours, access roads and FGGM access gates to minimize the impact of on- and off-post transportation systems by construction vehicles.

8.13 Monitoring

The U.S. Army Corps of Engineers – Baltimore District, INSCOM Headquarters, FGGM environmental and engineering staffs, and FGGM contracting offices will provide project management and oversight of construction contractors. They will identify and communicate to construction contractors any mitigation and monitoring actions required by regulatory agencies. This could include such activities as quality assurance/quality control of temporary and permanent storm water BMP construction and monitoring of storm water quality/quantity in accordance with permits to be obtained for construction of those structures.

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10.0 GLOSSARY OF TERMS

Abatement: Diminution in degree or intensity; moderation, amount lowered or reduced. For example, noise abatement might include replacement of existing noise-producing equipment with newer quieter equipment, or shielding equipment with noise-attenuating barriers.

Aesthetics: Defined as that which is concerned with the characteristics of objects and of the human beings perceiving them that make the object pleasing or displeasing to the senses. Giving consideration for the artistic beauty of natural or man-made features. Built up areas can be made more aesthetically pleasing by making them of similar architecture and making that architecture compatible with the surrounding natural environment.

Air Quality Control Region (AQCR): Each state has been divided into geographical regions known as Air Quality Control Regions (AQCR). Control requirements are developed from air quality data collected in each AQCR. These control requirements are then used to reduce emissions from various sources in each AQCR to meet the National Ambient Air Quality Standards (NAAQS).

Air quality management: All activities that are directed toward creating and maintaining clean air as defined by the National Ambient Air Quality Standards. Management activities can include standards setting, ambient air monitoring, development of permitting programs, enforcement activities, and establishment of economic incentives to reduce air pollution.

Alluvium: Sediment deposited by flowing water, as in a riverbed, flood plain, or delta.

Ambient air quality: The quality of background, outdoor air. The primary constituents of air are nitrogen, oxygen, and water vapor. About 78 percent of air is nitrogen, 21 percent oxygen, and the remaining one percent includes trace quantities of such substances as carbon dioxide, methane, hydrogen, argon, and helium. In many local areas, the quality of the ambient air is severely degraded by emissions from power generating stations, industrial sources, and vehicle emissions.

Anadromous fish: Species of fish that ascend rivers from the sea for the purpose of breeding.

Anaerobic: a situation in which molecular oxygen is virtually absent from the environment.

Aquifer recharge: Replenishment of an aquifer by means of the migration of surface and rain waters into the ground.

Aquifer: An underground bed or layer of earth, gravel, or porous stone that yields water.

Archaeological resources: Objects and areas made or modified by humans, as well as the data associated with these artifacts and features and as defined in the Archaeological Resources Protection Act of 1979. These objects can include such artifacts as Native American arrowheads, pottery, basketry, bottles, weapons, tools, structures, etc.

Archaic: Of, relating to, or characteristic of a much earlier, often more primitive period preceding the advent of written records.

Architectural resources: Distinctively designed and erected buildings deserving of special protection and restoration, particularly national historic landmarks such as the Alamo.

Area sources: A series of small (minor) sources of air emissions that together can affect air quality in a region. For example, an individual fireplace or wood stove produces a small amount of air emissions, but a community of homes produces a substantial amount of such emissions.

Artifacts: An object produced or shaped by human craft, especially a tool, a weapon, or an ornament of archaeological or historical interest.

Artificial hydric soil: a soil that meets the definition of a *hydric soil* as a result of an artificially induced hydrologic regime and did not meet the definition before the artificial measures were applied.

Attainment areas: Geographic areas that meet National Ambient Air Quality Standards (NAAQS). An area can be an attainment area for one criteria pollutant, and at the same time be a non-attainment area for another.

Bedrock: The solid rock that underlies loose material, such as soil, sand, clay, or gravel.

Best Management Practices: Also referred to as good management practices, these are "common-sense" practices that, although not mandated by law, are encouraged to promote safe handling of hazardous material and hazardous waste. Best management practices take into account state of the art as well as economically feasible procedures for handling hazardous material and hazardous waste while minimizing impacts on the environment and human health.

CFR: Acronym for the Code of Federal Regulations, a series of publications containing Federal regulations.

Characteristics: The US EPA has identified four characteristics of a hazardous wastes (HW): ignitibility, corrosivity, reactivity, and toxicity. Any solid waste that exhibits one or more of these characteristics is classified as a HW under RCRA.

Characterize: To describe the qualities or peculiarities of a site, e.g., to characterize the degree of soil contamination at a hazardous waste spill site.

Chlorination: To treat or combine water or wastewater with chlorine or a chlorine compound in order to disinfect that water.

Clay: A natural, earthy, fine-grained material that is plastic (putty-like) when moist but hard when fired, composed mainly of fine particles of hydrous aluminum silicates and other minerals; soil composed chiefly of this material having particles less than 0.002 mm in size.

Coagulation: To cause transformation of a liquid or solid into or as if into a soft, semisolid, or solid mass; a process used in water and wastewater treatment.

Colliforms: Bacilli that commonly inhabit the intestines of human beings and other vertebrates, especially the colon bacillus. Measurement of colliforms is commonly used to determine the quality of water.

Colloids: A suspension of finely divided particles in a continuous medium in which the particles are approximately 5 to 5,000 angstroms in size, do not settle out of the substance rapidly, and are not readily filtered.

Colluvium: A loose deposit of rock debris accumulated through the action of gravity at the base of a cliff or slope.

Commercial (zoning): An area designated primarily for shops, stores, and similar places of business that sell goods and services.

Compatibility: The ability of materials to exist together without adverse environmental effects or health risks. Primarily applied to waste fluid combinations and liner materials.

Conifer, coniferous: Any of various mostly needle-leaved or scale-leaved, chiefly evergreen, cone-bearing gymnospermous trees or shrubs such as pines, spruces, and firs.

Container: Any portable device in which material is stored, transported, treated, disposed of, or otherwise handled.

Contaminant: A substance when added to another substance makes that substance inferior or impure.

Contingency Plan: A document setting forth an organized, planned, and coordinated course of action to be followed in order to prevent pollution incidents, and limit potential pollution in case of fire, explosion, or discharge of hazardous materials or hazardous waste constituents which could threaten human health and the environment.

Corridor: A tract of land forming a passageway, such as a valley or open plain that provides access from one city to another.

Corrosive: The quality of a hazardous material or hazardous waste which causes the gradual deterioration of another substance by chemical process, such as oxidation or attack by acids. A substance is considered corrosive if it has a pH greater than or equal to 12.5 or less than or equal to 2.0.

Council on Environmental Quality (CEQ): This council was created by the National Environmental Policy Act (NEPA) as part of the Executive Office of the President to aid the implementation of the Environmental Impact Statement (EIS) process. This council provides overall coordination of the Environmental Impact Assessment (EIA) process in the United States.

Criminal Action: An act or the commission of an act that is forbidden or the omission of a duty that is commanded by a public law and that makes the offender liable to punishment by the law.

Criteria pollutant: The Federal Clean Air Act established National Ambient Air Quality Standards and there are currently six criteria pollutants: carbon monoxide (CO), sulfur oxides (SO_X), nitrous oxides (NO_X), lead (Pb), particulate matter smaller than 10 microns (PM_{10}), and ozone (O_3).

Critical Habitat: A critical habitat for a threatened or endangered species is a specific area within the species' range (or a geographical area occupied by that species) where there are physical or biological features that are essential to the conservation of the species. These may require special management considerations or protection and specific areas outside the range, which are essential for the conservation of the species.

Cultural resources: These include areas of ecological, scientific, or geological importance, and may include wildlife refuges, caves, and unique areas such as the Painted Desert in Arizona. Also included in this category are burial grounds and cemeteries or areas of religious importance. Known historic properties are maintained in the National Register of Historic Places and listings are also maintained by each State Historic Preservation Officer (SHPO).

Deciduous: Plants or trees with leaves that shed or lose foliage at the end of the growing season.

Demographics: The characteristics of human populations and population segments, such as gender, race, sex, housing, etc.

Diabase: A fine-grained rock of the composition of gabbro but with an ophitic texture.

Dike: As pertains to geologic structures, a relatively long, flat body of igneous rock that has been injected while molten into a fissure.

Discharge: An intentional or accidental spilling, leaking, pumping, pouring, dumping, emitting or any other release of hazardous waste, hazardous waste constituents, or hazardous material which, when released into land or water, become hazardous waste.

Disparate commercial developments: Fundamentally distinct or different, dissimilar commercial developments which are generally cluttered and visually unattractive. Poor land use planning and development regarding commercial development can lead to traffic congestion, an aesthetically displeasing mix of architectural styles, cluttered signage, loss of business to older or inconvenienced business establishments, and so on.

Dominant soils: The principal types of soils found in a given area of concern, normally in greater quantities than other soil types, or having the greatest potential impact on the project.

DOT: Acronym for the Department of Transportation. DOT shares authority with the Environmental Protection Agency (EPA) concerning the transportation of hazardous materials, including labeling, containment, and accident reporting requirements.

Drainage basin: An area drained by a river system.

Drainages: Slopes, valleys, and ravines that draw off rainfall and surface waters from surrounding higher ground.

Drained: a condition in which ground or surface water has been removed by artificial means.

Emission: A substance discharged into the air, water or land, especially by an industrial source or by internal combustion engines.

Empty container: A container that contained hazardous material is considered empty by the Environmental Protection Agency if it contains 2.5 centimeters (1 inch) or less. A container that has held acute hazardous material is not considered empty until it has been triple rinsed using a solvent capable of removing the hazardous material.

Endangered species: Any species that is in danger of extinction throughout all or a significant portion of its range (the geographical area occupied by the species).

Environmental Assessment: A concise public document that serves to briefly provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) when one is necessary.

Environmental Impact Assessment: The systematic identification and evaluation of the potential impacts (effects) of proposed projects, plans, programs, or legislative actions relative to the physical-chemical, biological, cultural, and socioeconomic components of the total environment.

Environmental Impact Statement: A detailed study that serves to disclose to the public and to other Federal, state, and local agencies, the environmental consequences of a proposed Federal action.

Excavation: The digging of holes or removal of large quantities of soil and rock, especially for construction of building foundations, roads, and bridges.

Exceedances: To go beyond the limits of an established standard, such as to exceed the ambient air quality standard in a given category.

Fauna: Animals, especially the animals of a particular region or period, considered as a group.

Federal Register: A document published daily by the federal government that contains federally significant information to include proposed and final regulations.

Fill: Construction fill refers to material such as earth or gravel used to build up the level of low-lying land.

Filtration plant: A plant designed to filter, decontaminate, and purify raw water in order to make it fit for human consumption.

Finding of No Significant Impact: (FONSI) A document which concisely presents the reasons why an action, not otherwise excluded, will not have a significant effect on the human environment and for which and EIS will not be prepared.

Finds: In the context of archaeological and cultural resources, something that is found, especially an unexpectedly valuable discovery such as ancient burial grounds, etc. For example, the Rosetta stone, that providential archaeological find.

Flocculation: A process by which chemicals such as alum (aluminum sulfate) are added to water to neutralize the charge on particles and then to aid in making tiny particles coalesce and form large particles called flocs.

Flooded: a condition in which the soil surface is temporarily covered with flowing water from any source, such as streams overflowing their banks, runoff from adjacent or surrounding slopes, inflow from the high tides, or any combination of sources.

Floodplain: A plain bordering a river and subject to flooding.

Flora: Plants considered as a group, especially the plants of a particular country, region, or time.

FONSI: See Finding of No Significant Impact.

Free Liquid: Liquids that readily separate from the solid portion of a waste under ambient (normally occurring) temperature and pressure.

Freeboard: The vertical distance between the top of a tank or surface impoundment dike and the surface of the hazardous waste contained therein.

Frequently flooded, ponded, saturated: a frequency class in which flooding, ponding, or saturation is likely to occur often under usual weather conditions (more than 50 percent chance in any year, or more than 50 times in 100 years).

Fugitive dust: Particulate matter that escapes from stockpiles of material and is carried by wind currents to surrounding areas.

Generator: Any person who by nature of ownership, management, or control, is responsible for causing or allowing to be caused, the creation of hazardous waste.

Geographic feature: A terrain feature such as a hill, valley, city, etc.

Geotechnical: The application of soil and engineering mechanics to evaluate the behavior of earth materials. Usually refers to engineering investigations for purposes of building design and construction, or for cleanup of contaminated soils and groundwaters.

Geothermal heating: Heat obtained from the ground by means of heat pumps or wells deep within the earth.

Grade, grading: In the context of construction, using equipment to create the proper degree of inclination of a slope, road, or other surface. For example, grading an area so that the level of the ground surface meets the foundation of a building.

Ground forces: Army units consisting of infantry, armor, artillery, combat engineers, and so on as opposed to air and naval forces.

Growing season: the portion of the year when soil temperatures are above biologic zero at 50 cm (19.7"). The following growing season months are assumed for each of the soil temperature regimes of Soil Taxonomy:

- Isohyperthermic: January-December
- Hyperthermic: February-December
- Isothermic: January-December
- Thermic: February-October
- Isomesic: January-December
- Mesic: March-October
- Frigid: May-September
- Cryic: June-August
- Pergelic: July-August

Habitat: The area or type of environment in which an organism or ecological community normally lives or occurs.

Hazardous Air Pollutant (HAP): National emission standards for hazardous air pollutants apply to new and existing sources. HAPs are those that may cause or contribute to increased mortality or an increase in serious irreversible or incapacitating reversible illness.

Hazardous material: Chemicals (may be solid, liquid, or gas) that can adversely effect an individual's health, safety, or property. These materials can be in unopened containers or currently in use.

Hazardous waste: A waste that could cause injury or death or damage or pollute the air, land, or water. Hazardous wastes are defined in two ways: a) listed, b) characteristic. Listed wastes are those listed by the Environmental Protection Agency in the Code of Federal Regulations (CFR). Characteristic wastes are ignitable (catch on fire easily), corrosive (dissolve metal and irritate skin), reactive (unstable and have a tendency to react violently or explode), or toxic (pose a health hazard to humans).

HSWA: Acronym for the Hazardous and Solid Waste Amendments of 1984 (Public Law 98-616), which significantly expanded both the scope and the coverage of RCRA.

Hydraulic conductivity: In simple terms, the ease with which water moves through soil or an aquifer under saturated conditions. A precise definition of hydraulic conductivity would be "the quantity of water that will flow through a unit cross-sectional area of porous material per unit of time under a hydraulic gradient of 1.0 (measured at right angles to the direction of flow) at a specified temperature."

Hydrology: The scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.

Hydrophytic vegetation: Plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content.

Ignitable: Wastes that pose a fire hazard (flashpoint less than 140 degrees Fahrenheit) during routine management (e.g., solvents, paints, paint remover).

Impervious surface: A surface incapable of being penetrated; for example, paved roads and parking lots are generally impervious to water.

Industrial (zoning): An area consisting primarily of developed industrial facilities that produce and sell commercial goods.

Inner Liner: A continuous layer of material placed inside a tank or container to protect the construction materials of the tank or container from the contained hazardous material and hazardous waste or reagents used to treat the hazardous material and hazardous waste.

Intermittent Drainages: Streambeds, valleys, and ravines that contain water only part of the year.

Intrusions/Intrusives: The forcing of molten rock into an earlier formation; the rock mass-produced by an intrusive process.

Large Quantity Generator (LQG): As defined by the Resource Conservation Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments of 1984, a large quantity generator is a facility that produces more than 2,200 pounds (1,000 kilograms) of hazardous waste in a calendar month. This equates to about five full 55-gallon drums per month.

Level of Service: Level of service for any particular roadway is a function of speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs. Roads are designed for a certain level of service at a specified volume, but operate at different levels of service as the flow varies. Roadway components, such as ramps and intersections, are normally designed to provide the same level of service as the main roadway. From a driver's viewpoint, the highest level of service (LOS A) occurs when there is free flow, but this is obtained only when the highway is operating much below capacity.

Listed Species: Species that are included on the list of threatened or endangered species as published periodically in the Federal Register. The lists are often revised by additions, deletions, or classification changes; a comprehensive review of the lists is called for on a five-year cycle. Each list refers to each species contained therein by its scientific and common name or names, if any, and must specify, with respect to each such species, over what portion of its range (the geographical area occupied by the species) it is endangered or threatened, along with any critical habitat within that portion of the range.

Listed Wastes: Wastes that have been placed on one of three lists developed by US EPA. They are nonspecific source wastes, specific source wastes, and commercial chemical products. These lists were developed by examining different types of waste and chemical products to see if they exhibited one of the four characteristics in the statutory definition of hazardous waste, were acutely toxic or hazardous, or were otherwise toxic.

Loam: A soil consisting of a friable (easily crumbled or pulverized) mixture of varying proportions of clay, silt, and sand

Long duration: a duration class in which inundation for a single event ranges from 7 days to 1 month.

Makeup water demand: The requirement for additional water to boilers and heating/air conditioning systems to make up for water lost to evaporation and consumption.

Manifest: The shipping document, US EPA Form 8700-22, used to identify the quantity, composition, origin, routing, and destination of hazardous waste during its transportation from the point of generation to the point of treatment, storage, or disposal.

Manmade intrusions: The disturbance of naturally occurring topographic, biologic and hydraulic features by human activities and structures.

Metamorphic: Rock that has experienced a pronounced change due to the effects of pressure, heat, and water, usually resulting in a more compact and more highly crystalline condition.

Meteorological parameters: Descriptive characteristics of the phenomena of the atmosphere, especially weather and weather conditions.

Metropolitan Statistical Area (MSA): A large city and its surrounding communities and counties that define a metropolitan area for purposes of census statistics and socioeconomic impact assessment.

Mitigation: In the context of environmental impact assessment, actions taken to moderate or alleviate potential environmental impacts of the proposed project.

Mobile sources: Sources of air pollution that include automobiles, buses, locomotives, trucks, and airplanes. Mobile sources of air pollution account for more than half of all air pollution in the United States.

MSDS: Acronym for Material Safety Data Sheets. Standard information sheets that are provided by chemical manufacturers with their chemicals, identifying any hazards associated with the product and outlining ways to respond to accidental spills.

National Ambient Air Quality Standards (NAAQS): National Ambient Air Quality Standards for criteria pollutants (carbon monoxide, sulfur oxides, nitrous oxides, lead, particulate matter less than 10 microns, and ozone) were established by the Federal Clean Air Act of 1970. NAAQS are based on scientific information published in air quality criteria documents. Primary and secondary standards have been set for each criteria pollutant. Primary standards are aimed at preventing adverse effects on human health, while secondary standards are aimed at preventing adverse effects on vegetation, property, and other elements of the environment.

New Source Performance Standards (NSPS): New Source Performance Standards are federal standards directed at new and modified sources of air pollution. The NSPS impose uniform requirements on new and modified sources throughout the nation. An NSPS states the degree of emission limitation that can be achieved through the application of the best technological system for continuously reducing emissions, or best demonstrated technology (BDT). Primary enforcement of NSPS is the responsibility of the US EPA, but this authority can also be delegated to the states.

Non-attainment areas: Geographic areas that do not meet National Ambient Air Quality Standards (NAAQS). An area can be an attainment area for one criteria pollutant (ozone, carbon monoxide, total suspended particulate, sulfur dioxide, lead, nitrogen oxide), and at the same time can be a non-attainment area for another.

Notice of Violation: A formal written document provided to a unit or installation by a regulatory agency as a result of environmental noncompliance.

NOV: See Notice of Violation.

Operator: The person responsible for the overall operation of a facility.

Outcrops: Portions of bedrock or other stratum protruding through the soil level.

Palustrine wetlands: Palustrine wetlands include those containing trees, shrubs, and herbaceous vegetation, as well as wetlands without woody or herbaceous emergents. These wetlands are less than 6.6 ft deep at low water and less than 20 acres (8 hectares) in size without a wave-formed or bedrock shoreline. Palustrine wetlands are often small (for example, wetlands within prairie potholes), but may be larger than 20 acres if they support woody or persistent emergent vegetation.

Parameters: One of a set of measurable factors (e.g., temperature and pressure) that define a system and determine its behavior; a distinguishing characteristic or feature.

Peak electrical demand: The period during which the most electricity is need by all customers.

Permeability: The ease with which water passes through a bulk mass of soil or a layer of soil.

Permeable, permeability: The ability of soil sediment or rock to transmit water (e.g., how well the pore spaces are interconnected). In the Map Unit Interpretation Record (MUIR) database, permeability is expressed as the number of inches per hour that water moves downward through the saturated soil on percolation tests.

Phase, soil: A subdivision of a soil series based on features that affect its use and management (e.g. slope, surface texture, stoniness, and thickness).

POL Products: Acronym for Petroleum, Oils and Lubricants. Includes but not limited to petroleum based oil, diesel fuel, kerosene, fuel oil, gasoline, aviation fuels, hydraulic fluid and grease.

Ponded: A condition in which water stands in a closed depression. Only percolation, evaporation, or transpiration removes the water.

Poorly drained: Water is removed from the soil so slowly that the soil is saturated periodically during the growing season or remains wet for long periods.

Potable water: Water that is fit for human consumption.

Prehistoric: Of, relating to, or belonging to the era before recorded history.

Protected species: Threatened or endangered species that are protected under the provisions of the Endangered Species Act.

Qualitative assessment: An assessment that incorporates a thorough description of the project and potential impacts without relying on measurement of the various facets of the project.

Quantitative assessment: An assessment that describes the project and potential impacts by measuring and comparing of the various components or facets of the project.

Ravine: A deep, narrow valley or gorge in the earth's surface worn by running water.

RCRA: Acronym for the Resource Conservation and Recovery Act of 1976. RCRA establishes guidelines and standards for hazardous waste generation, transportation, treatment, storage, and disposal.

Reactive: Wastes that can react spontaneously, react violently with water or air, be unstable to shock or heat, generate toxic gases, or explode (e.g., picric acid and explosives).

Receptor: In the context of risk assessment, an organism (plant, animal, human) that comes into contact with a hazardous substance.

Regulation: A binding rule or set of rules that spell out how a statute or inherent authority is to be implemented.

Reportable Spill: A "reportable" or "major" spill is generally defined as any spill over 5 gallons in volume or 100 square feet in area. However, consult your installation environmental office to determine local requirements for reporting spills.

Residential (zoning): An area having residences and consisting primarily of private homeowners and renters.

Right-of-way: The right to pass over property owned by another party. The path or thoroughfare on which such passage is made. The strip of land over which facilities such as highways, railroads, or power lines are built.

Riverine wetlands: Wetlands formed by, resembling or situated near a river; riverine wetlands are confined within a channel and lack persistent emergent or woody vegetation.

Rock formation: The primary unit of lithostratigraphy – the study and classification of rock strata – consisting of a succession of strata useful for mapping or description.

Saturated: a condition in which all voids (pores) between soil particles are filled with water.

Secondary biological methods (water treatment): In the context of sewage and wastewater treatment plants, methods for removing the biological demand for oxygen include aeration devices, trickling filters, and activated sludge systems.

Sedimentary rock: Rocks formed by the deposition of sediment.

Sedimentation: The process by which organic and inorganic material settles to the bottom of a liquid, or is carried and deposited by wind, water or ice.

Sensitive receptors: In the context of risk assessment, an organism (plant, animal, human) that is particularly vulnerable to contact with a particular hazardous substance, e.g., plants to acid rain.

Shrinking (of soil): The response of certain cohesive soils, such as clay, to loss of water is a loss of volume (shrinkage). Soils that exhibit excessive swelling and shrinkage are generally unsuitable for use as construction materials.

Signalized intersection: An intersection with a traffic light or similar traffic control.

Significant impact: In the context of environmental impact assessment, an action that could have substantial or severe environmental consequences if not reduced or mitigated.

Sill: As pertains to geologic structures, a generally flat body of igneous rock injected while molten between sedimentary or volcanic beds or along foliation planes of metamorphic rocks.

Silt: Loose sedimentary material with rock particles usually 1/20 millimeter or less in diameter; also, soil containing 80 percent or more of such silt and less than 12 percent of clay

Silt fence: A fence of material intended to prevent sedimentary material (i.e., sand, silt, and clay) from running off the construction site into roads, culverts, streambeds, etc.

Site preparation: Clearing a proposed construction site of all unneeded trees, vegetation, debris, soil, etc. so that construction may proceed.

Slope: A stretch of ground forming a natural or artificial incline.

Small Quantity Generator (SQG): As defined by the Resource Conservation Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments of 1984, a small quantity generator is a facility that produces between 220 pounds (100 kilograms) and 2,200 pounds (1,000 kilograms) of hazardous waste in a calendar month.

Socioeconomic impacts: Impacts involving both social and economic factors.

Soil series: A group of soils having horizons similar in differentiating characteristics and arrangements in the soil profile, except for texture of the surface layer.

Soil strength: The ability of soil to support a load, especially for purposes of construction. Larger, course grained, and well-graded soil mixtures (e.g., gravel-sand-silt mixture) can sustain significantly more weight than a fine-grained soil such as silty-clay.

Solid Waste: As defined in RCRA, solid waste refers to any of the following: garbage; refuse; sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility; and other discarded material, including solid, liquid, semi-solid, or contained gaseous material. These may result from industrial, commercial, mining, and agricultural operations, and from community activities.

Somewhat poorly drained: Water is removed slowly enough that the soil is wet for significant periods during the growing season.

Springs: A small stream of groundwater flowing naturally from the earth.

State Implementation Plan (SIP): State Implementation Plans are the principle mechanisms for achieving compliance with National Ambient Air Quality Standards (NAAQS). Compliance with the NAAQS has been the driving force behind most air pollution regulatory programs. State governments have primary responsibility for achieving compliance with NAAQS.

Statute: A written act of a legislature declaring, commanding, or prohibiting something.

Stereoscopic interpretation: The use of a stereoscope to allow for three-dimensional viewing of aerial photographs for the purpose of map-making, site selection, determination of vegetation types, identification of potential habitats, wetlands delineation, etc.

Storage: The holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere.

Storm water collection system: Manmade systems of managing runoff of rainfall, especially runoff from buildings and paved areas. Collection systems consist of onsite infiltration and detention, collection and transport systems (storm sewers), regional flood control, and major stream channel improvements.

Stratum: A bed or layer of sedimentary rock having approximately the same composition throughout.

Subsurface investigation: A determination of the geologic and hydrogeologic features as well as the location and extent of contamination below ground.

Surface waters: Waterbodies at the surface of the earth such as lakes, rivers, streams, ponds.

Swelling (of soil): The response of certain cohesive soils, such as clay, to the addition of water is an increase of volume (swelling). Soils that exhibit excessive swelling and shrinkage are generally unsuitable for use as construction materials.

Synthetic POL Products: Examples of synthetic POL products are fire resistant hydraulic fluid (FRHF), brake fluid and oil hydraulic turret (OHT).

Tank: A stationary device designed to contain an accumulation of hazardous waste; constructed primarily of non-earthen materials (e.g., wood, concrete, steel or plastic), which provides structural support.

Thermal energy storage: The use of solar heat panels and similar devices to capture energy from the sun as an alternative source of heat and electrical energy.

Threatened Species: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (the geographical area occupied by the species).

Toe of the slope: The lowest part of a slope; for example, the location at the base of an embankment adjacent to level ground.

Topography: The surface features of a site or region such as mountains, hills, valleys, lakes, etc.

Toxic: Wastes that may release toxic substances or cause a poison hazard to human health or the environment (e.g., heavy metals such as lead, cadmium, chromium, barium or pesticides)

Transporter: Any person engaged in the off-site transportation of hazardous waste within the United States by air, rail, highway, or water. Such persons must comply with all federal, state and local regulations.

Treatment Storage and Disposal Facility (TSDF): All contiguous land, structures, and other appurtenances and improvements on the land used for treating, storing or disposing of hazardous waste. A facility may consist of several treatments, more landfills, surface impoundments, or a combination.

Tributary corridor: A ravine or valley that conveys water from a small stream to a larger stream, river, or other body of water.

TSDF: See Treatment Storage and Disposal Facility.

Urban concentration: The high density of people, buildings, traffic, commerce, etc. within a city.

Useable Square Feet: Building space which can be utilized for office areas, conference rooms, filing cabinets, and other administrative functions as opposed to space taken up by boiler rooms, heating, ventilation, and air conditioning equipment rooms, etc.

Very long duration: A duration class in which inundation for a single event is greater than 1 month.

Very poorly drained: Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season.

Viewsheds: Locations which provide a scenic overlook of surrounding terrain and which are often protected from construction of signs and tall structures which would obstruct viewing.

Visual cohesiveness: Consistency or similarity of construction that provides a more pleasing appearance to a commercial development or community.

Visual quality: The degree to which a building, structure, community, or natural area is pleasing to the eye due to the way it has been preserved, designed, constructed, maintained, etc.

Waste Management Practices: Refers to aspects of a facility as design, operation, and closure that ensure protection of human health and the environment while treating, storing, or disposing of hazardous waste.

Waste Minimization: Refers to the reduction in the volume or quantity of hazardous waste being generated.

Waste stream: The continuous generation of hazardous waste from a specific source where the constituents remain constant.

Wastewater: Water that has been used, as for washing, flushing, or in a manufacturing process, and so contains waste products; sewage.

Water quality: The quality of a source of water is judged by its chemical, physical, and biological composition. Standards for water quality include chemical oxygen demand, biochemical oxygen demand, suspended solids, pH, mineral composition, dissolved oxygen, bacteriological content, temperature, turbidity, taste, color, odor, and concentrations of toxic materials.

Water supply: The water available for a community or region; the source and delivery system of such water.

Water table: The upper surface of ground water where the water is at atmospheric pressure. In the Map Unit Interpretation Record (MUIR) database, entries are made for the zone of saturation at the highest average depth during the wettest season. It is at least six inches thick and persists in the soil for more than a few weeks.

Waterbodies: Oceans, lakes, rivers, streams, and estuaries.

Weathered rock: Rock that has experienced deterioration and disintegration from exposure to the action wind, rain, freezing and thawing, acid rain, etc.

Well-drained soils: Soils which do not retain water for a long period of time due to their slope or permeability as well as the infiltration characteristics of underlying soils and geologic material.

Wetlands delineation: Determining the boundaries and the specific hydrologic and biological characteristics of a known or potential wetlands area.

Wetlands: A lowland area, such as a marsh or swamp, which is saturated with moisture, especially when regarded as the natural habitat of wildlife.

11.0 LIST OF ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
ACM	Asbestos Containing Materials
AHPA	Archeological and Historical Preservation Act
AMC	Army Materiel Command
AQCR	Air Quality Control Region
AR	Army Regulation
ARC	Average Reserve Capacity
ARPA	Archaeological Resources Preservation Act
AST	Above ground Storage Tank
BAT	Best Available Technology
Bldg	Building
BMP	Best Management Practices
BN	Battalion
BRAC	Base Realignment and Closure
CAA-90	Federal Clean Air Act of 1990
CAAA	Federal Clean Air Act Amendments of 1990
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by SARA of 1986
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERFA	Community Environmental Response Facilitation Act
CERL	US Army Construction Engineering Research Laboratory
CFC	Chlorofluorocarbon
cfh	Cubic feet per hour
CFR	Code of Federal Regulations
CM	Centimeter
CO	Company
CO	Carbon Monoxide
COMSEC	Communication Security
CONUS	Continental United States
CPW	Center for Public Works
CWA	Clean Water Act
CX	Categorical Exclusion
CY	Calendar Year
DA	Department of the Army
dB	Decibels
dBA	A-weighted decibels
DEH	Directorate of Engineering and Housing
DEQ	Department of Environmental Quality
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DESR	Defense Environmental Status Report
DIS	Directorate of Installation Support
DNL	Decibel Noise Level
DoD	Department of Defense
DOL	Directorate of Logistics
DOT	Department of Transportation
DRMO	Defense Reutilization Marketing Office
DSN	Defense System Network
EA	Environmental Assessment
EBS	Environmental Baseline Survey
ECA	Environmental Compliance Assessment
ECAP	Environmental Compliance Achievement Program
ECAS	Environmental Compliance Assessment System
EIFS	Economic Impacts Forecast System
EIS	Environmental Impact Statement
EM	Electromagnetic
ENL	Enlisted
ENRS	Emergency National Response System
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPCA	Energy Policy and Conservation Act
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Environmental Site Assessment
FAA	Federal Aviation Administration
FFDCA	Federal Food, Drug, and Cosmetic Act (1938)
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act (1972)
FLPMA	Federal Land Policy and Management Act
FOB	Federal Office Building
FONSI	Finding of No Significant Impact
FORSCOM	Forces Command

FR	Federal Register
FSTC	Foreign Science and Technology Center
ft	Feet
Ft.	Fort
FWS	US Fish and Wildlife Service
FY	Fiscal Year
g or gm	Grams
gal	Gallons
GOCO	Government-owned, Contractor Operated
GOSC	General Officers Steering Committee
GP	General Purpose
gpd	Gallons per day
GSA	General Services Administration
GSF	Gross square feet ("footprint" of building)
GVW	Gross Vehicle Weight
HAP	Hazardous Air Pollutant
HAZCOMM	Hazard Communication
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material and Waste Minimization
HC	Hydrocarbons
HCFC	Hydro chlorofluorocarbon
HF	High Frequency
HMTUSA	Hazardous Materials Transportation Uniform Safety Act
HPP	Historic Preservation Plan
HQ	Headquarters
HQDA	Headquarters, Department of the Army
HSWA	Hazardous and Solid Waste Amendments of 1984 to RCRA
HWMP	Hazardous Waste Management Plan
hz	Hertz
IAG	Inter-agency Agreement
ICUZ	Installation Compatible Use Zone
IDG	Installation Design Guide
IMP	Installation Master Plan
INSCOM	Intelligence and Security Command
IOSC	Installation On-scene Coordinator
IR	Installation Restoration
IRA	Interim Response Action
IRDMIS	Installation Restoration Data Management Information System
IRP	Installation Restoration Program
IRT	Installation Response Team
ISCP	Installation Spill Contingency Plan
ITAC	Intelligence and Threat Analysis Center
ITAM	Integrated Training Area Management
LB	Low Band
LEPC	Local Emergency Planning Committee
LI	Light Industrial
LOS	Level of Service
LQG	Large Quantity Generator
LUST	Leaking Underground Storage Tank
MACOM	Major Army Command
MACT	Maximum Available Control Technology
MCA	Military Construction, Army
MCL	Maximum Contaminant Level
mgd	Million gallons per day
$\mu g/m^3$	Micrograms per cubic meter
MI	Military Intelligence
mi	Miles
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSA	Metropolitan Statistical Area
MSDS	Material Safety Data Sheet
MSL	Mean Sea Level
mw	Miliwatt
NAAQS	National Ambient Air Quality Standards
NCP	National Contingency Plan
NECPA	National Energy Conservation Policy Act
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emission Standards for Hazardous Air Pollution
NHPA	National Historic Preservation Act
NiCad	Nickel Cadmium
NOI	Notice of Intent
NOV	Notice of Violation
NO_X	Nitrous Oxides
NO_2	Nitrogen Dioxide
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NWI	National Wetlands Inventory
^{o} C	Degrees Centigrade
^{o} F	Degrees Farenheight
O_3	Ozone
O&M	Operation and Maintenance
OCONUS	Outside the Continental United States
ODS	Ozone Depleting Substances
OMB	Office of Management and Budget
OPP	Office of Pesticide Programs, a division of US EPA
OPS	Operations

OSHA	Occupational Safety and Health Act
PA/SI	Preliminary Assessment/Site Inspection
PAO	Public Affairs Office
PAS	Preliminary Assessment Screening
Pb	Lead
PCB	Polychlorinated Biphenyls
pcph	Passenger cars per hour
PD-IP	Planned Development - Industrial Park
PEL	Permissible Exposure Limits
pH	A measure of a liquid's acid/base properties
PK	Parking
PL	Public Law
PM10	Particulate Matter less than 10 microns in size
POL	Petroleum, Oil, and Lubricants
POM	Program Operating Memorandum
POTW	Publicly Owned Treatment Work (municipal sewage treatment plant)
ppm	Parts per million
PRD	Planned Residential Development
PSD	Prevention of Significant Deterioration
P/T	Part Time
PWC	Public Works Center
R&D	Research and Development
RA	Remedial Action
RA	Rural Area
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
REC	Record of Environmental Consideration
RFA	RCRA Facilities Assessment
RFR	Radio Frequency Radiation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
ROI	Region of Influence
RRS	Remote Relay System
RTV	Rational Threshold Value
RUST	Registered Underground Storage Tank
SAE	Society of Automotive Engineers
SARA	Superfund Amendments and Reauthorization Act of 1986
SCIF	Special Compartmented Intelligence Facility
SCS	Soil Conservation Service
SDWA	Safe Water Drinking Act of 1974
SF	Square feet
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SJA	Staff Judge Advocate
SOx	Sulfuric Oxides
SO2	Sulfur Dioxide
SPCCP	Spill Prevention Control and Countermeasure Plan
sq. ft.	Square foot
SQG	Small Quantity Generator
sq. km.	Square Kilometers
STP	Sewage Treatment Plant
SWMU	Solid Waste Management Unit
TB	Technical Bulletin
TG	Technical Guide
tpy	Tons per Year
TRADOC	Training and Doctrine Command
TSCA	Toxic Substances Control Act of 1976
TSD	Treatment, Storage, Disposal of hazardous wastes under RCRA
TSDF	Treatment, Storage, Disposal Facility
TSM	Transportation System Management
TSP	Total Suspended Particulates
TV	Television
TWA	Time Weighted Average
UHF	Ultra High Frequency
UPH	Unaccompanied Personnel Housing
UPS	Uninterrupted Power Supply
USACE	US Army Corps of Engineers
USACHPPM	United States Army Center for Health Promotion and Preventive Medicine
USAINSCOM	US Army Intelligence and Security Command
USAEC	US Army Environmental Center
USC	United States Code
USDA	US Department of Agriculture
USD(A)	Under Secretary of Defense for Acquisition
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
UXO	Unexploded Ordnance
MDEQ	Maryland Department of the Environmental
MDT	Maryland Department of Transportation
VHF	Very High Frequency
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
VOR	VHF Omni directional Range

MPDES	Maryland Pollutant Discharge Elimination System
WES	US Army Waterways Experiment Station
WPFPA	Watershed Protection and Flood Prevention Act
WQS	Water Quality Standard
WWTP	Waste Water Treatment Plant
yr	Year

12.0 PREPARERS

Mr. Allan H. Anderson, P.E., REM, QEP
Mr. Anderson is the Environmental Engineer for the U.S. Army Intelligence and Security Command. Mr. Anderson previously served fourteen years as an Army Officer in the Army Corps of Engineers. He subsequently worked twelve years as a Department of Defense contractor, with environmental engineering experience as project manager (Richmond Air National Guard Base), Senior Engineer Environmental Planner (ManTech Telecommunications and Information Systems), Senior Environmental Technologist (Vanguard Research, Inc.), and Principal Engineer – Environmental (Lockheed Martin). His education and certifications include a B.S., Business Management, University of Wyoming, 1978; U.S. Army Corps of Engineers Basic Engineer Officer Training Course: 1978; Atomic Demolitions/Munitions School: 1978; Masters of Engineering Management, The George Washington University, 1997; U.S. Army Corps of Engineers Advanced Engineer Officer Training Course: 1983; Licensed Environmental Engineer, State of Virginia (# 0402 033104); Licensed Class I/III Waste Facility Manager (VA # 4602 001930). Mr. Anderson's professional certifications include Registered Environmental Manager (REM # 10150), National Registry of Environmental Professionals (NREP); Qualified Environmental Professional (QEP # 0800052), Institute of Professional Environmental Practice (IPEP). Mr. Anderson's professional memberships include the Society of American Military Engineers, Air and Waste Management Association, Water Environment Federation, National Society of Professional Engineers.

13.0 INTERAGENCY COORDINATION AND CORRESPONDENCE

13.1 Interagency Coordination

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Tawes State Office Building
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580 Taylor Avenue Annapolis, MD 21401
Toll Free: 1-877-620-8DNR (8367).
Out of state call 410-260-8573
E-mail: lbyrne@dnr.state.md.us

Anne Arundel County Maryland
Office of Environmental & Cultural Resources
ATTN: Ms. Ginger Ellis or Ms. Tracy Reynolds
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Annapolis, MD 21401
Telephone: 410-222-7502/4202
E-mail: treynolds@aacounty.org

Maryland Dept. of Environment Clearinghouse Coordinator
ATTN: Joane Mueller
1800 Washington Blvd
Baltimore, MD 21230
Toll Free: 1-800-633-6101

U.S. Dept. of the Interior Fish & Wildlife Services
Chesapeake Bay Field Office
ATTN: Devin Ray
177 Admiral Cochrane Drive
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Maryland Dept. of Housing & Community Development Maryland Historical Trust
Division of Historical and Cultural Programs
ATTN: Elizabeth J. Cole
100 Community Place
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13.2 Interagency Correspondence

The following pages contain responses from Federal, State and Local agencies regarding this environmental assessment document. This Final Environmental Assessment was revised and updated to incorporate agency review comments. No public comments were received during public comment period.

14.0 APPENDICES

Appendix A: Laws, regulations, executive orders, and policies pertinent to this study

Appendix B: Species list

Appendix C: Environmental Engineering Calculations

Appendix D: Storm water Calculations

Appendix E: Air Emissions Calculations

Appendix F: Environmental factors considered and deemed not relevant

Appendix G: Distribution

APPENDIX A

Appendix A: Pertinent Laws, Regulations, Executive Orders, and Policies

TITLE	U.S. CODE
Anadromous Fish Conservation Act (1965)	16 U.S.C. 755
Antiquities Act of 1906	16 U.S.C. 1906
Archeological and Historical Preservation Act of 1974 (AHPA)	16 U.S.C. 469
Archaeological Resources Protection Act of 1979	16 U.S.C. 470
Federal Clean Air Act of 1970, as Amended (CAA)	42 U.S.C. 7401-7671
Clean Water Act of 1977, as Amended (CWA) [or Federal Water Pollution Control Act]	33 U.S.C. 1251-1376
Community Environmental Response Facilitation Act of 1992 (CERFA)	42 U.S.C. 9620
Comprehensive Environmental Response Compensation and Liability Act (CERCLA) [Amendments to Superfund in 1983 and 1986 -- also known as SARA]	42 U.S.C. 9601-9657
Emergency Energy Conservation Act of 1979	42 U.S.C. 8501
Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA)	42 U.S.C. 11001-11050
Emergency Wetlands Resources Act of 1986	16 U.S.C. 3901
Endangered Species Act of 1973	16 U.S.C. 1531-1544
Energy Conservation in Existing Buildings Act of 1976	42 U.S.C. 8851
Energy & Conservation Standards for New Buildings Act of 1976	42 U.S.C. 6831
Energy Policy and Conservation Act of 1975 (EPCA)	42 U.S.C. 6201-6309
Energy Policy and Conservation Act of 1992(EPCA)	H.R.776
Environmental Quality Improvement Act of 1970	42 U.S.C. 4371
EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds	NA
EO 13148 Greening the Government through Leadership in Environmental Management	NA
EO 13123 Greening the Government Through Efficient Energy Management (Replaces EO 12902)	NA
EO 13101 Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition (Replaces EO 12995 and EO 12873)	NA
EO 13093 American Heritage Rivers, Amending Executive Orders 13061 and 13080	NA
EO 13061 Federal Support of Community Efforts Along American Heritage Rivers	NA
EO 13016 CERCLA Amendments (Amends EO 12580)	NA
EO 12996 Management and General Public Use of the National Wildlife Refuge System	NA
EO 12969 Federal Acquisition and Community Right-To-Know	NA
EO 12948 Amendment to Executive Order 12898	NA
EO 12916 Implementation of the Border Environment Cooperation Commission and the North American Development Bank	NA
EO 12915 Federal Implementation of the North American Agreement on Environmental Cooperation	NA
EO 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	NA
EO 12866 Regulatory Planning and Review	NA
EO 12856 Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements	NA
EO 12845 Requiring Agencies To Purchase Energy Efficient Computer Equipment	NA
EO 12843 Procurement Requirements and Policies for Federal Agencies for Ozone-Depleting Substances	NA
EO 12780 Federal Agency Recycling and the Council on Federal Recycling and Procurement Policy	NA
EO 12778 Civil Justice Reform	NA
EO 12777 Implementation of Section 311 of the Federal Water Pollution Control Act of October 18, 1972, as amended, and the Oil Pollution Act of 1990	NA
EO 12580 Superfund Implementation	NA

Appendix A: Pertinent Laws, Regulations, Executive Orders, and Policies (continued)

TITLE	U.S. CODE
EO 12512 Federal Real Property Management	NA
EO 12196 Occupational Safety and Health Programs for Federal Employees	NA
EO 12114 Environmental Effects Abroad of Major Federal Actions	NA
EO 12088 Federal Compliance with Pollution Control Standards	NA
EO 11990 Protection of Wetlands	NA
EO 11988 Floodplain Management	NA
EO 11987 Exotic Organisms	NA
EO 11738 Providing for Administration of the Federal Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans	NA
EO 11593 Protection and Enhancement of the Cultural Environment	NA
EO 11514 Protection and Enhancement of Environmental Quality	NA
EO 11472 Cabinet Committee on the Environment and the Citizens' Advisory Committee on Environmental Quality	NA
EO 11288 Prevention, Control, and Abatement of Water Pollution by Federal Activities	NA
Federal Environmental Pesticide Control Act of 1972	7 U.S.C. 136-136y
Federal Facilities Compliance Act of 1992	42 U.S.C. 6901 et seq.
Federal Insecticide, Fungicide and Rodenticide Act of 1972, as Amended	7 U.S.C. 136-136y
Federal Land Policy and Management Act of 1976 (FLPMA)	43 U.S.C. 1701 et. seq.
Fish and Wildlife Coordination Act of 1946	16 U.S.C. 661-667e
Flood Disaster Protection Act (1994)	42 U.S.C. 4001
Hazardous Materials Transportation Uniform Safety Act of 1990 (HMTUSA)	49 U.S.C. 5101
Historic Monuments Preservation Act (1974)	16 U.S.C. 470
Historic Sites Act of 1935 [a.k.a. Historic Sites, Buildings, and Antiquities Act of 1935]	16 U.S.C. 461-467
Housing & Community Development Act (1992)	42 U.S.C. 5301
Indoor Radon Abatement Act (1988)	15 U.S.C. 2661
Land and Water Conservation Fund Act (1964)	16 U.S.C. 4601-8
Lead Based Paint Poisoning Prevention Act (1973)	42 U.S.C. 4822
Lead Contamination Control Act (1944)	42 U.S.C. 201
Low-Level Radioactive Waste Policy Act of 1980, as Amended	42 U.S.C. 2021
Mercury-Containing and Rechargeable Battery Management Act (1996)	42 U.S.C. 14301
Migratory Bird Conservation Act (1966)	16 U.S.C. 715
Military Construction Codification Act of 1982	10 U.S.C. 1823
National Emission Standards Act of 1990	42 U.S.C. 7521-7554
National Energy Conservation Policy Act (1978) (NECPA)	42 U.S.C. 8251-8287
National Environmental Policy Act (1969) (NEPA)	42 U.S.C. 4331 et seq.
National Historic Preservation Act of 1966	16 U.S.C. 470 et. seq.
National Historic Preservation Act (NHPA), Amended 1980 & 1992	16 U.S.C. 470
Native American Grave Protection & Repatriation Act of 1990	25 U.S.C. 3001-3013
Noise Control Act of 1972	42 U.S.C. 4901
North American Wetlands Conservation Act of 1989	16 U.S.C. 4401-4412
Noxious Plant Control Act of 1968	43 U.S.C. 1241 et seq.
Occupational Safety and Health Act of 1970 (OSHA)	29 U.S.C. 651-678
Oil Pollution Act of 1990	33 U.S.C. 2701 et. seq.
Partnerships for Wildlife Act (1992)	16 U.S.C. 3741
Pollution Prevention Act of 1990	42 U.S.C. 13101-13109
Radon Gas & Indoor Air Quality Research Act of 1986	42 U.S.C. 7401
Refuse Act of 1899	33 U.S.C. part 407
Renewable Energy Resources Act of 1980	42 U.S.C. 7371
Renewable Energy Industry Development Act of 1983	42 U.S.C. 6276
Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989	42 U.S.C. 12001

Appendix A: Pertinent Laws, Regulations, Executive Orders, and Policies (continued)

TITLE	U.S. CODE
Renewable Resources Extension Act of 1978	16 U.S.C. 1671
Residential Lead-Based Paint Hazard Reduction Act of 1992	42 U.S.C. 4851 et seq.
Resource Conservation and Recovery Act of 1976 (RCRA)	42 U.S.C. 6901-6992
Rivers and Harbors Act (1899)	33 U.S.C. 401
Safe Drinking Water Act, as Amended 1986 (SDWA) • Hazardous and Solid Waste Amendments (HSWA) of 1984 • Amendments of 1996	42 U.S.C. 300f et seq. 42 U.S.C. 6917 42 U.S.C. 300a-300j
Soil Conservation and Domestic Allotment Act of 1938	16 U.S.C. 590a-590q
Superfund (trust fund established after the 1983 and 1986 amendments to Superfund) • Comprehensive Environmental Response Compensation and Liability Act (CERCLA) [Amendments to Superfund in 1983 and 1986 -- also known as SARA] • Superfund Recycling Equity Act	26 U.S.C. 9507 42 U.S.C. 9601-9657 42 U.S.C. 9627
Toxic Substances Control Act of 1976 (TSCA)	42 U.S.C. 2601-2629
Maryland Wilderness Act of 1984	16 U.S.C. 1132
Water Resources and Planning Act (1965)	42 U.S.C. 1962
Watershed Protection and Flood Prevention Act (WPFPA) (1954)	16 U.S.C. 1001 et seq.
Wild Bird Conservation Act of 1992	16 U.S.C. 4901 et seq.
Wild and Scenic Rivers Act (1968)	16 U.S.C. 1271
Wilderness Act of 1964	16 U.S.C. 1131-1136

NA: Not applicable

APPENDIX B

Appendix B: Species List

Table 16: State List of Rare, Threatened, and Endangered *Plant* Species Identified at FGGM (1993–94)

Scientific Name	Common Name	Maryland Natural Heritage Program Rank
Aronia prunifolia	Purple cokeberry	Watchlist
Carex atlantica	Eastern sedge	Watchlist
Carex leavenworthii	Leavenworth's sedge	Endangered Extirpated
Carex seorsa	Weak stellate sedge	Watchlist
Carex straminea	Straw sedge	Watchlist
Carex tonsa	Shaved sedge	Highly Rare
Castanea pumila	Chinquapin	Watchlist
Cyperus erythrorhizos	Red-rooted cyperus	Watchlist
Cyperus grayi	Asa Gray's cyperus	Watchlist
Helianthemum propinquum	Pine-barren frostweed	Watchlist
Juncus polycephalus	Many-headed rush	Status Uncertain
Lespedeza stuevei	Downy bushclover	Endangered
Panicum leucothrix	Roughish panicgrass	Status Uncertain
Rhodendrum atlanticum	Dwarf azalea	Watchlist
Senecio smallii	Smallii ragwort	Watchlist

Table 17: State and Federal List of Rare, Threatened, and Endangered *Animal* Species Identified at FGGM (1993-94)*

Scientific Name	Common Name	Maryland Natural Heritage Program Rank	U.S. Status
Chlorotettix sp.	A cicadellid leafhopper	Status Uncertain	--
Etheostoma vitreum	Glassy darter	Extremely Rare	--
Gallinula chloropus	Common moorhen	Very Rare	--
Limotettix sp.	Eastern sedge barrens	Extremely Rare	--
Lophodytes cucullatus	Hooded merganser	Extremely Rare	--
Percina notogramma	Stripeback darter	Historically Known	--
Pituophis melanoleucus	Northern pine snake	Historically Known	Candidate I/D**
Porzana carolina	Sora	Extremely/Very Rare	--
Reithrodontomys humulis	Eastern harvest mouse	Historically Known	--
Sorex longirostris	Southeastern shrew	Very Rare	--
Sperchopsis tessellatus	A hydrophylid beetle	Very Rare	--

* Information adapted from that found in FGGM, 1998a.
** I/D = Evidence of vulnerability, but insufficient data.

Table 18: List of Fish Species Identified at FGGM (1999)

Scientific Name	Common Name
Alosa aestivalis	Blueback herring
Anguilla rostrata	American eel
Catostomus commersoni	White sucker
Cyprinella analostana	Satinfin shiner
Dorosoma cepedianum	Gizzard shad
Enneacanthus gloriosus	Bluespotted sunfish
Erimyzon oblongus	Creek chubsucker
Etheostoma olmstedi	Tessellated darter
Etheostoma vitreum	Glassy darter
Fundulus heteroclitus	Mummichog
Exoglossum maxillingua	Cutlips minnow
Hypentelium nigricans	Northern hogsucker
Lampetra aepyptera	Least brook lamprey
Lampetra appendix	America brook lamprey
Lepomis auritus	Redbreast sunfish
Lepomis gibbosus	Pumpkinseed
Lepomis macrochirus	Bluegill
Micropterus dolomieu	Smallmouth bass
Micropterus salmoides	Largemouth bass
Notropis amoenus	Comely shiner
Notropis procne	Swallowtail shiner
Percina peltata	Shield darter
Rhinichthys atratulus	Blacknose dace
Rhinichthys cataractae	Longnose dace
Semotilus corporalis	Fallfish
Umbra pygmaea	Eastern mudminnow

(Source: Fort Meade, 1999)

As a result of the rare species surveys at FGGM, five areas were identified as having Statewide significance. None of these areas is located in the vicinity of the proposed project site. The five areas include:

- Rock Avenue Shrub Swamp
- Range Road Obstacle Course
- Range Road Corridor
- NSA Antenna Site
- Little Patuxent River

In accordance with the requirements of the Endangered Species Act, agency coordination was initiated with the USFWS, Maryland Forest, Wildlife, and Heritage Division of the Maryland Department of Natural Resources (DNR), and the Maryland DNR Division of Environmental Review. None of the above-mentioned species were found to occur within the proposed 902nd MI Group facility construction area during field reconnaissance. Nevertheless, construction contractors will be provided with the above information and will be advised to notify the Fort Meade Environmental Management Office if they encounter plant, animal or fish species that could possibly be a protected species.

The remainder of this Appendix includes a listing of all other species occurring on FGGM.

APPENDIX C

Appendix C: Environmental Engineering Calculations

902nd Military Intelligence Group MILCON Project
Environmental Engineering Calculations

<u>NOTE</u>: The following engineering calculations address environmental impacts at Fort George G. Meade, MD for the proposed new 902nd MI Group Administrative and Operations Center Building. These calculations are based on the unit's proposed FY09 Theater Intelligence Brigade (TIB) structure and are for estimating potential environmental impacts only. These calculations represent conservative (i.e., worst case) estimates and are not suitable for final facility design calculations to be performed later in the project cycle.

Key references for the following calculations include:

1. ASHRAE HandbookCD, which includes:
   - 2002 Refrigeration
   - 2001 Fundamentals
   - 2000 HVAC Systems and Equipment
   - 1999 HVAC Applications
2. Standard Handbook of Engineering Calculations, 3rd ed. (1994)
3. Handbook of Environmental Engineering Calculations (2000)
4. WHAM: Simplified Tool for Calculating Water Heater Energy Use (ASHRE Internet Site, CH-99-16-1)
5. Air Pollution Engineering Manual (2000)
6. Municipal Storm Water Management, 2nd ed. (2003)
7. Air Quality Permitting (1996)
8. Stormwater Collection Systems Design Handbook (2001)
9. 2000 Maryland Stormwater Design Manual
10. Anne Arundel County Stormwater Management Practices and Procedures Manual

Potable (Drinking) Water Requirement

<u>Potable (Drinking) Water Requirement Calculations</u>:

$$Unit\_strength := 1096\ personnel$$

$$Potable\_water\_demand := 50\cdot\frac{gal}{person \bullet day}$$

$$Potable\_water\_rqmt_{avg} := Unit\_strength\cdot Potable\_water\_demand$$

$$Potable\_water\_rqmt_{avg} = 207.44\cdot\frac{m^3}{day} \qquad Potable\_water\_rqmt_{avg} = 54800\cdot\frac{gal}{day}$$

$$Max\_potable\_water_{daily} := 180\%\cdot Potable\_water\_rqmt_{avg}$$

$$Max\_potable\_water_{daily} = 373.39\cdot\frac{m^3}{day} \qquad Max\_potable\_water_{daily} = 98640\cdot\frac{gal}{day}$$

$$Max\_potable\_water_{hourly} := 250\% \cdot Potable\_water\_rqmt_{avg}$$

$$Max\_potable\_water_{hourly} = 21.61 \cdot \frac{m^3}{hr}$$ $$Max\_potable\_water_{hourly} = 5708 \cdot \frac{gal}{hr}$$

Firefighting Water Requirement Calculations:

$$Firefighting\_water\_rqmt := 3.86 \cdot \frac{m^3}{min} \cdot \sqrt{\frac{Unit\_strength}{1000}} \left(1 - 0.01 \cdot \sqrt{\frac{Unit\_strength}{1000}}\right)$$

$$Firefighting\_water\_rqmt = 239.9 \cdot \frac{m^3}{hr}$$ $$Firefighting\_water\_rqmt = 63381 \cdot \frac{gal}{hr}$$

$$Firefighting\_water\_rqmt = 5758.2 \cdot \frac{m^3}{day}$$ $$Firefighting\_water\_rqmt = 1.52 \cdot mgd$$

NOTE: Firefighting water requirements are in addition to the maximum daily water requirement (flow rate). The firefighting water requirement must be available for 4 to 10 hours, preferably 10 hours.

TOTAL POTABLE WATER REQUIREMENT CALCULATIONS:

$$Total\_water\_rqmt := Max\_potable\_water_{hourly} + Firefighting\_water\_rqmt$$

$$Total\_water\_rqmt = 261.5 \cdot \frac{m^3}{hr}$$ $$Total\_water\_rqmt = 69089 \cdot \frac{gal}{hr}$$

$$Total\_water\_rqmt = 6276.8 \cdot \frac{m^3}{day}$$ $$Total\_water\_rqmt = 1.66 \cdot mgd$$

Preliminary Water Pipe Sizing

Pipe Design Statement and Assumptions

Potable water is conveyed via cast iron pipe to the project site (point 2) at an elevation of $\mathbf{h_2}$. The water main connection (Point 1) is located a distance of approximately **L** = 100 meters from the pipeline termination point 2 at an elevation of $\mathbf{h_1}$. The pressure at point 1 is $\mathbf{p_1}$ = 1000 kPa (145 psi). Assuming cast iron pipe with roughness factor ε, determine pipe diameter **d** needed to discharge water (with properties γ, μ, and ρ) at a flow rate of **Q** at friction factor **f**.

System Parameters

Height at point 1: $z_1 := 143 \cdot ft$

Height at point 2: $z_2 := 155 \cdot ft$

Distance from point 1 to point 2: $L_{w\_pipe} := 150 \cdot m$

Pressure at point 1: $p_1 := 1000 \cdot kPa$ $p_1 = 145 \cdot psi$

Pipe roughness: $\varepsilon_{w\_pipe} := .013 \cdot ft$

Required flow rate: $Total\_water\_rqmt = 1.151 \times 10^3 \cdot \frac{gal}{min}$

$Total\_water\_rqmt = 2.566 \cdot \frac{ft^3}{sec}$

Specific weight of water $\gamma_w := 9.789 \cdot \frac{kN}{m^3}$

Absolute viscosity of water $\mu_w := 1.129 \cdot \frac{newton \cdot sec}{m^2}$

Density of water $\rho_w := 998.2 \cdot \frac{kg}{m^3}$

Solution

The lost head is calculated using the Darcy-Weisbach formula:

$$h_L = friction \cdot \left(\frac{L_{w\_pipe}}{dia_{pipe}}\right) \cdot \left(\frac{V^2}{2 \cdot g}\right) \qquad (1)$$

Using the definition of pipe area,

$$A = \pi \cdot \left(\frac{dia_{pipe}}{2}\right)^2$$ (**dia_{pipe}** is pipe diameter)

the flow rate equation is

$$Total\_water\_rqmt = A \cdot V = \pi \cdot \left(\frac{dia_{pipe}}{2}\right)^2 \cdot V$$

Solving for the flow velocity **V** gives

$$V = \frac{Total\_water\_rqmt}{\pi \cdot \left(\frac{dia_{pipe}}{2}\right)^2} \qquad (2)$$

Substituting for **V** in (1) yields

$$h_L = 8 \cdot friction_{pipe} \cdot \frac{L_{w\_pipe}}{{dia_{pipe}}^5} \cdot \frac{Total\_water\_rqmt^2}{\pi^2 \cdot g}$$

where **$friction_{pipe}$** and **dia_{pipe}** are unknowns.

Bernoulli equation for 1 to 2; datum at 2.

$$\frac{p_1}{\gamma_w} + \frac{{V_1}^2}{2 \cdot g} + z_1 = 0 \cdot m + \frac{{V_2}^2}{2 \cdot g} + z_2 + 8 \cdot friction_{pipe} \cdot \frac{L_{w\_pipe}}{{dia_{pipe}}^5} \cdot \frac{Total\_water\_rqmt^2}{\pi^2 \cdot g}$$

Since the flow is steady and since the fluid may be treated as incompressible, $\mathbf{V_1} = \mathbf{V_2}$ and the velocity head terms cancel. Since there are two unknowns, the Colebrook equation relating **f** and **d** is used:

$$\frac{1}{\sqrt{friction_{pipe}}} = -2\cdot\log\left(\frac{\varepsilon_{w\_pipe}}{3.7\cdot dia_{pipe}} + \frac{2.51}{Re\cdot\sqrt{friction_{pipe}}}\right)$$

Substituting for **V** using (2), **Re** is expressed as

$$Re = \frac{\rho_w\cdot dia_{pipe}\cdot V}{\mu_w} = \frac{\rho_w\cdot dia_{pipe}}{\mu_w}\cdot\frac{Total\_water\_rqmt}{\pi\cdot\left(\frac{dia_{pipe}}{2}\right)^2}$$

Solve the Bernoulli equation and the Colebrook equation simultaneously using **Mathcad** solve block:

$friction_{pipe} := 0.0200$ $dia_{pipe} := 0.2\cdot m$ initial guess values

Given

$$\frac{p_1}{\gamma_w} + z_1 = z_2 + 8\cdot friction_{pipe}\cdot\frac{L_{w\_pipe}}{dia_{pipe}^{\,5}}\cdot\frac{Total\_water\_rqmt^2}{\pi^2\cdot g}$$ Bernoulli equation

$$\frac{1}{\sqrt{friction_{pipe}}} = -2\cdot\log\left[\frac{\varepsilon_{w\_pipe}}{3.7\cdot dia_{pipe}} + \frac{2.51}{\frac{\rho_w\cdot dia_{pipe}}{\mu_w}\cdot\frac{Total\_water\_rqmt}{\pi\cdot\left(\frac{dia_{pipe}}{2}\right)^2}\cdot\sqrt{friction_{pipe}}}\right]$$ Colebrook equation

$$\begin{pmatrix} dia_{water\_pipe} \\ friction_{water\_pipe} \end{pmatrix} := Find(dia_{pipe}, friction_{pipe})$$

$dia_{water\_pipe} = 0.143\cdot m$ ...minimum required pipe diameter

$friction_{water\_pipe} = 0.0911$ ...friction factor

$Pipe_{dia\_water} := Ceil(dia_{water\_pipe}, 1\cdot in)$

$Pipe_{dia\_water} = 6\cdot in$ ...minimum required water pipe diameter

Wastewater Treatment Requirement

Wastewater Generation Calculations:
Assume wastewater generation, including infiltration and inflow, equals 100% of potable water demand.

Estimated flow rates:

$$Wastewater_{avg} := Potable\_water\_rqmt_{avg}$$

$Wastewater_{avg} = 207 \cdot \frac{m^3}{day}$ $Wastewater_{avg} = 54800 \cdot \frac{gal}{day}$ $Wastewater_{avg} = 0.0548 \cdot mgd$

$Wastewater_{avg} = 75766 \cdot \frac{m^3}{yr}$ $Wastewater_{avg} = 2.002 \times 10^7 \cdot \frac{gal}{yr}$

$$Wastewater_{max} := Max\_potable\_water_{hourly}$$

$Wastewater_{max} = 519 \cdot \frac{m^3}{day}$ $Wastewater_{max} = 137000 \cdot \frac{gal}{day}$ $Wastewater_{max} = 0.137 \cdot mgd$

$Wastewater_{max} = 2 \times 10^5 \cdot \frac{m^3}{yr}$ $Wastewater_{max} = 5 \times 10^7 \cdot \frac{gal}{yr}$

Preliminary Sewer Pipe Sizing

Pipe Design Statement and Assumptions

Sewage is conveyed via cast iron pipe from the project site (Point 3) at an elevation of $\mathbf{z_3}$. The sewer main connection (Point 3) is located a distance **L** = 100 meters from the sewer pipe termination Point 4 at an elevation of $\mathbf{z_4}$. The pressure at Point 3 is $\mathbf{p_3}$ = atmospheric pressure = 1 atm (15 psi or 101.325 kPa). Assuming cast iron pipe with roughness factor ε, determine pipe diameter **d** needed to discharge water (with properties γ, μ, and ρ) at a flow rate of **Q** at friction factor **f**.

System Parameters

Height at point 3: $z_3 := 143 \cdot ft$

Height at point 4: $z_4 := 155 \cdot ft$

Distance from point 3 to point 4: $L_{ww\_pipe} := 150 \cdot m$

Pressure at point 3: $p_3 := 1 \cdot atm$ $p_3 = 15 \cdot psi$ $p_3 = 101.325 \cdot kPa$

Pipe roughness: $\varepsilon_{ww\_pipe} := .013 \cdot ft$

Required flow rate: $Wastewater_{max} = 6.002 \times 10^{-3} \frac{m^3}{s}$

$Wastewater_{max} = 0.212 \cdot \frac{ft^3}{sec}$

Specific weight of wastewater $\gamma_{ww} := 9.789 \cdot \frac{kN}{m^3}$

Absolute viscosity of wastewater $\mu_{ww} := 1.129 \cdot \frac{newton \cdot sec}{m^2}$

Density of wastewater $\rho_{ww} := 998.2 \cdot \frac{kg}{m^3}$

Solution

The lost head is calculated using the Darcy-Weisbach formula:

$$h_L = friction \cdot \left(\frac{L_{ww\_pipe}}{diameter}\right) \cdot \left(\frac{V^2}{2 \cdot g}\right) \qquad (1)$$

Using the definition of pipe area,

$$A = \pi \cdot \left(\frac{diameter}{2}\right)^2$$ (**diameter** is wastewater pipe diameter)

the flow rate equation is

$$Wastewater_{max} = A \cdot V = \pi \cdot \left(\frac{diameter}{2}\right)^2 \cdot V$$

Solving for the flow velocity **V** gives

$$V = \frac{Wastewater_{max}}{\pi \cdot \left(\frac{diameter}{2}\right)^2} \qquad (2)$$

Substituting for **V** in (1) yields

$$h_L = 8 \cdot friction \cdot \frac{L_{ww\_pipe}}{diameter^5} \cdot \frac{Wastewater_{max}^{\ 2}}{\pi^2 \cdot g}$$

where **friction** and **diameter** are unknowns.

Bernoulli equation for 1 to 2; datum at 2.

$$\frac{p_3}{\gamma_{ww}} + \frac{V_1^{\ 2}}{2 \cdot g} + z_3 = 0 \cdot m + \frac{V_2^{\ 2}}{2 \cdot g} + z_4 + 8 \cdot friction \cdot \frac{L_{ww\_pipe}}{diameter^5} \cdot \frac{Wastewater_{max}^{\ 2}}{\pi^2 \cdot g}$$

Since the flow is steady and since the fluid may be treated as incompressible, $\mathbf{V_1} = \mathbf{V_2}$ and the velocity head terms cancel. Since there are two unknowns, the Colebrook equation relating **f** and **d** is used:

$$\frac{1}{\sqrt{friction}} = -2 \cdot \log\left(\frac{\varepsilon_{ww\_pipe}}{3.7 \cdot diameter} + \frac{2.51}{Re \cdot \sqrt{friction}}\right)$$

Substituting for **V** using (2), **Re** is expressed as

$$Re = \frac{\rho_{ww} \cdot diameter \cdot V}{\mu_{ww}} = \frac{\rho_{ww} \cdot diameter}{\mu_{ww}} \cdot \frac{Wastewater_{max}}{\pi \cdot \left(\frac{diameter}{2}\right)^2}$$

Solve the Bernoulli equation and the Colebrook equation simultaneously using **Mathcad** solve block:

$diameter := 0.1 \cdot m$ $friction := 0.0200$ initial guess values

Given

$$\frac{p_3}{\gamma_{ww}} + z_3 = z_4 + 8 \cdot friction \cdot \frac{L_{ww\_pipe}}{diameter^5} \cdot \frac{Wastewater_{max}^{\ 2}}{\pi^2 \cdot g}$$ Bernoulli equation

$$\frac{1}{\sqrt{friction}} = -2 \cdot \log\left[\frac{\varepsilon_{ww\_pipe}}{3.7 \cdot diameter} + \frac{2.51}{\frac{\rho_{ww} \cdot diameter}{\mu_{ww}} \cdot \frac{Wastewater_{max}}{\pi \cdot \left(\frac{diameter}{2}\right)^2} \cdot \sqrt{friction}}\right]$$ Colebrook equation

$$\begin{pmatrix} diameter_{ww\_pipe} \\ friction_{ww\_pipe} \end{pmatrix} := Find(diameter, friction)$$

$diameter_{ww\_pipe} = 0.11 \cdot m$ $diameter_{ww\_pipe} = 4.312 \cdot in$ ...minimum required pipe diameter

$friction_{ww\_pipe} = 0.236$ ...friction factor

$Pipe_{dia\_ww} := Ceil(diameter_{ww\_pipe}, 1 \cdot in)$

$Pipe_{dia\_ww} = 5 \cdot in$ ...minimum required wastewater pipe diameter

Estimated wastewater characterization:

Assumptions:

Five-day Biochemical Oxygen Demand (BOD5): Typical domestic sewage ranges from 0.12 to 0.17 lb/day (0.054 to 0.077 kg/day) per person; use average 0.15 lb/cap/day

Suspended Solids (SS): Use 0.25 lb (0.11 kg) per person per day

$$BOD5_{rate1} := 0.15 \frac{lb}{person \bullet day} \qquad SS_{rate1} := 0.25 \cdot \frac{lb}{person \bullet day}$$

$$BOD_{5a} := BOD5_{rate1} \cdot Unit\_strength \qquad SSa := SS_{rate1} \cdot Unit\_strength$$

Metric Units: $BOD_{5a} = 74.57 \cdot \frac{kg}{day}$ $SSa = 124.28 \cdot \frac{kg}{day}$

English Units: $BOD_{5a} = 164.4 \cdot \frac{lb}{day}$ $SSa = 274 \cdot \frac{lb}{day}$

Estimated wastewater characterization:

Assumptions:

Five-day Biochemical Oxygen Demand (BOD5): Typical domestic sewage ranges from 0.12 to 0.17 lb/day (0.054 to 0.077 kg/day) per person; use average 0.15 lb/cap/day

Suspended Solids (SS): Use 0.25 lb (0.11 kg) per person per day

$$BOD5_{rate2} := 0.15 \frac{lb}{person \bullet day} \qquad SS_{rate2} := 0.25 \cdot \frac{lb}{person \bullet day}$$

$$BOD_{5b} := BOD5_{rate2} \cdot Unit\_strength \qquad SSb := SS_{rate2} \cdot Unit\_strength$$

Metric Units: $BOD_{5b} = 74.57 \cdot \frac{kg}{day}$ $SSb = 124.28 \cdot \frac{kg}{day}$

English Units: $BOD_{5b} = 164.4 \cdot \frac{lb}{day}$ $SSb = 274 \cdot \frac{lb}{day}$

Solid Waste Disposal Requirement

Determine approximate mass of waste produced, assuming solid waste to be primarily paper:

$$Unit\_strength = 1096 \cdot personnel$$

$$Solid\_waste_{rate} := 0.75 \cdot \frac{kg}{person \bullet day}$$

$$Solid\_waste_{generated} := Solid\_waste_{rate} \cdot Unit\_strength$$

Metric Units:

$$Solid\_waste_{generated} = 822 \cdot \frac{kg}{day}$$

$$Solid\_waste_{generated} = 300229 \cdot \frac{kg}{yr}$$

English Units:

$$Solid\_waste_{generated} = 2 \times 10^3 \cdot \frac{lb}{day}$$

$$Solid\_waste_{generated} = 330.9 \cdot \frac{ton}{yr}$$

Determine approximate volume of waste produced, assuming waste to be primarily paper:

$$Density_{paper} := 90 \cdot \frac{kg}{m^3}$$

$$Volume_{solid\_waste} := \frac{Solid\_waste_{generated}}{Density_{paper}}$$

Metric Units:

$$Volume_{solid\_waste} = 9.1 \cdot \frac{m^3}{day}$$

$$Volume_{solid\_waste} = 63.9 \cdot \frac{m^3}{week}$$

English Units:

$$Volume_{solid\_waste} = 322.5 \cdot \frac{ft^3}{day}$$

$$Volume_{solid\_waste} = 2258 \cdot \frac{ft^3}{week}$$

APPENDIX D

Appendix D: Storm water Treatment Calculations

902nd Military Intelligence Group MILCON Project
Stormwater Treatment Calculations

Determine pre- and post-contruction times of concentration:

Pre-construction:

Assume:

- Runoff coefficient of 0.0 (drainage area = 95% pervious and 5% impervious surfaces)
- Rainfall intensity of 1.5 inches per hour (2-year storm)
- Change in site elevation of 155' - 140' = 11'
- Site drainage distance from furthest point = 1000'
- Area of site = approximately 45 acres

$runoff\_coeff_{pre} := 0.05$ $intensity_{rain} := 1.5$ $Area := 45$

$Slope := \frac{155 - 140}{600}$ $Slope = 0.025$ $Distance_{overlnd} := 1000$

$$time\_conc_{pre} := runoff\_coeff_{pre} \times \left(\frac{Distance_{overlnd}}{Slope \times intensity_{rain}^{2}}\right)^{\frac{1}{3}}$$

$time\_conc_{pre} = 1.3$

Compute maximum hourly rate of rainfall using Talbot formulas (see ref. #2, p.11.13):

$$Rate\_rainfall_{ordinary} := \frac{105 \times in}{(time\_conc_{pre} + 15) \times hr}$$

$Rate\_rainfall_{ordinary} = 6.4 \times \frac{in}{hr}$ $Rate\_rainfall_{ordinary} = 0.05 \times \frac{mm}{s}$

$$Rate\_rainfall_{heavy} := \frac{360 \times in}{(time\_conc_{pre} + 30) \times hr}$$

$Rate\_rainfall_{heavy} = 11.5 \times \frac{in}{hr}$ $Rate\_rainfall_{heavy} = 0.08 \times \frac{mm}{s}$

Compute maximum storm-water runoff rate:

$$Quantity\_runoff_{pre} := Area_{site} \times runoff\_coeff_{pre} \times Rate\_rainfall_{heavy}$$

$Quantity\_runoff_{pre} = 0.74 \frac{m^3}{s}$ $Quantity\_runoff_{pre} = 26.1 \times \frac{ft^3}{s}$

Post-construction:

Assume:

- Runoff coefficient of 0.35 (drainage area = 65% pervious and 35% impervious surfaces)
- Rainfall intensity of 1.5 inches per hour (2-year storm)
- Change in site elevation of 155' - 140' = 11'
- Site drainage distance from furthest point = 1000'
- Area of site = approximately 45 acres

$runoff\_coeff_{post} = 0.35$ $intensity_{rain} = 1.5$ $Area = 45$

$Slope = 0.018$ $Distance_{overlnd} = 1 \times 10^{3}$

$$time\_conc_{post} = runoff\_coeff_{post} \times \left(\frac{Distance_{overlnd}}{Slope \times intensity_{rain}^{2}}\right)^{\frac{1}{3}}$$

$time\_conc_{post} = 10.1$

Compute maximum hourly rate of rainfall using Talbot formulas (see ref. #2, p.11.13):

$Rate\_rainfall_{ordinary} = 6.4 \times \frac{in}{hr}$ $Rate\_rainfall_{ordinary} = 0.05 \times \frac{mm}{s}$

Stormwater quality characterization:

$Rate\_rainfall_{heavy} = 11.5 \times \frac{in}{hr}$ $Rate\_rainfall_{heavy} = 0.08 \times \frac{mm}{s}$

Compute maximum storm-water runoff rate:

$$Quantity\_runoff_{post} = Area_{site} \times runoff\_coeff_{post} \times Rate\_rainfall_{heavy}$$

$Quantity\_runoff_{post} = 5.17 \frac{m^{3}}{s}$ $Quantity\_runoff_{post} = 182.6 \times \frac{ft^{3}}{s}$

The following stormwater quality characterization is based on the US EPA's National Urban Runoff Program (NURP) collected urban stormwater runoff data (p. 1.483 of ref. # 2 listed above). Sampling of site stormwater runoff should be performed to obtain actual, flow-weighted pollutant concentrations at the site in order to design suitable stormwater systems, particularly for implementing stormwater treatment best management practices (BMPs).

Estimated IMA Facility Site Stormwater Runoff Quality: Mean EMCS and Coefficient of Variance

Pollutant	Median	Coefficient of Variance
BOD (mg/L)	9.3	0.31
COD (mg/L)	57.0	0.39
TSS (mg/L)	69.0	0.35
Total lead (ug/L)	104.0	0.68
Total copper (ug/L)	29.0	0.81
Total zinc (ug/L)	226.0	1.07
Total kjeldahl nitrogen (ug/L)	1,179.0	0.43
NO2-N+NO3-N (ug/L)	572.0	0.48
Total P (ug/L)	201.0	0.67
Soluable P (ug/L)	80.0	0.71

Typical Pollutant Loadings by Land Use (pounds/acre-year)

Pollutant	Parking Lot	% of Site	Commercial land use	% of Site	Total Acres	Estimated Pollutant Load - Parking Lot (lbs/yr)	Estimated Pollutant Load - Other (lbs/yr)	TOTAL (lbs/yr)
BOD	47	6%	62	94%	45	127	2,623	***2,750***
COD	270	6%	420	94%	45	729	17,766	***18,495***
TSS	400	6%	1,000	94%	45	1,080	42,300	***43,380***
Total lead	0.8	6%	2.7	94%	45	2	114	***116***
Total copper	0.04	6%	0.4	94%	45	0	17	***17***
Total zinc	0.8	6%	2.1	94%	45	2	89	***91***
Total kjeldahl nitrogen	5.1	6%	6.7	94%	45	14	283	***297***
NO2-N+NO3-N	2.9	6%	3.1	94%	45	8	131	***139***
Total P	0.7	6%	1.5	94%	45	2	63	***65***
NH3-N	2	6%	1.9	94%	45	5	80.4	***86***

Stormwater BMP Design Parameters for Proposed Operations Facility

NOTE: The following calculations represent only basic stormwater runoff treatment requirements as derived from the *2000 Maryland Stormwater Design Manual - Volumes I and II* and the draft *Anne Arundel County Stormwater Management Practices and Procedures Manual, July 2001*. Selection and detailed design of appropriate stormwater Best Management Practices (BMPs) will be performed during the detailed facility design phase as appropriate.

Stormwater BMP Sizing Criteria 1: Water Quality Volume

Calculations for Sizing Criteria 1 base the size of stormwater facilities on their ability to treat for stormwater quality (i.e., ability to reduce pollutants to appropriate levels).

Impervious Area of New Facility	
Facility Component	Impervious Area (square feet)
Building footprint	105,030
Parking area and access road	1,250,000
Access entrance	10,000
Sidewalk	1,000
TOTAL NEW IMPERVIOUS AREA:	**1,366,030**

Pervious and impervious areas affected by this project:

$$\text{Pervious}_{\text{preconstruct}} = 45\ \text{acre}$$

$$\text{Impervious}_{\text{preconstruct}} = 0\ \text{acre}$$

$$\text{Impervious}_{\text{postconstruct}} = 31.4 \times \text{acre}$$

$$\text{Pervious}_{\text{postconstruct}} = \text{Pervious}_{\text{preconstruct}} - \text{Impervious}_{\text{postconstruct}} = 13.6 \times \text{acre}$$

Site conditions for locations affected by the proposed facility project:
(using 2000 Maryland Stormwater Design Manual calculations)

$drainage_{area} = 45 \cdot acres$ $precipitation_{depth} = 1.0\ in$

$$\%\_impervious\_cover_{pre\_construction} = \frac{Impervious_{preconstruct}}{drainage_{area}} = 0 \times \%$$

$$impervious\_cover_{change} = Impervious_{postconstruct} - Impervious_{preconstruct}$$

$impervious\_cover_{change} = 1.4 \times 10^{6} \times ft^{2}$ $impervious\_cover_{change} = 1.3 \times 10^{5}\, m^{2}$

$impervious\_cover_{change} = 31.36 \times acres$

$$\%\_impervious\_cover_{postconstruct} = \frac{Impervious_{postconstruct}}{drainage_{area}}$$

$$runoff\_coefficient_{volumetric} = 0.05 + 0.009 \times \%\_impervious\_cover_{postconstruct}$$

$\%\_impervious\_cover_{postconstruct} = 69.7 \times \%$

$$\%\_reduction_{impervious} = \%\_impervious\_cover_{pre\_construction} - \%\_impervious\_cover_{postconstruct}$$

-------------------> $\%\_reduction_{impervious} = -69.7 \times \%$ <-------------------

Because this project does NOT meet the criteria for a decrease of impervious area by 20%, stormwater best management practice (BMP) systems are mandated by COMAR 26.17.02. (Note: Negative value for $\%\_reduction_{impervious}$ indicates increase in impervious area)

$$Water\_Quality_{volume} = \frac{(precipitation_{depth} \times runoff\_coefficient_{volumetric} \times drainage_{area})}{12}$$

English Units:

$Water\_Quality_{volume} = 766 \times ft^{3}$

$Water\_Quality_{volume} = 5730 \times gal$

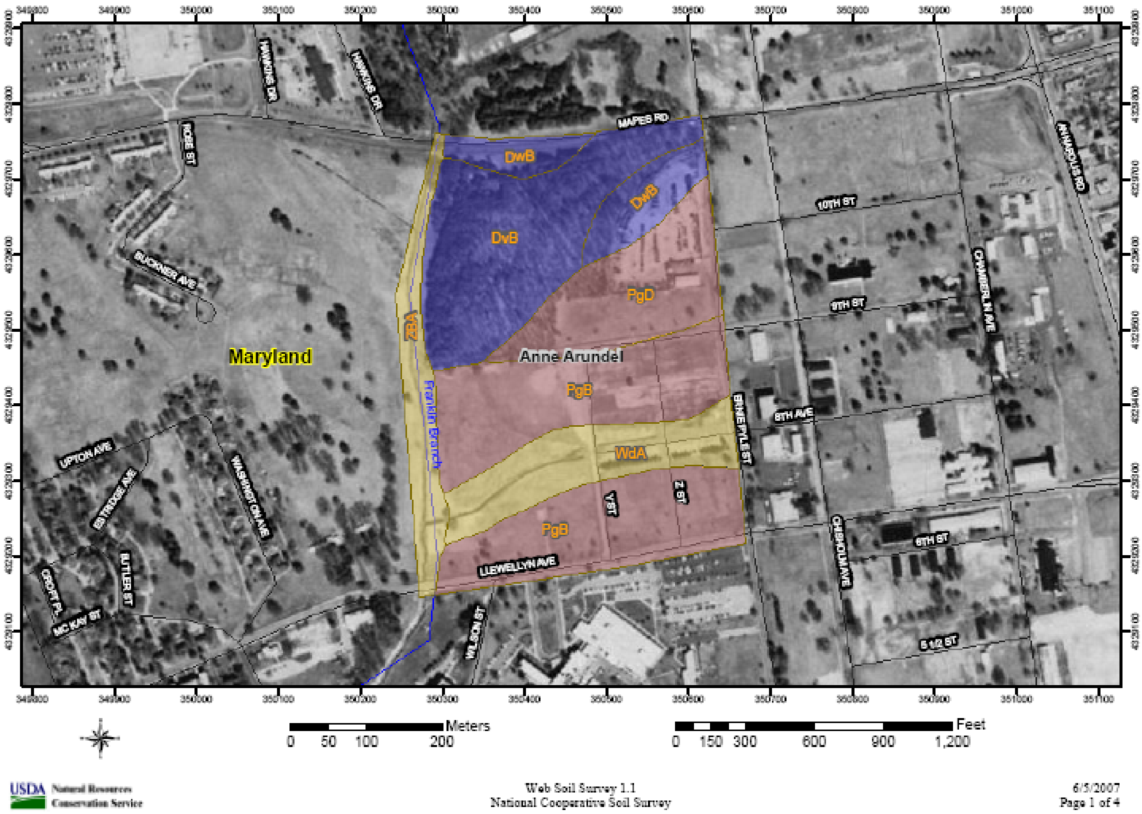
$Water\_Quality_{volume} = 0.018 \times acre \cdot ft$

Metric Units:

$Water\_Quality_{volume} = 2.2 \times 10^{4}\, L$

$Water\_Quality_{volume} = 21690.8 \times L$

Soils at Proposed Project Site



Soil Survey Area Map Unit Symbol	Map Unit Name	Group	Total Acres in AOI	Percent of AOI
DvB	Downer-Hammonton complex, 2 to 5 percent slopes	B	13.7	22.8
DwB	Downer-Hammonton-Urban land complex, 0 to 5 percent slopes	B	4.9	8.2
PgB	Patapsco-Fort Mott-Urban land complex, 0 to 5 percent slopes	A	21.3	35.4
PgD	Patapsco-Fort Mott-Urban land complex, 5 to 15 percent slopes	A	8.4	13.9
WdA	Woodstown sandy loam, 0 to 2 percent slopes	C	7.1	11.8
ZBA	Zekiah and Issue soils, 0 to 2 percent slopes, frequently flooded	C	4.8	8.0

MAP LEGEND

Hydrologic Soil Group
{Dominant Condition, <}

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available
- Soil Map Units
- Cities
- Detailed Counties
- Detailed States
- Interstate Highways
- Roads
- Rails
- Water
- Hydrography
- Oceans

Stormwater BMP Sizing Criteria 2: Recharge Volume

Calculations for Sizing Criteria 2 provide a determination of the size of stormwater BMPs based on their ability to provide an adequate amount of recharge vole for the site. Calculations address both structural and nonstructural stormwater facilities, the former generally requiring a much smaller size. Note: This sizing criteria does not apply to: (1) any portion of a site designated as a stormwater hotspot nor (2) any project considered as redevelopment. There are no areas of this project site that fall within either of those categories.

$$\%\_Soils_{Group\_A} = 35.4\% + 13.9\% = 49.3 \times \%$$

$$\%\_Soils_{Group\_B} = 22.8\% + 8.2\% = 31 \times \%$$

$$\%\_Soils_{Group\_C} = 11.8\% + 8.0\% = 19.8 \times \%$$

$$\%\_Soils_{Group\_D} = 0\%$$

Soil specific recharge factors based on Hydrologic Soil Group:

$$specific\_recharge\_factor_{soil\_A} = 0.38 \times in$$

$$specific\_recharge\_factor_{soil\_B} = 0.26 \times in$$

$$specific\_recharge\_factor_{soil\_C} = 0.13 \times in$$

$$specific\_recharge\_factor_{soil\_D} = 0.07 \times in$$

$$Factor_A = specific\_recharge\_factor_{soil\_A} \times runoff\_coefficient_{volumetric} \times \%\_Soils_{Group\_A} \times drainage_{area}$$

$$Factor_B = specific\_recharge\_factor_{soil\_B} \times runoff\_coefficient_{volumetric} \times \%\_Soils_{Group\_B} \times drainage_{area}$$

$$Factor_C = specific\_recharge\_factor_{soil\_C} \times runoff\_coefficient_{volumetric} \times \%\_Soils_{Group\_C} \times drainage_{area}$$

$$Factor_D = specific\_recharge\_factor_{soil\_D} \times runoff\_coefficient_{volumetric} \times \%\_Soils_{Group\_D} \times drainage_{area}$$

Recharge Volume 1 - Percent Volume Method (if structural BMPs are employed):

$$Recharge_{volume1} = \frac{(Factor_A + Factor_B + Factor_C + Factor_D)}{12} = 6.37 \times 10^3\ L$$

English Units:

$Recharge_{volume1} = 1683 \times gal$

$Recharge_{volume1} = 5.16 \times 10^{-3} \times acre \cdot ft$

$Recharge_{volume1} = 225 \times ft^3$

Metric Units:

$Recharge_{volume1} = 6370.1\ L$

$Recharge_{volume1} = 6.37 \times m^3$

Recharge Volume 2 - Percent Area Method (if non-structural BMPs are employed):

$$Factor_{A2} = specific\_recharge\_factor_{soil\_A} \times Impervious_{postconstruct}$$

$$Factor_{B2} = specific\_recharge\_factor_{soil\_B} \times Impervious_{postconstruct}$$

$$Factor_{C2} = specific\_recharge\_factor_{soil\_C} \times Impervious_{postconstruct}$$

$$Factor_{D2} = specific\_recharge\_factor_{soil\_D} \times Impervious_{postconstruct}$$

$$Recharge_{volume2} = Factor_{A2} + Factor_{B2} + Factor_{C2} + Factor_{D2} = 2.708 \times 10^6\ L$$

English Units:

$Recharge_{volume2} = 7.15 \times 10^5 \times gal$

$Recharge_{volume2} = 9.56 \times 10^4 \times ft^3$

$Recharge_{volume2} = 2.2 \times acre \cdot ft$

Metric Units:

$Recharge_{volume2} = 2.71 \times 10^6\ L$

$Recharge_{volume2} = 2.71 \times 10^3 \times m^3$

APPENDIX E

Appendix E: Air Emissions Calculations

902nd Military Intelligence Group MILCON Project
Air Emissions Calculations and
General Conformity Determination Analysis

NOTE: The following environmental engineering calculations are based on the preliminary conceptual design of the proposed facility. These calculations are for estimating potential environmental impacts only, represent conservative (i.e., worst case) estimates, and do not represent more precise facility design calculations to be performed later in the project cycle.

Key references for the following calculations include:

1. ASHRAE Handbook CD-ROM
2. ASHRAE 62-1999 Ventilation for Acceptable Indoor Air Quality
3. Standard Handbook of Engineering Calculations, 3rd ed. (1994)
4. Handbook of Environmental Engineering Calculations (2000)
5. WHAM: Simplified Tool for Calculating Water Heater Energy Use (ASHRE Internet Site, CH-99-16-1)
6. Air Pollution Engineering Manual (2000)
7. Municipal Storm Water Management (1995)
8. Air Quality Permitting (1996)
9. 2000 Maryland Stormwater Design Manual
10. Draft Anne Arundel County Stormwater Management Practices and Procedures Manual (July 2001)

The calculations in this Appendix have been performed in 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) as well as the Maryland State Implementation Plan.

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 non-attainment area designations. Projects below the *de minimis* levels are not subject to the Rule. Those at or above the levels are required to perform a conformity analysis as established in the Rule. The *de minimis* levels apply to direct and indirect sources of emissions that can occur during the construction and operational phases of the action.

Direct and indirect air emissions resulting from the construction and operational phases of this project fall below *de minimus* levels and therefore this project is not subject to the air conformity determination rule.

In addition to evaluation of air emissions against *de minimis* levels, emissions were also evaluated for regional significance. A federal action that does not exceed the threshold emission rates of criteria pollutants may still be subject to a general conformity determination if the direct and indirect emissions from the action exceed ten percent of the total emissions inventory for a particular criteria pollutant in a non-attainment or maintenance area. If the emissions exceed this ten percent threshold, the federal action is considered to be a “regionally significant”activity, and thus, the general conformity rules do not apply.

Direct and indirect emissions for construction and operations for both phases (FY08 and FY15+) for this project were determined not to have regional significance.

Air Emissions Calculations - Construction Phase

Construction Phase Emissions

Construction emissions would result from the operation of heavy equipment, delivery trucks, the commuter vehicle traffic from the construction crew, and the painting of the building structures and parking spaces. The project would utilize a mix of heavy equipment for construction, mainly associated with preparing the site for the buildings and utility relocation.

Emissions from Heavy Equipment

Annual emissions were calculated for various types of diesel construction vehicles using model emission rate input for the year 2008 in U.S. EPA' s Nonroad2005 Emission Inventory Model: Diesel Construction Equipment, Anne Arundel County, Maryland. Truck emission levels were calculated using U. S. EPA's MOBILE6 model for conditions in July 2008. The total annual emissions in TPY were determined for each vehicle based on the number of vehicles used and the number of operating hours per year. As noted in Section 1.0, construction of the 902nd MI GP facility will be in two phases, the first occurring in Fiscal Year 2008 (FY08), and the second phase occurring sometime after FY1 5.

Construction personnel were assumed to commute an average of 40 miles per day over the construction period.

Other assumptions include:

- Delivery trucks would travel 20 miles per trip, making three trips a day, for a total of 60 miles a day.
- Pick-up trucks would also travel 20 miles per trip, making five trips a day, for a total of 100 miles a day.
- During trenching activities, dump trucks would accumulate a total of 85 miles/day and 34 miles/day during regular construction.
- Water tankers travel 20 miles per day of operation.

Emissions factors used for construction vehicles, under all alternatives, are shown in Table E-1.

Table E-1: Emissions Factors for Construction Vehicles

Construction Vehicle Type	Emissions Factors lbs/hr-vehicle			
	NOx	VOC	Exhaust PM2.5	Fugitive PM2.5
Chipping Machine	1.169	0.119	0.091	0.165
Front End Loader	3.402	0.204	0.182	0.496
Chain Saw s	0.208	0.029	0.018	0.037
Excavator	2.763	0.204	0.164	0.529
Dozer	2.714	0.199	0.158	0.496
Vibratory Roller	1.466	0.116	0.096	0.24
Grader	1.513	0.121	0.102	0.265
Asphalt Paver	1.284	0.1	0.085	0.215
Steel Wheel Roller	0.927	0.099	0.093	0.156
Pneumatic Tire Roller	0.927	0.099	0.093	0.156
Scraper	5.19	0.28	0.263	0.827
Concrete Pumper Truck	2.941	0.237	0.19	0.331
Concrete Truck	2.941	0.237	0.19	0.331
Crane	1.156	0.116	0.089	0.182
Backhoe	1.47	0.353	0.22	0.213
Water Tanker*	9.984	0.242	0.149	0.0132
Dump Truck*	9.984	0.242	0.149	0.0132
Pick-Up Truck*	1.22	1.304	0.0115	0.0114
Delivery Truck (Medium)*	1.069	0.306	0.0382	0.0056
Delivery Truck (Heavy)*	6.488	0.713	0.0485	0.003

Calculations for Construction Emissions

Using the emissions factors in Table E-1, construction emissions were calculated for the proposed 902nd MI GP construction project. Using the assumptions described above, the emissions in tons of NOx, VOC, PM2.5, and SO2 for construction equipment emissions were calculated for each vehicle type using the appropriate equations displayed in Table E-2.

Table E-2: Equations for Construction Emissions Calculations

Emission Source	Equation	Sample Calculation
Heavy Equipment Emissions, Hourly On-Site Activities	(# of vehicle type) (Emission factor) (Total # of days in operation) (hours/day)(1 ton / 2000 lbs) = tons of air emissions	(1 grader) (1.513 lbs/hr/vehicle) (66 days in operation) (8 hours/day)(1 ton/2000 lbs) = **0.402tons of NOx of equipment emissions**
Construction Truck Emissions with Vehicle-miles	(# vehicle type) (Emission factor) (Total # of days in operation) (miles/day) (1 ton / 2000 lbs) = tons of air emissions	(1 dump truck) (9.984 grams/mile/vehicle) (846 days) (34 miles/day) (1 lb/453.59 grams) (1 ton/2000 lb) = **0.324 tons NOx of vehicle emissions**
Construction Crew, Commuting	(# of vehicles) (#miles/day) (#days) (emissions factor grams/mile) (1 lb/453.59 grams) (1 ton / 2000 lb) = tons of vehicle emissions	(100 vehicles) (40 miles/day) (240 days) (0.582 grams/mile/vehicle) (1 lb/453.59 grams) (1 ton/2000 lb) **= 0.62 tons NOx of vehicle emissions**

Surface Disturbance (Fugitive PM2.5)

The quantity of dust emissions of PM2.5 from construction operations is assumed proportional to the days of construction activity on unpaved surfaces. The following sources for emission factors, with a capture fraction of 50% and silt and moisture contents of 20%, were used in PM2.5 emission calculations for fugitive emissions (AP-42 Section 13.2; U. S.EPA 2006).

- The unpaved road equation 13.2.2.1 equation 1 a (AP-42 Chapter 13.2.2) is used to estimate fugitive emissions for the concrete pumper truck, concrete truck, crane, water truck, dump truck pickup truck, and delivery truck. Mileage on unpaved surface for each day of operation by vehicle type is estimated, then multiplied by the number of construction days.
- Front end loader and backhoe emissions combine unpaved road travel from equation 13.2.2.1 equation 1a and the dumping equation from AP-42 Chapter 11, Chapter 11.9-4.
- Dozer, pneumatic tire roller, and vibratory roller emissions are based on the dozer equation from AP-42 Chapter 11, Table 11.9-1.
- Grader emissions are based on the grader equation from AP-42 Chapter 11, Table 11.9-1.
- Scraper emissions are based on the “removing topsoil” equation from AP-42 Chapter 13, Table 13.2.3-1 and dumping equation from Chapter 11, table 11.9-4.2.

Resultant emission rates in lb/day are presented in Table E-3 and resultant tons of PM2.5 emissions are provided in Tables E-4 and E-5.

Table E -3: Fugitive PM2.5 Emission Factors for Construction Vehicles

Equipment/Vehicle Type	Fugitive PM2.5 (lb/day)	Equipment/Vehicle Type	Fugitive PM2.5 (lb/day)
Front End Loader	4.49	Concrete Pumper Truck	1.16
Dozer	1.77	Concrete Truck	1.16
Pneumatic Tire Roller	0.89	Water Tanker	13.39
Vibratory Roller	0.89	Dump Truck	11.16
Grader	0.01	Pick-Up Truck	2.64
Scraper	20.62	Delivery Truck (Medium)	5.44
Backhoe	2.25	Delivery Truck (Heavy)	7.44
Crane	1		

902nd MI GP Phase 1 Construction
902nd MI GP construction project for Phase 1 (FY08) builds 128,257 GSF (39,093 GSM) with a footprint of about 42,752 ft2 (3,972 m2; 1 acre).

Parking surface area requirements are based on parking spaces of 400 square feet per space, with parking spaces for 70% of authorized personnel strength. Parking surface area for phase 1 is thus calculated at 95, 133 ft2 (8838 m2; 2.2 acres).

Approximately 2,000 linear feet of utility trenching and 2 primary backup generators will be required for this project and constructed during Phase 1.

Total new impervious surface for Phase 1 would thus equal approximately 3.2 acres. Construction is estimated to require 16 months and would be complete by September 2009.

Equipment requirements were estimated for the construction activities associated with site preparation for buildings, parking, and trenching for utilities. Table E-4 provides the equipment assumptions and resultant total equipment emissions for Phase 1 construction.

Table E-4: Annual Emissions For Phase 1 (FY08) Construction

Construction Vehicle Type	Total Days of Operation	Total Emissions - Tons				
		NOx	VOC	Exhaust PM2.5	Fugitive PM2.5	SO2
Chipping Machine	1	0.0048	0.0005	0.0004	0.0000	0.0007
Front End Loader	5	0.0726	0.0042	0.0038	0.0121	0.0106
Chain Saws	2	0.0017	0.0002	0.0002	0.0000	0.0003
Excavator	1	0.0123	0.0009	0.0007	0.0000	0.0024
Dozer	10	0.1038	0.0073	0.0060	0.0084	0.0190
Pneumatic Tire Roller	1	0.0026	0.0003	0.0002	0.0003	0.0004
Steel Wheel Roller	1	0.0053	0.0006	0.0005	0.0000	0.0009
Asphalt Paver	1	0.0037	0.0003	0.0002	0.0000	0.0006
Vibratory Roller	4	0.0219	0.0017	0.0014	0.0016	0.0036
Grader	2	0.0125	0.0010	0.0008	0.0000	0.0022
Scraper	7	0.1456	0.0078	0.0072	0.0722	0.0232
Concrete Pumper Truck	13	0.1522	0.0124	0.0096	0.0074	0.0171
Concrete Truck	3	0.0378	0.0031	0.0025	0.0019	0.0043
Crane	10	0.0446	0.0047	0.0034	0.0053	0.0071
Backhoe	26	0.1522	0.0366	0.0223	0.0291	0.0226
Water Tanker	1	0.0001	0.0000	0.0000	0.0040	0.0000
Dump Truck	26	0.0100	0.0002	0.0002	0.1463	0.0000
Pick-Up Truck	129	0.0174	0.0186	0.0002	0.1705	0.0002
Delivery Truck (Medium)	4	0.0003	0.0001	0.0000	0.0105	0.0000
Delivery Truck (Heavy)	19	0.0081	0.0009	0.0001	0.0698	0.0000
Total Emissions:		**0.8095**	**0.1014**	**0.0597**	**0.5394**	**0.1151**

902nd MI GP Phase 2 Construction

902nd MI GP construction project for Phase 2 (FY15+) builds 291,857 GSF (88,958 GSM) with a footprint of about 97,286 ft2 (9,038 m2; 2.2 acres).

Parking surface area for phase 2 construction is calculated at 211,747 ft2 (19,672 m2; 4.9 acres).However, phase 2 surface parking area may not increase substantially from phase 1 if the proposed structured parking deck is funded for FY15+ construction.

Phase 2 construction is estimated to require 20 months. Assuming construction begins October 2015, construction would be completed by about July 2016.

Equipment requirements were estimated for the construction activities associated with site preparation for buildings, parking. No new utilities trenching is anticipated since the Phase 2 facility will be adjoining to Phase 1 construction and will connect to those utilities. Table E-5 provides the equipment assumptions and resultant total equipment emissions for Phase 2 construction.

Table E-5: Annual Emissions For Phase 2 (FY15+) Construction

Construction Vehicle Type	Total Days of Operation	Total Emissions - Tons				
		NOx	VOC	Exhaust PM2.5	Fugitive PM2.5	SO2
Chipping Machine	2	0.0106	0.0011	0.0008	0.0000	0.0015
Front End Loader	12	0.1616	0.0094	0.0086	0.0269	0.0236
Chain Saws	5	0.0038	0.0006	0.0003	0.0000	0.0007
Excavator	2	0.0273	0.0020	0.0016	0.0000	0.0052
Dozer	21	0.2310	0.0163	0.0134	0.0186	0.0422
Pneumatic Tire Roller	2	0.0059	0.0006	0.0006	0.0007	0.0010
Steel Wheel Roller	3	0.0118	0.0012	0.0012	0.0000	0.0020
Asphalt Paver	2	0.0081	0.0006	0.0006	0.0000	0.0014
Vibratory Roller	8	0.0488	0.0039	0.0031	0.0035	0.0080
Grader	5	0.0277	0.0022	0.0018	0.0000	0.0048
Scraper	16	0.3241	0.0175	0.0159	0.1608	0.0516
Concrete Pumper Truck	29	0.3388	0.0276	0.0214	0.0166	0.0380
Concrete Truck	7	0.0842	0.0069	0.0055	0.0041	0.0097
Crane	23	0.0994	0.0104	0.0076	0.0117	0.0159
Backhoe	58	0.3388	0.0814	0.0497	0.0649	0.0504
Water Tanker	1	0.0003	0.0000	0.0000	0.0090	0.0000
Dump Truck	58	0.0224	0.0006	0.0003	0.3257	0.0000
Pick-Up Truck	288	0.0386	0.0413	0.0003	0.3795	0.0003
Delivery Truck (Medium)	9	0.0006	0.0002	0.0000	0.0235	0.0000
Delivery Truck (Heavy)	42	0.0179	0.0020	0.0001	0.1553	0.0000
Total Emissions:		**1.8017**	**0.2257**	**0.1328**	**1.2006**	**0.2563**

Emissions from Construction Crew Workers
Emissions from construction personnel traffic were calculated using the U.S.EPA's MOBILE6. For the Phase 1 construction, it is assumed that the construction crew would consist of approximately 4,800 worker-days, which equates to an average of 15 workers per day for 320 days, or 240 days annually. For a conservative analysis, it was assumed each person would drive to the site and that the average number of workers would drive approximately 40 miles each day. Based on MOBILE6, the emission factor for NOx is 0.59 grams/mile/vehicle, VOC is 0.65 grams/mile/vehicle, PM2.5 is 0.013 grams/mile/vehicle, and SO2 is 0.0068 grams/mile/vehicle for the average fleet in

Resultant annual emissions associated with the commuter vehicles from the construction crew during Phase 1, using the commuter equation in Table E-2, are approximately:

- $Worker\_NOx_{08} = 0.094 \times ton$
- $Worker\_VOC_{08} = 0.11 \times ton$
- $Worker\_PM_{08} = 0.002 \times ton$
- $Worker\_SO2_{08} = 0.002 \times ton$

Calculations for the Phase 2 construction are similar, but it is assumed that the construction crew would consist of an average of 20 workers per day for 400 days which equates to approximately 6,000 worker-days and 240 days annually. Estimated annual emissions for Phase 2 are:

- $Worker\_NOx_{15} = 0.125 \times ton$
- $Worker\_VOC_{15} = 0.146 \times ton$
- $Worker\_PM_{15} = 0.002 \times ton$
- $Worker\_SO2_{15} = 0.002 \times ton$

Emissions from Painting Activities
For painting building structures, it was assumed that water-based latex paint would be used with a VOC content of one pound per gallon and one gallon of paint covers approximately 300 square feet. Three coats of paint will be applied (one primer and two finish) to approximately 128,257 square feet of interior surfaces in Phase 1 building and an additional 291,857 square feet in Phase 2 building. These values assume 50-percent of the interior space consists of rooms with drop ceilings and a ratio of walls needing paint to floor space of 3 to 1, with the remainder of the space (50-percent) consisting of open cubicle space not requiring paint. Based on these assumptions, approximately 642 gallons of paint are needed for Phase 1 interior construction and 1,460 gallons are needed for interior construction related to Phase 2 construction. Assuming that painting for eachphase will occur within a one year period (FY09 and FY16+), annual interior painting for 902n MI GP building construction create approximate annual VOC emissions of:

- Phase 1 Building Painting VOC (FY09): $BldgPaintVOC_{09} = .32 \times ton$
- Phase 2 Building Painting VOC (FY1 6+): $BldgPaintVOC_{16} = .73 \times ton$

Emissions from painting parking spaces were based on four-inch wide stripes. Assume average parking spaces of 9 feet wide by 19 feet long and every two parking spaces share a common line. Approximately 9.24 square feet would be painted for every parking space. For parking spaces, it was assumed that alkyd paint would be used with a VOC content of three pounds per gallon and one gallon of paint covers approximately 200 square feet. One coat of paint would be applied to the parking surfaces. Based on the construction of 238 spaces during Phase 1 and an additional 539 spaces in Phase 2, approximate VOC emissions for painting parking spaces would be:

- Phase 1 Parking Space Painting (FY09): $ParkingPaintVOC_{09} = .02 \times ton$
- Phase 2 Parking Space Painting (FY1 6+): $ParkingPaintVOC_{16} = .04 \times ton$

To summarize, painting generates emissions of:

- Phase 1 Paint Emissions (FY09):
  $PaintVOC_{09} = BldgPaintVOC_{09} + ParkingPaintVOC_{09} = 0.34 \times ton$
- Phase 2 Paint Emissions (FY1 6+):
  $PaintVOC_{16} = BldgPaintVOC_{16} + ParkingPaintVOC_{16} = 0.77 \times ton$

Asphalt Curing

It is assumed that hot mix asphalt will be used. Hot mix and emulsion asphalt cement are estimated to be used 90- percent and 7-percent of the time respectively for paving, and have negligible VOC emissions (Spivey, 2000). Cutback asphalt cement, which is responsible for the VOC emission issues, is only used in 3-percent of paving jobs and assumed not used at Fort Meade.

Summary of Construction Emissions

Tables E-6 and E-7 summarize total annual construction emissions for Phase 1 and 2 construction.

Table E-6: Annual Emissions from 902nd MI GP Construction – FY08

Construction Activity	Total Annual Emissions (Tons)			
	NOx	VOC	PM2.5	SO2
Use of Heavy Equipment	0.809	0.101	0.060	0.115
Fugitive Emissions	NA	NA	0.539	NA
Construction Crew Workers	0.094	0.110	0.002	0.002
Painting	NA	0.340	NA	NA
Total Emissions from Construction	**0.903**	**0.551**	**0.601**	**0.117**

Table E-7: Annual Emissions from 902nd MI GP Construction – FY15+

Construction Activity	Total Annual Emissions (Tons)			
	NOx	VOC	PM2.5	SO2
Use of Heavy Equipment	1.802	0.226	0.133	0.256
Fugitive Emissions	NA	NA	1.201	NA
Construction Crew Workers	0.125	0.146	0.002	0.002
Painting	NA	0.770	NA	NA
Total Emissions from Construction	**1.927**	**1.142**	**1.335**	**0.258**

Air Emissions Calculations - Operations Phase

Stationary Sources:

Criteria Pollutants and Volatile Organic Compounds (VOCs). As shown in the following calculations, stationary source air emissions for criteria pollutants (PM_{10}, SO_2, CO, NO_2, O_3, Pb) and VOCs fall below the General Conformity Determination *de minimus* levels (40 CFR 51 and 93, and Maryland Code 26.11) and will not be regionally significant in conformance with the Maryland SIP.

Hazardous Air Pollutants (HAPs). These estimated air emissions calculations also show that the facility is not a major source of HAPS; it will emit significantly less than 10 tons per year of any single hazardous air pollutant and less than 25 tons per year of any combination of hazardous air pollutants.

Estimated Energy Use for Utility Boiler (Building Heat):

Building heating load: Assuming a 420,114-gross square foot, four story building, use the following ASHRAE design factors:

1) Roof Group 26: 105,030 ft^2, 6" insulation with 6" light weight concrete deck and suspended ceiling.
2) Floors: 105,030 ft^2 concrete deck on all floors (no basement)
3) Wall Group 1: Assume spandrel glass, R-10 insulation board, gyp board along vertical exterior of all four walls of each floor.
4) Window Group 20: Assume a 6-foot high glass curtainwall with thermal break and structural double glazing along entire vertical exterior of all four walls of each floor.

Transmission heat loss through building envelope:

$Building_{length} = 420ft$ $Building_{width} = 250ft$ $Building_{height} = 60ft$ $Window_{height} = 24ft$

$Area_{roof} = Building_{length} \times Building_{width}$ $Area_{roof} = 1.05 \times 10^5 \times ft^2$ $Area_{roof} = 9754.82\, m^2$

$North\_wall_{glass} = 1 \times Window_{height} Building_{width}$ $North\_wall_{glass} = 6000 \times ft^2$ $North\_wall_{glass} = 557.418 \times m^2$

$South\_wall_{glass} = 1 \times Window_{height} Building_{width}$ $South\_wall_{glass} = 6000 \times ft^2$ $South\_wall_{glass} = 557.418 \times m^2$

$East\_wall_{glass} = 1 \times Window_{height} Building_{length}$ $East\_wall_{glass} = 10080 \times ft^2$ $East\_wall_{glass} = 936.463 \times m^2$

$West\_wall_{glass} = 1 \times Window_{height} Building_{length}$ $West\_wall_{glass} = 10080 \times ft^2$ $West\_wall_{glass} = 936.463 \times m^2$

$North\_wall_{brick} = Building_{height} \times Building_{width} - North\_wall_{glass}$

$North\_wall_{brick} = 9000 \times ft^2$ $North\_wall_{brick} = 836.127 \times m^2$

$South\_wall_{brick} = Building_{height} \times Building_{width} - South\_wall_{glass}$

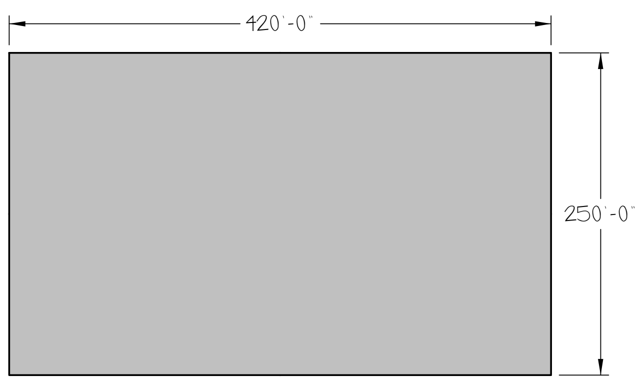
$South\_wall_{brick} = 9000 \times ft^2$ $South\_wall_{brick} = 836.127 \times m^2$

$East\_wall_{brick} = Building_{height} \times Building_{length} - East\_wall_{glass}$

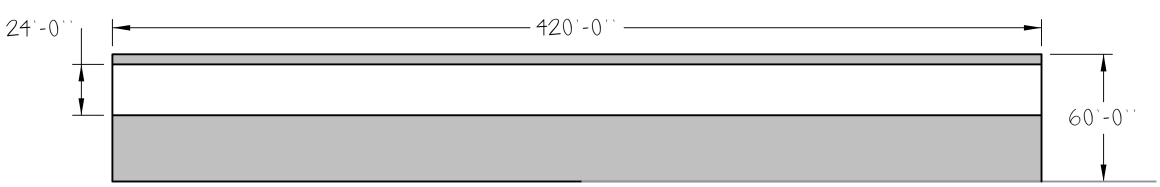
$East\_wall_{brick} = 15120 \times ft^2$ $East\_wall_{brick} = 1404.694 \times m^2$

$West\_wall_{brick} = Building_{height} \times Building_{length} - West\_wall_{glass}$

$West\_wall_{brick} = 15120 \times ft^2$ $West\_wall_{brick} = 1404.694 \times m^2$



PLAN VIEW
(building dimensions for heating load estimate only)



ELEVATION VIEW
(building dimensions for heating load estimate only)

$$Area_{glass} = North\_wall_{glass} + South\_wall_{glass} + East\_wall_{glass} + West\_wall_{glass}$$

$$Area_{glass} = 32160 \times ft^2 \qquad Area_{glass} = 2.99 \times 10^3\, m^2$$

$$Area_{brick} = North\_wall_{brick} + South\_wall_{brick} + East\_wall_{brick} + West\_wall_{brick}$$

$$Area_{brick} = 48240 \times ft^2 \qquad Area_{brick} = 4481.64\, m^2$$

$$Area_{total} = Area_{glass} + Area_{brick} \qquad Area_{total} = 80400 \times ft^2 \qquad Area_{total} = 7469.404 \times m^2$$

$$temp_{indoor} = 529.67R \qquad temp_{outdoor} = 459.67R \qquad \Delta temp = temp_{indoor} - temp_{outdoor}$$

$$U_{glass} = 0.520 \times \frac{BTU}{hr \times R \times ft^2} \qquad U_{brick} = 0.066 \times \frac{BTU}{hr \times R \times ft^2} \qquad U_{roofing} = 0.055 \times \frac{BTU}{hr \times R \times ft^2}$$

$$Heat\_loss_{glass} = U_{glass} \times Area_{glass} \times \Delta temp \qquad Heat\_loss_{glass} = 1.171 \times 10^6 \times \frac{BTU}{hr}$$

$$Heat\_loss_{brick} = U_{brick} \times Area_{brick} \times \Delta temp \qquad Heat\_loss_{brick} = 2.229 \times 10^5 \times \frac{BTU}{hr}$$

$$Heat\_loss_{roofing} = U_{roofing} \times Area_{roof} \times \Delta temp \qquad Heat\_loss_{roofing} = 4.043 \times 10^5 \times \frac{BTU}{hr}$$

$$Transmission\_heat\_loss_{total} = Heat\_loss_{glass} + Heat\_loss_{brick} + Heat\_loss_{roofing}$$

$$Transmission\_heat\_loss_{total} = 1.798 \times 10^6 \times \frac{BTU}{hr} \qquad Transmission\_heat\_loss_{total} = 5.269 \times 10^5\, W$$

Ventilation heat loss: Assume:

- Outside air requirements: Assume 35 cubic feet per minute per person
- Indoor design temperature: 70 ^{o}F (529.67 ^{o}R)
- Outdoor design temperature: 0 ^{o}F (459.67 ^{o}R)

$$Volume_{air\_change} = 1096 \times \frac{cfm}{person} \times 15\ employees \qquad Volume_{air\_change} = 1.644 \times 10^4 \times cfm$$

$$Volume_{air\_change} = 7.76\, \frac{m^3}{s}$$

$$Ventilation\_heat\_loss = Volume_{air\_change} \times \frac{\Delta temp}{514.67 \times R \times \frac{ft^3}{BTU}} \qquad Ventilation\_heat\_loss = 1.342 \times 10^5 \times \frac{BTU}{hr}$$

$$Heating\_load_{total} = Transmission\_heat\_loss_{total} + Ventilation\_heat\_loss$$

$$Heating\_load_{total} = 1931903 \times \frac{BTU}{hr}$$

Determine natural gas requirement for building heat: Assume:

- Natural gas-fired, hot water boiler system
- 5,000 heating degree-days (HDD) for Fort Meade, Maryland
- Equivalent Direct Radiation (EDR) factor for hot water heat of 0.000675 Btu/(hr*ft^2)
- Correction factor for outdoor design temperature of 0 ^oF (459.67 ^oR) of 1.0
- Natural gas heating value of 1,000 Btu/ft^3

$$HDD = 5000$$

$$R_{value} = \frac{Heating\_load_{total}}{240 \times \frac{BTU}{hr}} \qquad R_{value} = 8050$$

From Table 3, p. 2.64 of ref. #2 above, given design conditions above and R_{value} < 1,200:

$$Unit\_fuel\_consumption_{nat\_gas} = 0.000675 \times \frac{therm}{Degree\_day} \qquad heating\_value_{nat\_gas} = 1000 \times \frac{BTU}{ft^3}$$

$$Corr\_factor = 1.0$$

$$Nat\_gas_{building\_heat} = HDD \times Unit\_fuel\_consumption_{nat\_gas} \times R_{value} \times Corr\_factor \times \frac{10^5 \times \frac{BTU}{therm}}{heating\_value_{nat\_gas}}$$

$$Nat\_gas_{building\_heat} = 7.693 \times 10^7 L \qquad Nat\_gas_{building\_heat} = 2.717 \times MMCF$$

$$Nat\_gas_{building\_heat} = 2.72 \times 10^6 \times SCF$$

Hot water generator energy requirements:

Facility Hot Water Requirements	Qty (ea)	Gal / hour (gph)	Possible Maximum Hourly Demand (gph)	Possible Maximum Daily Demand (gallons)
Basins, public lavoratory	64	6	384	4,608
Showers	8	6	48	576
Kitchen sinks	6	20	120	1,440
Service sinks	10	20	200	2,400
			752	9,024

Facility Hot Water Requirements	Demand factor	Probable Maximum Hourly Demand (gph)	Probable Maximum Daily Demand (gallons)	Storage capacity factor	Required Hot Water Tank Storage Capacity (gal) per tank (rounded up)	Tanks Rqd
Basins, public lavoratory	0.30	115	1,382	2.00	230.4	
Kitchen sinks	0.30	36	432	2.00	72.0	
Service sinks	0.30	60	720	2.00	120.0	
		211	***2,534***		***425***	***5***

From the preceeding spreadsheet, estimated daily hot water requirement is = 2,534 gallons.
Assume five 425-gallon storage hot water generators each supplying about 507 gal/day as follows:

Hot water generator data inputs:

$H2O_{volume} = H2O\_Demand_{daily} \times \frac{gal}{day}$

$H2O_{density} = 8.2938 \times \frac{lb}{gal}$

$RE = 70\%$

$C_p = 1.0007 \times \frac{BTU}{lb \times R}$

$EF = 52\%$

$T_{tank} = 599.67R$ = 140 °F

$Pon = 56000 \times \frac{BTU}{hr}$

$T_{ambient} = 529.67R$ = 70 °F

$Number_{tanks} = 5$

$T_{in} = 509.67R$ = 50 °F

$Q_{out} = H2O_{volume} \times H2O_{density} \times C_p \times (T_{tank} - T_{in})$

$Q_{out} = 1.89 \times 10^6 \times \frac{BTU}{day}$

Standby Heat Loss Coefficient UA:

$$UA = \frac{\left(\frac{1}{EF} - \frac{1}{RE}\right)}{(T_{tank} - T_{ambient}) \times \left(\frac{24}{Q_{out}} - \frac{1}{RE \times Pon}\right)}$$

$UA = 25.343 \times \frac{BTU}{hr \bullet R}$

Estimated energy use for hot water generators (from Reference #4 above):

$$Q_{in} = \frac{H2O_{volume} \cdot H2O_{density} \cdot C_p \cdot (T_{tank} - T_{in})}{RE}\left[1 - \frac{UA(T_{tank} - T_{ambient})}{Pon}\right] + 24 \cdot \frac{hr}{day} \times UA(T_{tank} - T_{ambient})$$

$Q_{in} = 110889 \times \frac{BTU}{hr}$ $Q_{in} = 3 \times 10^6 \times \frac{BTU}{day}$

$$natural\_gas_{annual} = \frac{Q_{in}}{1020 \times \frac{BTU}{ft^3}} 365day$$

$natural\_gas_{annual} = 9523 \times CCF$

Annual natural gas requirement for hot water generators:

$$Natural\_gas_{hot\_water} = Number_{tanks} \times natural\_gas_{annual}$$

$Natural\_gas_{hot\_water} = 1.348 \times 10^8 L$ $Natural\_gas_{hot\_water} = 47617 \times CCF$

$$Natural\_gas_{total} = Nat\_gas_{building\_heat} + Natural\_gas_{hot\_water}$$

$Natural\_gas_{total} = 2.118 \times 10^8 L$ $Natural\_gas_{total} = 7.478 \times MMCF$

$Natural\_gas_{total} = 7.478 \times 10^6 \times SCF$

Estimated air emissions based on fuel consumption: (based on USEPA AP-42 emissions factors)

Estimated emissions (uncontrolled) from facility boilers:

-- CRITERIA POLLUTANTS AND ORGANIC COMPOUNDS --

Pollutant	Natural gas used per year (SCF)	Emissions Factor (lb/SCF)	Estimated Annual Emissions (tons)	*De minimus* levels (tons/yr)	Estimated emissions below *de minimus* levels?
Lead	7,479,000	5.0E-10	1.9E-06	25	***TRUE***
Particulate Matter:					
Total PM	7,479,000	7.6E-06	2.8E-02	100	***TRUE***
Condensable PM	7,479,000	5.7E-06	2.1E-02	***Not applicable***	***Not applicable***
Filterable PM	7,479,000	1.9E-06	7.1E-03	***Not applicable***	***Not applicable***
NOx	7,479,000	1.0E-04	3.7E-01	70	***TRUE***
CO	7,479,000	8.4E-05	3.1E-01	50	***TRUE***
SO2	7,479,000	6.0E-07	2.2E-03	100	***TRUE***
VOC	7,479,000	5.5E-06	2.1E-02	100	***TRUE***
TOC	7,479,000	1.1E-05	4.1E-02	***Not applicable***	***Not applicable***

Estimated emissions (uncontrolled) from facility boilers:

-- GREENHOUSE GASES --

Pollutant	Natural gas used per year (SCF)	Emissions Factor (lb/SCF)	Estimated Annual Emissions (tons)
CO2	7,479,000	1.20E-01	448.7400
N2O (uncontrolled)	7,479,000	2.20E-06	0.0082
Methane	7,479,000	2.30E-06	0.0086
TOTAL:			***448.7568***

Estimated air toxics emissions (uncontrolled) from facility boilers:

ORGANIC HAZARDOUS AIR POLLUTANTS (HAPS) AND OTHER COMPOUNDS

Pollutant	Natural gas used per year (SCF)	Emissions Factors (lb/SCF)	Estimated Emissions (tons/year)	De minimus levels (tons/yr)	Estimated emissions below de minimus levels?
2-Methylnaphthalene	7,479,000	2.4E-11	9.0E-08	10	TRUE
3-Methylchloranthrene	7,479,000	1.8E-12	6.7E-09	10	TRUE
7,12-Dimethylbenz(a)anthracene	7,479,000	1.6E-11	6.0E-08	10	TRUE
Acenaphthene	7,479,000	1.8E-12	6.7E-09	10	TRUE
Acenaphthylene	7,479,000	1.8E-12	6.7E-09	10	TRUE
Anthracene	7,479,000	2.4E-12	9.0E-09	10	TRUE
Benz(a)anthracene	7,479,000	1.8E-12	6.7E-09	10	TRUE
Benzene	7,479,000	2.1E-12	7.9E-09	10	TRUE
Benzo(a)pyrene	7,479,000	1.2E-12	4.5E-09	10	TRUE
Benzo(b)fluoranthene	7,479,000	1.8E-12	6.7E-09	10	TRUE
Benzo(g,h,l)perylene	7,479,000	1.2E-12	4.5E-09	10	TRUE
Benzo(k)fluoranthene	7,479,000	1.8E-12	6.7E-09	10	TRUE
Butane	7,479,000	2.1E-06	7.9E-03	10	TRUE
Chrysene	7,479,000	1.8E-12	6.7E-09	10	TRUE
Dibenzo(a,h)anthracene	7,479,000	1.2E-12	4.5E-09	10	TRUE
Dichlorobenzene	7,479,000	1.2E-09	4.5E-06	10	TRUE
Ethane	7,479,000	3.1E-06	1.2E-02	10	TRUE
Fluoranthene	7,479,000	3.0E-12	1.1E-08	10	TRUE
Fluorene	7,479,000	2.8E-12	1.0E-08	10	TRUE
Formaldehyde	7,479,000	7.5E-08	2.8E-04	10	TRUE
Hexane	7,479,000	1.8E-06	6.7E-03	10	TRUE
Indeno(1,2,3-cd)pyrene	7,479,000	1.8E-12	6.7E-09	10	TRUE
Naphthalene	7,479,000	6.1E-10	2.3E-06	10	TRUE
Pentane	7,479,000	2.6E-06	9.7E-03	10	TRUE
Phenanathrene	7,479,000	1.7E-11	6.4E-08	10	TRUE
Propane	7,479,000	1.6E-06	6.0E-03	10	TRUE
Pyrene	7,479,000	5.0E-12	1.9E-08	10	TRUE
Toluene	7,479,000	3.4E-09	1.3E-05	10	TRUE
TOTAL:			***0.042***	***25***	***TRUE***

Estimated emissions (uncontrolled) from facility boilers: -- METALS --			
Pollutant	Natural gas used per year (SCF)	Emissions Factor (lb/SCF)	**Estimated Annual Emissions (tons)**
Arsenic	7,479,000	2.0E-10	7.48E-07
Barium	7,479,000	4.4E-09	1.65E-05
Beryllium	7,479,000	1.2E-11	4.49E-08
Cadmium	7,479,000	1.1E-09	4.11E-06
Chromium	7,479,000	1.4E-09	5.24E-06
Cobalt	7,479,000	8.4E-11	3.14E-07
Copper	7,479,000	8.5E-10	3.18E-06
Manganese	7,479,000	3.8E-10	1.42E-06
Mercury	7,479,000	2.6E-10	9.72E-07
Molybdenum	7,479,000	1.1E-09	4.11E-06
Nickel	7,479,000	2.1E-09	7.85E-06
Selenium	7,479,000	2.4E-11	8.97E-08
Vanadium	7,479,000	2.3E-09	8.60E-06
Zinc	7,479,000	2.9E-08	1.08E-04
TOTAL:			***1.62E-04***

<u>Standby emergency power generator air emissions</u>: Two each 1,250kW (1,562 kVA; 1,677 hp) generators driven by diesel-fueled engines in the low emissions configuration. The estimated air emissions below utilize EPA AP-42 emissions factors. Calculations using vendor-supplied emissions factors (Caterpillar 3512 TA diesel engine) are included on the next page. Note that Particulate Matter (PM) emissions were the only pollutant that exceeded *de minimus* levels. However, PM emissions using the more accurate vendor-supplied PM emissions factor are well below *de minimus* levels.

Pollutant	Fuel used (gph)	Diesel fuel lb/gal	Btu/lb fuel	Emissions Factor (lb/Btu) (fuel input)
NOx (uncontrolled)	93.5	7.1	19,300	3.20E-06
CO	93.5	7.1	19,300	1.90E-06
SOx	93.5	7.1	19,300	8.50E-07
CO2	93.5	7.1	19,300	1.01E-06
PM	93.5	7.1	19,300	1.65E-04
TOC (as CH4)	93.5	7.1	19,300	9.00E-08

Pollutant	Number of diesel engines	Air emissions factor per hour operation (lbs)	**Potential to emit @ 7,200 hrs/yr (tons per yr)**	Permitted actual hours of operation per year
NOx (uncontrolled)	2	82	590	100
CO	2	49	351	100
SOx	2	22	157	100
CO2	2	26	186	100
PM	2	4,228	30,442	100
TOC (as CH4)	2	2	17	100

Pollutant	**Estimated Annual Emissions (tons)**	*De minimus* levels (tons/yr)	**Estimated emissions below *de minimus* levels?**
NOx (uncontrolled)	***2.39***	50	***TRUE***
CO	***1.42***	100	***TRUE***
SOx	***0.63***	100	***TRUE***
CO2	***0.75***	***Not applicable***	***Not applicable***
PM	***123.11***	70	***FALSE***
TOC (as CH4)	***0.07***	***Not applicable***	***Not applicable***

Standby generator emissions calculated from vendor-supplies data:

Pollutant	Number of diesel engines	Vendor-supplied air emissions factors (g/hp-hr)	Potential to emit @ 7,200 hrs/yr (tons per yr)	Actual hours of operation per year
NOx (uncontrolled)	2	9.930	105.607	100
CO	2	1.290	13.719	100
HC	2	0.100	1.064	100
PM	2	0.193	2.053	100

Pollutant	Estimated Annual Emissions (tons)	*De minimus* levels (tons/yr)	Estimated emissions below *de minimus* levels?
NOx (uncontrolled)	1.467	50	***TRUE***
CO	0.191	100	***TRUE***
HC	0.015	100	***TRUE***
PM	0.029	70	***TRUE***

Moile Source Emissions:

The vehicle air emissions factors below were modeled using the USEPA Mobile 5b Mobile Source Emission Factor Model. Mobile 5b model input factors were provided by the Maryland Department of the Environment Mobile Sources Control Program. MOBILE5 is a computer program that estimates hydrocarbon (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) emission factors for gasoline-fueled and diesel highway motor vehicles. The program uses the calculation procedures presented in *Compilation of Air Pollutant Emission Factors - Volume II: Highway Mobile Sources* (*AP-42, Fourth Edition*, September 1985; *Supplement A to AP-42 Volume II*, Jan 91).

Assume: Number of Government-Owned Vehicles, $GOVs = 20$ at an average $GOV_{miles} = 4000$ miles per year, and the number of $POVs = 1069$ at an average $POV_{miles} = 5000$ annual miles travelled (to/from work).

Estimated emissions from government-owned vehicles (GOVs):

Year 2002 Mobile Source Air Emissions - GOVs				
Pollutant	Air emissions (gram/mile)	Number of vehicles:	Average annual miles traveled per vehicle:	Annual emissions (tons/year)
VOC HC	1.142	20	4,000	***0.85***
CO	10.561	20	4,000	***5.08***
NOx	1.089	20	4,000	***1.66***

Year 2005 Mobile Source Air Emissions - GOVs				
Pollutant	Air emissions (gram/mile)	Number of vehicles:	Average annual miles traveled per vehicle:	Annual emissions (tons/year)
VOC HC	1.02	20	4,000	***0.67***
CO	10.079	20	4,000	***3.75***
NOx	1.041	20	4,000	***1.42***

Year 2010 Mobile Source Air Emissions - GOVs				
Pollutant	Air emissions (gram/mile)	Number of vehicles:	Average annual miles traveled per vehicle:	Annual emissions (tons/year)
VOC HC	0.965	20	4,000	***0.66***
CO	10.066	20	4,000	***4.18***
NOx	1.025	20	4,000	***1.45***

Year 2015 Mobile Source Air Emissions - GOVs				
Pollutant	Air emissions (gram/mile)	Number of vehicles:	Average annual miles traveled per vehicle:	Annual emissions (tons/year)
VOC HC	0.953	20	4,000	***0.63***
CO	10.043	20	4,000	***4.02***
NOx	1.017	20	4,000	***1.43***

Year 2025 Mobile Source Air Emissions - GOVs				
Pollutant	Air emissions (gram/mile)	Number of vehicles:	Average annual miles traveled per vehicle:	Annual emissions (tons/year)
VOC HC	0.944	20	4,000	***0.63***
CO	10.038	20	4,000	***4.17***
NOx	1.014	20	4,000	***1.44***

Estimated emissions from personally-owned vehicles (POVs):

Year 2002 Mobile Source Air Emissions - POVs				
Pollutant	Air emissions (gram/mile)	Number of vehicles:	Average annual miles traveled per vehicle:	Annual emissions (tons/year)
VOC HC	1.142	1069	5,000	***0.85***
CO	10.561	1069	5,000	***5.08***
NOx	1.089	1069	5,000	***1.66***

Year 2005 Mobile Source Air Emissions - POVs				
Pollutant	Air emissions (gram/mile)	Number of vehicles:	Average annual miles traveled per vehicle:	Annual emissions (tons/year)
VOC HC	1.02	1069	5,000	***0.67***
CO	10.079	1069	5,000	***3.75***
NOx	1.041	1069	5,000	***1.42***

Year 2010 Mobile Source Air Emissions - POVs				
Pollutant	Air emissions (gram/mile)	Number of vehicles:	Average annual miles traveled per vehicle:	Annual emissions (tons/year)
VOC HC	0.965	1069	5,000	***0.66***
CO	10.066	1069	5,000	***4.18***
NOx	1.025	1069	5,000	***1.45***

Year 2015 Mobile Source Air Emissions - POVs				
Pollutant	Air emissions (gram/mile)	Number of vehicles:	Average annual miles traveled per vehicle:	Annual emissions (tons/year)
VOC HC	0.953	1069	5,000	***0.63***
CO	10.043	1069	5,000	***4.02***
NOx	1.017	1069	5,000	***1.43***

Year 2025 Mobile Source Air Emissions - POVs				
Pollutant	Air emissions (gram/mile)	Number of vehicles:	Average annual miles traveled per vehicle:	Annual emissions (tons/year)
VOC HC	0.944	1069	5,000	***0.63***
CO	10.038	1069	5,000	***4.17***
NOx	1.014	1069	5,000	***1.44***

APPENDIX F

Appendix F: Environmental Factors Considered and Deemed Not Relevant

The following environmental factors were considered, but potential effects were negligible and not deemed relevant to this project.

Table 19: Environmental Factors Considered and Deemed Not Relevant

Category	Environmental Affects Considered	Yes/No
Land form	Will the project result in:	
	• Landslides caused by inappropriate slope or embankment stability due to over development on particular soil types within areas having certain topographic features?	No
	• Impact to land classified as prime or unique farmland?	No
	• Destruction, covering or modification of unique physical features?	No
	• Foreclosure on future uses of site on a long-term basis?	No
	• Land subsidence as a result of over pumping of groundwater resources?	No
Air, climatology	Will the project result in:	
	• Objectionable odors?	No
	• Alteration of air movements, humidity, or temperature?	No
Water	Will the project result in:	
	• Changes in currents or water movements in marine or fresh water?	No
	• Alterations to the course or flow of flood waters?	No
	• Impoundment, control, or modifications of any body of water equal to or greater than 10 acres in surface area?	No No
	• Location in a State's coastal zone and subject to consistency with the State Coastal Zone Management Plan?	No
Plant life	Will the project:	
	Reduce acreage or create damage to any agricultural crop?	No
Land use	Will the project:	
	• Substantially alter the present or planned use of an area?	No
	• Impact a component of the National Park system, the National Wildlife Refuge system, the National Wild and Scenic River system, the National Wilderness system, or National Forest land?	No
Natural resources	Will the project:	
	• Increase the rate of use of any natural resources?	No
	• Substantially deplete any nonreusable natural resources?	No
Energy	Will the project:	
	• Substantially increase the demand on existing sources of energy?	No
Transportation and traffic circulation	Will the project result in:	
	•Alterations to present patterns of circulation or movement of people and/or goods?	No
	•Construction of new roads?	No
Public service	Will the project have an effect on, or result in, a need for new or altered governmental services in any of the following areas:	
	• Fire protection?	No
	• Schools?	No
	• Other governmental services?	No

Table 12: Environmental Factors Considered and Deemed Not Relevant (continued)

Category	Environmental Affects Considered	Yes/No
Population	Will the project:	
	Alter the location or distribution of human population in the area?	No
Economic	Will the project:	
	Have any adverse effect on local or regional economic conditions, e.g., tourism, local income levels, land values, or employment?	No
Community reaction	Is the project:	
	In conflict with locally adopted environmental plans and goals?	No
Aesthetics	Will the project:	
	• Change any scenic vista or view open to the public?	No
	• Create an aesthetically offensive site open to the public view (e.g., out of place with character or design of surrounding area)?	No
	• Significantly change the visual scale or character of the vicinity?	No

APPENDIX G

Appendix G: Distribution

Maryland Dept. of Natural Resources
Tawes State Office Building
ATTN: Lori Byrne
580 Taylor Avenue Annapolis, MD 21401
Toll Free: 1-877-620-8DNR (8367).
Out of state call 410-260-8573
E-mail: lbyrne@dnr.state.md.us

Anne Arundel County Maryland
Office of Environmental & Cultural Resources
ATTN: Ms. Ginger Ellis or Ms. Tracy Reynolds
2664 Riva Rd
Annapolis, MD 21401
Telephone: 410-222-7502/4202
E-mail: treynolds@aacounty.org

Maryland Dept. of Environment Clearinghouse Coordinator
ATTN: Joane Mueller
1800 Washington Blvd
Baltimore, MD 21230
Toll Free: 1-800-633-6101

U.S. Dept. of the Interior Fish & Wildlife Services
Chesapeake Bay Field Office
ATTN: Devin Ray
177 Admiral Cochrane Drive
Annapolis, MD 21401
Telephone: 410-573-4531

Maryland Dept. of Housing & Community Development Maryland Historical Trust
Division of Historical and Cultural Programs
ATTN: Elizabeth J. Cole
100 Community Place
Crownsville, MD 21032-2023
Toll Free: 1-800-756-0119
Telephone: 410-514-7631
E-mail: bcole@mdp.state.md.us

USEPA Region III
ATTN: Mr. William Arguto
1650 Arch Street, Mail Code EA30
Philadelphia, PA 19103
Toll Free: 1-800-438-2474
Phone: 484-995-1003

State of Maryland Dept. of Agriculture
ATTN: Ms. Joe Oberg, Public Affairs Officer
Telephone: 410-841-5700
E-mail: obergja@mda.state.md.us

Maryland Department of Planning
ATTN: Mr. Bob Rosenbush, Planner
301 West Preston Street, Suite 1101
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