# SECTION 4

# ENVIRONMENTAL CONSEQUENCES

# 4. Environmental Consequences

## 4.1 Land Use

### 4.1.1 Evaluation Criteria

The evaluation of impacts on land use is based on the degree of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. Land use can remain compatible, become compatible, or become incompatible. Projected compatibility issues were measured both qualitatively and quantitatively. Effects on land use were assessed by evaluating the following:

- Consistency and compliance with existing land use plans, zoning, or policies
- Alteration of the viability of existing land use
- The degree to which the Proposed Action or alternatives preclude continued use or occupation of an area
- The degree to which the Proposed Action or alternatives conflict with planning criteria established to ensure the safety and protection of human life and property
- The degree to which the Proposed Action or alternatives preclude use of recreational areas.

The significance of potential impacts on visual resources is based on the level of visual sensitivity in the area. Visual sensitivity is defined as the degree of public interest in a visual resource and concern over adverse changes in the quality of that resource. In general, an impact on a visual resource is adverse if implementation of a proposal were to result in substantial alteration to an existing sensitive visual setting.

### 4.1.2 No Action Alternative

Under the No Action Alternative, DOD would not develop Site M on a phased, multiyear basis and would not construct and operate administrative facilities. NSA/CSS operations and similar or related operations of other Intelligence Community agencies would continue at their present locations. Therefore, no impacts on land use would be expected under the No Action Alternative.

### 4.1.3 Proposed Action (Phase I)

The Proposed Action would involve the conversion of 82 acres of Site M from current recreational areas that include the golf courses at Fort Meade. Site M consists of approximately 227 acres in the southwestern quadrant of Rockenbach Road and Cooper Avenue, as shown in **Figure 2.1-1**. Phase I would require 1.8 million $ft^2$ of building footprint on Site M. DOD has considered development of Site M under three discrete phases identified for implementation over a horizon of approximately 20 years. Implementation of Phase I is being addressed in this EIS as the Proposed Action.

***On-installation.*** Short- to long-term, moderate, adverse impacts on land use would be expected from the Proposed Action. The proposed development of Site M is consistent with current master planning for the installation; however, the reclassification and loss of viable open space at Fort Meade would be an adverse impact. Under the Proposed Action, approximately 82 acres would be converted from open space to administrative land use at Fort Meade, which would represent a 3 percent loss in the overall acreage of open space at the installation. Although a 3 percent reduction in open space is a small percentage, conversion of 82 acres of open space land use would represent a permanent loss of recreational areas on-

installation. Short-term, minor, adverse impacts on land use would be expected due to an increased presence of construction vehicles and disturbances related to construction activities. However, construction-related activities would not affect adjacent land uses, which would continue their current uses unchanged.

Short- to long-term, moderate, direct, adverse impacts on recreation would be expected from the conversion of the golf courses to administrative functions on the installation. The Fort Meade CEMP discussed future development of 800 available acres between Site M and Site S on Fort Meade. BRAC actions, reviewed in the 2007 BRAC EIS (USACE Mobile District 2007), have resulted in the use of an 84-acre portion of the existing golf course for administration functions, which resulted in the loss of nine holes of the golf courses. Loss of the remaining holes would represent both a short- and long-term, adverse impact on recreation. The two baseball fields in the northwest portion of Site M would remain. The Proposed Action would not affect other MWR programs at the installation, as impacts on recreation would be localized to the golf course area.

The areas adjacent to Site M on-installation include the Midway Common MFH neighborhood to the north, administration/operations to the east, Site G to the south and southwest with industrial/installation support functions, and the NSA campus to the west. These surrounding land uses would be compatible with the proposed administrative facilities under the Proposed Action. The proposed administrative uses on Site M include a data center and the supporting associated facilities, including an electrical substation and generator plants; chiller plants; boiler plants; ancillary parking; site improvements; water storage, water, gas, and communications services; paving, sidewalks, curbs, and gutters; storm water management; and security systems. It is assumed that the proposed facilities and site design would meet all AT/FP requirements including the DOD Minimum Antiterrorism Standards for Buildings (UFC 4-010-01). Therefore, the proposed facilities would likely be within safe setback distances making them more compatible with their adjacent uses. Long-term, minor, beneficial impacts would be expected from consolidating mission functions of the NSA/CSS into the more secure central portion of Fort Meade from their current location in the NSA campus. Personnel currently in facilities on the NSA campus could be relocated to Site M, thus shifting these sensitive facilities to the interior of the installation, resulting in a beneficial effect on land use and security.

Typically, residential areas represent a more sensitive land use; however, it is assumed that because portions of the MFH neighborhoods are already adjacent to the NSA campus and administration type facilities, facilities associated with the Proposed Action would be compatible with adjacent MFH neighborhoods. The Proposed Action is compatible with the NSA Real Property Master Plan, which seeks to place higher security Administration/Operations functions in the central portions of the installation. Less security-sensitive land uses, such as open space, should be placed on the perimeter of the installation according to the NSA Real Property Master Plan. No land use conflicts with the 2007 BRAC EIS facilities on Site G and Site F would be expected under the Proposed Action (USACE Mobile District 2007).

***Off-installation.*** All projects would be within the Fort Meade installation boundary. Land use surrounding Fort Meade includes low-medium (2 to 5 dwellings per acre), medium (5 to 10 dwellings per acre), and high density (10 or more dwellings per acre) residential areas along with a mix of industrial, and natural features (e.g., Patuxent Wildlife Research Center). The proposed development of Site M within the central portion of Fort Meade would unlikely affect these adjacent land uses. Although the Proposed Action includes changing land use at Fort Meade, there is little potential to affect adjacent land uses off-installation, as Site M is buffered from off-installation areas by the distances involved.

The proposed development of 82 acres and 1.8 million $ft^2$ of building footprints on Site M would not adversely affect any land use planning functions of Anne Arundel County. Construction activities

associated with the Proposed Action would only be short-term in nature and isolated within Site M. Potential noise impacts related to short-term construction noise are discussed in **Section 4.3**. The addition of 6,500 personnel to Fort Meade under the Proposed Action would likely result in an increased demand for housing, build-out open space, undeveloped areas, public services, and school enrollments. See **Section 4.11** for further discussion of impacts on housing and schools. The adjacent Odenton Growth Management Area was planned as an area of Anne Arundel County to support potential personnel growth of Fort Meade and demand in housing and services. As discussed in **Section 3.1.2**, approximately 45 percent of the developable land is available within this growth management area for expansion. Therefore, the increase in 6,500 personnel at Fort Meade would not be expected to adversely affect developable land in Anne Arundel County. Future land use plans and zoning in Anne Arundel County were designed to accommodate growth around Fort Meade. Anne Arundel County projected that most of the county's 55,000 new jobs over a 25-year period would occur in the western part of the county, near Fort Meade, NSA, and BWI Airport. Anne Arundel County is focusing future commercial and residential growth in the area of the county near Fort Meade (Fort Meade 2005b). Consistency with the CZMA is discussed in **Section 4.7.3**.

***Visual Resources.*** The Proposed Action involves the development of 1.8 million $ft^2$ of building footprints and would transform the aesthetic characteristic of Site M from a golf course and rolling hills to administration functions. As discussed in **Section 3.1.2**, Site M is within the Western Administrative Zone, which is characterized by administrative uses and includes mature tree-lined avenues and formal landscaping. The landscape of Site M would be expected to diminish in visual integrity because of the increased amount of development on Site M; however, development under the Proposed Action would be consistent with the Western Administrative Zone. Construction activities and eventual operation would likely result in short-term, minor, adverse impacts on land use as a result of visual impacts. Temporary (e.g., construction equipment) and permanent facilities would be new visual elements introduced into existing viewsheds on Site M.

Views to Site M from the east, south, and west would be permanently affected from the loss of visual integrity because of the increased amount of development. Mature trees would buffer sightlines from the north and it is expected that the project area would be buffered with planted trees to help mitigate adverse impacts on land use from visual intrusion. These measures would help prevent establishing unwanted views or establishing aesthetically unpleasing facades.

As discussed in **Section 2.1.2**, the complex would include sustainability features to meet LEED Silver requirements and the facilities would be energy-efficient and use "green" technology. Viewsheds could be impacted from some of the "green" technologies chosen, such as the use of wind turbines. The facilities are currently in the preliminary design stage; therefore, a complete list of technologies and associated manufacturers specifications are not finalized. Potential adverse impacts would be considered during evaluation of these technologies for Site M development.

### 4.1.4 Alternative 1: Implement Phases I and II

Alternative 1 involves building footprints of approximately 3.0 million $ft^2$ and includes Phase I and II development of Site M, as shown in **Figure 2.1-1**. Alternative 1 would result in the loss of approximately 134 acres of open space land use at Fort Meade, which would represent a 5 percent decrease in the total open space areas at the installation. Although a 5 percent reduction in open space is a small percentage, conversion of 134 acres of open space land use would represent a permanent loss of recreational areas, including the baseball fields affected by Alternative 1. Short-term, minor, adverse impacts on land use would be expected due to an increased presence of construction vehicles and disturbances related to construction activities. However, construction activities are not expected to disturb surrounding land uses adjacent to the Alternative 1 area. The conversion of open space to administrative land use would

represent a short- to long-term, moderate, adverse impact on land use at Fort Meade. Although development of Site M would be consistent with current master planning for the installation, the conversion and loss of viable open space at Fort Meade would still represent an adverse impact.

Although Alternative 1 includes a larger footprint area than the Proposed Action, impacts on recreation would be expected to be only slightly greater under Alternative 1 than under the Proposed Action. Phases I and II would include the loss of additional golf course holes and two baseball fields in the northwest corner of Site M.

Alternative 1 also includes the addition of approximately 1,500 personnel for a total of 8,000 personnel on Site M; therefore, impacts on off-installation areas are assumed to be slightly greater than those under the Proposed Action. Impacts are not expected to be adverse, as Anne Arundel County has planned for future development of off-installation areas near Fort Meade. Zoning and planning considerations around Fort Meade have been accounted for in the Anne Arundel County's long-term planning and management strategies.

Impacts on land use as a result of visual impacts under Alternative 1 would be similar to, but slightly greater than the Proposed Action because of a larger footprint. Alternative 1 includes building footprints of approximately 3 million $ft^2$ and would involve similar building types as the Proposed Action. The landscape of Site M would be expected to diminish in visual integrity because of the increased amount of development on Site M; however, development would be consistent with the Western Administrative Zone. Views to Site M from the east, south, and west would be permanently affected from the loss of visual integrity because of the increased amount of development. Existing mature trees would buffer sightlines from the north and it is expected that the project area would be buffered with planted trees to help mitigate adverse impacts on land use from visual intrusion. These measures would help prevent establishing unwanted views or establishing aesthetically unpleasing facades.

### 4.1.5 Alternative 2: Implement Phases I, II, and III

Alternative 2 involves building footprints of approximately 5.8 million $ft^2$ and includes Phases I, II, and III of development of Site M, as shown in **Figure 2.1-1**. Alternative 2 would include the loss of approximately 321 acres of open space land use, which would represent a 12 percent decrease in the overall amount of open space. Alternative 2 also includes the addition of 3,000 personnel for a total of 11,000 personnel on Site M. The conversion of open space to administrative land use would result in short- and long-term, moderate, adverse impacts on land use at Fort Meade. Although development of Site M would be consistent with current master planning for the installation, the change in land use would represent an adverse impact because of the loss of recreational areas at the installation. In addition, short- and long-term, moderate, direct, adverse impacts on recreation would be expected under Alternative 2 from the loss of the golf course. However, future consideration of a golf course at Site S was reviewed in the 2007 BRAC EIS (USACE Mobile District 2007).

Impacts on off-installation resources would be greater under Alternative 2 than the Proposed Action and Alternative 1; however, they are not expected to be adverse because Anne Arundel County has planned for future development of off-installation areas near Fort Meade. Alternative 2 would increase demand for off-installation housing and services in Anne Arundel County. Anne Arundel County has been planning for increased growth around Fort Meade and has addressed increased growth concerns in the Odenton Town Center Master Plan. In addition, zoning and planning considerations around Fort Meade have been accounted for in Anne Arundel County's long-term planning and management strategies.

Impacts on land use as a result of visual impacts under Alternative 2 would be greater than the Proposed Action and Alternative 1 because of a larger footprint. Alternative 2 involves approximately 5.8 million

$ft^2$ of building space that would permanently affect all of Site M. Construction activities would likely result in short-term, minor, adverse impacts, while operation impacts could range from minor, such as the impacts adjacent to Site M when seen from a distance, to moderate, such as the obstruction of views on the golf courses looking north. Views from the south, east, and west would be permanently obstructed by loss of the entire golf course area. It is expected that the project area would be buffered with planted trees to help mitigate adverse impacts on land use from visual intrusion. These measures would help prevent establishing unwanted views or establishing aesthetically unpleasing facades.

## 4.2 Transportation

### 4.2.1 Evaluation Criteria

The evaluation of impacts on the transportation system is based on the capacity of the transportation network in an area affected by a proposed action and compatibility of proposed actions with existing conditions. The region of influence for transportation impacts is public roadways within/near the study area. Projected traffic levels were measured both qualitatively and quantitatively using Synchro/SimTraffic Version 7.0 and HCS+ transportation modeling tools. Thresholds for triggering major impacts include evaluating the potential for the following:

- Increase in traffic volumes or delays to levels that impair a roadway's handling capacity or increase traffic safety hazards
- Reduction in the intersection and state or Federal highway function from LOS A through D to LOS E and F
- Substantial increase in vehicle queue length
- Substantial disruption of traffic operations.

DOD has considered development of Site M under three discrete phases identified for implementation over a horizon of approximately 20 years. Phase I is identified as Proposed Action and would occur by 2015. Phase II would occur by 2020 and Phase III by 2029. Traffic within Fort Meade and in the surrounding region would likely continuously grow due to ongoing development activities in coming years. Therefore, in addition to presenting the Proposed Action and alternatives, a comparable No Action Alternative analysis for each of the optional phase build-out years (i.e., 2015, 2020, and 2029) is presented in order to provide baseline conditions for comparison with the potential traffic impacts of the Proposed Action and alternatives. The three no action alternatives are identified as the No Action Alternative (Year 2015) analysis (**Section 4.2.2.1**) to compare with the Proposed Action analysis, No Action Alternative 1 (Year 2020) analysis (**Section 4.2.3.1**) to compare with Alternative 1 analyzed in this EIS, and No Action Alternative 2 (Year 2029) analysis (**Section 4.2.4.1**) to compare with Alternative 2. This section also identifies a range of viable transportation improvements that would minimize the potential impacts from the Proposed Action and alternatives and other development.

### 4.2.2 Future Conditions (Year 2015)

The proposed NSA site would be developed in three discrete phases over a horizon of 20 years. Phase I is identified as the Proposed Action and the transportation analysis is provided in **Section 4.2.2.2**. Phase II and Phase III are presented as alternative analyses in later sections. **Table 4.2-1** is presented to show the build-out years and job growth associated with each phase.

**Table 4.2-1. Comparison for Proposed Action and Alternatives**

| Alternative | Land Use | Size* | Build-out Year |
|---|---|---|---|
| Proposed Action (Phase I) | Office | 6,500 personnel (1.8 million $ft^2$) | 2015 |
| Alternative 1 (Phases I and II) | Office | 8,000 personnel (3 million $ft^2$) | 2020 |
| Alternative 2 (Phases I, II, and III) | Office | 11,000 personnel (5.8 million $ft^2$) | 2029 |

Note: * For trip generation purposes, the numbers of personnel are used to represent the worst-case condition.

#### 4.2.2.1 No Action Alternative (Year 2015)

Long-term, major adverse impacts on the study area roadway network would be expected under the No Action Alternative. DOD would not develop the proposed site on a phased, multiyear basis and would not construct and operate 1.8 million $ft^2$ of administrative facilities employing approximately 6,500 personnel. The baseline conditions for the No Action Alternative (Year 2015) are used for comparison with Proposed Action.

The BRAC-related activities on Fort Meade and partial EUL actions are assumed to be implemented by Year 2015 and therefore, associated development trips are considered in the analysis of the No Action Alternative. The BRAC-related development activities include the administrative facilities for DISA, DMA, and Defense Adjudication Activities. The partial EUL action includes the completion of the construction for administrative facilities on the parcel located along the south side of Reece Road, east of MD 175.

Additionally, the analysis assumes the completion of planned projects on Fort Meade such as 902nd Military Intelligence Group Administrative and Operations Center, and Defense Information School Expansion.

In order to incorporate all of the trips associated with ongoing and planned future development surrounding the Fort Meade area, a conservative annual growth rate of 3 percent (compounded) was applied to the existing traffic volumes from Year 2009 to Year 2015. Note that 3 percent compounded growth rate over a period of 6 years would represent the worst-case scenario. **Figure 4.2-1** presents a location map of all the aforementioned developments.

The weekday AM/PM peak hour trips entering and exiting the site due to aforementioned developments were established using equations/rates provided in the 8th Edition of the Institute of Transportation Engineers' (ITE) *Trip Generation Report*. **Table 4.2-2** summarizes the total trip generation associated with each of the background developments.

##### No Action Alternative: Total Traffic Volumes (Year 2015)

The projected trips related to background development and trips related to other regional growth described under the previous section were added to determine total future traffic volumes for the No Action Alternative. Total trips were then assigned to the study area roadway network. The distribution of trips was based upon local travel patterns for the roadway network surrounding Fort Meade. The trip distribution percentages were derived based upon the amalgamation of the Meade Coordination Zone (MCZ) traffic pattern (Friedberg 2009) and the Fort Meade Traffic and Safety Engineering Study (DOD 2008b). The RGMC trip distribution percentages were revised to some extent in order to reflect more trips coming from MD 32 east per the Traffic Study. **Table 4.2-3** summarizes the directional trip distribution on major roadways. **Figure 4.2-2** illustrates the AM/PM peak hour volumes at all the study area intersections for Year 2015 No Action Alternative.


**Figure 4.2-1. Location Map: No Action Alternative**

## No Action Alternative: Capacity Analysis and Levels of Service (Year 2015)

The AM/PM peak hour traffic volumes described above and lane configurations were entered in the Synchro model to determine the intersection LOS. Due to continual growth in the area, signal timings at the signalized intersections are in need of constant adjustments. In an effort to achieve progressive traffic flow and, subsequently, to reduce the traffic delay, signal timings and signal phasing were optimized.

HCS+ was used to analyze the weaving and merging/diverging conditions at the MD 295/MD 32 interchange.

Major adverse impacts of the No Action Alternative were observed for the study area intersections at both on- and off-installation intersections. Based upon the analysis results, all the Fort Meade perimeter intersections along MD 175 and MD 32, including MD 175 and Rockenbach Road, MD 175 and Disney Road, MD 175 and Reece Road, MD 175 and Mapes Road, MD 175 and Llewellyn Avenue, MD 32 eastbound ramps and Mapes Road, MD 32 westbound ramps and Mapes Road, and Reece Road and Jacobs Road, would fail under this alternative in Year 2015.

**Table 4.2-2. No Action Alternative Trip Generation Summary**

| Land Use | Amount | AM Peak Hour | | | PM Peak Hour | | | Weekday ADT |
|---|---|---|---|---|---|---|---|---|
| | | In | Out | Total [a] | In | Out | Total [a] | |
| BRAC – DISA | 4,272 employees | 1,483 | 202 | 1,685 | 279 | 1,362 | 1,641 | 10,428 |
| BRAC – DMA | 663 employees | 299 | 41 | 339 | 52 | 253 | 305 | 2,180 |
| BRAC – Adjudication | 772 employees | 340 | 46 | 387 | 59 | 287 | 346 | 2,478 |
| 902nd Military Center | 420,000 $ft^2$ | 520 | 71 | 591 | 93 | 456 | 549 | 4,028 |
| DINFOS Expansion | 300 students | 50 | 13 | 63 | 53 | 123 | 176 | 1,109 |
| EUL – Site Z | 3,450 employees | 1,234 | 168 | 1,402 | 227 | 1,109 | 1,337 | 8,715 |
| ***Subtotal*** [a] | | ***3,926*** | ***541*** | ***4,467*** | ***763*** | ***3,590*** | ***4,353*** | ***28,938*** |
| *Alternative Mode Reduction (5%)* [b] | | *196* | *27* | *223* | *38* | *180* | *218* | *1,447* |
| **Total trips** [a] | | **3,730** | **514** | **4,244** | **725** | **3,411** | **4,136** | **27,491** |

Sources: DOD 2008b, USACE Mobile District 2007

Notes:

a. Subtotals and totals might vary due to rounding during the calculations.

b. Vehicular trips reduction anticipated due to future transit improvements.

**Table 4.2-3. Trips Distribution Pattern**

| Highway | Direction: From/To* | Trips (Percentage) |
|---|---|---|
| BW Parkway (MD 295) | North | 30 |
| BW Parkway (MD 295) | South | 7.5 |
| MD 32 | East | 30 |
| MD 32 | West | 25 |
| MD 174, MD 175, MD 198, and MD 713 | -- | 7.5 |

Sources: Friedberg 2009, DOD 2008b

Note: * Direction: From/To indicates the Inbound and Outbound trips percentage respectively.

Similarly, intersections inside Fort Meade, including Mapes Road and Ernie Pyle Street and Mapes Road and Cooper Avenue, would also fail and operate with LOS E or F. These intersections would experience increased delays due to heavy influx of traffic generated by BRAC action, EUL action, 902nd Military Center, DINFOS expansion, and other regional growth. Consequently, the LOS would degrade from D or better observed in the existing conditions to E or F under this alternative. In addition, a through lane along Mapes Road in both directions is recommended due to increased traffic in through lanes.

All the weaving/merging/diverging segments, except MD 295 northbound off-ramp, MD 295 southbound off-ramp, and the weaving segment along MD 295 southbound, would also experience heavy delays and operate with inadequate LOS.

An analysis was conducted with the existing lane geometry to establish the baseline condition, with potential improvements suggested by the U.S. Army and with the recommended improvements that would be required to reduce the impacts of the influx of trips generated by new developments.


**Figure 4.2-2. No Action Alternative: Peak Hour Traffic Volumes (Year 2015)**

**Figure 4.2-3** illustrates the projected LOS that would result for all the study area intersections during the No Action Alternative without any roadway improvements. **Figures 4.2-4** and **4.2-5** show the LOS results assuming the potential and recommended improvements, respectively, for Year 2015 No Action Alternative.

### 4.2.2.2 Proposed Action (Phase I)

Long-term, minor, adverse impacts on the study area roadway network would be expected under the Proposed Action, above and beyond already major impacts identified under the No Action Alternative in **Section 4.2.2.1**. Under this action, 1.8 million $ft^2$ of administrative facilities would be developed for NSA use on Fort Meade. The build-out and full occupation would occur by Year 2015. Job growth due to this action is estimated to be 6,500 personnel. However, it is anticipated that only two-thirds (approximately 4,333 personnel) of the estimated 6,500 employees would come from outside of the Fort Meade boundary. The remaining one-third (approximately 2,167 personnel) of the personnel would be shifted from adjacent buildings within Fort Meade to the new facility. Therefore, for the purpose of this analysis, the impact of 4,333 personnel has been taken into account.

The weekday AM/PM peak hour trips entering and exiting the site due to the Proposed Action were established using equations/rates provided in the 8th Edition of the ITE *Trip Generation Report*.

**Table 4.2-4** summarizes the total trip generation associated with the Proposed Action.

**Table 4.2-4. Proposed Action Trip Generation Summary**

| Land Use | Amount | AM Peak Hour | | | PM Peak Hour | | | Weekly ADT |
|---|---|---|---|---|---|---|---|---|
| | | In | Out | Total | In | Out | Total | |
| NSA | 4,333 employees | 1,501 | 205 | 1,706 | 283 | 1,381 | 1,664 | 10,555 |
| *Alternative Mode Reduction (5%)* [a] | | *75* | *10* | *85* | *14* | *69* | *83* | *528* |
| **Total Trips** [b] | | **1,426** | **194** | **1,621** | **269** | **1,312** | **1,580** | **10,027** |

Notes:

a. Vehicular trips reduction anticipated due to future transit improvements.

b. Totals might vary due to rounding during the calculations.

#### Proposed Action: Total Traffic Volumes

The projected Proposed Action traffic volumes as described in **Section 4.2.2.2** were combined with the No Action Alternative total traffic volumes to determine the total future traffic volumes for the Phase I. It is assumed that the Proposed Action-generated trips would follow the similar traffic pattern to that of the Fort Meade workforce as described in the **Table 4.2-3**.

**Figure 4.2-6** shows the AM/PM peak hour traffic volumes for the Proposed Action at all the study area intersections.

#### Proposed Action: Capacity Analysis and Levels of Service

The projected total traffic volumes were entered in the Synchro model to evaluate the Proposed Action, as was done for the existing and No Action Alternative. Based upon the capacity analysis results using projected volumes, 11 out of 18 study area intersections would operate at constrained LOS E or F during

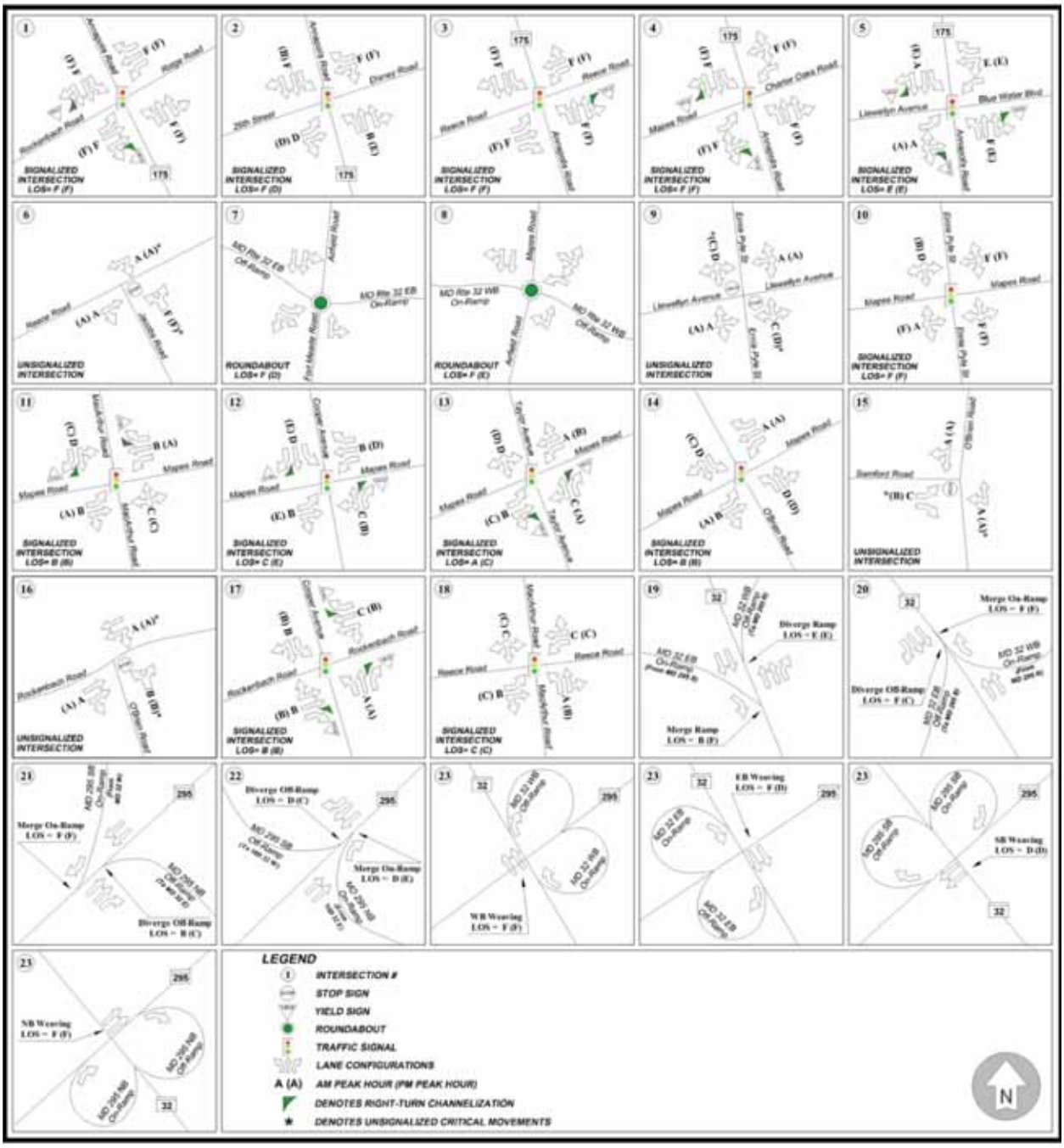



**Figure 4.2-3. No Action Alternative: Lane Geometry and Level of Service (Year 2015)**

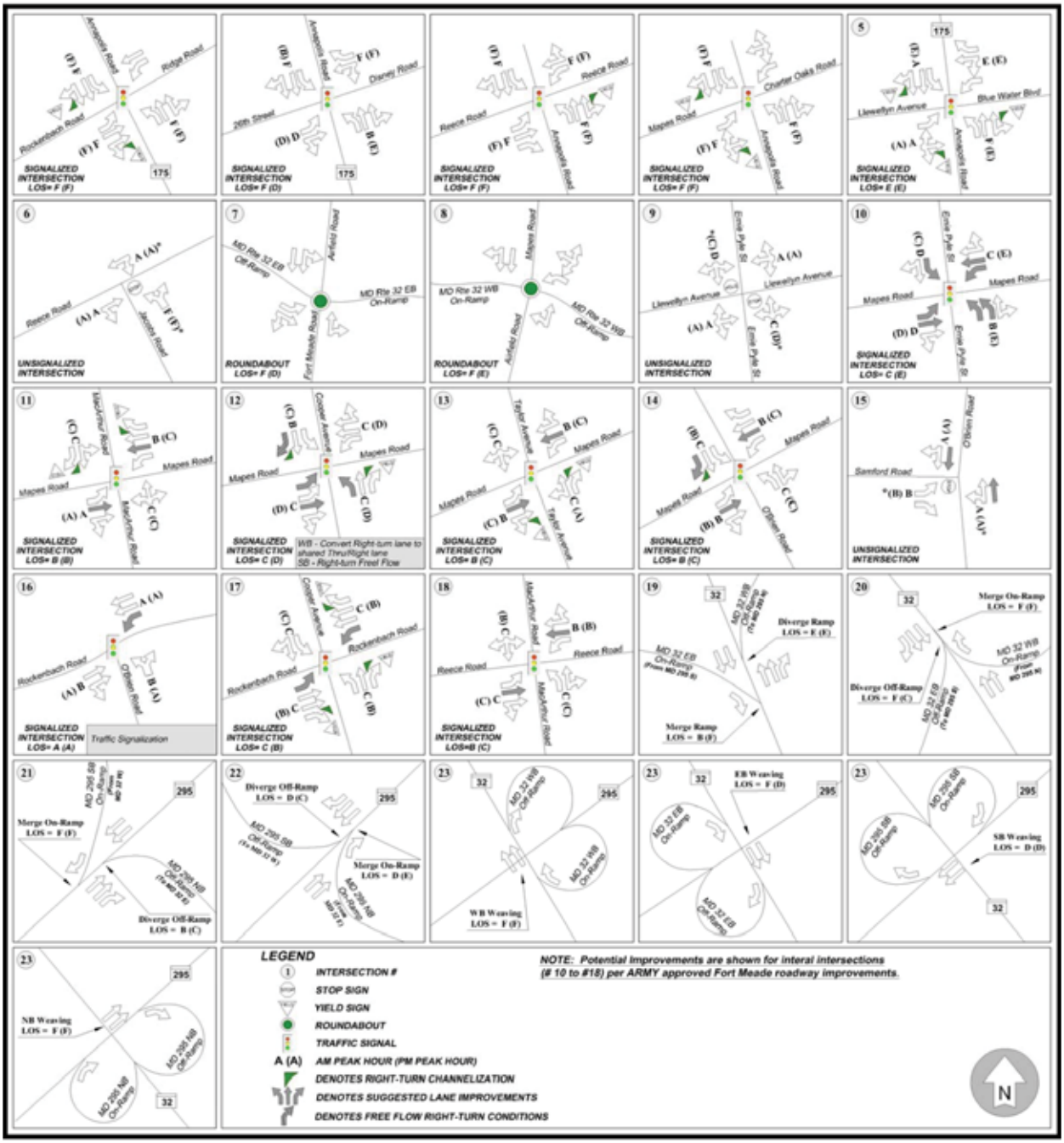



**Figure 4.2-4. No Action Alternative: Lane Geometry and Level of Service with Potential Improvements (Year 2015)**

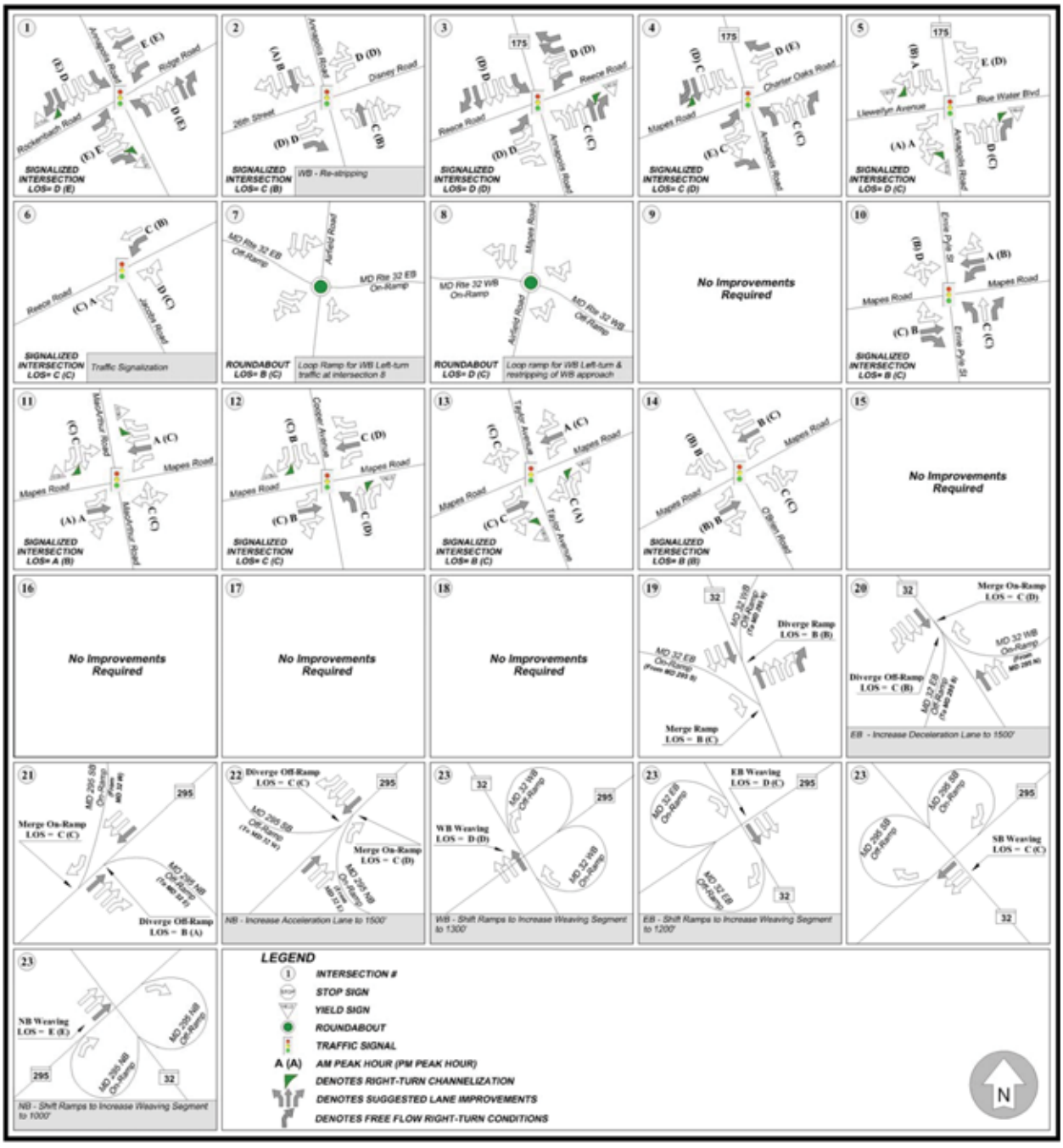



**Figure 4.2-5. No Action Alternative: Lane Geometry and Level of Service with Recommended Improvements (Year 2015)**

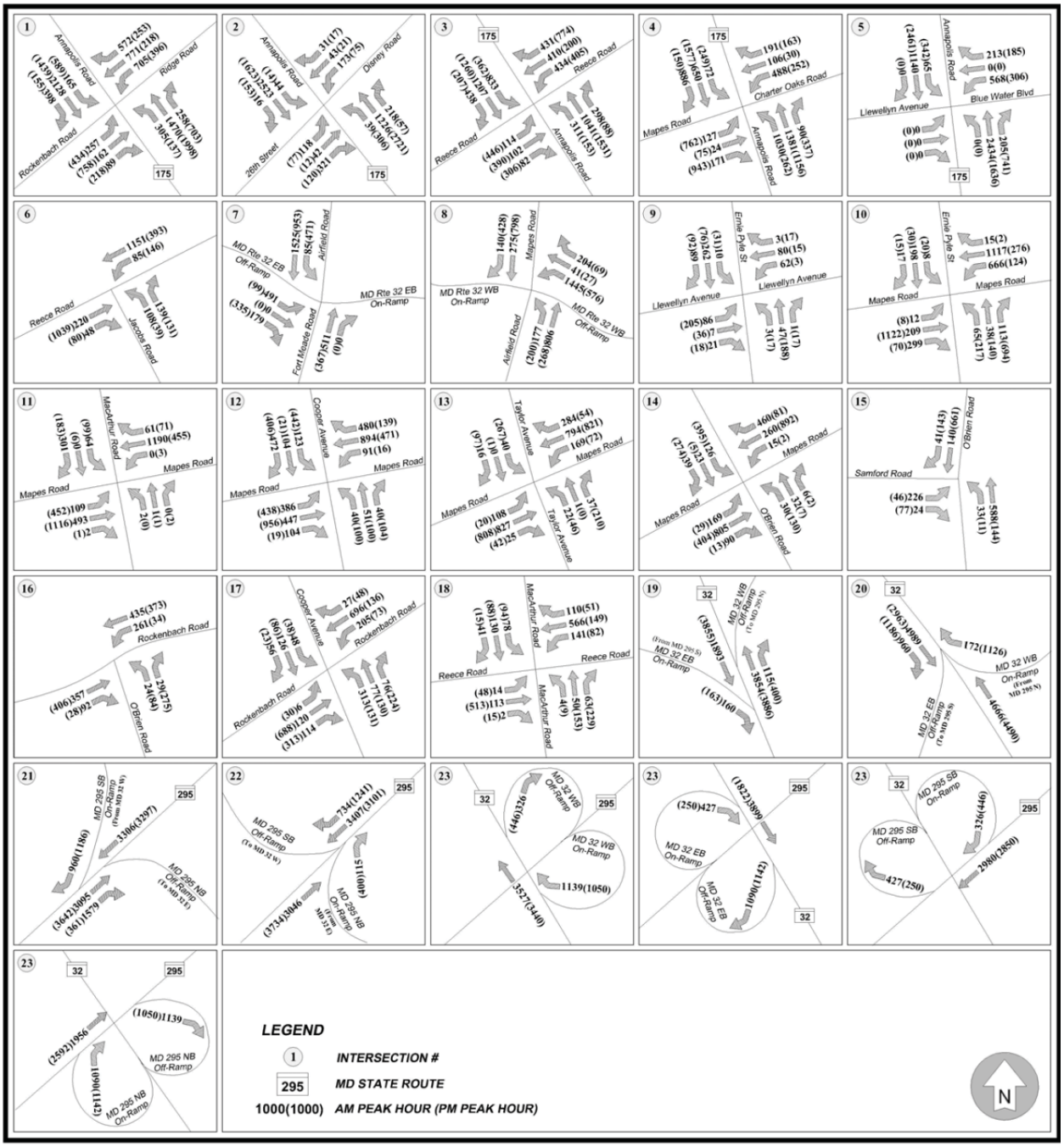



**Figure 4.2-6. Proposed Action Peak Hour Traffic Volumes (Year 2015)**

either AM or PM peak hour traffic conditions. In addition to the intersection failing under the No Action Alternative, the unsignalized intersection of O'Brien Road and Samford Road and weaving segment along MD 295 in a southbound direction would fail due to increased trips related to NSA expansion under the Proposed Action.

A major adverse impact under the Proposed Action would occur if an intersection operating with adequate LOS results (LOS D or better) under the No Action Alternative would experience increased delays and, as a result, would drop the intersection LOS to E or F. Based on this, the Proposed Action would have a long-term, minor, adverse impact on the study area roadway network. An analysis was conducted with existing geometry, with potential improvements suggested by the U.S. Army and with recommended improvements based on the analysis.

**Table 4.2-5** is presented to summarize the intersection LOS comparison between the No Action Alternative and the Proposed Action.

**Figure 4.2-7** shows the AM/PM peak hour LOS results with the existing lane geometry for the Proposed Action during Year 2015 at all the study area intersections. **Figures 4.2-8** and **4.2-9** show Year 2015 Proposed Action LOS results assuming potential improvements and recommended improvements, respectively.

## 4.2.3 Future Conditions (Year 2020)

Alternative 1 is discussed and analyzed in this section. It would include 3 million $ft^2$ of administrative facilities with an estimated growth of 8,000 personnel.

### 4.2.3.1 No Action Alternative 1 (Year 2020)

Long-term, major, adverse impacts on the study area roadway network would be expected under No Action Alternative 1. The baseline conditions for the No Action Alternative 1 (Year 2020) are used for comparison with Alternative 1. This analysis is performed due to the increase in traffic volumes at the off-installation study area intersections for the Year 2020. The increase in traffic is due to the yearly regional growth and other background developments. Under the No Action Alternative 1, Alternative 1 would not be developed on a phased, multiyear basis and DOD would not construct and operate 3 million square feet of administrative facilities employing approximately 8,000 personnel.

Trips associated with the BRAC-related activities on Fort Meade, partial EUL action, and other non-BRAC activities on Fort Meade, assumed in the No Action Alternative (Year 2015) described in **Section 4.2.2.1**, remain consistent with the No Action Alternative 1 analysis. In addition, trips related to the remainder of EUL developments (Site Y) are also considered in the analysis. This EUL action includes the completion of the construction for administrative facilities on a parcel along the northern side of Reece Road, east of MD 175. Estimated job growth related to this action would be 7,000 personnel. Access would be provided via a driveway along the east side of MD 175, opposite Clark Road, and via a driveway along the northern side of Reece Road. **Figure 2.5-1** presented the locations of these proposed projects.

In order to incorporate all of the ongoing and planned future developments trips surrounding the Fort Meade area, an annual growth rate of 1 percent (compounded) was applied to the No Action Alternative traffic volumes from Year 2015 to Year 2020.

**Table 4.2-5. Comparison of Intersection LOS**

| Number | Intersection | LOS* | | | |
|---|---|---|---|---|---|
| | | No Action Alternative | | Proposed Action | |
| | | AM | PM | AM | PM |
| 1 | MD 175 and Rockenbach Road/Ridge Road | F | F | F | F |
| 2 | MD 175 and Disney Road/26th Street | F | D | F | D |
| 3 | MD 175 and MD 174 (Reece Road) | F | F | F | F |
| 4 | MD 175 and Mapes Road | F | F | F | F |
| 5 | MD 175 and Llewellyn Avenue | E | E | F | E |
| 6 | MD 174 and Jacobs Road | F | F | F | F |
| 7 | Mapes Road and MD 32 Eastbound Ramps | F | D | F | E |
| 8 | Mapes Road and MD 32 Westbound Ramps | F | E | F | E |
| 9 | Llewellyn Avenue and Ernie Pyle Street | D | D | D | D |
| 10 | Mapes Road and Ernie Pyle Street | F | F | F | F |
| 11 | Mapes Road and MacArthur Road | B | B | C | B |
| 12 | Mapes Road and Cooper Avenue | C | E | C | E |
| 13 | Mapes Road and Taylor Avenue | A | C | B | C |
| 14 | Mapes Road and O'Brien Road | B | B | B | C |
| 15 | O'Brien Road and Samford Road | C | B | F | C |
| 16 | O'Brien Road and Rockenbach Road | B | B | D | C |
| 17 | Cooper Avenue and Rockenbach Road | B | B | C | B |
| 18 | Reece Road and MacArthur Road | C | C | C | C |
| 19 | MD 32 Eastbound on-ramp, merging | B | F | C | F |
| | MD 32 Westbound off-ramp, diverging | E | E | E | F |
| 20 | MD 32 Westbound on-ramp, merging | F | F | F | F |
| | MD 32 Eastbound off-ramp, diverging | F | C | F | D |
| 21 | MD 295 Southbound on-ramp, merging | F | F | F | F |
| | MD 295 Northbound off-ramp, diverging | B | C | B | C |
| 22 | MD 295 Northbound on-ramp, merging | D | E | D | F |
| | MD 295 Southbound off-ramp, diverging | D | C | D | C |
| 23 | MD 32 Westbound, weaving | F | F | F | F |
| | MD 32 Eastbound, weaving | F | D | F | E |
| | MD 295 Westbound, weaving | D | D | E | D |
| | MD 295 Eastbound, weaving | F | F | F | F |

Note: * For signalized intersections, overall intersection LOS is shown.

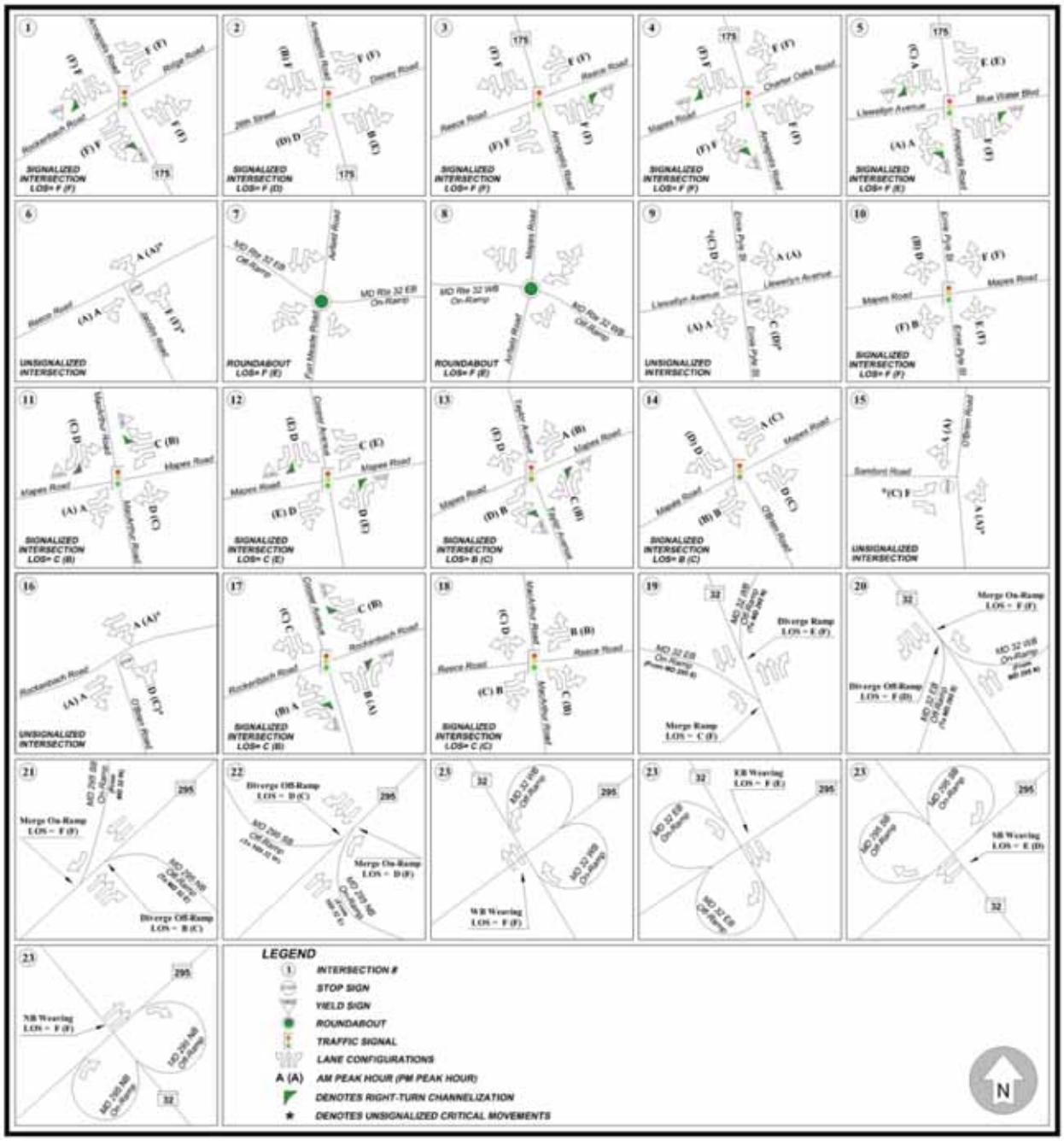



**Figure 4.2-7. Proposed Action Lane Geometry and Level of Service (Year 2015)**

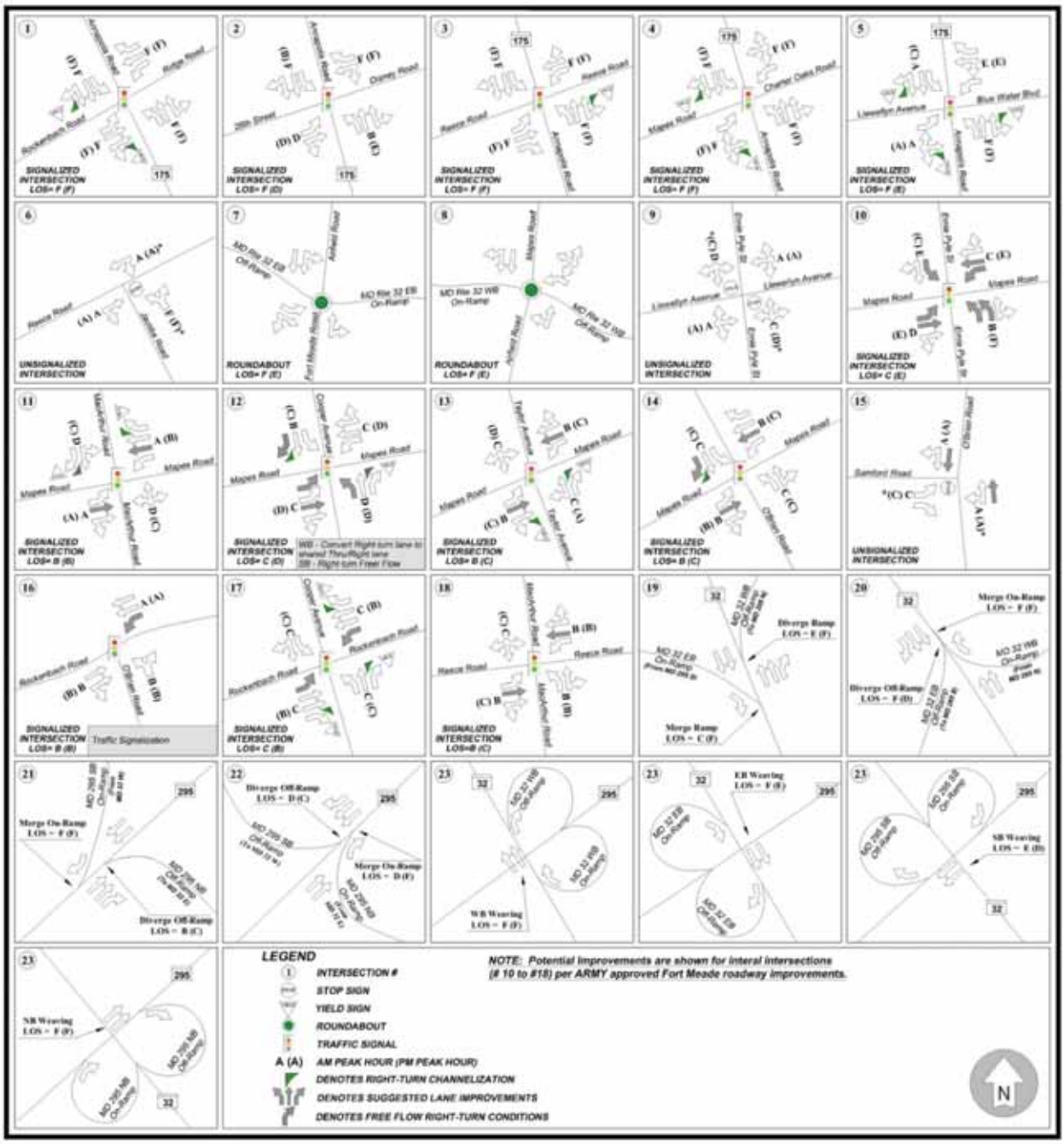



**Figure 4.2-8. Proposed Action Lane Geometry and Level of Service with Potential Improvements (Year 2015)**

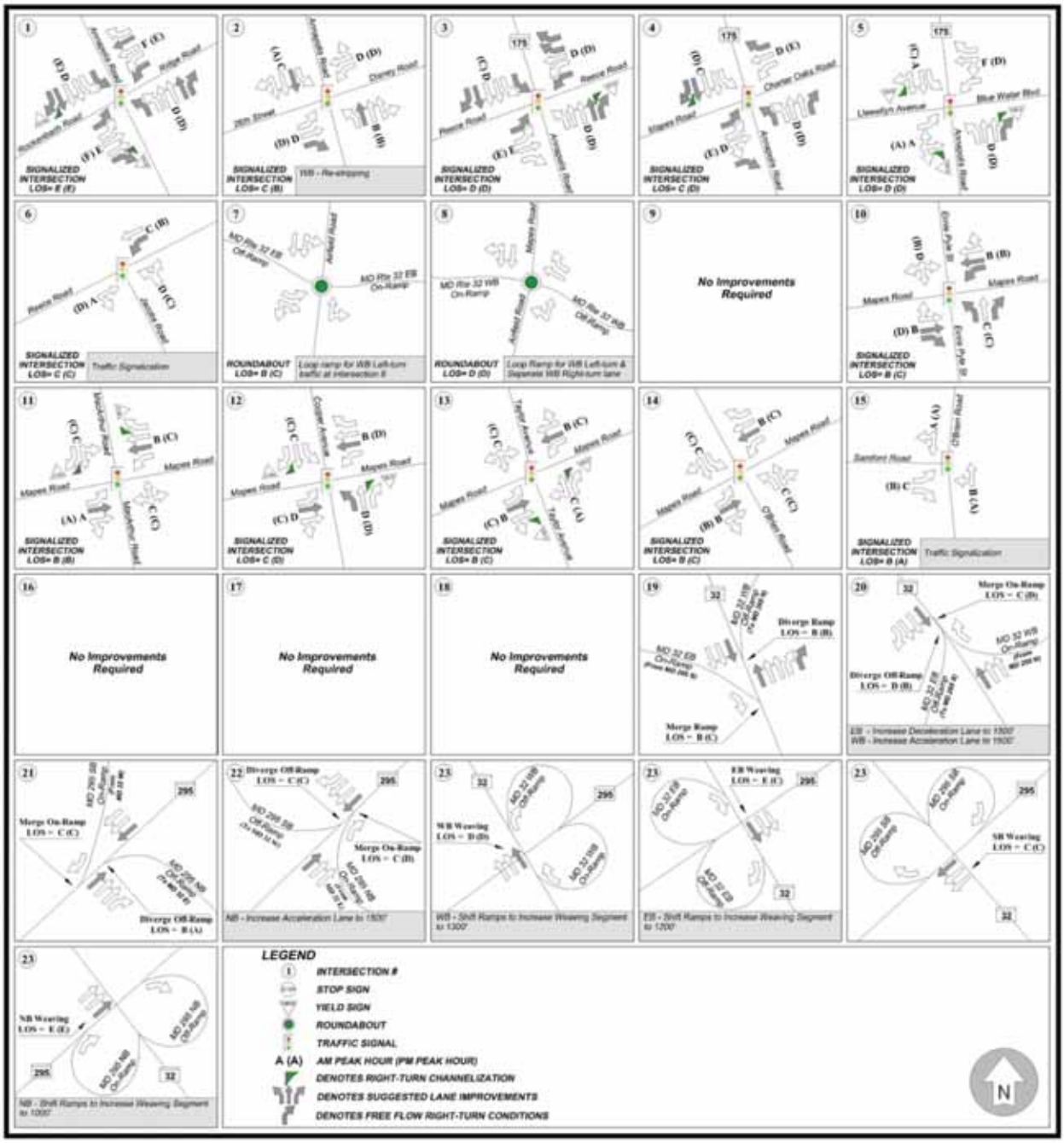



**Figure 4.2-9. Proposed Action Lane Geometry and Level of Service with Recommended Improvements (Year 2015)**

The weekday AM/PM peak hour trips entering and exiting the site due to aforementioned developments were established using equations/rates provided in the 8th Edition of the ITE *Trip Generation Report*. **Table 4.2-6** summarizes the total trip generation associated with each of the background developments.

**Table 4.2-6. No Action Alternative 1 – Trip Generation Summary**

| Land Use | Amount | AM Peak Hour | | | PM Peak Hour | | | Weekday ADT |
|---|---|---|---|---|---|---|---|---|
| | | In | Out | Total [a] | In | Out | Total [a] | |
| BRAC – DISA | 4,272 employees | 1,483 | 202 | 1,685 | 279 | 1,362 | 1,641 | 10,428 |
| BRAC – DMA | 663 employees | 299 | 41 | 339 | 52 | 253 | 305 | 2,180 |
| BRAC – Adjudication | 772 employees | 340 | 46 | 387 | 59 | 287 | 346 | 2,478 |
| 902nd Military Center | 420,000 $ft^2$ | 520 | 71 | 591 | 93 | 456 | 549 | 4,028 |
| DINFOS Expansion | 300 students | 50 | 13 | 63 | 53 | 123 | 176 | 1,109 |
| EUL – Site Z | 3,450 employees | 1,234 | 168 | 1,402 | 227 | 1,109 | 1,337 | 8,715 |
| EUL – Site Y | 7,000 employees | 2,267 | 309 | 2,576 | 451 | 2,200 | 2,650 | 8,715 |
| ***Subtotal*** [a] | | ***6,194*** | ***850*** | ***7,044*** | ***1,213*** | ***5,790*** | ***7,003*** | ***44,727*** |
| *Alternative Mode Reduction (5%)* [b] | | *310* | *43* | *352* | *61* | *289* | *350* | *2,236* |
| **Total Trips** [a] | | **5,884** | **808** | **6,692** | **1,153** | **5,500** | **6,653** | **42,491** |

Sources: DOD 2008b, USACE Mobile District 2007

Notes:

a. Subtotals and totals might vary due to rounding during the calculations.

b. Vehicular trips reduction anticipated due to future transit improvements.

### No Action Alternative 1: Total Traffic Volumes (Year 2020)

The projected trips associated with background development and trips related to other regional growth described in **Section 4.2.2.1** were combined to determine total future traffic volumes for the No Action Alternative 1 in Year 2020. Total trips were then assigned to the study area roadway network. The distribution of trips was based upon local travel patterns for the roadway network surrounding Fort Meade. The trip distribution percentages remain consistent with the percentages utilized in the No Action Alternative as shown in **Table 4.2-3**.

**Figure 4.2-10** illustrates the AM/PM peak hour volumes at all the study area intersections for Year 2020 No Action Alternative 1.

### No Action Alternative 1: Capacity Analysis and Levels of Service (Year 2020)

The AM/PM peak hour traffic volumes previously described and lane configurations were entered in the Synchro model to determine the intersection LOS. Due to continual growth in the area, signal timings at the signalized intersections are in need of constant adjustments. In an effort to achieve progressive traffic flow and, subsequently, to reduce the traffic delay, signal timings and signal phasing were optimized.

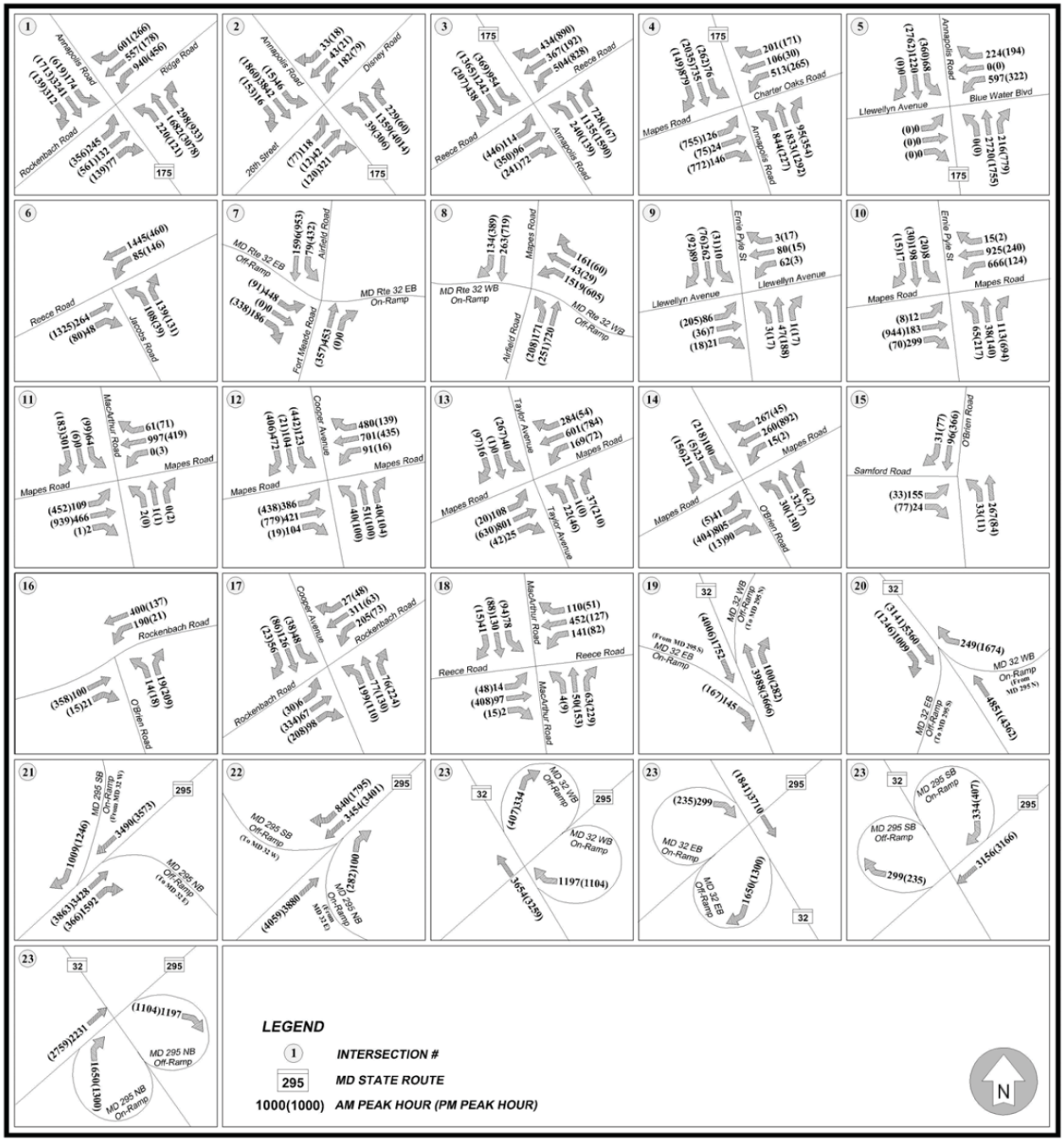



**Figure 4.2-10. No Action Alternative 1: Peak Hour Traffic Volumes (Year 2020)**

HCS+ was used to analyze the weaving and merging/diverging conditions at the MD 295/MD 32 interchange.

Major adverse impacts of the No Action Alternative 1 were observed for the study area intersections at both on- and off-installation intersections. Based upon the analysis results, all the intersections failing under the No Action Alternative would also fail under this alternative in Year 2020. These intersections would experience increased delay due to heavy influx of traffic generated by BRAC action, EUL action (Site Y & Z), 902nd Military Center, DINFOS expansion, and other regional growth. Consequently, the LOS would degrade from D or better observed in the existing conditions to E or F under this alternative.

All the weaving/merging/diverging segments, except MD 295 northbound off-ramp, would also experience heavy delay and operate with inadequate LOS.

Analysis was conducted with the existing lane geometry to establish the baseline condition as well as assuming the infrastructure improvements, which would be required to reduce the impacts of the influx of trips generated by new developments.

**Figure 4.2-11** illustrates the projected LOS results at all the study area intersections during No Action Alternative 1 without any roadway improvements. **Figure 4.2-12** illustrates the LOS results assuming the improvements, which would be required to maintain adequate LOS results.

### 4.2.3.2 Alternative 1 – (Phases I and II)

Long-term, minor, adverse impacts on the study area roadway network would be expected under Alternative 1, identified as Phase I and Phase II in the study. Under this alternative, the Proposed Action (Phase I) would be implemented along with Phase II. Under Phase II, development would occur on the western half of proposed site in between the Phase I parcel and 3rd Cavalry Road supporting an additional 1.2 million $ft^2$ of operational administrative facilities. The build-out and full occupation would occur by Year 2020. The analysis of Alternative 1 includes Phase I and Phase II. Job growth due to this action is estimated to be 1,500 personnel. However, it is anticipated that approximately two-thirds (1,000 personnel) of the estimated 1,500 employees would come from outside the Fort Meade boundary. The remaining one-third (500) of the personnel would be shifted from adjacent buildings within Fort Meade to the new facility. Therefore, for the purpose of this analysis, the impact of a total of approximately 5,333 personnel (4,333 for Phase I and 1,000 for Phase II) has been taken into consideration.

The weekday AM/PM peak hour trips entering and exiting the site due to Alternative 1 were established using equations/rates provided in the 8th Edition of the ITE *Trip Generation Report*. **Table 4.2-7** summarizes the total trip generation associated with Alternative 1.

#### Alternative 1: Total Traffic Volumes

The projected Alternative 1 traffic volumes as described in previous section were combined with the No Action Alternative 1 traffic volumes (see **Figure 4.2-13**) to determine the total future traffic volumes for Alternative 1 in Year 2020. It is assumed that the Alternative 1-generated trips would follow a traffic pattern similar to that of the Fort Meade workforce described in the **Table 4.2-3**.

**Figure 4.2-14** shows the AM/PM peak hour traffic volumes for the Alternative 1 at all the study area intersections.

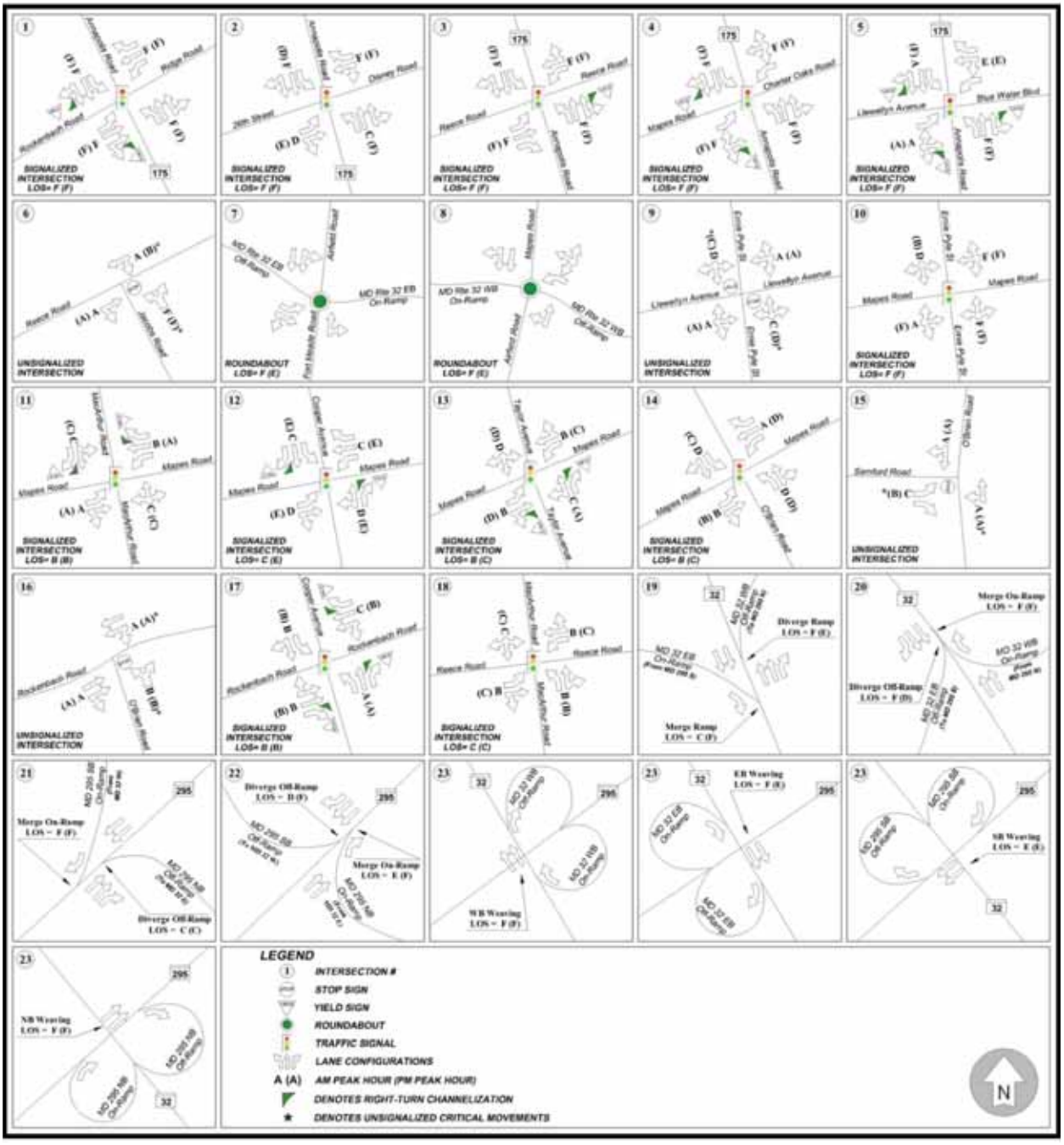



**Figure 4.2-11. No Action Alternative 1: Lane Geometry and Level of Service (Year 2020)**

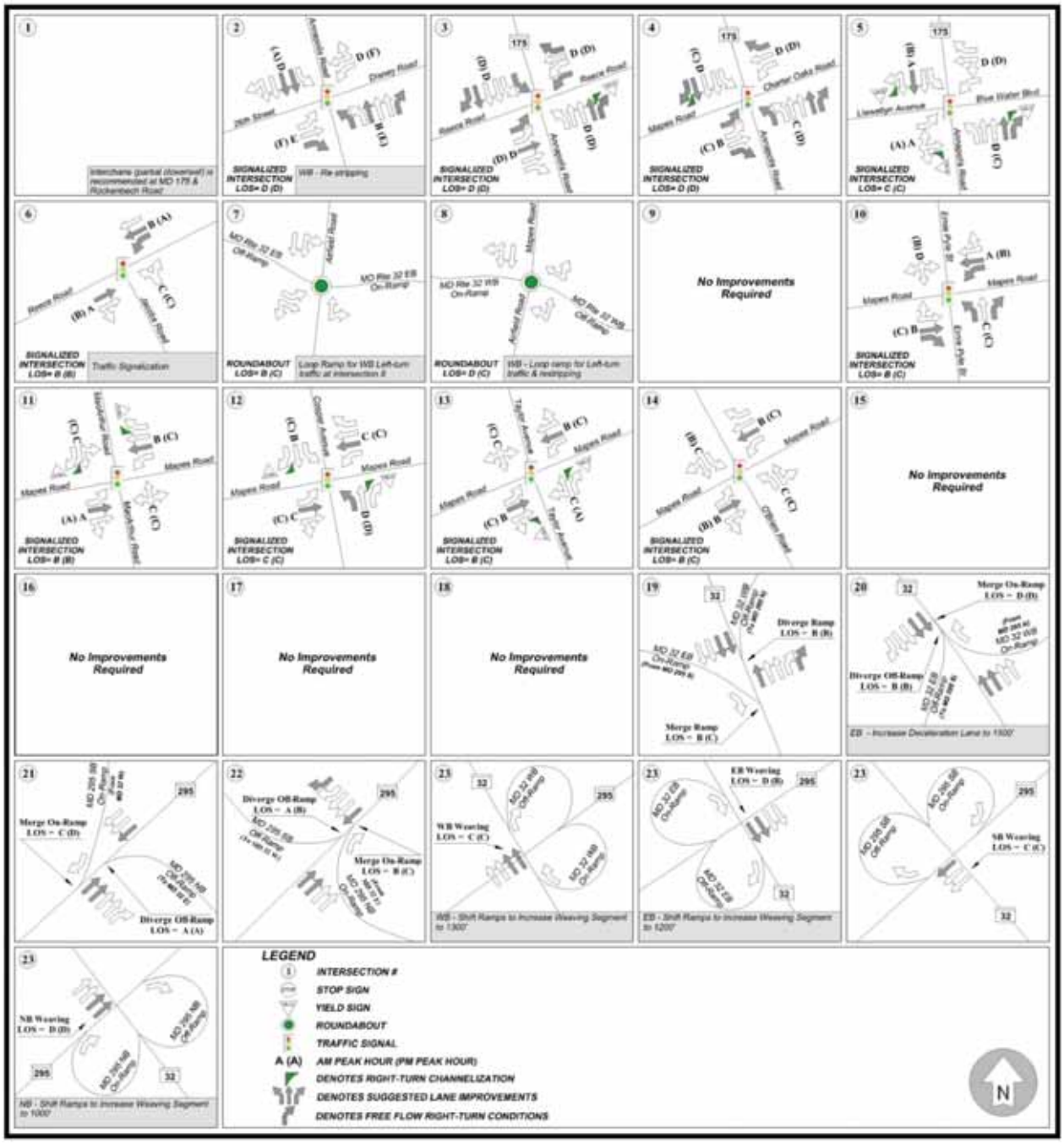



**Figure 4.2-12. No Action Alternative 1: Lane Geometry and Level of Service with Recommended Improvements (Year 2020)**

**Table 4.2-7. Alternative 1 – Trip Generation Summary**

| Land Use | Amount | AM Peak Hour | | | PM Peak Hour | | | Weekly ADT |
|---|---|---|---|---|---|---|---|---|
| | | In | Out | Total [a] | In | Out | Total [a] | |
| NSA | 5,333 employees | 1,795 | 245 | 2,039 | 346 | 1,688 | 2,034 | 12,566 |
| *Alternative Mode Reduction (5%)* [b] | | *90* | *12* | *102* | *17* | *84* | *102* | *628* |
| **Total Trips** [a] | | **1,705** | **232** | **1,937** | **328** | **1,604** | **1,932** | **11,938** |

Notes:

a. Totals might vary due to rounding during the calculations.

b. Vehicular trips reduction anticipated due to future transit improvements.

### Alternative 1: Capacity Analysis and Levels of Service

The projected total traffic volumes were entered in the Synchro model to evaluate the Alternative 1 traffic conditions. Based upon the capacity analysis results using projected volumes, 13 out of 18 study area intersections would operate at constrained LOS E or F during either AM or PM peak hour traffic conditions. In addition to the intersection failing under No Action Alternative 1, the onsite intersections of Mapes Road and O'Brien Road and Rockenbach Road and O'Brien Road would also fail due to increased trips related to NSA expansion under Alternative 1.

A major adverse impact under Alternative 1 is considered when an intersection operating with adequate LOS results (LOS D or better) under No Action Alternative 1 would experience increased delay and, as a result, would drop the intersection LOS to E or F. Based on this, Alternative 1 would have minor adverse impacts on the on-installation intersections. An analysis was conducted with and without infrastructure improvements.

**Table 4.2-8** is presented to summarize the intersection LOS comparison between No Action Alternative 1 and implementation of Alternative 1.

**Figure 4.2-14** shows the AM/PM peak hour LOS results with the existing lane geometry for Alternative 1 during year 2020 at all the study area intersections. **Figure 4.2-15** shows Year 2020 Alternative 1 levels of service results with the recommended lane geometry.

## 4.2.4 Future Conditions (Year 2029)

Alternative 2 is discussed and analyzed in this section. It would include a total of 5.8 million $ft^2$ of administrative facilities with a total job growth of 11,000 personnel.

### 4.2.4.1 No Action Alternative 2 (Year 2029)

Long-term, major, adverse impacts on the study area roadway network would be expected under No Action Alternative 2. The baseline conditions for the No Action Alternative 2 (Year 2029) are used for comparison with Alternative 2. This analysis is performed due to the increase in traffic volumes at the off-installation study area intersections for the Year 2029. The increase in traffic is due to the yearly regional growth and other background developments. Under the No Action Alternative 2, Alternative 2 would not be developed on a phased, multiyear basis and DOD would not construct and operate 5.8 million $ft^2$ of administrative facilities employing approximately 11,000 personnel.

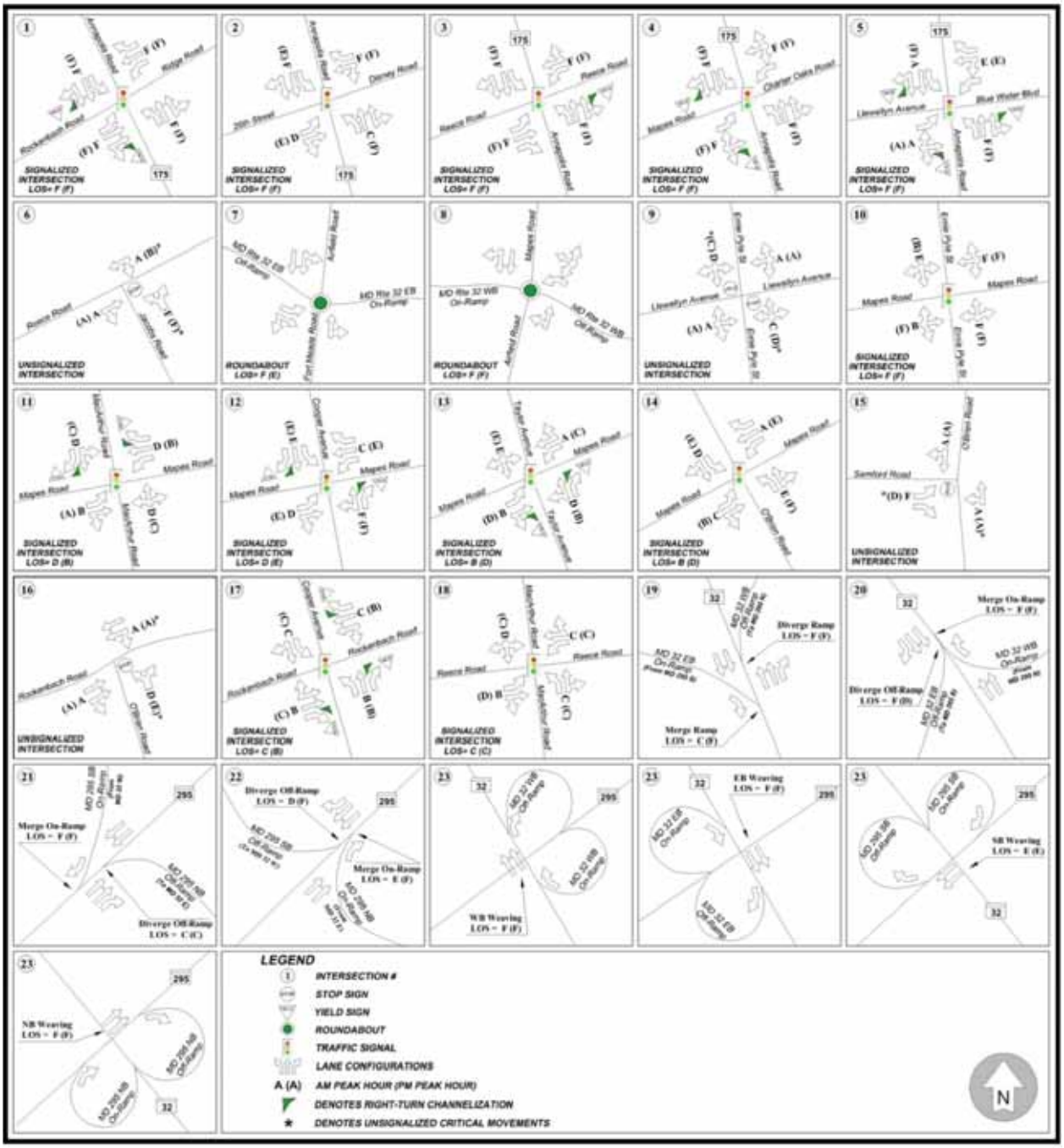



**Figure 4.2-13. Alternative 1 (Phase I and Phase II): Lane Geometry and Level of Service (Year 2020)**

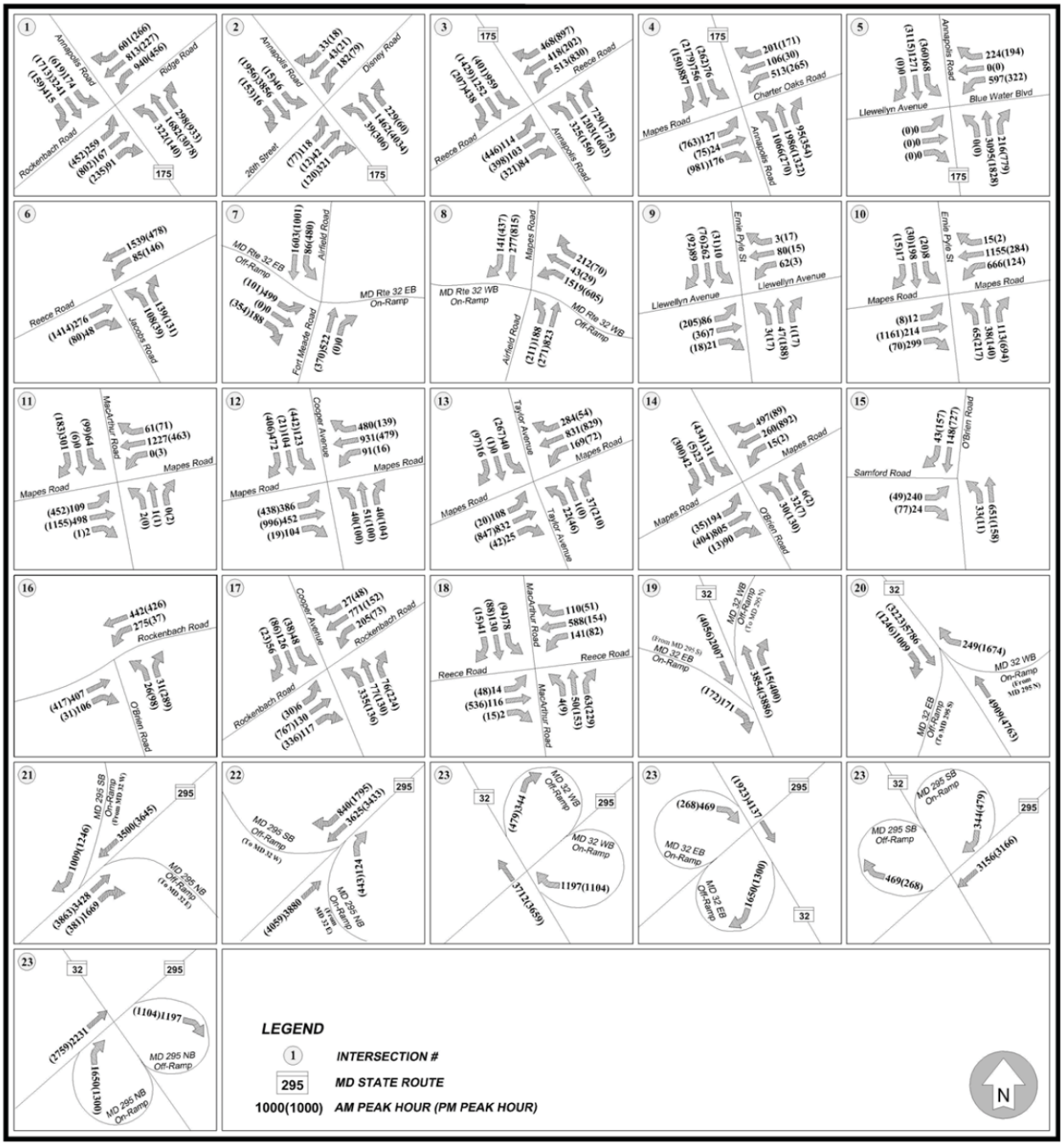



**Figure 4.2-14. Alternative 1 (Phase I and Phase II): Peak Hour Traffic Volumes (Year 2020)**

**Table 4.2-8. Comparison of Intersection LOS (Year 2020)**

| Number | Intersection | LOS* | | | |
|---|---|---|---|---|---|
| | | No Action Alternative 1 | | Alternative 1 | |
| | | AM | PM | AM | PM |
| 1 | MD 175 and Rockenbach Road/Ridge Road | F | F | F | F |
| 2 | MD 175 and Disney Road/26th Street | F | F | F | F |
| 3 | MD 175 and MD 174 (Reece Road) | F | F | F | F |
| 4 | MD 175 and Mapes Road | F | F | F | F |
| 5 | MD 175 and Llewellyn Avenue | F | F | F | F |
| 6 | MD 174 and Jacobs Road | F | F | F | F |
| 7 | Mapes Road and MD 32 Eastbound Ramps | F | E | F | E |
| 8 | Mapes Road and MD 32 Westbound Ramps | F | E | F | F |
| 9 | Llewellyn Avenue and Ernie Pyle Street | D | D | D | D |
| 10 | Mapes Road and Ernie Pyle Street | F | F | F | F |
| 11 | Mapes Road and MacArthur Road | B | B | D | B |
| 12 | Mapes Road and Cooper Avenue | C | E | D | E |
| 13 | Mapes Road and Taylor Avenue | B | C | B | D |
| 14 | Mapes Road and O'Brien Road | B | C | B | D |
| 15 | O'Brien Road and Samford Road | C | B | F | D |
| 16 | O'Brien Road and Rockenbach Road | B | B | D | E |
| 17 | Cooper Avenue and Rockenbach Road | B | B | C | B |
| 18 | Reece Road and MacArthur Road | C | C | C | C |
| 19 | MD 32 Eastbound on-ramp, merging | C | F | C | F |
| | MD 32 Westbound off-ramp, diverging | F | E | F | F |
| 20 | MD 32 Westbound on-ramp, merging | F | F | F | F |
| | MD 32 Eastbound off-ramp, diverging | F | D | F | D |
| 21 | MD 295 Southbound on-ramp, merging | F | F | F | F |
| | MD 295 Northbound off-ramp, diverging | C | C | C | C |
| 22 | MD 295 Northbound on-ramp, merging | E | F | E | F |
| | MD 295 Southbound off-ramp, diverging | D | F | D | F |
| 23 | MD 32 Westbound, weaving | F | F | F | F |
| | MD 32 Eastbound, weaving | F | E | F | F |
| | MD 295 Southbound, weaving | E | E | E | E |
| | MD 295 Northbound, weaving | F | F | F | F |

Note: * For signalized intersections, overall intersection LOS is shown.

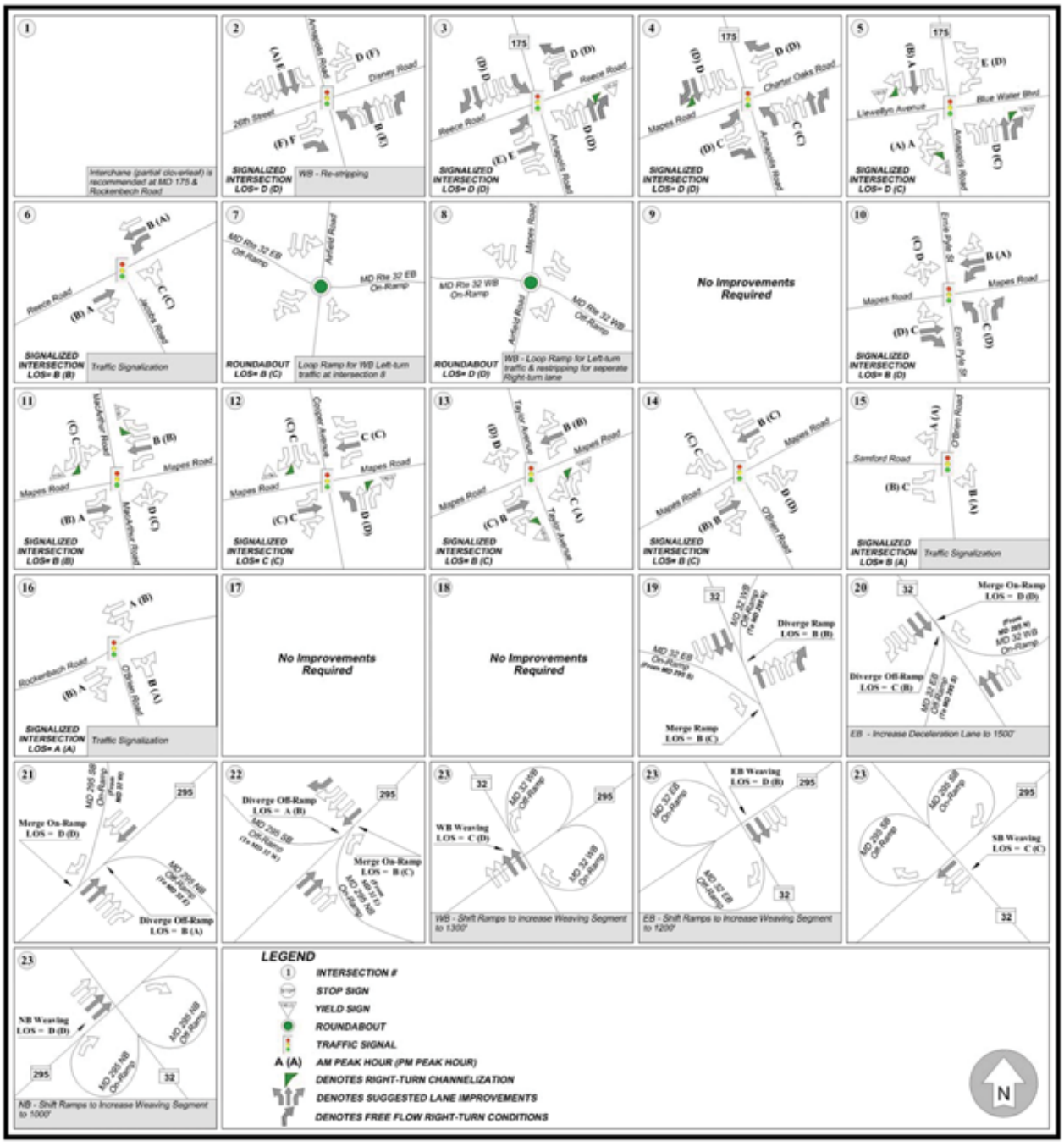



**Figure 4.2-15. Alternative 1 (Phase I and Phase II): Lane Geometry and Level of Service with Recommended Improvements (Year 2020)**

Trips associated with the BRAC-related activities on Fort Meade, EUL action, and other non-BRAC activities on Fort Meade, assumed in the No Action Alternative 1 (Year 2020) described in the **Section 4.2.3.1** remain consistent with the No Action Alternative 2 analysis.

An annual growth rate of 1 percent (compounded) was applied to the No Action Alternative 1 traffic volumes from Year 2020 to Year 2029 to incorporate all of the ongoing and planned future development trips surrounding the Fort Meade area.

The weekday AM/PM peak hour trips entering and exiting the site due to the aforementioned developments were established using equations/rates provided in the 8th Edition of the ITE *Trip Generation Report*.

Total trip generation associated with each of the background developments remains consistent with **Table 4.2-6** and **Figure 2.5-1**.

### No Action Alternative 2: Total Traffic Volumes (Year 2029)

The projected background development trips and trips related to other regional growth were added to determine total future traffic volumes for the No Action Alternative 2 in Year 2029. Total trips were then assigned to the study area roadway network. The distribution of trips was based upon local travel patterns for the roadway network surrounding Fort Meade. The trip distribution percentages remain consistent with the percentages utilized in the No Action Alternative as illustrated in **Table 4.2-3**.

**Figure 4.2-16** illustrates the AM/PM peak hour volumes at all the study area intersections for Year 2029 No Action Alternative 2.

### No Action Alternative 2: Capacity Analysis and Levels of Service (Year 2029)

The AM/PM peak hour traffic volumes and lane configurations were entered in the Synchro model to determine the intersection LOS. Due to continual growth in the area, signal timings at the signalized intersections are in need of constant adjustments. In an effort to achieve progressive traffic flow and, subsequently, to reduce the traffic delay, signal timings and signal phasing were optimized.

HCS+ was used to analyze the weaving and merging/diverging conditions at the MD 295/MD 32 interchange.

Major adverse impacts under No Action Alternative 2 were observed for the study area intersections at both on- and off-installation intersections. Based upon the analysis results, all the intersections failing under No Action Alternative 1 (see **Section 4.2.3.1**) would also fail under this alternative in Year 2029. These intersections would experience increased delays due to heavy influx of traffic generated by BRAC action, EUL action (Site Y & Z), 902nd Military Center, DINFOS expansion, and other regional growth. Consequently, the LOS would degrade from D or better observed in the existing conditions to E or F under this alternative.

All the weaving/merging/diverging segments would experience heavy delay and operate with inadequate LOS.

Analysis was conducted with the existing lane geometry to establish the baseline condition and to determine the infrastructure improvements, which would be required to reduce the impacts of the influx of trips generated by new developments.

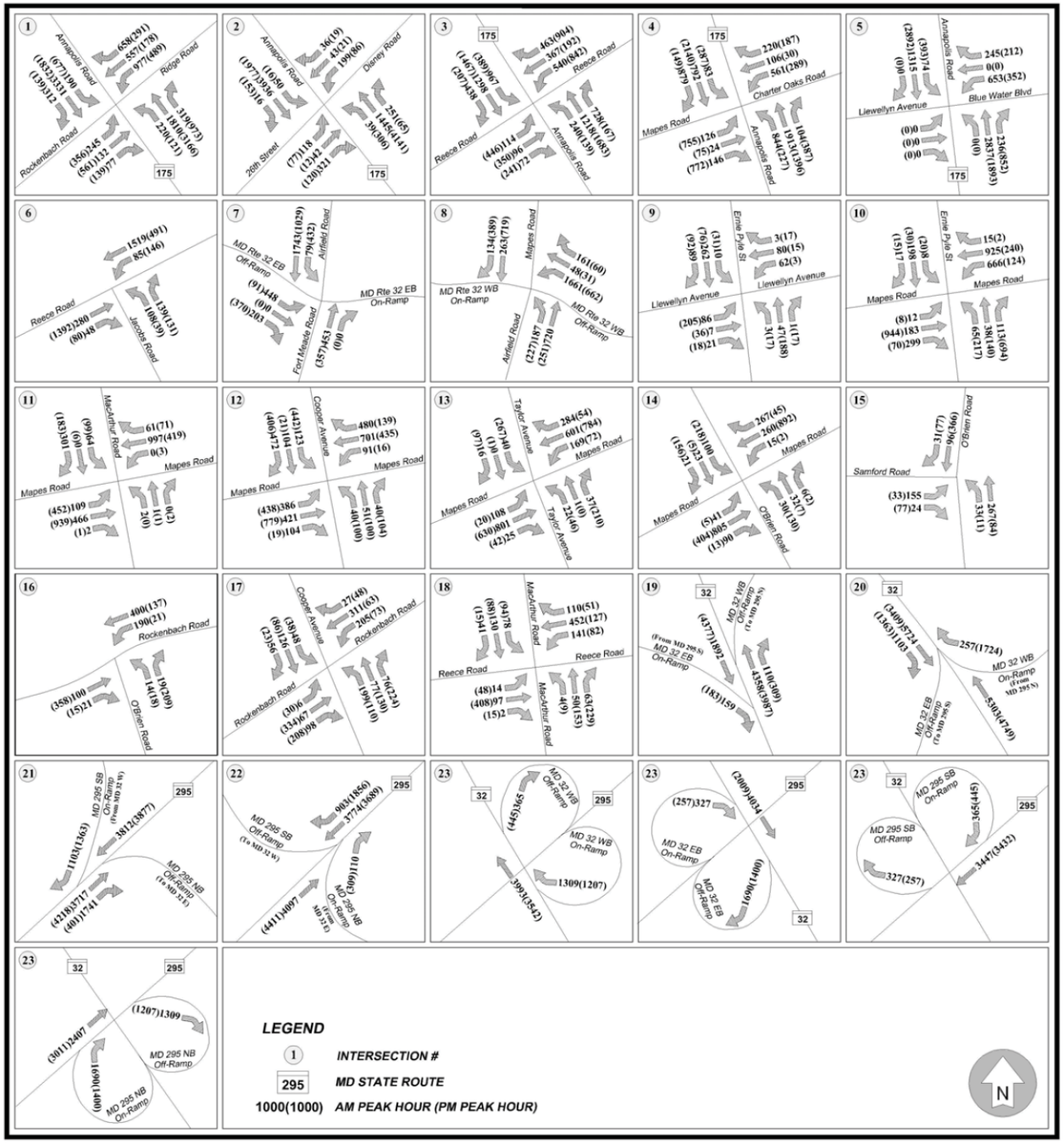



**Figure 4.2-16. No Action Alternative 2: Peak Hour Traffic Volumes (Year 2029)**

**Figure 4.2-17** illustrates the projected LOS results at all the study area intersections during No Action Alternative 2. **Figure 4.2-18** illustrates proposed improvements, which would be required to maintain adequate LOS results.

### 4.2.4.2 Alternative 2 (Phases I, II, and III)

Long-term, moderate, adverse impacts on the study area roadway network would be expected under Alternative 2, identified as Phase I, Phase II, and Phase III in the study. Under this alternative, the Proposed Action (Phase I) would be implemented along with Phase II and Phase III. Under Phase III, development would occur south of Phase I and Phase II supporting an additional 2.8 million $ft^2$ of operational administrative facilities, bringing total built space to 5.8 million $ft^2$ under all three phases. The build-out and full occupation would occur by Year 2029. The analysis of Alternative 2 includes Phase I, Phase II, and Phase III. Job growth due to this Phase III action is estimated to be 3,000 personnel. However, it is anticipated that only two-thirds (2,000 personnel) of the estimated 3,000 employees would come from outside the Fort Meade boundary. The remaining one-third (1,000) would be shifted from adjacent buildings within Fort Meade to the new facility. Therefore, for the purpose of this analysis, the impact of a total of approximately 7,333 personnel (4,333 for Phase I, 1,000 for Phase II, and 2,000 for Phase III) has been considered.

The weekday AM/PM peak hour trips entering and exiting the site due to the Alternative 2 were established using equations/rates provided in the 8th Edition of the ITE *Trip Generation Report*. **Table 4.2-9** summarizes the total trip generation associated with Alternative 2.

**Table 4.2-9. Alternative 2 – Trip Generation Summary**

| Land Use | Amount | AM Peak Hour | | | PM Peak Hour | | | Weekly ADT |
|---|---|---|---|---|---|---|---|---|
| | | In | Out | Total | In | Out | Total | |
| NSA | 7,333 employees | 2,360 | 322 | 2,682 | 472 | 2,302 | 2,774 | 16,420 |
| *Alternative Mode Reduction (5%)* [a] | | *118* | *16* | *134* | *24* | *115* | *139* | *821* |
| **Total Trips** [b] | | **2,242** | **306** | **2,548** | **448** | **2,187** | **2,635** | **15,599** |

Notes: *

a. Vehicular trips reduction anticipated due to future transit improvements.

b. Totals might vary due to rounding during the calculations.

#### Alternative 2: Total Traffic Volumes

The projected Alternative 2 traffic volumes as described in **Section 4.2.4.2** were combined with the No Action Alternative 2 traffic volumes (see **Figure 4.2-16**) to determine the total future traffic volumes for Alternative 2 in Year 2029. It is assumed that the Alternative 2-generated trips would follow a traffic pattern similar to that of the Fort Meade workforce described in **Table 4.2-3**.

**Figure 4.2-19** shows the AM/PM peak hour traffic volumes for Alternative 2 at all the study area intersections.

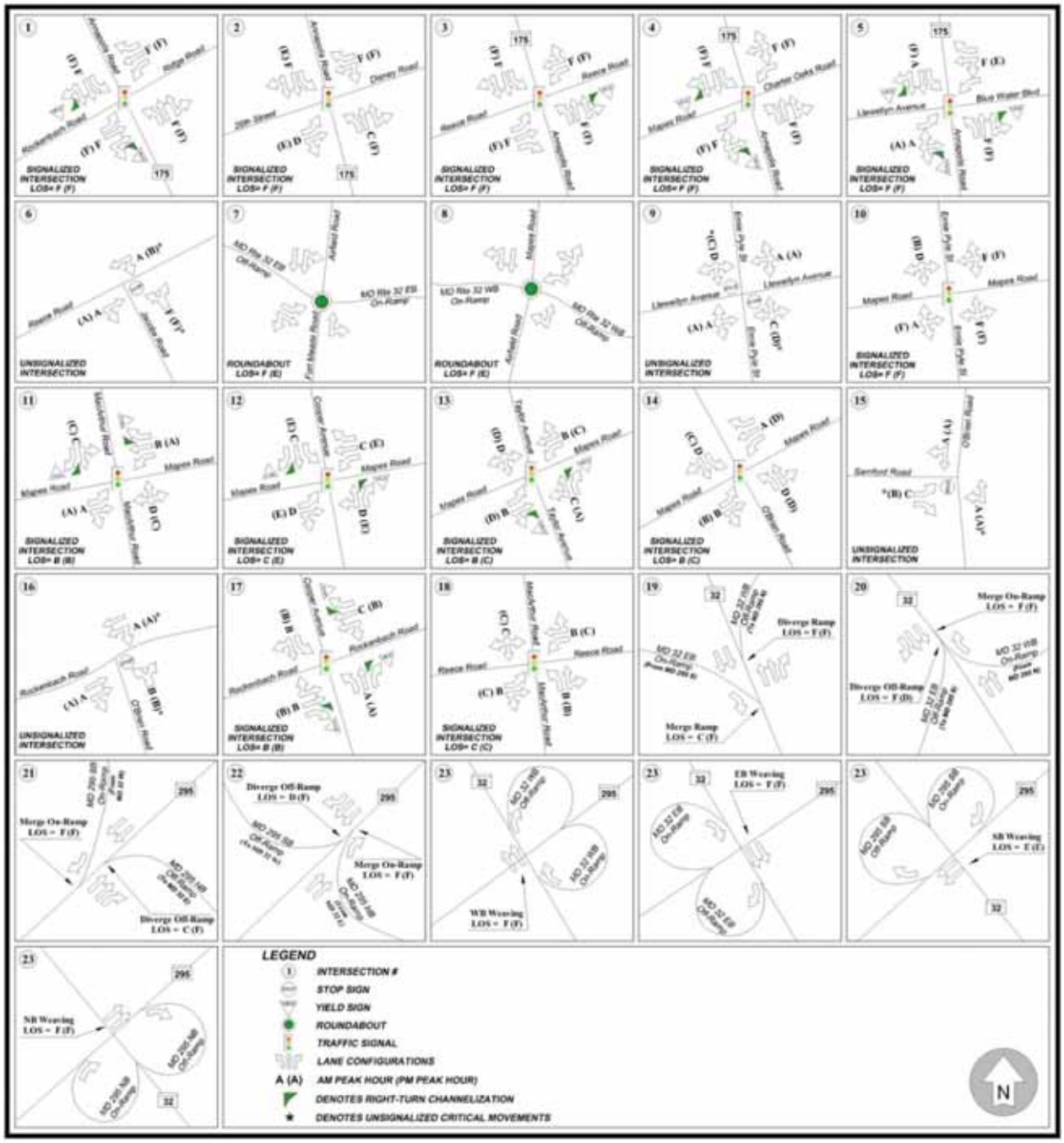



**Figure 4.2-17. No Action Alternative 2: Lane Geometry and Level of Service (Year 2029)**

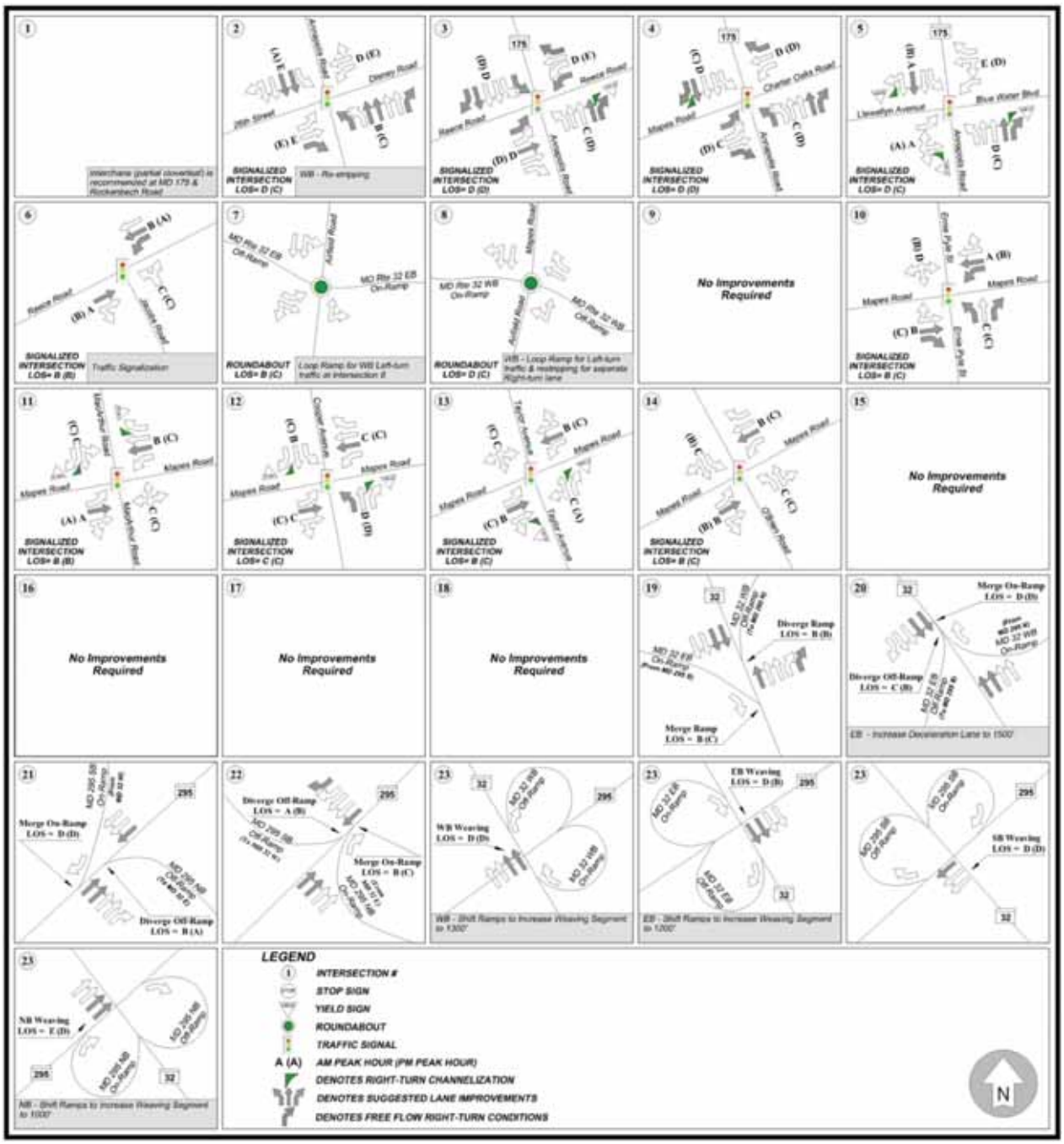



**Figure 4.2-18. No Action Alternative 2: Lane Geometry and Level of Service with Recommended Improvements (Year 2029)**

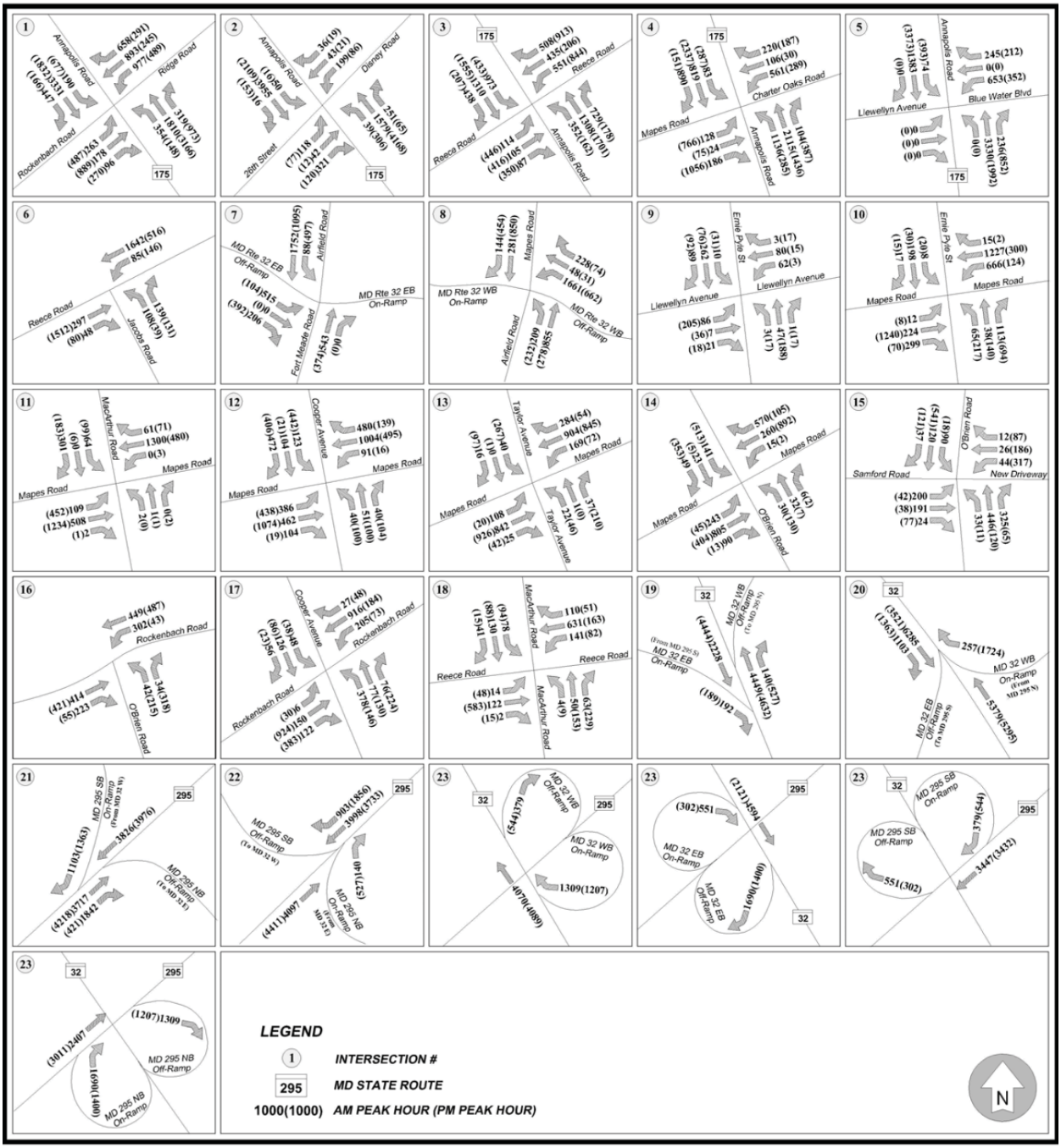



**Figure 4.2-19. Alternative 2 (Phases I, II, and III): Peak Hour Traffic Volumes (Year 2029)**

### Alternative 2: Capacity Analysis and Levels of Service

The projected total traffic volumes were entered in the Synchro model to evaluate the Alternative 2 traffic conditions. Based upon the capacity analysis results using projected volumes, 15 out of 18 study area intersections would operate at constrained LOS E or F during either AM or PM peak hour traffic conditions. In addition to the intersection failing under No Action Alternative 2, the on-installation intersections of Mapes Road and MacArthur Road and Mapes Road and Taylor Avenue would also fail due to increased trips related to NSA expansion under Alternative 2.

A major adverse impact under Alternative 2 is considered when an intersection operating with adequate LOS results (LOS D or better) under No Action Alternative 2 would experience increased delay and, as a result, would drop the intersection LOS to E or F. Based on this analogy, Alternative 2 would have moderate adverse impacts on the on-installation study area intersections. Analysis was conducted with the existing lane geometry to establish the baseline condition and assume the infrastructure improvements, which would be required to reduce the impacts of the influx of trips generated by new development.

**Table 4.2-10** is presented to summarize the intersection LOS comparison between No Action Alternative 2 and implementation of Alternative 2.

**Figure 4.2-20** shows the AM/PM peak hour LOS results with the existing lane geometry for Alternative 2 during year 2029 at all the study area intersections. **Figure 4.2-21** shows the respective Year 2029 Alternative 2 LOS results with the recommended lane geometry.

## 4.2.5 Recommendations

As a result of the Proposed Action (NSA expansion), BRAC action (DISA, DMA, and Adjudication), EUL action, other onsite developments such as 902nd Military Intelligence Group Administrative and Operations Center, DINFOS expansion, and other offsite regional growth, substantial personnel increase is proposed in and around the Fort Meade region. Transportation constraints and deficiencies were identified in the existing conditions analysis. The results of the study indicate that the influx of new traffic would significantly affect the existing roadway capacity in the vicinity of Fort Meade. The study area was limited to the perimeter and internal roadways of Fort Meade. A regionwide traffic study is suggested to analyze the impacts of future growth in and around Fort Meade on the regional roadway network in Howard County, Anne Arundel County, and Prince George's County. On June 3, 2010, NSA and other agencies at Fort Meade signed a Maryland Department of Transportation Interagency Memorandum of Understanding (MOU) to (1) support Transportation Demand Management program practices in support of growth at Fort Meade, (2) work to establish services from and to regional transit facilities, (3) develop commuting options, (4) support the Fort Meade TMP, and (5) participate in the Fort Meade Regional Ridesharing Coordination Center Advisory Board (MDOT 2010). Such a regionwide traffic study could be accomplished through this MOU. Transportation improvements are recommended in this section for the purpose of identifying the magnitude of the improvements at failing intersections, as a result of the Proposed Action, that would reduce the motorist delay and thus maintain satisfactory operational condition.

**Table 4.2-10. Comparison of Intersection LOS (Year 2029)**

| Number | Intersection | LOS* | | | |
|---|---|---|---|---|---|
| | | No Action Alternative 2 | | Alternative 2 | |
| | | AM | PM | AM | PM |
| 1 | MD 175 and Rockenbach Road/Ridge Road | F | F | F | F |
| 2 | MD 175 and Disney Road/26th Street | F | F | F | F |
| 3 | MD 175 and MD 174 (Reece Road) | F | F | F | F |
| 4 | MD 175 and Mapes Road | F | F | F | F |
| 5 | MD 175 and Llewellyn Avenue | F | F | F | F |
| 6 | MD 174 and Jacobs Road | F | F | F | F |
| 7 | Mapes Road and MD 32 Eastbound Ramps | F | E | F | E |
| 8 | Mapes Road and MD 32 Westbound Ramps | F | E | F | F |
| 9 | Llewellyn Avenue and Ernie Pyle Street | D | D | D | D |
| 10 | Mapes Road and Ernie Pyle Street | F | F | F | F |
| 11 | Mapes Road and MacArthur Road | B | B | D | B |
| 12 | Mapes Road and Cooper Avenue | C | E | E | F |
| 13 | Mapes Road and Taylor Avenue | B | C | B | D |
| 14 | Mapes Road and O'Brien Road | B | C | B | E |
| 15 | O'Brien Road and Samford Road | C | B | F | D |
| 16 | O'Brien Road and Rockenbach Road | B | B | F | F |
| 17 | Cooper Avenue and Rockenbach Road | B | B | C | B |
| 18 | Reece Road and MacArthur Road | C | C | C | D |
| 19 | MD 32 Eastbound on-ramp, merging | C | F | C | F |
| | MD 32 Westbound off-ramp, diverging | F | F | F | F |
| 20 | MD 32 Westbound on-ramp, merging | F | F | F | F |
| | MD 32 Eastbound off-ramp, diverging | F | D | F | D |
| 21 | MD 295 Southbound on-ramp, merging | F | F | F | F |
| | MD 295 Northbound off-ramp, diverging | C | F | C | F |
| 22 | MD 295 Northbound on-ramp, merging | F | F | F | F |
| | MD 295 Southbound off-ramp, diverging | D | F | E | F |
| 23 | MD 32 Westbound, weaving | F | F | F | F |
| | MD 32 Eastbound, weaving | F | F | F | F |
| | MD 295 Southbound, weaving | E | E | E | E |
| | MD 295 North, weaving | F | F | F | F |

Note: * For signalized intersections, overall intersection LOS is shown.

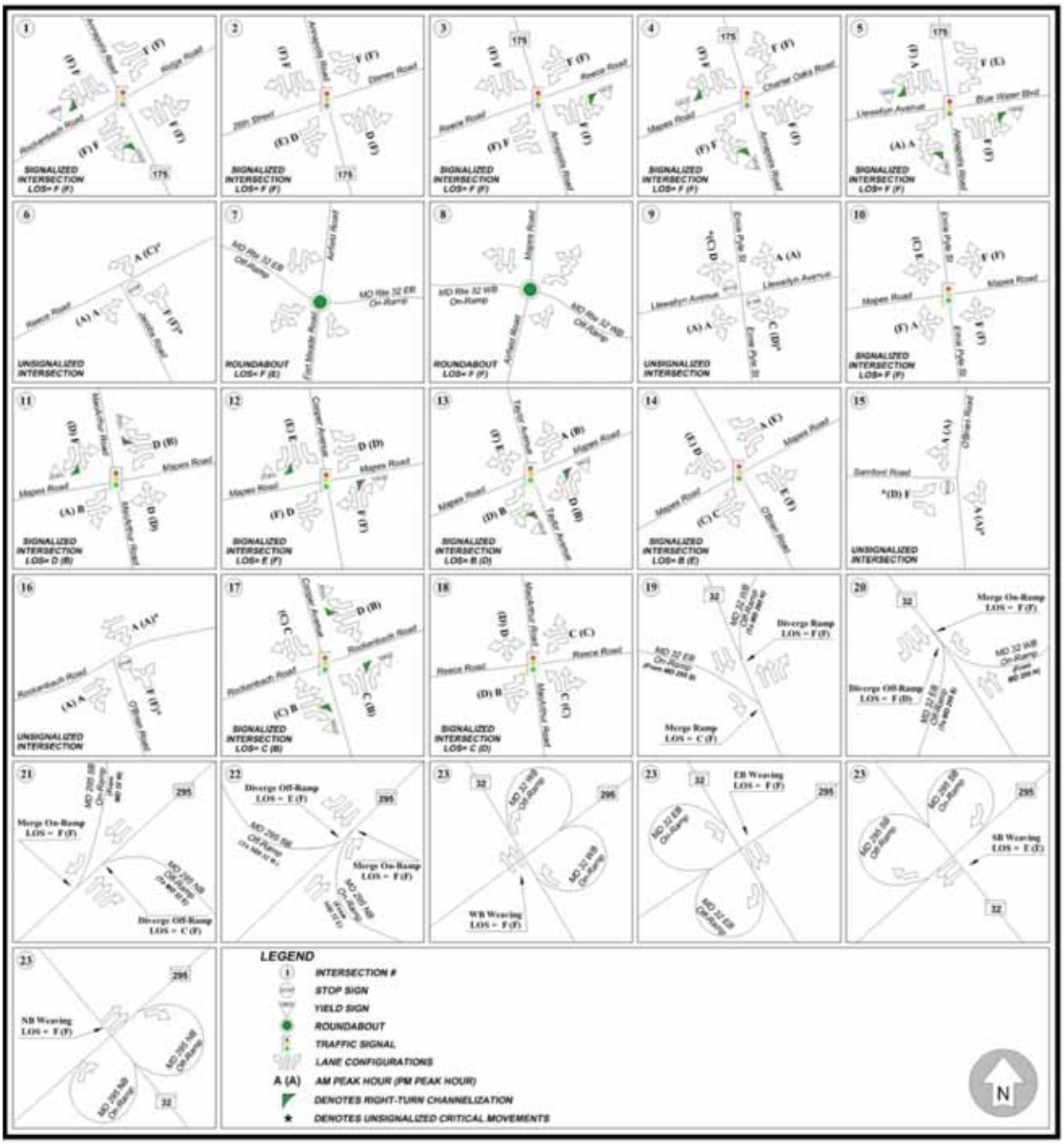



**Figure 4.2-20. Alternative 2 (Phases I, II, and III): Lane Geometry and Level of Service (Year 2029)**

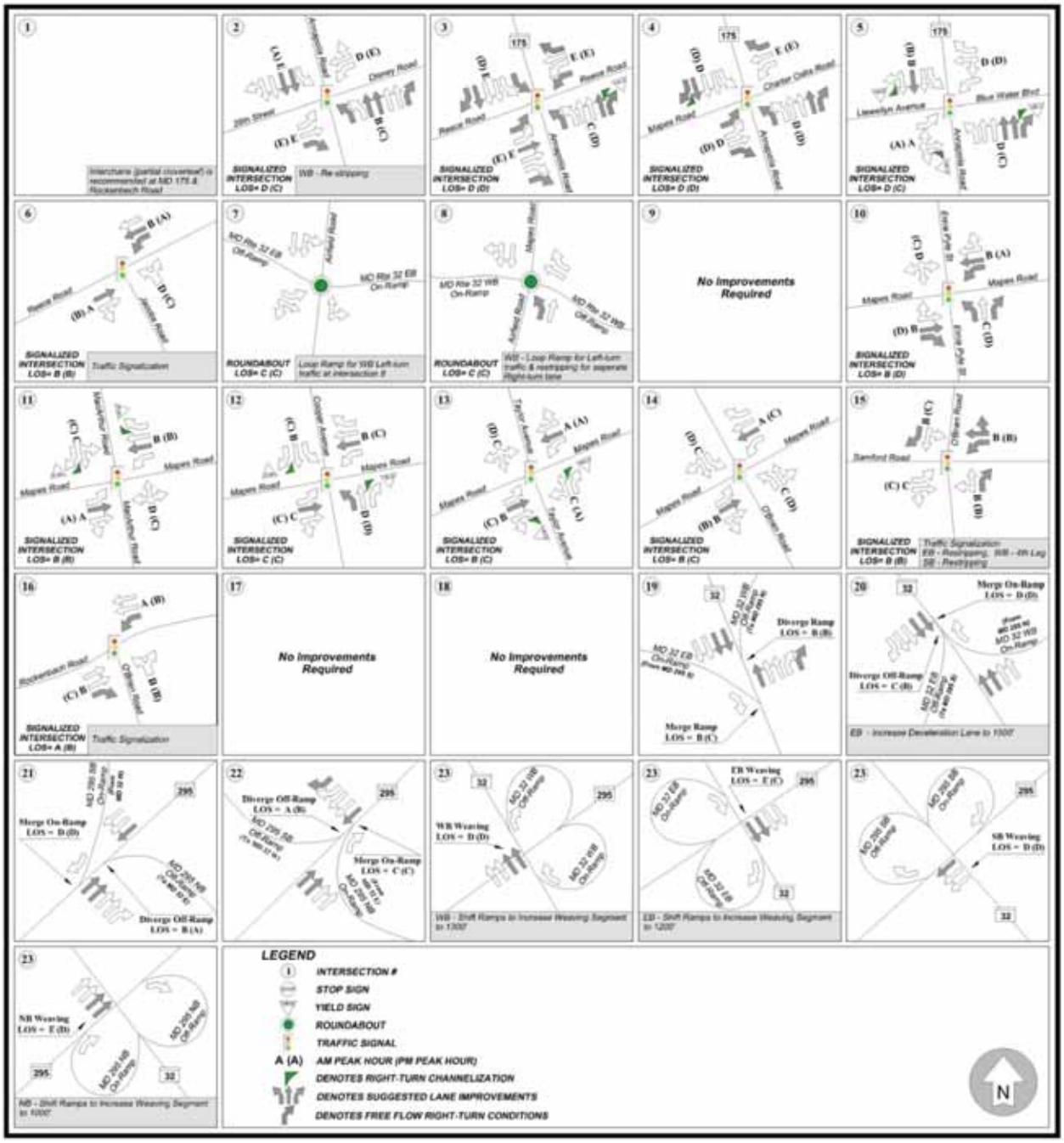



**Figure 4.2-21. Alternative 2 (Phases I, II, and III): Lane Geometry and Level of Service with Recommended Improvements (Year 2029)**

### 4.2.5.1 Roadway Improvements

The improvements are identified to mitigate the adverse impacts of the foregoing alternatives. The improvements presented under the heading of "Potential Improvements" are the improvements for on-installation intersections. They are identified by the Army and potentially could be funded by the U.S. Army to mitigate the impacts of BRAC action by Proposed Action Year 2015. However, the funding details are not finalized yet. Additionally, another set of improvements are presented under the heading of "Recommended Improvements" for the Proposed Action, Alternative 1, and Alternative 2. These improvements are suggested based upon the transportation infrastructure deficiencies identified in the analysis results. In addition to roadway improvements, existing NSA ACPs would be required to be improved and potentially relocated to handle the increased traffic demand. The existing gates could be modified to be set farther back into the installation or widened, where possible, to accommodate potentially longer traffic queues. The roadway improvements are as discussed below.

#### Potential Improvements (Proposed Action – Year 2015)

The U.S. Army has identified these improvements for the on-installation intersections to mitigate the traffic impacts caused by the trips generated by BRAC and other ongoing activities on Fort Meade.

***Ernie Pyle Street and Mapes Road:***

- Two additional left-turn lanes and conversion of the shared left/through/right lane to shared through/right lane along Ernie Pyle Street northbound direction.
- One additional left-turn lane and conversion of the shared left/through/right lane to shared through/right lane along Ernie Pyle Street southbound direction.
- One additional through lane, one additional left-turn lane and converting shared left/through/right lane to shared through/right lane along Mapes Road eastbound direction.
- One additional left-turn lane, one additional through lane, and conversion of the shared left/through/right lane to shared through/right lane along Mapes Road westbound direction.

***MacArthur Road and Mapes Road:***

- One additional through lane along Mapes Road eastbound direction.
- One additional through lane along Mapes Road westbound direction.

***Cooper Avenue and Mapes Road:***

- One additional left-turn lane and conversion of the shared left/through lane to through lane along Cooper Avenue northbound direction.
- One free-flow right-turn lane along Cooper Avenue southbound direction.
- One additional left-turn lane, one additional through lane along Mapes Road eastbound direction.
- Converting right-turn lane to shared through/right lane along Mapes Road westbound direction.

***Taylor Avenue and Mapes Road:***

- One additional through lane along Mapes Road eastbound direction.
- One additional through lane along Mapes Road westbound direction.

***O'Brien Road and Mapes Road:***

- One additional through lane along Mapes Road eastbound direction.
- One additional through lane along Mapes Road westbound direction.
- One additional right-turn lane and conversion of the through/right shared lane to through lane along O'Brien Road southbound direction.

***O'Brien Road and Samford Road:***

- One additional through lane along O'Brien Road northbound direction.
- One additional through lane along O'Brien Road southbound direction.

***O'Brien Road and Rockenbach Road:***

- Traffic signalization.
- One additional left-turn lane and conversion of the shared left/through lane to through lane along Rockenbach Road westbound direction.

***Cooper Avenue and Rockenbach Road:***

- One additional left-turn lane and conversion of the shared left/through lane to through lane along Rockenbach Road eastbound direction.
- One additional left-turn lane and conversion of the shared left/through lane to through lane along Rockenbach Road westbound direction.

***Reece Road and MacArthur Road:***

- One additional through lane along Reece Road eastbound direction.
- One additional through lane along Reece Road westbound direction.

### Recommended Improvements (Proposed Action – Year 2015)

Based on analysis results, the following improvements are recommended to maintain an adequate level of service at the study area intersections. The mitigation measures might not completely eliminate the projected capacity deficiencies to achieve conditions that satisfy the capacity threshold set forth by Anne Arundel County and the U.S. Army. However, they would improve the traffic conditions greatly by relieving the congestion and reducing the delay and back of queue. The recommended improvements are as follows:

***MD 175 and Rockenbach Road/Ridge Road:***

- One each additional left-turn lane, through lane, and right-turn lane and conversion of the shared through/right lane to through lane along MD 175 northbound direction.
- One each additional left-turn lane, through lane, and right-turn lane and conversion of the shared through/right lane to through lane along MD 175 southbound direction.

- One each additional left-turn lane and right-turn lane and conversion of the shared through/right lane to through lane along Rockenbach Road eastbound direction.
- One additional left-turn lane and through lane along Ridge Road westbound direction.

***MD 175 and 26th Street/Disney Road:***

- One additional through lane along MD 175 northbound direction.
- One additional through lane along MD 175 southbound direction.
- One additional right-turn lane and conversion of the shared through/right to through lane along 26th Street eastbound direction.
- Conversion of the shared left/through lane to left-turn only and converting right-turn lane to shared through/right lane along Disney Road westbound direction.

***MD 175 and Reece Road (MD 174):***

- One each additional through lane and right-turn lane and conversion of the shared through/right lane to through lane along MD 175 northbound direction.
- One each additional left-turn lane, through lane, and right-turn lane and conversion of the shared through/right lane to through lane along MD 175 southbound direction.
- One additional left-turn lane along Reece Road eastbound direction.
- One additional left-turn lane and two additional right-turn lanes and conversion of the shared through/right lane to through lane along Reece Road westbound direction.

***MD 175 and Mapes Road/Charter Oaks Road:***

- One each additional left-turn lane and right-turn lane and conversion of the shared through/right lane to through lane along MD 175 northbound direction.
- One each additional through lane and free-flow right-turn lane and conversion of the shared through/right lane to through lane along MD 175 southbound direction.
- One each additional left-turn lane, and right-turn lane and conversion of the shared left/through/right lane to shared through/right lane along Mapes Road eastbound direction.
- One additional right-turn lane and conversion of the shared left/through/right lane to through lane along Charter Oaks Road westbound direction.

***MD 175 and Llewellyn Avenue/Blue Water Boulevard:***

- One additional right-turn lane and conversion of the shared through/right lane to through lane along MD 175 northbound direction.

***MD 32 Westbound Ramps and Mapes Road:***

- A loop ramp for traffic coming from westbound MD 32 to westbound MD 198.
- Conversion of the shared through/right lane to right-turn lane along MD 32 westbound direction.

***MD 174 (Reece Road) and Jacobs Road:***

- Traffic signalization, one additional left-turn lane, and conversion of the shared left/through to through lane along Jacobs Road northbound direction.

***Ernie Pyle Street and Mapes Road:***

- One additional left-turn lane, one additional right-turn lane, and conversion of the shared left/through/right lane to through lane along Ernie Pyle Street northbound direction.
- One additional through lane, one additional right-turn lane, and conversion of the shared left/through/right lane to shared left/through lane along Mapes Road eastbound direction.
- One additional left-turn lane, one additional through lane, and conversion of the shared left/through/right lane to shared through/right lane along Mapes Road westbound direction.

***MacArthur Road and Mapes Road:***

- One additional through lane along Mapes Road eastbound direction.
- One additional through lane along Mapes Road westbound direction.

***Cooper Avenue and Mapes Road:***

- One additional left-turn lane and converting shared left/through lane to through lane along Cooper Avenue northbound direction.
- One additional through lane along Mapes Road eastbound direction.
- One additional through lane along Mapes Road westbound direction.

***Taylor Avenue and Mapes Road:***

- One additional through lane along Mapes Road eastbound direction.
- One additional through lane along Mapes Road westbound direction.

***O'Brien Road and Mapes Road:***

- One additional through lane along Mapes Road eastbound direction.
- One additional through lane along Mapes Road westbound direction.

***O'Brien Road and Samford Road:***

- Traffic signalization, if warranted by Manual on Uniform Traffic Control Devices (MUTCD).

***MD 295 and MD 32 Interchange:***

- One additional lane along MD 295 northbound and southbound direction, one additional lane along MD 32 eastbound and westbound direction, one additional lane on MD 32 westbound off-ramp to MD 295 northbound, and lengthening of acceleration/deceleration ramps lanes.

### Recommended Improvements (Alternative 1 – Year 2020)

The following improvements, in addition to the improvements recommended for Proposed Action – Year 2015, would be required for Alternative 1 in Year 2020.

***MD 175 and Rockenbach Road/Ridge Road:***

- Full/partial cloverleaf interchange.

***MD 175 and 26th Street/Disney Road:***

- One additional left-turn lane and right-turn lane and conversion of the shared through/right lane to through lane along MD 175 northbound direction.
- One additional through lane along MD 175 southbound direction.

***MD 175 and Reece Road (MD 174):***

- Make right-turn lane as free flow along MD 175 northbound direction.
- One additional through lane along Reece Road eastbound direction.
- Make right-turn lane as free flow along Reece Road westbound direction.

***MD 175 and Mapes Road/Charter Oaks Road:***

- One additional through lane along MD 175 northbound direction.
- Make right-turn lane as free flow and convert shared through/right lane to through lane along Mapes Road eastbound direction.

***MD 175 and Llewellyn Avenue/Blue Water Boulevard:***

- One additional through lane along MD 175 northbound direction.
- One additional through lane along MD 175 southbound direction.

***Rockenbach Road and O'Brien Road:***

- Traffic Signalization.

***MD 174 (Reece Road) and Jacobs Road:***

- One additional through lane along Reece Road eastbound direction.
- One additional through lane along Reece Road westbound direction.

***MD 295 and MD 32 Interchange:***

- One additional lane along MD 295 northbound direction (four-lanes in northbound), one additional lane on MD 295 southbound off-ramp to MD 32 westbound, one additional lane along MD 32 eastbound and westbound direction (four-lanes in each direction), and lengthening of acceleration/deceleration ramps lanes.

### Recommended Improvements (Alternative 2 – Year 2029)

The following improvements, in addition to the improvements recommended for Alternative 1 – Year 2020, would be required for Alternative 2 in Year 2029.

***MD 175 and 26th Street/Disney Road:***

- One additional through lane along MD 175 northbound direction.

***MD 175 and Reece Road (MD 174):***

- One additional left-turn lane along MD 175 northbound direction.
- One additional right-turn along Reece Road eastbound direction.

***MD 175 and Llewellyn Avenue/Blue Water Boulevard:***

- One additional through lane along MD 175 northbound direction.

***MD 32 Westbound Ramps and Mapes Road:***

- One additional left-turn lane and conversion of the shared left/through lane to through lane along MD 198 (Airfield Road) northbound direction.

***O'Brien Road and Samford Road:***

- One additional right-turn lane along O'Brien Road northbound direction.
- One additional right-turn lane along O'Brien Road southbound direction and conversion of the shared through/right lane to shared left/through lane.
- Conversion of the right-turn lane to shared through/right lane along Samford Road eastbound direction.
- Add intersection leg with one left-turn lane and shared through/right lane in westbound direction.

The study results indicated that the existing roadway network would be significantly affected by NSA, BRAC, and other Fort Meade onsite and offsite activities. The analysis of No Action Alternatives suggested major adverse impacts of BRAC action and other Fort Meade onsite activities and other regional growth on regional highways including MD 295, MD 175, and MD 32. Existing roadway capacity would be inadequate and substantial roadway improvements would be required with or without the proposed NSA Alternatives.

## 4.2.5.2 Transit Improvements

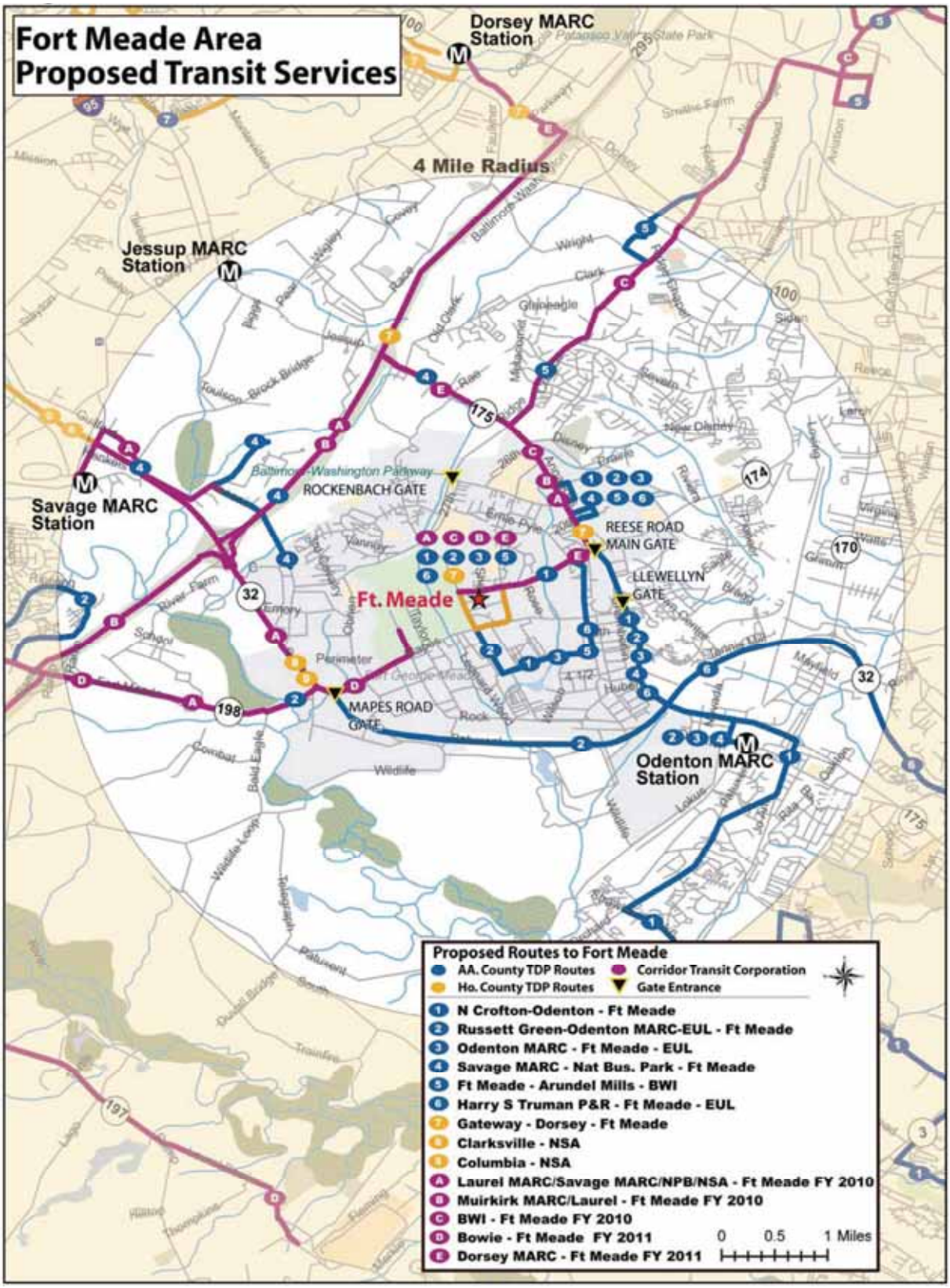
The foregoing analysis and discussion have identified several transportation deficiencies and constraints. The completion of BRAC, the Proposed Action, and other onsite and offsite development activities would create approximately 25,000 new jobs in the Fort Meade region. This job growth would result in more than 60,000 daily trips on to the study are roadway network. Currently, Fort Meade lacks in commuter choices as discussed in **Section 3.2.2.2**. The shuttle bus service is provided from Odenton MARC Station and Savage MARC Station to Fort Meade. However, the ridership is limited due to the limited service in the morning and evening peak hours and a lack of service for the internal circulation. Roadway improvements alone would not be sufficient to reduce the congestion and delay in the region. This

section discusses the planned transit improvements, which would address the imminent influx of trips due to the BRAC, NSA, and other related activities.

Numerous proposals have been identified by local and state agencies to address the on-installation circulation, connectivity to MARC stations, local connectivity, and regional connectivity. The planned improvements are as follows:

- As shown in **Figure 4.2-22**, bus services have been proposed by local agencies from MARC stations and other major locations in Howard County and Anne Arundel County to Fort Meade. These routes will serve the NSA buildings and other major facilities located on Fort Meade.
- Per the MARC Growth & Investment Plan, MTA has proposed to enhance the train services on the Penn Line and Camden Line serving the Odenton Station and Savage Station, respectively. As part of the plan, additional peak hours and nonpeak hour services will be provided and headways will be improved to 20 minutes.
- MTA has proposed commuter bus service connecting Fort Meade to the region. This planned service includes the following:
    - *Gaithersburg to Fort Meade:* This route would originate from the Metropolitan Grove MARC Station in Montgomery County along the Intercounty Connector roadway with connections to the Shady Grove Metro Station and other park and ride lots. Six daily trips would be provided.
    - *Annapolis to Fort Meade:* This route would operate from the Harry S. Truman Park and Ride Lot in Anne Arundel County to Fort Meade. Six daily trips would be provided.
    - *Greenbelt to Fort Meade:* This route would operate from the Greenbelt Metro Station in Prince George's County to Fort Meade. Six daily trips would be provided.
- Transit Oriented Development (TOD) at the Odenton MARC Station is planned by MTA in conjunction with Anne Arundel County. The Odenton Station is located along the Penn Line connecting Baltimore and Washington, DC. The station currently handles 2,100 trips per day and it has approximately 2,000 surface parking spaces. The purpose of this project is to develop a high-density, pedestrian-friendly development. It will consist of approximately 800 condominium/townhouse units and a mix of retail uses including restaurants, bank, coffee shops, cleaners, and other retail uses. As part of the development, two parking garages will be constructed and total parking spaces will increase from 2,000 to almost 5,000. Considering the infrastructure constraints and ongoing national economic situation, the development is not anticipated to be completed before 2020. The TOD at Odenton MARC Station, through improved regional transit service, will support the ability of regional transit service providers to enhance services to Fort Meade and major regional destinations. The development would also facilitate in creating the transit system connectivity.

The aforementioned proposals are still in preliminary stages. The funding sources and implementation strategies have not been identified. There are also challenges associated with these proposals such as security issues at gates for transit vehicles entering Fort Meade and parking availability at the park and ride lots. In addition, the Transportation Management Plan (TMP) being developed for Fort Meade would be implemented and maintained to influence the travel choice of Fort Meade commuters towards discouraging the single-occupant vehicle travel. This can be achieved by employing telecommuting and flexible employee timing programs to reduce the peak hour trips, developing ridesharing programs to encourage carpool and vanpool, providing transit subsidies to the employees, extending the Guaranteed Ride Home program to Fort Meade employees, and increasing the awareness about various TMP strategies among Fort Meade commuters.




Source: MTA 2009

**Figure 4.2-22. Proposed Fort Meade Area Transit Services**

# 4.3 Noise

## 4.3.1 Evaluation Criteria

An analysis of the potential effects associated with noise typically evaluates potential changes to the existing acoustical environment that would result from implementation of a proposed action. Potential changes in the acoustical environment can be beneficial (i.e., they reduce the number of sensitive receptors exposed to unacceptable noise levels or reduce the ambient sound level), negligible (i.e., the total number of sensitive receptors to unacceptable noise levels is essentially unchanged), or adverse (i.e., they result in increased sound exposure to unacceptable noise levels or ultimately increase the ambient sound level).

The main issues concerning noise effects on humans are physiological effects (e.g., hearing loss and non-auditory effects), behavioral effects (e.g., speech or sleep interference and performance effects), and subjective effects such as annoyance. This noise analysis considers potential effects on nearby noise-sensitive receptors, including residential (MFH and barracks), schools, churches, and hospitals. The major sources of noise, their contribution to the overall noise environment, and maximum sound level were estimated for comparison to local noise-control standards. The analysis considers construction and operation of the proposed facilities.

## 4.3.2 No Action Alternative

Under the No Action Alternative, the proposed campus development would not be implemented. The acoustical environment described in **Section 3.3.2** would remain unchanged. No effects on the noise environment would be expected.

## 4.3.3 Proposed Action (Phase I)

Under the Proposed Action, an increase in noise levels could originate from construction equipment, additional vehicle traffic, and the use of emergency generators and other operational equipment (i.e., electrical substation, heating and cooling systems, and equipment for operation of the facility). The primary sources of noise under the Proposed Action would be construction and pile-driving noise and the operation of emergency power generators on those occasions when they are needed, once the facilities are completed. Effects due to noise would vary with location and the nearest noise-sensitive receptor. An overview of construction and operational noise for Phase I is presented below.

### Construction Effects

***Construction Noise.*** Short-term, minor, adverse impacts on the ambient acoustical environment would be expected as a result of construction activities under the Proposed Action. Noise from construction activities varies depending on the type of construction being done, the area that the project would occur in, and the distance from the source. Construction activities under Phase I include grading, paving, and building construction. Pile-driving noise was evaluated separately due to the intensity of the sound generated (91 to 105 dBA) and the short duration the equipment would be used. Noise associated with pile-driving activities is an impact-type noise. Impact-type noises are those of high intensity and a very short duration, and can be particularly intrusive.

To predict how these activities would affect populations, noise from the anticipated construction was estimated. For example, as shown in **Table 3.3-4**, building construction usually involves several pieces of equipment (e.g., saws and haul trucks) that can be used simultaneously. Cumulative noise from the

construction equipment during the busiest day for the Proposed Action was estimated to determine the total effect of noise from building activities at a given distance. Since construction of multiple facilities, structures, and roadways would take place throughout Phase I simultaneously, construction and pile-driving noise levels were estimated from the property line to a specific noise-sensitive receptor. Noise levels were estimated using logarithmic cumulative decibel equations for construction (which includes grading, excavation, and building construction) and pile-driving activities. Examples of expected construction and pile-driving noise for Phase I are shown in **Table 4.3-1**.

**Table 4.3-1. Predicted Construction Noise Levels at Noise-sensitive Receptors**

| Phase I Property Line | Noise-Sensitive Receptor | | | Estimated Noise from Construction (dBA) | Estimated Noise from Pile Driving (dBA) |
|---|---|---|---|---|---|
| | Distance in feet (meters) | Direction from Property Line | Type | | |
| Northern | 350 (107) | North | Residential (MFH) | 72 | 81 |
| | 750 (223) | North | Church (Argonne Hills Chapel Center) | 65 | 75 |
| | 1,110 (338) | Northwest | School (Pershing Hill Elementary) | 62 | 71 |
| Western | 3,100 (945) | West | Government (NSA Campus off Canine Road) | 53 | 62 |
| | 4,760 (1,451) | West | Installation Boundary | 49 | 58 |
| Eastern | 800 (244) | East | Residential (MFH) | 65 | 58 |
| | 1,850 (564) | North | School (MacArthur Middle) | 57 | 67 |
| | 2,640 (805) | East | School (Manor View Elementary) | 54 | 64 |
| Southern | 7,175 (2,187) | South | Recreational (Patuxent Research Refuge) | 46 | 59 |

Since multiple items of equipment would be operating concurrently, noise levels would be relatively high during daytime periods at locations within several hundred feet of active construction sites. As shown in **Table 4.3-1**, the zone of relatively high construction noise levels would typically extend to distances of 300 to 800 feet from the site of major equipment operations. Locations more than 1,000 feet from construction sites would seldom experience substantial levels (greater than 62 dBA) of construction noise. A noise-sensitive receptor would have to be within approximately 50 feet of building construction activity or 125 feet from pile driving to experience noise louder than the maximum allowed in the State of Maryland noise regulation for daytime activities (90 dBA). As shown in **Table 4.3-1**, the closest noise-sensitive receptor to Phase I is MFH approximately 350 feet north of construction. A noise-sensitive receptor would have to be within approximately 2,500 feet (approximately 0.5 miles) of the site to experience construction noise louder than the maximum allowed in the State of Maryland noise regulation for nighttime activities (55 dBA). As shown in **Table 4.3-1**, several residences and facilities are within 2,500 feet of construction. Therefore, some of the on-installation land uses, such as MFH,

could potentially be exposed to relatively high levels of construction noise. Specific construction times would be provided under the direction of the Fort Meade Garrison Command and could be restricted due to proximity of residential areas.

Implementation of the Proposed Action would have short-term effects on the ambient acoustical environment within the installation boundary from the use of heavy equipment during construction activities. Noise generation would last only for the duration of construction activities. It is proposed that construction of Phase I would occur from 6 a.m. to 6 p.m., Monday to Friday, and the occasional weekend. Construction and pile-driving noise would be louder than the maximum allowed for nighttime activities (55 dBA). Therefore, restrictions on construction would likely be necessary between the hours of 10:00 p.m. and 7:00 a.m. Fort Meade would seek an exception from the State of Maryland noise regulation before construction begins due to the need to start construction at 6:00 a.m. If an exception is not obtained, construction activities would adhere to the time and noise level restrictions stated in the noise regulation as discussed in **Section 3.3.1**. Pile-driving activities would only be conducted from 8 a.m. to 5 p.m. on weekdays per the State of Maryland noise regulation, as pile-driving noise would exceed the regulation during any other times due to the considerable distance required for pile-driving noise to attenuate to levels below 55 dBA (approximately 7,200 feet [1.4 miles]). Specific construction times would be provided under the direction of the Fort Meade Garrison Command and could be restricted due to proximity of residential areas.

No adverse effects on noise-sensitive receptors outside of the installation boundary would be expected from construction noise, as demonstrated in the construction noise level calculations provided in **Appendix D**, the average construction noise level (approximately 49.1 dBA) would be lower than the estimated ambient noise level of approximately 60 to 65 dBA [see **Table 3.3-3**]). Estimated construction noise levels at the Patuxent Research Refuge boundary would be expected to be similar to the ambient noise level (as described in **Section 3.3.2**) and would not exceed the state noise regulation; therefore, no adverse effects on the refuge from construction noise would be expected.

No adverse effect on noise-sensitive receptors outside of the installation boundary would be expected from pile-driving noise, as demonstrated in **Appendix D**, the average pile-driving noise level (approximately 63.5 dBA) would be similar to the ambient noise level and would not exceed the lowest State of Maryland noise regulation for daytime activities (65 dBA). The estimated pile-driving noise level of approximately 59 dBA at the Patuxent Research Refuge boundary (given in **Table 4.3-1**) would also not exceed the state noise regulation. As described in **Section 3.3.2**, the northern portion of the refuge is adjacent to several noise-generating activities (i.e., Tipton Airport, a small arms range, and MD 32). Therefore, existing ambient noise levels in this area would be expected to be slightly higher than is typical for a refuge. Therefore, it is expected that pile-driving noise would only slightly exceed the existing ambient noise level in the northern portion of the refuge. Pile-driving activities would only be conducted from 8 a.m. to 5 p.m. on weekdays or at the direction of Fort Meade Garrison Command; therefore, negligible adverse effects on the refuge would be expected from pile-driving activities. Noise effects on biological resources are discussed in **Section 4.7**.

***Construction Noise Mitigation Measures.*** Daytime construction and pile-driving noise levels for the Proposed Action (Phase I) would not exceed the maximum allowed under the State of Maryland noise regulation (65 dBA) in off-installation areas. Specific construction times would be provided under the direction of the Fort Meade Garrison Command and could be restricted due to proximity of residential areas. Therefore, it is unlikely that nighttime construction would be authorized because it would exceed the maximum allowed under the state noise regulation for nighttime activities (55 dBA). Construction noise effects on residential areas under the Proposed Action could be mitigated through the following actions (City of New York 2007):

- Performing maintenance on the equipment to potentially lessen their noise levels
- Replacing older equipment with newer, quieter equipment
- Using the best available noise-control techniques (i.e., improved mufflers, equipment redesign, intake silencers, ducts, and engine enclosures and noise-attenuating shields or shrouds on all equipment and trucks)
- Using exhaust mufflers on compressed air exhaust
- Placing stationary construction equipment as far from sensitive receptors as possible
- Using acoustical shielding on stationary equipment when feasible.

Pile-driving noise for the Proposed Action (Phase I) could be mitigated through the following actions (City of New York 2007):

- Use noise barriers around the entire construction site, such as plywood barriers
- Use "quiet" pile-driving technology based on soils and structural requirements, as feasible
- Use noise-control blankets on structures to reduce noise emissions from site
- Implement noise-reduction measures under the supervision of an acoustical consultant
- Evaluate effectiveness of noise attenuation by taking noise measurements during construction
- Provide surrounding residents and personnel (minimum 300-foot radius) at least 30 days written notice of start date and duration of pile driving.

***Construction Vehicular Noise.*** Short-term, negligible, adverse effects on the ambient noise environment would be expected as a result of the increase in construction vehicle traffic under the Proposed Action. Construction traffic would exit from MD 295 or MD 32 onto Canine Road, then turn onto Rockenbach Road to access Site M. Canine Road and Rockenbach Road are primary roads within the installation (Fort Meade 2005b), and are therefore already heavily used by Fort Meade personnel. In addition, temporary construction traffic would be distributed throughout the day (peaking at the beginning and end of the normal working day) and would be minimal compared to noise produced on roads outside the installation boundary including MD 32 and MD 295. The temporary construction traffic would be a fraction of the existing traffic, and would likely cause negligible increases in noise levels on noise-sensitive populations adjacent to the roads outside the installation boundary.

### Operational Effects

***Electrical Generation Alternative: Stationary Internal Combustion Engine (Generator) Noise.*** Noise from the emergency generators would dominate over the noise levels produced by other equipment associated with the operation of the Proposed Action (Phase I). Generator operation would only occur during emergency situations; however, the generators would also be tested on a regular basis (maximum of 100 hours per year) to ensure they are in working order. This facility is in the preliminary design stage; therefore, a complete equipment list and associated manufacturers specifications are not finalized. Much of the noise producing equipment associated with the generators would be contained inside the facility superstructure. For the purpose of this EIS, it was assumed that the facility superstructure would provide a 25 dBA noise reduction, which could be accomplished via a combination of multiple noise-reducing methods (e.g., each generator being enclosed in a separate enclosure within the facility superstructure, the use of noise-reducing materials on surfaces, and the superstructure being constructed of brick). Generator exhausts would be open to the exterior of the facility and would be equipped with

industrial-grade silencers. The site development plan for Phase I is in the preliminary design stage; therefore, the location of the generator facility within Site M-1 is not finalized. For the purposes of this EIS, the proposed location of the generator facility within Site M-1 from the 2009 *NSA Real Property Master Plan, Fort Meade, Maryland* (URS/LAD 2009) was used to determine the distance from the facility to a noise-sensitive receptor.

Noise levels generated by operation of the proposed generators under the Proposed Action (Phase I) were estimated for 100 percent capacity (24 2.5-MW generators running concurrently). Sound level data for the proposed 2.5-MW generators were obtained from vendors, and noise levels were calculated using empirical formulas based on process and mechanical equipment data. **Table 4.3-2** outlines noise levels that would be generated by operation of the proposed generators under the Proposed Action for the period of time emergency power is required. Detailed operating noise calculations are provided in **Appendix D**. Any emergency operations are exempt from the State of Maryland's noise regulation; however, the levels outlined in the regulation were carried forward to assess the noise effects. The generators would be operated for a maximum of 100 hours per year for testing and maintenance purposes. As shown in **Table 4.3-2**, operating noise levels at locations within the installation boundary would exceed state noise limits for the period of time that an emergency electrical power supply might be needed. The long-term intermittent noise effects would be negligible to minor depending on the distance from the generator facility to a noise-sensitive receptor.

**Table 4.3-2. Estimated Noise Levels for Noise-Sensitive Receptors Due to Generator Operations**

| Noise-Sensitive Receptor | | | Sound Level (dBA) | Exceeds State Noise Limits for Nighttime (> 55 dBA) |
|---|---|---|---|---|
| Receptor | Direction from Generator Facility | Distance in feet (meters) | | |
| Residential (MFH) | North | 665 (203) | 74 | Yes |
| School (Pershing Hill Elementary) | North | 1,415 (431) | 68 | Yes |
| Residential (MFH) | East | 1,600 (488) | 67 | Yes |
| Church (Argonne Hills Chapel Center) | Northwest | 1,980 (604) | 65 | Yes |
| School (MacArthur Middle) | Northeast | 2,450 (747) | 63 | Yes |
| Installation Boundary | West | 5,860 (1,786) | 55 | No |

***Mitigation Measures for Generator Noise.*** As shown in **Table 4.3-2**, operating noise levels at locations within the installation boundary would exceed state noise limits for the period of time that an emergency electrical power supply is needed. Generator noise could be mitigated via residential sound dampening such as the tree buffers that are planned on the northern border of Site M along Rockenbach Road; however, the buffers would not be expected to provide the 12 to 19 dBA noise reduction necessary to bring the noise level at the closest receptors to the State of Maryland maximum noise level for nighttime activities (55 dBA). As shown **Table 4.3-2**, increasing the distance from the generator facility to the receptor (i.e., moving the facility more to the interior of Site M rather than its proposed location near the northern border) would not significantly reduce the noise level at receptors within the installation boundary, as a receptor would have to be 5,860 feet (1,786 meters) from the facility to experience noise levels less than 55 dBA. To adhere to the state nighttime noise limit of 55 dBA at the closest receptor (MFH), the generator facility superstructure would have to provide a 35 dBA noise reduction, and the

generator exhaust would have to be equipped with critical-grade silencers that would provide a 30 dBA noise reduction. A noise reduction of this scale would require a significant financial investment.

***Electrical Generation Alternative: Natural Gas-Fired Combustion Turbine Noise.*** An alternative to the generators discussed above is a natural gas-fired combustion turbine. It was assumed that if the turbine alternative was chosen for implementation, the turbine facility would be constructed in the same location as the generator facility discussed above; therefore, the distance from the turbine facility to adjacent noise-sensitive receptors would be the same as shown in **Table 4.3-2**.

A single 85-MW turbine was analyzed, as this would be the unit to cover the 50-MW range. For the purposes of this EIS, it was assumed that the facility superstructure would provide a 10 dBA noise reduction; the actual amount of attenuation might be greater depending upon the actual facility design. Noise levels were calculated using empirical formulas based on process and mechanical equipment data. **Table 4.3-3** outlines noise levels that would be generated by operation of the proposed turbine at Phase I for the period of time emergency power generation is required. Detailed operating noise calculations are provided in **Appendix D**. Any emergency operations are exempt from the State of Maryland's noise regulation. However, the levels outlined in the regulation were carried forward to assess the noise effects and provide the analyses for this EIS. The turbine would be operated for a maximum of 100 hours per year for testing and maintenance purposes.

**Table 4.3-3. Estimated Long-term Noise Levels Due to Turbine Operations**

| Noise-Sensitive Receptor | | | Sound Level (dBA) | Exceeds State Noise Limits for Nighttime (> 55 dBA) |
|---|---|---|---|---|
| Distance in feet (meters) | Direction from Turbine Facility | Type | | |
| 665 (203) | North | Residential (MFH) | 42 | No |
| 1,415 (431) | North | School (Pershing Hill Elementary) | 36 | No |
| 1,600 (488) | East | Residential (MFH) | 35 | No |
| 1,980 (604) | Northwest | Church (Argonne Hills Chapel Center) | 33 | No |
| 2,450 (747) | Northeast | School (MacArthur Middle) | 31 | No |
| 5,860 (1,786) | West | Installation Boundary | 23 | No |

As shown in **Table 4.3-3**, operation of natural gas-fired combustion turbines would be 32 dBA quieter than operation of diesel generators. Operating noise levels would not exceed state noise limits for the period of time that an emergency electrical power supply is needed. The noise level would be lower than the ambient noise level (see **Section 3.3.2**); therefore, a negligible long-term effect on the ambient acoustical environment from combustion turbine operation would be expected.

***Other Operational Equipment Noise.*** As previously discussed, noise from the emergency diesel generators would dominate over the noise levels produced by other equipment associated with the operation of Phase I. Other noise-producing equipment would include the electrical substation, heating and cooling systems, and operation of the facility. The electrical substation would be outdoors, and the heating and cooling systems and equipment for operation of the facility would be enclosed.

The electrical substation would operate full time and would provide the 50 MW of electricity for Phase I. The site development plan for Phase I is in the preliminary design stage; therefore, the location of the substation within Site M-1 has not been finalized. The proposed location of the substation from the 2009 NSA Master Plan is the same as the generator building (URS/LAD 2009). At 50 feet, the noise level of a 100-MW electrical substation is approximately 52 dBA; therefore, this is a conservative overestimate for the noise of the substation proposed for Phase I (BHP & BEPC 2007). Electrical transformers at substations emit a sound that has a tonal component to it; the tone is a harmonic of 60 Hz and would be audible as a distinct hum at 50 feet. By virtue of its nature, this tonal noise might be perceived as annoying. However, transformer noise is unlikely to approach noise impact thresholds at noise-sensitive receivers in the project area; therefore, a negligible adverse effect on the ambient noise environment would be expected.

No adverse effects on the ambient acoustical environment would be expected from operation of the heating and cooling systems, and other operational equipment. The heating and cooling systems and equipment for operation of the facility would be enclosed within a building; therefore, operational noise would only affect persons accessing those structures. Typically, acoustical treatments like absorbent baffles are not installed in rooms that house certain types of facility equipment because of the requirements to minimize dust. Therefore, noise levels within certain areas of the facility could approach OSHA thresholds for worker exposure. Per USEPA Report No. 550/9-82-105, *Guidelines for Noise Impact Analysis,* noise-induced hearing loss can begin to occur at high levels, and other noise-induced physiological effects and/or changes could occur. However, a firm causal link between community noise and extra-auditory disease has not been established at this time. Therefore, the USEPA proceeds on the assumption that protection against noise-induced hearing loss is sufficient to protect against severe extra-auditory health effects (USEPA 1982). If operational noise levels for Phase I are expected to exceed the OSHA standards (see **Section 3.3.1**), hearing protection equipment would be provided that would reduce sound levels to acceptable limits and a hearing conservation program would be implemented per 29 CFR Part 1910.95.

As discussed in **Section 2.1.2**, the complex would include the use of "green" technology. Operational noise could result from some of the "green" technologies chosen, such as the use of wind turbines. The facilities are currently in the preliminary design stage, and a complete list of potential technologies and associated manufacturers specifications are not finalized. Therefore, this EIS only discusses noise effects from one potential technology, the construction and operation of wind turbines.

Negligible, adverse effects on the ambient acoustical environment would be expected from wind turbine operation. Wind turbines would operate full time to provide the 50 MW of electricity for Phase I. Common commercial wind turbines are between 1.5 and 3.0 MW; therefore, approximately 17 to 33 wind turbines would be required to produce the 50 MW of power generation for the Proposed Action. A wind turbine farm of this size would normally be spread out over a very large area; therefore, it is unlikely that the turbines would be located within the Fort Meade installation boundary.

Modern wind turbines emit noise from several places. This includes the mechanical systems inside the housing on the top of the mast, the mast itself via mechanical and physical radiation, and the blades emit aerodynamic noise as they move through the air. Aerodynamic noise from the wind turbine blades is the loudest source of noise. Wind turbine noise would be expected to be similar to operation of the electrical substation, which is estimated at approximately 52 dBA at 50 feet. A 2.0-MW wind turbine has a noise level of approximately 60 dBA at 50 feet (15 meters), 59 dBA at 131 feet (40 meters), and 57 dBA at 250 feet (76 meters) (GE Energy 2009). Therefore, a noise-sensitive receptor would have to be within approximately 250 feet (76 meters) of the turbine to experience operational noise above the maximum allowed in the State of Maryland noise regulation for nighttime activities (55 dBA). A wind turbine would not be constructed this close to a noise-sensitive receptor; typical setback distances for residences would be normally 1,000 feet (305 meters) or more. Therefore, negligible adverse effects on the ambient

noise environment would be expected from wind turbine operation. These potential adverse impacts from noise generated from wind turbines would be considered during evaluation of this technology for Site M development.

***Operational Vehicular Noise.*** Long-term, negligible, adverse effects on the ambient acoustical environment would be anticipated as a result of the increase in vehicular traffic from the operation of Phase I. Civilian and military traffic entering the Phase I would use the same roadways discussed above for construction vehicular traffic. As discussed in **Section 3.3.2**, the roadways in the vicinity of Phase I are already heavily utilized. In addition, vehicle noise would be distributed throughout the day (peaking at the beginning and end of the normal working day) and would be minimal compared to noise produced on roads outside the installation boundary including MD 32 and MD 295. The traffic from personnel commuting to Phase I would be a fraction of the existing traffic, and would likely cause negligible increases in noise levels on noise-sensitive populations adjacent to the roads outside the installation boundary.

## 4.3.4 Alternative 1: Implement Phases I and II

Under this alternative, Phase I would be implemented along with Phase II. Phase II would include the development discussed in **Section 4.3.3** and development on the eastern half of Site M-1. Phase II would have greater, but still minor, adverse effects on the ambient acoustical environment than those described under Phase I for the western noise-sensitive receptors, since the western border of Site M-1 is approximately 1,400 feet (463 meters) west of the western border of Phase I.

### Construction Effects

***Construction Noise.*** Short-term, minor, adverse effects on the ambient noise environment would be expected as a result of construction and pile-driving activities under Phase II. Construction and pile-driving noise within the eastern portion of Site M-1 would be the same as discussed above in **Section 4.3.3** for Phase I. The western border of Site M-1 is approximately 1,400 feet (463 meters) closer to the western noise-sensitive receptors shown in **Table 4.3-1** than the western border of Phase I; therefore, construction and pile-driving noise levels would be slightly higher at those receptors. Noise levels were calculated in the same manner as Phase I. Examples of expected construction and pile-driving noise would be expected to include the following:

- Persons accessing the NSA campus off Canine Road approximately 1,730 feet (526 meters) west of the western border of Phase II would experience construction noise levels of approximately 58 dBA, and pile-driving noise levels of approximately 67 dBA.
- Persons at the installation boundary approximately 3,420 feet (1,042 meters) west of the western border of Phase II would experience construction noise levels of approximately 52 dBA, and pile-driving noise levels of approximately 61 dBA.
- Persons accessing the Patuxent Research Refuge approximately 6,770 feet (2,063 meters) south of the southern border of Phase II would experience construction noise levels of approximately 46 dBA, and pile-driving noise levels of approximately 55 dBA.

The same construction hours of operation discussed for Phase I would apply to Alternative 1. As discussed previously, a noise-sensitive receptor would have to be within approximately 50 feet of building construction or 125 feet of pile driving to experience construction noise louder than the maximum allowed in the State of Maryland noise regulation for daytime activities (90 dBA). The closest noise-sensitive receptor to the western half of Site M-1 is the barracks approximately 300 feet north of the northwestern border. A noise-sensitive receptor would have to be within approximately 2,500 feet (approximately 0.5 miles) of the site to experience construction noise louder than the maximum allowed

in the State of Maryland noise regulation for nighttime activities (55 dBA). Pile-driving activities would not be conducted at night. The same mitigation measures discussed in **Section 4.3.3** could also be applied to Phase II.

***Construction Vehicular Noise.*** Short-term, negligible, adverse effects on the ambient acoustical environment would be expected as a result of the increase in construction vehicle traffic under Phase II. Construction traffic would use the same roadways as discussed above for Phase I, and the additional traffic resulting from construction vehicles would likely cause negligible increases in noise levels on noise-sensitive populations adjacent to these roadways.

### Operational Effects

***Electrical Generation Alternative: Stationary Internal Combustion Engine (Generator) Noise.*** The proposed location for the generator facility as shown in the 2009 NSA Master Plan is within Phase I (URS/LAD 2009); therefore, the noise levels shown in **Table 4.3-2** would also apply to Phase II.

***Electrical Generation Alternative: Natural Gas-Fired Combustion Turbine Noise.*** The turbine facility is part of Phase I; therefore, the discussion of the turbine noise in **Section 4.3.3** would apply to Phase II.

***Other Operational Noise.*** The electrical substation, heating and cooling systems, equipment for operation of the facility, and "green" technologies are part of Phase I; therefore, the discussion of their operational noise in **Section 4.3.3** would apply to Phase II.

***Operational Vehicular Noise.*** Long-term, negligible, adverse effects on the ambient noise environment would be expected as a result of the increase in vehicular traffic from operation of Phases I and II. Under Alternative 2, approximately 8,000 personnel would use the same roadways discussed above for construction vehicular traffic. As discussed in **Section 3.3.2**, the roadways in the vicinity of Fort Meade are already heavily utilized. In addition, vehicle noise would be distributed throughout the day (peaking at the beginning and end of the normal working day) and would be minimal compared to noise produced on roads outside the installation boundary including MD 32 and MD 295. The traffic from personnel commuting to Phases I and II would be a fraction of the existing traffic, and would likely cause negligible increases in noise levels on noise-sensitive populations adjacent to the roads outside the installation boundary.

## 4.3.5 Alternative 2: Implement Phases I, II, and III

Under this alternative, Phase I would be implemented along with Phases II and III. Phase III would include the development discussed in **Sections 4.3.3** and **4.3.4**, and development on Site M-2. Phase III would have greater, but still minor, adverse effects on the ambient acoustical environment than those described under Phase I and II for noise-sensitive receptors south of Phase II, since Site M-2 extends approximately 1,770 feet (539 meters) south of Phase II.

### Construction Effects

***Construction Noise.*** Short-term, minor, adverse effects on the ambient noise environment would be expected as a result of construction and pile-driving activities under Phase III. Construction and pile-driving noise within the northern half of Phase III would be the same as discussed above in **Section 4.3.3** for Phase I and **Section 4.3.4** for Phase II. The southern border of Site M-2 is approximately 1,400 feet south of the southern border of Phase II; therefore, noise-sensitive receptors south of Mapes Road would experience higher construction and pile-driving noise levels than they would under Phase I or II. Examples of expected construction and pile-driving noise would be expected to include the following:

- Persons accessing the Defense Information School (Building 6500) approximately 1,780 feet (543 meters) south of the southern border of Phase III would experience construction noise levels of approximately 58 dBA, and pile-driving noise levels of approximately 67 dBA.
- Persons at the installation boundary approximately 3,850 feet (1,773 meters) west of the southwestern border of Phase III would experience construction noise levels of approximately 51 dBA, and pile-driving noise levels of approximately 60 dBA.
- Persons accessing the Patuxent Research Refuge approximately 5,630 feet (1,716 meters) south of the southern border of Phase III would experience construction noise levels of approximately 48 dBA, and pile-driving noise levels of approximately 57 dBA.

The same hours of operation discussed for Phase I would apply to Phase III. As discussed previously, a noise-sensitive receptor would have to be within approximately 50 feet of building construction or 125 feet of pile driving to experience construction noise louder than the maximum allowed in the State of Maryland noise regulation for daytime activities (90 dBA). The closest noise-sensitive receptor to Site M-2 is Building 8901 off Love Road, approximately 130 feet west of the Phase III western border. A noise-sensitive receptor would have to be within approximately 2,500 feet (approximately 0.5 miles) of the site to experience construction noise louder than the maximum allowed in the State of Maryland noise regulation for nighttime activities (55 dBA). Pile-driving activities would not be conducted at night. The same mitigation measures discussed in **Section 4.3.3** could also be applied to Phase III.

***Construction Vehicular Noise.*** Short-term, negligible, adverse effects on the ambient acoustical environment would be expected as a result of the increase in construction vehicle traffic under Phase III. Construction traffic would use the same roadways as discussed above for Phase I to access the northern portion of Phase III, and would use the Mapes Road exit off MD 32 to access the southern portion of Phase III. As discussed in **Section 3.3.2**, the roadways in the vicinity of Phase III are already heavily utilized. The additional traffic resulting from construction vehicles would likely cause negligible increases in noise levels on noise-sensitive populations adjacent to these roadways.

### Operational Effects

***Electrical Generation Alternative: Stationary Internal Combustion Engine (Generator) Noise.*** The proposed location for the generator facility as shown in the 2009 NSA Master Plan is within Phase I (USACE Mobile District 2007); therefore, the noise levels shown in **Table 4.3-2** would also apply to Phase III.

***Electrical Generation Alternative: Natural Gas-Fired Combustion Turbine Noise.*** The turbine facility is part of Phase I; therefore, the turbine noise shown in **Section 4.3.3** would also apply to Phase III.

***Other Operational Noise.*** The electrical substation, heating and cooling systems, equipment for operation of the facility, and "green" technologies are part of Phase I; therefore, their operational noise as discussed in **Section 4.3.3** would also apply to Phase III.

***Operational Vehicular Noise.*** Long-term, negligible to minor, adverse effects on the ambient noise environment would be expected as a result of the increase in vehicular traffic from operation of Alternative 2. Under Alternative 2, approximately 11,000 additional personnel would use the same roadways discussed above for construction vehicular traffic. As discussed in **Section 3.3.2**, the roadways in the vicinity of Phases I, II, and III are already heavily utilized. In addition, vehicle noise would be distributed throughout the day (peaking at the beginning and end of the normal working day) and would be minimal compared to noise produced on roads outside the installation boundary including MD 32 and MD 295. The traffic from personnel commuting to Phases I, II, and III would be a fraction of the existing

traffic, and would likely cause negligible to minor increases in noise levels on noise-sensitive populations adjacent to the roads outside the installation boundary.

## 4.4 Air Quality

### 4.4.1 Evaluation Criteria

The environmental impacts on local and regional air quality conditions near a proposed action are determined based on increases in regulated pollutant emissions compared to existing conditions and ambient air quality. With respect to the General Conformity Rule, impacts on air quality would be considered major if a proposed action would result in an increase of a nonattainment or maintenance area's emissions inventory by 10 percent or more for one or more nonattainment pollutants, or if such emissions exceed *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants.

### 4.4.2 No Action Alternative

The No Action Alternative would not result in changes in ambient air quality conditions if the Proposed Action or alternatives were not implemented. No construction activities would be undertaken, and no changes in operations would take place. A general conformity analysis and the permitting of stationary sources would not be required. No impacts on air quality would be expected.

### 4.4.3 Proposed Action (Phase I)

Implementing the Proposed Action would have both short- and long-term, minor, adverse impacts on air quality. Short-term impacts would be due to air emissions generated during the construction of the proposed facilities. However, increases in emissions would be below the General Conformity Rule applicability thresholds and would not contribute to a violation of any Federal, state, or local air regulations. Long-term impacts would be due to introducing heating boilers and standby generators at the proposed facilities.

***General Conformity.*** For the purpose of determining if the General Conformity Rule applies, all the projects were combined in a single analysis. All direct and indirect sources of air emissions were estimated for all years and for all phases of the Proposed Action and alternatives. Direct emissions are emissions that would be caused or initiated by a Federal action and occur at the same time and place as the action. Indirect emissions are defined as reasonably foreseeable emissions that would be caused by the action, but could occur later in time or be farther removed in distance from the action itself, and that the Federal agency can practicably control. Because all the projects and all the potential sites are within the same AQCR, the emissions have been combined throughout this discussion. More specifically, project-related direct and indirect emissions would result from the following:

- *Demolition and construction activities*—use of construction equipment, worker vehicles (e.g., bulldozers, backhoes), and use of VOC paints; and paving off gasses and fugitive particles from surface disturbances.
- *Operational activities*—use of emergency generators and boilers. Notably, the diesel generator alternative would have greater emissions than the combustion turbine alternative. Therefore, it was carried forward as the worst-case alternative under the general conformity analysis.

Regardless of the individual building sites ultimately chosen, estimated actual construction emissions would be similar. The construction emissions were generated by estimating equipment use for utilities, site preparation, and construction for the proposed facilities, including the following:

- Office Modules and Operations Center
- Module Interconnections
- Data Center
- Electrical substation
- Generator plants (providing 50 MW of service)
- Chiller plants
- Boiler plants
- Ancillary parking
- Water storage tank
- Utility upgrades (water, gas, and communications services)
- Infrastructure upgrades (paving, walks, curbs, and gutters; storm water management).

Operational emissions include increases due to new boilers, emergency generators with controls, and additional commuter emissions. Emissions estimates from proposed stationary sources do not include reductions from the possible demolition or partial reuse of the existing NSA facilities. Therefore, regardless of the ultimate decision regarding the existing NSA facilities, the emissions described herein would be considered the upper bound of adverse impacts. Detailed methodologies for estimating air emissions are provided in **Appendix E**.

***Applicability.*** To determine the applicability of the General Conformity Rule to the Proposed Action, air emissions from proposed Phase I construction and operational activities were estimated (see **Table 4.4-1**). The total direct and indirect emissions of $NO_X$ and VOCs in any given year are less than the applicability thresholds and less than 10 percent of the emissions in the region (see **Tables 4.4-2** and **4.4-3**). Therefore, the general conformity requirements do not apply, and no formal conformity determination is required. Detailed methodologies for estimating air emissions and a Record of Non-Applicability (RONA) to the General Conformity Rule are provided in **Appendix E**.

***Regulatory Review.*** Permitting scenarios can vary based on the types and sizes of new stationary sources, timing of the projects, and the types of controls ultimately selected. These can differ in specific features from the ones described in this EIS. However, during the final design stage and the permitting process either (1) the actual equipment, controls, or operating limitations would be selected to reduce the PTE below the major source threshold; or (2) the NNSR permitting process would require emissions offsets be obtained at a 1 to 1.3 ratio from other previously decommissioned sources within the region. This cap-and-trade-type system is inherent to Federal and state air regulations, and leads to a forced reduction in regional emissions. Therefore, regardless of the ultimate permitting scenario, these impacts would be considered minor under NEPA.

Permitting requirements for proposed stationary sources are based on their overall PTE criteria pollutants. A discussion of the use of diesel generators and the use of combustion turbines for back-up power is below.

***Diesel Generator Alternative.*** The estimated PTE for the use of diesel generators for the 50 MW of back-up power is outlined in **Table 4.4-4** and **4.4-5**. If diesel generators were selected, the total uncontrolled PTE of VOCs would not exceed the NNSR threshold (see **Table 4.4-4**). However, total uncontrolled emissions of $NO_x$ would exceed the NNSR threshold of 25 tpy. Both SCR and the MDE mandated federally enforceable limitation on the hours of operation of the generators would be required to reduce potential $NO_x$ emissions below the NNSR threshold (see **Table 4.4-5**). Under this scenario, a Minor NSR construction permit would be required.

**Table 4.4-1. Total Annual Emissions Subject to the General Conformity Rule**

| Year [a] | Total Annual Emissions (tpy) | | | | | |
|---|---|---|---|---|---|---|
| | Phase I | | Phase II [b] | | Phase III [b] | |
| | $NO_x$ | VOC | $NO_x$ | VOC | $NO_x$ | VOC |
| 1 | 26.8 | 1.9 | 29.1 | 3.2 | 34.2 | 4.2 |
| 2 | 14.5 | 1.1 | 14.6 | 2.2 | 34.2 | 4.3 |
| 3 | **51.2** | 7.6 | 46.2 | 7.3 | 46.7 | **7.8** |
| 4 | 34.2 | 5.4 | 33.8 | 5.6 | 40.0 | 7.0 |
| 5 | 44.9 | 7.5 | 38.3 | 6.5 | 41.6 | 7.6 |
| 6 | 13.1 | 2.3 | - | - | 41.1 | 7.8 |
| 7 | 8.3 | 1.3 | - | - | 39.2 | 7.5 |
| 8 | - | - | - | - | - | - |
| | **Phase I** | | **Phase I and II** | | **Phase I, II, and III** | |
| **Total Operational Emissions** | **9.3** | **1.8** | **11.8** | **2.6** | **16.9** | **3.7** |

Sources: SCAQMD 1993, USEPA 1995, USEPA 2003, USEPA 2005

Notes:

a. Represents years from the beginning of each phase.

b. Includes operational emissions from previous phases.

**Table 4.4-2. Greatest Annual Project-Related Emissions Compared to Applicability Thresholds**

| Criteria pollutants | Greatest annual project-related emissions (All years – All phases) (tpy) | Applicability threshold (tpy) | Exceeds applicability threshold (yes/no) |
|---|---|---|---|
| ***$O_3$ ($NO_x$ or VOCs): Marginal and moderate Nonattainment Areas inside an $O_3$ transport region*** | | | |
| $NO_x$ | 51.2 | 100 | No |
| VOC | 7.8 | 50 | No |

Sources: 40 CFR 93.153, 71 FR 40420

**Table 4.4-3. Greatest Annual Project-Related Emissions Compared to Regional Emissions**

| Criteria pollutants | Greatest annual project-related emissions (All years – All phases) (tpy) | Regional Emissions (tpy) | Percent Regional Emissions (percent) | Regionally Significant (> 10 percent)? |
|---|---|---|---|---|
| $NO_x$ | 51.2 | 83,742 | < 0.1% | No |
| VOC | 7.8 | 101,496 | < 0.1% | No |

Sources: 40 CFR 93.153, MDE 2007

**Table 4.4-4. Uncontrolled Potential to Emit – Diesel Generators**

| Criteria Pollutant | $NO_x$ | CO | VOC | PM* | $SO_x$ |
|---|---|---|---|---|---|
| PTE (tpy) | 44.8 | 3.6 | 0.9 | 0.3 | 1.8 |
| PSD Threshold (tpy) | - | 250 | - | 250 | 250 |
| NNSR Threshold (tpy) | 25 | - | 25 | - | - |
| Exceeds Threshold (Yes/No) | Yes | No | No | No | No |

Note: * Conservatively assumed $PM_{2.5} = PM_{10} = PM$

**Table 4.4-5. Controlled Potential to Emit $NO_x$ – Diesel Generators**

| | PTE $NO_x$ (tpy) | NNSR Threshold (tpy) | Exceeds Threshold (Yes/No) |
|---|---|---|---|
| SCR and Limited Hours of Operation (100 hours) | 6.7 | 25 | No |

NSPS limitations on diesel generator emissions come into effect using a tiered approach over time; Tier 1 being the least restrictive and Tier 4 being the most. All generators would meet the NSPS requirements. The 2.5-MW Tier 2 generators are the most suitable off-the-shelf generators at this time. It is possible that Tier 4 generators could be available for nonemergency applications in the next few years. The generators ultimately selected would have emissions profiles consistent with or lower than the Tier 2 engines described herein. All stationary sources at NSA combined currently emit 0.31 tpy of HAPs. With the additional proposed diesel generators, the total HAP emissions would increase by approximately 0.09 tpy. All proposed diesel generators would meet NESHAP requirements.

***Combustion Turbine Alternative.*** The estimated PTE for the use of stationary combustion turbines for the 50 MW of back-up power is outlined in **Table 4.4-6**. If combustion turbines were selected, the total uncontrolled PTE of all regulated nonattainment pollutants (i.e., $NO_x$ and VOC) would be below the NNSR thresholds (see **Table 4.4-6**). This analysis assumes a 100 hours-of-operation limitation and the selection of low $NO_x$ turbines. Although SCR would not be required, a federally enforceable limitation on the hours of operation would be necessary to reduce potential $NO_x$ emissions below the NNSR threshold. Under this scenario, a Minor NSR construction permit would be required.

**Table 4.4-6. Uncontrolled Potential to Emit – Combustion Turbines**

| Criteria Pollutant | $NO_x$ | CO | VOC | PM* | $SO_x$ |
|---|---|---|---|---|---|
| PTE (tpy) | 0.8 | 2.3 | 0.2 | 0.2 | 0.2 |
| PSD Threshold (tpy) | - | 250 | - | 250 | 250 |
| NNSR Threshold (tpy) | 25 | - | 25 | - | - |
| Exceeds Threshold (Yes/No) | No | No | No | No | No |

Note: * Conservatively assumed $PM_{2.5} = PM_{10} = PM$

NSPS limitations on $NO_x$ and $SO_2$ emissions for stationary gas turbines were promulgated in 2006 (40 CFR Part 60, subpart KKKK). All stationary combustion turbines with a heat input equal to or greater than 10 MMBtu/hour would meet these NSPS requirements. As with the diesel generators, with

the proposed gas turbines the total HAP emissions would not change appreciably. All proposed stationary gas turbines would meet NESHAP requirements.

Neither emergency generators, nor combustion turbines are included in the 26 listed source categories subject to PSD review. Therefore, regardless of what is selected the applicable PSD threshold for the back-up power facility is 250 tpy of any regulated attainment pollutant. Total uncontrolled emissions of the regulated attainment pollutants (i.e., CO, $SO_2$, $PM_{2.5,}$ and $PM_{10}$) would not exceed the PSD thresholds, and therefore would not trigger PSD review (see **Tables 4.4-4** and **4.4-6**). Additional controls would only further reduce these already limited emissions, and PSD permitting would still not be required.

Regardless whether emergency generators or combustion turbines are ultimately selected, the following scenarios and rationale apply:

- If the final permitting scenario became such that NSA's contemporaneous emissions were the determining factor for NNSR, a thorough evaluation of the emissions would be necessary. However, additional controls or changes in scheduling to meet the "netting" requirements under NNSR would not change the applicability determination under the General Conformity Rule, and would only reduce further these already limit emissions and their effects.
- The proposed facility is rated at less than 70 MW, and no electricity would be exported to the electrical system. NSA would be required to obtain a waiver from the PSC. This process would take approximately 2 months.
- Title V Significant Permit Modifications would be required to establish federally enforceable limitations to reduce potential emissions below the thresholds. Submission of an application for these permit modifications would be required within one year of the first operation of the proposed units.

***Other proposed stationary sources.*** In addition to the standby power generation equipment outlined above, the proposed action would include the establishment of new boilers, chillers, tanks, and other support equipment. Detailed information about the sizes and types of equipment is not available at this time. However, as stated above, during the final design stage and the permitting process either (1) the actual equipment, controls, or operating limitations would be selected to reduce the PTE below the major source threshold; or (2) the NNSR permitting process would require emissions offsets be obtained at a 1 to 1.3 ratio from other previously decommissioned sources within the region. Therefore, regardless of the ultimate permitting scenario, these impacts would be minor under NEPA.

Notably, fossil fuel boilers are included in the 26 listed source categories subject to PSD review. Therefore, the applicable PSD threshold for the proposed boiler plant is 100 tpy of any regulated attainment pollutant. Total emissions of the regulated attainment pollutants (i.e., CO, $PM_{2.5}$, $PM_{10}$, and $SO_2$) might exceed the PSD thresholds, and trigger PSD review (see **Tables 4.4-4** and **4.4-6**). PSD regulations would impose limits on the amount of pollutants that the new boilers would emit. The PSD permitting process would take 18–24 months to complete, and require a BACT review for criteria pollutants, predictive modeling of emissions, and a public involvement process.

***Greenhouse Gases and Global Warming.*** The only direct (Scope 1 and 2) sources of GHG would be the $CO_2$ emitted from the emergency generators, boilers, and generation of electricity purchased by NSA. There would be no significant emissions of nitrous oxide ($N_2O$), methane ($CH_4$), hydrofluorocarbons (HFCs), perfluorinated compounds (PFCs), or sulfur hexafluoride ($SF_6$). Although the exact type of equipment is yet unknown, the primary onsite sources would be fossil fuel-burning equipment such as generators and boilers. One-third of the 6,500 personnel consolidating to Site M under the Proposed Action are already on-installation, and the remainder would come from locations within the Baltimore

and Washington metropolitan areas. New hires would constitute less than 10 percent of the workforce consolidating at Fort Meade. Although there would be an increase in GHG from construction activities, modern construction techniques and meeting LEED Silver requirements would result in more efficient proposed facilities than the buildings currently occupied by these personnel. This would constitute a reduction in both the use of fossil fuels and onsite electricity, and would subsequently lead to long-term reduction of GHG emissions.

The DOD has committed to reduce GHG emissions from noncombat activities 34 percent by 2020 (DOD 2010). NSA is committed to continuing to act in accordance with EO 13514 within the framework of the DOD-wide efforts to reduce GHG emissions. Inventorying GHG emissions at all Federal agencies, including NSA as part of the DOD, is the current stage of the process. NSA, as part of the DOD, has begun the process of inventorying their direct and indirect emissions of GHG, and determining their role in the overall process. This is both in response to, and consistent with, the guidelines put forth in EO 13514. It is not expected that any of the activities outlined herein would interfere with the DOD's ability to meet their overall goal.

***Best Management Practices.*** BMPs would be required and implemented for both construction emissions and stationary point source emissions associated with the new facilities. The construction would be accomplished in full compliance with current and pending Maryland regulatory requirements through the use of compliant practices or products. These requirements appear in COMAR Title 26, Subtitle 11, *Air Quality*. They include the following:

- Particulate Matter from Materials Handling and Construction (COMAR 26.11.06.03.D)
- Open Fires (COMAR 26.11.06)
- Control of Emissions of VOCs from Architectural Coatings (COMAR 26.11.33)
- Control of Emissions of VOCs from Consumer Products (COMAR 26.11.32)
- Control of Emissions of VOCs from Adhesives and Sealants (COMAR 26.11.35).

Irrespective of whether stationary sources are above or below the major source threshold, one or more air pollution control permits would be required for the facilities. BMPs associated with the new permitted stationary sources of emissions would include the following:

- BACT review for each criteria pollutant
- MACT review for regulated HAPs and designated categories
- Air quality analysis (predictive air dispersion modeling), upon MDE's request
- Establishing procedures for measuring and recording emissions or process rates
- Meeting the NSPS and NESHAP requirements.

This listing is not all-inclusive; NSA and any contractors would comply with all applicable Maryland air pollution control regulations.

### 4.4.4 Alternative 1: Implement Phases I and II

Implementing Alternative 1 would have both short- and long-term, minor, adverse impacts on air quality. Short-term impacts would be due to air emissions generated during the construction of the proposed facilities. However, increases in emissions would be below the General Conformity Rule applicability thresholds and would not contribute to a violation of any Federal, state, or local air regulations. Long-term impacts would be due to introducing additional heating requirements and the mobile emissions from commutes from the additional onsite personnel.

Phase II activities involve the mid-term construction and operation of approximately an additional 1.2 million $ft^2$ of operational administrative facilities. The construction activities outlined in Phase II are smaller in size and in scope as those outlined under the Phase I. However when combined with operational activities from Phase I, the emissions for any given year increase during Phase II. For these reasons, impacts on air quality under Alternative 1 would be expected to be both more intense and over a longer period than those outlined under the Proposed Action.

***General Conformity.*** To determine the applicability of the General Conformity Rule, air emissions from proposed construction and operational activities for both Phases I and II were estimated (see **Table 4.4-1**). The total direct and indirect emissions of $NO_x$ and VOCs in any given year are less than the applicability thresholds and less than 10 percent of the emissions in the region (see **Tables 4.4-2** and **4.4-3**). Therefore, the general conformity requirements do not apply, and no formal conformity determination is required. Detailed methodologies for estimating air emissions and a RONA to the General Conformity Rule are provided in **Appendix E**.

Construction emissions were estimated based primarily on the building areas and the relative timeframe of the action. Unlike the BRAC action, construction activities for the Campus Development are slated to occur over a 20-year period. Regardless of the construction approach, it is unlikely that these emissions estimations would change appreciably. For example, if the implementation schedule were to change such that one building was to be built before another, the overall intensity of the construction would remain the same. In addition, the combination of estimated construction emissions from any 2 years would be below the applicability threshold values. Therefore, even if construction activities for any two phases would overlap substantially the General Conformity Rule would still not apply. However, if the overall timeline for the implementation of the project were to be compressed dramatically (i.e., into a 7- to 10-year period or less) it is likely that the applicability thresholds would be exceeded and a formal conformity determination would be required. Notably, much of the scheduled construction would take place after the act mandated attainment year for the 8-hour $O_3$ NAAQS.

***Regulatory Review.*** Permitting requirements and applicable air quality regulations would be similar to those outlined under the Proposed Action, although they would take place over the mid-term. Air quality regulations and applicable standards are updated frequently. All permitting of stationary sources and construction would be accomplished in full compliance with Maryland regulatory requirements at the time of construction. BMPs would be similar to those outlined for the Proposed Action. It is not expected that any of the activities would interfere with the DOD's ability to meet their overall GHG reduction goals.

### 4.4.5 Alternative 2: Implement Phases I, II, and III

Implementing Alternative 2 would have both short- and long-term, minor, adverse impacts on air quality. Short-term impacts would be due to air emissions generated during the construction of the proposed facilities. However, increases in emissions would be below the General Conformity Rule applicability thresholds and would not contribute to a violation of any Federal, state, or local air regulations. Long-term impacts would be due to introducing additional heating requirements and the mobile emissions from commutes from the additional onsite personnel.

Phase III activities involve the long-term construction and operation of approximately an additional 2.8 million $ft^2$ of operational administrative facilities, and the demolition of the golf course clubhouse. The construction activities outlined in Phase III are smaller in size and in scope as those outlined under the Phase I; however, when combined with operational activities from Phase I and Phase II, the emissions for any given year increase during Phase III. For these reasons, impacts on air quality for these activities

would be expected to be both more intense and over a longer period than those outlined under the Proposed Action and Alternative 1.

***General Conformity.*** To determine the applicability of the General Conformity Rule, air emissions from proposed construction and operational activities for Phases I, II, and III were estimated (see **Table 4.4-1**). The total direct and indirect emissions of $NO_x$ and VOCs in any given year are less than the applicability thresholds and less than 10 percent of the emissions in the region (see **Tables 4.4-2** and **4.4-3**). Therefore, regardless of the implementation schedule ultimately selected, the general conformity requirements do not apply, and no formal conformity determination is required. Detailed methodologies for estimating air emissions and a RONA to the General Conformity Rule are provided in **Appendix E**.

***Regulatory Review.*** Permitting requirements and applicable air quality regulations would be similar to those outlined under the Proposed Action, although they would take place over the long-term. Air quality regulations and applicable standards are updated frequently. All permitting of stationary sources and construction would be accomplished in full compliance with Maryland regulatory requirements. BMPs would be similar to those outlined for the Proposed Action. It is not expected that any of the activities would interfere with the DOD's ability to meet their overall GHG reduction goals.

# 4.5 Geological Resources

## 4.5.1 Evaluation Criteria

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential effects of a proposed action on geological resources. Generally, adverse effects can be avoided or minimized if proper construction techniques, erosion-control measures, and structural engineering design are incorporated into project development.

Effects on geology and soils would be major if they would alter the lithology, stratigraphy, and geological structures that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability; or change the soil composition, structure, or function (including prime farmland and other unique soils) within the environment.

## 4.5.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be established and existing conditions would remain as described in **Section 3.5.2**. No effects on geological resources or soils would be expected.

## 4.5.3 Proposed Action (Phase I)

Short-term, minor, and long-term, minor to moderate, adverse impacts on soils would be expected from implementing the Proposed Action. The Proposed Action would require additional disturbance to the soils resulting from excavation, grading, and compaction associated with construction of buildings, roads, parking areas, and the placement of other infrastructure, such as power lines. As a result of implementing the Proposed Action, soils would be compacted, and soil structure disturbed and modified. Loss of soil structure due to compaction from foot and vehicle traffic could result in localized changes in drainage patterns. Soil productivity, which is the capacity of the soil to produce vegetative biomass, would be eliminated in those areas within the footprint of building structures, roadways, or parking facilities. The activities associated with the Proposed Action would entail clearing of vegetation, grading, and paving.

Clearing of vegetation would increase erosion and sedimentation potential. Soil erosion and sediment production would be minimized for all construction operations as a result of following an approved ESCP. Use of storm water control measures that favor reinfiltration would minimize the potential for erosion and sediment production as a result of storm events. Implementing green roofs would be a viable technique to diminish erosion and sedimentation potential by absorbing precipitation and decreasing runoff volume and velocity. In addition, earthen security berms would be constructed that would alter natural water flow patterns. However, berms would be designed and constructed in a manner to maintain the natural conveyance of storm water flow. Please see **Section 4.6.3** for an evaluation of impacts from the Proposed Action on water resources.

Short-term, minor, adverse impacts would be expected from trenching activities associated with placement of utilities. Trenching would involve removal of vegetation and disturbance of soil structure. Removal of vegetation would temporarily increase erosion and sedimentation potential until disturbed soil has been stabilized and vegetation regrowth has occurred. Once vegetation has been reestablished, impacts from trenching activities associated with erosion and sedimentation would be reduced to negligible. Please see **Section 4.7.2** for a discussion of impacts on vegetation. Any removed soils would be managed onsite and incorporated into the design plan if appropriate. If soils cannot be maintained onsite, they would be transferred to a user for construction or other purposes.

Site-specific soil surveys should be conducted prior to implementation of the Proposed Action to determine the breadth and severity of any engineering limitations. Per COMAR 26.17.01, *Erosion and Sediment Control*, an ESCP would be required for the Proposed Action, as it involves land clearing, grading, or other earth disturbances to an area greater than 5,000 $ft^2$ of land area. The *1994 Maryland Standards and Specifications for Soil Erosion and Sediment Control* (MDE 1994) would serve as the official guide for erosion-and-sediment-control principles, methods, and practices. The 1994 manual is currently being updated, and, if finalized prior to implementation of the Proposed Action, the Proposed Action would be subject to the standards outlined in the updated document. The ESCP would describe the measures implemented to prevent loss of soil during construction by storm water runoff or wind erosion and to prevent sedimentation of storm sewer or receiving streams. Construction BMPs would be implemented to minimize soil erosion; therefore, no major, adverse impacts on the soils would be anticipated. BMPs could include installing silt fencing and sediment traps, applying water to disturbed soil, installing green roofs, and revegetating disturbed areas as soon as possible after disturbance, as appropriate. In addition, storm water BMPs, discussed in **Section 4.6.2** would be implemented to reduce potential for soil erosion and associated sedimentation. State storm water requirements would be adhered to, including the minimization of storm water generation, removal of 80 percent of average annual total suspended solids through use of structural BMPs, and the maintenance of uniform annual recharge from pre- and post-development site conditions (MDE 2009c).

### 4.5.4 Alternative 1: Implement Phases I and II

Impacts on geological resources and soils from implementing Phase II would be similar to, and in addition to, those impacts associated with Phase I. Implementation of Phase II would require disturbing 1.2 million $ft^2$ to soils in addition to the 1.8 million $ft^2$ disturbed during Phase I. Therefore, short-term, minor, to long-term, minor to moderate, adverse impacts on geology and soils would be expected. Phase II would consist of excavating, grading, and construction activities similar to those discussed in **Section 4.1.3**. Increased impervious surfaces could lead to increased soil erosion and sedimentation. Site-specific soil surveys should be conducted prior to implementation of the Proposed Action to determine the types and severity of any engineering limitations. An ESCP and construction BMPs would be implemented and state storm water requirements would be followed to minimize soil erosion and associated sedimentation; therefore, no major, adverse impacts on the soils would be anticipated. Any removed soils would be managed onsite and incorporated into the design plan if appropriate. If soils

cannot be maintained onsite, they would be transferred to a user for construction or other purposes. BMPs could include installing silt fencing and sediment traps, applying water to disturbed soil, installing green roofs, and revegetating disturbed areas as soon as possible after disturbance, as appropriate. In addition, storm water BMPs, discussed in **Section 4.6.2,** would be implemented to reduce potential for soil erosion and associated sedimentation.

### 4.5.5 Alternative 2: Implement Phases I, II, and III

Impacts on geological resources and soils from implementing Phase III would be similar to, and in addition to, those impacts associated with Phase I and Phase II. Phase III would require an additional 2.8 million $ft^2$ of disturbance to soils. Therefore short-term, minor, to long-term, minor to moderate, adverse impacts on geology and soils would be expected. Phase III would consist of excavating, grading, and construction activities similar to those discussed in **Section 4.1.3**. Increased impervious surfaces could lead to increased soil erosion and sedimentation. Any removed soils would be managed onsite and incorporated into the design plan if appropriate. If soils cannot be maintained onsite, they would be transferred to a user for construction or other purposes. Site-specific soil surveys should be conducted prior to implementation of the Proposed Action to determine the types and severity of any engineering limitations. An ESCP and construction BMPs would be implemented and state storm water requirements would be followed to minimize soil erosion and associated sedimentation; therefore, no major adverse impacts on the soils would be anticipated. BMPs could include installing silt fencing and sediment traps, applying water to disturbed soil, installing green roofs, and revegetating disturbed areas as soon as possible after disturbance, as appropriate. In addition, storm water BMPs, discussed in **Section 4.6.2**, would be implemented to reduce potential for soil erosion and associated sedimentation.

## 4.6 Water Resources

### 4.6.1 Evaluation Criteria

Evaluation of impacts on water resources is based on water availability, quality, and use; existence of floodplains; and associated regulations. A proposed action would be adverse if it were to substantially affect water quality; substantially reduce water availability or supply to existing users; threaten or damage hydrologic characteristics; or violate established Federal, state, or local laws and regulations. The potential impact of flood hazards on a proposed action is important if such an action occurs in an area with a high probability of flooding.

### 4.6.2 No Action Alternative

Under the No Action Alternative, NSA would not develop Site M. Conditions would remain as described in **Section 3.6.2**. No impacts on water resources would be expected.

### 4.6.3 Proposed Action (Phase I)

Under the Proposed Action, the construction contractor would obtain all necessary construction permits and comply with the requirements and guidelines set forth in those permits to minimize potential for adverse impacts. The Proposed Action would require storm water management plans and soil erosion and sedimentation controls. The NPDES storm water program requires construction site operators engaged in clearing, grading, and excavating activities that disturb 1 acre or more to obtain coverage under an NPDES permit for their storm water discharges. Construction or demolition that requires permit coverage requires preparation of an NOI to discharge storm water and a Storm Water Pollution Prevention Plan (SWPPP) that is implemented during construction. In addition, per the CWA Final Rule

(see **Section 3.6.1**) construction activities under the Proposed Action would be required to meet the non-numeric effluent limitations and design, install, and maintain effective erosion and sedimentation controls, including the following:

- Control storm water volume and velocity to minimize erosion
- Minimize the amount of soil exposed during construction activities
- Minimize the disturbance of steep slopes
- Minimize sediment discharges from the site
- Provide and maintain natural buffers around surface waters
- Minimize soil compaction and preserve topsoil where feasible.

Also required by the CWA Final Rule (see **Section 3.6.1**), if construction activities under the Proposed Action occur after August 1, 2011, construction activities disturbing 20 or more acres must comply with the numeric effluent limitation for turbidity of receiving water bodies (i.e., a maximum daily turbidity limitation of 280 ntu) in addition to the non-numeric effluent limitations specified in the CWA Final Rule. The permittees would select management practices or technologies that would be best suited for site-specific conditions.

Per COMAR 26.17.01, an ESCP would be required for the Proposed Action, as it involves land clearing, grading, or other earth disturbances to an area greater than 5,000 $ft^2$ of land area. COMAR 26.17.01 is currently being updated to reflect updated Maryland standards and specifications for soil erosion and sediment control and proposed regulations changes. A draft version of the Erosion and Sediment Control Regulations Proposed Changes (COMAR 26.17.01.00, October 15, 2009) is currently under review. The *1994 Maryland Standards and Specifications for Soil Erosion and Sediment Control* (MDE 1994) shall serve as the official guide for erosion-and-sediment-control principles, methods, and practices. The 1994 standards are currently under revision, and a *Draft 2010 Maryland Standards and Specifications for Soil Erosion and Sediment Control* (MDE 2009d) guide is currently under review. Construction activities and BMPs would be implemented according to the Maryland standards and specifications for erosion and sediment control that are in effect at the time of construction. The ESCP would describe the measures implemented to prevent soil erosion during construction by storm water runoff and to prevent sedimentation of storm sewer or receiving streams. In addition, construction contractors would need to develop a site-specific SWPPP prior to construction. All construction BMPs would follow the guidelines provided in the ESCP, site-specific SWPPP, MDE's *Maryland Stormwater Design Manual* and Supplement No. 1 of the manual, and Federal and state permitting processes and regulations.

Assuming proper use of BMPs to provide erosion and sediment control and storm water management on the active construction site, no major, short-term, adverse, effects on water resources would be expected. However, short-term, minor, adverse impacts on water resources could occur from the Proposed Action. Despite construction BMPs, a minor amount of sediment or construction-related pollutants (e.g., fuels, oils, paints, solvents) could be transported during large storm events to Midway Branch. In the event of a spill or leak of fuel or other construction-related products, there could be adverse impacts on surface water quality or groundwater quality. All construction equipment would be maintained according to the manufacturer's specifications and all fuels and other potentially hazardous materials would be contained and stored appropriately. In the event of a spill, procedures outlined in NSA's Spill Prevention, Control, and Countermeasures (SPCC) Plan would be followed to quickly contain and clean up a spill. See **Section 3.10** and **4.10** for a discussion on hazardous materials and wastes.

The Proposed Action would result in a substantial increase in impervious surfaces, as the existing condition of Site M is golf course with permeable vegetated surfaces throughout with patches of tree cover. It is anticipated that the overall building footprint from the Proposed Action would be approximately 1.8 million $ft^2$. According to the general illustrative plan in NSA's Master Plan,

approximately 1.6 million $ft^2$ (36 acres) of impervious surface, including buildings, roads, and sidewalks, could be constructed in Site M-1 from the implementation of Proposed Action (Phase I). The amount of impervious surfaces can be greatly reduced through ESD and nonstructural BMPs. Per the Maryland Stormwater Management Act of 2007 and COMAR 26.17.02, NSA would be required to implement ESD in its storm water management system to the maximum extent practicable through the use of better site design and nonstructural BMPs, and by using appropriate structural BMPs only when absolutely necessary. ESD would be used in order to maintain the predevelopment runoff characteristics post-development and to reduce stream channel erosion, pollution, siltation and sedimentation, and local flooding to the maximum extent practicable. Adherence to the *Maryland Stormwater Design Manual* and updates in Supplement No. 1 of the manual would ensure that post-development storm water runoff characteristics mimic the predevelopment storm water runoff characteristics on Site M.

NSA would comply with the General Performance Standards for Stormwater Management in Maryland, outlined in the *Maryland Stormwater Design Manual* and the updated Supplement No. 1 (MDE 2009c). To prevent adverse impacts from storm water runoff, the State of Maryland has developed performance standards that must be met at development sites, which apply to any construction activity disturbing 5,000 $ft^2$ or more of earth. The *Maryland Stormwater Design Manual* outlines five sizing criteria for storm water management in the State of Maryland, including water quality volume, recharge volume, channel protection storage volume, overbank flood control volume, and extreme flood volume (MDE 2009c).

Adherence to ESD as outlined in the *Maryland Stormwater Design Manual* and the updated Supplement No. 1 of the manual would ultimately attenuate the potential major long-term, adverse impacts the Proposed Action could have on water resources. The following are the performance standards for using ESD that NSA would meet in its storm water management design:

- The standard for characterizing predevelopment runoff characteristics for new development projects shall be woods in good hydrologic condition.
- ESD shall be implemented to the maximum extent practicable to mimic predevelopment conditions.
- As a minimum, ESD shall be used to address both water quality volume and recharge volume requirements.
- Channel protection obligations are met when ESD practices are designed according to the Reduced Runoff Curve Number (RCN) Method (MDE 2009c).

The criteria for sizing ESD practices are based on capturing and retaining enough rainfall so that the runoff leaving a site is reduced to a level equivalent to a wooded site in good condition as determined using USDA, NRCS methods (e.g., Technical Release 55, *Urban Hydrology for Small Watersheds*). The basic principle is that a RCN may be applied to post-development conditions when ESD practices are used. The goal is to provide enough treatment using ESD practices to address channel protection storage volume requirements by replicating an RCN for woods in good condition for the 1-year rainfall event (i.e., replicating the amount of runoff that would be generated by woods in good condition for the 1-year rainfall event), thereby eliminating the need for structural BMPs (MDE 2009c).

***Groundwater.*** With no BMPs in place, an increase in impervious areas would reduce the land that is available for groundwater recharge; however, as required by the Stormwater Management Act of 2007 and COMAR 26.17.02, ESD practices would be used to maintain 100 percent of the average annual predevelopment groundwater recharge volume for the site. This would be accomplished by infiltrating runoff from impervious surfaces back into the groundwater through the use of structural (e.g., bioretention) and nonstructural (e.g., filter strips, buffers, and disconnection of rooftops) methods.

Therefore, no major adverse effects on groundwater recharge would be expected from the Proposed Action.

Operational activities associated with the Proposed Action could result in long-term, negligible to minor, adverse impacts on groundwater quality as a result of sheet runoff or petroleum spills, particularly from parking areas. However, these impacts would be mitigated through planned implementation of the various applicable Federal and state storm water management requirements and adherence to the SWPPP, so that no water quality violations would be expected. BMPs, such as installation of oil-water separators in parking lots, would minimize the potential for pollutants to reach the groundwater.

***Surface Water and Stream Channels.*** Based on the provisions of the Stormwater Management Act of 2007 and COMAR 26.17.01 and 26.17.02, all jurisdictions within Maryland must implement a storm water management program using ESD to control the quality and quantity of storm water runoff resulting from any new development. Per the performance standards for using ESD for storm water management in Maryland, ESD would be implemented to the maximum extent practicable under the Proposed Action so that post development hydrologic conditions mimic predevelopment conditions. For this to occur, NSA would minimize the generation of storm water and maximize pervious areas for storm water management. Per the *Maryland Stormwater Design Manual*, the post development 10-year storm event peak discharge must not exceed the predevelopment peak discharge (MDE 2009c). Therefore, no long-term, major, adverse impacts on surface water would be expected from the Proposed Action.

The water quality volume is the storage needed to capture and treat the runoff from 90 percent of the average annual rainfall. Based on the storm water management sizing criteria formula below, an estimated 2.9 acre-feet of storage on Site M would be necessary to meet the water quality volume requirement for the Proposed Action. This volume can be greatly reduced through the use of nonstructural practices in ESD.

Water Quality Volume (acre-feet) = $[(P)(Rv)(A)]$ 12, where

P = rainfall depth in inches and is equal to 1.0” in the Eastern Rainfall Zone and 0.9” in the Western Rainfall Zone

$R_v$ = volumetric runoff coefficient [0.05 + 0.009(I), where I is percent impervious cover)

A = area in acres (MDE 2009c).

Because storm water management design would only need to capture and treat 90 percent of the average annual rainfall runoff, potential long-term, minor, adverse impacts on water quality could occur. During large storm events, total suspended solids, nutrients, and other pollutants could be directly conveyed to Midway Branch and ultimately the Little Patuxent River without sufficient treatment. Therefore, minor adverse impacts from sedimentation, nutrient loading, and decreased water quality could occur. Because these impacts would generally only be expected during large storm events when the storm water design cannot capture and treat all rainfall, these impacts would likely be sparse and intermittent. New construction design for the Proposed Action would require that a 100-foot forested buffer be established, preserved, and maintained between development and the stream to comply with Maryland’s Coastal Zone Management Program and the U.S. Green Building Council LEED Green Building standards. The buffer would serve as a water quality filter for the removal or the reduction of sediment, nutrients, and toxic substances found in surface runoff (URS/LAD 2009).

Long-term, direct, minor, adverse effects on water quality would be expected from the generation of additional wastewater and long-term, direct, major adverse effects on potable water usage by the estimated 4,400 new personnel brought to Fort Meade by the Proposed Action. Based on Fort Meade’s current population of 109,000 (Fort Meade 2010), this would represent an approximate 4 percent increase

in the population generating wastewater and using potable water. The generation of additional wastewater would likely increase nutrient loads (e.g., nitrogen and phosphorus) within the effluent discharged to the Little Patuxent River. If the average flow to the WWTP were to exceed 3.0 mgd, Fort Meade would be required to notify the MDE and modify their existing NPDES permit. MDE would be notified again if flow were to exceed 4.5 mgd. See **Section 4.9.3** for discussion of the impacts resulting from the Proposed Action on Fort Meade's potable water and sanitary sewer and wastewater system.

Long-term, negligible to minor, adverse impacts on the Little Patuxent River could be expected due to removal of the golf course on Site M. Since some treated wastewater is used for irrigational purposes on the golf course, the conversion of Site M to administrative facilities would reduce the amount of Fort Meade's wastewater that could be reused for irrigation. Therefore, a negligible to minor increase in effluent to the Little Patuxent River would be expected.

Long-term, minor, beneficial effects on water quality would be expected from the removal of the golf course on Site M. The golf course primarily drains into the Midway Branch, which is of concern due to a lack of a substantial riparian buffer between the tributary and the golf course and the associated pollutants from various herbicides, pesticides, and fertilizers used for golf course maintenance on Site M (U.S. Army 2005). According to NSA's Master Plan, a 100-foot forested buffer would be established on the western side of Midway Branch within Site M. This buffer would result in long-term beneficial impacts on surface water quality by intercepting excess storm water volume, pollutants, and sediments and by providing bank stability within Midway Branch.

Long-term, minor, adverse impacts on stream channels could occur from the implementation of the Proposed Action. Large areas of impervious pavement that once were pervious soils increase the speed at which storm water enters channels. If a stream channel cannot accommodate the increased volume of storm water, areas downstream can flood. In addition, the channel morphology of the receiving streams could adjust to accommodate increased flows often resulting in streambank and channel erosion, channel widening, decline in stream substrate quality, and associated impacts on downstream water quality and habitat. Because storm water management design would only need to capture and treat 90 percent of the average annual rainfall runoff, potential adverse impacts on stream channels could still occur. Development from the Proposed Action would likely result in an increased frequency and magnitude of storm water flows, thereby causing Midway Branch to reach bankfull flow more often, which could lead to channel erosion and enlargement. Because these impacts would generally only be expected during large storm events when the storm water design cannot capture and treat all rainfall, these impacts would likely be minimal. New construction design for the Proposed Action would require that a 100-foot buffer be established, preserved, and maintained between development and the streams.

As previously mentioned, NSA's proposed forested buffer would help take up or slow excessive sheet flow prior to it reaching Midway Branch and would provide bank stability; therefore, no major impacts on the channel morphology of Midway Branch would be expected.

The use of ESD practices to the maximum extent practicable would be implemented to address channel protection storage volume. Channel protection volume shall be based on the runoff from the 1-year 24-hour design storm calculated using the reduced RCN. If the reduced RCN for a drainage area reflects "woods in good condition," then the channel protection volume requirement has been satisfied for that drainage area. When the targeted rainfall is not met, any remaining channel protection volume requirements could be treated using structural practices described in the *Maryland Stormwater Design Manual*.

A segment of the Patuxent River (Patuxent River 1) south of Fort Meade is categorized as a High Quality (Tier II) water by MDE. This segment is approximately a half mile in length and occurs upstream of its

confluence with Little Patuxent River (MDE 2010a). Since storm water runoff from Site M would eventually drain into the Little Patuxent River via the Midway Branch, this Tier II segment of the Patuxent River would not receive storm water runoff from the project area as the segment lies upstream of Little Patuxent River's confluence with the Patuxent River. Likewise, wastewater from Fort Meade's wastewater treatment plant is discharged into the Little Patuxent River and ultimately the Patuxent River below this segment. Therefore, no impacts on the Patuxent River 1 Tier II water segment would be expected from the Proposed Action.

***Best Management Practices.*** Post-construction runoff could be minimized using a variety of nonstructural BMPs. Structural BMPs would only be used if additional storm water management is needed after ESD practices were used to the maximum extent practicable.

EO 13514 directs Federal agencies to improve water use efficiency and management; implement high performance sustainable Federal building design, construction, operation, and management; and advance regional and local integrated planning by identifying and analyzing impacts from energy usage and alternative energy sources. EO 13514 also directs Federal agencies to prepare and implement a Strategic Sustainability Performance Plan to manage its greenhouse gas emissions, water use, pollution prevention, regional development and transportation planning, and sustainable building design; and promote sustainability in its acquisition of goods and services. Section 2(g) requires new construction, major renovation, or repair and alteration of buildings to comply with the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings. The CEQ regulations in 40 CFR 1502.16(e) direct agencies to consider the energy requirements and conservation potential of various alternatives and mitigation measures.

Section 438 of the EISA of 2007, Storm Water Runoff Requirements for Federal Development Projects, directs that the sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 $ft^2$ shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with respect to the temperature, rate, volume, and duration of flow. The controls required by USEPA outlined in **Section 3.6.1** would be implemented during design, construction, and operation of the proposed campus development project.

Because it would disturb more than 1 acre of land, the Proposed Action would require an NPDES permit for discharge of storm water to receiving water bodies (i.e., Midway Branch). All NPDES storm water permits issued by the USEPA must incorporate requirements established in the CWA Final Rule. All new construction sites are required to meet the non-numeric effluent limitations and to design, install, and maintain effective erosion and sedimentation controls, as outlined in **Section 3.6.1**. In addition, construction site owners and operators that disturb 1 or more acres of land are required to use BMPs to ensure that soil disturbed during construction activities does not pollute nearby water bodies. Effective August 1, 2011, construction activities disturbing 20 or more acres must comply with the numeric effluent limitation for turbidity in addition to the non-numeric effluent limitations. The maximum daily turbidity limitation is 280 ntu.

Fort Meade provides guidance for the design, construction, and operation of Green Buildings on the installation through its *Green Building Manual* (USACE Baltimore District 2007), which NSA could choose to implement as nonstructural BMPs for storm water management. These include combinations of the following:

- Landscape parking lot islands to manage storm water (e.g., bio-retention ponds, tree plantings)

- Restore and protect the site area where practical (excluding the building footprint) with native or adapted vegetation to maintain or improve water quality on and off the installation
- Where practical, reuse storm water for nonpotable uses in and around buildings to help reduce the quantities of storm water
- Preserve a 100-foot buffer landward from tributary waterways to maintain storm water flow and to reduce adverse impacts from natural runoff, bank erosion, and sedimentation
- Irrigate landscapes with collected and stored rainwater on site
- Establish green/vegetated roofs or walls on buildings and other structures
- Utilize porous pavement.

According to NSA's Real Property Master Plan, green roofs or walls would be utilized for development on Site M (URS/LAD 2009). Additionally, a forested 100-foot buffer would be established on the western side of Midway Branch within Site M. Additional potential practices could include vegetated swales or micro-bioretention to capture and treat runoff from the roads. Likewise, rain gardens and disconnection of rooftop runoff could be used to capture and treat runoff from the facilities.

If the storm water management sizing criteria are not met through the implementation of ESD to the maximum extent practicable, sizing requirements shall be met using the following structural BMPs:

- Storm water retention ponds (e.g., dry extended detention ponds, wet ponds)
- Storm water wetlands (e.g., shallow wetland, extended detention shallow wetland, pond/wetland system, pocket wetland)
- Infiltration practices (e.g., infiltration basin, infiltration trench)
- Storm water filtering systems (e.g., surface or underground sand filters, organic filters, bioretention)
- Open channel systems (e.g., dry swale, wet swale).

### 4.6.4 Alternative 1: Implement Phases I and II

Short-term impacts on water resources would be similar to, but greater than, those described under the Proposed Action. Assuming proper adherence to USEPA's Technical Guidance on Implementing the Stormwater Runoff Requirements under the EISA; the Stormwater Management Act of 2007; COMAR 26.17.01; COMAR 26.17.02, *Stormwater Management*; ESD; and the associated ESCP, Site Development Plan, and site-specific SWPPP, no short-term, major, adverse impacts on water resources would be expected from implementation of Alternative 1.

Long-term impacts on water resources would be expected to be similar to, but greater than, those described under the Proposed Action. Alternative 1 would result in a substantial increase in impervious surfaces, as the existing condition of Site M is mostly golf course with permeable vegetated surfaces throughout and patches of tree cover. It is anticipated that the overall building footprint from Alternative 1 would be approximately 3 million $ft^2$ of operational administrative facilities. According to the general illustrative plan in NSA's Master Plan, approximately 2.8 million $ft^2$ (65 acres) of impervious surface, including buildings, roads, and sidewalks, could be constructed in Site M-1 from the implementation of Alternative 1 (Phases I and II). The amount of impervious surfaces can be greatly reduced through ESD and nonstructural BMPs. Additionally, the implementation of Phase II in addition to Phase I would be expected to increase the installation's population by approximately 1,000 new

personnel to staff the new operational complex. Therefore, the amount of wastewater generated and associated nutrient loads (e.g., nitrogen and phosphorus) in the effluent discharged to the Little Patuxent River would also be expected to increase.

The water quality volume is the storage needed to capture and treat the runoff from 90 percent of the average annual rainfall. Based on the storm water sizing criteria formula defined in **Section 4.6.3**, an estimated 5.1 acre-feet of storage on Site M would be necessary to meet the water quality volume requirement for Alternative 1. This volume can be greatly reduced through the use of nonstructural practices in ESD.

Assuming proper adherence to USEPA's Technical Guidance on Implementing the Stormwater Runoff Requirements under the EISA, the Stormwater Management Act of 2007, COMAR 26.17.02, and ESD as outlined in the *Maryland Stormwater Design Manual*, no long-term, major, adverse impacts on water resources would be expected from the implementation of Alternative 1. However, long-term, minor, adverse impacts on surface and groundwater quality and channel banks could occur.

### 4.6.5 Alternative 2: Implement Phases I, II, and III

Short-term impacts on water resources would be similar to, but greater than, those described under Alternative 1. Assuming proper adherence to USEPA's Technical Guidance on Implementing the Stormwater Runoff Requirements under the EISA; the Stormwater Management Act of 2007; COMAR 26.17.01; COMAR 26.17.02; ESD; and the associated ESCP, Site Development Plan, and site-specific SWPPP, no short-term, major, adverse impacts on water resources would be expected from implementation of Alternative 2.

Long-term impacts on water resources would be expected to be similar to, but greater than, those described under Alternative 1. Alternative 2 would result in a substantial increase in impervious surfaces, as the existing condition of Site M is mostly golf course with permeable vegetated surfaces throughout with patches of tree cover. It is anticipated that the overall building footprint from Alternative 2 would be approximately 5.8 million $ft^2$ of operational administrative facilities. According to the general illustrative plan in NSA's Master Plan, approximately 4.9 million $ft^2$ (112 acres) of impervious surface, including buildings, roads, and sidewalks, could be constructed in Site M-1 from the implementation of Alternative 2 (Phases I, II, and III). The amount of impervious surfaces can be greatly reduced through ESD and nonstructural BMPs. Additionally, the implementation of Phase III in addition to Phases I and II would be expected to increase the installation's population by approximately 2,000 new personnel to staff the new operational complex. Therefore, the amount of wastewater generated and associated nutrient loads (e.g., nitrogen and phosphorus) within the effluent discharged to the Little Patuxent River would also be expected to increase.

The water quality volume is the storage needed to capture and treat the runoff from 90 percent of the average annual rainfall. Based on the storm water sizing criteria formula defined in **Section 4.6.3**, an estimated 8.9 acre-feet of storage on Site M would be necessary to meet the water quality volume requirement for Alternative 2. This volume can be greatly reduced through the use of nonstructural practices in ESD.

Assuming proper adherence to USEPA's Technical Guidance on Implementing the Stormwater Runoff Requirements under the EISA, the Stormwater Management Act of 2007, COMAR 26.17.02, and ESD as outlined in the *Maryland Stormwater Design Manual*, no long-term, major, adverse impacts on water resources would be expected from the implementation of Alternative 2. However, long-term, minor adverse impacts on surface and groundwater quality and channel banks could occur.

# 4.7 Biological Resources

## 4.7.1 Evaluation Criteria

Potential impacts on biological resources are evaluated based on the importance (e.g., legal, commercial, recreational, ecological, scientific) of the resource, the proportion of the resource that would be affected relative to its occurrence in the region, the sensitivity of the resource to proposed activities, and the duration of ecological impacts. A habitat perspective is used to provide a framework for analysis of general classes of impacts (e.g., removal of critical habitat, noise, human disturbance).

Ground disturbance and noise associated with construction activities might directly or indirectly cause potential adverse effects on biological resources. Effects from ground disturbance were evaluated by identifying the types and locations of potential ground-disturbing activities in correlation to important biological resources. Mortality of individuals, habitat removal, and damage or degradation of habitats might be effects associated with ground-disturbing activities.

To evaluate the effects of noise, considerations were given to the number of individuals or critical species involved, amount of habitat affected, relationship of the Proposed Action area to total available habitat within the region, type of stressors involved, and magnitude of the effects.

Under the ESA, Federal agencies are required to provide documentation that ensures that agency actions will not adversely affect the existence of any federally threatened or endangered species. The ESA requires that all Federal agencies avoid "taking" threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with USFWS (and National Marine Fisheries Service) that ends with concurrence on a determination of the risk of jeopardy from a Federal agency project.

## 4.7.2 No Action Alternative

Under the No Action Alternative, DOD would not implement the Proposed Action. No impacts on biological resources (e.g., vegetation, wetlands, wildlife, or threatened and endangered species) would be expected under the No Action Alternative.

## 4.7.3 Proposed Action (Phase I)

***Vegetation.*** Long-term, minor, direct, adverse impacts on the forested areas on the western portion of Site M-1 would be expected as the result of the Proposed Action. Site M-1 includes approximately 137 acres of open and wooded land uses. Clearing and grading, establishing new roads and parking areas, and installing erosion-control and storm water management measures are among the first activities to prepare for full development of Site M-1. Site clearing would require subsequent tree planting integrated into landscaping as appropriate to FCA standards.

Implementation of the Proposed Action would include modification of the Site M FSD Study to determine the extent and characteristics of forest area affected by proposed development. Approximately 1,795 acres of Fort Meade's 5,067 acres are presently forest lands. Forest lands located within the entire Site M project area total approximately 104 acres, which represent approximately 13 percent of the total forest lands existing on the installation. The actual total acreage of forested lands and vegetation disturbed would depend on the design and layout of the different structures or facilities, the number of buildings required, the size and layout of parking facilities, and the constraints of each of the proposed sites. Minor, adverse impacts on vegetation would be expected because most of the site is surrounded and

divided by the golf course, with the areas between fairways and along the outside perimeter of the golf course being the remnant forest.

The Proposed Action would result in long-term, minor, beneficial impacts from the planting of native shrub and tree species. The native shrub and tree species would be planted where possible and vegetation selectively cleared to provide a higher quality habitat, albeit likely of reduced quantity, and maintain linkages between habitat and minimize fragmentation. Large or historic trees (those that are preferred dominant natives, such as oaks and American beech) would be preserved to the greatest extent possible and additional trees planted around them. Buffers of a minimum of 50 feet, with a preferred arrangement of 3 rows, would be installed in areas along connection corridors and other sensitive areas.

In keeping with FCA standards, the installation would preserve 20 percent of the project area as forested. If this is not possible, then alternative sites would be designated for reforestation. Reforestation strategies would include a range of landscape improvements such as onsite street trees, site landscape plantings, and open space plantings in conjunction with other storm water management approaches that could include wetland conservation and enhancement practices. Forestry BMPs and practices to control erosion and sedimentation during clearing and construction activities would be implemented to minimize potential impacts on adjacent forested habitats and water quality. Timber within areas to be developed could be harvested and revenue collected would go into a DOD forestry account to be used for future forestry programs on U.S. Army installations.

***Wetlands.*** Long-term, minor, indirect, adverse impacts on the wetlands on the eastern boundary of Site M-1 could occur as a result of the Proposed Action (see **Figure 3.7-1**). Impacts associated with an increase in impervious surfaces and storm water runoff could include reduction in wetland habitat diversity, change in wetlands species composition, nutrient loading, sedimentation, and modification to hydrologic regimes.

Freshwater wetlands in Maryland are protected by the Nontidal Wetlands Protection Program, which sets a state goal of no overall net-loss of nontidal wetlands acreage and functions. Activities in nontidal wetlands require a nontidal wetland permit or a letter of exemption, unless the activity is exempt by regulation. Any activity that involves excavating, filling, changing drainage patterns, disturbing the water level or water table, grading and removing vegetation in a nontidal wetland, or that is within a 25-foot buffer requires a permit from the MDE.

Long-term, minor, indirect, adverse impacts could occur as a result of an increase in impervious surfaces and storm water runoff if properly designed erosion and sediment control and storm water management practices were not implemented. Implementation and proper maintenance of erosion and sediment control and storm water management practices along with strict adherence to Federal and state permit requirements, site-specific ESCPs, Fort Meade INRMP Wetland Management, Fort Meade's *Green Building Manual*, and Fort Meade's Nutrient Management Plan would minimize potential for these indirect impacts to occur.

***Coastal Zone Management.*** No major adverse impacts would be expected. New construction and operation under the Proposed Action meets the goals and objectives of the Maryland Coastal Zone Management Program by:

- To the extent feasible, consider low-impact development options during the design phase of the projects
- Avoid construction activities within 100 feet of riparian areas where practical

- Avoid construction activities within 100 feet of wetland areas, where practical (MDE requires a 25-foot buffer area for wetlands)
- Avoid construction activities within 100 feet of wetlands meeting the criteria of MDE's Special State Concern
- Development and implementation of a site-specific ESCP and development and implementation of Storm water Management Plan, including SWPPP measures to control storm water runoff.

In addition, Fort Meade would adhere to all Federal and state permit requirements to protect coastal and marine resources and wetland areas. Grading and removing vegetation in a nontidal wetland or within a 25-foot buffer requires a permit from the State of Maryland (U.S. Army 2007).

Based on the above description, the Proposed Action represents minimal foreseeable effects over coastal uses or resources in the State of Maryland. Construction activities represent minor impacts on wetlands. Impervious surfaces would increase in the immediate area of the development, but efforts would be made to minimize the amount, such as adherence to guidelines, as outlined in the Fort Meade INRMP and *Green Building Manual*. This EIS has been provided to MDE as the Federal Coastal Zone Consistency Determination.

***Floodplains.*** Construction of the facilities in the Proposed Action would not occur within the 100-year floodplain. Therefore, no direct, long-term, adverse impacts on floodplains would be expected as a result of the Proposed Action.

Two design criteria from the *Maryland Stormwater Design Manual* apply to floodplains: the overbank flood protection criteria and the extreme flood criteria. Overbank flood protection volume sizing criteria prevent an increase in the frequency and magnitude of out-of-bank flooding generated by development. Overbank flood protection for the 10-year storm would be required. The intent of the extreme flood criteria is to prevent flood damage from large storm events, to maintain the boundaries of the pre-development, 100-year FEMA-designated floodplain, and to protect the physical integrity of BMP control structures.

***Wildlife.*** Short-term, direct, minor adverse impacts would occur on wildlife as a result of temporary noise disturbances associated with construction activities. Some wildlife species occurring in the vicinity of the proposed project area would be expected to have adapted to the variety of noise levels associated with the campus and might move back into the area following site development.

Long-term, direct, moderate, adverse impacts could occur from the mortality of small less-mobile terrestrial species (e.g., reptiles, rodents, and small mammals) as a result of collision with construction equipment. Collision with wildlife would be avoided and less-mobile species would be allowed to avoid, or would be assisted in avoiding, impacts with construction equipment.

Long-term, direct, moderate, adverse impacts would occur as a loss of 1.8 million $ft^2$ of habitat from the building footprint, particularly species with large home ranges. The preservation of areas associated with Midway Creek over time would provide habitat for species that are currently occupying Site M.

***Threatened and Endangered Species.*** No impacts on threatened and endangered species would be expected as a result of implementing the Proposed Action. There are no Federal- or state-listed threatened or endangered species documented or known to occur on or adjacent to any of the potential development sites.

### 4.7.4 Alternative 1: Implement Phases I and II

***Vegetation.*** Minor to moderate, direct, adverse effects would be expected as the result of implementation of Alternative 1. Projects associated with Alternative 1 would convert up to 69 acres of land into developed facilities and associated landscape vegetation. Impacts on vegetation under this alternative would be similar to those described for the Proposed Action (Phase I); however, larger wooded areas exist on the western half of Site M-1. The forested area along O'Brien Road is characterized as chestnut oak forest, dominated by several mature oak species (*Quercus* spp.). Existing vegetation at the project sites would largely be permanently removed during construction (though historic trees would be preserved to the greatest extent possible), and new vegetation would be planted around the new buildings once construction is complete. Impacts on vegetation would be adverse but not major because the project areas considered are located within a golf course, characterized by forested areas surrounding fairways and greens. Vegetation within the developed golf course is characterized by mowed grasses with scattered trees and shrubs. Natural plant communities in these areas have rather low vegetative diversity.

In keeping with FCA standards, the installation would preserve 20 percent of the project area as forested. If this is not possible, then alternative sites would be designated for reforestation. Reforestation strategies would include a range of landscape improvements such as onsite street trees, site landscape plantings, and open space plantings in conjunction with other storm water management approaches that could include wetland conservation and enhancement practices. Forestry BMPs and practices to control erosion and sedimentation during clearing and construction activities would be implemented to minimize potential impacts on adjacent forested habitats and water quality.

***Wetlands.*** Impacts on wetlands under this alternative would be similar to those described for the Proposed Action (Phase I). The primary impact on wetlands under Alternative 1 would be associated with storm water runoff. Long-term, minor, indirect, adverse impacts could occur due to an increase in impervious surfaces and storm water runoff. Implementation and proper maintenance of erosion and sediment control and storm water management practices along with strict adherence to Federal and state permit requirements, site-specific erosion and sedimentation control plans, Fort Meade INRMP Wetland Management, Fort Meade's *Green Building Manual*, and Fort Meade's Nutrient Management Plan would minimize potential for these indirect impacts to occur.

***Wildlife.*** Short-term, direct, minor adverse impacts would occur on wildlife as a result of temporary noise disturbances associated with construction activities. Some wildlife species occurring in the vicinity of the proposed project area would be expected to have adapted to the variety of noise levels associated with the campus and might move back into the area following site development.

Long-term, direct, moderate, adverse impacts could occur from the mortality of small less-mobile terrestrial species (e.g., reptiles, rodents, and small mammals) as a result of collision with construction equipment. Collision with wildlife would be avoided and less-mobile species would be allowed to avoid, or would be assisted in avoiding, impacts with construction equipment.

Long-term, direct, moderate, adverse impacts would occur as a loss of 3.0 million $ft^2$ of habitat from the building footprint. Phase II would have a greater impact on wildlife than the Proposed Action due to the increased amount of habitat loss. The preservation of areas associated with Midway Creek over time would provide habitat for species that are currently occupying Site M.

***Threatened and Endangered Species.*** No impacts on threatened and endangered species would be expected as a result of implementing Phase II. There are no Federal- or state-listed threatened or endangered species documented or known to occur on or adjacent to any of the potential development sites.

### 4.7.5 Alternative 2: Implement Phases I, II, and III

***Vegetation.*** Minor to moderate, direct, adverse impacts on vegetation would be expected as the result of implementation of Alternative 2. The proposed projects, including the consolidated facilities and associated infrastructure, would convert approximately 133 acres of land as part of Phases I, II, and III (41, 28, and 64 acres, respectively). Existing vegetation within the footprint of the proposed projects would be largely be permanently removed during construction (though historic trees would be preserved to the greatest extent possible), and new vegetation would be planted around the buildings once construction is complete.

***Wetlands.*** Impacts on wetlands under this alternative would be similar to those described for the Proposed Action (Phase I). The primary impact on wetlands under Alternative 2 would be associated with storm water runoff. Long-term, minor, indirect, adverse impacts could occur due to an increase in impervious surfaces and storm water runoff. Implementation and proper maintenance of erosion and sediment control and storm water management practices along with strict adherence to Federal and state permit requirements, site-specific ESCPs, Fort Meade INRMP Wetland Management, Fort Meade's *Green Building Manual*, and Fort Meade's Nutrient Management Plan would minimize potential for these indirect impacts to occur.

***Wildlife.*** Short-term, direct, minor adverse impacts would occur on wildlife as a result of temporary noise disturbances associated with construction activities. Some wildlife species occurring in the vicinity of the proposed project area would be expected to have adapted to the variety of noise levels associated with the installation and might move back into the area following site development.

Long-term, direct, moderate, adverse impacts could occur from the mortality of small less-mobile terrestrial species (e.g., reptiles, rodents, and small mammals) as a result of collision with construction equipment. Collision with wildlife would be avoided and less-mobile species would be allowed to avoid, or would be assisted in avoiding, impacts with construction equipment.

Long-term, direct, moderate, adverse impacts would occur as a loss of 5.8 million $ft^2$ of habitat from the building footprints. This phase would have a greater impact on wildlife than the Proposed Action and Phase II due to the increased amount of habitat loss. The preservation of areas associated with Midway Creek over time would provide habitat for species that are currently occupying Site M.

***Threatened and Endangered Species.*** No impacts on threatened and endangered species would be expected as a result of implementing Phase III. There are no Federal- or state-listed threatened or endangered species documented or known to occur on or adjacent to any of the potential development sites.

## 4.8 Cultural Resources

### 4.8.1 Evaluation Criteria

Adverse impacts on cultural resources can include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or that alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

For this Proposed Action, ground-disturbing activities associated with the implementation of the Campus Development for the NSA complex at Site M constitute the most relevant potential effects on cultural resources.

## 4.8.2 No Action Alternative

Under the No Action Alternative, the implementation of Campus Development at Fort Meade would not occur. Baseline conditions for cultural resources as described above would remain unchanged. Therefore, no major impacts on cultural resources would occur as a result of the implementation of the No Action Alternative.

## 4.8.3 Proposed Action (Phase I)

The Proposed Action involves development of the eastern half of Site M-1, supporting 1.8 million $ft^2$ of facilities for a data center and associated administrative space. Although the current design for the Fort Meade Campus Development is conceptual, it is expected that the Proposed Action for Phase I development at Site M-1 would not have major impacts on any previously identified archaeological or architectural resources. However, an undocumented historic cemetery might be present in the northern portion of Site M-1. A 1977 topographic map of Fort Meade shows the presence of a cemetery in the area of golf course fairway 4B, or currently the 3rd hole of the Parks course (see **Figure 3.8-2**). The Proposed Action would potentially have a long-term, major impact on this unrecorded cemetery. Although a ground penetrating radar (GPR) survey conducted in December 2009 in the general location of the undocumented cemetery shown on **Figure 3.8-2** did not verify its presence or absence (HDR|e²M 2010a), precautions are recommended during construction activities on Site M. It is recommended that the undocumented cemetery location be treated as a design constraint and avoided should Site M be developed for an administrative facility. If these resources cannot be preserved in place through avoidance, ground excavation activities should be conducted prior to construction activities to determine presence or absence of the cemetery. Extra precautions, including archaeological monitoring, would also be exercised in the vicinity of the undocumented cemeteries. Fort Meade has developed procedures for treatment of human remains in the event of their unexpected discovery (USACE Baltimore District 2006), which are outlined as follows.

### *Unexpected Discovery of Human Remains*

1. Immediately stop any excavations that discover human remains and make reasonable efforts to protect the burials and the site.
2. Notify the installation commanding officer and the cultural resources manager immediately following the discovery. Contact Fort Meade Military Police and determine the origin of the discovery.
3. Contact the Department of the Interior's Departmental Consulting Archaeologist (DCA), Archeological Assistance Division, National Park Service, P. O. Box 37127, Washington, DC 20013-7127, or by telephone at 202-343-4101, and advise of the nature of the discovery. Provide the DCA all known information concerning the cultural resource, such as resource type, date, location, and size, and any information on its eligibility. The DCA retains the option of notifying and consulting with the ACHP and the SHPO, who could require an onsite examination of the affected remains. The DCA would determine the significance and origins of the remains and what mitigation measures to take.
4. If Fort Meade has reason to know that it has discovered Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony, Fort Meade must provide

immediate telephone notification of the nature of the discovery to the installation commander, and provide via certified mail the written discoverer's confirmation of notification (DCON) to the commander, to the DCA, installation commander, Army Federal Preservation Officer, and Army Headquarters. If the remains are of Native American origin, the Commander should do the following:

a. Take immediate steps, if necessary, to further secure and protect the discovered site, providing appropriate stabilization or covering.

b. Immediately certify receipt of notification by the discoverer.

c. Notify by telephone, and follow with written confirmation, the appropriate federally recognized tribes no later than 3 days after certification of the discovery, and the commander must certify in writing that he has received the DCON. This notification must include pertinent information as to kinds of human remains, funerary objects, sacred objects, or objects of cultural patrimony; their condition; and the circumstances of their discovery.

In addition, two potential historic landscapes evaluated for NRHP eligibility (Applewood and Parks golf courses) overlap Phase I development (see **Section 4.8.5** for full discussion).

## 4.8.4 Alternative 1: Implement Phases I and II

Phases I and II at Site M-1 would not have major impacts on any previously identified archaeological or architectural resources. Impacts on other resources would be similar to those discussed in **Section 4.8.3**.

## 4.8.5 Alternative 2: Implement Phases I, II, and III

Alternative 2 would incorporate all three phases of development (Phases I, II, and III) and encompasses the entire 227-acre development tract referred to as Site M (see **Figure 2.1-1**). Four archaeological resources, including two known archaeological sites (18AN234 and 18AN973) and two undocumented historic cemeteries, are within the area designated for Alternative 2 development. In addition, there are two potential archaeological sites associated with demolished historic buildings (see **Figures 3.8-1** and **3.8-2**). Site 18AN234 consists of a prehistoric site containing Late Archaic/Early Woodland cultural deposits. The site was evaluated during the summer of 2003 and was determined not eligible for the NRHP through subsequent consultation with MHT (USACE Baltimore District 2006). Site 18AN973 (Downs Cemetery and Farmstead) is potentially eligible for the NRHP, although in a separate evaluation, the cemetery component of the site was recommended not eligible for the NRHP. Based on information from the 2006 ICRMP, it is unclear if MHT concurred with this recommendation. In addition to the potential cemetery identified in **Section 4.8.3**, the 1977 topographic map of Fort Meade shows the presence of a cemetery in the area of golf course fairway 13A, or currently the 5th hole of the Applewood course, within Site M.

Currently, no architectural resources at Fort Meade are listed on the NRHP; although the Fort Meade Historic District and a Water Treatment Plant (Building 8688) have been determined eligible by MHT. Initially, no architectural resources were identified within the construction footprint or within the visual APE of the proposed Fort Meade Campus Development at Site M. However, in its public scoping letter (see **Appendix B**), MHT requested that four potential historic properties be formally evaluated for NRHP eligibility and that appropriate DOE forms be submitted to assist in reaching a consensus on eligibility determinations for these resources. These potential architectural resources include the Applewood and Parks golf courses, the Post Sergeant Major's House (Building 6926), and the Golf Course Clubhouse (Building 6865) (MDP-MHT 2009) (see **Figures 3.8-1** and **3.8-2**).

The Applewood or Parks golf courses have not been identified as historic resources; however, both were built by the military in the 1950s and, therefore, might be eligible for the NRHP as historic landscape(s). A subsequent evaluation of the golf courses conducted by DOD concluded that they did not meet the criteria for NRHP eligibility and recommended them as ineligible for listing on the NRHP (HDR|e²M 2010b). The Post Sergeant Major's House and the Golf Course Clubhouse were demolished in the mid-1990s. It should be noted, that while the Post Sergeant Major's House has been demolished, archaeological deposits associated with occupation could still be present and intact.

As identified above, Alternative 2 would potentially have a major impact on three historic properties. These include one previously recorded archaeological site (18AN973/Downs Cemetery and Farmstead) and two undocumented cemeteries. In addition, potential archaeological components associated with Post Sergeant Major's House could potentially be affected. Although a GPR survey conducted in December 2009 in the general location of the undocumented cemeteries shown on **Figure 3.8-2** did not verify their presence or absence (HDR|e²M 2010a), it is recommended that construction activities follow the procedure for unexpected discovery of human remains described in **Section 4.8.3**. It is recommended that 18AN973 (Downs Cemetery and Farmstead) and the Post Sergeant Major's House also be treated as a design constraint and avoided should Site M be developed for an administrative facility. If these resources cannot be preserved in place through avoidance, additional studies would be required to be conducted to evaluate these sites for NRHP eligibility.

# 4.9 Infrastructure and Sustainability

## 4.9.1 Evaluation Criteria

The analysis to determine potential impacts on infrastructure, infrastructure systems, and sustainability considers primarily whether a proposed action would exceed capacity or place unreasonable demand on a specific utility. Impacts might arise from energy needs created by either direct or indirect workforce and population changes related to installation activities. Pursuant to EOs 13514 and 13423, impacts from energy usage and alternative energy sources are also evaluated. Impacts would be considered major if implementation of the Proposed Action resulted in exceeded capacity of a utility, long-term interruption of the utility, violation of a permit condition, or violation of an approved plan for a utility. It is assumed that construction contractors would be well-informed of utility locations prior to any ground-disturbing activities that could result in major unintended utility disruptions or human safety hazards, and all ground-disturbance required for utility line installation and facility construction would be accomplished in accordance with Federal and state safety guidelines. In addition, any permits required for excavation and trenching would be obtained prior to the commencement of construction and demolition activities.

The placement of utilities in utility corridors at the NSA campus would provide a comprehensive utility management approach for main utility arteries. Most of the mechanical utility systems, which include water, natural gas, and steam, would be sized based on the largest existing utility sizes that are sufficient for both existing and future growth (URS/LAD 2009).

## 4.9.2 No Action Alternative

Under the No Action Alternative, no adverse impacts would be expected. The DOD would not develop Site M on a phased, multiyear basis. NSA operations and similar or related operations of other Intelligence Community agencies would continue at their present locations and there would be no change in infrastructure.

## 4.9.3 Proposed Action (Phase I)

The Proposed Action (Phase I) would result in the use of many of the existing infrastructure and utility resources discussed in **Section 3.9.2**. Phase I would include the development infrastructure that would support the proposed facilities and increased personnel including electrical substations and generator plants; chiller and boiler plants; a water storage tower; water, gas, and communications services; storm water management; security systems; and multi-level parking facilities.

### Water Supply

Short-term, negligible to major, and long-term, major, adverse impacts on water supply would be expected. The NSA currently receives 1.2 mgd from the WTP, which equals approximately 16 percent of the current WTP design capacity and approximately 35 percent of the current WTP production capacity. Additionally, there are two water supply wells adjacent to the NSA campus that serve the National Cryptologic Museum and are permitted for withdrawal of an annual average of 0.018 mgd (DOD 2009a, URS/LAD 2009). Water demand would increase slightly during construction activities associated with the Proposed Action, which would result in short-term, negligible, adverse impacts. However, potential increases in water demand associated with construction activities would be temporary and are not anticipated to exceed existing capacity. The existing NSA campus and the new facility would temporarily be in operation at the same time, until the transition from the existing NSA campus to the new facility was completed and portions of the existing NSA campus taken off-line as a result of personnel in those portions relocating to the new facility. During this time period (5 to 7 years), water demand would increase significantly, and impacts on water supply would be short-term, major, and adverse. Potential increases in water demand associated with the operation of these two facilities concurrently would not be expected to exceed existing capacity.

It is assumed that the two server centers would be cooled by a 50-MW closed-loop chilled water system (i.e., cooling tower), that would use internal circulation with a minimum of two water cycles, and six- to eight-cycle treatment is being considered. Upon completion of the Proposed Action, there would be a long-term, major increase in potable water demand due to operation of the cooling system and an increase in personnel at Site M. A preliminary estimate of the amount of water required for operation of the cooling tower is approximately 1 mgd (based on 20,000 gallons per day [gpd], per MW). Approximately 6,500 personnel would be located at the proposed facilities at Site M. It is assumed that one-third of the 6,500 personnel (approximately 2,166) are already on Fort Meade and the remaining additional personnel (approximately 4,333) would come from positions at other Intelligence Community locations throughout the Baltimore-Washington metropolitan area. Using the per capita water consumption of 75 gpd (Fort Belvoir 2007), the estimated amount of potable water required for the addition of approximately 4,333 personnel would be 325,000 gpd (0.32 mgd). The total estimated long-term increase in potable water demand, including the amount of potable water required for operation of the cooling tower and addition of approximately 4,333 personnel would be 1.32 mgd. This estimate would equal 18 percent of the current WTP design capacity and 39 percent of the current WTP production capacity and, therefore, would not be expected result in exceedance of existing capacity.

Implementation of BMPs and sustainable design techniques would reduce the demand on the water supply and help minimize adverse impacts (see **Section 4.9.6**). As the Proposed Action is implemented, the NSA would continue to maintain compliance with all Federal, state, and local regulations regarding water supply.

### Sanitary Sewer and Wastewater System

The existing NSA campus and the new facility would temporarily be in operation at the same time, until the transition from the existing NSA campus to the new facility was completed. During this time period (5 to 7 years), the demand for wastewater treatment would increase, and impacts on the sanitary sewer and wastewater system would be short-term, minor, and adverse. Potential increases in wastewater treatment associated with the operation of these two facilities concurrently would not be expected to exceed existing capacity.

Long-term, minor, adverse impacts on sanitary sewer and wastewater systems would be expected. The increase of personnel would result in a long-term increase in demand for wastewater collection and treatment. The WWTP operates under an NPDES permit (Permit No. 07-DP-2533). Because a more stringent nitrogen load cap was imposed by MDE, to remain in compliance with the NPDES permit the capacity of the WWTP is limited by more than half of the original design capacity. In order to meet the increased wastewater demand resulting from the 4 percent increase in personnel under the Proposed Action on the installation, the WWTP would need to be upgraded. Currently, the average flow to the WWTP is 2.5 mgd (Anne Arundel County 2010b). If the average flow to the WWTP were to exceed 3.0 mgd, Fort Meade would be required to notify the MDE and modify their existing NPDES permit. MDE would be notified again if flow were to exceed 4.5 mgd.

A 2007 Wastewater Systems Report was conducted for Fort Meade that considered NSA expansion on Site M totaling 8,400 persons, which would require an additional average daily demand of approximately 0.5 mgd. The report identified the following actions that would be needed to increase capacity of the WWTP:

- Retrofit the existing WWTP treatment process and replace filters to meet NPDES biological nutrient removal and the Chesapeake Bay Initiative
- Upgrade Site Safety and Security at the WWTP
- Upgrade Instrumentation and Controls at the WWTP
- Upgrade wastewater collection pump stations
- Inflow/infiltration control (URS/LAD 2009).

In addition to upgrading the WWTP, the current 18-inch gravity main (line “C”) that runs through the golf courses would need to be expanded in size and relocated east of Sites M-1 and M-2. The relocated line would provide the primary sanitary sewer discharge for Site M. The discharge would then continue to flow through existing sanitary lines and pump stations before reaching the WWTP. New sanitary building connection lines for facilities in Sites M-1 and M-2 would be connected to site mains running along the new roads and ultimately connect to line “C.” The sanitary flow from an existing 12-inch gravity main, northeast of Site M-1, currently connected to the existing 18-inch line, could be redirected, as needed, to accommodate the gravity mains and optimize gravity flow. In addition, the WWTP line connection options would be using the WWTP line exiting the DISA facility or construction of a separate dedicated line for the facility proposed for Site M.

The northwestern corner of Site M-1 slopes generally to the west, away from the sanitary sewer line that runs through Sites M-1 and M-2. There are two options for sanitary sewer connection in this area. One option would be to connect the existing services to the west, in the 9800 Area. However, additional flows from this option could potentially create a need to upgrade the existing sanitary sewer facilities in the 9800 Area and beyond. The second option would be to use a pump station to force the flows east to the sanitary sewer facilities, which would eliminate the need to upgrade the existing facilities in the

9800 Area. It would also maintain the single connection point to Fort Meade services south of Sites M-1 and M-2 (URS/LAD 2009).

### Storm Water Drainage System

Short- and long-term, negligible to minor, adverse impacts on storm water drainage systems would be expected. Ground disturbance resulting from the Proposed Action would temporarily increase the potential for soil erosion-and-sediment-transport during sheet flow runoff. Soil compaction and increased impermeable surfaces (e.g., new structures, pavements, and sidewalks) would decrease storm water permeation into the ground and thereby permanently increase sheet flow runoff into the storm water drainage system.

According to the Code of Maryland Regulations regarding storm water management, construction projects that disturb more than 5,000 $ft^2$ of earth require a Storm Water Management Plan. In addition, the NSA would be required to follow the latest MDE guidelines and the Maryland Storm Water Design Manual (Volumes I and II) when developing storm water criteria for new development on Site M (see **Section 4.6** for a discussion of MDE guidelines and the Maryland Storm Water Design Manual).

Implementation of BMPs and sustainable design techniques would limit adverse impacts on the storm water drainage system. The Fort Meade Environmental Division has developed the *Green Building Manual* to assist new construction in meeting LEED silver and above ratings at the installation. ESD techniques are strongly recommended in the manual. The MDE approval process for new development would ensure ESD techniques would be evaluated and implemented, where practical, to reduce the impervious footprint (see **Section 4.9.6**).

### Electrical System

Short- and long-term, negligible to major, adverse impacts from the use of energy would be expected. The amount of electrical power required for operation of the proposed facilities is 50 MW. The supplier of the electrical power has not yet been determined. BGE is the local electric utility; however, the source of the electric power is subject to NSA power purchase agreements with available suppliers. The existing NSA campus and the new facilities would temporarily be in operation at the same time, until the transition from the existing NSA campus to the new facility was completed. During this time period (5 to 7 years), electricity demand would temporarily increase, and impacts on the electrical system would be negligible to major. In addition, there would be a long-term increase in electricity demand associated with operation of the proposed facilities upon completion of the transition period. The level of the short- and long-term impacts would depend on the available capacity of the supplier. Two substations (East Substations) would be constructed on Site M-1. A primary-power generator plant would be directly connected to the East Substations. The East Substations and primary-power generator plant would support the entire operational complex on Site M. The numbers of primary and redundant electrical and telecommunication ductbanks within the recommended utility easements would be sized based on an additional 50 percent ductbank spare capacity in order to provide opportunity for future growth and flexibility (URS/LAD 2009).

Implementation of BMPs and sustainable design techniques would be used throughout the project to minimize adverse impacts from the construction and operation of the facility. These techniques could include evaluation of energy and water-use efficiency and green construction and material specifications in order to limit adverse impacts on the electrical system (see **Section 4.9.6**).

As stated in **Section 2.2.3.1**, part of the Proposed Action includes the construction of emergency generator facilities to ensure a redundant power supply. There are three alternatives for emergency power generation equipment: (1) stationary internal combustion engines, (2) natural gas-fired combustion

turbines, and (3) natural gas-fired microturbines; however, natural gas-fired microturbines are not considered to be a viable alternative because of their high capital cost and the time it takes the microturbines to generate useful power. Therefore, only the impacts from stationary internal combustion engines and natural gas-fired combustion turbines are evaluated in this EIS (see **Section 4.4**).

### Natural Gas System

Short- and long-term, minor, adverse impacts on natural gas systems would be expected. The current natural gas capacity is 445,000 $ft^3$/hr supplied by seven BGE meters. The capacity can be exceeded by 25 percent and its current demand by 300 percent. The existing NSA campus and the new facilities would temporarily be in operation at the same time, until the transition from the existing NSA campus to the new facility was completed. During this time period (5 to 7 years), natural gas demand would temporarily increase, and impacts on the natural gas system would be anticipated to be minor. In addition, there would be a long-term increase in natural gas demand associated with operation of the proposed facilities upon completion of the transition period. The supplier and amount of natural gas required for operation of the proposed facilities has not yet been determined; however, if natural gas would be provided by the existing supplier, the amount of natural gas required would not exceed existing capacity. If natural gas would not be provided by the existing supplier, the significance of the impacts would depend on the available capacity of the supplier. A new gas line connection would be tapped into the existing 8-inch line that runs adjacent to Site M, along O'Brien Road, and would loop Site M-1, Site M-2, the 9800 Area, the South Campus, and the Big 3. Facilities at Site M requiring natural gas would connect to the gas mains in the utility easement (URS/LAD 2009).

### Solid Waste

Short- and long-term, minor, adverse impacts would be expected. Any increases in solid wastes associated with the construction phases of the Proposed Action or with operating the existing NSA campus and the new facilities concurrently until the transition from the existing facility to the new facility was completed would be minimal, temporary in nature, and would be disposed of in accordance with relevant Federal, state, and local regulations. Construction materials would be recycled or reused to the greatest extent possible. Construction debris that could not be recycled or reused would be taken off-installation by the general contractor to an approved construction and demolition landfill within the vicinity of the installation. There would be a long-term increase in solid waste due to an increase in personnel at Site M-1; however, all solid waste would be disposed of in accordance with current NSA waste contracts. If the recipient landfill is the King George Landfill, this landfill's available capacity was approximately 88 percent in 2000. Therefore the increase in solid waste associated with the increase in personnel would not be expected to exceed current capacity.

Implementation of BMPs and sustainable design techniques would reduce the amount of solid waste taken offsite and would limit adverse impacts on solid waste management (see **Section 4.9.6**).

### Communication System

No adverse impacts would be expected. Modern telecommunications fiber optics and cabling infrastructure would be provided to the proposed facilities at Site M-1. Telecommunication ductbanks would be extended to the new development parcels in the easements established adjacent to new roads. The ductbanks would be sized to handle the system that is needed for new development at Site M-1 and future development at Site M. A revised telecommunications plan for the extension of these systems would be developed after the land uses were approved in conjunction with the design of the new facilities at Site M-1.

### Liquid Fuel Supply

Long-term, negligible, direct, adverse impacts would be expected, as the amount of liquid fuel stored on site would increase. Site M would be served by one or more boiler facilities, which would have a required total fuel capacity of approximately 246,000 gallons. Stationary internal combustion engines, powered by diesel fuel, would provide emergency electrical power. The diesel fuel would need to be stored in permanent ASTs. Each AST would be approximately 20,000 gallons in size, and the total diesel fuel storage capacity would be between approximately 440,000 and 480,000 gallons. It is anticipated that any increases in demand on liquid fuel systems would not exceed capacity. The liquid fuel would be transferred, stored, and disposed of in accordance with all applicable Federal and state requirements.

### Heating and Cooling System

Long-term, beneficial impacts on heating and cooling capabilities would be expected. The proposed boiler and chiller plants would be modern and energy-efficient, thereby providing heating and cooling to Site M at a reduced energy cost. It is assumed that boilers would be rated up to 98 million British thermal units per hour. The proposed chiller plant would consist of a closed-loop system with evaporative loss at a rate to be determined as design progresses. The proposed boiler and chiller plants would be constructed in the northeastern portion of Site M-1 to serve the proposed facilities at Site M.

### Pavements

Long-term, minor to moderate impacts would be expected. The parking demand requirement generated by each facility would be based on the number of employees that the facility could house. Parking would be provided to meet 92 percent of the maximum demand for each facility (i.e., 9 parking spaces for every 10 employees that could normally be expected to occupy each facility). This proportion would allow for 1 in 10 employees to be out sick, on travel, rideshare, or use an alternate form of transportation each day. It also anticipates that some employees might be absent in the morning while others leave early in the afternoon. Portions of the total parking provided would be designated for visitors and for handicapped employees and visitors. A row of parking garages would be constructed along the northern side of the proposed Road B extending across the center of Site M-1 from west to east. The parking garages would provide 85 percent of the parking required for the proposed facilities. The remaining 15 percent of the parking would be in surface parking lots in front of the facilities. Each parking garage would accommodate approximately 422 parked vehicles on each of the five levels (2,110 parking spaces total). The lower level of the parking garage would be at the ground surface and perimeter walls, and all levels would be sufficiently open to allow ample daylight and airflow throughout the garage (URS/LAD 2009).

The sidewalk system would be expanded to provide a continuous safe and comfortable pedestrian experience between the proposed facilities and parking areas. Crosswalks would be constructed at major pedestrian crossings of roadways. Vehicular/pedestrian conflicts would be addressed by constructing bridges over the roadways between garages and the proposed facilities at Site M. The walkways and cross walks would be designed to comply with the provisions of the American with Disabilities Act (URS/LAD 2009).

Implementation of BMPs and sustainable design techniques would limit adverse impacts potentially resulting from increased pavements (see **Section 4.9.6**).

## 4.9.4 Alternative 1: Implement Phases I and II

Under Alternative 1, the NSA would conduct all of the actions described under the Proposed Action (Phase I), and in addition, would implement Phase II, which would include the development of 1.2 million $ft^2$ of operational administrative facilities.

Alternative 1 would have similar impacts on the sanitary sewer and wastewater system, storm water drainage system, electrical system, natural gas system, communication system, security systems, liquid fuel supply, heating and cooling systems, and pavements as the Proposed Action (see **Section 4.9.3**). Additional impacts are described in the following paragraphs.

### Water Supply

Alternative 1 would have similar short- and long-term, adverse impacts on water supply as the Proposed Action (See **Section 4.9.3**). However, long-term, adverse impacts would be slightly greater in magnitude due to increased personnel and subsequent increase in potable water demand.

Upon completion of Alternative 1, a total of approximately 8,000 personnel (6,500 from Phase I and 1,500 from Phase II) would be located at the proposed facilities at Site M. It is assumed that one-third of the 8,000 personnel (approximately 2,667) are already on Fort Meade and the remaining additional personnel (approximately 5,333) would come from positions at other Intelligence Community locations throughout the Baltimore-Washington metropolitan area. Using the per capita water consumption of 75 gpd (Fort Belvoir 2007), the estimated amount of potable water required for the addition of approximately 5,333 personnel would be 400,000 gpd (0.40 mgd). The total estimated long-term increase in potable water demand, including the amount of potable water required for operation of the cooling system for the two service centers (Phase I) and addition of approximately 5,333 personnel would be 1.40 mgd. This estimate would equal 19 percent of the current WTP design capacity and 41 percent of the current WTP production capacity and, therefore, would not be expected to result in exceedance of existing capacity.

Implementation of BMPs and sustainable design techniques would reduce the demand on the water supply and limit adverse impacts (see **Section 4.9.6**). As Alternative 1 is implemented, the NSA would continue to maintain compliance with all Federal, state, and local regulations regarding water supply.

### Solid Waste

Alternative 1 would have similar short- and long-term, adverse impacts on solid waste as the Proposed Action (see **Section 4.9.3**). However, short-term, adverse impacts would be slightly greater in magnitude due to demolition activities, resulting in additional solid waste generation. Demolition materials would be recycled or reused to the greatest extent possible. Demolition debris that could not be recycled or reused would be taken off-installation by the general contractor to an approved construction and demolition landfill within the vicinity of the installation. Implementation of BMPs and sustainable design techniques would reduce the amount of solid waste taken off site and would limit adverse impacts on solid waste management (see **Section 4.9.6**).

## 4.9.5 Alternative 2: Implement Phases I, II, and III

Under Alternative 2, the NSA would conduct all of the actions described under Alternative 1 (Phases I and II), and in addition, would implement Phase III, which would include the development of 2.8 million $ft^2$ of operational administrative facilities. Upon completion of Alternative 2 (all three phases), the total number of increased personnel at Site M would be 11,000 people and all of Site M (5.8 million $ft^2$) would be developed.

Alternative 2 would have similar impacts on the storm water drainage system, electrical system, natural gas system, communication system, security systems, liquid fuel supply, heating and cooling systems, pavements, and solid waste as Alternative 1 (see **Section 4.9.4**). Additional impacts are described in the following paragraphs.

### Water Supply

Alternative 2 would have similar short- and long-term, adverse impacts on water supply as the Proposed Action (See **Section 4.9.3**). However, long-term, adverse impacts would be slightly greater in magnitude due to increased personnel and subsequent increase in potable water demand.

Upon completion of Alternative 2, a total of approximately 11,000 personnel (6,500 from Phase I, 1,500 from Phase II, and 3,000 from Phase III) would be located at the proposed facilities at Site M. It is assumed that one-third of the 11,000 personnel (approximately 3,667) are already on Fort Meade and the remaining additional personnel (approximately 7,333) would come from positions at other Intelligence Community locations throughout the Baltimore-Washington metropolitan area. Using the per capita water consumption of 75 gpd (Fort Belvoir 2007), the estimated amount of potable water required for the addition of approximately 7,333 personnel would be 550,000 gpd (0.55 mgd). The total estimated long-term increase in potable water demand, including the amount of potable water required for operation of the cooling system for the two service centers (Phase I) and addition of approximately 7,333 personnel would be 1.55 mgd. This estimate would equal 21 percent of the current WTP design capacity and 46 percent of the current WTP production capacity and, therefore, would not be expected result in exceedance of existing capacity.

Implementation of BMPs and sustainable design techniques would reduce the demand on the water supply and limit adverse impacts (see **Section 4.9.6**). As Alternative 2 is implemented, the NSA would continue to maintain compliance with all Federal, state, and local regulations regarding water supply.

### Sanitary Sewer and Wastewater System

The 2007 Wastewater Systems Report conducted for Fort Meade considered expansion on Site M totaling 8,400 persons. Upon completion of Alternative 2, approximately 11,000 personnel would be located at the proposed facilities at Site M. It is estimated that one-third of the personnel (approximately 3,667 people) that would staff the new development are already on Fort Meade. The remaining personnel (approximately 7,333 people) would come from positions at other Intelligence Community locations throughout the Baltimore-Washington metropolitan area. If the suggested upgrades to the WWTP discussed in **Section 4.9.3** would not sufficiently increase capacity to support the addition of approximately 7,333 personnel, further upgrades and expansion of the WWTP would be needed to limit major adverse impacts on the sanitary sewer and wastewater system. If the suggested upgrades to the WWTP discussed in **Section 4.9.3** sufficiently increased the capacity to support the addition of approximately 7,333 personnel, Alternative 2 would have long-term, minor, adverse impacts on the sanitary sewer and wastewater system. Implementation of BMPs and sustainable design techniques would further reduce the demand on the sanitary sewer and wastewater system and limit adverse impacts (see **Section 4.9.6**). In addition, a study would be conducted to address insufficient wastewater line capacities.

### Solid Waste

Alternative 2 would have similar short- and long-term, adverse impacts on solid waste as the Proposed Action (see **Section 4.9.3**). However, short-term, adverse impacts would be slightly greater in magnitude due to demolition of the golf course clubhouse which would result in additional solid waste generation. Demolition materials would be recycled or reused to the greatest extent possible. Demolition debris that could not be recycled or reused would be taken off-installation by the general contractor to an approved construction and demolition landfill within the vicinity of the installation. Implementation of BMPs and sustainable design techniques would reduce the amount of solid waste taken off site and would limit adverse impacts on solid waste management (see **Section 4.9.6**).

### 4.9.6 BMPs and Sustainable Design Techniques

EO 13514, *Federal Leadership In Environmental, Energy, And Economic Performance*, dated October 5, 2009, directs Federal agencies to improve water use efficiency and management; implement high performance sustainable Federal building design, construction, operation, and management; and advance regional and local integrated planning by identifying and analyzing impacts from energy usage and alternative energy sources. EO 13514 also directs Federal agencies to prepare and implement a Strategic Sustainability Performance Plan to manage its greenhouse gas emissions, water use, pollution prevention, regional development and transportation planning, and sustainable building design; and promote sustainability in its acquisition of goods and services. Section 2(g) requires new construction, major renovation, or repair and alteration of buildings to comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*. The CEQ regulations at 40 CFR 1502.16(e) directs agencies to consider the energy requirements and conservation potential of various alternatives and mitigation measures.

Section 503(b) of EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, instructs Federal agencies to conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically, and fiscally sound, integrated, continuously improving, efficient, and sustainable manner. EO 13423 sets goals in energy efficiency, acquisition, renewable energy, toxic chemical reduction, recycling, sustainable buildings, electronics stewardship, fleets, and water conservation (USDOE 2007). Sustainable design measures such as the use of "green" technology (e.g., photovoltaic panels, solar collection, heat recovery systems, wind turbines, green roofs, and habitat-oriented storm water management) would be incorporated where practicable.

The measures detailed in this section are intended to implement these requirements. One mechanism for measuring the sustainability of a proposed project is LEED, developed by the Green Buildings Council. The LEED Green Building Rating System is organized into six major credit categories (1) sustainable sites, (2) water efficiency, (3) energy and atmosphere, (4) materials and resources, (5) indoor environmental quality, and (6) innovation and design processes. Most credit categories have both prerequisites and credits. Credits can be pursued to achieve points, and depending on the points a project earns, there are four levels of certification under the LEED Rating System including Certified (lowest level), Silver, Gold and Platinum (highest level). At a minimum, sustainability features that can be cost-effectively integrated to meet LEED Green Building Rating System Silver would be required for the Proposed Action.[3] The LEED credit categories and specific strategies related to those categories regarding infrastructure include the following:

- *Sustainable Sites* – heat island effect, green roofs, and storm water design
- *Water Efficiency* – innovative wastewater technologies and water-use reduction
- *Energy and Atmosphere* – energy-efficient building systems (i.e., centralized heating and cooling systems), onsite renewable energy, and green power
- *Materials and Resources* – recycled materials and local/regional materials (URS/LAD 2009).

[3] The information regarding the LEED Rating System contained in this EIS refers to LEED for New Construction Version 2.2. The LEED Rating System is undergoing a major revision which includes a more stringent rating system, especially in the area of energy efficiency. The strategies that contribute to a LEED Silver rating might be different in the new version.

***Heat Island Effect.*** "Heat island" refers to built up areas that have hotter surface and air temperatures than nearby rural areas. Heat island effect occurs when impermeable surfaces such as buildings, roads, and other infrastructure replace open land and vegetation (USEPA 2009a). In order to reduce heat island effect at Site M, a majority of parking areas would be constructed under cover (under buildings, decks, or roofs). In addition, site hardscape would be made of highly reflective materials with a Solar Reflectance Index value of at least 29, which would equate to light-colored materials such as gray or white concrete. If use of such materials is not be feasible, the NSA could incorporate open-grid paving systems (pavement that is pervious to water), which contribute to a reduction of the heat island effect and increase storm water infiltration. Heat island effect could also be reduced at Site M by shading paved surfaces with trees, solar panels, or other features. Each area of the development would be evaluated to determine the most appropriate options for reducing heat island effect in non-roof areas (URS/LAD 2009).

***Green Roofs.*** Green roofs are vegetative layers grown on a rooftop that provide shade and remove heat from the air through evapotranspiration, reducing temperatures of the roof surface and surrounding air (USEPA 2009b). Green roofs provide added insulation for buildings, help reduce storm water runoff, improve storm water runoff quality, and minimize heat island effect. The NSA would evaluate the costs and benefits of various roof options, including using roofs for alternative energy generation to minimize impacts potentially resulting from an increase in facilities, storm water runoff, and pavements (URS/LAD 2009).

***Storm Water Design.*** Facilities and associated infrastructure would be designed using a variety of techniques to control the quantity and quality of water being released. Specifically, storm water retention ponds would be developed to capture and filter runoff. Bioswales and rain gardens could be used to help channel runoff and filter water before it is released to ponds offsite. Bioswales are storm water runoff conveyance systems that absorb low flows or carry runoff from heavy rains and snowmelt to storm sewer inlets or surface waters (USDA/NRCS 2007). Rain gardens are small gardens which are designed to withstand the extremes of moisture and concentrations of nutrients, particularly nitrogen and phosphorus that are found in storm water runoff. Rain gardens are ideally sited close to the source of the runoff and serve to slow the storm water as it travels downhill, giving the storm water more time to infiltrate (LIDC 2007). The NSA would evaluate the use of storm water cisterns that would capture storm water runoff and make it available for reuse onsite for irrigation purposes or as a substitute for potable water in toilets, urinals, or process water (URS/LAD 2009).

ESD techniques could be appropriate if opportunities exist to reduce the life-cycle cost of the site's storm water infrastructure. Some examples of ESD strategies include grading to encourage sheet flow and lengthen flow paths; maintaining natural drainage divides to keep flow paths dispersed; disconnecting impervious areas such as pavement and roofs from the storm drain network, allowing runoff to be conveyed over pervious areas instead; preserving the naturally vegetated areas and soil types that slow runoff, filter out pollutants, and facilitate infiltration; directing runoff into or across vegetated areas to help filter runoff and encourage recharge; using rain barrels and cisterns, soil amendments, tree box filters, vegetated buffers, and vegetated roofs (URS/LAD 2009).

***Innovative Wastewater Technologies.*** The NSA would consider the feasibility of innovative wastewater technologies that minimize the discharge of wastewater into sewers. Permitting implications associated with treatment and reuse efforts would need to be assessed (URS/LAD 2009).

***Water Use Reduction.*** The Proposed Action would include low-flow and no-flow water fixtures in buildings, where applicable. This includes low-flow faucets, showerheads, and toilets and no-flow urinals. Incorporation of these technologies would help reduce the overall project demand for water from Fort Meade utility systems and achieve up to three LEED points under the current rating system

(URS/LAD 2009). Use of a six- to eight-cycle treatment and gray water are being considered for the server centers' cooling system.

***Energy-Efficient Building Systems.*** The proposed facilities at Site M would be oriented to maximize passive solar heating and daylighting (using the Sun to brighten the interior of a building) to help lower energy costs and reduce lighting needs. To the extent feasible, light shelves would also be used that would shade south-facing windows in summer months while bouncing light into the building. Installing daylight sensors in the proposed facilities could also help reduce energy use by dimming interior lights on sunny days. The implementation of these strategies is dependent on the ability for facilities to incorporate windows and maintain proper security levels. To help further reduce the carbon footprint and reduce energy bills, the Proposed Action would include energy-efficient building systems such as the following:

- Energy-efficient lighting fixtures
- High-efficiency heating, ventilation, and air conditioning systems with variable speed motors, fans, and pumps
- Cogeneration systems that use waste heat from one system/process to power or heat other systems
- Highly insulated and efficient building envelopes
- Centralized heating and cooling systems (URS/LAD 2009).

The NSA would assess the feasibility of incorporating geothermal systems under parking garages and parking lots or as part of storm water retention ponds to further reduce energy demands across the project. The NSA could conduct pilot projects for this type of system under a garage area or parking area to evaluate the utility of the system and the energy savings that could be achieved (URS/LAD 2009).

***Onsite Renewable Energy and Green Power.*** The NSA would consider the feasibility of incorporating renewable energy systems throughout the NSA campus. This would include the installation of photovoltaic systems and solar hot water heaters on rooftops or over parking structures. It could also include the application of integrated solar photovoltaics on building façades. Incorporation of renewable energy on site would not only help to offset rising energy bills, it might present opportunities to test and advance new energy technologies and eventually provide energy independence for the facility. The NSA could conduct pilot projects for photovoltaic and wind alternatives to evaluate their effectiveness. Knowledge gained through pilot projects would provide insights into how these green technologies could be incorporated more broadly across the NSA campus and in areas that are scheduled to be demolished. Previously developed areas could be candidates for conversion to alternative energy farms, depending on nearby structures (URS/LAD 2009).

In addition to onsite renewable energy generation, NSA would consider entering into a power purchase agreement with BGE to supply power from renewable or sustainable sources in accordance with EO 13514 and its Strategic Sustainability Performance plan.

***Recycled Materials.*** The proposed facilities would be designed to accommodate recycling programs for the following items at a minimum: paper, cardboard, glass, plastics, and metals. The Proposed Action would incorporate materials with high recycled content. This would help reduce the demand for raw materials. Materials with high recycled content include steel, ceiling panels, gypsum wallboard, and glass. The exact percentage of these materials would be determined based on the final building designs (URS/LAD 2009).

***Local/Regional Materials.*** Materials used for the Proposed Action would be from local or regional sources (manufactured, harvested, extracted, or processed within 500 miles of the project area). This

would encourage local markets and help reduce air pollutants and energy used to transport goods. Common materials that can be found within 500 miles of Site M include carpet, steel, wallboard, and glass. The exact percentage of these materials would be determined based on the final building designs (URS/LAD 2009).

# 4.10 Hazardous Materials and Wastes

## 4.10.1 Evaluation Criteria

Impacts on hazardous materials or hazardous waste management would be considered adverse if the Proposed Action or proposed alternatives resulted in noncompliance with applicable Federal or state regulations, or increased the amounts generated or procured beyond current waste management procedures and capacities. Impacts on the Environmental Restoration Program (ERP) would be considered adverse if the Proposed Action or proposed alternatives disturbed or created contaminated sites resulting in negative effects on human health or the environment, or if the Proposed Action or proposed alternatives made it more difficult or costly to remediate existing contaminated sites. Impacts on fuels management would be adverse if the established management policies, procedures, and handling capacities could not accommodate the activities associated with the Proposed Action or proposed alternatives, or if the Proposed Action or proposed alternatives resulted in the disturbance or creation of contaminated sites causing negative effects on human health or the environment. Additional adverse impacts include actions that make it more difficult or costly to remediate hazardous waste or petroleum waste sites.

## 4.10.2 No Action Alternative

The No Action Alternative would result in no change to the existing hazardous materials and waste management conditions. No impacts on hazardous materials and waste management would be expected as a result of not implementing the Proposed Action, Alternative 1, or Alternative 2.

## 4.10.3 Proposed Action (Phase I)

***Hazardous Materials and Petroleum Products.*** Short-term, negligible, adverse impacts would be expected during the implementation of the Proposed Action. Construction activities would require the use of certain hazardous materials such as paints, welding gases, solvents, preservatives, and sealants. Additionally, hydraulic fluids, diesel, and gasoline would be used in many of the construction vehicles and other equipment needed for the implementation of the Proposed Action. It is anticipated that the quantities of hazardous materials and petroleum products needed during the construction would be minimal, and their use would be limited to a short duration. No hazardous materials or petroleum products are currently stored within the area of the Proposed Action; therefore, no hazardous materials and petroleum products would need to be removed. No hazardous material or petroleum product releases or contamination have been documented within the area of the Proposed Action. Long-term, minor, adverse impacts would be expected from operational activities as minimal quantities of hazardous materials and petroleum products would be required (e.g., household cleaners and diesel for emergency generators [see ***Storage Tanks and Oil/Water Separators*** subsection]). All hazardous materials and petroleum products associated with the Proposed Action would be managed in accordance with the NSA's Hazardous Materials Management Program in compliance with Federal and state regulations.

***Hazardous and Petroleum Wastes.*** Short-term, negligible, adverse impacts would be expected during the implementation of the Proposed Action. Construction activities would generate minor quantities of hazardous and petroleum wastes; however, these quantities would not be expected to exceed the

capacities of existing hazardous and petroleum waste disposal streams at Fort Meade. Contractors would be responsible for the disposal of hazardous and petroleum wastes in accordance with Federal and state laws and the NSA's Hazardous Materials Management Program. No hazardous or petroleum wastes are currently stored within the area of the Proposed Action; therefore, no hazardous or petroleum wastes would need to be removed. No hazardous or petroleum waste disposal areas have been documented within the area of the Proposed Action; however, if any soil containing hazardous or petroleum wastes were discovered during construction activities, the contractor would be required to immediately stop work, report the discovery to the installation, and implement appropriate safety measures. Commencement of field activities would not continue in this area until the issue was investigated and resolved.

No long-term impacts would be expected from operation of campus development under this alternative. Following construction, levels of hazardous and petroleum wastes generated in the area of the Proposed Action would be negligible and be disposed of in accordance with DOD, Federal, and state regulations.

***Storage Tanks and Oil/Water Separators.*** Short-term, negligible, adverse impacts would be expected during the implementation of the Proposed Action. Temporary ASTs that would store equipment fuel and nonpotable water would be installed to support the construction of the Proposed Action. These ASTs would be removed following the completion of construction, and all contractors would use proper hazardous materials management practices (e.g., secondary containment) and adhere to the NSA's Hazardous Materials Management Program to prevent and limit releases from the ASTs. No ASTs, USTs, or OWSs are currently within the area of the Proposed Action; therefore, none would need to be removed. No former ASTs or USTs that have leaked have been reported within the area of the Proposed Action; however, in the event that petroleum-contaminated soil is discovered during construction activities, the contractor would be required to immediately stop work, report the discovery to the installation, and implement appropriate safety measures. Commencement of field activities would not continue in this area until the issue was investigated and resolved.

Long-term, negligible, adverse impacts would be expected from fuel usage. As part of the Proposed Action, between 22 and 24 natural gas-fired combustion turbines or stationary internal combustion engines would be installed to provide emergency electrical power. Natural gas-fired combustion turbines would be powered by natural gas, which would not require the use of ASTs or USTs; however, stationary internal combustion engines would be powered by diesel fuel, which would need to be stored in permanent ASTs at each generator. Each AST would be approximately 20,000 gallons in size, and total diesel fuel storage capacity would be between approximately 440,000 and 480,000 gallons. In addition, Site M would be served by one or more boiler facilities, which would require the use of ASTs that would have a total capacity of approximately 246,000 gallons. No other permanent storage tanks would be installed as part of the Proposed Action.

All permanent storage tanks installed as part of the Proposed Action would be used with appropriate BMPs, such as secondary containment systems, leak detection systems, and alarm systems, and adhere to the NSA's Hazardous Materials Management Program to ensure that contamination from a spill would not occur. If a spill occurs, the installation Spill Prevention Control and Countermeasures Plan outlines the appropriate measures for spill situations.

***Asbestos-Containing Materials.*** No impacts would be expected. No current buildings are within the area of the Proposed Action; therefore, no ACMs would be disturbed. U.S. Army policy prohibits the use of ACMs for new construction when asbestos-free substitute materials exist.

***Radon.*** No short-term, adverse impacts would be expected. Long-term, negligible, adverse impacts would be expected in the event that indoor radon testing is conducted and indicates that elevated radon

concentrations are inside any of the buildings of the Proposed Action. Appropriate mitigation measures, such as installing radon pumps to exhaust vapors outside or installing passive radon systems to lower radon levels, would be required.

***Lead-Based Paint.*** No impacts would be expected. No buildings are within this area of the Proposed Action; therefore, no LBP would be disturbed. U.S. Army regulations prohibit the use of LBP in new construction.

***Pesticides.*** No impacts would be expected. No pesticides would be mixed, stored, or disposed of during the implementation of the Proposed Action. Future pesticide applications would be conducted in adherence with the NSA Integrated Pest Management Plan. Minor pesticide contamination was noted within the area of the Proposed Action; however, the level of contamination was reported as not significant enough to impact the future use of Site M and would not require remedial action.

***Polychlorinated Biphenyls.*** No impacts would be expected. The Proposed Action does not include the use of any PCBs, and no PCB-containing transformers have been noted within the area of the Proposed Action. Any items that contain PCBs would be handled in accordance to U.S. Army policy and the NSA's Hazardous Materials Management Program.

***Environmental Restoration Program.*** Short-term, minor, adverse and long-term, minor, beneficial impacts would be expected. Portions of an active IRP Site (FGGM 95) are within the area of the Proposed Action. Sampling investigations at this IRP site are in progress to determine the extent of contamination. Future remedial actions would be conducted on an as needed basis based on the results of the ongoing sampling investigations.

Prior to the start of construction activities for the Proposed Action, all appropriate remediation measures would be completed at IRP Site FGGM 95. Remediation measures might involve disturbing contaminated media, disposing of contaminated soil, and treating contaminated groundwater. Because the remediation of the IRP site would expose workers to potential contamination, a health and safety plan would be prepared in accordance with OSHA requirements. Workers performing soil removal activities within the IRP site would be required to have OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training. In addition to this training, supervisors would be required to have an OSHA Site Supervisor certification.

During construction activities for the Proposed Action, if any soil containing hazardous or petroleum wastes were to be discovered, the contractor would be required to immediately stop work, report the discovery to the installation, and implement appropriate safety measures. Commencement of field activities would not continue in this area until the issue was investigated and resolved. The remediation of FGGM 95 would result in long-term, minor, beneficial impacts.

***Ordnance.*** Short-term, minor, adverse and long-term, minor, beneficial impacts on ordnance would be expected. The area of the Proposed Action overlaps a portion of the former mortar range training area of active MMRP Site FGGM-003-R-01. Prior to the start of construction activities, the ongoing remedial investigation for UXO, munitions debris, munitions constituents, and munitions and explosives of concern at FGGM-003-R-01 would be completed and any remediation recommendations from the investigation would be instituted. To date, the remedial investigation has found only practice materials within the area of Proposed Action. As such, the discovery of UXO within the area of the Proposed Action is remote. Should any ordnance be encountered during the construction of the Proposed Action, the contractor would be required to immediately stop work, report the discovery to the installation, and implement appropriate safety measures. All ordnance would be collected and disposed of in accordance

with Federal and U.S. Army regulations. Commencement of field activities would not continue in this area until the issue was resolved.

### 4.10.4 Alternative 1: Implementation of Phase I and II

Impacts on hazardous materials and wastes from construction activities would be similar to those described under the Proposed Action (see **Section 4.10.3**). Short-term, negligible, adverse impacts on hazardous materials and petroleum products; hazardous and petroleum wastes; and storage tanks and oil/water separators would be expected during the implementation of Alternative 1. Similar to the Proposed Action, no impacts on ACM, LBP, or PCBs would be expected during the implementation of Alternative 1. Impacts from radon and pesticides would be the same as those described under the Proposed Action.

Impacts on the ERP and ordnance would be similar to those described for the Proposed Action. Short-term, minor, adverse and long-term, minor, beneficial impacts would be expected from the remediation of IRP Site (FGGM 95) and the former mortar range training area.

The demolition activities of Alternative 1 would not result in any additional impacts on hazardous materials and wastes. There are no hazardous materials, petroleum products, hazardous or petroleum wastes, ACM, radon, LBP, or PCBs in the Alternative 1 area.

### 4.10.5 Alternative 2: Implementation of Phase I, II, and III

Impacts on hazardous materials and wastes from construction activities would be similar to, but greater than, those described under Alternative 1 (see **Section 4.10.4**). Largely similar short-term, negligible, adverse impacts on hazardous materials and petroleum products and hazardous and petroleum wastes would be expected. However, unlike the Proposed Action, minimal quantities of hazardous materials and petroleum products and minimal quantities of hazardous and petroleum wastes are currently stored within several buildings at the area of Alternative 2. Hazardous materials and petroleum products and hazardous and petroleum wastes currently within the area of Alternative 2 would be removed prior to the start of demolition and construction activities and in accordance with Federal, state, and U.S. Army policy. The removal of these hazardous materials and petroleum products from the area of Alternative 2 would be a long-term, negligible, beneficial impact.

Short-term, minor, adverse and long-term, minor, beneficial impacts on ACM and LBP would be expected. It is anticipated that the demolition of Buildings 8860 and 8880 would generate ACM and LBP wastes. Any ACMs encountered during building demolition and cleanup would be handled in accordance with established U.S. Army policy and the Asbestos Management Program for Fort Meade. Any LBP encountered during the building demolition and cleanup would be handled in accordance with established U.S. Army policy and the Fort Meade Lead Hazard Management Plan. All personnel involved in the demolition of these buildings would be trained to reduce potential exposure to, and release of, asbestos and LBP. The removal of these buildings would be a long-term, minor, beneficial impact.

Impacts on the ERP would be similar to those described for the Proposed Action. Short-term, minor, adverse impacts from the active IRP Site (FGGM 95) and long-term, minor, beneficial impacts from the remediation of the IRP site would be expected. Impacts on storage tanks and oil/water separators, radon, pesticides, and PCBs would be the same as those described under the Proposed Action.

Impacts on ordnance would be similar to, but greater than, those described under the Proposed Action. The area of Alternative 2 includes portions of both the former mortar range training area and the former mortar range of active MMRP Site FGGM-003-R-01. As such, there would be an increased potential for

the discovery of ordnance during construction and demolition activities associated with Alternative 2. Similar precautionary measures as discussed under the Proposed Action would be taken prior to and during construction and demolition activities to reduce the potential for the discovery of ordnance.

# 4.11 Socioeconomics and Environmental Justice

## 4.11.1 Evaluation Criteria

***Socioeconomics.*** This section addresses the potential for direct and indirect impacts that the Proposed Action could have on local or regional socioeconomics. Impacts on local or regional socioeconomics are evaluated according to their potential to stimulate the economy through the purchase of goods or services and increases in employment. Similarly, impacts are evaluated to determine if overstimulation of the economy (e.g., housing availability is inadequate to accommodate increases in permanently based workforce) could occur as a result of the Proposed Action.

***Environmental Justice.*** Ethnicity and poverty data are examined for Anne Arundel County District 4 and compared to the ROI and the State of Maryland to determine if a low-income or minority population could be disproportionately affected by the Proposed Action.

## 4.11.2 No Action Alternative

Under the No Action Alternative, DOD would not develop Site M on a phased, multi-year basis and would not construct and operate approximately 1.8 million $ft^2$ of administrative facilities. NSA/CSS operations and similar or related operations of other intelligence community agencies would continue at their present locations. The No Action Alternative would not alter the economic climate or the demographics of the area. Therefore, no impacts on socioeconomics or environmental justice would occur.

## 4.11.3 Proposed Action (Phase I)

Construction of Phase I would be completed by 2015 and include the construction of three office modules, one operations center, two module interconnections, and data center with a total cost estimated at $2.07 billion. To determine the impacts on the local economy an Economic Impact Forecast System (EIFS) was used along with other socioeconomic indicators presented in **Section 3.11**.

The methodology for the EIFS was developed by the DOD in the 1970s to identify and address the regional economic effects of proposed military actions (USACE undated). EIFS provides a standardized system to quantify the effect of military actions and to compare various options or alternatives in a standard, nonarbitrary approach. The EIFS assesses potential effects on four principal indicators of regional economic effect: business volume, employment, personal income, and population. As a "first tier" approximation of effects and their significance, these four indicators have proven very effective.

Assumptions for the impacts section and the EIFS model and are as follows: (1) of the 6,500 personnel, one-third currently work at Fort Meade and the remaining two-thirds would be from a consolidation of DOD employees from other locations in the Baltimore-Washington metropolitan area; (2) average income for civilian employees is $80,425 per the BRAC EIS (USACE Mobile District 2007, DOD 2008b) cost of the Proposed Action totals $5.23 billon, $2.07 billion during Phase I, $1.11 billion during Phase II, and $2.05 billion during Phase III (see **Table 2.2-1**); (3) the ROI is defined as Anne Arundel County, Howard County, Montgomery County, and Prince George's County; (4) those employees being consolidated to Fort Meade would seek housing off installation; (5) all actions would occur within 1 year. These assumptions provide for the maximum impact that would occur as a result of the Fort Meade Campus

Development. Impacts on socioeconomics and environmental justice would likely be less as construction would take more than 1 year and some of the workers would not need to relocate as they are already within commuting distance of Fort Meade. It should also be noted that impacts from the development of Site M would stretch into additional counties within the Baltimore Metropolitan Area and the Washington Metropolitan Area, but to a lesser extent than the counties within the defined ROI. Also, estimates from the EIFS model might be overstated due to the procurement of expensive equipment that might be purchased outside of the ROI.

***Demographics and Housing Characteristics.*** Of the 6,500 employees associated with the Proposed Action, the two-thirds who would consolidate to Fort Meade would represent, at worst, a 0.14 percent increase in the population of the ROI. The EIFS model assumes the average family size is 2.49 persons, resulting in a maximum estimated total of 10,789 additional residents within the ROI, or a population increase of 0.34 percent. The number of vacant housing units in the ROI, at 112,395 units, should be adequate to accommodate the additional employees who would require housing. If each of the employees being consolidated to Fort Meade were to require a housing unit, the stock of vacant housing units within the ROI would decrease by 6 percent. The decrease of vacant housing units within the five counties and Baltimore City is displayed in **Table 4.11-1**. Anne Arundel, Howard, and Carroll counties would experience the largest depletion of vacant housing stock if considering existing employee commuting trends.

**Table 4.11-1. Distribution of Possible Fort Meade Families within the ROI**

| ROI | Workforce* (percent) | New Families | Increase in New Families (percent) | Vacant Housing Units Needed (percent) |
|---|---|---|---|---|
| ROI | 100 | 4,333 | 0.6 | 3.9 |
| Anne Arundel County | 39 | 1,690 | 1.3 | 14.9 |
| Howard County | 22 | 953 | 1.4 | 20.5 |
| Baltimore County/City | 14 | 607 | 0.2 | 0.8 |
| Carroll County | 7 | 303 | 0.7 | 14.0 |
| Prince George's County | 5 | 217 | 0.1 | 1.1 |

Source: Friedberg 2009, U.S. Census Bureau 2000, U.S. Census Bureau 2007

Note: * 13 percent of the workforce lives outside of the ROI.

Those employees who would be consolidated to Fort Meade might currently live within the Baltimore metropolitan area or the Washington metropolitan area and not require relocation, but to analyze maximum impact it is assumed all consolidated employees would require housing. Also, additional locations outside of the ROI for employees to reside would increase the number of available vacant housing units. The Proposed Action would result in an increased tax base as a result of employees moving to the area. Impacts on the local demographic and housing characteristics would be direct, moderate, long-term, and beneficial on the number of vacant housing units.

***Employment Characteristics.*** According to the EIFS model, development of Phase I at Fort Meade would result in 46,667 additional jobs throughout the region with additional income to employees totaling $2.07 billion (USACE undated). The job total represents both direct and indirect increases in employment. Complete results of the EIFS model can be seen in **Table 4.11-2**. It should be noted that these estimates could be inflated (overstatement of total sales volume and income) due to the procurement of additional expensive items, such as emergency generators, that could be purchased outside of the ROI.

**Table 4.11-2. Results from the EIFS Model**

| | Sales Volume | Income | Employment* |
|---|---|---|---|
| Direct | $2,039,321,000 | $833,332,800 | 15,253 |
| Indirect | $7,321,162,000 | $1,404,390,000 | 31,424 |
| **Total** | **$9,360,483,000** | **$2,237,722,800** | **46,667** |

Source: USACE undated

Note: * Assuming 6,500 nonmilitary positions with an average salary of $80,425.

Indirect employment includes all indirect or induced job creation in all industries. As noted during the BRAC process, DOD agencies often include a contractor trail (SPG 2009). The contractor trail represents contractors who are not embedded on site, in this case on Fort Meade, but are located in close proximity to their client to enable timely and effective communication. During the BRAC process, it was estimated that the contractor trail for DISA was approximately 3,000 to 5,000 persons and that these positions would relocate to the Fort Meade area. The contractor trail estimate used during the BRAC process represented approximately 0.6 to 1 contractor trail position for each BRAC position (SPG 2009). Although somewhat speculative, assuming a similar trend might occur with the Proposed Action, there would be long-term, moderate, beneficial impacts on employment associated with contractor trail positions.

Short- and long-term, major, direct and indirect, beneficial impacts on the local economy would be expected from construction activities associated with the Proposed Action. Beneficial impacts would include construction expenditures for building materials, construction workers' wages and taxes, and purchases of goods and services in the area. Building materials for this project are assumed to be sourced locally, when available. As a result, short- and long-term, moderate to major, direct, beneficial impacts would be expected on the building materials industry. Increases to the local construction workforce and industry would be expected to result in direct, moderate to major, short-term beneficial impacts.

For this analysis, it is projected that the majority of construction workers and equipment would come from within the ROI. The ROI has a construction workforce representing 6 percent of the ROI's total workforce, as shown in **Table 3.11-4**. As a result of construction, short- and long-term, moderate to major, beneficial impacts would be expected on the surrounding economies due to construction-related expenditures. In addition, workers are not anticipated to relocate to the area since existing levels of construction workers could accommodate the Proposed Action. Additional job expansion would be expected to occur in manufacturing as a result of the demand for equipment, infrastructure, and other materials needed for the Proposed Action. These manufacturing jobs might occur outside of the ROI.

The 6,500 personnel would represent 0.4 percent of the workforce in the ROI. Indirect, long-term, moderate, and beneficial impacts would be expected from the addition of personnel wages and taxes and the purchases of goods and services.

***Commercial Real Estate.*** For analysis of impacts on the commercial real estate market the square footage of leased real estate that would be vacated as a result of the Proposed Action was analyzed. Construction of Phase I would result in 367,800 $ft^2$ of leased commercial real estate in Anne Arundel County being vacated by NSA as they relocate their operations to Fort Meade. Throughout the entire ROI, 527,800 $ft^2$ (which includes the 367,800 $ft^2$ of office space in Anne Arundel County) of leased commercial real would be vacated by NSA as they relocate their operations to Fort Meade.

The 367,800 $ft^2$ of existing occupied office space in Anne Arundel County would become vacant; therefore, the amount of vacant office space would increase from 20 percent of existing Class A Office

Space to 24 percent (see **Figure 4.11-1**). The amount of office space currently under construction or proposed for future properties would not be directly impacted as a result of the Proposed Action, although indirect impacts might occur. The increase in vacant office space might result in the average lease price of office real estate throughout Anne Arundel County to decrease as a result of increased supply. The Proposed Action could also cause some developers to defer planned developments if they determine that there is lower demand for Class A office space.

The 527,800 $ft^2$ of office space within the ROI would become vacant as a result of the Proposed Action. This would increase the amount of vacant Class A Office Space by 1 percent (from 18 to 19 percent) (see **Figure 4.11-2**). The ROI, with its larger amount of existing Class A Office Space, would absorb the increase in vacant office space more easily than if all 527,800 $ft^2$ were to become vacant in Anne Arundel County. As a result, developers throughout the ROI might be less likely to delay or postpone new office space projects as the increase in vacant office space would not cause large increases in the vacant inventory of office spaces.

Short-term, moderate, direct and indirect, adverse impacts on the Class A Office Space market would be expected as a result of the Proposed Action. The property owners from vacant office space would experience a direct impact from the decrease in revenue. Indirect impacts might include decreases in local employee payroll taxes (if the employees relocating to Fort Meade would move to Anne Arundel County from another county), developers becoming more tentative to develop new properties (if the existing vacancies were to increase drastically), and office parks and buildings becoming less desirable (if significant portions of the properties would become vacant). Long-term impacts from the Proposed Action would be less likely as the real estate market fluctuates naturally, returning itself to equilibrium based upon supply and demand.

***School Characteristics.*** According to the EIFS model, an estimated 2,123 school-age children would accompany the consolidated personnel (the EIFS model assumes that 1 spouse and an average of 1/2 child accompany each personnel). These 2,123 additional school-age children represent, at worst, a 0.5 percent increase in the total number of students enrolled in the ROI. A large majority of the personnel already currently reside in and are widely distributed throughout the ROI. In addition, there is available capacity in some local school districts, including Anne Arundel County. Therefore, the increase in students would not be large enough to cause extensive adverse effects, but might result in increased class sizes which would increase the student-to-teacher ratio. Therefore impacts from Phase I would be expected to result in long-term, indirect, minor, adverse impacts on the school systems within the ROI.

***Law Enforcement and Fire Protection.*** Any influx of residents into the ROI would cause impacts on the law enforcement and fire protection facilities. The potential increase in population represents less than 0.5 percent of the total ROI population. This small increase would not strain the existing law enforcement and fire protection services extensively, but the police, fire, and rescue services might receive an increase in the number of calls. The increase in employment on Fort Meade could result in an increased level of demand and require the on-installation fire department to request mutual assistance more frequently and this would be provided by the nearby fire departments in Anne Arundel County. As a result, the number of incidents that Anne Arundel County squads respond to might increase. If existing operations are unable to handle a minor influx in services, direct and indirect, minor, adverse, long-term impacts on the police, fire, and rescue services would occur. In addition, long-term, minor, adverse impacts on law enforcement and fire protection facilities would be expected from increased response times due to increased traffic levels.

***Recreation.*** Construction of Phase I would eliminate numerous holes on the golf course. During BRAC construction on Site M, nine holes of The Courses were removed to allow for construction (USACE Mobile District 2007). Reduced access to golf facilities on Fort Meade would result in long-term, minor, adverse impacts on golfers' use of the course and other golf-related activities.

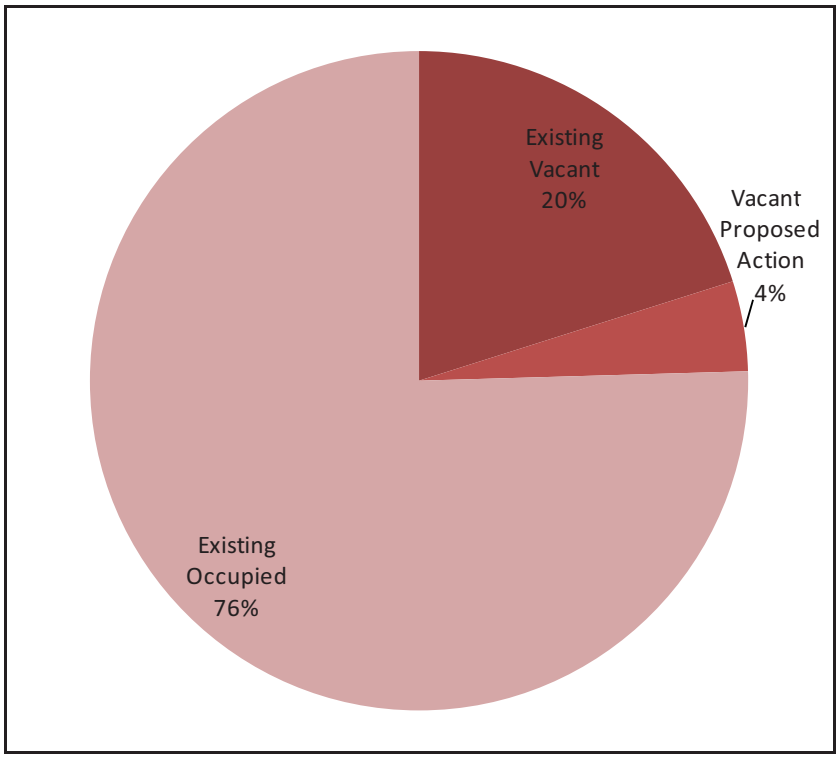



**Figure 4.11-1. Potential Vacancy Rate of Anne Arundel County after Completion of Proposed Action**

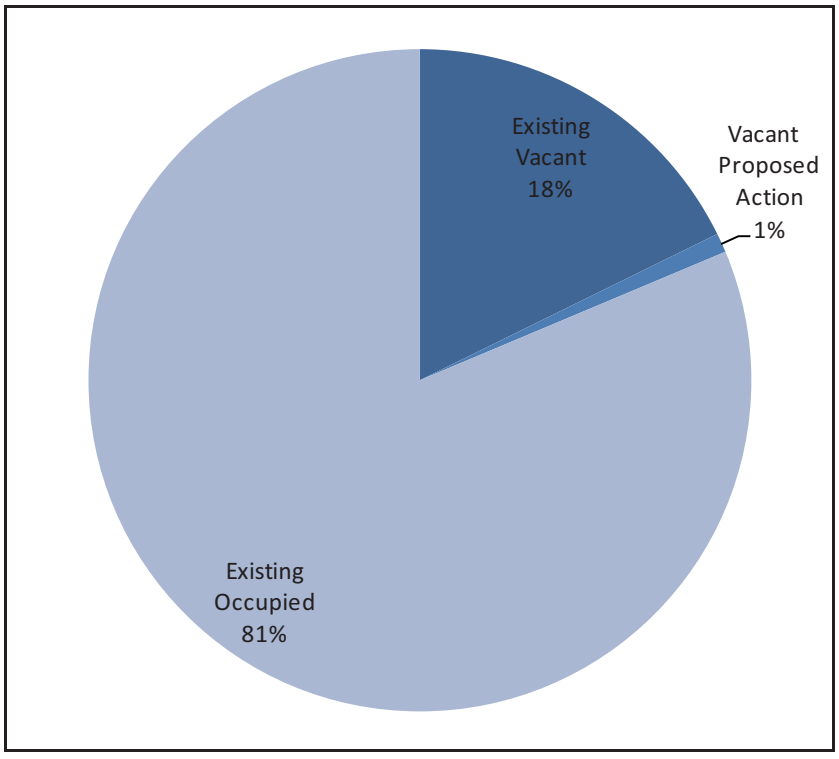



**Figure 4.11-2. Potential Vacancy Rate of ROI after Completion of Proposed Action**

***Environmental Justice.*** As discussed in **Section 3.11**, Anne Arundel County Census District 4 does contain a higher percentage of African American individuals when compared to Anne Arundel County, but the percentage is similar to the ROI and the State of Maryland. Low-income populations within the Census District are similar to Anne Arundel County and by percentage lower than the ROI and the State of Maryland. Considering the Proposed Action would occur entirely within the boundaries of Fort Meade, impacts associated with construction would not affect any neighboring populations. Therefore, the Proposed Action would not result in disproportionate impacts on minority or low-income populations.

## 4.11.4 Alternative 1: Implement Phases I and II

Construction of Alternative 1 would be completed in 2020 and would include all infrastructure under Phase I and an additional 1.2 million $ft^2$ of administrative operational facilities as part of Phase II. The number of personnel for Phase I and Phase II would total 8,000. Total cost for construction of the additional 1.2 million $ft^2$ of administrative operational facilities is estimated at an additional $1.11 billion, bringing total investment for Phase I and Phase II to $3.18 billion and 3.0 million $ft^2$ of total area of building footprints.

***Demographics and Housing Characteristics.*** Alternative 1 would have impacts similar to the Proposed Action on the local demographics and housing characteristics. More personnel would be employed at Fort Meade as a result of Alternative 1. Due to the longer build time of Alternative 1 the additional employees would move to the area over a longer time period. Assuming that one-third of the 8,000 employees are currently located on Fort Meade and two-thirds of the employees would be consolidation from other office locations, there would be approximately 2,667 employees currently on-installation and approximately 5,333 employees consolidating from other locations. In a worst-case scenario, all 5,333 employees consolidating onto Fort Meade would need to relocate their residence to the area. These employees would be distributed throughout the ROI similar to current Fort Meade workforce distribution. Distribution of the 5,333 according to **Table 3.11-1** would be as follows: 2,080 employees in Anne Arundel County, 1,173 employees in Howard County, 747 employees in Baltimore City/County, 373 employees in Carroll County, 267 employees in Prince George's County, and 693 employees in other counties. As a result the impacts on the local demographic and housing characteristics would be direct, moderate, long-term, and beneficial.

***Employment Characteristics.*** Alternative 1 would require a greater number of construction workers compared with the Proposed Action, but the total number of construction workers needed would not increase to a level that would outstrip the supply of the ROI. Increases to the local construction workforce and industry would result in direct, moderate to major, short-term, beneficial impacts.

***School Characteristics.*** Alternative 1 would result in impacts on the school systems of the ROI being slightly greater than the Proposed Action as more employees would move to the ROI. According to the EIFS model, an estimated 2,614 school-age children would accompany the consolidated personnel (the EIFS model assumes that 1 spouse and an average of 1/2 child accompany each personnel). These 2,614 additional school-age children represent, at worst, a 0.6 percent increase in the total number of students enrolled in the ROI. A large majority of the personnel currently reside in and are widely distributed throughout the ROI. Therefore, long-term, indirect, moderate, adverse impacts on the school systems within the ROI would be expected.

***Law Enforcement and Fire Protection.*** Alternative 1 would result in similar, but slightly greater impacts on law enforcement and fire protection than the Proposed Action within the ROI.

***Recreation.*** Long-term, minor, direct, adverse impacts on golf facilities within Fort Meade would be expected as a result of reduced access to golf facilities on Fort Meade under Alternative 1.

***Environmental Justice.*** Alternative 1 would result in similar impacts on environmental justice as the Proposed Action within the ROI.

## 4.11.5 Alternative 2: Implement Phases I, II, and III

Construction of Alternative 2 would be completed by 2029 and would include Phases I, II, and III. Alternative 2 would include an additional 2.8 million $ft^2$ bringing the total area of building footprints to 5 million $ft^2$. Personnel under Alternative 2 would total 11,000. Construction of Alternative 2 would result in an additional expenditure of $2.05 billion bringing the total cost of construction for all three phases to $5.23 billion.

***Demographics and Housing Characteristics.*** Alternative 2 would have impacts similar to the Proposed Action on the local demographics and housing characteristics. More personnel would be located at Fort Meade as a result of Alternative 2. Due to the longer build time of Alternative 2 the additional employees would move to the area over a longer time period. Assuming that one-third of the 11,000 employees are currently located on Fort Meade and two-thirds of the employees would consolidate from other locations, there would be approximately 3,367 employees currently on-installation and approximately 7,333 employees consolidating from other locations. In a worst-case scenario all 7,333 employees consolidating onto Fort Meade would need to relocate their residence to the area. These employees would be distributed throughout the ROI similar to current Fort Meade workforce distribution. Distribution of the 7,333 according to **Table 3.11-1** would be as follows: 2,860 employees in Anne Arundel County, 1,163 employees in Howard County, 1,027 employees in Baltimore City/County, 513 employees in Carroll County, 367 employees in Prince George's County, and 953 employees in other counties. As a result, the impacts on the local demographic and housing characteristics would be direct, minor, long-term, and beneficial.

***Employment Characteristics.*** Alternative 2 would require a greater number of construction workers compared with the Proposed Action, but the total number of construction workers needed would not increase to a level that would outstrip the supply of the ROI. Increases to the local construction workforce and industry would result in direct, moderate to major, short-term beneficial impacts.

***School Characteristics.*** Alternative 2 would result in impacts on the school systems within the ROI being greater than the impacts under the Proposed Action as more employees would move to the ROI. According to the EIFS model an estimated 3,594 school-age children would accompany the consolidated personnel (the EIFS model assumes that 1 spouse and an average of 1/2 child accompany each personnel). These 3,594 additional school-age children represent, at worst, a 0.8 percent increase in the total number of students enrolled in the ROI. A large majority of the personnel currently reside in and are widely distributed throughout the ROI. Therefore, impacts on the school systems within the ROI would be indirect, moderate, adverse, and long-term.

***Law Enforcement and Fire Protection.*** Alternative 2 would result in similar but slightly greater impacts on law enforcement and fire protection to Alternative 1 within the ROI.

***Recreation.*** Long-term, minor, direct, adverse impacts on golf facilities within Fort Meade would be expected as a result of reduced access to golf facilities on Fort Meade under Alternative 2.

***Environmental Justice.*** Alternative 2 would result in similar impacts on environmental justice as the Proposed Action within the ROI.

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# SECTION 5

# CUMULATIVE AND OTHER IMPACTS

# 5. Cumulative and Other Impacts

This cumulative impacts analysis summarizes expected environmental effects for the combined impacts of past, present, and reasonably foreseeable future projects. **Section 2.5** presented projects that are considered temporally or geographically related to the Proposed Action, and, as such, have the potential to result in cumulative impacts. Projects identified for detailed consideration for potential cumulative impacts include the following:

- Construction and operation of various utilities upgrades on the NSA campus, including a utility plant, a generator facility, and a central boiler plant. It is estimated that utilities upgrades would result in the loss of approximately 6 acres of open space (DOD 2009a).
- BRAC actions at Fort Meade, which would include the construction of 3.0 million $ft^2$ of facility and parking space, the addition of 5,700 people to the Fort Meade workforce, and the loss of approximately 25 acres of forest (USACE Mobile District 2007). The DISA and DMA facilities are in the eastern and southern portions, respectively, of Site M.
- EUL actions at Fort Meade, which could include the construction of office buildings (2 million $ft^2$ on 173 acres of land), potential golf courses (367 acres), the addition of approximately 10,000 people, and the loss of approximately 205 acres of forested areas (USACE Mobile District 2007).
- Ongoing actions at Midway Common MFH at Fort Meade, which is considered for potential cumulative impacts because this neighborhood is adjacent to Site M.
- Expansion of the DINFOS, which would add approximately 60,273 $ft^2$ of administrative and teaching space. Construction of approximately 8,000 $ft^2$ of training space, and the renovation of approximately 50,630 $ft^2$ of teaching space would occur (Brundage 2009a).
- Construction of a 27,000-$ft^2$ WSOC facility to the west of Site M.
- Consolidation of the U.S. Navy 10th Fleet Cyber Command to Fort Meade
- Construction of a BGE Substation southwest of MD 32 and southeast of the BW Parkway. The construction of the BGE Substation could result in the removal of forested area on the project site.
- Construction of mixed-use commercial and residential developments off of Fort Meade property, including National Business Park, National Business Park North, Seven Oaks, Arundel Preserve, Arundel Gateway, and Odenton Town Center projects.

This cumulative impacts section presents the resource-specific impacts related to the past, present, and reasonably foreseeable actions identified above.

## 5.1 Cumulative Impacts Under the Proposed Action

### Land Use

The Proposed Action would be consistent with present and foreseeable land uses on Fort Meade and would have minimal potential to combine with other projects, such as utilities upgrades, DISA or DMA construction, or DINFOS expansion, to produce incompatible land uses. Furthermore, the Proposed Action would not be expected to impact surrounding sensitive land uses, such as Midway Common MFH.

Short- to long-term, moderate, adverse, cumulative impacts would be expected from the loss of open space and conversion of forested land. The Proposed Action would result in the loss of 82 acres of open space, BRAC actions would result in the loss of 175 acres of open space (USACE Mobile District 2007), EUL actions would result in the loss of 540 acres, the utilities upgrades would result in the loss of 6 acres of open space (DOD 2009a), and the BGE Substation could result in the loss of as much as 83 acres. Cumulatively, assuming maximum impact, the loss of open space could be as much as 886 acres, or 32 percent of open space on Fort Meade. By far, the largest project on Fort Meade in terms of land area is the EUL project.

Short- to long-term, moderate, adverse, cumulative impacts on recreational land uses would be expected from loss of the golf course. Nine holes of the golf course were lost due to development under BRAC activities, and the Proposed Action is anticipated to result in the loss of the remaining holes on the golf course. As analyzed in the 2007 BRAC/EUL EIS, there are parcels of Fort Meade that are anticipated to be available for future golf course development under the DOD EUL program (USACE Mobile District 2007).

The Proposed Action and BRAC actions would be expected to have long-term, beneficial and adverse, cumulative impacts on surrounding land uses. Construction associated with the Proposed Action and BRAC actions would stimulate changes in land use surrounding Fort Meade. Adverse impacts as a result of this include loss of open space and forested areas as office, retail, and residential areas are constructed. Beneficial impacts include the redevelopment of areas in need of revitalization, such as the Odenton Growth Management Area. Construction activities on land surrounding Fort Meade would indirectly support the Proposed Action and BRAC actions.

### Transportation

Short-term, minor, adverse, cumulative impacts on transportation could occur if multiple construction projects were occurring simultaneously. Long-term, major, adverse, cumulative impacts on transportation systems would be expected in the absence of roadway improvements. The analysis of the No Action Alternative in **Section 4.2.2** includes the BRAC, EUL, and DINFOS projects and other regional growth (e.g., National Business Park, Clarks Hundred, Seven Oaks, Odenton Town Center, and Parkside) in the future baseline for traffic impacts. The No Action Alternative and Proposed Action analyses show that major adverse cumulative impacts on roadways as a result of increased personnel. Roadway improvements would be expected to raise the LOS at failing intersections (i.e., LOS E or LOS F) to acceptable levels.

### Noise

Implementation of the Proposed Action and other concurrent actions would have short-term, minor, adverse, cumulative impacts on the noise environment during construction activities, particularly construction of DISA and DMA, and expansion of the DINFOS because of their proximity to Site M. Construction noise under the Proposed Action would be expected to have no adverse effects on noise-sensitive receptors outside of the installation boundary, as the construction noise levels would be lower than the estimated ambient noise levels. The northern portion of the Patuxent Research Refuge is adjacent to several noise-generating activities (i.e., Tipton Airport, a small arms range, and MD 32) (see **Section 3.3.2**); therefore, existing ambient levels in this area would be expected to be slightly higher than is typical for a refuge. Pile-driving activities would only be conducted from 8 a.m. to 5 p.m. on weekdays; therefore, negligible effects on the refuge would be expected from pile-driving activities under the Proposed Action.

The Proposed Action would also result in long-term, negligible to minor, adverse, cumulative impacts on the noise environment. The planned utilities upgrades on the NSA campus will result in construction of a new backup power plant and expansion of another backup power plant. Additionally, new facilities, such as DISA, DMA, and the DINFOS expansion, will also likely have emergency power generation capabilities. Cumulative noise from power plants would only occur when more than one power plant is undergoing maintenance or in use for emergency power. These levels would be intermittent, limited in duration, and have little impact on areas outside Fort Meade. The past, current, and reasonably foreseeable noise environment in and around Site M is dominated by traffic noise from the adjacent roadways, which will continue into the future. The change in noise for all noise-sensitive receptors would be minor and not likely distinguishable from future noise environments under the No Action Alternative.

### Air Quality

Historically, the heavily populated and urban areas within the northeast corridor of the United States have had more anthropogenic emissions than other areas of the country. These emissions, when combined with the stagnation impact from the coastal weather patterns, lead to higher concentrations of regional air pollutants, which result in the current nonattainment designation. Since 1990, when the CAA came into full force, states (both collectively and individually) have implemented plans (i.e., SIPs) to reduce emissions in a strategic way to meet the NAAQS. Since that time, there has been a steady decrease in both emissions and atmospheric concentrations of air pollutants.

Emissions from the Proposed Action would be cumulative to both past and present emissions. Current regional activities would be the dominant source of emissions. The Proposed Action would have both short- and long-term, negligible, adverse, cumulative impacts on air quality. Impacts on air quality would primarily be due to the use of heavy construction equipment during construction and operational emissions from new boilers and standby generators. Other projects would occur within the region and would produce some measurable amounts of air pollutants. Specifically, BRAC actions at Fort Meade would occur during the same timeframe as the Proposed Action. These actions, as evaluated in the BRAC/EUL EIS, would have minor adverse impacts on air quality resulting primarily from short-term construction activities and long-term increased commuters (USACE Mobile District 2007).

The Proposed Action, utilities upgrades, BRAC actions, EUL actions, DINFOS expansion, BGE substation, and other development activities within the region would have some level of construction-related emissions. The State of Maryland takes into account the impacts of all past, present, and reasonably foreseeable future projects in the region and associated emissions during the development of their SIP. Within the SIP, the State of Maryland has a detailed budget for all sources of air emissions including those from construction. Estimated emissions generated by the Proposed Action would be below *de minimis* levels and not regionally significant. Therefore, these construction-related impacts would contribute negligibly to cumulative short-term impacts on air quality.

In addition to construction emissions, the Proposed Action would introduce new stationary sources of air emissions within the region. Other new stationary sources, such as the backup power plants and central boiler for the NSA utilities upgrades and small boilers and generators for individual facilities associated with BRAC actions, would also produce some measurable amounts of air pollutants. Permitting requirements for the Proposed Action could vary based on the types and sizes of new stationary sources, timing of the projects, and the types of controls ultimately selected. These could differ in specific features from the ones described in this EIS. However, during the final design stage and the permitting process either (1) the actual equipment, controls, or operating limitations would be selected to reduce the PTE below the major source threshold; or (2) the NNSR permitting process would require emissions offsets be obtained at a 1 to 1.3 ratio from other previously decommissioned sources within the region. This cap-and-trade-type system is inherent to Federal and state air regulations and leads to a forced

reduction in regional emissions. Therefore, long-term impacts from proposed stationary sources associated with the Proposed Action would contribute negligibly to cumulative long-term impacts on air quality.

The Baltimore Regional Transportation Board is responsible for developing conformity demonstrations for transportation plans and programs within this area. This includes all planned transportation projects in the region. The Transportation Improvement Program (TIP) for the Baltimore Region contains a list of all proposed transportation projects to be built in the region. The transportation conformity demonstration for these plans evaluates the ability of the transportation project inventory contained in the TIP, emissions controls, and subsequent mobile emissions budget ability to comply with the SIP. Because the Campus Development Project at NSA is not an approved transportation project, transportation conformity is not required. Vehicle emissions were included in the emissions estimations and in the general conformity demonstration. It would be necessary for the Metropolitan Planning Organization to include the changes in vehicle patterns for all actions in the region when developing the new TIP.

### Geological Resources

No cumulative impacts on geological resources would be expected from construction activities. Direct impacts on topography, geology, and soils from construction are localized to the site that is being developed. Construction sites that are greater than 5,000 $ft^2$ require development of BMPs, storm water management plans, and ESCPs to minimize the potential for impacts offsite. Long-term cumulative impacts would occur as a result of the conversion of as much as 880 acres of undeveloped land, which is an irreversible and irretrievable conversion of natural soils to urban land.

### Water Resources

Short-term, minor, cumulative, adverse impacts on water resources could occur from all construction activities. Implementation of soil erosion and sedimentation controls and storm water pollution prevention at construction sites would minimize the potential for adverse impacts from individual construction sites and, therefore, reduce potential cumulative impacts on water resources.

Long-term, minor to moderate, cumulative, adverse impacts on water resources would be expected from the overall increases in impervious surfaces on Fort Meade. The Proposed Action would result in the construction of 1.8 million $ft^2$ of new facilities and pavements. Additionally, the utilities upgrades would result in an estimated 183,000 $ft^2$ (DOD 2009a), BRAC actions would result in an estimated 3.0 million $ft^2$, EUL actions would result in an estimated 2.0 million $ft^2$ (USACE Mobile District 2007), and the DINFOS expansion would result in 68,273 $ft^2$ (Brundage 2009b), for a cumulative total of at least 7.0 million $ft^2$ of new impervious surfaces on Fort Meade. It is unknown what size the BGE substation footprint would be. Off-installation development would also create impervious surfaces. Over the next 5 to 10 years, development activities such as the National Business Park, Odenton Town Center, Arundel Gateway, and Arundel Preserve could result in as much as 8.8 million $ft^2$ of new residential, retail, and office space (Sernovitz 2009b, McIlroy 2006, AAEDC undated).

The removal of forest and other vegetation and the subsequent creation of impervious surfaces can increase storm water flows during rain events, introducing contaminants (e.g., oils, fertilizers, pesticides) into surfaces water bodies and possibly worsening downstream flooding if water channels are transporting more water in a shorter period of time. Cumulatively, the Proposed Action and other projects identified would increase impervious surfaces and could exacerbate water quality and flooding problems that are already occurring in the Little Patuxent River and other downstream areas. The cumulative increase in impervious surfaces would be considered a minor contribution in the context of the whole watershed but could be noticeable on a more localized level. Adherence to the ESD as outlined in the *Maryland*

*Stormwater Design Manual* and the updated Supplement No. 1 of the manual would be expected to attenuate potentially long-term, major, adverse impacts on water resources.

### Biological Resources

Short- and long-term, direct and indirect, adverse, cumulative impacts would be expected on vegetation and wildlife as a result of the development of currently undeveloped forested sites. The Proposed Action would result in the development of 82 acres. The utilities upgrades will result in the development of 6 acres of forest (DOD 2007), BRAC actions will result in the development of 25 acres of forest, EUL actions will result in the development of 205 acres of forest (USACE Mobile District 2007), and the BGE substation could result in the development of as much as 83 acres of forest, though the actual acreage of forest lost is likely to be much less. It is unknown how many acres of forest will be impacted by off-installation development activities. Development activities could include buildings, parking, sidewalks, or landscaping. Cumulative impacts would include increased segmentation of existing wildlife habitat on and around Fort Meade, increased potential for wildlife mortality associated with collision during construction, a reduction in the quality of wildlife habitat available, and the permanent removal of some vegetative cover. There would remain good habitat available on Fort Meade in Forest Conservation Areas and at the nearby Patuxent Research Refuge.

There is potential for long-term, cumulative impacts on wetlands to occur. Wetland losses in the United States have resulted from draining, dredging, filling, leveling, and flooding for urban, agricultural, and residential development. Construction activities associated with the Proposed Action could result in a potential increase in surface runoff as a result of an increase in impervious surfaces. The BRAC actions, EUL actions, and utilities upgrades also have the potential to result in indirect impacts on wetlands as a result of surface runoff. Implementation of BMPs, storm water management plans, and ESCPs, as required by Federal and state regulations, would minimize the potential for impacts on wetlands and other surface water bodies.

No cumulative impacts on threatened or endangered species would be expected since they do not occur on Fort Meade.

### Cultural Resources

Potentially major, permanent, cumulative impacts on archaeological sites and architectural resources have likely occurred from past construction on and off NSA and Fort Meade property as areas were disturbed for construction activities. No direct impacts on archaeological resources, historic resources, or traditional cultural properties would be expected under the Proposed Action because none have been identified within the APE. No impacts on cultural resources have been identified in association with the utilities upgrades, BRAC actions, EUL actions, MFH construction and renovation activities, DINFOS expansion, the BGE substation, or off-installation development projects. There is a potential cemetery (unconfirmed) on Site M and a known cemetery (Meeks Cemetery) in the vicinity of Midway Common MFH. No cumulative adverse impacts on these cemeteries would be expected, assuming potential graves and cemetery boundaries would be identified and avoided during any ground-disturbing activities.

### Infrastructure

The Proposed Action and other projects identified would generally be expected to have short-term, minor, adverse, cumulative impacts resulting from increased demand on utility systems. Short-term impacts associated with construction activities, which would last only during construction, would not be significant.

The BRAC actions, EUL actions, and the DINFOS project would have similar long-term, minor to major, adverse impacts on infrastructure systems as the Proposed Action. New buildings and associated increase in personnel would be expected to increase demands on potable water systems, sanitary sewer systems, storm water systems, electrical systems, natural gas systems, solid waste management, communications, security systems, liquid fuel supply, heating and cooling systems, and pavements. Cumulatively, the increased demand on infrastructure systems would likely result in utility systems being serviced, upgraded, and expanded, as needed, to meet increased demands. For example, the increased demand on the Fort Meade WWTP, as a result of the Proposed Action, would likely result in greater discharge of total nitrogen and phosphorus into the Patuxent River, which also receives other permitted discharges elsewhere in Anne Arundel and Howard Counties. Fort Meade's current NPDES permit established an annual maximum loading rate for nitrogen and phosphorus based on flow equal to or less than 3.0 mgd and flow greater than 3.0 mgd and up to 4.5 mgd. If the average flow to the WWTP were to exceed 3.0 mgd, Fort Meade would be required to notify the MDE and modify their existing NPDES permit. MDE would be notified again if flow were to exceed 4.5 mgd (MDE 2008b).

Cumulatively, the NSA utilities upgrades (i.e., utility plant, generator facility, and central boiler plant) would result in long-term, moderate, beneficial impacts by upgrading backup electrical and primary heating systems that service the NSA campus. Additionally, the BGE substation could result in long-term, beneficial, cumulative impacts by providing the necessary primary or backup electrical power for the proposed development of Site M. The BGE Substation would also be expected to have long-term, beneficial, cumulative impacts on electrical power supply to Anne Arundel County by providing capacity for growth.

### Hazardous Materials and Wastes

No cumulative adverse impacts would be expected as a result of hazardous materials and wastes. Increased amounts of hazardous materials and petroleum products would be used during the construction and operations associated with the Proposed Action. The Proposed Action and all other projects identified for cumulative impacts analysis on Fort Meade would be expected to use hazardous materials and generate hazardous wastes during construction activities, but all uses would be in accordance with existing laws, regulations, and management plans. Hazardous materials, wastes, and petroleum products would be contained and disposed of according to procedures already in place at NSA and Fort Meade.

### Socioeconomics and Environmental Justice

The Proposed Action, BRAC actions, and EUL actions would have short- and long-term, major, beneficial, cumulative impacts on socioeconomics. Cumulatively, an additional 22,195 personnel would be relocated to Fort Meade (approximately 6,500 from Proposed Action, 5,695 personnel from BRAC actions, and 10,000 personnel from EUL actions). Other projects considered for cumulative impacts would add negligible personnel and so are not considered further. With an increase of approximately 22,195 personnel within the ROI and Anne Arundel County, there would be an increase in regional economic activity and an increase in demand for housing and local community services (e.g., schools, emergency services). These on-installation projects would also indirectly stimulate the economy through an increase in government contractors moving into the area. The National Business Park and other office parks are anticipated to provide office space for government contractor tenants (Sernovitz 2009b). The Seven Oaks and other planned communities are anticipated to provide housing for some of the incoming personnel (Siegel 2008). Future construction for Odenton Town Center would also help the area around Fort Meade accommodate the increased population as those areas are developed.

If existing regional resources are strained and population increases occur at a pace that cannot be accommodated by existing infrastructure, there would be a negative socioeconomic impact

(i.e., overcrowding). As infrastructure expands to accommodate the increase, this leads to a further increase in construction of schools and hospitals with an increase in development. As an example, if more school capacity is required as the result of additional development, hiring of more teachers would be required.

The Proposed Action, BRAC activities, and EUL activities would have short-term, major, direct, beneficial impacts on socioeconomic resources through increased construction labor employment and purchase of related goods and services. Job creation as a result of expanded infrastructure and an increase in the demand for social services would have a long-term, beneficial socioeconomic impact. The overall economic impact would be beneficial because Fort Meade expansion would stimulate more spending within the ROI by both Fort Meade and its employees.

## 5.2 Comparison of Cumulative Impacts under the Proposed Action and Alternatives

Cumulative impacts under Alternative 1 and Alternative 2 would be similar to those described for the Proposed Action but generally more adverse because there would be more building construction and land disturbance. **Table 5.2-1** provides a summary and brief comparison of cumulative impacts under the Proposed Action and other alternatives.

## 5.3 Unavoidable Adverse Impacts

The Proposed Action would result in development of land that is currently open space or used as a golf course. Minor adverse impacts on vegetation, wildlife, and storm water would be unavoidable because that habitat would be lost and replaced with impervious surfaces. It is anticipated that potentially adverse impacts on geological resources and water resources (i.e., sedimentation, erosion, storm water runoff, and stream crossing) could be minimized during site design and use of BMPs. Construction and demolition activities also unavoidably generate solid waste.

The Proposed Action would increase stationary (i.e., power plant) and mobile (i.e., automobiles) sources of noise and air emissions. Increased automobiles also increase pressure on already stressed transportation networks. These are also unavoidable adverse impacts, though traffic congestion can be reduced through roadway improvements.

## 5.4 Relationship Between Short-Term Uses and Long-Term Productivity

Short-term uses of the biophysical components of the human environment include direct impacts, usually related to construction activities, which occur over a period of less than 5 years. Long-term uses of the human environment include those impacts that occur over a period of more than 5 years, including permanent resource loss.

This EIS identifies potential short-term adverse impacts on the natural environment as a result of construction activities. These potential adverse impacts include soil erosion, storm water runoff into surface water and wetlands, and removal of vegetation and wildlife habitat. Removal of forest for construction of facilities would be considered an adverse impact on the long-term productivity of forests on Fort Meade.

**Table 5.2-1. Comparison of Cumulative Impacts under the Proposed Action and Alternatives**

| Resource Area | Other Actions & Proposed Action (Phase I) | Other Actions & Alternative 1 (Phases I and II) | Other Actions & Alternative 2 (Phases I, II, and III) | Other Actions & No Action Alternative |
|---|---|---|---|---|
| **Land Use** | Cumulative land uses would be compatible.<br>Short- to long-term, moderate, adverse cumulative impacts from loss of 886 acres (32 percent) of open space on Fort Meade.<br>Short- to long-term, moderate, adverse cumulative impacts from loss of 18 holes of the golf course. | Impacts similar to but more adverse than Proposed Action.<br>Cumulative loss of 938 acres (34 percent). | Impacts similar to but more adverse than Proposed Action and Alternative 1.<br>Cumulative loss of 1,125 acres (41 percent). | No cumulative impacts expected. |
| **Transportation** | Short-term, minor, cumulative adverse impacts during construction.<br>Long-term, major, adverse impacts (in the absence of roadway improvements) from increased personnel. | Impacts similar to but more adverse than Proposed Action. | Impacts similar to but more adverse than Proposed Action and Alternative 1. | Long-term, major, adverse impacts (in the absence of roadway improvements) from increased personnel. |
| **Noise** | Short-term, minor, cumulative adverse impacts during construction.<br>Long-term, negligible to minor, adverse cumulative impacts from operation of power plant. | Impacts similar to but slightly more adverse than Proposed Action. | Impacts similar to but slightly more adverse than Proposed Action and Alternative 1. | No cumulative impacts expected. |
| **Air Quality** | Short-term, negligible, cumulative adverse impacts during construction. | Impacts similar to but slightly more adverse than Proposed Action. | Impacts similar to but slightly more adverse than Proposed Action and Alternative 1. | No cumulative impacts expected. |

| Resource Area | Other Actions & Proposed Action (Phase I) | Other Actions & Alternative 1 (Phases I and II) | Other Actions & Alternative 2 (Phases I, II, and III) | Other Actions & No Action Alternative |
|---|---|---|---|---|
| **Geological Resources** | Long-term, adverse cumulative impact from permanent conversion of 886 acres of natural soil to urban land. | Impacts similar to but more adverse than Proposed Action.<br>Cumulative loss of 938 acres of natural soil to urban land. | Impacts similar to but more adverse than Proposed Action and Alternative 1.<br>Cumulative loss of 1,125 acres of natural soil to urban land. | No cumulative impacts expected. |
| **Water Resources** | Short-term, minor, cumulative adverse impacts during construction.<br>Long-term, minor to moderate, adverse cumulative impacts from 6.9 million $ft^2$ increase in impervious surfaces. | Impacts similar to but slightly more adverse than Proposed Action. | Impacts similar to but slightly more adverse than Proposed Action and Alternative 1. | No cumulative impacts expected. |
| **Biological Resources** | Short-term, minor, adverse cumulative impacts during construction.<br>Long-term, minor, adverse cumulative impacts resulting from loss of vegetation and wildlife habitat.<br>Potential long-term, minor, adverse cumulative impacts on wetlands. | Impacts similar to but slightly more adverse than Proposed Action. | Impacts similar to but slightly more adverse than Proposed Action and Alternative 1. | No cumulative impacts expected. |

| Resource Area | Other Actions & Proposed Action (Phase I) | Other Actions & Alternative 1 (Phases I and II) | Other Actions & Alternative 2 (Phases I, II, and III) | Other Actions & No Action Alternative |
|---|---|---|---|---|
| **Cultural Resources** | Previous development has likely significantly impacted archaeological and architectural resources.<br>No additional cumulative impacts identified.<br>Avoidance of cemeteries, if encountered, to minimize impacts (e.g., potential cemetery on Site M-1). | Impacts similar to Proposed Action.<br>Avoidance of cemeteries, if encountered, to minimize impacts (e.g., potential cemetery on Site M-1). | Impacts similar to Proposed Action and Alternative 1.<br>Identification and avoidance of cultural resources is necessary to avoid impacts (e.g., potential cemeteries on Site M, Downs Farmstead and Cemetery). | No cumulative impacts expected. |
| **Infrastructure** | Short-term, minor, cumulative adverse impacts during construction.<br>Long-term, negligible to minor, adverse cumulative impacts as a result of increased use of utilities and infrastructure.<br>Long-term, minor, beneficial impacts on water supply as a result of decreased irrigation for the golf course.<br>Long-term, moderate, beneficial cumulative impacts as a result of upgraded infrastructure systems. | Impacts similar to but slightly more adverse than Proposed Action. | Impacts similar to but slightly more adverse than Proposed Action and Alternative 1.<br>Long-term adverse cumulative impacts on the wastewater system could occur if planned upgrades are insufficient for installation population. | No cumulative impacts expected. |
| **Hazardous Materials and Wastes** | No cumulative impacts expected. | No cumulative impacts expected. | Long-term, minor, beneficial cumulative impacts could occur if contaminated sites, such as on Site M-2, are remediated. | No cumulative impacts expected. |

| Resource Area | Other Actions & Proposed Action (Phase I) | Other Actions & Alternative 1 (Phases I and II) | Other Actions & Alternative 2 (Phases I, II, and III) | Other Actions & No Action Alternative |
|---|---|---|---|---|
| **Socioeconomics and Environmental Justice** | Short-term, major, beneficial cumulative impacts from construction expenditures.<br>Long-term, major, beneficial cumulative impacts from additional 22,195 people in Fort Meade area.<br>Long-term, minor, adverse cumulative impacts on school from increased class sizes. | Impacts similar to but slightly more intense than Proposed Action. | Impacts similar to but slightly more intense than Proposed Action and Alternative 1.<br>Cumulative population increase is estimated at 26,695. | No cumulative impacts expected. |

## 5.5 Irreversible and Irretrievable Commitments of Resources

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be reversed or recovered, even after an activity has ended and facilities have been decommissioned. A commitment of resources is related to use or destruction of nonrenewable resources, and the impacts that loss will have on future generations. For example, if Prime Farmland is developed, there would be a permanent loss of agricultural productivity. Construction and operation of the proposed campus would involve the irreversible and irretrievable commitment of materials, energy, biological resources, landfill space, and human resources. The impacts on these resources would be permanent.

***Materials.*** Material resources irretrievably used for the Proposed Action include steel, concrete, and other building materials. Such materials are not in short supply and would not be expected to limit other unrelated construction activities. The irretrievable use of material resources would not be considered significant. The preferential use of recycled building materials would reduce the overall amount of materials used for building construction.

***Energy.*** Energy resources used for the Proposed Action would be irretrievably lost. These include fossil fuels (e.g., gasoline, diesel, natural gas, No. 2 fuel oil) and electricity. During construction, gasoline and diesel fuel would be used for the operation of construction vehicles and equipment. Long-term operation of new facilities would use electricity generated by combusting fossil fuels, both for primary and backup power. Overall, consumption of energy resources would not place a significant demand on their availability in the region. Therefore, no major impacts would be expected.

***Biological Resources.*** The Proposed Action would result in some irretrievable loss of vegetation and wildlife habitat. The loss of vegetation would remove potential wildlife habitat and could degrade some remaining scenic and natural qualities of Fort Meade. This result would be a permanent loss or conversion of open spaces.

***Landfill Space.*** The generation of construction and demolition debris and subsequent disposal of that debris in a landfill would be an irretrievable adverse impact. Construction contractors would be expected to recycle at least 40 percent of the debris that is generated. If a greater percentage is recycled, then irretrievable impacts on landfills would be reduced. There are numerous rubble landfills and construction and demolition processing facilities that could handle the waste generated. However, any waste that is generated by the Proposed Action that is disposed of in a landfill would be considered an irretrievable loss of that landfill space.

***Human Resources.*** The use of human resources for construction is considered an irretrievable loss only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action represents employment opportunities and is considered beneficial.