

NWS EARLE JOINT LAND USE STUDY



MONMOUTH COUNTY, NEW JERSEY

FINAL

December 31, 2017

PREPARED BY

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TABLE OF CONTENTS

1. Introduction	
A. What is a Joint Land Use Study (JLUS)	Page 1
B. NWS Earle JLUS Goals	Page 1
C. Purpose of Study.....	Page 2
D. Study Process.....	Page 2
E. Study Area.....	Page 2
F. Report Organization.....	Page 3
2. Regional Setting	
A. Regional Perspective.....	Page 6
i. County Overview	Page 6
1. General	
2. Military History	
ii. NWS Earle Overview	Page 8
1. Mission & History	
2. Base Loading & Tenants	
3. Economic Impacts	
4. Mission Critical Assets	
5. Strategic Highway Network	
6. Military Influence Area	
B. Municipal Profiles	Page 21
i. NWS Earle Municipalities	Page 21
1. Colts Neck Township	
2. Howell Township	
3. Middletown Township	
4. Borough of Tinton Falls	
5. Wall Township	
ii. MIA Municipalities	Page 55
1. Atlantic Highlands Borough	
2. Eatontown Borough	
3. Farmingdale Borough	
4. Freehold Township	
5. Highlands Borough	
6. Keansburg Borough	
7. Neptune Township	
8. Ocean Township	
iii. Watershed Communities.....	Page 71
3. JLUS Planning Process, Organizational Structure & Outreach	
A. Participating Partners	Page 72
i. JLUS Policy Committee	
ii. JLUS General Advisory Committee	
iii. Technical Advisory Groups	

B.	Key Stakeholder Coordination	Page 75
i.	Municipal Surveys	
ii.	State Agencies	
iii.	Military Departments	
C.	Public Involvement Strategy	Page 76
4.	Existing Compatibility Tools	
A.	Federal	Page 78
B.	State	Page 79
C.	County	Page 82
D.	Municipal	Page 84
5.	Compatibility Assessment & Tools	
A.	Economic Development and Land Use	Page 87
i.	Economic Evaluation.....	Page 87
ii.	Zoning and Development	Page 96
iii.	Land Use Compatibility	Page 98
B.	Transportation	Page 116
i.	Land Mobility	Page 116
1.	STRAHNET	
2.	Coastal Evacuation Routes	
3.	Normandy Road/Rail Corridor	
ii.	Sea Mobility	Page 120
1.	Military Access to Piers/Trestle	
2.	Ferry Passenger Routes	
3.	Recreational Boating in the Bay	
iii.	Air (Air space and over flights).....	Page 123
C.	Utilities	Page 123
D.	Climate Resilience	Page 125
i.	Coastal Flooding and Climate Resilience	Page 125
ii.	Coastal Flooding Exposure Assessment.....	Page 132
iii.	Current Projects & Local Issues	Page 141
1.	Culverts along Normandy Road	
2.	Oyster Restoration in Sandy Hook Bay at NWS Earle	
3.	Storm drainage in adjacent Middletown neighborhoods	
4.	Ware Creek and shoreline areas	
6.	Recommendations	Page 147
i.	Communication/Outreach	
ii.	Land Use	
iii.	Economic Development	
iv.	Transportation	
v.	Utilities	
vi.	Climate Resilience	

7. Implementation PlanPage 161
 A. Recommendation Methodology
 B. Next Steps

Figures

Figure 1.01: NWS Earle Location

Figure 1.02: Naval Station Boundary, Review and Study Areas

Figure 2.01: Existing Land Use: Mainside

Figure 2.02: Normandy Road/Rail Corridor

Figure 2.03: Existing Land Use: Waterfront

Figure 2.04: Restricted Area

Figure 2.05: NWS Earle Strategic Highway Network (STRAHNET)

Figure 2.06: NWS Earle Military Influence Area (MIA)

Figure 2.07: Existing Zoning and Development

Figure 2.08: Overview of Colts Neck

Figure 2.09: Land Use and Land Cover for Colts Neck

Figure 2.10: Existing Zoning for Colts Neck

Figure 2.11: Overview of Howell Township

Figure 2.12: Land Use / Land Cover in Howell Township

Figure 2.13: Zoning in Howell Township

Figure 2.14: Overview of Middletown Township

Figure 2.15: Land Use / Land Cover in Middletown Township

Figure 2.16: Zoning in Middletown Township

Figure 2.17: Overview of Tinton Falls Borough

Figure 2.18: Land Use / Land Cover of Tinton Falls Borough

Figure 2.19: Zoning of Tinton Falls Borough

Figure 2.20: Overview of Wall Township

Figure 2.21: Land Use / Land Cover in Wall Township

Figure 2.22: Zoning in Wall Township

Figure 2.23: MIA within Atlantic Highlands

Figure 2.24: MIA within Eatontown

Figure 2.25: MIA within Farmingdale

Figure 2.26: MIA within Freehold Township

Figure 2.27: MIA within Highlands

Figure 2.28: MIA within Keansburg

Figure 2.29: MIA within Neptune

Figure 2.30: MIA within Ocean Township

Figure 3.01: General Advisory Committee Meeting at County Planning Offices

Figure 3.02: Technical Advisory Committee Meeting at NWS Earle Pier

Figure 3.03: Public Open House

Figure 4.01: Farm Preservation Status within NWS Earle MIA

Figure 5.01: NWS Earle Aerial (Google Earth view)

Figure 5.02: Colts Neck Township Aerial (Google Earth view)

Figure 5.03: Howell Township Aerial (Google Earth view)

Figure 5.04: Middletown Township Aerial (Google Earth view)

Figure 5.05: Tinton Falls Borough Aerial (Google Earth view)

Figure 5.06: Wall Township Aerial (Google Earth view)

Figure 5.07: Existing Zoning in NWS Earle Planning Area

Figure 5.08: Strategic Highway Network near NWS Earle

Figure 5.09: Aerial of Normandy Road at Route 36 looking Southeast (Google Earth view)

Figure 5.10: Monmouth County Evacuation Routes (Monmouth County)

Figure 5.11: Normandy Road Rail Corridor (NWS Earle Master Plan)

Figure 5.12: View of Pier looking South (NWS Earle Master Plan)

Figure 5.13: Earle Pier Restricted Zone Depicted on Nautical Chart of Lower Sandy Hook Bay

Figure 5.14: Mean Sea Level Trend in Atlantic City, NJ (1911 – 2017)

Figure 5.15: Process for Estimating Flood Exposure (Source: New Jersey Department of Environmental Protection (2017))

Figure 5.16: NWS Earle Exposure Assessment with Coastal Flooding Base Map (MHHW)

Figure 5.17: Exposure Assessment with Coastal Flooding 1 ft. above MHHW

Figure 5.18: NWS Earle Exposure Assessment with Coastal Flooding 2 ft. above MHHW

Figure 5.19: NWS Earle Exposure Assessment with Coastal Flooding 3 ft. above MHHW

Figure 5.20: NWS Earle Exposure Assessment with Coastal Flooding 7 ft. above MHHW

Figure 5.21: NWS Earle Exposure Assessment with Coastal Flooding 12 ft. above MHHW

Figure 5.22: Aerial view of Normandy Road culverts at McClees Creek

Figure 5.23: Photo of typical Oyster Castle

Figure 5.24: Graphic Representation of Stormwater Drainage issue in Leonardo

Figure 5.25: Aerial View from Sandy Hook Bay looking south, Ware Creek is the area to the right or west of the pier (Google Earth image)

Tables

Table 2.01: NWS Earle Base Population

Table 2.02: NWS Earle Tenants

Table 2.03: Economic Impact

Table 2.04: Land Use by Area for Entire MIA Area

Table 2.05: Land Use by Area for Colts Neck

Table 2.06: Land Use by Zoning for Colts Neck

Table 2.07: Land Use by Area for Howell Township

Table 2.08: Land Use by Zone for Howell Township

Table 2.09: Land Use by Area for Middletown Township

Table 2.10: Land Use by Zone for Middletown Township

Table 2.11: Land Use by Area for Tinton Falls Borough

Table 2.12: Land Use by Zone for Tinton Falls Borough

Table 2.13: Land Use by Area for Wall Township

Table 2.14: Land Use by Zone for Wall Township

Table 2.15: Land Use by Area for Atlantic Highlands

Table 2.16: Land Use by Area for Eatontown

Table 2.17: Land Use by Area for Farmingdale

Table 2.18: Land Use by Area for Freehold Township

Table 2.19: Land Use by Area for Highlands

Table 2.20: Land Use by Area for Keansburg

Table 2.21: Land Use by Area for Neptune

Table 2.22: Land Use by Area for Ocean Township

Table 4.01: Annual Economic Impact

Table 5.01: Employment by Sector

Table 5.02: Travel Time to Work

Table 5.03: Place of Employment

Table 5.04: Land Use Summary by Jurisdiction

Table 5.05: NWS Earle Land Use Compatibility (NAICS Codes)

Table 5.06: Municipal Land Use Compatibility

Table 5.07: STAP Probabilistic SLR Projections for New Jersey (ft.)

Table 5.08: CARSWG / SERDP Scenario SLR Projections for NWS Earle (Hall et al., 2016)

Table 5.09: NOAA Regional SLR Projections (Sweet et al., 2017)

Table 5.10: NJ FRAMES Projected Water Levels Relative to 2000 MHHW

Table 5.11: NAVFAC Projected Extreme Water Levels Relative to 1992 MHHW

Table 5.12: Water Levels above Current MHHW Assessed for NJ FRAMES Analyses (Sandy Hook, NJ)

Appendices

- A. Policy and Advisory Committee Meetings and Presentations
- B. Technical Advisory Committee Meetings and Presentations
- C. Municipal Questionnaire and Meeting Summaries
- D. Summary of Meeting with NWS Earle (Stakeholder Interviews)
- E. Public Involvement Strategy (PIS)
- F. Public Outreach and Presentations
- G. Rutgers SLR/Climate Study Summary
- H. Citations of Recent Related Studies

1. INTRODUCTION

The County of Monmouth, in cooperation with Naval Weapons Station (NWS) Earle and the thirteen municipalities that surround this military installation, initiated a Joint Land Use Study (JLUS) in the fall of 2016. This report documents the results of this joint military-community planning project.

A. WHAT IS A JOINT LAND USE STUDY (JLUS)

A Joint Land Use Study (JLUS) is a cooperative land use planning effort between affected local governments and military installations. The recommendations present a rationale and justification, and provide a policy framework to support adoption and implementation of compatible development measures. The U.S. Department of Defense (DOD), Office of Economic Adjustment (OEA) provides funding for local governments to undertake a JLUS in partnership with their military installation, aimed at minimizing operational effects on neighboring jurisdictions and the encroachment of the civilian community within a military influence area in ways that impair the continued operational utility of the military installation or could impact public health, safety and welfare.

B. NWS EARLE JLUS GOALS

NWS Earle was commissioned in 1943 with a mission to provide ordnance for all Atlantic Fleet Carrier and Expeditionary Strike Groups, and support strategic DOD ordnance requirements. It is the largest weapons station on the East Coast. The facility encompasses a total of 11,851 acres in three major landward elements: Mainside (10,893 acres in Colts Neck, Howell and Wall townships); the Waterfront Area (705 acres in Middletown Township); and the 17 mile Normandy Road Ammunition Transportation Corridor (253 acres in Colts Neck and Middletown townships and the Borough of Tinton Falls). The fourth element of NWS Earle is the Pier Complex which extends out 2.2 miles into Raritan/Sandy Hook Bay (see Figure 1.01).

NWS Earle suffered \$50 million in damage from Superstorm Sandy. Resiliency from future storm events, adapting to sea level rise, and maintaining accessibility are important planning issues for the base and the surrounding communities moving forward.

The goals of this JLUS are:

1. To encourage local governments, together with Monmouth County, to work closely with the military installation to implement measures that encourage the introduction of new civilian development that is compatible with the continued operational utility of the military installation, and to preserve and protect the public health, safety, and welfare of those living near this active military installation.
2. To improve post-storm resiliency within New Jersey's Watershed Management Area 12 (WMA 12), also known as the Monmouth Coastal Watersheds, for the military installation and surrounding communities through increased planning and adaptation to adverse impacts from Sea Level Rise (SLR), both on base and in the neighboring communities.
3. To ensure preservation, protection, and post-storm resiliency of the Strategic Highway Network (STAHNET) including the Normandy Road/Rail Corridor, enabling the deployment of military assets outside of the continental United States at the direction of the National Command Authority, while protecting the safety of the surrounding communities.

C. PURPOSE OF STUDY

This JLUS is a community-driven, cooperative, strategic planning process among all elements of Naval Weapons Station Earle; the surrounding municipalities; and the County of Monmouth. This JLUS Investigated:

1. Ways to promote community development that are compatible with the mission of NWS Earle.
2. Ways to reduce operational impacts on adjacent lands. NWS Earle has identified 18 compatibility challenges to continued military operations. The main three are:
 - a) Normandy Road/Rail Corridor
 - b) Increased Use of Raritan/Sandy Hook Bay
 - c) Resiliency Planning
3. Adaptation options that would reduce community-wide potential impacts from sea level rise, increase storm resiliency, and prevent isolation of NWS Earle during significant storm events.

D. STUDY PROCESS

The JLUS planning process is intended to improve communication between partners and establish informal policies and procedures for military participation and cross-jurisdictional coordination in community development review and planning processes, including proposed infrastructure and energy related projects. The JLUS includes a background study, gap analysis and recommendations for project implementation.

Monmouth County has served as the JLUS project sponsor and coordinating entity. The Division of Planning within the County is the lead project agency. Three separate groups lead the study effort: a JLUS Policy Committee, General Advisory Committee, and Technical Working Groups. The make-up and responsibility of these three groups is discussed in Chapter 3. The study also included a public involvement process, including open public meetings, a project website, and other outreach methods, to present information and gather input over the course of the project, as described in Chapter 3.

The JLUS was conducted over an approximate one-year-long time period by a consultant team lead by Maser Consulting from Red Bank and including AECOM, HR&A Advisors, and Rutgers University climatology and resiliency specialists.

E. STUDY AREA

The study area for the JLUS includes five geographic areas, as follows (see Figure 1.2):

1. NWS Earle including the Mainside, Normandy Road/Rail ammunition transportation corridor, Waterfront, and Pier Complex areas.

2. NWS Earle Municipalities including the five municipalities in which parts of the installation are located: Colts Neck, Howell, Middletown, Tinton Falls, and Wall.
3. Military Influence Area (MIA) Municipalities including the municipalities that have land area within the MIA (defined in Chapter 2). These include Atlantic Highlands, Highlands, Eatontown, Farmingdale, Freehold Township, Keansburg, Neptune, and Ocean.
4. Watershed Municipalities including Monmouth County municipalities within watersheds where land use decisions could impact the mission of NWS Earle through impacts to Raritan Bay or Sandy Hook Bay. These include municipalities within the Raritan Bayshore Watershed and those within the Navesink/Swimming River Watersheds. The watershed municipalities are part of a 3-year pilot resiliency project spearheaded by the New Jersey Department of Environmental Protection (NJDEP) known as New Jersey Fostering Regional Adaptation through Municipal Economic Scenarios (NJ FRAMES).
5. Major Access Highways and Strategic Highway Network (STAHNET) including highways within Monmouth County that provide local access to NWS Earle as well as routes comprising the STAHNET (defined in Chapter 2).

F. REPORT ORGANIZATION

This report documents the results of the JLUS planning process. It is organized into seven sections, as follows:

- Chapter 1, *Introduction* provides an overview of the study purpose.
- Chapter 2, *Regional Setting* provides a description of the study area and land use and other characteristics affecting the JLUS.
- Chapter 3, *JLUS Process, Organization & Outreach* discusses the study process, schedule and organizational structure. It also details the Public Involvement Strategy.
- Chapter 4, *Existing Compatibility Tools* provides a review of the existing Federal, state, regional and local policies and programs now in place addressing compatibility between and among the installation and its surrounding jurisdictions.
- Chapter 5, *Compatibility Assessment & Tools* describes the proposed policies and programs that would augment compatibility and military-community relationships.
- Chapter 6, *Recommendations* discusses the study recommendations resulting from the JLUS planning analysis.
- Chapter 7, *Implementation Plan* provides a matrix of the JLUS recommendations outlining priorities for action, relative cost, timeframes for implementation, and responsible parties.

The JLUS report is also accompanied by an executive summary that highlights certain aspects and results of the study.

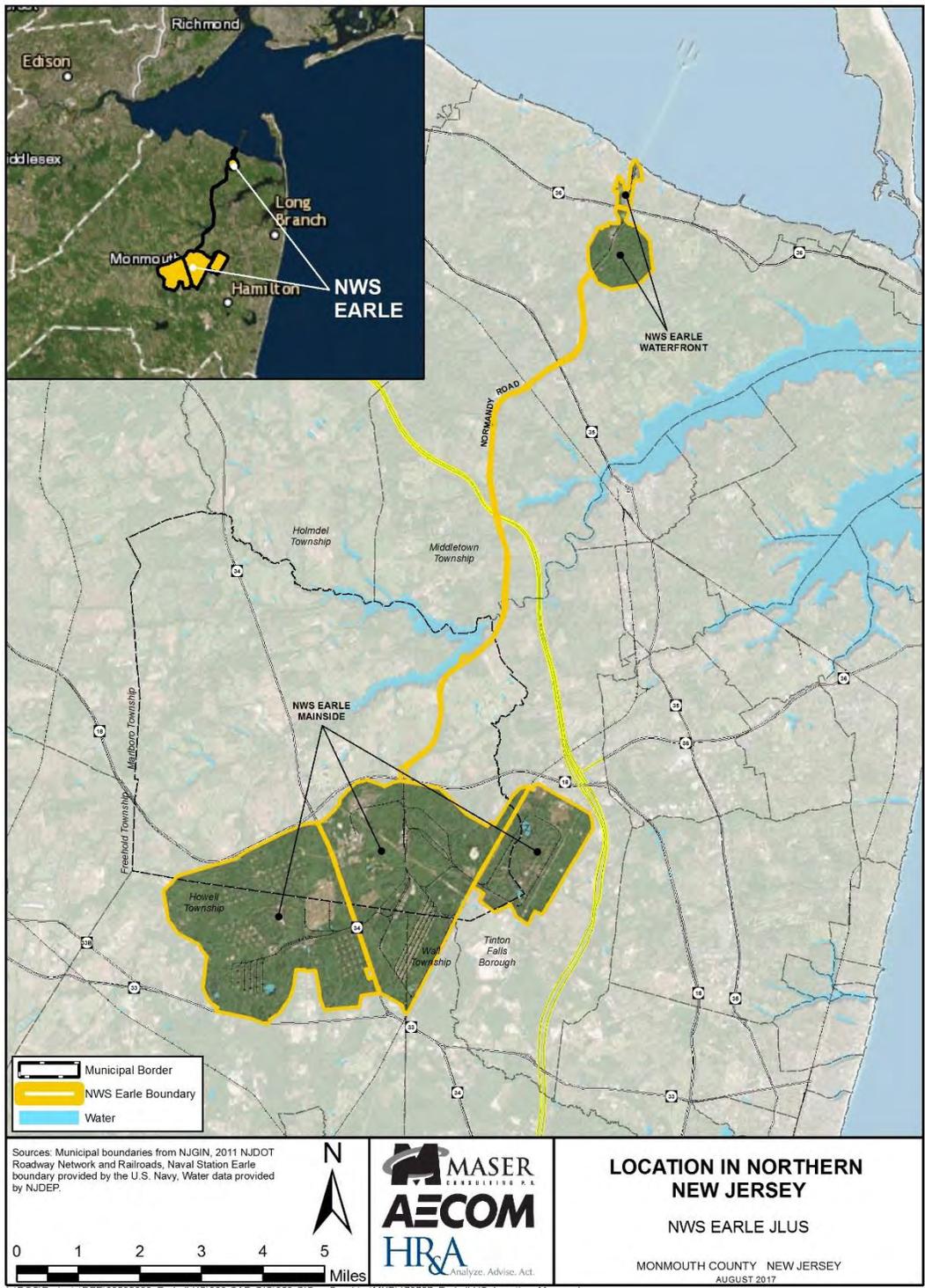


Figure 1.01 NWS Earle Location

2. REGIONAL SETTING

A. REGIONAL PERSPECTIVE

I. COUNTY OVERVIEW

Monmouth County Division of Planning in May of 2016 completed an updated Planning Report which provides a snapshot of the County. For the purposes of this JLUS, relevant data has been extracted to provide a sense of NWS Earle within the context of the greater Monmouth County area surrounding the base.

1. GENERAL

LOCATION

Monmouth County, with a total land area of 472 square miles and 193 square miles of water bodies, ranks as the 6th largest county in New Jersey. The County is situated along the Atlantic Seaboard between New York City and Philadelphia, centrally located within the Boston to Washington D.C. regional corridor. The county is home to fifty-three municipalities, ranging in size from 0.1 square miles (Loch Arbour) to 62.1 square miles (Howell). Overall population density is approximately 1,330 people per square mile with town populations ranging from 190 (Loch Arbour) to 65,500 people (Middletown). Most of the population lives within five miles of either the Raritan Bay shoreline or Atlantic Ocean coastline. The County Seat is Freehold Borough, which is located in central Monmouth County at the convergence of U.S. Route 9 and NJSH Route 33. Monmouth County's ideal seaside setting, midway between two of the nation's largest metropolitan areas, provides the perfect location for city bound commuters as well as a close getaway for urbanites seeking refuge to the country or the world famous Jersey Shore.

DEMOGRAPHICS

Prior to World War II, Monmouth County was predominately rural with over 50% of its land area devoted to farming. After the war ended the population surged and by 1950 the County had added over 64,000 residents to the 1940 total. The 1954 opening of the Garden State Parkway brought expanded residential and economic development opportunities along with improved access to regional employment centers.

In subsequent decades, the County's population growth slowed to a more sustainable rate, averaging 51,000 per decade, reaching 615,301 by the year 2000. The 2010 U.S. Census reported Monmouth's population to be 630,380, a 2.5% increase from 2000, the lowest observed population growth increase since The Great Depression. The 2010 Census count ranked Monmouth County as the 5th most populous in New Jersey, encompassing 7.2% of the state's population.

Between 2000 and 2010, twenty of the County's fifty-three municipalities grew in population, while thirty-three saw a decline. A significant portion of the County's population growth continued to be concentrated in western municipalities: Manalapan, Freehold Township, Marlboro, Tinton Falls, Upper Freehold, and Howell.

The overall population decline can be potentially linked to two significant events – the closing of Fort Monmouth in 2011, and Superstorm Sandy in 2012.

EDUCATION & INCOME

a) Education

Monmouth County's residents have achieved a high level of educational attainment, making for a highly skilled localized labor force. The 2014 ACS 1-Year Estimates reported that approximately 93.1% of adult residents over the age of 25 have earned a high school diploma or higher, as compared to the New Jersey figure of 89.1%, and the national figure of 86.9%.

Approximately 50.9% of Monmouth County's over-25 population has earned a higher education degree: 7.2% have earned an associate degree, 26% have earned a bachelor's degree, and 16% have earned a graduate or professional degree. The County ranks 5th in the state in percentage of adults with a graduate or professional degree, and 5th in the percentage of adults with a bachelor's degree.

b) Income

The 2014 ACS 1-Year Estimates reported the median household income in 2014 inflation-adjusted dollars of Monmouth County as \$88,413, which is 23% above New Jersey's median of \$71,919, and 65% above the United States' median of \$53,657. Approximately 25.7% of Monmouth County households had total incomes of more than \$150,000 as compared to 19% of New Jersey households, and 10.5% of the United States. When evaluating per capita income in 2014 inflation-adjusted dollars, Monmouth County, at \$44,873, was 23% higher than the state's income of \$36,593, and 55% above the national income of \$28,889. Monmouth County residents have the fifth highest per capita income in New Jersey, while Hunterdon County has the highest per capita income county at \$50,415. (page 25)

c) Sources of Income

Bureau of Economic Analysis data indicates that Monmouth County residents earn a higher percentage of personal income than both New Jersey and the United States within the following industries: utilities, construction, information, professional, scientific and technical services, health care, local government, arts, entertainment and recreation, retail trade, and other services. (page 25)

The chart of Personal Income Data: Sources of Non-Farm Earnings as of 2014 for Monmouth County, New Jersey, United States, lists Military Income as 0.3% of the total County Personal Income (page 26)

FACILITIES & INFRASTRUCTURE

Multiple modes of transportation provide Monmouth County residents with links to both the New York City and Philadelphia metro regions. Twenty-seven miles of the Garden State Parkway traverse the eastern portion of the County, connecting with Atlantic City to the south, and Newark and New York City to the north. Seventeen miles of Interstate 195 run east/west through the southern portion of the County, providing connections to the New Jersey Turnpike, Mercer County, Pennsylvania, and the Atlantic coastline. In addition, there are approximately 233 miles of State roads and 381 miles of County roads.

- Ferry Service

Terminals located in Highlands and Atlantic Highlands offer SeaStreak ferry service to Wall Street's Pier 11 and East 35th street. NY Waterway ferry service to West 39th street, Pier 11, World Financial Center, and Jersey City is available from Middletown's Belford Terminal. Annually, ferries shuttle 900,000 passengers between points in Monmouth County and New York City, 90% of whom are commuters. In the first quarter of 2015, the Belford Ferry Terminal saw an average daily ridership of approximately 1,689 passengers; Highlands and Atlantic Highlands marina terminals served on average 2,743 daily riders. SeaStreak offers a variety of trips and packages to encourage non-work related trips. Between

May and October, trips from Highlands to Martha’s Vineyard are offered, as well as summer-season direct trips from lower Manhattan to Sandy Hook, trips involving Broadway and sports game packages, etc. (page 59)

- Airports

The Monmouth County Executive Airport (formerly the Allaire Airport) located in Wall, is available for local charter and corporate flights. The new owners of the airport, Wall Aviation, hope to attract more corporate jets, rather than the smaller planes and skydiving businesses that currently encompass most of their clientele. Wall Aviation is planning on investing millions of dollars to modernize the airport. The planned upgrades include new facilities, a new operator, new fuel provider, and installation of air traffic controllers (the airport has not had controllers since 1960). They also have plans to increase airport safety by implementing new rules and regulations. (page 60)

2. MILITARY HISTORY

Monmouth County has a long military history stemming back to the Revolutionary War Battle of Monmouth. For troop training during the Civil War, Camp Vredenburg was established. Sandy Hook, recognized as a vital defense location for New York Harbor, saw its first military fort built in 1857. The Sandy Hook Proving Ground was added in 1874 for coastal defense weapons testing. Renamed Fort Hancock in 1895, it included several coastal defense batteries and during the Cold War Era housed one of three local Nike Missile facilities. When the missile system was deactivated in 1974, Fort Hancock was decommissioned. The state purchased 120 acres of beachfront property in Sea Girt in 1887 for a National Guard training facility. Guardsmen were mobilized from this site during the Spanish American War and other campaigns. Fort Monmouth opened in 1917 as Camp Vail for World War I officer training. In 1941 it was expanded with the addition of Camp Coles in Middletown, Camp Charles Wood in Tinton Falls, and Camp Evans in Wall Township. Over time the outlying properties were decommissioned and on September 15, 2011, Fort Monmouth closed as part of a Department of Defense Base Realignment and Closure (BRAC).

In 1943 an ammunition ship caught fire while moored at the heavily populated city of Bayonne, leading to the rapid planning for Naval Ammunitions Depot Earle. At the time, the rural nature of Monmouth County, along with a sheltered bay that offered quick access to the Atlantic Ocean, and proximity to a network of rail and roads, made this area an ideal location. Today, Naval Weapons Station Earle and the National Guard Training Center in Sea Girt are Monmouth County’s only remaining military facilities.

II. NWS EARLE OVERVIEW

Naval Weapons Station Earle is one of three major ammunitions activities serving the Navy’s Atlantic Fleet on the East Coast. The installation is divided into two sections – Mainside and Waterfront – which are connected by a military-owned and operated road and rail line that measures 9.9-miles from gate to gate. Mainside encompasses approximately 10,000 acres, while the Waterfront and Pier Complex total 719 acres. The Waterfront has a 2.2 mile long pier/trestle complex extending into Sandy Hook Bay, which allows loading and unloading of ships at a safe distance from populated areas.

Ordnance is primarily transported by rail from Mainside to the Pier Complex along Normandy Road, where it can be loaded onto ships docked at the pier. Except for the waterfront and ordnance operations functions, most of NWS Earle’s departments and facilities are located at the Mainside Administrative Area.

Unique attributes found at NWS Earle - multiple ordnance loading piers, a large land area for munitions storage, a protected waterfront area for munitions loading, access to deep water, and an extensive

magazine network – are critical to supporting the Department of Defense’s (DoD) ordnance requirements. These attributes are nearly irreplaceable - they would be extremely difficult and costly to replicate or relocate, given the lack of available suitable land on the East Coast and current environmental regulations.

1. MISSION & HISTORY

The current military mission of NWS Earle, as stated on the installation website, is to “provide all ordnance for all Atlantic Fleet Carrier and Expeditionary Strike Groups, and support strategic Department of Defense ordnance requirements.”¹

NWS Earle was originally commissioned as Naval Ammunition Depot (NAD) Earle in 1943 to support American forces engaged in World War II. At that time, the site was located in a rural area in central New Jersey with access to the New York Harbor and open ocean for ordnance transport, as well as links to rail lines serving the area from the west where the majority of ammunition shipments originated. During the war, NAD Earle quickly became a focal point for ordnance shipping on the East Coast, and the majority of ammunition used by the Allied Forces for the invasion of Normandy originated from NAD Earle.

The installation continued to develop after World War II and was renamed Naval Weapons Station Earle in 1974. NWS Earle continued to develop keeping pace with the changing needs of the Navy and DoD during the Cold War. In subsequent years, NWS Earle proved its strategic worth as the major DoD trans-shipment site for ordnance used in Operation Desert Storm and Operation Iraqi Freedom. The installation is currently used to support ordnance requirements for military operations throughout the Atlantic Fleet’s Area of Operations (AOR).

2. BASE LOADING AND TENANTS

NWS Earle has a base population of approximately 800 personnel, including military, civilian, and contract employees (Table 2.01). In addition, Navy Operational Support Center (NOSC) Earle supports up to 250 Navy reservists who report to the base once a month for the drill weekend.

Table 2.01: NWS Earle Base Population

Military		178
Civilian		562
Contractors		89
Subtotal Military		829
Dependents	Military Family Members	176
Reservists	US Navy Reserves (report one weekend per month)	250
Total NWS Earle		1,255

Source: NWS Earle Master Plan, 2014

¹ https://www.cnmc.navy.mil/regions/cnrma/installations/nws_earle/about/mission_and_vision.html

Beyond the military and civilian personnel, NWS Earle offers on-base housing for military personnel and their families and assists families with finding homes or apartments in the surrounding area if they do not wish to live on base. Belfour Beatty operates the military housing on-base and provides privatized homes (single-family and townhouse), with two, three and four bedroom units.

The base has over twenty Navy and DoD tenants (Table 2.02). The major tenant is the Navy Munitions Command (NWC), Detachment Earle which is responsible for ordnance-related activities at the base. Several of the tenants on-base serve DoD retirees and other active and inactive service members living in the area, including the Naval Health Clinic, the Navy Exchange (NEX), and the Naval Federal Credit Union (NFCU).

Table 2.02: NWSEarle Tenants

DCAA	Defense Contract Audit Agency
DCMA	Defense Contract Management Agency
EOD	Explosive Ordnance Disposal Mobile Unit Twelve, Det. Earle
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
Medical & Dental	Naval Health Clinic Earle
MSC LANT	Military Sealift Command Atlantic
MSC-TCE	Military Sealift Command Training Center East (Fire School)
NCTAMS-LANT	Naval Computer & Telecommunications Area Master Station Atlantic / Base Communications Officer
NCIS	Naval Criminal Investigative Service
NSWC-CD	Naval Surface Warfare Center, Carderock Division, Detachment Philadelphia
NAVFAC MIDLANT	Naval Facilities Engineering Command Mid-Atlantic
NAVSUP FLC	Naval Support Fleet Logistics Center, Earle
NAVSURWARCEN, DIV IH	Naval Surface Warfare Center, Division Indian Head
NEX	Navy Exchange
NERSMO	Northeast Regional Storage Management Office
NFCU	Navy Federal Credit Union
NMC	Naval Munitions Command, Detachment Earle
NOSC EARLE NJ	Navy Operational Support Center, Earle
DOI-BSEE	Department of the Interior, Bureau of Safety and Environmental Enforcement- Oil and Hazardous Materials Simulated Environmental Test Tank

RLSO MID-ATLANTIC BROFF EARLE	Region Legal Service Office, Mid-Atlantic Branch Office Earle
USAASC	US Army Acquisitions Support Center
US Marine Corps	Recruiting Station

Source: NWS Earle Master Plan, 2014

3. ECONOMIC IMPACTS

The Navy prepares an annual Economic Impact Report which provides key information about the economic impact of each of the installations that comprise Navy Region Mid-Atlantic (NRMA) on the surrounding communities, in addition to the Region's economic impact in its entirety. The report captures the amount of direct capital infused into the local economies as a result of salaries, expenditures and contractual payments for services rendered in support of installation activities. This document is made available to senior military officials and their civilian counterparts, as well as the NRMA Public Affairs Office (PAO) for public dissemination.

This report is not intended to provide specific military, civilian, contractor, dependent or retiree population counts. Because of the transient nature of military units and personnel, as well as the associated supporting civilian staff and family members, the numbers are in constant fluctuation. Therefore, the population numbers in this report are considered a reasonable estimate for the fiscal year and are coupled with the accompanying financial impacts to constitute the economic impact on each area. The economic impact area includes all counties and cities encompassing a 40-mile radius from the center of the each installation.

The economic impact data for NWS Earle from the 2015 NRMA Economic Impact report (which is the latest available) is provided in Table 2.03.

Naval Weapons Station Earle provides approximately 400 civilian jobs in the clerical, administrative, industrial, law enforcement, and professional fields. Approximately 250 base personnel and dependents reside in base housing. Additionally, approximately 300 navy reservists are on-site once a month. Earle is the operational support base for five Military Sealift Command combat logistics ships.

Table 2.03 Economic Impact



Navy Region Mid-Atlantic
Naval Weapons Station Earle
Colts Neck, New Jersey
01 October 2014 – 30 September 2015



<u>Personnel</u>	<u>FY 2015</u>
Active Duty Military (Navy and Marine Corps) -----	
Officer ² -----	21
Enlisted ² -----	225
Officer Reserve ² -----	21
Enlisted Reserve ² -----	172
Students ¹ -----	24
Army/Air Force/USCG – Officer² -----	14
Enlisted ² -----	116
Officer Reserve ² -----	0
Enlisted Reserve ² -----	0
Retired AD and Survivors (est.)² -----	1,535
Military Family Members (est.)² -----	838
Total -----	2,966
Civilian Employees (Navy and Marine Corps) -----	
Civil Service ² -----	577
Army/Air Force/USCG/Other DOD ² -----	23
Civilian Contractors (est.) ² -----	78
Non-Appropriated Fund ⁴ -----	52
Commissary-----	0
NEX and Navy Lodge-----	6
Total Civilian Employees -----	736
Total Navy Family (Personnel) -----	3,702
Homeported Operating Units³ -----	
Ships-----	0
Aircraft Squadrons-----	0
Total Operating Units -----	0
Military Family Housing⁵ -----	
Occupy Government Housing-----	0
Occupy Government PPV Housing-----	75
Own Private Dwellings-----	27
Rent Private Dwellings-----	273
Total Housing -----	375
Economic Impact: Annual Payroll (\$K) -----	
Active Duty Military ² -----	\$28,544
Retired Military/Survivors ³ -----	25,923
Total Military Payroll -----	\$54,467
All Civil Service ² -----	43,725
Civilian Contractors (est.) ⁶ -----	5,918
Non-Appropriated Funds ⁴ – MWR-----	1,632
Commissary-----	0
NEX and Navy Lodge-----	113
Total Civilian Payroll -----	\$51,388
Total Annual Payroll -----	\$105,855
Procurement Goods and Services (G&S) (\$K)(est.)⁷ -----	\$842,268
Per Diem paid for travel-----	T
Grand Total Direct Economic Impact (\$K) -----	\$948,123

1- Installation provided data
2- Defense Manpower Data Center
3- Dept. of Defense Office of the Actuary (40 mile radius)
4- Regional NAF data
5- Mid-Atlantic Regional Housing Office data
6- Pay Scale.com Civilian contractor salary 2015
7- FY15 Federal Procurement Data System
T- No NGIS or Navy Lodge facilities

4. MISSION CRITICAL ASSETS

- Magazines

The NWS Earle ordnance storage facilities are located at Mainside (see Figure 2.01). As recorded in 2014, NWS Earle had the following ordnance facilities: 264 ordnance storage and handling facilities. This included 243 magazines, 16 inert storage facilities, four segregation facilities, and one transfer depot. Many of the magazines at NWS Earle were constructed during the World War II era. As a result, a number of them are unable to efficiently and effectively store modern ordnance. The 2014 NWS Earle Master Plan addressed these deficiencies and recommended improvements which are underway dependent on available funding.

- Normandy Road

Normandy Road is a 9.9-mile Government-owned, Government-protected thoroughfare that connects the NWS Earle Mainside with the Waterfront and Pier Complex (see Figure 2.02). The roadway consists of a two-lane road and a dual-line railway. The corridor is the sole route for ordnance transport between Mainside and the Waterfront, and also serves as a direct route for logistical support including security and fire/emergency support.

There is limited security fencing along Normandy Road, although the property is signed to note that it is for Government use only and trespassers may be prosecuted. There are security camera boxes located at all at-grade road crossings. Normandy Road traverses seven at-grade road crossings (Hockhockson Rd, Lakeside Rd, Swimming River Rd, West Front St, Nut Swamp Rd, Oak Hill Rd, & Sleepy Hollow Rd.), underpasses two major highways (NJSH Route 18 and the Garden State Parkway), and has four overpasses at CR 537, CR 520, NJSH Route 35 and NJSH Route 36.

- Piers/Trestle

The Waterfront area includes a 705 acre octagonal shaped facility in the Chapel Hill section of Middletown Township and the Pier Complex on Raritan/Sandy Hook Bay (see Figure 2.03). The NWS Earle deep water piers and barge are connected to the shore by a trestle that extends over two miles across the mud flats from the shore-side waterfront support facilities. The pier stretches 2.2 miles into the Sandy Hook bay and comprises 2.9 miles of pier/trestle surface area. Trestle 1 is the 2 mile-long rail and road causeway that leads to Trestles 2, 3 and 4. There are no docking or berthing facilities on Trestle 1.

Trestle 2 leads to Pier 2, and ship berths on the east and west side of the pier. Pier deck height is 13 feet above mean low water (MLW), loading platform height is 18 feet above MLW, and the alongside water depth is 35 feet at MLW. Pier 2 is not currently used for cargo loading.

Trestle 3 leads to Pier 3 and two berths on each side of the pier. Pier deck height is 12 feet above MLW, loading platform height is 17 feet above MLW, and the alongside water depth is 35 feet at MLW. A small boat mooring area is located in the southeast end of Trestle 3. Tugs and yard craft are moored in this location.

Trestle 4 leads to Pier 4 and berths on the east and west side of the pier. Pier deck height is 13 feet above MLW, loading platform height is 18 feet above MLW, and the alongside water depth is 45 feet at MLW. Pier 4 is the primary cargo-loading pier.

- Piers/Trestle Restriction Area

Pursuant to its authorities in section 7 of the Rivers and Harbors Act of 1917 (40 Stat 266; 33 U.S.C. 1) and Chapter XIX, of the Army Appropriations Act of 1919 (40 Stat 892; 33 U.S.C. 3), NWS Earle, acting through the Army Corps of Engineers, has established a Restricted Area in 33 CFR part 334 (33 CFR 334.102) about its piers and terminal channel in the Sandy Hook Bay. The Restricted Area represents a 750-yard perimeter around the trestles and pier complex (Figure 2.04). To better protect authorized vessels transiting the Terminal Channel and mooring at the Earle piers from acts of terrorism and other incidences of a similar nature during explosives loading and unloading, the Commanding Officer (CO), Naval Weapons Station has established this Restricted Area to be enforced at all times. This enables the U.S. Navy to restrict vessel traffic in a portion of Sandy Hook Bay. These regulations are also necessary to protect the public from potentially hazardous conditions that may exist as a result of military use within the area. Regulation 33 CFR 334.10 also allows the Navy to restrict use of the Terminal Channel. Vessels are only authorized to cross the Terminal Channel at such times as no naval vessels are transiting the channel.

5. STRATEGIC HIGHWAY NETWORK

The Department of Defense has established a Strategic Highway Network (STRAHNET) which is a system of highways within the National Highway System that is important to the United States' strategic defense policy and provides access, continuity and emergency capabilities for defense purposes. The STRAHNET includes routes for long distance travel and to connect individual installations to the routes for access and egress purposes to each military installation in the country. Figure 2.05 depicts the STRAHNET within New Jersey. The two roadways designated as part of the STRAHNET for NWS Earle (Mainside) are Interstate 195 and NJSH Route 34. There are no STRAHNET designated roads for the Waterfront portion of the base. Given the mission of the installation, these two highways serve as the main transport routes for ordnance delivery to NWS Earle from contracted munitions manufacturing plants in the northeast U.S. There are also DoD promulgated guidelines for transportation of ordnance as a hazardous waste on these roadways which are applicable to the contracted or military transport of ordnance by truck to the installation.

6. MILITARY INFLUENCE AREA

NWS Earle has defined a Military Influence Area (MIA) around the base. This MIA is a geographical planning area where military operations may impact local communities and, conversely, where local activities may affect the installation's ability to carry out its mission. The Navy monitors land use, transportation, regulatory, and economic activities within this area to identify and avoid potential incompatibilities between NWS Earle and its neighbors.

The MIA for NWS Earle is illustrated in Figure 2.06 and described as follows.

- **Mainside:** The MIA surrounding Mainside is comprised of a one mile Primary Buffer and an additional one mile Secondary Buffer.
- **Normandy Road:** Along Normandy Road, the Primary MIA is a quarter mile from the rail/ road on either side of the boundary, and an additional ¼ mile on either side serving as the Secondary MIA. The combined result is a ½ mile MIA buffer on either side of the corridor.
- **Waterfront/Pier Complex:** The ½ mile Primary and Secondary MIA along Normandy Road continues to and around the Waterfront area of NWS Earle. At the confluence of the MIA with Route 36, the MIA becomes one single entity (that is, all areas within the MIA are considered Primary). The MIA extends west along Route 36 from Keansburg Borough (to include the Belford Ferry Terminal and Marina), and east along Route 36 to the southernmost tip of the Sandy Hook Unit of Gateway National Recreational Area. The MIA continues north to include the entirety of

the Sandy Hook Unit, and then runs east to west to encompass the shipping channels to and from the Pier Complex.

Figure 2.01: Existing Land Use: Mainside

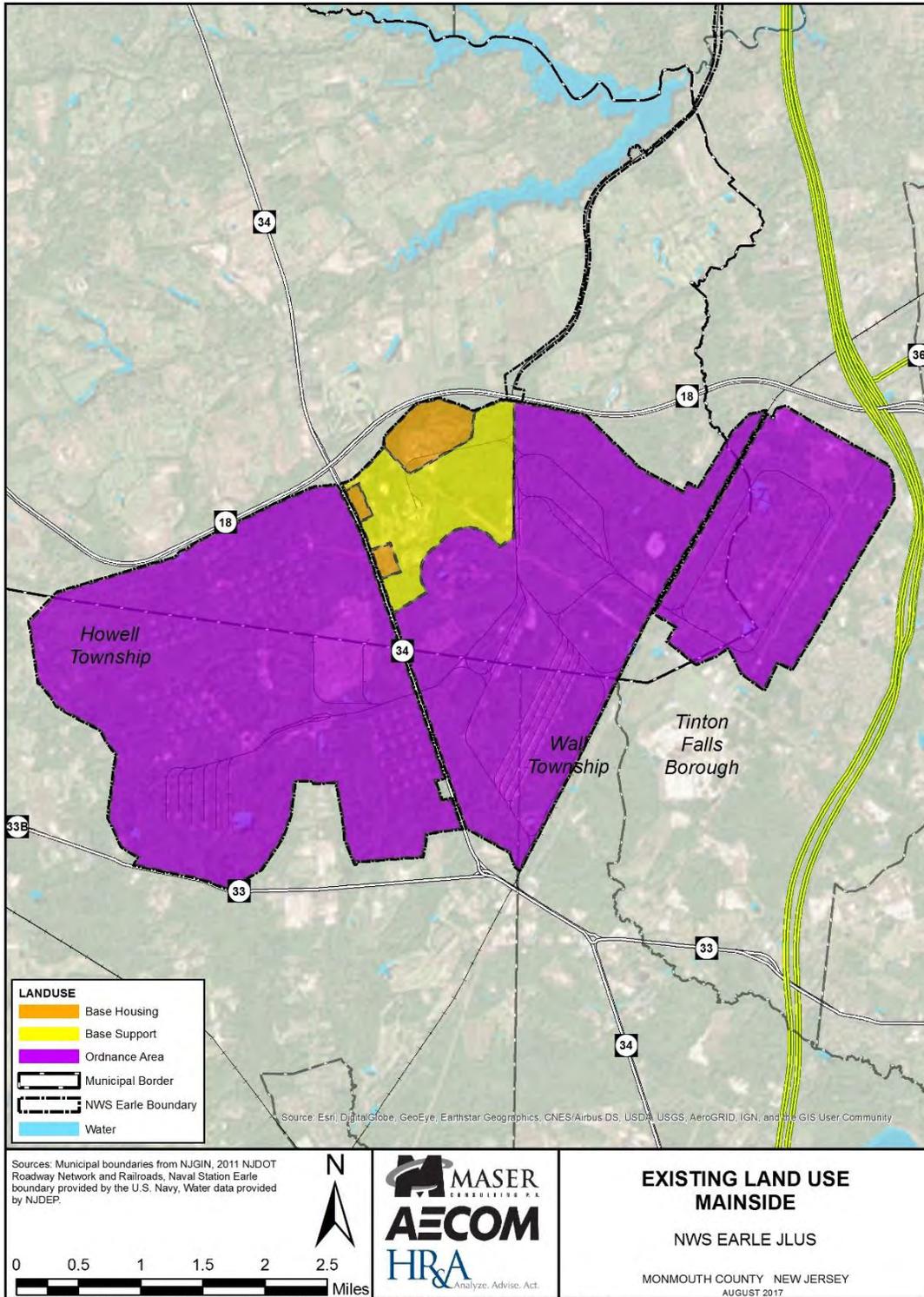


Figure 2.02: Normandy Road/Rail Corridor

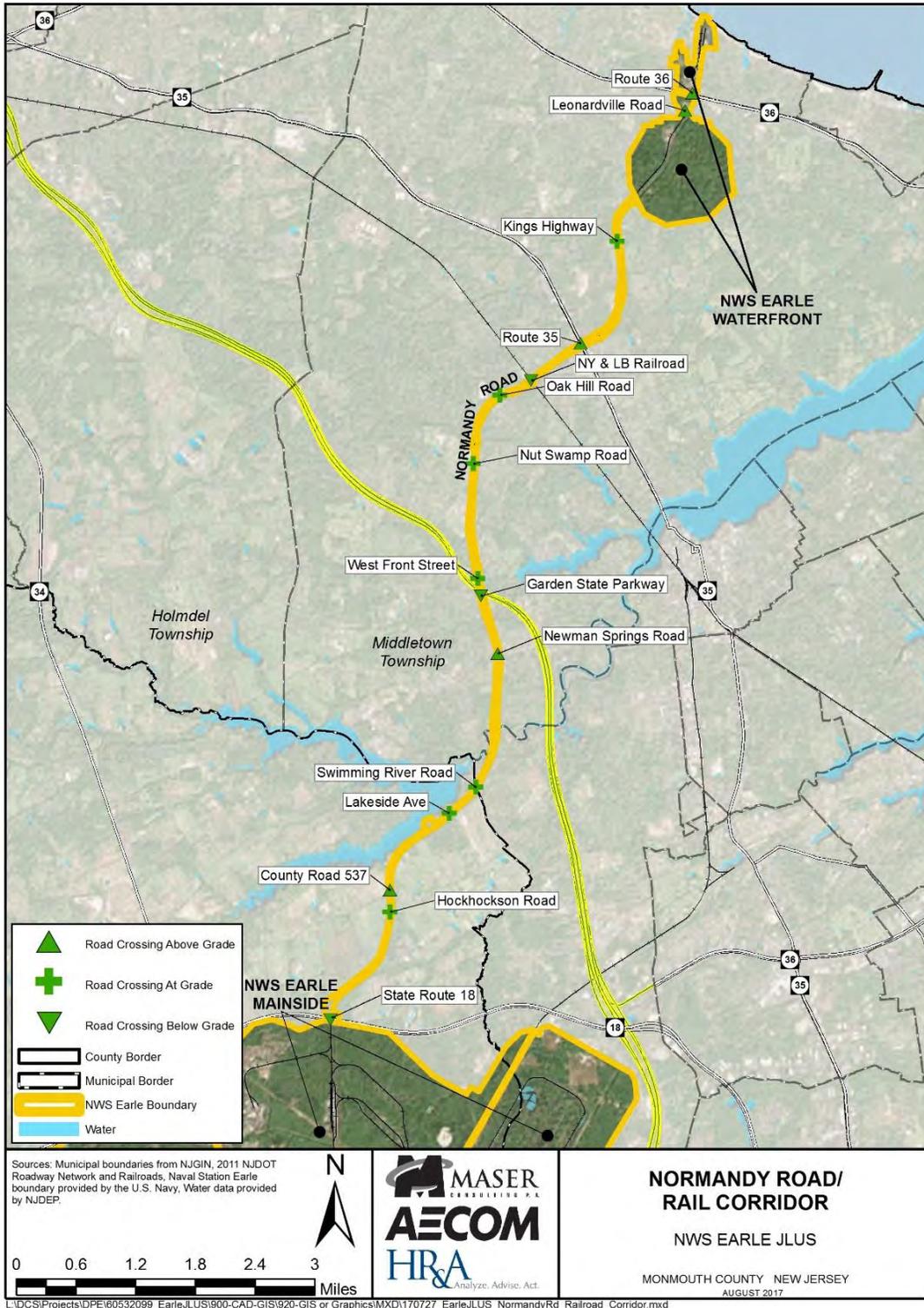


Figure 2.03: Existing Land Use: Waterfront

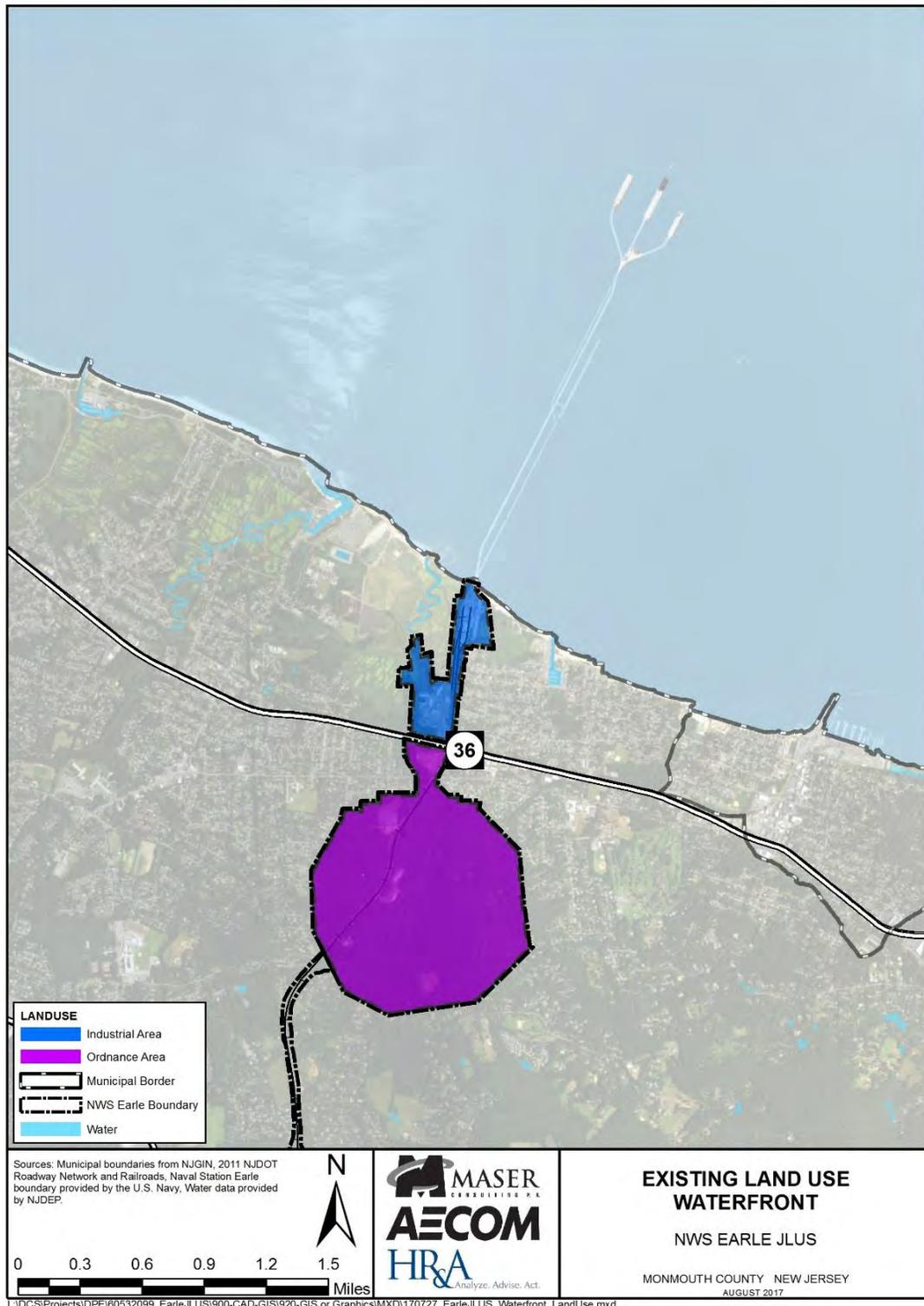


Figure 2.04: Restricted Area

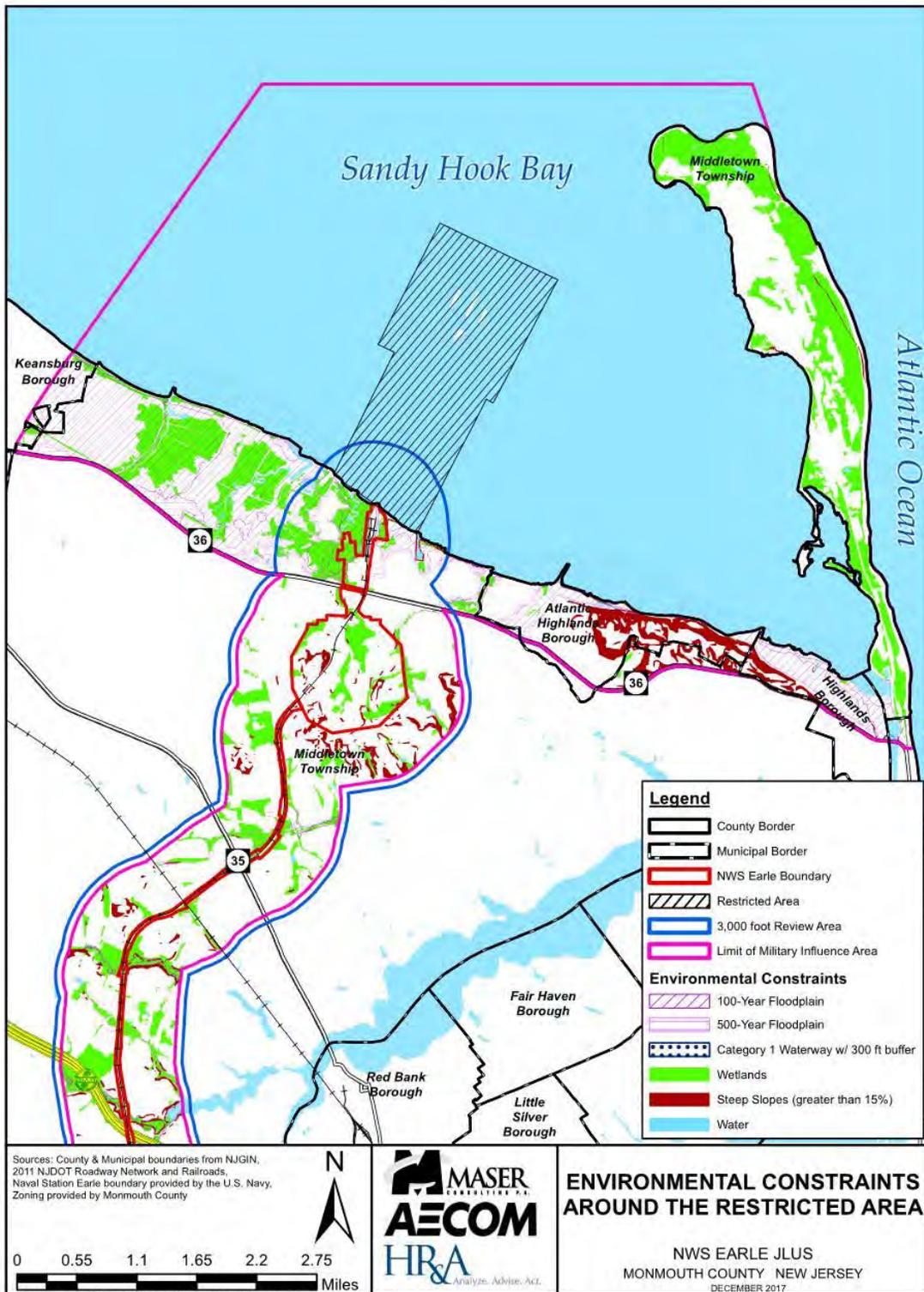
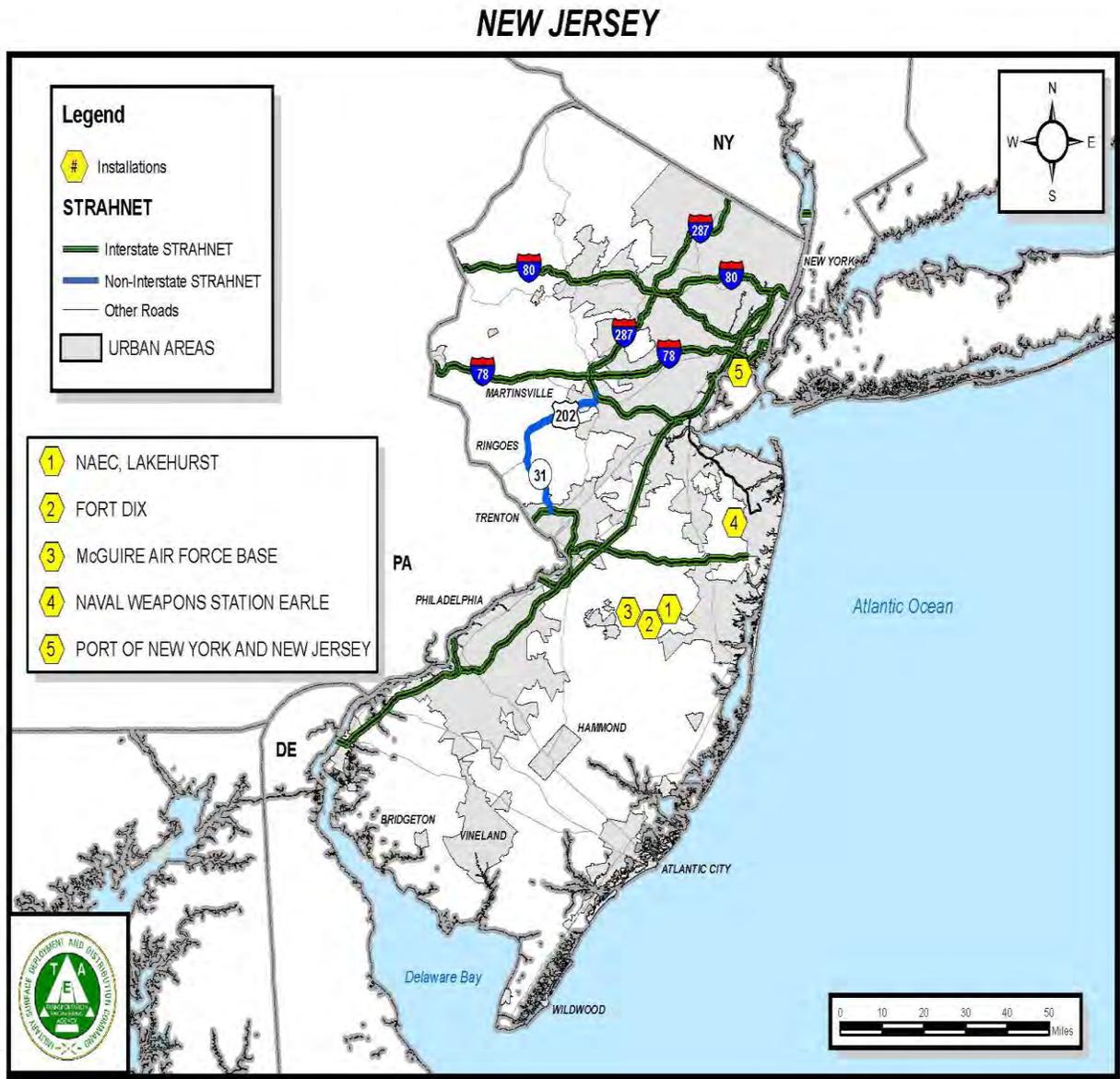
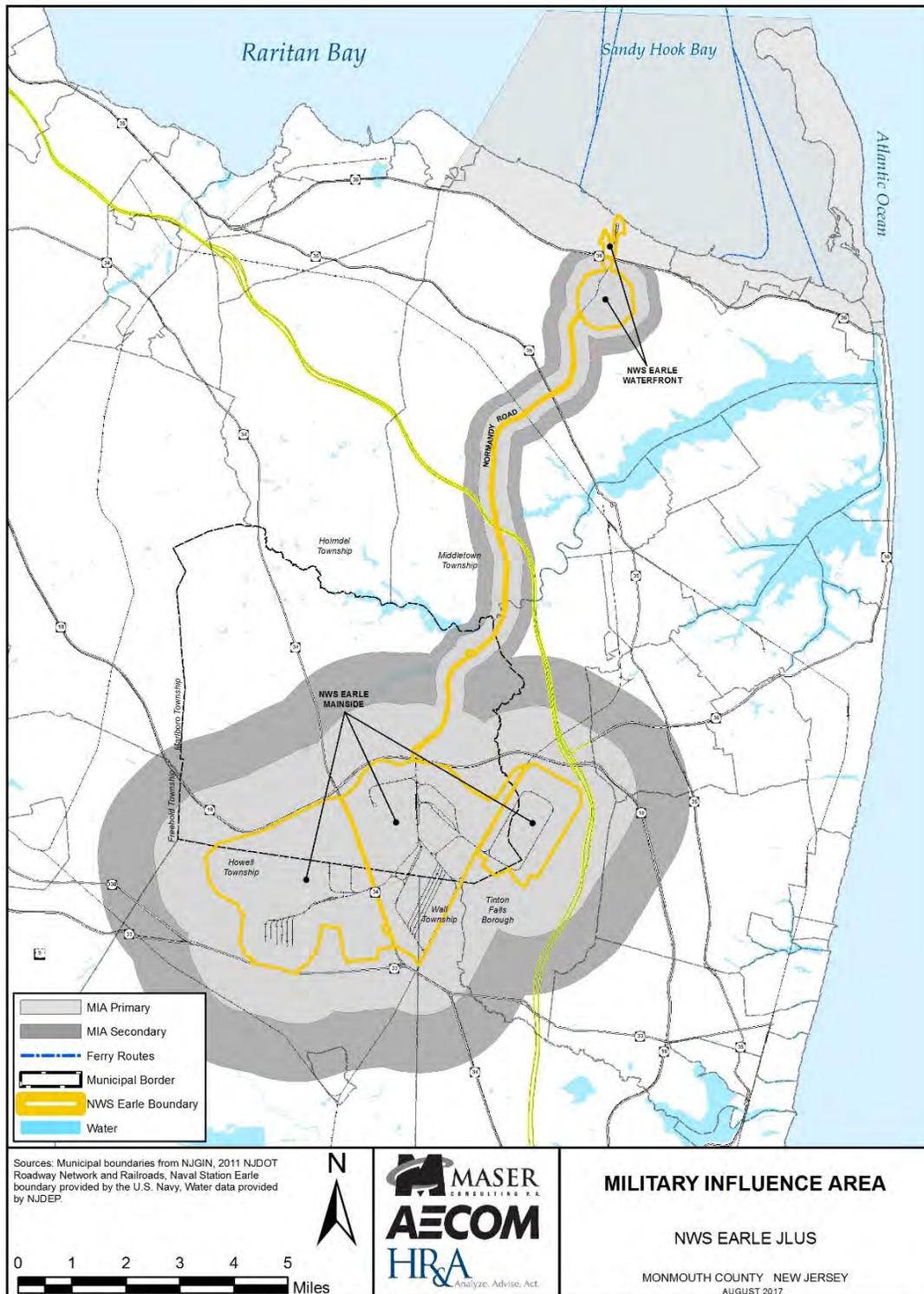


Figure 2.05: NWS Earle Strategic Highway Network (STRAHNET)



Last Updated: June 12 2012

Figure 2.06: NWS Earle Military Influence Area (MIA)



I. NWS EARLE-ADJACENT MUNICIPALITIES

Of the municipalities in Monmouth County within the NWS Earle Military Influence Area, five are directly adjacent to the base’s boundary: Colts Neck, Howell, Middletown, Tinton Falls, and Wall. Altogether, the population of these five municipalities totals 171,795 residents, or more than one-quarter of the County’s entire population. The part of these five municipalities that are within the Military Influence Area comprises 47,070 acres. More than half of the Military Influence Area (51.5%) is undeveloped, containing several types of forest and wetlands. Just over one-third is urbanized land, which includes residential, commercial, industrial, and institutional development and roadways. Each of the major adjacent municipalities has relatively varied land use and is described in the following sections. Figure 2.07 illustrates the generalized zoning and development for the entire MIA and Table 2.04 provides the acreage and percentage of each use.

Table 2.04 Land Use by Area for Entire MIA Area

Type	Total Acres	%
Agriculture	3,476.9	7.4%
Barren Land	1,172.6	2.5%
Forest	9,955.3	21.1%
Urban	17,270.6	36.7%
Water	905.8	1.9%
Wetlands	14,289.5	30.4%
Total	47,070.6	100.0%

The geology and topography of the Military Influence Area is very unique, with the base stretching across two physiographic regions in New Jersey within the Atlantic Coastal Plain. The base and the Military Influence Area lie within both the Inner Plain and the Outer Plain. The land in and near NWS Earle is some of the hilliest in Monmouth County, with the Mount Pleasant Hills ringing the Bayshore near the Waterfront facility and the Hominy Hills traversing the area around the Mainside base. According to the Monmouth County Natural Features Study, elevations at Earle can reach 307 feet above sea level making it one of the highest points in the County. On either side of the Hominy Hills are lowlands which stretch to Ocean County at the south and to the Shrewsbury River at the north.

The lands from the Mainside portion of Earle drain into four major watersheds. The two northern watersheds drain to the Swimming River, and then to the Navesink River. The watershed that passes through Tinton Falls in the southern section of Mainside drains to Shark River, and the watershed that predominantly passes through the portion of the base in Howell is one of the largest in the County and drains to the Manasquan River. The Swimming River and Manasquan reservoirs are major drinking supply sources for Monmouth County, and both are within three miles of Earle’s boundary.

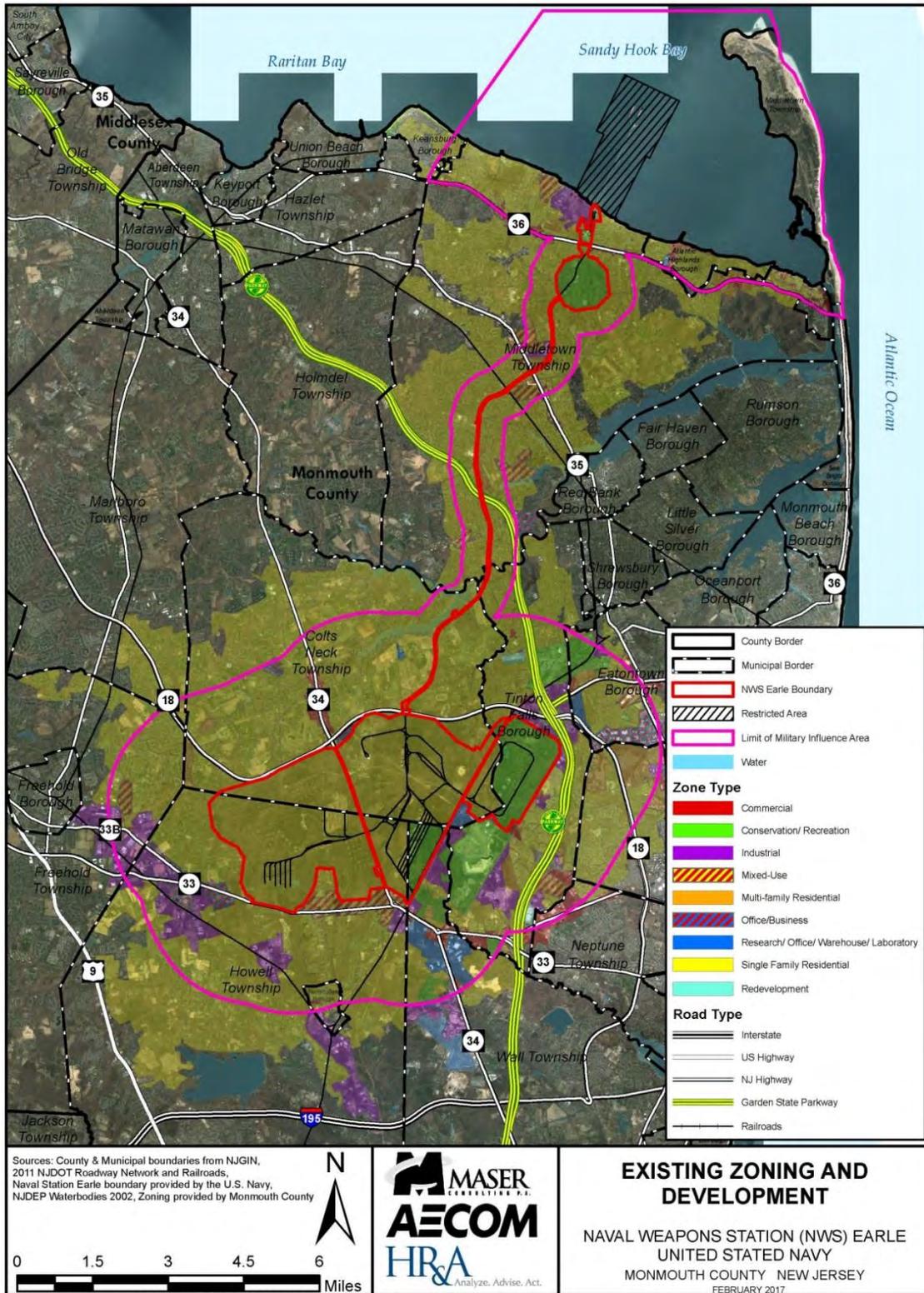


Figure 2.07 Existing Zoning and Development

1. COLTS NECK TOWNSHIP

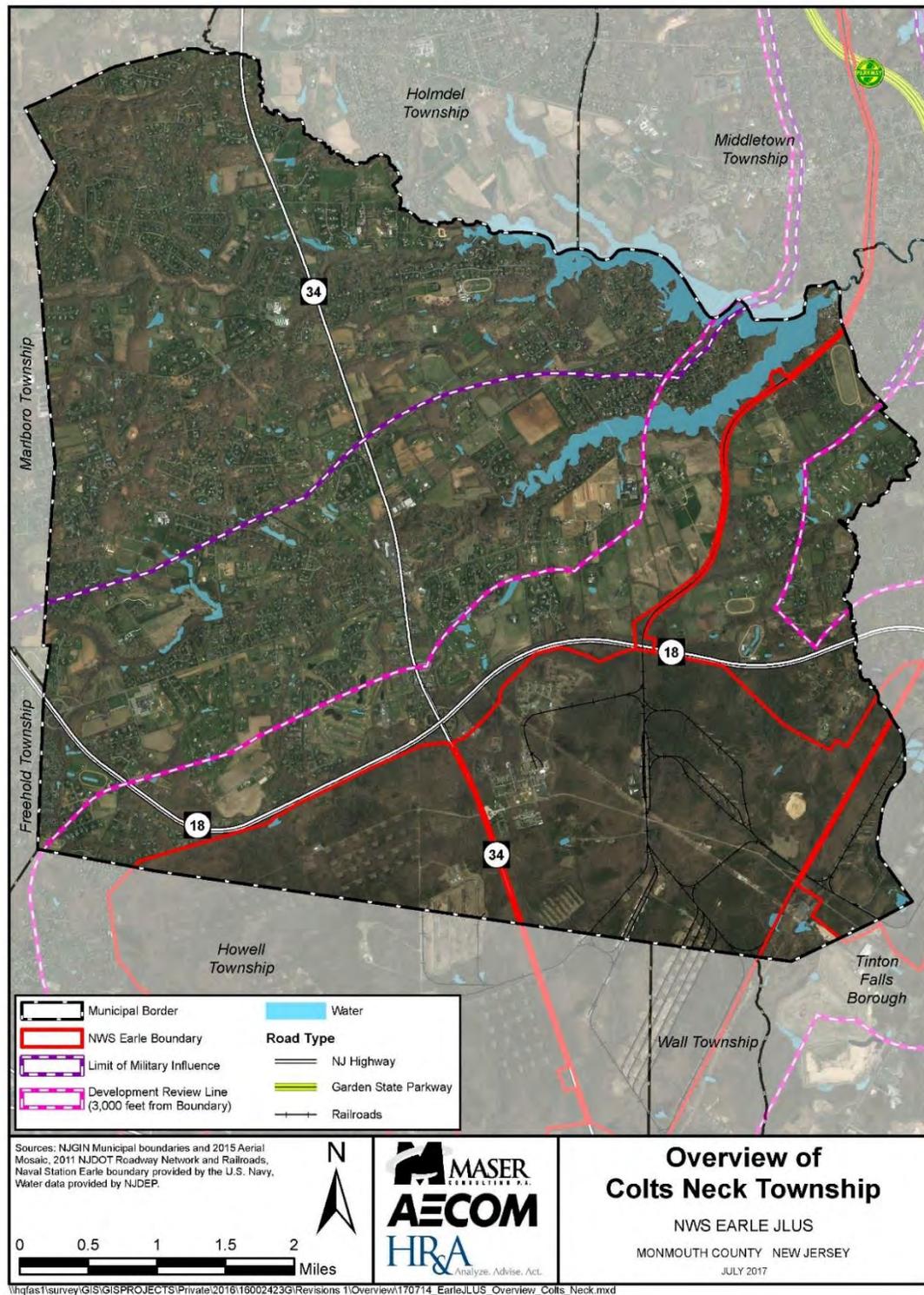


Figure 2.08 Overview of Colts Neck

As seen in Figure 2.08, Colts Neck is a predominantly suburban and agricultural township of approximately 10,142 residents located in central Monmouth County. The township is 31.7 square miles in size, with NWS Earle comprising close to one-quarter of its land area. The base's Mainside entrance is located on NJSH Route 34 and much of the base's administrative buildings, rail storage, and housing are located in the portion of the base in Colts Neck. At the time of the 2010 Census, base housing in the township provided a residence for approximately 225 people.

New Jersey State Highway Route 34 runs in a north-south direction through the township and base, separating the western and eastern portions. NJSH Route 18 forms an approximate northern boundary for the base, running east-west and interchanges with Route 34. Normandy Road and the railroad to Leonardo begin in Colts Neck and run northward to Sandy Hook Bay. Though much of the topography of the township is relatively level, the terrain becomes hillier when approaching the base from the north. The Swimming River Reservoir, a major water source for Monmouth County, is located in the eastern part of the township and is mostly surrounded by agricultural areas. Due to the lack of sewer service, nearly all of the township's development has occurred at very low densities.

EXISTING LAND USE

Residential, farmland, and military/institutional uses dominate the land area in Colts Neck (see Figure 2.09 and Table 2.05), with the Military Influence Area comprising just over two-thirds (67.4%) of the township's land area. The Naval Weapons Station comprises most of the southern portion of the township south of Route 18. Almost the entire township is outside of the Sewer Service Area, though the portion of the township west of Route 34 is considerably more developed with residential uses than the eastern section closer to Swimming River. The area immediately adjacent to NWS Earle on the northern side of Route 18 contains a mix of uses, ranging from public lands (such as Dorbrook Recreation Area abutting Normandy Road) to low-density residential and farmland uses. Route 18 effectively separates the township from the base, though a limited amount of residential and public uses are present in the western corner of the base's boundary in Colts Neck at the border with Howell. A portion of the Monmouth County Reclamation Center is adjacent to the base in the southeastern portion of the base's boundary near the Tinton Falls border, and the northeast section of the base near the Normandy Road crossing with Route 18 abuts private residential and farmland uses.

Within the two-mile Military Influence Area, the plurality of land use/land cover (33.5%) is urbanized land such as military facilities, residences, and roadways. Just over one-quarter of the land area is wetlands, and approximately one-fifth is forest. Agricultural land uses comprise only 13.7% of the land area in the Military Influence Area, yet account for more than half of all farmland in the Military Influence Area across the five municipalities. The majority of the forest and wetlands in the township are located within the Base's boundary, while much of the developed land is located east of Route 34 in the area north of the base. The majority of the forest coverage is deciduous, and the majority of urbanized land is single-unit residential. Small areas of higher-density residential are located near the border with Freehold Township and near the Route 34 business district.

Table 2.05 Land Use by Area for Colts Neck

Type	Acres	Percent
Agriculture	1,871.0	13.7%
Barren Land	69.2	0.5%
Forest	2,806.1	20.5%
Urban	4,579.4	33.5%
Water	416.2	3.0%
Wetlands	3,932.9	28.8%
Total	13,674.8	100%

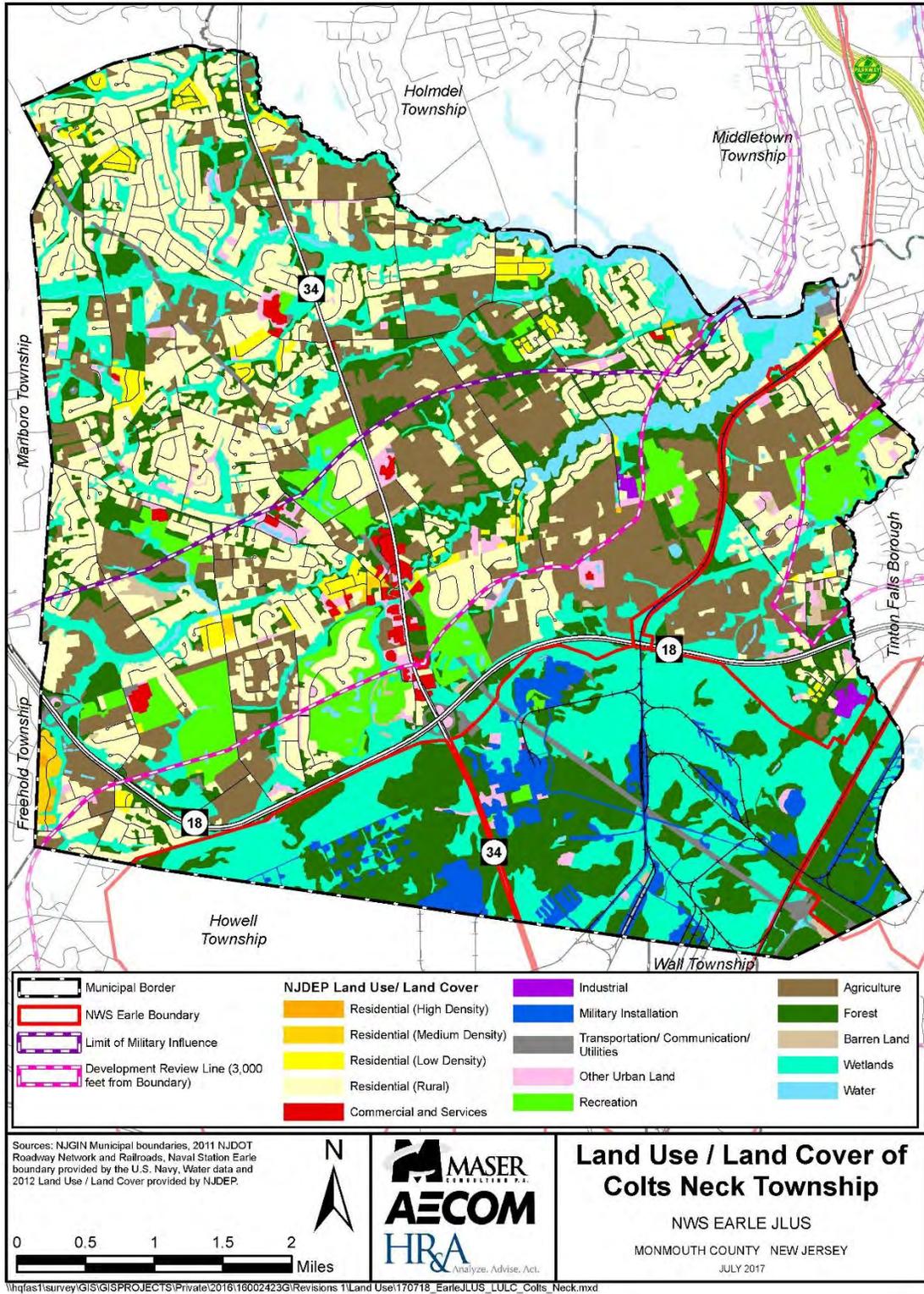


Figure 2.09 Land Use and Land Cover for Colts Neck

ZONING

Zoning within the Military Influence Area in Colts Neck is almost entirely single-family residential on large lots (see Table 2.06 and Figure 2.10). A small area of commercial zoning is designated along Route 34 between the interchange with Route 18 and Phalanx Road. Two small areas supporting office/business uses are present along Heritage Drive at the site of the municipal building and at a public works area at the northern boundary of the base near the Routes 18 and 34 interchange. Two other areas supporting research/office/warehouse/laboratory uses are located at a small area near the corner of Laird Road and CR-537 and just outside of the NWS Earle boundary near the Monmouth County Reclamation Center.

The vast majority of land in the Military Influence Area is within the AG Agricultural District. Though only 14.5% of Colts Neck is comprised of agricultural land uses, this composition likely results because the Agricultural District permits single-family dwellings, golf courses, and public uses. The second-largest zoning district in the Military Influence Area is the A-1 Residential District, which also permits single-family detached dwellings and farms as well as public and non-profit uses.

Table 2.06 Land Use by Zoning for Colts Neck

Zone	Acres	Percent
A-1	2,312.6	16.9%
A-3	257.1	1.9%
A-4	93.5	0.7%
A-5	135.0	1.0%
A-6	46.1	0.3%
AG	10,364.3	75.8%
B-1	198.5	1.5%
B-1A	14.1	0.1%
B-2	14.0	0.1%
B-3	8.7	0.1%
D	20.1	0.1%
D-1	100.4	0.7%
MP	101.1	0.7%
Total	13,665.478	100%

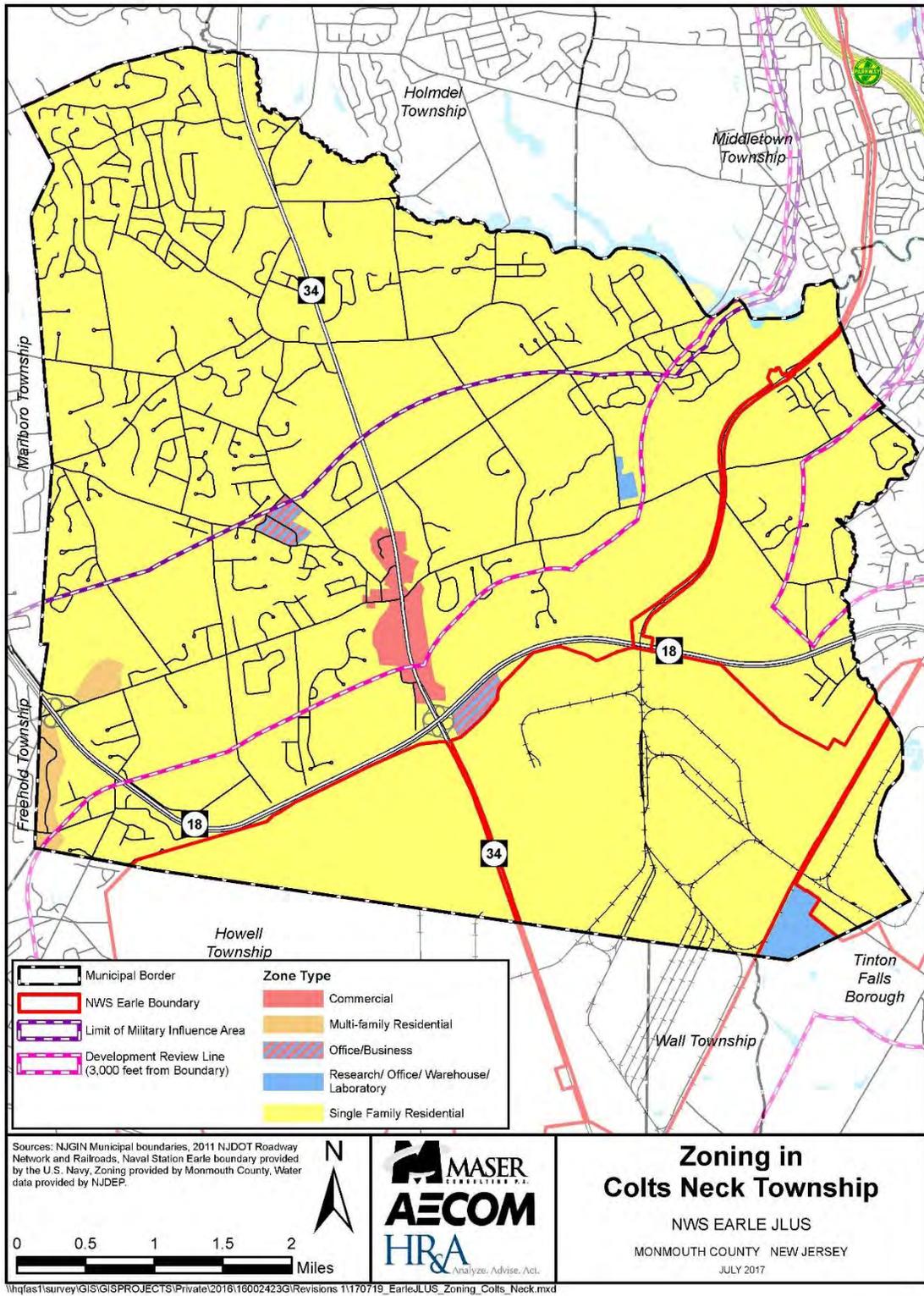


Figure 2.10 Existing Zoning for Colts Neck

2. HOWELL TOWNSHIP

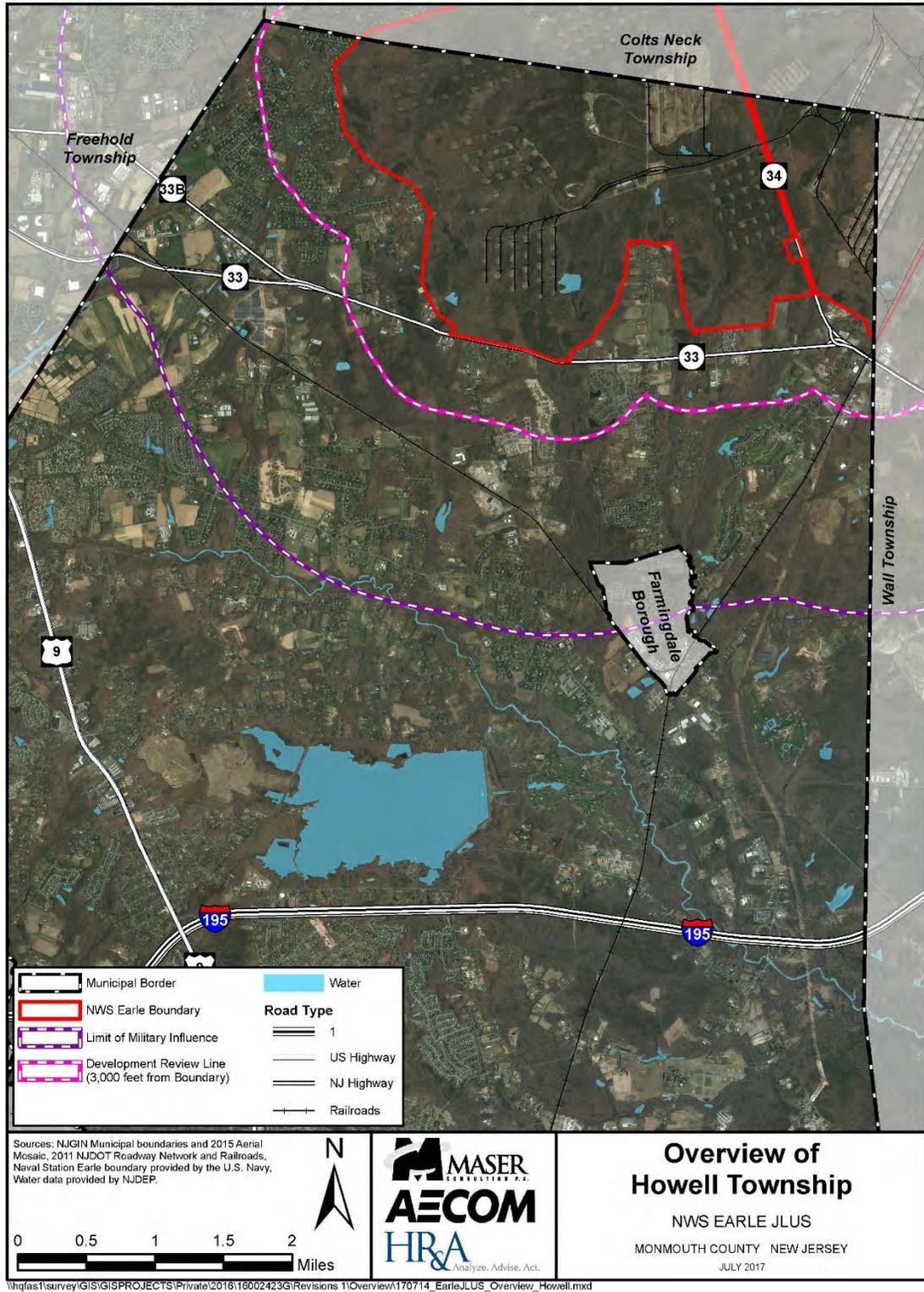


Figure 2.11 Overview of Howell Township

Howell Township comprises 62.1 square miles and is home to 51,075 residents as of 2010, making it the second most-populous municipality in Monmouth County and the largest in land area. More than 3,000 acres of NWS Earle is located within Howell, including the western half of its weapons storage area (see Figure 2.11). Route 33 passes through the township in an east-west direction in the northern section of the township, while Interstate 195 also traverses the township east-west in the southern section of the township. US Highway Route 9 passes through Howell in a north-south direction in the western section of township between Freehold Township and Lakewood Township in Ocean County. The Borough of Farmingdale is located entirely within Howell along County Route 524, and the New Jersey Water Supply Authority's Manasquan Reservoir is located near the geographic center of the township, and the western portion of Allaire State Park is also within the township's boundaries.

The southern portion of the Mainside base is located in the northern portion of Howell along NJSH Route 33. The Military Influence Area extends to an area roughly midway between Interstate 195 and Route 33. The Mainside base in Howell contains approximately half of the base's ammunition storage facilities. Access to the base is not available from Howell Township, though Midway Road (which connects the two portions of the Mainside Base) passes over Route 34 in the township.

The Cedar Swamp, an ecologically-valuable area identified in the 1978 Monmouth County Unique Areas Study, is located in the MIA adjacent to and just inside the Earle boundary. The swamp contains cedar trees and deciduous vegetation and supports habitat for woodland and wetland wildlife.

EXISTING LAND USE

Land use in the area surrounding the base in Howell is highly diversified with considerable amounts of wooded areas and wetlands broken up by smaller pockets of development. Several tributaries of the Manasquan River, such as Marsh Bog Brook and the Mingamahone Brook, have headwaters within the boundaries of the base and flow in a southwestern direction towards the Manasquan River. The interstitial areas between the tributaries' wetlands have been developed into a variety of industrial, agricultural, and residential uses. The base has approximately 4,300 feet of linear frontage along Route 33 and 1.5 miles of frontage along Route 34. Its southern border is generally parallel to Route 33, excepting an approximately 300-acre bump-out in the vicinity of Colts Neck Road containing agricultural and residential uses and a 28 acre lot that houses the Monmouth County Fire Academy, directly adjacent to the NWS Earle Military Sealift Command firefighting school. The western boundary of the base in Howell is less uniformly defined, but partially follows Brickyard Road. Less than one-third (31.3%) of the township is within the two-mile Military Influence Area, though Howell has the largest land area within the MIA of all the NWS Earle -adjacent municipalities.

Residential uses within the Military Influence Area are clustered to the area west of the base and north of Route 33, with some scattered areas of rural residential use and low/medium density uses scattered along Route 33 and other secondary roads in the vicinity. Commercial uses, which comprise a small percentage of land in the area, are found along Route 33, County Route 524, and Fairfield Road. Industrial uses in this section of Howell tend to cluster near the now-defunct Freehold and Squan Village Railroad and the active Conrail freight line between Lakehurst and Red Bank, which serves NWS Earle. Additional industrial uses are found along Route 33, though the area south of NWS Earle is less developed than the highway frontage heading away from the base in either direction.

Within the Military Influence Area, the plurality of land coverage is wetlands, most of which is deciduous wooded and mixed wooded dominated by coniferous trees. Urbanized land coverage comprises more than one-quarter of the land area within the Military Influence Area, and forest coverage comprises 23%

of the land area. Forest and wetlands comprise the majority of land area within the Military Influence Area, while agricultural lands only comprise 10.5% of land area (see Table 2.07 and Figure 2.12).

Table 2.07 Land Use by Area for Howell Township

Type	Acres	Percent
Agriculture	1,302.7	10.5%
Barren Land	99.1	0.8%
Forest	2,870.3	23.0%
Urban	3,420.4	27.5%
Water	76.7	0.6%
Wetlands	4,688.7	37.6%
Total	12,457.8	100.0%

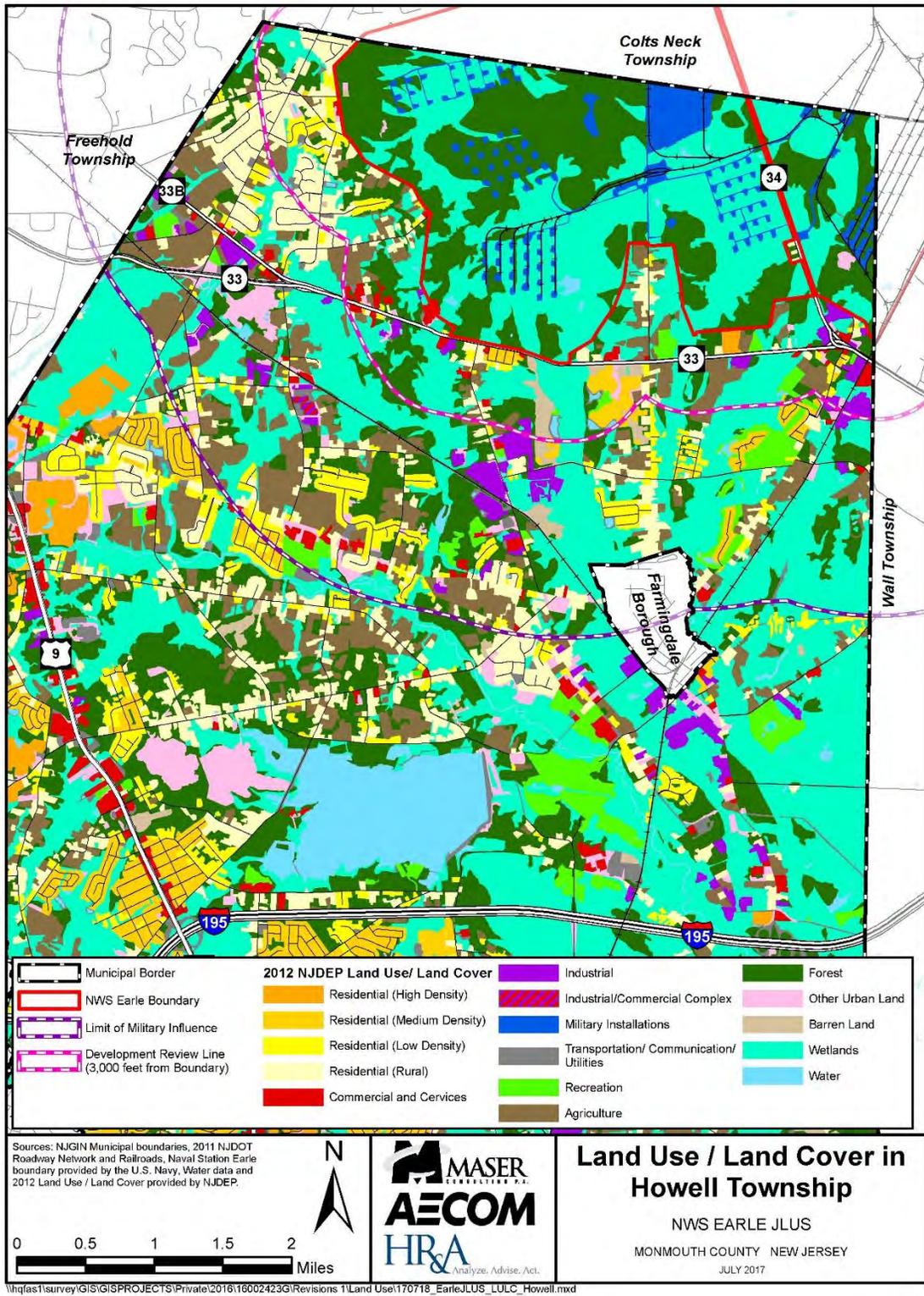


Figure 2.12 Land Use / Land Cover in Howell Township

ZONING

More than 70% of the zoning within the Military Influence Area is comprised of the Agricultural Rural Estate ARE-2 and ARE-6 zones, which represent 25.4% and 46.5% of the area, respectively (see Table 2.08 and Figure 2.13). These zones were designed to support residential and rural uses while minimizing development impacts in the areas outside of the township centers. The principal permitted uses in these zones are agriculture and horticulture uses and single-family residences. ARE-2 zones require minimum lot sizes of two acres, though minimum lot sizes of one acre are permitted through the preservation of open lands and lot averaging. ARE-6 zones require minimum lot sizes of six acres under conventional development methods, though clustering, lot averaging, and open lands preservation permits minimum lot sizes of two acres. Highway-Development (HD) zoning comprises about 6.7% of the Military Influence Area. Special Economic Development (SED) zones, which are located near the Route 33 and Route 33B merge and along Route 33 and the railroad line, comprise approximately 8.6% of the military influence area. Developments in these zones must be at least 2.75 acres in size, though a wide variety of uses are permitted, including manufacturing, utility, office, medical, and warehousing uses.

Table 2.08 Land Use by Zone for Howell Township

Zone	Acres	Percent
ARE-2	3,163.9	25.4%
ARE-3	382.7	3.1%
ARE-4	124.1	1.0%
ARE-6	5,799.5	46.5%
HD-2	326.3	2.6%
HD-3	513.1	4.1%
PRC	319.0	2.6%
R-2	65.6	0.5%
R-3	216.1	1.7%
RMLD	16.8	0.1%
RRC	464.3	3.7%
SED	1,071.7	8.6%
Total	12,463.3	100%

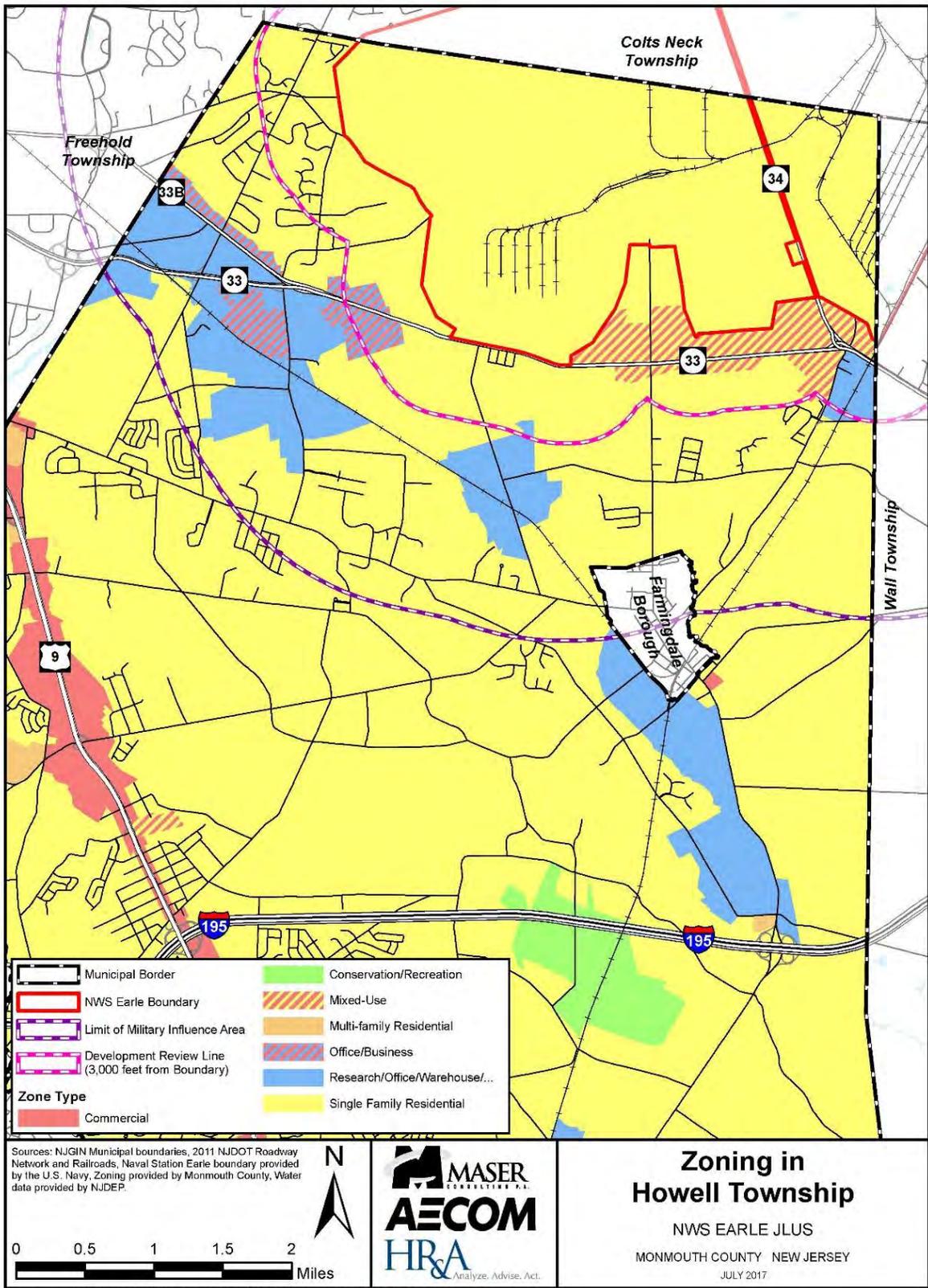


Figure 2.13 Zoning in Howell Township

3. MIDDLETOWN TOWNSHIP

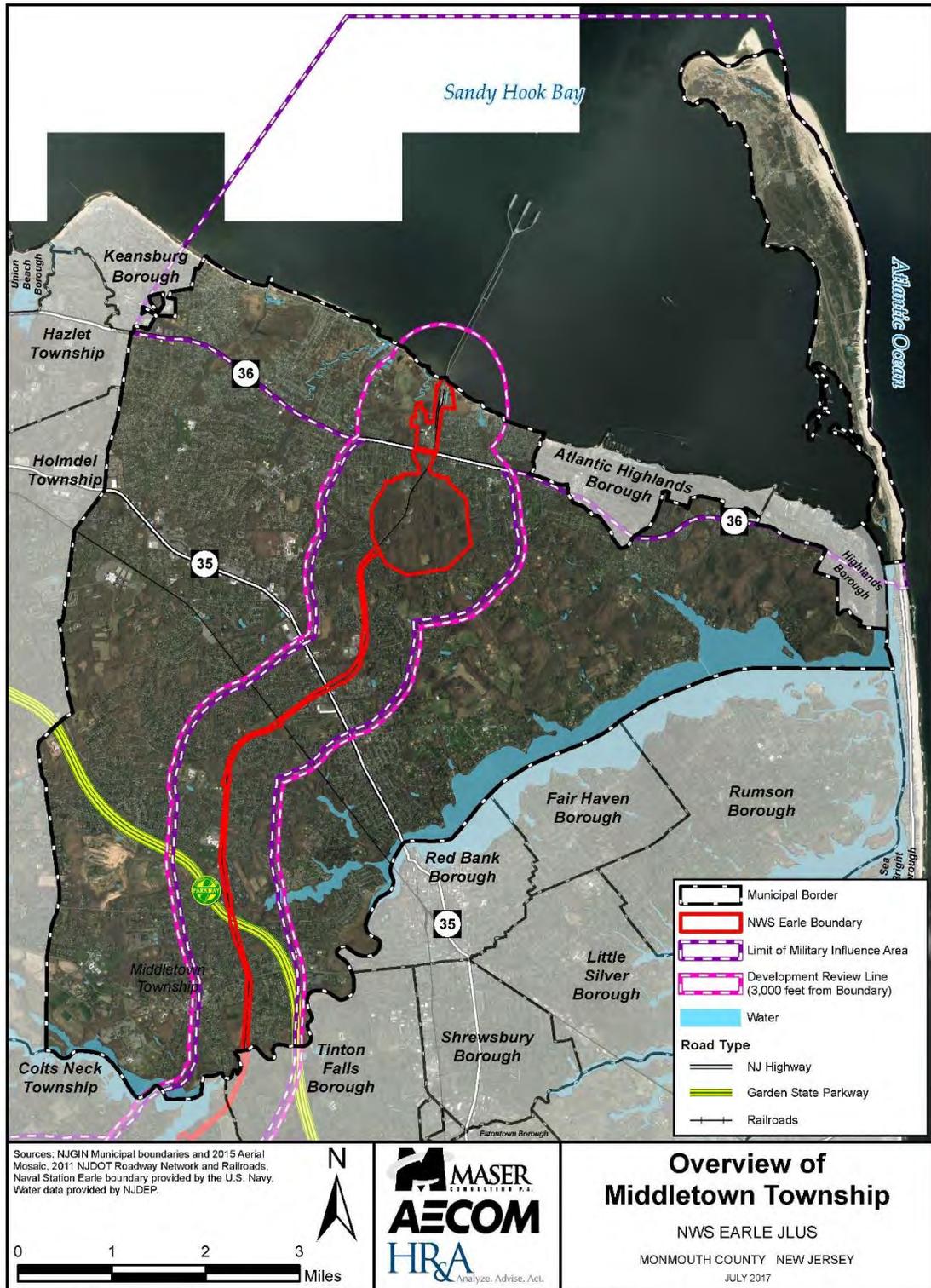


Figure 2.14 Overview of Middletown Township

Middletown Township is a suburban community located in the northernmost portion of the study area in Monmouth County. With a population of 66,522 residents and a size of 43.5 square miles, it is the most populous municipality in the County and the third-largest in land area. However, with a density of 1,529 persons per square mile, Middletown's density is lower than many of the municipalities in Monmouth County. The township enjoys approximately four miles of frontage along Raritan Bay, 13 miles of frontage along the Navesink and Swimming Rivers, and approximately 2.5 miles of frontage along the Swimming River Reservoir (see Figure 2.14). Sandy Hook, a 5.5-mile long sand spit also within Middletown Township, is bounded by the Atlantic Ocean on the east and Sandy Hook Bay on the west and is part of Gateway National Recreation Area.

Middletown Township is traversed by three major roadways: NJSH Route 35 (which continues north to Perth Amboy and south to Berkeley), NJSH Route 36 (which continues north to Keyport and south to Long Branch), and the Garden State Parkway. Middletown is comprised of several distinct communities, such as Lincroft, Port Monmouth, Belford, Leonardo, New Monmouth, and Navesink. The Township is more heavily developed in the northern section along the Bayshore than it is in the south and east in Lincroft and along the Navesink River.

The totality of the Waterfront and Pier Complex sections of Naval Weapons Station Earle is located within Middletown. The pier extends two miles into Sandy Hook Bay, and the Restricted Zone encompasses the waters off of Leonardo and Belford. Most operating facilities are located at the part of the base on the north side of Route 36; the 560-acre portion south of Route 36 is predominantly wooded with some ammunition storage facilities available. Normandy Road and the base's rail facilities enter the township at the Swimming River, and wind their way through Middletown for over eight miles before reaching the Pier facilities.

EXISTING LAND USE

The majority of the land in Middletown within the Military Influence Area is urbanized (see Table 2.09 and Figure 2.15). This is likely due to the location of NWS Earle adjacent to the more densely populated Bayshore communities of Leonardo and Belford. Excluding water bodies, approximately one-fifth of land coverage within the Military Influence Area is wetlands. A large area of coastal wetlands is present on both the east and west sides of the Pier Complex (particularly along Ware Creek) and along the tributaries of the Navesink and Shrewsbury Rivers. Nearly 16% of the land is forested, much of which is located on the hilly, relatively-undeveloped portion of the base located between Kings Highway East and Route 36.

Approximately 40% of Middletown's land is within the two-mile Military Influence Area. The Military Influence Area stretches along Normandy Road from Tinton Falls to the Waterfront facilities in Leonardo, and surrounds the octagonal and wooded NWS Earle area near Chapel Hill. The area along Normandy Road has been considerably developed with low and medium-density residential uses, while the portion of the MIA north of Route 36 is mostly wetlands or medium-density development. Though residential uses comprise much of the urbanized land area, commercial highway development uses are found along Routes 35 and 36.

Table 2.09 Land Use by Area for Middletown Township

Type	Acres	Percent
Agriculture	165.6	1.6%
Barren Land	318.7	3.0%
Forest	1,707.5	16.1%
Urban	5,493.4	51.9%
Water	321.3	3.0%
Wetlands	2,581.4	24.4%
Total	10,587.9	100.0%

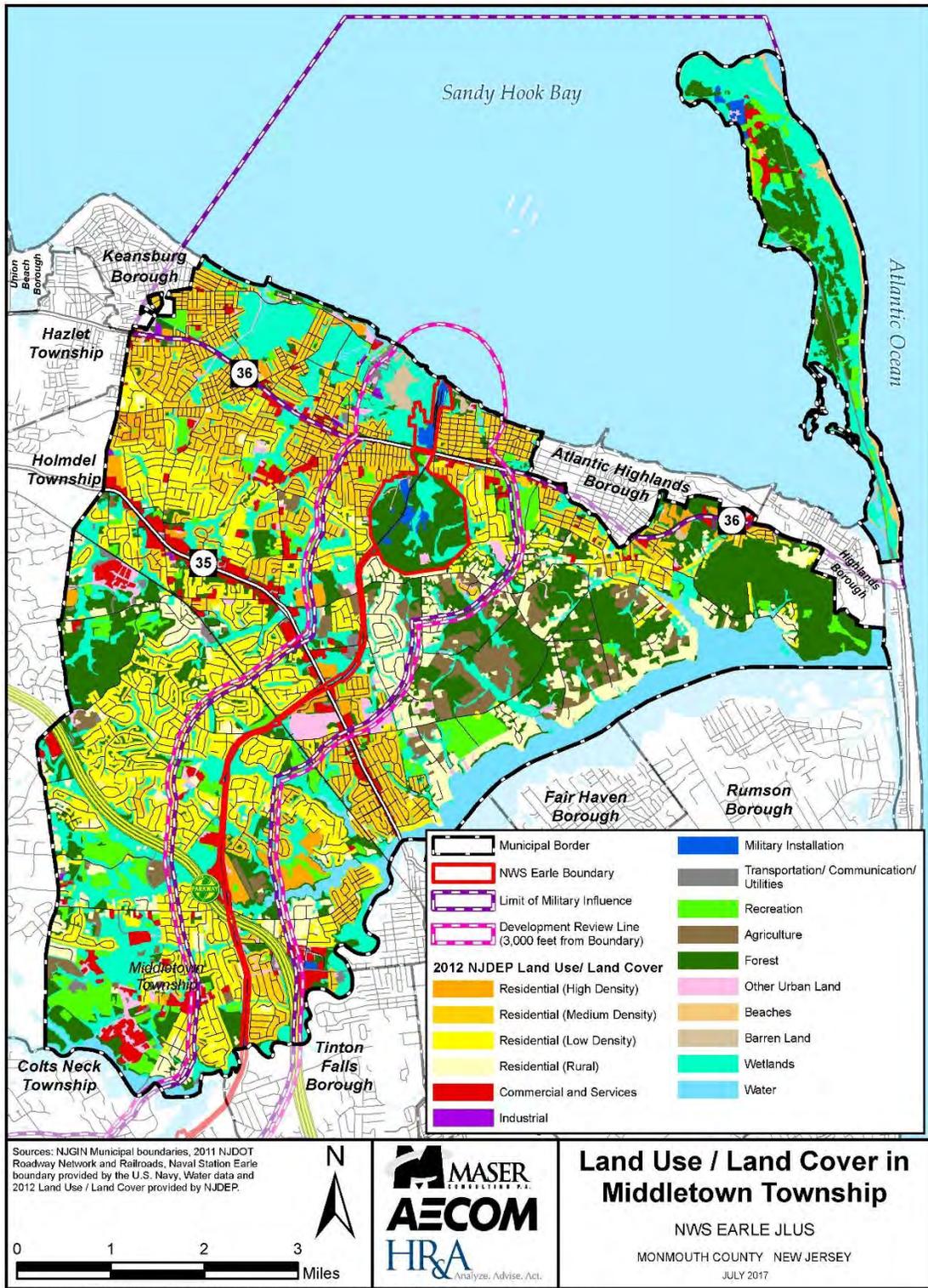


Figure 2.15 Land Use / Land Cover in Middletown Township

ZONING

Note that the total acreage with zoning is approximately two thousand acres less than that shown in the previous section on land use. This is because Sandy Hook, which is within Middletown’s jurisdiction, does not fall within a zoning district. Table 2.10 provides a breakdown of the zoning within the MIA. Figure 2.16 provides the generalized zoning map.

Table 2.10 Land Use by Zone for Middletown Township

Zone	Acres	Percent
B-1	40.1	0.47%
B-1A	0.52	<0.1%
B-2	126.0	1.5%
B-3	250.9	2.9%
BP	61.2	0.7%
FL	704.3	8.3%
M-1	348.6	4.1%
MC	127.9	1.5%
PD	78.6	0.92%
PRH	25.3	0.3%
R-1	14.1	0.17%
R-2	87.9	1.0%
R-5	471.6	5.5%
R-7	833.8	9.8%
R-10	421.6	5.0%
R-15	427.3	5.0%
R-22	1,745.5	20.5%
R-22A	60.5	0.71%
R-30	1,076.5	12.7%
R-45	906.8	10.7%
R-45A	14.1	0.17%
R-90	353.3	4.2%
R-130	29	0.34%

R-220	19.2	0.22%
R-O	13.6	0.16%
RGA	75.6	0.89%
RGA-1	9.1	0.10%
RGA-2	12.7	0.15%
RGA-4	0.27	<0.1%
RHA	12.1	0.14%
RHA-1	0.5	<0.1%
RMF-1	2	<0.1%
RTF	31.2	0.37%
RTH	66	0.77%
RTH-1	0.7	<0.1%
RTH-2	36.3	0.42%
RTH-4	15.3	0.18%
RTH-5	2	<0.1%
RTH-9	5.5	<0.1%
TOTAL	8,507	100%

Middletown Township has a majority of residential uses located within the MIA, including roughly 75% with Single Family designations, the R-22 Zone being the largest at 20.5% of the MIA area. As the MIA area is aligned to follow Normandy Road from the higher elevations of Mainside down to the Pier Complex, it crosses a number of waterways and conservation areas, including the Swimming River and Swimming River Reservoir, McClees Creek, Poricy Brook and Nut Swamp Brook, and these areas often have associated conservation areas, such as Lincroft Park, making this designation the second largest at 8.3%. There are a small amount of other areas, such as schools and commercial uses which are scattered along the corridor.

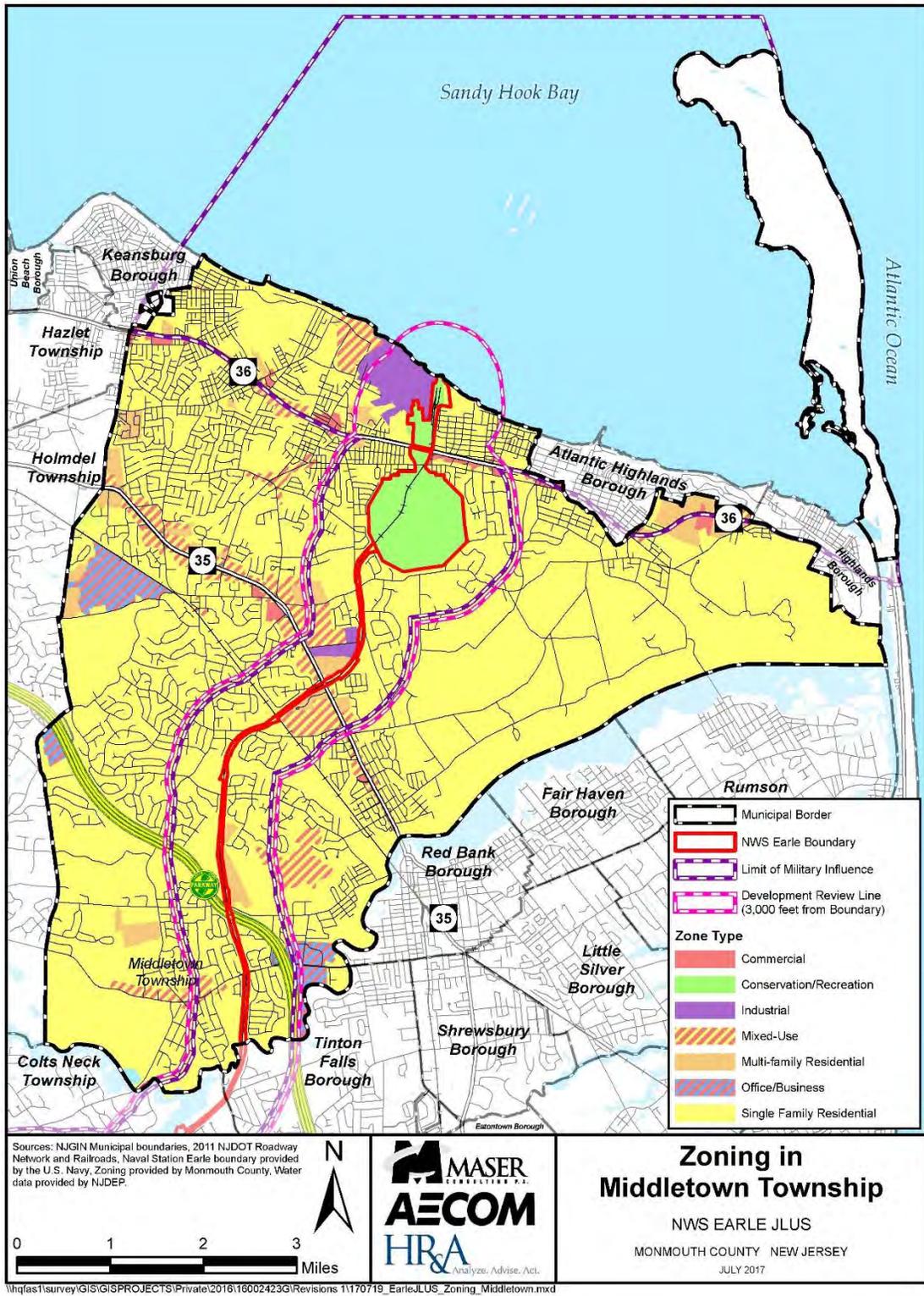


Figure 2.16 Zoning in Middletown Township

4. BOROUGH OF TINTON FALLS

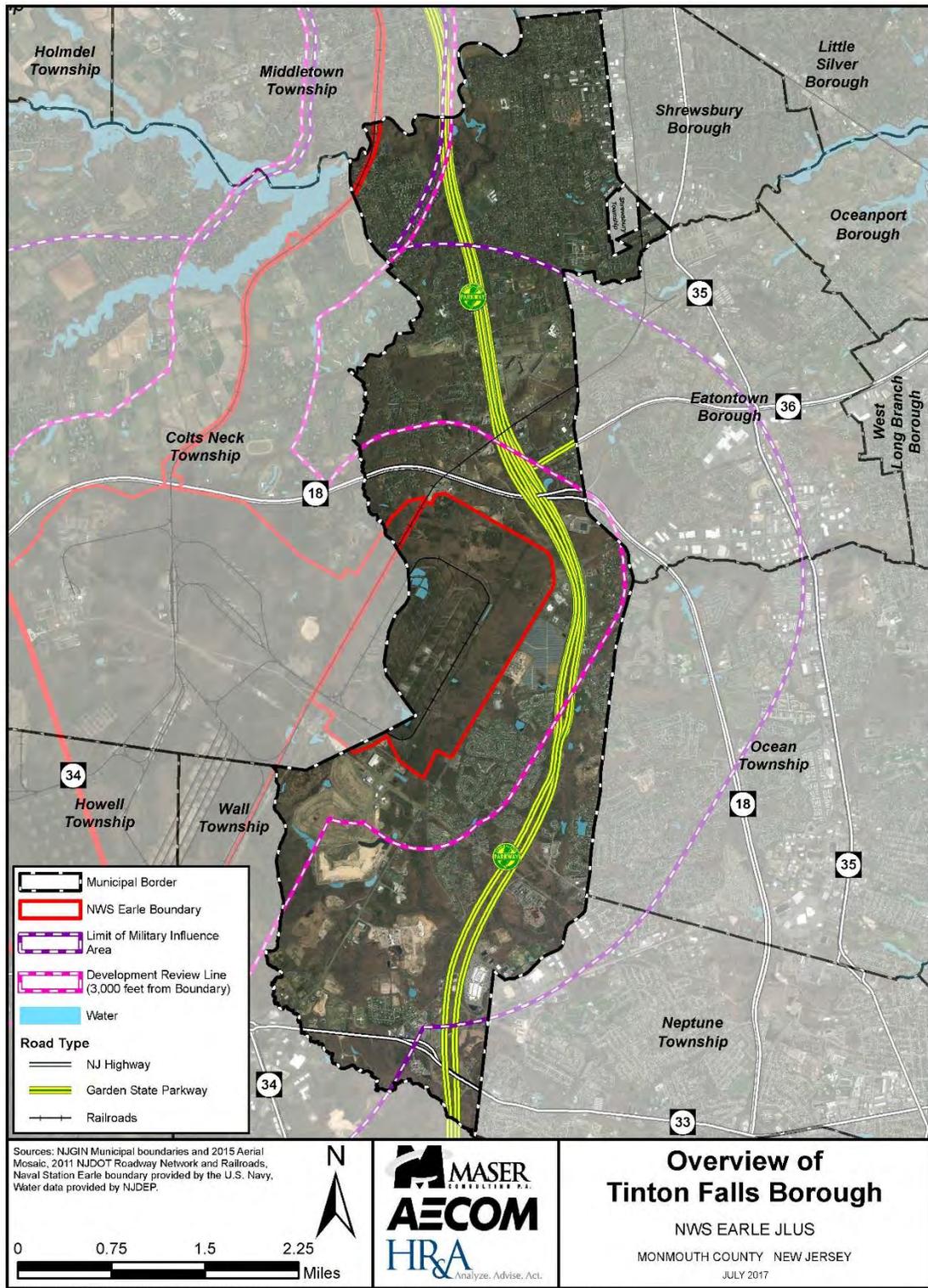


Figure 2.17 Overview of Tinton Falls Borough

Tinton Falls is a borough of approximately 17,892 residents (as of 2010) located in central-eastern Monmouth County. The borough comprises 15.15 square miles of land, and is a relatively narrow municipality located along eight miles of the Garden State Parkway. It contains the easternmost portion of NWS Earle and is almost entirely located within the Military Influence Area (see Figure 2.17). The northern portion of the borough includes the neighborhood of West Shrewsbury and borders Red Bank and Middletown. It consists of denser, traditional suburban and highway-commercial uses. South of County Route 537, Tinton Falls becomes less dense, with scattered planned-unit developments and institutional uses located along Shafto Road.

Former and current major public land holdings have defined Tinton Falls' development over the course of the twentieth century. Due to its location between the now-closed Fort Monmouth and Earle, Tinton Falls has been significantly influenced by military activities as well as development pressures in the region. Portions of the now-closed Fort Monmouth – including the recreation area and the former CECOM site –are currently undergoing redevelopment. The eastern-most section of Earle– including rail staging areas – comprises the western portion of the borough along Shafto Road. The Monmouth County Reclamation Center, which collects solid waste from communities in Monmouth County, is also located on Shafto Road and comprises approximately 375 acres of landfill.

Tinton Falls has convenient regional roadway access, with the Garden State Parkway, Routes 18, 33, 36, 66, and county roads passing through the municipality. The interchange of Routes 18 and 36 with the Garden State Parkway (Exit 105) comprises roughly 100 acres, and limited commercial development has occurred nearby the roadways. As a result of this access, large-scale developments such as the Jersey Shore Premium Outlets, Seabrook apartments, and Commvault headquarters have located in the borough. Commvault was part of the redevelopment of the former Fort Monmouth property.

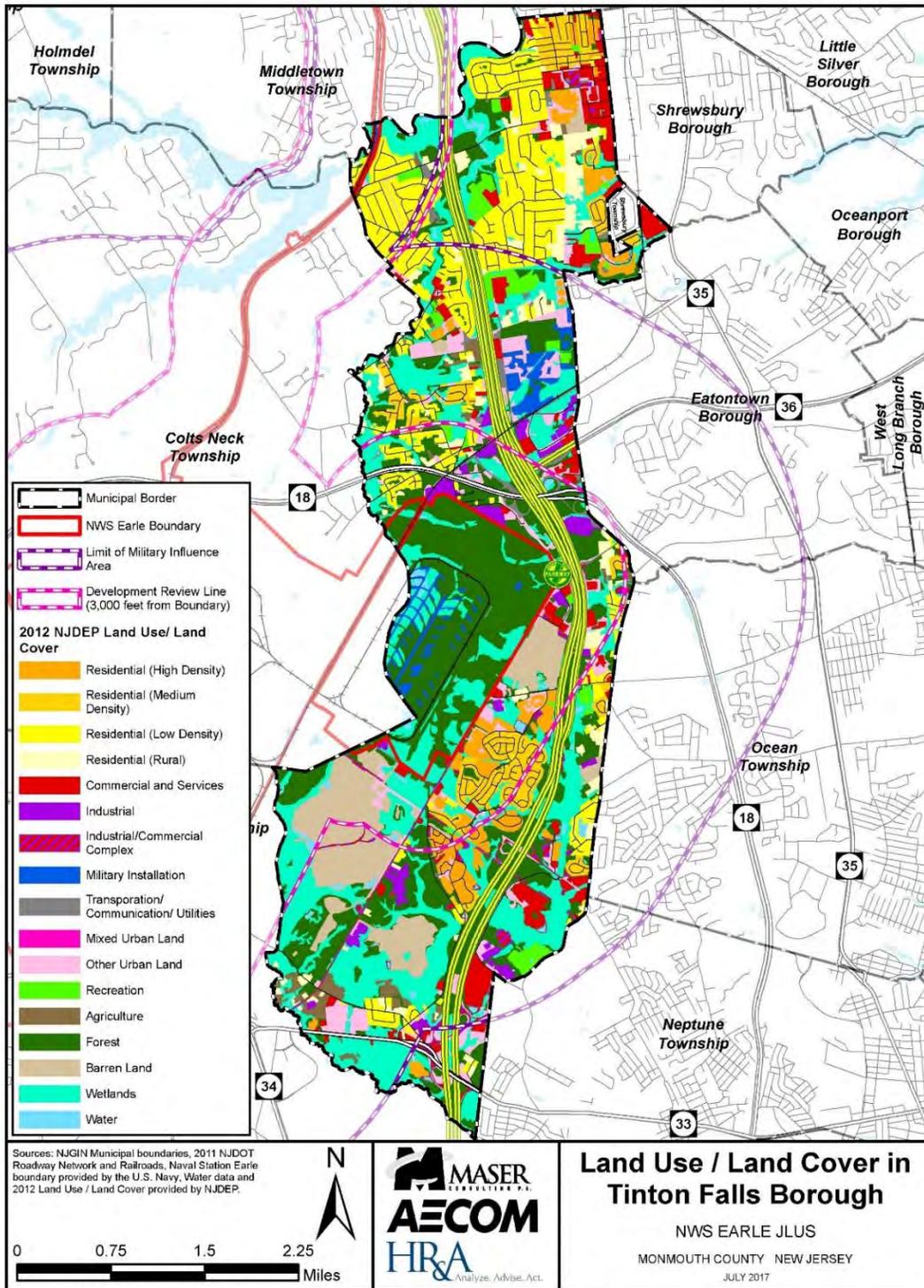
EXISTING LAND USE

Land use within the Military Influence Area in Tinton Falls is fairly varied, with no single use comprising a majority of the land area. The plurality of land coverage (39.9% of the total) in Tinton Falls is urban/developed land, which is scattered throughout the borough (see Table 2.11 and Figure 2.18). Of the municipalities adjacent to Earle, Tinton Falls has the largest proportion of land area within the Military Influence Area (82.9%). Because the major roadways are limited access, Tinton Falls has seen less highway development than nearby municipalities. Development is more intensive along Shafto and Wayside Roads (each comprising portions of County Routes 547 and 537). Green Grove Road, which forms the municipal boundary between Ocean Township and Tinton Falls, is home to a mix of residential and commercial uses in the narrow land area between the Garden State Parkway and the Ocean Township boundary.

Most of the wetlands and forest land cover in the Tinton Falls MIA is found on the base just west of Shafto Road. These uses serve as a buffer between the developed land and the Monmouth Reclamation Center and the base. The northern portion of the borough, bordering Colts Neck, Middletown, Shrewsbury Borough, Shrewsbury Township, and Eatontown, is considerably more developed than the southern portion. Wetlands in the northern portion of Tinton Falls remain along Pine Brook, which is a tributary of Swimming River.

Table 2.11 Land Use by Area for Tinton Falls Borough

Type	Acres	Percent
Agriculture	108.8	1.4%
Barren Land	654.3	8.1%
Forest	2,118.3	26.3%
Urban	3,206.6	39.9%
Water	76.4	0.9%
Wetlands	1,877.2	23.3%
Total	8,041.5	100%



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Figure 2.18 Land Use / Land Cover of Tinton Falls Borough

ZONING

The largest zoning district in Tinton Falls' Military Influence Area is the Open Space/Government Use (OS/GU) zone, which comprises nearly 31% of the MIA and only permits its namesake uses though schools and houses of worship are conditionally permitted. The single-family R-1 and R-2 zones each comprise 12% and 11% respectively, while the TR (Transportation Corridor) Zone comprises 10.8% of the land area (see Table 2.12 and Figure 2.19).

The R-1 zoning district permits detached single-family residential developments on 60,000 square foot lots with septic systems or 40,000 square foot lots with sewer service. Clustering permits development of 30,000 square foot lots with water/sewer service. The R-2 zone also permits single-family detached development, though lot sizes of 20,000 square feet are permitted with clustering and water/sewer service. Only single-family detached and limited public uses are permitted in the R-1 and R-2 zones. The R-4 zone, with similar principal permitted uses to the R-1 and R-2 zones, permits single-family detached dwellings on 8,000 square foot lots and comprises nearly 500 acres (or 6.2%) of the zoning districts within the MIA. The IOP (industrial/office park) zone comprises 7.1% of land within the MIA and permits a range of non-residential uses, including hospitals on a minimum of four-acre lots to offices on 20,000 square foot lots.

Table 2.12 Land Use by Zone for Tinton Falls Borough

Zone	Acres	Percent
AARZ	54.7	0.7%
AH	153.2	1.9%
AR	183.0	2.3%
CCRH/AH	137.7	1.7%
HCC	186.0	2.3%
IOP	569.7	7.1%
MFG	273.6	3.4%
MFG2	66.5	0.8%
NC	73.1	0.9%
OS/GU	2,472.9	30.8%
R-1	997.9	12.4%
R-2	944.9	11.7%
R-3	110.2	1.4%
R-3-I	14.6	0.2%
R-4	495.4	6.2%
R-4-I	149.8	1.9%

RA		233.9	2.9%
ROUTE 66 Redevelopment		54.9	0.7%
TR		869.6	10.8%
Total		8,041.4	100.0%

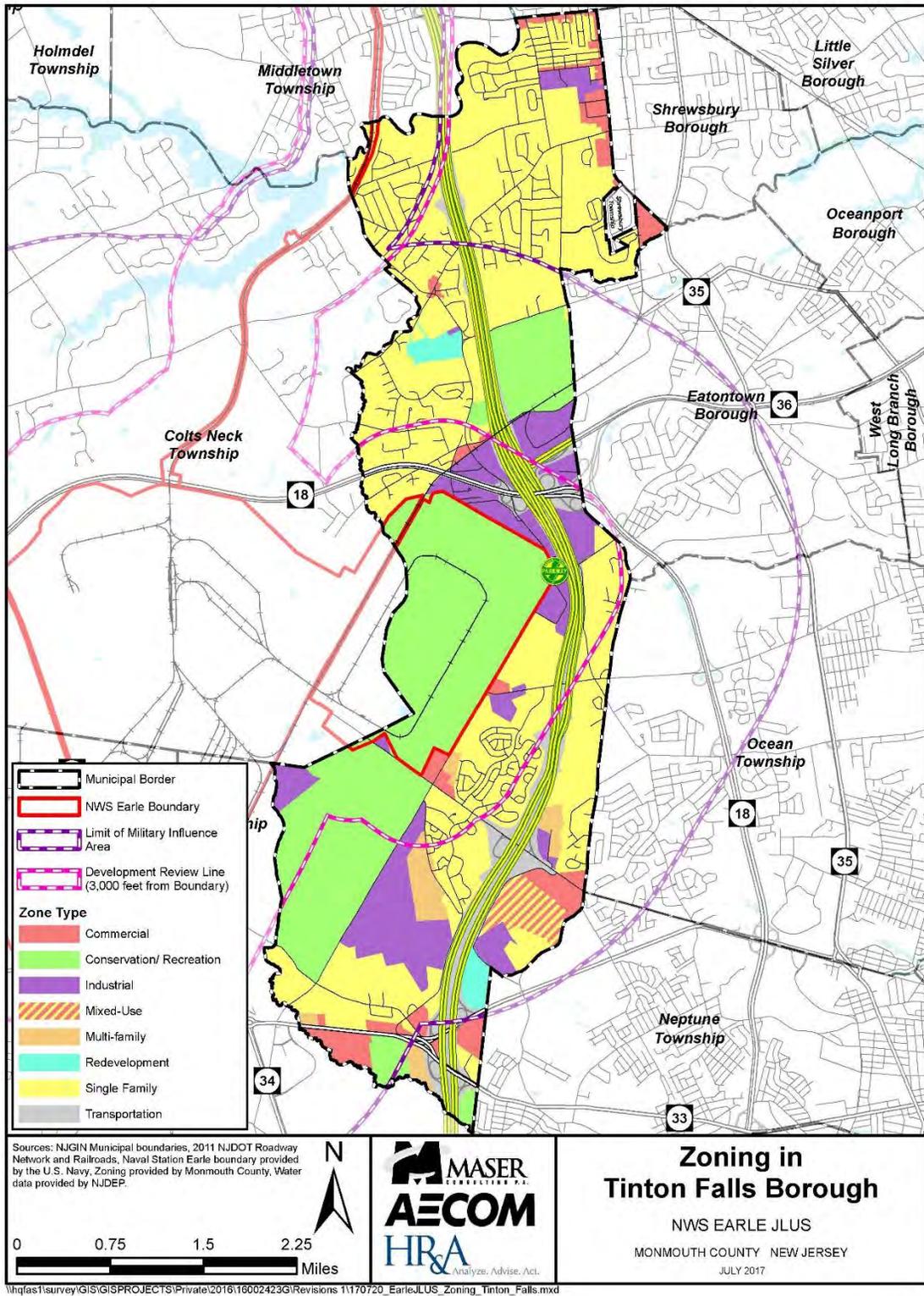


Figure 2.19 Zoning of Tinton Falls Borough

5. WALL TOWNSHIP

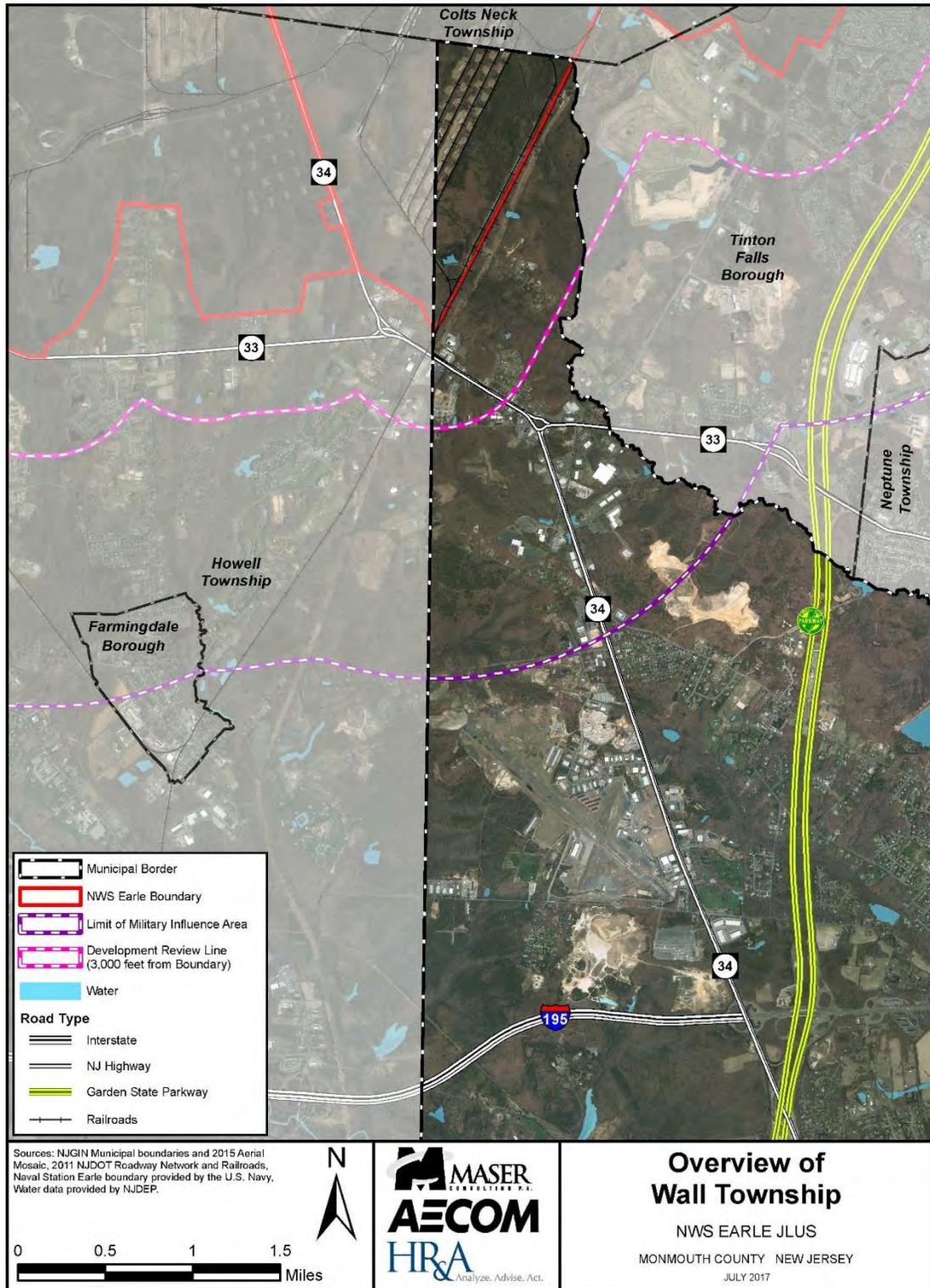


Figure 2.20 Overview of Wall Township

Wall Township is a suburban community located in the southern portion of Monmouth County. As shown on Figure 2.20, the southeastern-most portion of NWS Earle is located within Wall, and the Military Influence Area extends along Route 34 towards the Monmouth Executive Airport. Some of the Earle ammunition magazines are located in the northern section of the township near Shark River, which forms the township’s northern boundary. The Manasquan River forms Wall’s southern boundary.

At the time of the 2010 Census, Wall was home to 26,164 residents living across 31 square miles. Wall is one of the least-dense municipalities in Monmouth County, and protected open space (including Allaire State Park, the former Camp Evans, and watershed preservation areas) makes up a relatively large portion of Wall. Nearly all of the township’s population lives in the section of the township east of the Garden State Parkway. The township is well-served by regional roadways, including Routes 33, 34, 35, 70, and 138. Interstate 195 terminates in Wall just west of the Garden State Parkway and continues as NJSH Route 138 towards Belmar. Routes 34 and 35 intersect in the southern section of the township near Brielle, and Route 18 terminates at Route 138.

EXISTING LAND USE

Approximately 12% of Wall’s land is within the two-mile Military Influence Area, making it the municipality adjacent to Earle with the smallest land area and proportion in the MIA (see Table 2.13 and Figure 2.21). Land use within the Military Influence Area in Wall is mostly undeveloped, with nearly half of the land being wetlands and approximately one-fifth being forest. Developed land, which tends to be clustered along Routes 33 and 34, comprises nearly one-quarter of the land in the Military Influence Area. The area near the traffic circle is the most heavily developed within the Study Area. Agricultural land, barren lands, and water comprise less than five percent of the township’s land area within the two-mile boundary, which altogether comprises approximately 2,308 acres in total. A large portion of barren land (as well as forest and wetland) within the MIA is on the McDowell property, which has active sand mining operations. Significant amounts of wetlands are also found on the Earle property along the tributaries of Shark River. Excepting NWS Earle, the preponderance of land in the MIA is privately owned, with only a small portion permanently protected.

Table 2.13 Land Use by Area for Wall Township

Type	Acres	Percent
Agriculture	28.8	1.2%
Barren Land	31.3	1.4%
Forest	453.1	19.6%
Urban	570.8	24.7%
Water	15.2	0.7%
Wetlands	1,209.3	52.4%
Total	2,308.6	100.0%

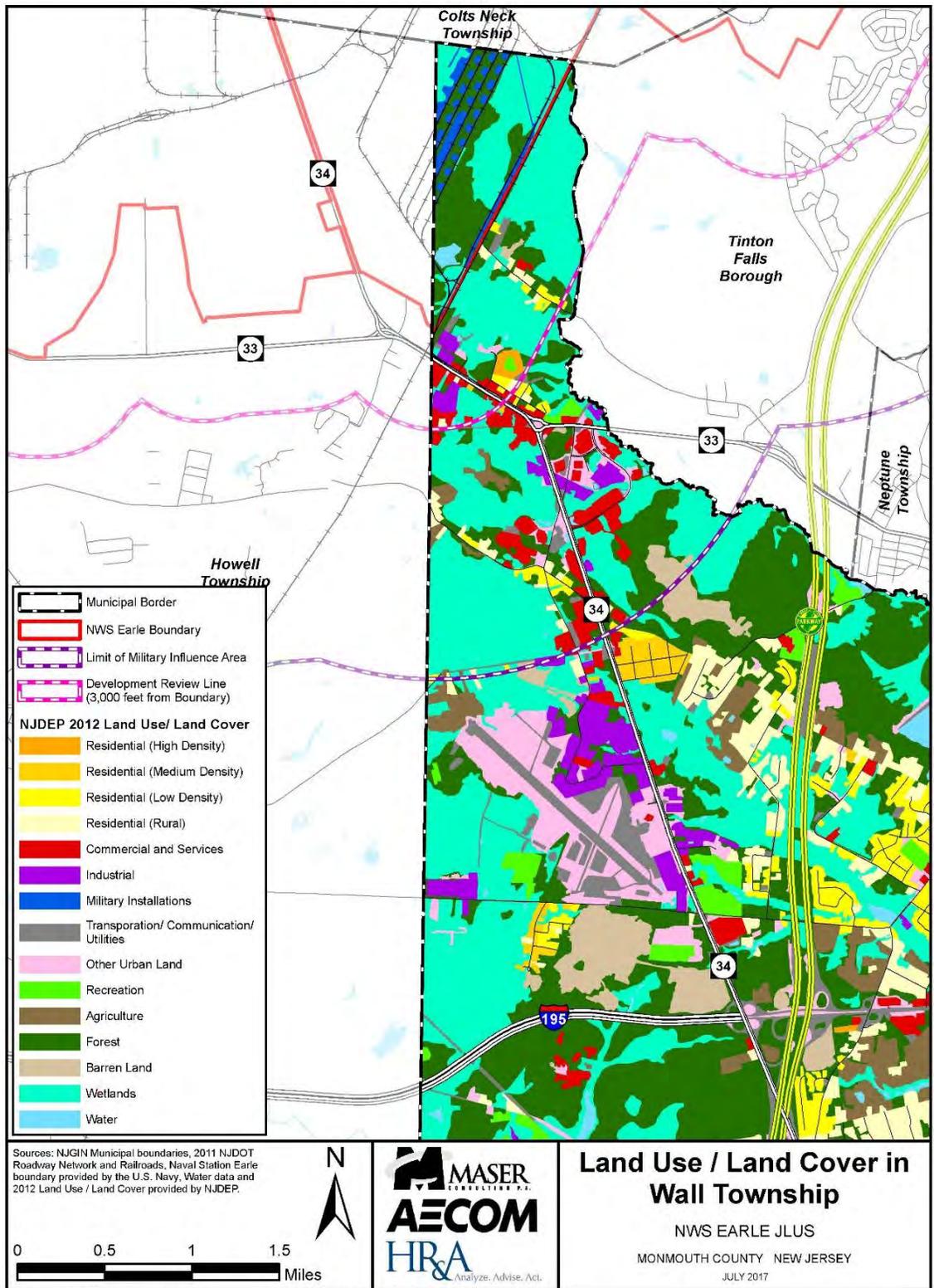


Figure 2.21 Land Use / Land Cover in Wall Township

ZONING

Zoning in the vicinity of Earle mostly permits low-density, non-residential uses such as industry and offices (see Table 2.14 and Figure 2.20). Almost all of the area is within a sewer service area, though the area nearby to Earle is along a heavily-trafficked arterial highway conducive to non-residential uses. Within the two-mile Military Influence Area, the plurality of land (32.1%) is within the POS (Public Open Space District). The OR-10 Zone, which permits office/research uses on 10-acre lots, comprises 23% of the land within the Military Influence Area. The OR-10 zone permits agricultural and utility uses, certain manufacturing uses, wholesale trade, non-store retail, professional/technical services, educational and health uses, as well as a limited number of other conditional and permitted uses. The GI-10 area comprises approximately 10% of the land within the two-mile Military Influence Area, and permits industrial uses on 10-acre lots. Principal permitted uses include agriculture, utilities, construction and manufacturing, wholesale trade, certain professional service and real estate uses, certain medical uses, and golf courses.

The preponderance of zoning within the MIA does not support residential uses. However, the RR-6 Zone, which comprises 428 acres (or 18.6%) of the area within the Military Influence Area, has minimum lot sizes of six acres and permits single-family detached dwellings and agricultural uses. The R-60 zone, covering only 3.3% of land in the MIA, supports single-family detached housing on lots 60,000 square feet in size (or roughly one and a half acres). Smaller portions of residential and non-residential zones are found along the two-mile boundary.

Table 2.14 Land Use by Zone for Wall Township

Zone	Acres	Percent
A-I	1.4	0.1%
CR-10	13.4	0.6%
GI-10	229.9	10.0%
GI-2	7.6	0.3%
GI-5	8.5	0.4%
HB-120	16.6	0.7%
HB-20	9.1	0.4%
HB-200	67.4	2.9%
HB-40	51.4	2.2%
ML-7	16.7	0.7%
OP-2	50.3	2.2%
OR-10	530.8	23.0%
POS	740.4	32.1%

R-15	1.4	0.1%
R-30	24.6	1.1%
R-60	77.1	3.3%
RR	33.5	1.5%
RR-6	428.7	18.6%
Total	2,308.7	100.0%

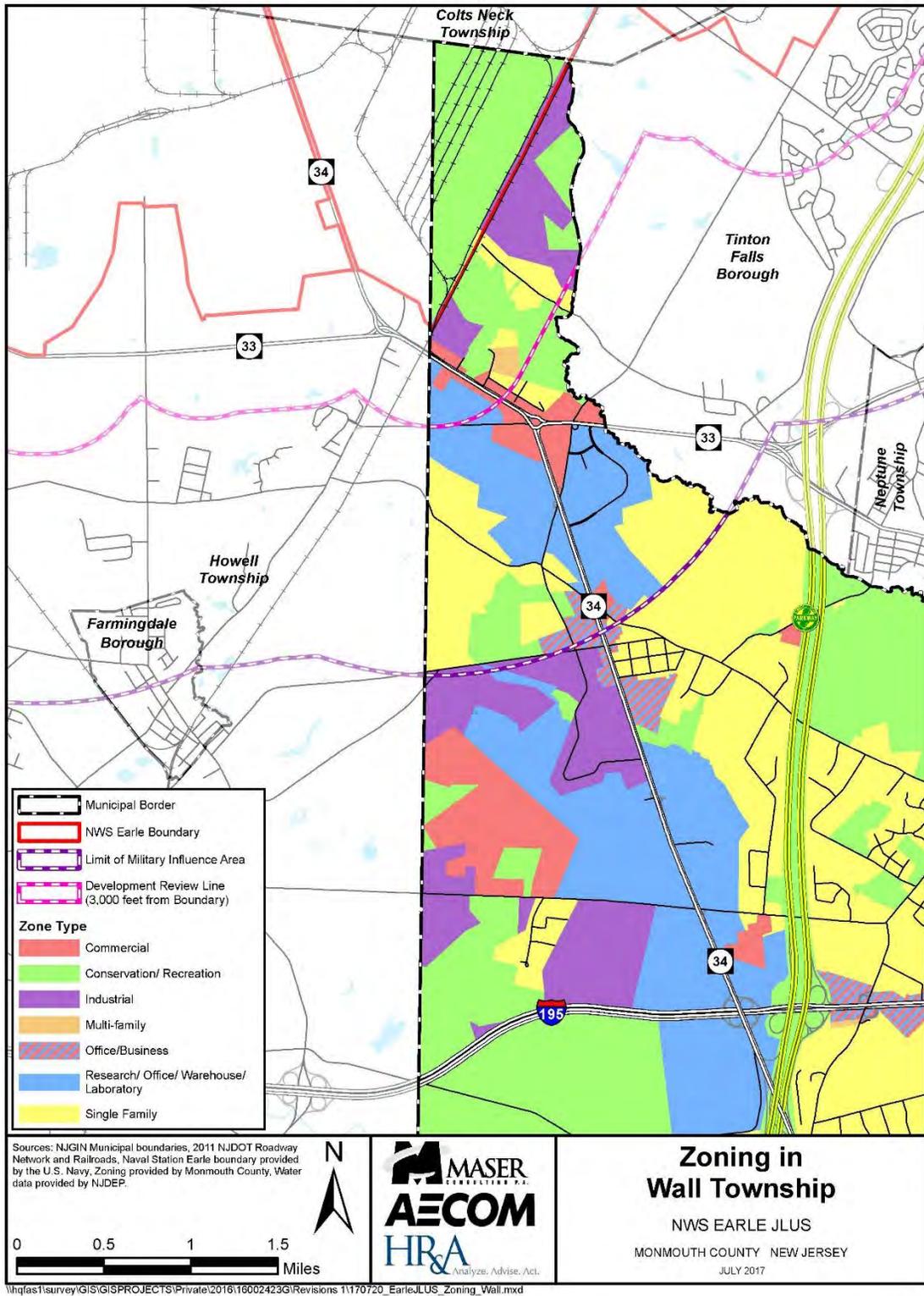


Figure 2.22 Zoning in Wall Township

II. MILITARY INFLUENCE AREA MUNICIPALITIES

1. ATLANTIC HIGHLANDS BOROUGH



Figure 2.23 MIA within Atlantic Highlands

Atlantic Highlands is a small borough in northern Monmouth County near the eastern edge of the Military Influence Area (see Figure 2.23). With an approximate size of 1.2 square miles and a 2010 population of 4,385 residents, Atlantic Highlands is a relatively dense small town built into the hills of the Navesink Highlands. The borough has many historic homes and features a walkable downtown along First Avenue. Ferry access to New York City is available near the borough’s large marina.

The western portion of Atlantic Highlands borders the Middletown neighborhood of Leonardo, while the eastern portion borders Highlands and the Middletown neighborhood of Navesink. The Henry Hudson and Bayshore Trails – two multi-use paths – run along an abandoned Central Railroad of New Jersey right-of-way and continue to Sandy Hook. The borough is situated along the former railroad as well as Route 36, which passes through the borough’s southern portion. Atlantic Highlands is located roughly one mile from the NWS Earle bayfront facilities, and is a large contributor of boat traffic to Sandy Hook Bay.

EXISTING LAND USE

Land use within the Military Influence Area of Atlantic Highlands is predominantly urban, particularly in the vicinity First Avenue and in the adjacent neighborhoods (see Table 2.14). A small amount of wetlands are found along the floodplain of Many Mind Creek just west of First Avenue. As the borough becomes hillier, land use transitions to forest and the density of the developed areas decreases.

Table 2.15 Land Use by Area for Atlantic Highlands

Type	Acres	Percent
Barren Land	11.8	1.0%
Forest	171.7	14.9%
Urban	942.9	82.0%
Water	1.6	0.1%
Wetlands	21.4	1.9%
Total	1,149.5	

2. EATONTOWN BOROUGH

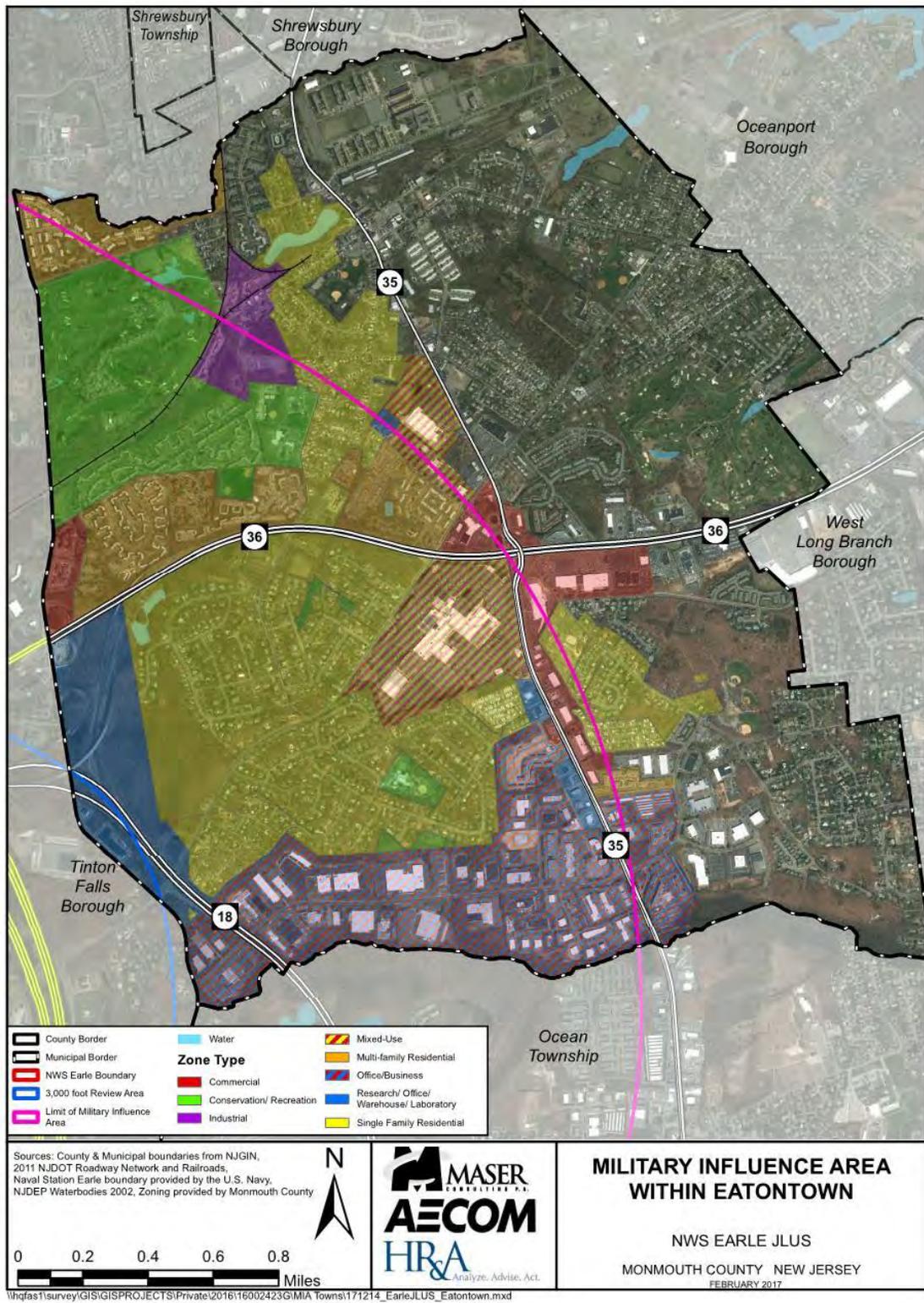


Figure 2.24 MIA within Eatontown

Eatontown is a mid-sized borough located in east-central Monmouth County. As of 2010, it was home to 12,709 residents and had a size of approximately 5.8 square miles. Eatontown was home to a portion of Fort Monmouth, including the Main Post and Charles Wood Area. The borough was significantly affected by the closure of the Fort, with the population decreasing by 1,200 residents between 2000 and 2010. As shown on Figure 2.24, Eatontown is located at the intersections of State Highway Routes 35 and 36, and is home to Monmouth Mall and a sizeable industrial park along the border with Ocean Township, between Routes 18 and 35. The former Main Post portion of Fort Monmouth is mostly outside of the Military Influence Area, while the former Charles Wood Area is within the area.

EXISTING LAND USE

Existing land use within the Military Influence Area is predominantly urban, with developed areas taking up more than three-quarters (77.7%) of the land area (see Table 2.15). Uses with high impervious coverage are present in the industrial park and the apartment complexes on the north side of Route 36. Limited forest and wetlands are found near Route 18. Additional wetlands are found along the railroad tracks near the Charles Wood Area. The former Fort properties are currently under redevelopment.

Table 2.16 Land Use by Area for Eatontown

Type	Acres	Percent
Agriculture	6.0	0.3%
Barren Land	3.4	0.2%
Forest	155.1	8.6%
Urban	1,399.0	77.7%
Water	4.2	0.2%
Wetlands	232.4	12.9%
Total	1,800.1	

3. FARMINGDALE BOROUGH

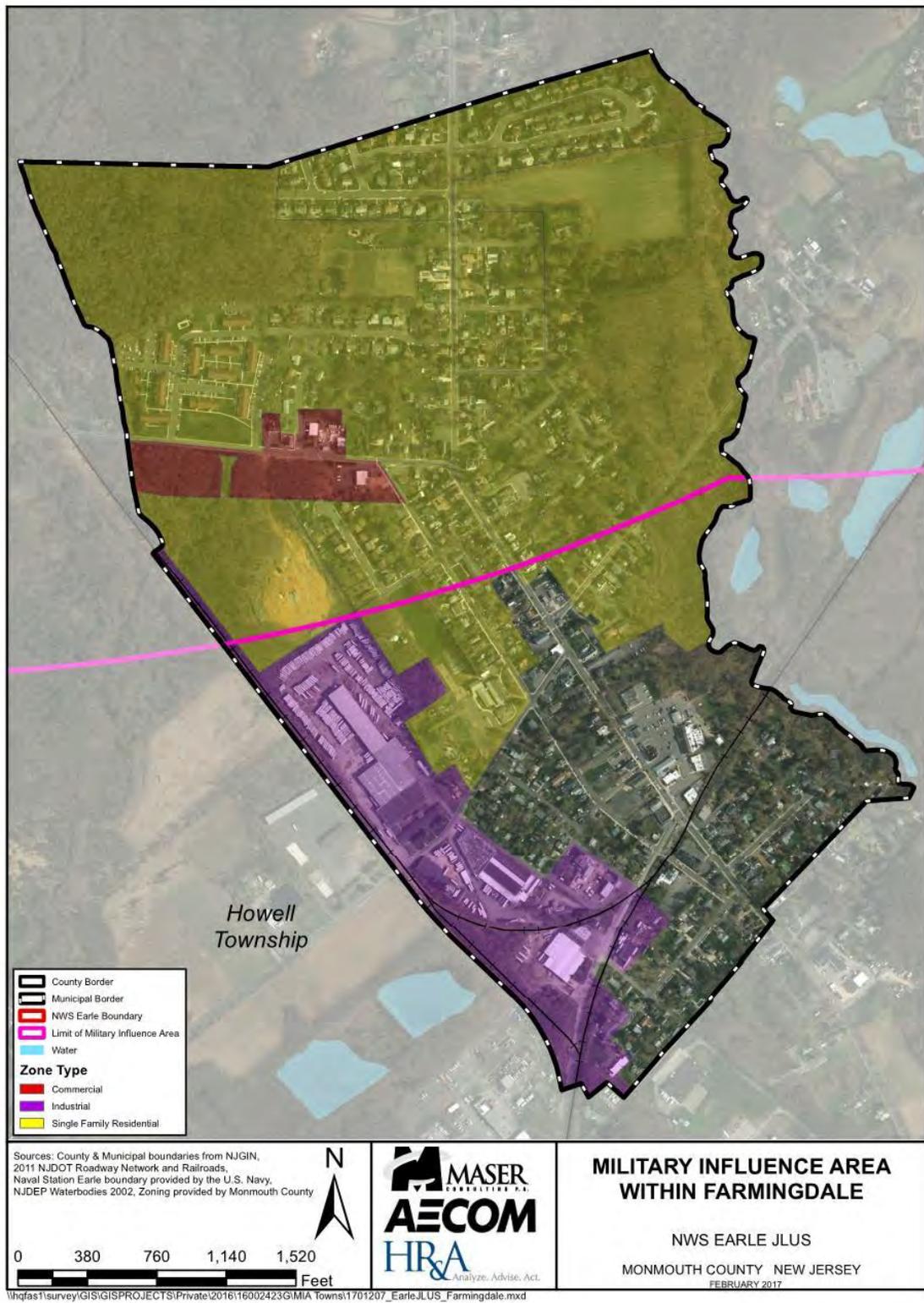


Figure 2.25 MIA within Farmingdale

Farmingdale is a small borough in south-central Monmouth County with a land area of 0.5 square miles and a 2010 population of 1,329 residents. The borough is completely encircled by Howell Township. Despite the borough’s small size, it has a relatively low density with much of the development clustered along the main road (see Figure 2.25). The northern portion of the borough is located within the Military Influence Area, including the area north of Hall Street and Asbury Road (CR-547). Mingamahone and Marsh Bog brooks – both of which have headwaters on the base – form the eastern and western boundaries of the borough respectively. Both brooks are tributaries to the Manasquan River.

EXISTING LAND USE

Land use within the Military Influence Area of Farmingdale is mostly developed low-density residential and commercial. A significant portion of the Military Influence Area is wetlands (39%) located along either side of North Main Street/Colts Neck Road near the brooks (see Table 2.16).

Table 2.17 Land Use by Area for Farmingdale

Type	Acres	Percent
Agriculture	4.3	2.2%
Forest	2.2	1.1%
Urban	114.7	57.8%
Wetlands	77.4	39.0%
Total	198.5	

4. FREEHOLD TOWNSHIP

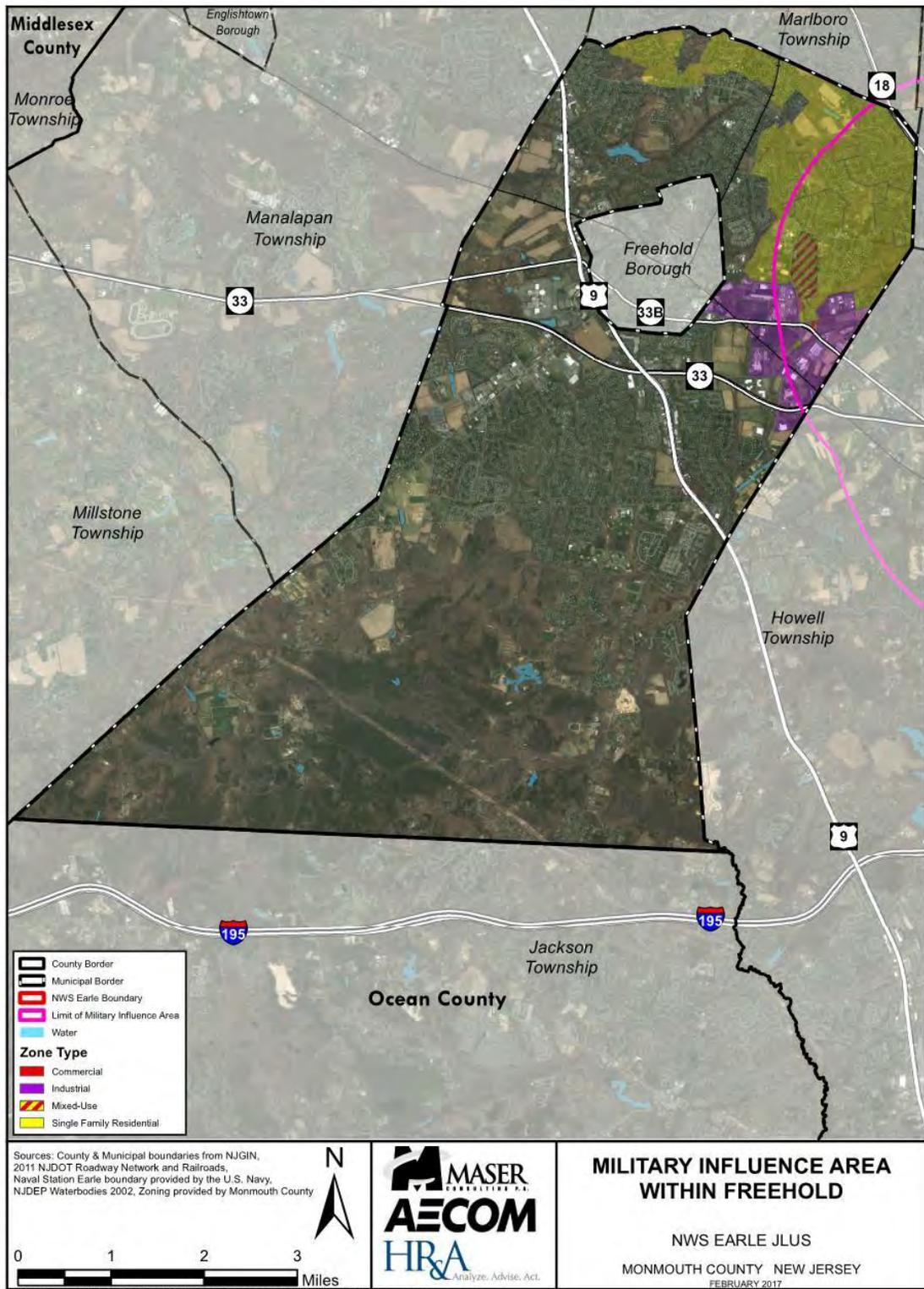


Figure 2.26 MIA within Freehold Township

Freehold Township is one of the largest municipalities in Monmouth County in terms of both size (37 square miles) and population (36,184 residents as of 2010). Of the municipalities within the Military Influence Area not adjacent to Earle NWS, Freehold has the highest amount of acreage within the MIA. However, this acreage is a smaller proportion of the total land area within the township and is limited to the northeast corner (see Figure 2.26). The major roadways within Freehold’s MIA are NJSH Route 79 (which runs north towards Matawan), Dutch Lane Road/CR-46, East Main Street/CR-537, and Route 33B which intersects with Route 33 near Earle. Various county buildings are located within portions of the MIA. Streams within the northern portion of Freehold’s MIA flow northeast towards the Swimming River Reservoir; those within the southern portion of the MIA flow south and east towards the Manasquan River.

EXISTING LAND USE

Land use in the portion of the township within the MIA is mostly urbanized, with more than two-thirds of the land taken up by residential, commercial, and governmental uses (see Table 2.17). Approximately one-third of Freehold Township’s MIA is agriculture, forest, or wetlands. Wetlands are found in the areas along the streams such as Yellow Brook or Debois Creek, with forests and agriculture found in the County Park System’s Durand Tract (located near the intersection of Dutch Lane Road and Kozlowski Road) and Baysholm Tract.

Table 2.18 Land Use by Area for Freehold Township

Type	Acres	Percent
Agriculture	180.5	9.1%
Barren Land	5.4	0.3%
Forest	187.0	9.4%
Urban	1,351.9	67.9%
Water	4.0	0.2%
Wetlands	262.9	13.2%
Total	1,991.8	100.0%

5. HIGHLANDS BOROUGH

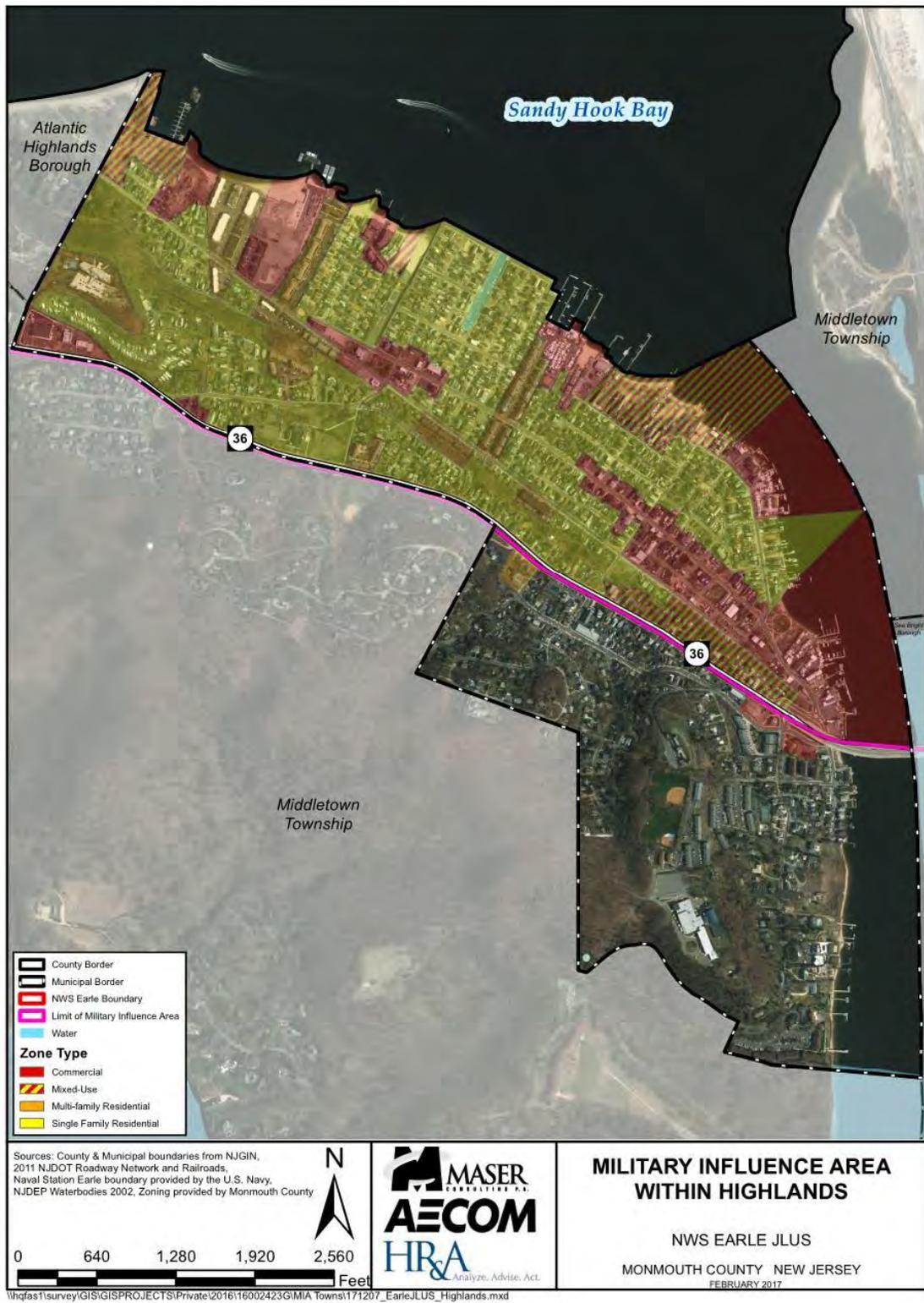


Figure 2.27 MIA within Highlands

Highlands is a coastal borough in the northeast corner of Monmouth County located between Middletown and Atlantic Highlands. Route 36 mostly separates the “wet” and “dry” portions of the borough which are defined by their flooding hazard and elevation. Much of the “wet” portion of Highlands as well as some of the elevated portions on the north side of Route 36 are located within the Military Influence Area of the Waterfront/Pier Complex. As shown on Figure 2.27, Highlands is bordered to the east by the Shrewsbury River and to the north by Sandy Hook Bay. The elevation increases considerably approaching Middletown, and Highlands has some of the highest elevations anywhere on the Eastern Seaboard.

EXISTING LAND USE

Like the other communities in the Military Influence Area not adjacent to Earle, much of the land within Highlands’ MIA is urbanized (75%), featuring a high density of residential and commercial uses (see Table 2.18). The borough has considerable waterfront development supporting the boating and fishing industry as well as higher-density residential areas. A limited amount of the MIA is forested, particularly in the higher-elevation areas in the vicinity of Mount Mitchell.

Table 2.19 Land Use by Area for Highlands

Type	Acres	Percent
Barren Land	5.3	1.5%
Forest	23.5	6.8%
Urban	259.5	75.0%
Water	56.5	16.3%
Wetlands	1.1	0.3%
Total	345.8	

6. KEANSBURG BOROUGH

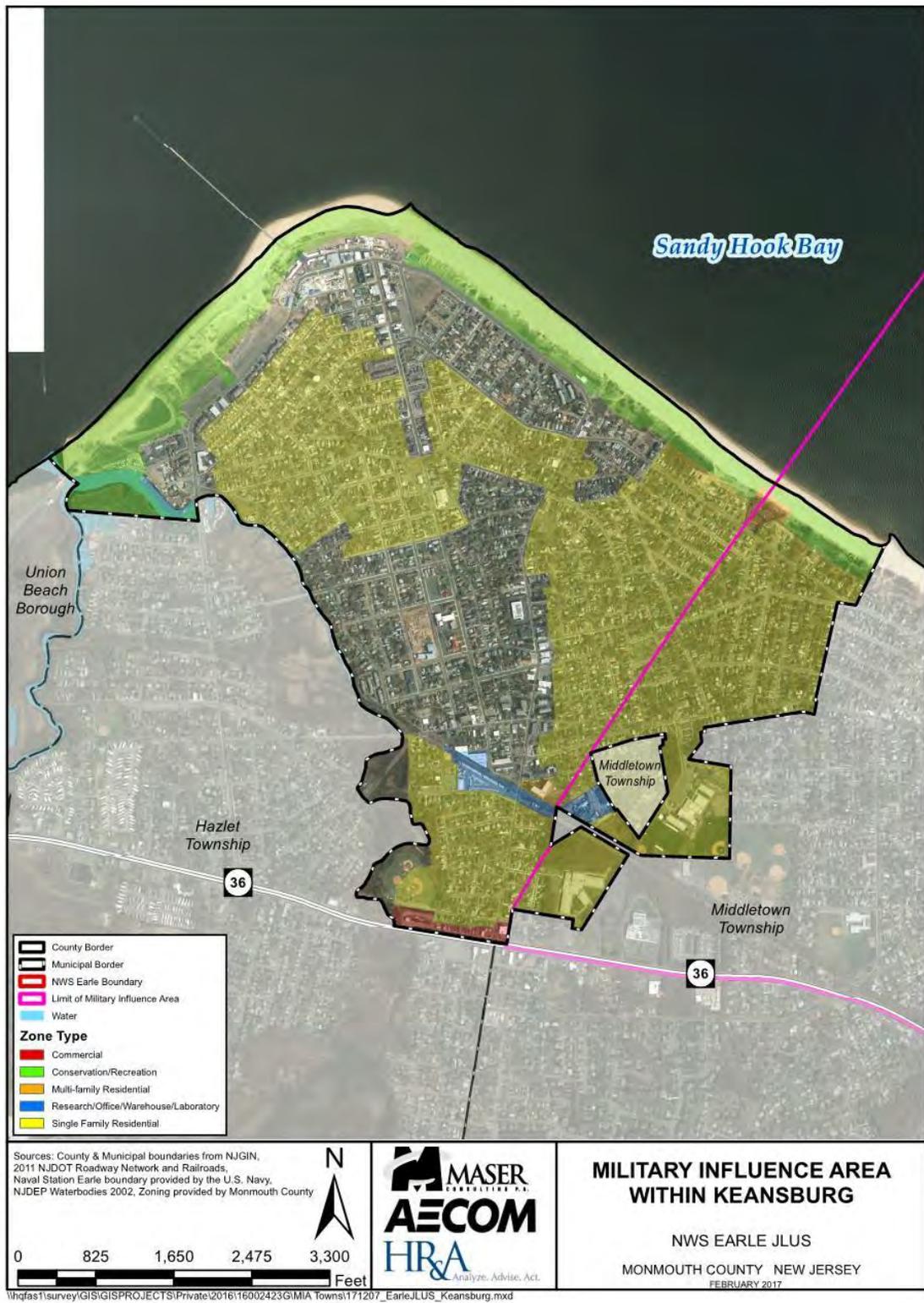


Figure 2.28 MIA within Keansburg

Keansburg is a small bayshore borough located at the tip of Point Comfort (see Figure 2.28). With a 2010 population of 10,105 residents and a size of approximately one square mile, Keansburg was the third-densest municipality in Monmouth County. Much of the borough is within the Special Flood Hazard Area, and as a result was hit particularly hard by Superstorm Sandy. Beach fills and flood control projects have been undertaken throughout the borough. A smaller, 136-acre portion of the borough known as Ideal Beach, located adjacent to Middletown, is within the two-mile Military Influence Area of the Waterfront complex.

EXISTING LAND USE

Keansburg is almost entirely urbanized within the Military Influence Area. Approximately 84% of the land use consists of detached structures built at high densities between the Henry Hudson Trail and Sandy Hook Bay (see Table 2.19). Nearly 10% of the land within the MIA is wetlands, much of which is located along the dunes or in the vegetated area behind the Bolger Middle School.

Table 2.20 Land Use by Area for Keansburg

Type	Acres	Percent
Barren Land	3.2	2.3%
Forest	4.3	3.1%
Urban	114.6	84.1%
Water	1.1	0.8%
Wetlands	13.2	9.7%
Total	136.4	

7. NEPTUNE TOWNSHIP

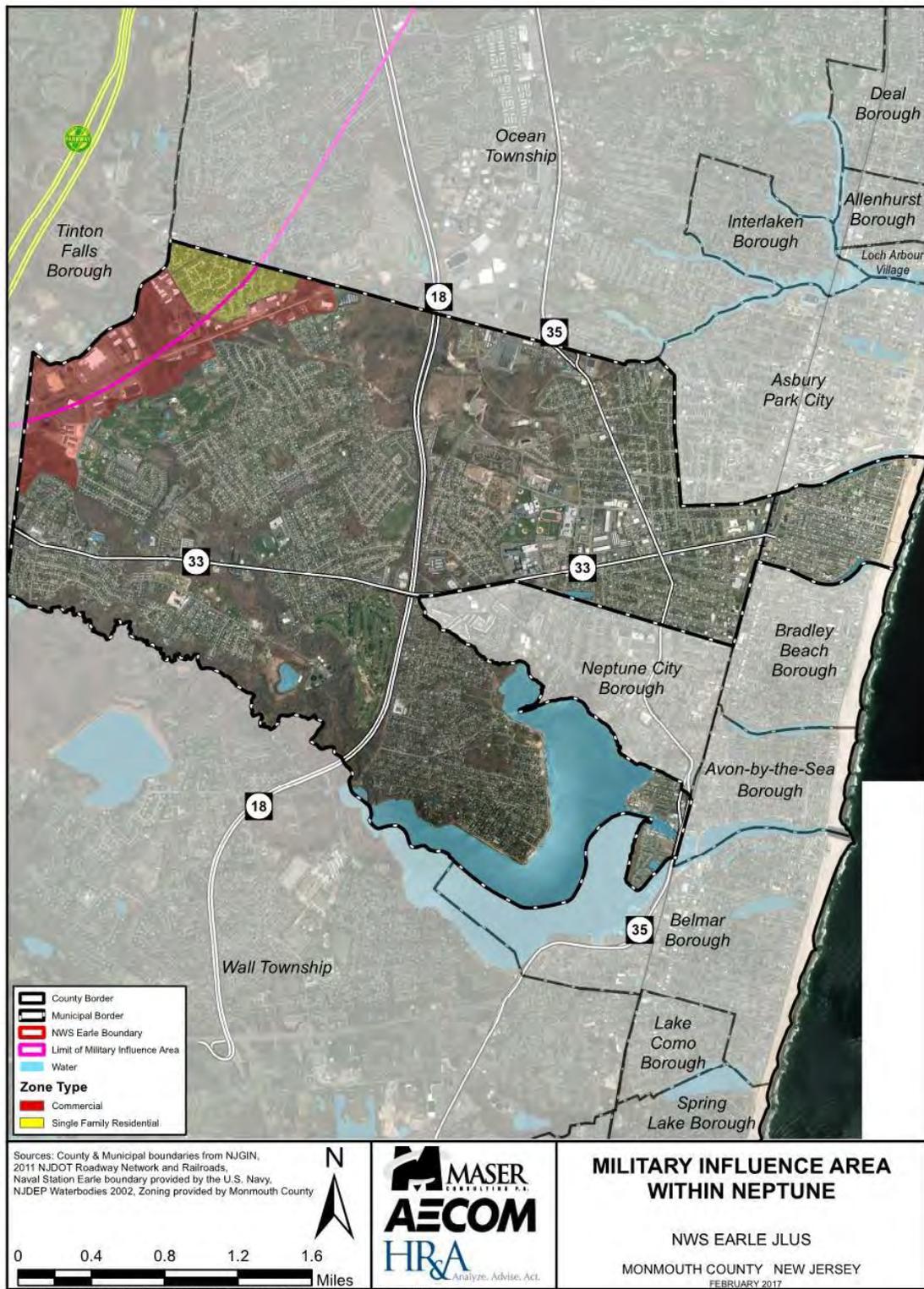


Figure 2.29 MIA within Neptune

Neptune Township is a large municipality located in southeastern Monmouth County. The township is comprised of coastal portions (including the neighborhoods of Ocean Grove, Shark River Hills, and Shark River Island) and inland portions stretching from NJSH Route 71 west to the Garden State Parkway. The northwestern corner of the township north of NJSH Route 66 is within the two-mile Military Influence Area (see Figure 2.29).

EXISTING LAND USE

Most of the Military Influence Area in Neptune Township is urbanized (see Table 2.20), with large retail areas (including a Wal-Mart, Home Depot and car dealerships) and industrial buildings located off of Route 66. Medium density residential uses are also present near the edge of the MIA. The area along Jumping Brook, a tributary of Shark River, comprises most of the MIA’s wetlands and forest areas.

Table 2.21 Land Use by Area for Neptune

Type	Acres	Percent
Barren Land	2.3	0.9%
Forest	6.1	2.4%
Urban	210.5	81.5%
Water	0.4	0.2%
Wetlands	38.9	15.1%
Total	258.2	

8. OCEAN TOWNSHIP

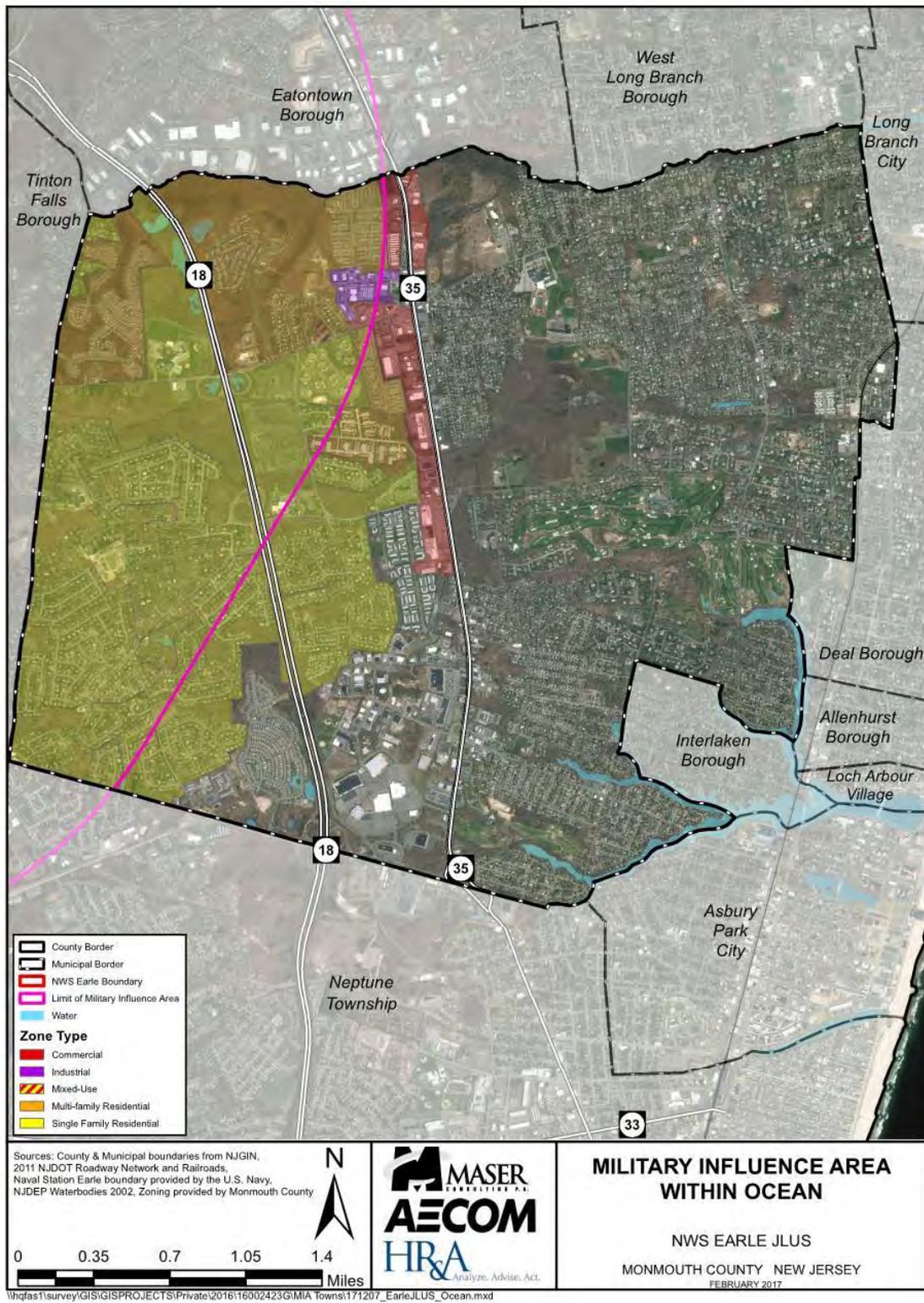


Figure 2.30 MIA within Ocean Township

Ocean Township is one of the larger municipalities in central Monmouth County, comprising 11.2 square miles and a population of 27,291 residents as of 2010. The township is located immediately inland from some of the County’s coastal municipalities, and extends west to border Tinton Falls and Eatontown. Routes 18 and 35 traverse the township in a north-south direction (see Figure 2.30), though Route 18 is limited-access, Route 35 has seen considerable highway-related development. The northern portion of Route 35 marks the eastern extent of the Military Influence Area which extends southwest towards Neptune. Of the non-adjacent Military Influence Area municipalities, Ocean has the second-highest amount of land within the MIA (approximately 1,947 acres) and 38% of the municipality’s total land area. The MIA in Ocean is predominantly within the Wayside neighborhood. Poplar Brook, which runs east towards the Atlantic Ocean, and Harvey Brook, a tributary of Deal Lake, both pass through the MIA.

EXISTING LAND USE

Given the less dense nature of Ocean Township, a smaller proportion is urbanized (approximately two-thirds) compared to other MIA municipalities (see Table 2.21). Much of the urbanized land consists of clustered low-density residential on either side of Route 18. More intense commercial uses are found along Route 35. Just over one-fifth of the MIA in Ocean is wetlands, much of which is comprised by the New Jersey Natural Lands Trust’s Whale Pond Brook Preserve located along Route 18 near the border with Eatontown and the area in the vicinity of Poplar Brook. Forest areas are found in the vicinity of West Park Avenue near Route 18 and near the existing wetlands.

Table 2.22 Land Use by Area for Ocean Township

Type	Acres	Percent
Agriculture	2.3	0.1%
Barren Land	8.1	0.4%
Forest	204.8	10.5%
Urban	1,292.6	66.4%
Water	19.8	1.0%
Wetlands	419.8	21.6%
Total	1,947.4	

III. WATERSHED COMMUNITIES:

The original intent of the JLUS included a plan for outreach to the watershed communities that lay outside of the Military Influence Area but which could affect the mission of NWS Earle through land use decisions that could impact Sandy Hook Bay.

Many of these municipalities are part of the NJDEP NJ FRAMES project and outreach to them about the Joint Land Use Study was accomplished through coordination with NJ FRAMES. NJ FRAMES served as a JLUS Technical Advisory Committee and is discussed further in Chapter 3.

3. JLUS PLANNING PROCESS, ORGANIZATION STRUCTURE & OUTREACH

A. PARTICIPATING PARTNERS

As previously noted, a Joint Land Use Study (JLUS) is intended as a cooperative land use planning effort between local governments, numerous organizations, groups and regulatory agencies, and the military installation.

The Planning Process is structured to gather information and to have a group of study-related advisory committees composed to provide input, feedback, and ultimately, recommendations.

The following is a general outline of the Committees, Working Groups, and Outside Agencies involved with the NWS Earle JLUS Planning Process:

I. JLUS POLICY COMMITTEE

JLUS Policy Committee was intended to be comprised of elected officials and administrators from throughout the study area, including: a County Freeholder, Monmouth County Administrator, NWS Earle Commanding Officer (ex-officio), Monmouth County Director of Planning, Monmouth County Director of Public Works and Engineering, representatives of the Earle communities: Colts Neck, Howell, Middletown, Tinton Falls and Wall, and the Director of the NJ Office for Planning Advocacy. Invitations were sent at the beginning of the grant period. The Policy Committee met on January 20, August 23 and December 4, 2017. They were also invited to meet the new NWS Earle Commander and tour the base on May 23, 2017.

The Policy Committee included the following:

- Freeholder Director Lillian G. Burry
- County Administrator Teri O'Connor
- County Planning Director Edward J. Sampson PP/AICP*
- County Director of Public Works and Engineering John W. Tobia
- Director of the NJ Office for Planning Advocacy, Dr. Gerard Scharfenberger, PhD*
- NWS Earle Commanders Capt. Jay Steingold and Capt. Pierre Fuller*
- Colts Neck Township Administrator, Kathleen M. Capristo
- Howell Township Community Land Use Director Matthew R. Howard, PSM
- Middletown Township Planning Director Sanyogita Chavan, PP/AICP*
- Mayor Gerald M. Turning of Tinton Falls
- Wall Township Administrator Jeffrey Betrand

** denotes these members also served on the General Advisory Committee*

II. JLUS GENERAL ADVISORY COMMITTEE



Figure 3.01 General Advisory Committee Meeting at County Planning Offices

JLUS General Advisory Committee (GAC) was intended to include staff from additional Monmouth County Departments; Representatives of NWS Earle, and several New Jersey State Departments including Environmental Protection and Transportation. All municipalities within the Military Influence Area were also invited to serve on this committee as a means of discussing issues and disseminating information to all planning partners. The General Advisory Committee met on February 13, April 25, September 9 and December 4, 2017. They were also invited to the May 23, 2017 tour of NWS Earle.

GAC membership included:

- County Engineer Joseph Ettore, PE
- County Environmental Engineering Chief Engineer, Inkyung Englehart, PE
- Director of County Office of Emergency Management Michael Oppegaard
- County Office of Emergency Management Margaret Murnane Brooks
- County Health Officer Christopher Merkle
- Assistant County Environmental Health Coordinator Alain Fortier
- County Park System Planner Paul Gleitz, PP/AICP
- County Division of Economic Development Director John Ciufu
- County Environmental Council Michael Fedosh, Chair
- NWS Earle Community Plans and Liaison Officer Dennis Blazak
- NJDEP Office of Coastal & Land Use Planning and NJFRAMES Project Manager Nicholas Angarone, PP/AICP

- Atlantic Highlands Borough Administrator Adam Hubeny
- Eatontown Zoning Officer Erik Brachman and Borough Administrator George Jackson
- Farmingdale Borough Clerk Corinne DiCorcia, RMC
- Freehold Township Administrator Peter R. Valesi
- Highlands Borough Administrator Brian Geoghegan
- Howell Township Community Development Director Jim Herrman, PE
- Keansburg Borough Manager Raymond J. O’Hare
- Neptune Township Administrator Vito Gadaleta
- Ocean Township Manager Michael Muscillo (formerly Tinton Falls Borough Administrator) and former Ocean Township Manager Andrew Brannen
- Interium Tinton Falls Borough Administrator Elizabeth Perez
- Wall Township Planner Nora Coyne, PP/AICP

III. TECHNICAL ADVISORY GROUPS

Technical Advisory Groups could be formed as needed for data gathering, technical input, and review of documents throughout the study process. Originally, a working group was intended to be assembled from the municipalities in the Navesink/Swimming River Watershed, as land use decisions in that region have the potential for significant impact on the Earle Pier Complex and overall resiliency in the Bayshore. At the same time that the Earle JLUS process was beginning, the New Jersey Department of Environmental Protection Coastal Management Program was kicking off their NJ FRAMES project. NJ FRAMES stands for New Jersey Fostering Regional Adaptation through Municipal Economic Scenarios. The project is a regional collaborative effort to address future flood vulnerability and prepare a long-term resilience plan for the 15 municipalities surrounding the Navesink and Shrewsbury rivers with a focus on reducing risks and impacts. The project is led by the NJDEP in cooperation with the Two Rivers Council of Mayors and was funded by a grant from the National Oceanic and Atmospheric Administration (NOAA). Rather than form a separate working group for the JLUS, the County and NJDEP worked together on both projects.



Figure 3.02 Technical Advisory Committee Meeting at NWS Earle Pier

Additional working groups were formed to discuss transportation related issues, economic development initiatives, and Bay/Bayshore issues. One initial meeting was held for each group. Follow-up was handled through email. A list of working group participants is in the Appendix.

B. KEY STAKEHOLDER COORDINATION

As an important step in the planning process the following interviews were conducted to identify specific concerns that could be presented at Committee Meetings for discussion and possible recommendations and implementation strategies:

I. MUNICIPAL SURVEYS

A Municipal Questionnaire (See Appendices) was created and distributed to the NWS Earle municipalities (5) and the MIA Municipalities (8), and subsequently individual follow-up interviews were conducted with all Earle and some MIA municipalities. The surveys were an important part of the planning process as it allowed each municipality to expound upon ideas and concerns that were touched up in the initial Policy and General Advisory Committee meetings, and to provide additional information to the study team about policies and procedures, in particular regarding review of development and zoning in the MIA. The results of these surveys are provided as part of Section 5: Existing Compatibility Tools, section D. Local / Municipal.

II. STATE AGENCIES

Rutgers, the State University worked with the NJ FRAMES professionals at NJDEP and NOAA to provide technical and consultative support to the integration of climate science and data into the development of the JLUS. The planning process was seen as part of a larger East Coast wide study that Rutgers has been developing for the past several years. The JLUS project evaluated the exposure of assets within the MIA to develop recommendations for increasing the resilience of NWS Earle and the surrounding communities. The review suggests that global sea level change projections and methods for local adjustments (i.e. vertical land movement (VLM), ocean circulation, ice melt, etc.) are generally consistent among all of the supporting reports; the NJCAA STAP framework, NAVFAC Handbook, and NOAA reports all set forth similar processes for developing extreme water levels to assess exposure to current and plausible future flood hazard conditions. These conditions were then mapped onto the Sandy Hook Bay for the state.

The New Jersey Department of State Office for Planning Advocacy provided information and support throughout the JLUS process. The Director also served as a liaison between the JLUS team and various state agencies, particularly on land use planning related issues.

The study team reached out to the New Jersey Department of Transportation (NJDOT) on several occasions inviting them to participate in the study. Unfortunately they were not able to provide a representative to sit on the General Advisory Committee.

III. MILITARY DEPARTMENTS

It was important for the study team to have firsthand knowledge of the mission, facilities, and concerns of the military personnel tasked with running NWS Earle. Towards this end an initial base site visit was conducted on March 29, 2017 with interviews of various operations personnel, including the Port Ops Officer, the Naval Munitions Command Deputy Officer in Charge, the NWS Earle Security Department Command Duty Officer, and the then Installation Commanding Officer. A summary of these meetings is included in the appendix to this document.

C. PUBLIC INVOLVEMENT STRATEGY

Public involvement plays a critical role in shaping the JLUS in a way that is meaningful to the County and the municipalities in the Military Influence Area, and in particular, for the NWS Earle municipalities which have lands that comprise the base and are directly affected by the future planning process. The Public also plays an important role in the perception of the base and its mission now and into the future.

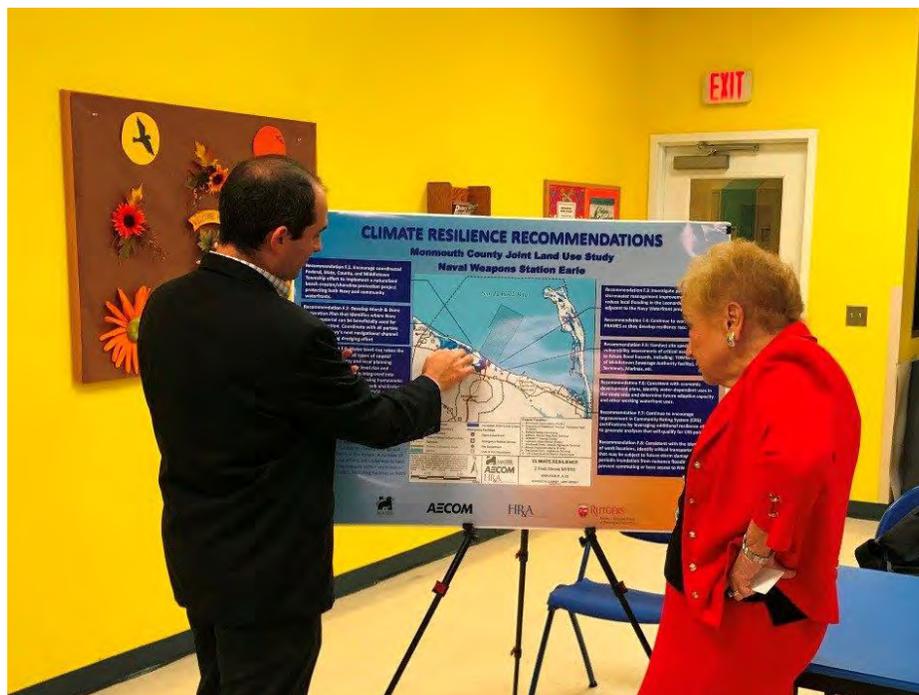


Figure 3.03 Public Open House

A Public Involvement Strategy (PIS) was created which outlined a wide range of methods to reach and engage the widest possible audience, including:

PUBLIC MEETINGS - Hold 3 Public Open House Meetings at the beginning, middle and end of the project. These meetings would be an open invitation to watershed municipalities and all county residents to review project information generated and to offer comments.

COMMUNITY OUTREACH - Community Outreach included identifying potential stakeholders for technical working groups.

WEB SITE - Public outreach included the development of a project specific web site to house ongoing uploads of relevant project information as it was developed, such as mapping, fact sheets, and meeting agendas. This website, along with the County Facebook Page, Twitter feed and press releases, served to notify residents of upcoming meetings. The project website was linked to the Monmouth County website for broader outreach.

The complete Public Involvement Strategy is included in the Appendix.

4. EXISTING COMPATIBILITY TOOLS

This section of the JLUS report covers the existing land use and other policies and programs addressing military-community compatibility around NWS Earle that are already in place. These are summarized at the different governmental levels involved – Federal, state, county, and township/borough. The next chapter addresses proposed future programs and policies that could augment these existing ones resulting from the analysis completed in this JLUS.

A. FEDERAL

The Federal government has several ways it has been addressing compatibility since NWS Earle was established. These include the following:

- Federal Environmental Legislation: A number of environmental laws have been passed since the 1970s that NWS Earle, as a Federal Department of Navy installation, must adhere to. These environmental regulations often either directly or indirectly involve coordination with the state, county or surrounding jurisdictions to meet applicable Federal regulatory requirements. The most notable of these include:
 - Clean Air Act (CAA), involving coordination with the NJ Department of Environmental Protection to meet CAA State Implementation Plan (SIP) requirements;
 - Clean Water Act (CWA), involving coordination with NJDEP as part of New Jersey's Watershed Management Area (WMA) 12;
 - National Environmental Policy Act (NEPA), involving public scoping and environmental impact review of major projects at NWS Earle that trigger NEPA review;
 - National Historic Preservation Act (NHPA), involving consultation with the State Historic Preservation Office (SHPO) to meet NHPA, Section 106 requirements.

The Federal government also has regulations for hazardous waste transport which are applicable to ordnance transport on public roads outside the base boundaries. These regulations ensure safe transport of munitions to NWS Earle by government personnel or private contractors to ordnance storage facilities on-base using DOD's Strategic Highway Network described in Chapter 2.

- Land Acquisition and Conservation Partnering: DOD has established a program – called Readiness and Environmental Protection Integration (REPI) - to limit encroachment and incompatible land use through land acquisition of properties with proximity to military bases. Funding for this is done on a competitive basis across DOD by interested installations and can be used for conservation easements or the purchase of property. While two REPI grant applications (2015 and 2016) have been submitted for lands surrounding NWS Earle, none have yet received funding.
- Federal involvement in Superstorm Sandy recovery: The Federal government has been involved in multiple ways in assisting New Jersey and surrounding states with recovery efforts. These efforts have included Federal Emergency Management Agency (FEMA) funding, as well as funding for shoreline stabilization and other coastal protection efforts along the New Jersey coast. Currently, the U.S. Army Corps of Engineers (USACE) is conducting the *New York- New Jersey Harbor and Tributaries Coastal Storm Risk Management Study*, which includes the Raritan Bay and Sandy Hook Bay, to identify measures to better manage coastal flood risks in the region in the future. Depending on the results of this study, any coastal protection actions

proposed for implementation could benefit both NWS Earle Waterfront facilities and the adjacent coastal municipalities in the MIA including Keansburg, Middletown, Atlantic Highlands, and Highlands.

- NWS Earle initiatives: NWS Earle has addressed military-community compatibility through several steps including participation in this JLUS. In 2012, the base established a Community Plans and Liaison Officer (CPLO) who reports to the Commanding Officer and helps interact and coordinate with local community representatives on issues potentially affecting base operations or its mission. In 2014, the base prepared an internal document – the *NWS Earle Encroachment Action Plan* - to inform base leadership of potential encroachment challenges with action steps and timelines established to help mitigate any identified challenges. The base also has a master plan with planned projects to address future requirements and land use compatibility within the fence line. In addition, NWS Earle has undertaken several joint efforts with the County and municipalities addressing mutual areas of concern. These have included:
 - A joint effort with Monmouth County to assist with mosquito control on base property;
 - Working with the NY/NJ Baykeeper to establish an oyster reef in Sandy Hook Bay offshore of NWS Earle and Middletown coastal residential areas to help minimize beach erosion from storms and hurricane events;
 - Shared use of Normandy Road for county and municipal emergency vehicles and Middletown Township school buses.

NWS Earle has also established Shared Service Agreements with Monmouth County. These agreements are discussed below under the County section on existing compatibility tools.

B. STATE

1. State Legislation

In 2005, New Jersey passed state legislation concerning land use adjacent to military facilities. This legislation is similar to what other states have enacted that recognize an area within 3,000 feet of a military base as a buffer area requiring notice for zoning changes. Specifically, the New Jersey legislation provides the following amendments to existing public laws:

- *Section 7.1 of Public Law 1975, c. 291 was amended requiring the notice of hearings on applications for approval of a major subdivision or site plan be given to military facility commanders for any properties within 3,000 feet of a military base. In addition, the municipal clerk shall provide notice of a hearing on an amendment to the zoning ordinance proposing a change to the classification or boundaries of a zoning district, exclusive of classification or boundary changes recommended in a periodic general reexamination of the master plan, to the Office for Planning Advocacy, and to any military facility commander who has registered with the municipality pursuant to section 1 of P.L.2005, c.41 (C.40:55D-12.4), at least 10 days prior to the hearing, by personal service or certified mail.*
- *The military base must register with the town if they want to receive notices. As per PL2005, c41 ([MLUL](#)) 40:55D-12.4- Notice to military facility commander from municipality:*
 - a. Any military facility commander interested in receiving notice pursuant to paragraph (2) of subsection h. of section 7.1 of P.L.1975, c.291 (C.40:55D-12) and section 2 of P.L.1995, c.249 (C.40:55D-62.1) may register with the administrative officer of the municipality in which the military facility is situated and any municipality situated within 3,000 feet in all directions of the*

military facility. The registration shall remain in effect until revoked by the military facility commander.

b. The administrative officer of every municipality in which a military facility is situated or which is situated within 3,000 feet in all directions of a military facility shall adopt a registration form and shall maintain a record of any military facility which has registered with the municipality pursuant to subsection a. of this section. The registration form shall include the name and address of the military facility commander to whom notice shall be forwarded, as required pursuant to paragraph (2) of subsection h. of section 7.1 of P.L.1975, c.291 (C.40:55D-12).

2. State Task Force

In 2014 the State of New Jersey created a Task Force to study the current state of military installation growth and development within the State of New Jersey, led by then Acting Governor Kim Guadagno.

The New Jersey Military Installation Growth and Development Task Force Report, Findings and Recommendations, dated June 2015, details recommendations under the section entitled, *Develop Synergistic Opportunities Enabling Greater Cooperation Between Military Installations and Local Communities a) Coordinate to Establish a Plan for Symbiotic Land Use.* The study defines the JLUS process, the negative impacts of development near an installation, the need for notification of development proposals and zoning changes near bases, and more, and recommends a greater role for the State Office for Planning Advocacy (OPA) in mediating conflicting matters.

Specific conflicting situations that the military seeks to avoid by engaging in the JLUS process include undue encroachment on military installations to avoid potential hazards and limitations on the base, including:

- *Building residential areas too close to installations thereby exposing residents to noise from planes, helicopters, and firing ranges; and*
- *Limiting potential for future expansion on the installation by reducing open or undeveloped surrounding property.*

The Task Force arose from the on-going national dialogue regarding BRAC and mission loss and the impacts on New Jersey. The Task Force report included an economic overview of each military base remaining in the state. Specific information on NWS Earle highlighted the installation’s contribution to the state economy as follows:

Table 4.01 Annual Economic Impact

Annual Economic Impact on NJ’s Economy			
	Indirect/Direct Effects	Induced Effects	Total
Output (x\$1,000)	32,532.2	35,754.9	68,287.1
Employment	295	185	481
Earnings (x\$1,000)	17,628.7	11,127.5	28,756.2
GDP (x\$1,000)	25,092.7	19,624.5	44,717.2

Based on the analysis conducted by the Task Force, the final report produced the following recommendations to enhance all military installations in the state.

A. Appoint a Military and Defense Economic Ombudsman

This recommendation has been completed. Acting Governor Guadagno officially established this position with Executive Order 192 in November 2015. At that time, she appointed retired Major General Clark W. Martin as the Ombudsman who is still currently serving in this position.

Establish a Coordinated Approach to Improve Military and Defense Industry Economic Development

1. Attract Private Capital to and Around Our Military Installations

- a) Develop Targeted State Incentive Programs for Businesses Working with Military Installations
- b) Cut Red Tape for Military Installations and the Defense Industry
- c) Targeted Marketing Campaign by *Choose New Jersey* (looking at ways to improve interactions on communications and economics between military leaders and the State of New Jersey)
- d) Establish and Deploy a Military Mobile Cabinet
- e) Develop Asset Management Databases of New Jersey Resources

2. Improve Relationships Among Federal Contractors

- a) Establish New Jersey Procurement Partnership Program
 - Establish a Mentorship Program
 - Host Procurement Seminars
 - Identify Federal Procurement Resources and Develop a Plan to Make Them More Accessible
 - Engage with NJ Market Shift
- b) Organize Regular Military “Resources for Growth” Events in Coordination with Military Installations.

B. Align New Jersey’s Workforce with the Military and Defense- Industry Current and Future Needs

1. Understand and Respond to the Needs of Our Military Installations and the Industries that Support Them

- a) Convene a Military Skills Council
- b) Target Workforce Training Dollars Towards Supportive Grantees

2. Improve New Jersey’s Pipeline of STEM (Science, Technology, Engineering and Math) - Educated Employees Who Can Fill the Needs of Our Future Military and Defense Jobs

- a) Include Military and Defense-Industry Membership on the STEM Pathways Network
- b) Collaborate with Military Installations on Increasing STEM Education

3. Continue Expanding Prior Learning Assessments for Veterans

C. Develop Synergistic Opportunities Enabling Greater Cooperation Between Military Installations and Local Communities

1. Facilitate Shared Services Between Installations and Neighboring Governments

Examples of military installations and municipalities sharing services around the country include:

- Shared maintenance of the installation's streets, sewers, storm drains, and fence systems;
- Allowing installation personnel to utilize the civilian 9-1-1 service;
- Shared vehicle, grounds, and road maintenance;
- Refuse and snow removal;
- Shared utility infrastructure and maintenance including sewer, water, and electric; and
- Consolidated police and fire units to maximize effective coverage area.

2. Minimize Encroachment Through Strategic Land Use Planning

- a) Coordinate to Establish a Plan for Symbiotic Land Use (including preparing a JLUS, cooperatively working on utilities and other local issues, and coordinating on comprehensive plan updates and zoning changes)
- b) Preserve Open Space Near Military Installations

3. Improve Energy Resiliency

4. Increase Supportive Coalitions to Forge and Strengthen Local Relationships

3. NJ FRAMES Project (2016):

As noted in Chapter 3, NJ FRAMES is a comprehensive regional planning effort to build coastal resilience in a 15-municipality pilot to perform a stakeholder led scenario planning process; deploy new and enhanced decision-making tools; and develop consistent state- and community-level policy and practices that support resilience and adaptation actions. NJ FRAMES is a 3-year federal grant funded project spearheaded by the NJDEP Coastal Management Program in cooperation with the Two Rivers Council of Mayors, working with Rutgers University, Jacques Cousteau National Estuary Research Reserve, and consultant Louis Berger. This State sponsored planning effort provided some of the initial methodology used to project Sea Level Rise scenarios along this portion of the Atlantic Seaboard, including the Middletown Township area along Sandy Hook Bay, where the NWS Earle's pier is located. NWS Earle and the County are both partners in this project.

C. COUNTY

Monmouth County's Shared Services Program presents opportunities for local government entities to work together to share existing resources and a collective purchasing power. Reducing the cost of services and commodities helps to lower municipalities' annual budgets, and the savings can then be passed on to local taxpayers. Over the last several years the County has worked with NWS Earle to establish Intergovernmental Support Agreements to utilize and engage the County Public Works staff and equipment for such tasks as snow plowing Normandy Road and re-grading and stoning of perimeter areas. These agreements allow for a reduction in the base operational budget. Both parties are looking at opportunities to expand this cooperation.

The County and NWS Earle coordinate construction scheduling to assure that there is adequate access to the entrances on Route 34 at Mainside and on Route 36 at the Pier Complex during state, county or local road construction in the area.

The Monmouth County Master Plan (2016) references NWS Earle and associated projects in several chapters including Natural Resources; Community Resiliency; and Planning Services, Outreach and Coordination.

As noted in the Master Plan Chapter 12, the Monmouth County Highway Division in the Department of Public Works and Engineering assisted Naval Weapon Station Earle by desnagging areas of the Ware Creek Salt Marsh to control invasive species, improve habitat, and increase stormwater capacity.

Section 12.4.2 State and Federal Partnership Efforts addressed numerous planning efforts to improve resiliency including discussion of the Oyster Restoration project located in the Sandy Hook Bay adjacent to the pier within the restricted area of NWS Earle that the County cites as a positive effort towards greater resiliency. Within the section 12-23: U. S. Navy and Department of Defense (DoD), the following was noted:

“In 2014, the Monmouth County Board of Chosen Freeholders passed a resolution supporting a Superstorm Sandy Coastal Resiliency Competitive Grant Application by Middletown. Naval Weapons Station Earle, and Monmouth County entered into a partnership to enhance the Ware Creek salt marsh, located on Raritan Bay between the Belford Ferry Terminal and the Naval Weapons Station pier. The project would restore the salt marsh, improve stormwater capacity, increase storm surge resistance, restore the natural ecosystem, and lessen localized flooding around Ware Creek. Invasive species control increased habitat and stormwater management capacity.”

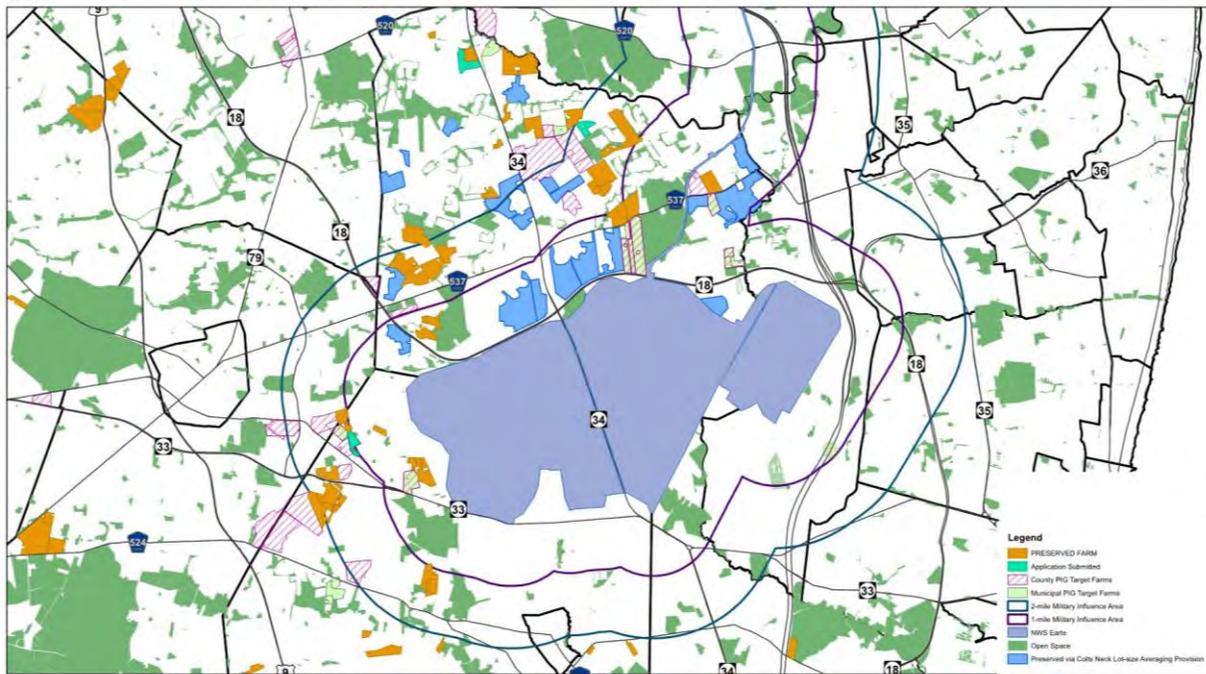
A relationship has also developed between the County Farmland Preservation Program, the County Park System and NWS Earle through the preparation of two REPI grants, neither of which was funded. However, the County Park System has already acquired land in the Military Influence Area (MIA) around Earle, in the Bayshore, and along Normandy Road including: Dorbrook Recreation Area, Monmouth Cove Marina, and Bayshore Waterfront Park. In fact, there are 14 Monmouth County Park System facilities within the Earle MIA. These parks currently total in excess of 3,200 acres with more than 2,000 acres of these parks being within the boundary of the Earle MIA. Of these 14 parks one has a current, pending acquisition of 6.5 acres. The 2017 draft MCPS Open Space Plan identifies the potential for 13 of the 14 park areas within the MIA to expand anywhere from 3 acres to 1,900 acres for a total possible park expansion of 5,100 acres. Of these 5,100 acres of park expansion, 3,500 acres are within the Earle MIA and should be eligible for DOD REPI funds or other DOD funding to remove the potential for incompatible development by moving them into permanently protected open space. The Farmland Preservation Program continues to work with local farmers to preserve agricultural properties within the MIA. Target farms have been identified within the MIA, several of which are currently in discussion with program staff for potential preservation. Recreation and farming uses are both compatible with the base’s mission, and preservation is a good tool to use to assure compatibility into the future.

Below is a map created for this study that shows the relationship of preservation efforts to the perimeter, 3000’ buffer area and 2-mile MIA. It is hoped that cooperative efforts with the County can be used as a means of re-applying for potential outside funding.



NWS Earle JLUS Study Farmland Program Info

Monmouth County Agriculture Development Board
One East Main Street, Freehold, NJ 07728 732-431-7460



This map was created on August 9, 2017 and is for information purposes only.

Basemap layers courtesy of Monmouth County Division of Planning.

0 0.5 1 2 Miles



Figure 4.01 Farm Preservation Status within NWS Earle MIA

D. MUNICIPAL

An important part of the information gathering portion of the JLUS was to solicit input from as many of the surrounding communities as were willing to contribute and to meet individually with the 5 Earle municipalities: - Colts Neck, Wall, Middletown, Tinton Falls and Howell.

The Community Plans and Liaison Officer for the base is regularly involved in various projects, events and functions, and meets with a number of the municipalities on a wide range of topics, from future redevelopment plans in the area, to the creation of shared services agreements for both regular maintenance and emergency services.

Some of the comments from the municipal interviews are excerpted below:

COLTS NECK TOWNSHIP

- There is generally a positive perception of Earle and it is considered an asset to the local commercial economy
- Shared volunteer fire services
- Earle base residents use Colts Neck municipal services for such things as marriage licenses and recreational sports
- High school age children of military personnel are assigned to Colts Neck High School, within the Freehold Regional High School District

- The township has begun preliminary discussions with NWS Earle regarding their interest in long term leasing of land from Earle to accommodate public works and possibly recreation on the south side of Route 18

HOWELL TOWNSHIP

- It is believed that a number of Earle employees have found off-base housing in Howell
- Howell Township is considering some form of military area zoning that would limit the Military Influence Area from potential high density housing
- Earle and the township have discussed potential cooperation on resiliency related items such as wetlands banking
- The township presently has some Mutual Aid Agreements with the base for use of facilities

MIDDLETOWN TOWNSHIP

- It is believed that a number of Earle employees have found off-base housing in Middletown
- Middletown Township is working with Earle and other partners on a BPU funded feasibility study to determine if an energy microgrid could provide additional power, particularly during future storm events, for local, county, state and Navy facilities located within the Bayshore area
- The township and base have Cooperative Service Agreements for emergency services and permission for township school buses to use Normandy Road
- The township included NWS Earle representatives in the recently completed Belford Development Plan study
- The Township of Middletown Sewerage Authority (TOMSA) provides treatment of wastewater for Earle's pier complex and ships in port
- Middletown recently completed a corridor study of the NJSH Route 36 area which includes the Earle Pier Complex

WALL TOWNSHIP

- Much of the local STRAHNET route to Earle is within Wall Township (parts of routes 195, 34 & 33)
- Most of the NJSH Route 34 corridor within Wall Township is zoned for office park and commercial uses that would seem to be compatible with the base's mission
- The 1999 Township Master Plan recognizes Earle as a self-functioning entity within the township

BOROUGH OF TINTON FALLS

- The borough has shared services agreements with Earle and emergency services have permission to use Normandy Road
- Elementary school aged children residing on the base attend Tinton Falls schools.
- The borough has obtained surplus military vehicles and equipment

- Earle land within Tinton Falls is heavily wooded and provides a sufficient buffer visually but the borough has some concerns with the current state of the wooded area and the potential for fires

OVERALL IMPRESSIONS FROM MUNICIPAL MEETINGS

1. All of the Earle municipalities seem to have a positive relationship and impression of the base and have no immediate concern with the mission of the base
2. The Route 33 & 34 Corridor should be studied from a Transportation, Land Use, Zoning and Economic Development aspect. After the meetings it was found that there was a study done some years ago (2004) of this area that needs to be reviewed
3. There are numerous access points around the perimeter of the base and numerous uses, mostly commercial, that have some impact or potential impact on the base
4. The Normandy Road corridor has issues relating to traffic and rail signalization that will need to be resolved but is an important part of the area
5. The waterfront corridor between the shoreline of Sandy Hook Bay and Route 36 needs to be studied further as one area for potential Sea Level Rise and resiliency issues that affect both NWS Earle access and usage, and the impact on the surrounding residential and commercial neighborhoods

While each community seemed to have slightly differing impressions of NWS Earle, with some towns more cognizant of the mission of the base than others, it would seem that all had a favorable impression of the base.

5. COMPATIBILITY ASSESSMENT & TOOLS

A. ECONOMICS DEVELOPMENT AND LAND USE

I. ECONOMIC EVALUATION

Retail and commercial uses are most compatible with the base and MIA. Retail uses also provide needed amenities and services for military and civilian personnel. However, the demand for retail within the surrounding municipalities has been much weaker than recent demand for residential development. With approximately 19% of Monmouth County residents aged 62 or older, residential development has increasingly shifted to senior housing.¹ Residential and institutional uses, such as schools and hospitals, are least compatible with the base and MIA, due to the concentration of residents and vulnerable populations such as children, adjacent to magazine storage and other military activities which present safety concerns.

Major employment sectors in the area surrounding NWS Earle are similar and generally in line with those prevalent throughout Monmouth County (see Table 5.01). At approximately 44%, employment in the County and in each municipality, is concentrated in management, business, science, and arts organizations. The largest employers in this sector are healthcare providers, making up nearly half of the top ten private employers in the County. Sales and office sector jobs are a secondary source of employment, making up 25% of jobs in the County.

Table 5.01: Employment by Sector

	Monmouth County	Colts Neck	Howell	Middletown	Tinton Falls	Wall
Management, business, science, arts	134,590	2,470	10,173	15,326	4,118	5,968
	43.8%	53.5%	38.4%	46.9%	49.2%	48.2%
Sales, office	78,385	1,270	7,327	8,350	2,097	2,896
	25.5%	27.5%	27.7%	25.5%	25.0%	23.4%
Service	47,847	430	4,203	4,151	1,386	1,973
	15.6%	9.3%	15.9%	12.7%	16.5%	15.9%
Natural resources, construction, maintenance	23,519	244	2,252	2,546	494	891
	7.7%	5.3%	8.5%	7.8%	5.9%	7.2%
Production, transportation, materials, moving	22,843	199	2,525	2,309	281	644
	7.4%	4.3%	9.5%	7.1%	3.4%	5.2%

Source: U.S. Census American Community Survey, 2015

The County, including the areas surrounding the base, does not have employment clusters, except for some employment activity driven by public schools, universities, and health networks like Meridian

Health. The municipalities in the County are largely bedroom communities supporting residents and families who commute to business centers across the metropolitan region. Approximately 20% of County residents report 60 minutes or more of travel time to work, consistent with commute times seen for residents in the five Earle municipalities (Table 5.02). Additionally, nearly 40% of residents in these municipalities are employed outside of the County (Table 5.03).

Table 5.02: Travel Time to Work

	Monmouth County	Colts Neck	Howell	Middletown	Tinton Falls	Wall
1 - 19 Minutes	107,521	1,330	7,666	10,739	3,343	5,533
	38%	31%	31%	35%	43%	48%
20 - 39 Minutes	83,352	1,374	8,870	7,768	2,346	3,193
	29%	32%	36%	26%	30%	28%
40 - 59 Minutes	37,817	574	3,960	3,987	820	1,112
	13%	13%	16%	13%	10%	10%
60+ Minutes	57,252	988	4,083	7,837	1,330	1,613
	20%	23%	17%	26%	17%	14%

Source: U.S. Census American Community Survey, 2015

Table 5.03: Place of Employment

	Monmouth County	Colts Neck	Howell	Middletown	Tinton Falls	Wall
Employed in Monmouth County	184,920	2,705	15,123	18,630	5,527	8,385
	61.5%	58.1%	58.6%	58.6%	67.0%	69.1%
Employed outside Monmouth County	116,047	1,950	10,669	13,177	2,717	3,743
	38.6%	41.9%	41.4%	41.4%	33.0%	30.9%

Municipal Reviews:

Each municipality surrounding the base has its own set of unique economic development challenges and strengths. The Figure 5.01 provides an overview where it is possible to see the various municipalities in relationship to the centrally located NWS Earle. What can be noticed is how, in general, the Tinton Falls and Middletown areas to the east and northeast are mostly developed at this point, how the Colts Neck area has a lower overall density but has farmlands and other uses such as golf courses, and how the lower municipalities that are around the Route 33 and 34 intersection have some open wooded lands but are experiencing development as can be seen in the area of Route 33 and Colts Neck Road.

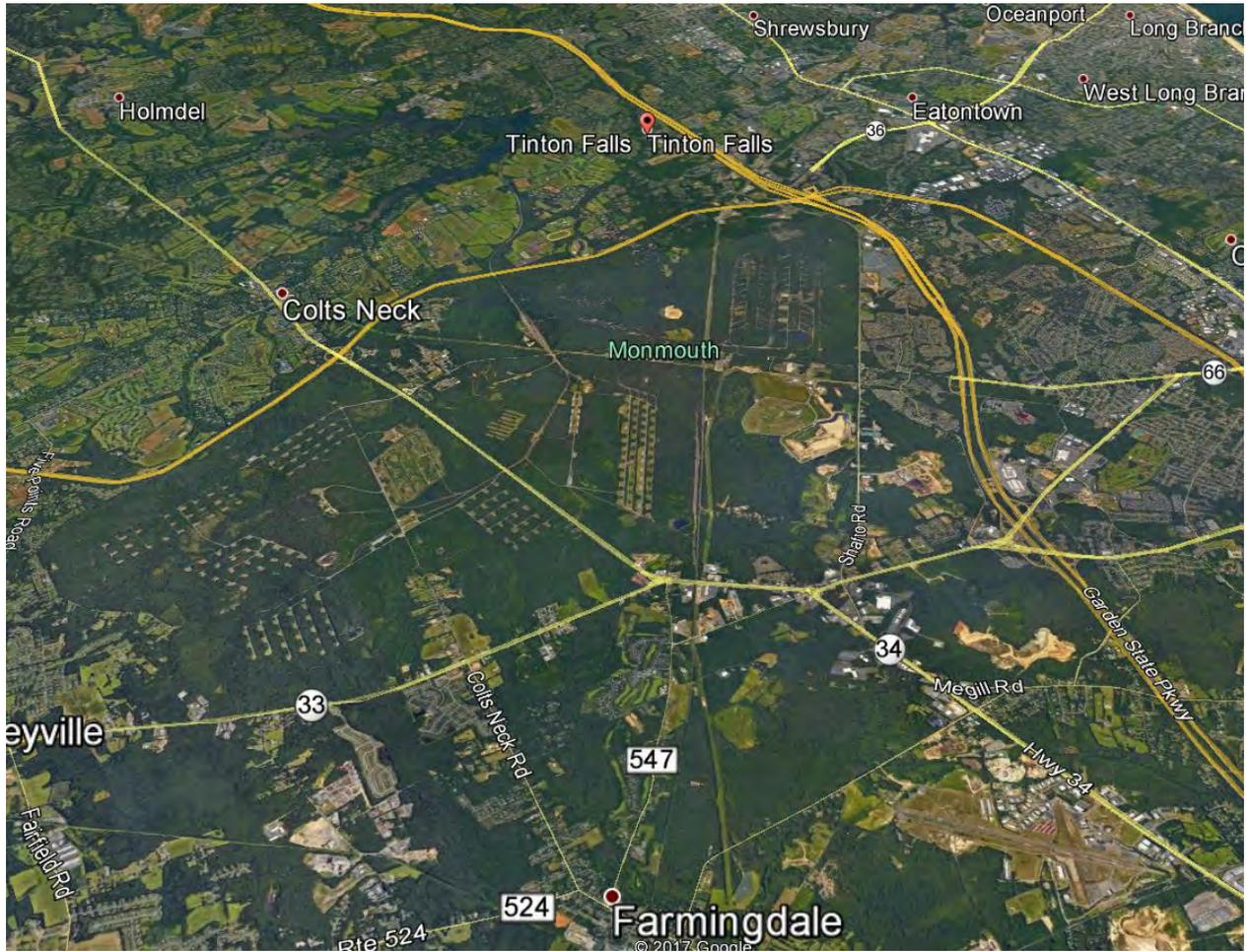


Figure 5.01 NWS Earle Aerial (Google Earth view)

The following section describes key economic development goals and priorities gathered through interviews, surveys, and one-on-one outreach with individual stakeholders from each Earle municipality. Additional information was gleaned from recent studies.

Colts Neck Township



Figure 5.02 Colts Neck Township Aerial (Google Earth view)

Colts Neck Township is a rural community located in central Monmouth County, known for large single-family homes, golf courses, equestrian facilities, as well as farmland (see Figure 5.02). The township has very limited commercial land use – approximately 4% of total land area – and 29% of the land area within the township is dedicated to farming activities.² As a result, the development and economic goals of the township are focused on this industry.

Colts Neck has created programs dedicated to growing and promoting locally-serving agricultural and farm-supportive businesses. To achieve this, Colts Neck and local business leaders have established the Colts Neck Business Association surrounding Route 18, a major corridor within the township, and the Township Committee has attempted to protect farm-supportive uses through zoning controls.

² Monmouth County Board of Taxation

Howell Township

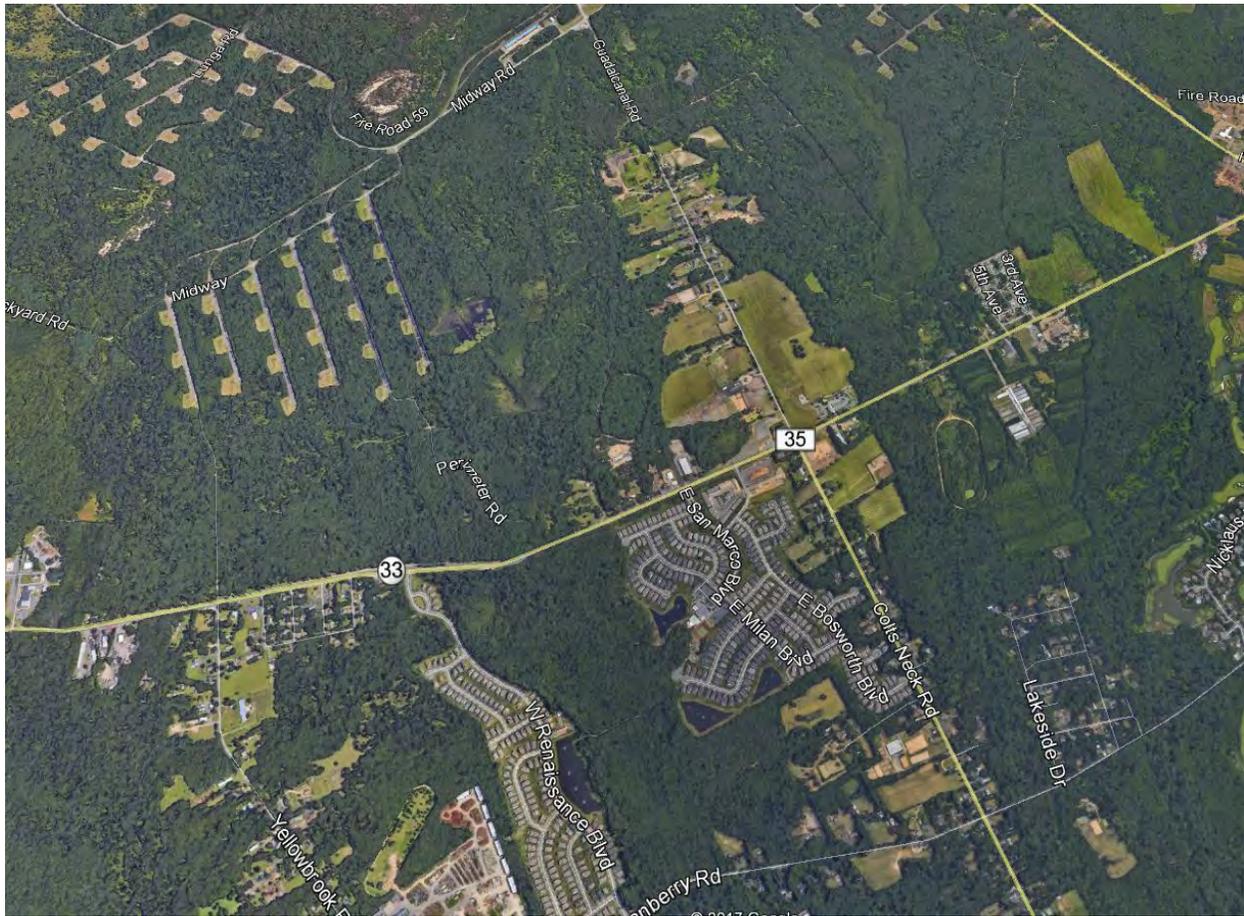


Figure 5.03 Howell Township Aerial (Google Earth view)

At 62 square miles, Howell is the largest municipality in Monmouth County, but large swaths of wetlands limit available development sites. Despite this constraint, Howell saw population and residential development growth through the 1990s and into the 2000s.³ However, commercial development has lagged and the township is focusing efforts on revitalizing key retail corridors.

Howell Township has identified Route 33, which runs along the southern end of the base and serves a NJ Transit bus route, as a key corridor for enhanced retail activity. Along with Route 34 to the east, Route 33 currently supports a variety of retail and commercial tenants, but significant stretches of the corridor are dominated by vacant land and a lack of a cohesive character (see Figure 5.03). In interviews with Township officials, this corridor was identified as an opportunity for economic growth, specifically the development of destination commercial uses.

Middletown Township

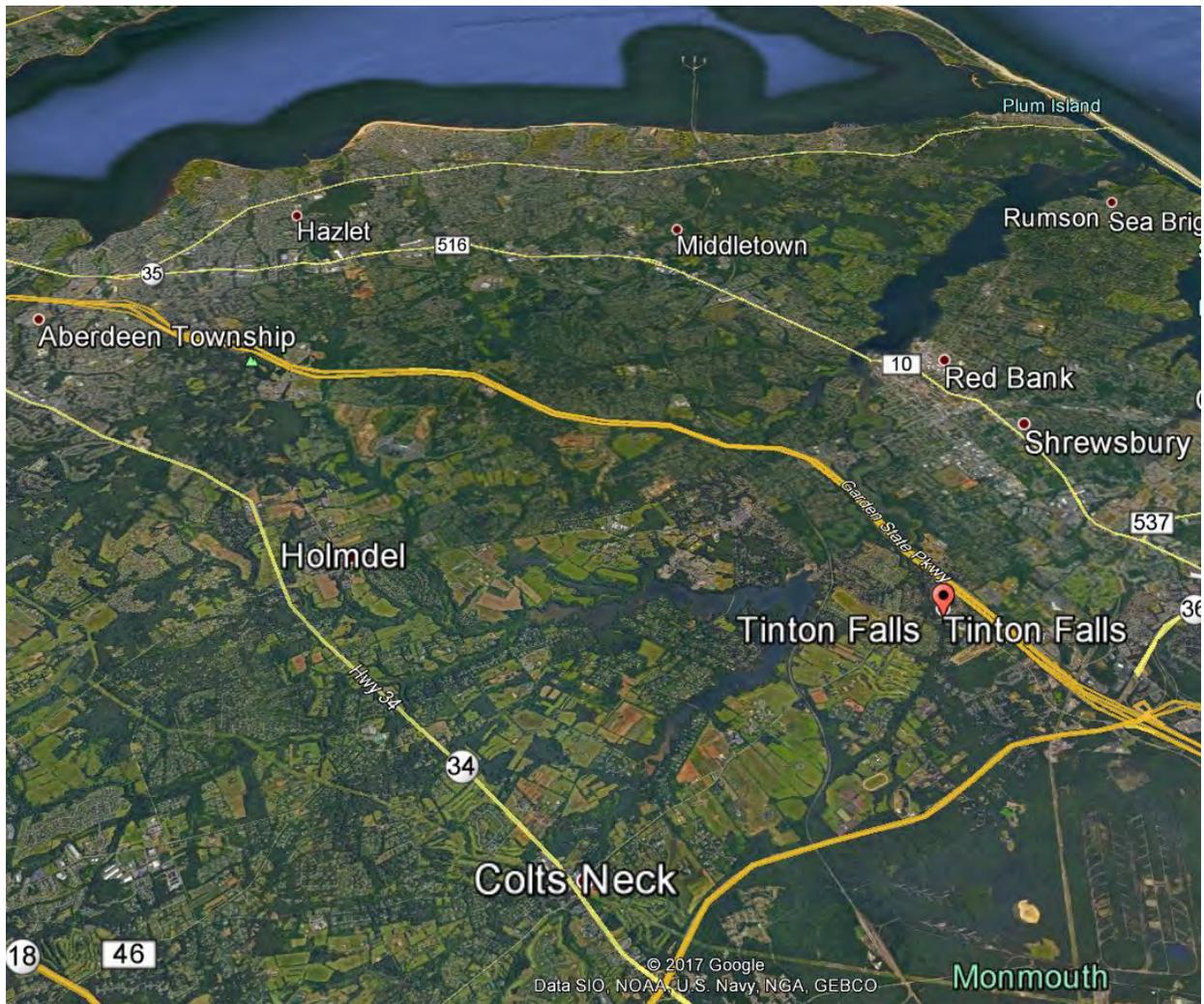


Figure 5.04 Middletown Township Aerial (Google Earth view)

Middletown is the most populous township in Monmouth County and features several unique residential neighborhoods (see Figure 5.04). Route 36 is situated within the northern portion of the township and separates the coastal communities of Port Monmouth, Belford, and Leonardo from the significant portion of the township to the southwest (Lincroft). In the wake of Hurricane Irene and Superstorm Sandy, Middletown received more than \$100 million in Federal funds for the Bayshore communities, including allocations for flood control measures, visioning studies, and other resiliency efforts focused on developing and implementing design standards and codes that mitigate the effects of flooding and sea level rise while activating the streetscape and retail corridors.⁴

As a result of these early studies, Middletown has begun focusing on a number of redevelopment sites, most notably the 450-acre Port Belford area, which has been identified as an “area in need of redevelopment,” pursuant to New Jersey Redevelopment Law (NJSA 40A:12A-1 et seq.), and was the subject of a recently completed redevelopment study. Additionally, the Route 36 Corridor Study (2017)

⁴ 2017 Monmouth County At-A-Glance; Route 36 Corridor Design Guidelines (2017?)

provided recommendations to activate the corridor through the North Middletown, Port Monmouth, Belford, and Leonardo neighborhoods through streetscape improvements, zoning changes, and other measures.

Over the last decade numerous planning and related studies have been conducted within this region of Monmouth County looking at ways to revitalize the Middletown Bayshore and surrounding area without losing its inherent character and charm. The study cited below entitled: **Bayshore Region Strategic Plan** was conducted by the Monmouth County Planning Board in 2006, prior to Sandy, but outlines many of the issues that remain today.

Section 3: Economic Development Issues and Strategies

A. Introduction

As presented in Part I, Regional Profiles, four key economic development issues have been identified to be addressed under the plan:

- *Awareness of the Bayshore Region. There is a need to raise awareness of the Bayshore's cultural and recreational amenities both within and outside of the Region in order to attract tourism. These efforts should include a strong focus on preserving the Region's maritime heritage.*

- *Route 36. This roadway, which connects the Bayshore as the central spine of the region's economy, is in need of aesthetic and economic improvement. With a cohesive development strategy, Route 36 can become an economic driver for the Region.*

- *Downtown Centers. The Region's downtown areas are undertaking ongoing revitalization efforts that offer opportunities for economic development.*

- *Potential Revitalization and Redevelopment Opportunities. There are a number of large vacant and underutilized sites throughout the Bayshore Region that are in need of reuse or redevelopment.*

For each of these plan elements, issues, management strategies and implementation strategies were presented.

In the aftermath of the storm the Township of Middletown conducted the **Route 36 Corridor Study** as part of the Post Sandy Planning Grants program funded by FEMA. It looked at the Route 36 corridor as a vital link through this area as it was designated as the primary Emergency Evacuation Route in this part of the county. The corridor study, completed on April 28, 2017, was intended to expand upon recommendations made by the Bayshore Region Strategic Plan, and was an attempt to create Design Standards for both the Public Rights of Way and for each of the identified Centers, that could spur Economic Development while making the corridor more sustainable. Further review of the design standards with possible adoption by the Township and recommendations for funding of the improvements provide an ongoing effort.

Borough of Tinton Falls



Figure 5.05 Tinton Falls Borough Aerial (Google Earth view)

Although there is limited developable land in the borough (see Figure 5.05), the redevelopment of the decommissioned Army installation at Fort Monmouth dominates much of the activity in Tinton Falls. Between 2012 and 2016, the Fort Monmouth Economic Redevelopment Authority (FMERA) acquired over 1,000 acres of the former Army installation and has begun redevelopment of the properties with a focus on office stock.⁵

As previously noted, Commvault, a global data and information software company, established its corporate headquarters in 2013 at a 55-acre site in Fort Monmouth and employs over 850 employees.⁶ With nearly 200 additional acres of the Fort within Tinton Falls⁷, there is substantial opportunity for additional redevelopment and economic activity at Fort Monmouth, as well as provisions for recreation. The proximity of many state and county roads increases the marketability of this area for redevelopment.

⁵ 2017 Monmouth County At-A-Glance; fortmonmouthnj.com

⁶ 2017 Monmouth County At-A-Glance; Monmouth County Division of Economic Development

⁷ Redevelopment Study for the Former Fort Monmouth Properties in the Borough of Tinton Falls, New Jersey

Wall Township



Figure 5.06 Wall Township Aerial (Google Earth view)

Wall Township has easy highway access and connectivity to major cities, including New York City and Philadelphia, as well as key destinations in New Jersey, including Trenton and the Belmar beach. In recent decades, highway access has positioned Wall as an employment center of the County (see Figure 5.06). This has been most apparent along Route 34, which supports a cluster of office parks, including multiple office developments that were built in the early to mid-2000s.

Route 34 supports some of the County's primary job centers, including New Jersey Natural Gas (NJNG), the principal subsidiary of New Jersey Resources, (1,020 employees) -- the County's sixth biggest private employer.⁸ NJNG's Headquarters is located at the northern edge of Route 34 in Wall and provides an anchor to the commercial and office uses along the corridor. This corridor is integral to the economic strength of the township and the focus of future development. On August 23, 2017 The Wall Township Committee passed Resolution 17-0812 authorizing the Township Planning Board to study the Route 33/34 corridor to determine if it would qualify as an "Area in Need of Redevelopment", pursuant to New Jersey Redevelopment Law. The township expressed interested in considering uses that are compatible with Earle's mission as they look at the future of this corridor.

⁸Monmouth County Division of Economic Development, Monmouth County's 2016 Top Ten Employers, <https://co.monmouth.nj.us/page.aspx?ID=1540>

II. ZONING AND DEVELOPMENT

The chart below provides a breakdown of the 5 Earle Municipalities (Colts Neck, Howell, Middletown, Tinton Falls, and Wall) with information about how many acres of land lay within the 3,000 ft. zone around the base, and the 2 mile MIA boundary. A review of the Zoning for each of the 5 Earle Municipalities shows how each community is arranged and what the present residential Zoning Districts are under current approved municipal planning documents (Master Plan, Zoning Map, etc.).

Table 5.04 Land Use Summary by Jurisdiction

NWS Earle JLUS - Land Use Summary by Jurisdiction (acres)						
	Colts Neck	Howell	Middletown	Tinton Falls	Wall	Total All Jurisdictions Adjacent to NWS Earle
Land area in the Municipality	20,322	39,149	27,865	9,989	20,288	117,613
Land area within MIA	9,046	8,531	7,634	6,817	1,883	33,910
Land area within 3,000 ft of base boundary	4,161	2,570	6,505	2,602	567	16,405
Land zoned residential within MIA	8,591	6,389	6,673	3,461	582	25,696
Land zoned single-family residential within 3,000 ft of base boundary	3,961	1,842	5,530	1,310	94	12,738
Land zoned multi-family residential within 3,000 ft of base boundary	9.3	16.8	266.6	20.1	17	330
Vacant land zoned residential within MIA						
Vacant land zoned residential within 3,000 ft of base boundary						

General Observations from the information generated in the above chart would be:

1. The majority of the land area within the 3,000 ft. base boundary notification area, 16,405 acres is zoned for single-family residential, 12,738 acres, or roughly 78% of all of the land area surrounding the base. This includes land zoned for agricultural use and large lot residential, which can be compatible with the Earle mission.
2. Some municipalities, such as Colts Neck (95%) and Middletown (85%) are overwhelmingly zoned for residential uses around NWS Earle.
3. The anomaly is Wall Township which has only 16% of the municipalities' area in the 3,000 ft. base boundary zoned for single – family residential with most of the remaining area in Commercial and Office zoning. Tinton Falls has a large area of Conserved land and Industrially zoned lands within the 3,000 ft. Base Boundary area, which include wetlands, parklands and County facilities.
4. Fortunately, most of the towns have limited land areas zoned for multi-family residential within the 3,000 ft. base boundary area. Higher density housing is not a use considered compatible with the mission of a weapons station.
 - a. Middletown has the largest area zoned for multi-family residential at 266.6 acres within a 6,505 acre base boundary area along the Normandy Road corridor, but this area is only 4% of the total area within Middletown. Some investigation should be conducted to see how much of this area has already been developed, and with what level of density. A visual review from aerials indicates that most, if not all of the land in this area has been developed, some with higher density housing.
 - b. Most of the other towns with lands within the 3,000 ft. base boundary area have minimal areas zoned for multi-family adjacent to NWS Earle (Colts Neck: 9.3 of 4,161 ac. or 0.25%,

Howell: 16.8 of 2,570 ac. or 0.65% , Tinton Falls 20.1 of 2,602 ac. or 0.70%, and Wall 17 of 567 ac. or 3.0%).

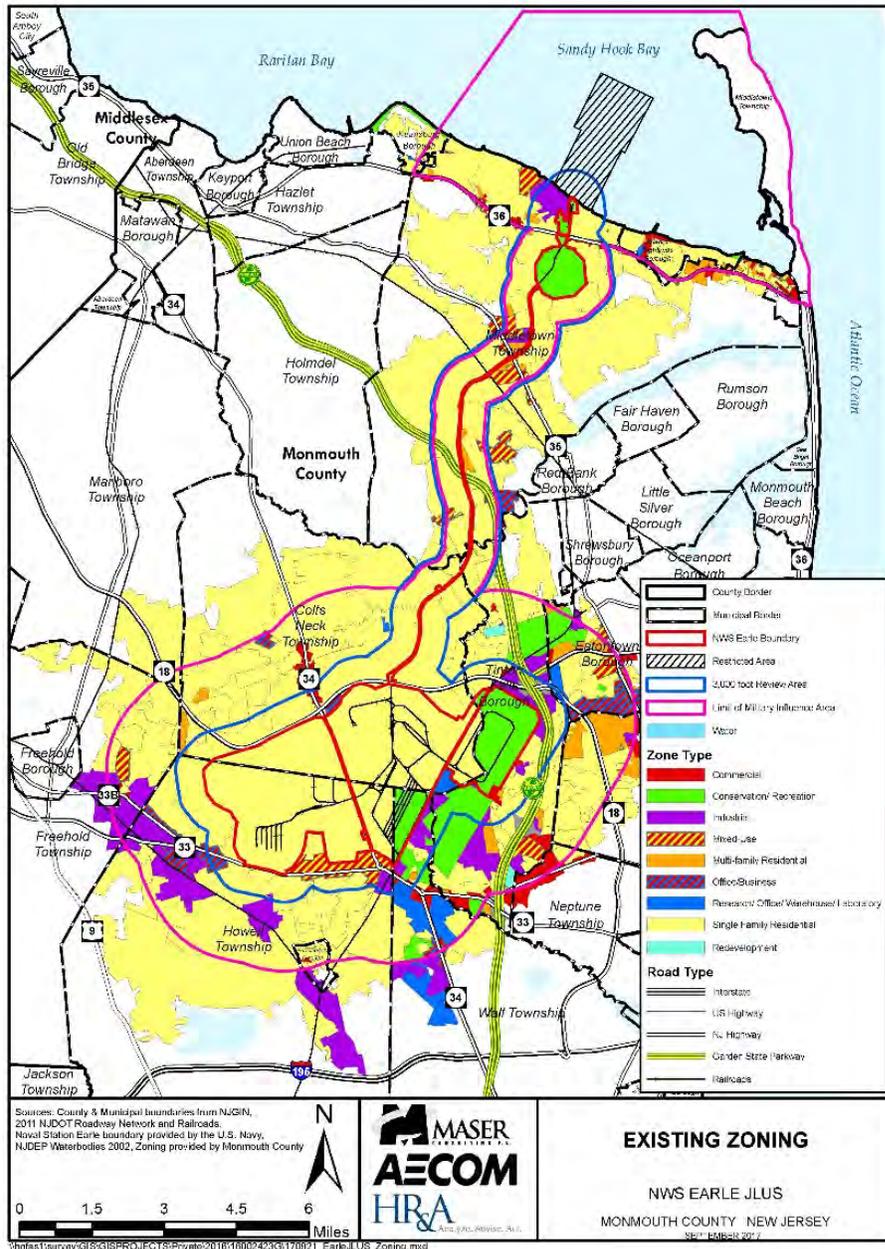


Figure 5.07 Existing Zoning in NWS Earle Planning Area

One of the stated goals of this JLUS is to work with the surrounding communities to develop land usage that is compatible with the mission of the base. As previously noted some of the surrounding areas are developed at this point, in particular Middletown and Tinton Falls, while some of the other towns are only now experiencing development pressure around NWS Earle, such as Howell and Colts Neck. Wall Township, with the Route 34 and 33 corridors, is at a point where portions of these areas are being considered for redevelopment.

The next steps would be to work with the municipalities to identify what directions and needs could be addressed with the help of the resources available to NWS Earle. The desire to work on the Route 36 Corridor by Middletown, and the Route 33/ 34 Corridor in both Howell and Wall, is a clear indication of direction. As these planning studies are developed, it will potentially be possible to identify more compatible uses and zoning for the areas immediately adjacent and within the 3,000 ft. Base Boundary areas.

III. LAND USE COMPATIBILITY

Local government officials, citizens and military leaders need to have a greater understanding of each other's issues, future needs, and current planning processes to assess how planning decisions on the part of the military or local government may impact one another. Throughout New Jersey, a 'Home Rule' state, local governments have land use and zoning authority. Municipalities have established processes and requirements that are intended to ensure the protection of the public's safety and well-being. A number of tools currently exist or could be developed that could assist local governments in the pursuit of compatible land use planning and the minimization of impacts on citizens. Existing tools available at the Federal, state, and local levels were discussed in Chapter 4. This section describes additional land use tools that, at the local level, could be used to further military-community compatibility around NWS Earle.

Comprehensive Plans

The NJ Municipal Land Use Law (N.J.S.A. 40:55 D-1 et seq.) requires each municipality to reexamine its Master Plan and development regulations at least every 10 years, with many municipalities conducting periodic reexaminations in the intervening years. Specifically, N.J.S.A. 40:55D-89 states:

"The governing body shall, at least every ten years, provide for a general reexamination of its Master Plan and development regulations by the Planning Board, which shall prepare and adopt by resolution a report on the findings of such reexamination, a copy of which report and resolution shall be sent to the County Planning Board. A notice that the report and resolution have been prepared shall be sent to the municipal clerk of each adjoining municipality, who may, on behalf of the governing body of the municipality, request a copy of the report and resolution. A reexamination shall be completed at least once every 10 years from the previous reexamination."

Addressing the requirements of N.J.S.A. 40:55D-89 should including a review of the following:

- A. The major problems and objectives relating to land development in the municipality at the time of the adoption of the last examination report.
- B. The extent to which such problems and objectives have been reduced or have increased.
- C. The extent to which there have been significant changes in the assumptions, policies and objectives forming the basis for the master plan or development regulations as last revised, with particular regard to the density and distribution of population and land uses, housing conditions, circulation, conservation of natural resources, energy conservation, collection, disposition and recycling of designated recyclable materials, and changes in State, County and municipal policies and objectives.
- D. The specific changes recommended for the Master Plan or development regulations, if any, including underlying objectives, policies and standards, or whether a new plan or regulations should be prepared.

- E. The recommendations of the Planning Board concerning the incorporation of redevelopment plans adopted pursuant to the “Local Redevelopment and Housing Law”, P.L. 1992, c.79 (C.40A:12A-1 et al.) into the land use plan element of the municipal Master Plan, and recommended changes, if any, in the local development regulations necessary to effectuate the redevelopment plans of the municipality.

It would seem that the ongoing discussions about the relationship of NWS Earle to the surrounding communities could be considered among “... significant changes in the assumptions” of most municipal master plans, therefore this relationship should be open to evaluation within the Planning Process.

Zoning and Overlay Districts

Overlay zoning is a regulatory tool municipalities can use as part of their zoning ordinance that creates a special zoning district on top of an existing base zone(s) and includes special provisions in addition to those in the underlying base zone. The boundaries of an overlay district can mirror the base zoning or cut across multiple base zone boundaries. The overlay zone district has a special purpose and has attached regulations and requirements. A military overlay zone would allow a municipality to make certain modifications to existing zones to be more compatible with the base, without the need to create entirely new zones.

In many JLUS communities, overlay districts have been established around military installations to further regulate development standards and specify limitations on use, height, density and intensity of development with the intent of protecting the people who live and work within the vicinity of the military operations. For NWS Earle, the main intent of an overlay zone would be to control the density and type of development in proximity to the base boundaries where munitions are stored, transported, handled, and tested. Since New Jersey has already established a 3,000 ft. buffer around military installations in the state for plan and development notifications (see Section 4.B.1.), using this same buffer area may make sense for a potential military overlay zone for the municipalities in close proximity to the base. This overlay zone option could, therefore, apply to the NWS Earle municipalities of Colts Neck, Howell, Middletown, Tinton Falls, and Wall and could be implemented by each municipality separately as part of their standard public planning and zoning process. It could also be considered by the MIA municipalities for potential implementation.

DoD has published a compatibility guide for land uses around military airfields that has been used in JLUS efforts for military installations with aviation operations. However, DoD has not created this type of land use compatibility guide for weapons or munitions installations. Therefore, as part of this JLUS, a land use compatibility guide was developed by the NWS Earle JLUS consultant team for future implementation purposes. It notes uses as identified by North American Industry Classification System (NAICS). The NAICS is used to categorize land uses for planning and other land use purposes within both the public and private sectors on a nationwide level. It was specifically referenced as part of the zoning ordinance for Wall Township and is, therefore, directly applicable to the NWS Earle area. This table specifies compatibility with NWS Earle operations for non-residential land uses within the 3,000 ft. buffer area surrounding the installation (including Mainside, the Waterfront area, the Pier Complex, and the Normandy Road corridor). Residential land uses are addressed in separate tables for each municipality.

Table 5.05 NWS Earle Land Use Compatibility (NAICS Codes)

Municipal Land Use		
NAICS Code*	Use	
11	Agriculture, Forestry, Fishing, and Hunting	More Compatible
21	Mining	More Compatible
22	Utilities	More Compatible
23	Construction	More Compatible
31-33	Manufacturing	More Compatible
42	Wholesale Trade	More Compatible
44-45	Retail Trade	More Compatible
48-49	Transportation and Warehousing	More Compatible
51-52	Information	More Compatible
52	Finance and Insurance	More Compatible
53	Real Estate Rental and Leasing	More Compatible
54	Professional, Scientific, and Technical Services	More Compatible
55	Management of Companies and Enterprises	More Compatible
56	Admin and Support and Waste Mgt. and Remediation Services	More Compatible
61	Education Services	Conditionally Compatible**
611110	Elementary and Secondary Schools	Less Compatible
611210	Junior Colleges	Less Compatible
611310	Colleges, Universities, and Professional Schools	Less Compatible
62	Health Care and Social Assistance	Conditionally Compatible**
622110	General Medical and Surgical Hospitals	Less Compatible
623110	Nursing Care Facilities	Less Compatible
623311	Continuing Care Retirement Communities	Less Compatible
623312	Assisted Living Facilities for the Elderly	Less Compatible

623990	Other Residential Care Facilities	Less Compatible
624221	Temporary Shelters	Less Compatible
624410	Child Day-Care Services	Less Compatible
71	Arts, Entertainment, and Recreation	Conditionally Compatible**
713110	Amusement and Theme Parks	Less Compatible
713210	Casinos	Less Compatible
72	Accommodation and Food Services	Conditionally Compatible**
721110	Hotels and Motels	Less Compatible
721120	Casino Hotels	Less Compatible
721191	Bed-and-Breakfast Inns	Less Compatible
721211	RV Parks and Campgrounds	Less Compatible
81	Other Services (except Public Administration)	More Compatible
92	Public Administration	Conditionally Compatible**
922140	Correctional Institutions	Less Compatible

Notes:

** North American Industry Classification System (NAICS)*

*** Land uses noted as Conditionally Compatible are generally compatible except for the sub-categories indicated with six digit land use codes*

**Zones may allow uses that are less compatible; permit applications should be reviewed on a case-by-case basis to determine compatibility*

The main types of development deemed less compatible adjacent to NWS Earle are: multi-family housing; institutional uses such as schools and hospitals; residential uses that serve vulnerable populations (such as assisted living facilities); and land uses involving large congregations of people for long periods of time (hotels, amusement parks, casinos, etc.). In implementing an overlay zone, these types of uses within the 3,000 ft. buffer should at least be reviewed on a case-by-case basis for approval or not allowed. More compatible uses should be encouraged, while less compatible development should be directed to areas outside of the most susceptible buffer range to alleviate potential safety issues associated with munitions operations. Existing land uses would be 'grandfathered' within this 3,000 ft. buffer area with the intent of the restrictions oriented towards vacant land not yet developed or future redevelopment.

A review of the municipal zoning ordinances for the five Earle municipalities resulted in the preparation of municipal tables identifying the compatibility of specific zones and if these zones are present within the 3,000 ft. buffer area for each municipality (see Table 5.06). Further research could identify specifically which parcels are zoned for less compatible land uses, as well as details on the parcels' ownership, current use, value, etc. as part of the review process involved with implementation. In addition, developing a military overlay zone at the municipal level would require legal review and input to ensure compatibility with each municipality's land use authority as allowed by state and local statute.

Note that some of the NAICS land uses identified as Less Compatible in Table 5.05 are allowed in certain municipal zones (for example, hotels or motels in Commercial zones). These zones are identified as Conditionally Compatible in the municipal tables below. Applications for uses in these zones within 3,000 ft. of the installation boundaries should be reviewed on a case-by-case basis to determine compatibility with NWS Earle operations.

Table 5.06 Municipal Land Use Compatibility

Colts Neck Township Municipal Zoning Districts			Within 3000 ft of NWS Earle
Zone	Zoning Designation		
A-1	Agricultural Residential	More Compatible	x
A-2	Agricultural Residential	More Compatible	
A-3	Village Residential	More Compatible	x
A-4	Mixed Housing	Less Compatible	x
A-5	Rural Residential	More Compatible	
A-6	Residential	More Compatible	x
AG	Agricultural	More Compatible	x
B-1	Commercial	Conditionally Compatible*	x
B-1A	Commercial	Conditionally Compatible*	x
B-2	Commercial	Conditionally Compatible*	
B-3	Commercial	Conditionally Compatible*	
D	Research/Office/Warehouse/Laboratory	More Compatible	
D-1	Research/Office/Warehouse/Laboratory	More Compatible	
MP	Office-Business	More Compatible	x

**Zones may allow uses that are less compatible; permit applications should be reviewed on a case-by-case basis to determine compatibility*

Howell Township Municipal Zoning Districts			Within 3000 ft
Zone	Zoning Designation		of NWS Earle
ARE-1	Agricultural Rural Estate 1	More Compatible	
ARE-2	Agricultural Rural Estate 2	More Compatible	x
ARE-3	Agricultural Rural Estate 3	More Compatible	x
ARE-4	Agricultural Rural Estate 4	More Compatible	x
ARE-6	Agricultural Rural Estate 6	More Compatible	x
ARE-C	Agricultural Rural Estate/Natural Resource Protection Zone	More Compatible	
ARE-NRW	Agricultural Rural Estate/Natural Resource Wilderness Zone	More Compatible	
HC	Highway Commercial Zone	Conditionally Compatible*	
HD-1	Highway Development Zone 1	Conditionally Compatible*	
HD-2	Highway Development Zone 2	Conditionally Compatible*	x
HD-3	Highway Development Zone 3	Conditionally Compatible*	x
LC/OS	Land Conservation/Open Space	More Compatible	
MHP	Mobile Home Park Residential	Less Compatible	
ML7	Moderate and Low Income Housing	Less Compatible	
ML8	Moderate and Low Income Housing	Less Compatible	
NC	Neighborhood Commercial	Conditionally Compatible*	
PMU	Planned Mixed Use District	Less Compatible	
PRC	Planned Retirement Community	Less Compatible	x
R-2	Residential 2	More	

		Compatible	
R-3	Residential 3	More Compatible	x
R-4	Residential 4	Less Compatible	
R-5	Residential 5	Less Compatible	
R-6	Environmentally Sensitive Low Density Residential 6	More Compatible	
R-50	Residential 50	Less Compatible	
RAC	Residential Adult Community	Less Compatible	
RMLD	Reserved Mount Laurel District	Less Compatible	x
RMLD-2	Reserved Mount Laurel District 2	Less Compatible	
RRC	Recreational-Residential Community	More Compatible	x
SED	Special Economic Development	More Compatible	x

**Zones may allow uses that are less compatible; permit applications should be reviewed on a case-by-case basis to determine compatibility*

Middletown Township Municipal Zoning Districts			Within 3000 ft
Zone	Zoning Designation		of NWS Earle
R-220	Rural Estate Residence Zone	More Compatible	x
R-130	Rural Estate Residence Zone	More Compatible	
R-110	Rural Estate Residence Zone	More Compatible	x
R-90	Low Density, Single-Family Residence Zone	More Compatible	
RR	Rural Residential Zone	More Compatible	
R-45	Low Density, Single-Family Residence Zone	More Compatible	x
R-45A	Medium/Low Density, Single-Family Residence Zone	More Compatible	x
R-30	Medium Density, Single-Family Residence Zone	More Compatible	x
R-22	Medium Density, Single-Family Residence Zone	More Compatible	x
R-22A	Medium Density, Single-Family Residence Zone	More Compatible	x
R-15	Medium Density, Single-Family Residence Zone	More Compatible	x
R-10	Medium Density, Single-Family Residence Zone	More Compatible	x
RTF	Two-Family Residence Zone	More Compatible	x
R-7	High Density, Single-Family Residence Zone	More Compatible	x
R-5	High Density, Single-Family Residence Zone	More Compatible	
R-O	Residence and Office Zone	Conditionally Compatible*	x
B-1	Business Zone	Conditionally	x

				Compatible*	
B-1A	Business Zone			Conditionally Compatible*	x
B-2	Business Zone			Conditionally Compatible*	x
B-3	Business Zone			Conditionally Compatible*	x
B/P	Business/Park Zone			Conditionally Compatible*	x
M-1	Light Industrial Zone			Conditionally Compatible*	x
MC	Marine Commercial Zone			Conditionally Compatible*	
PRH	Public Recreation and Housing Zone			Conditionally Compatible*	
R-1	Planned Adult Community Zone			Less Compatible	x
R-2	Planned Adult Community Zone			Less Compatible	x
RTH	Multifamily Zone	Townhouse	Residential	Less Compatible	x
RTH-1	Multifamily Zone	Townhouse	Residential	Less Compatible	
RTH-2	Multifamily Zone	Townhouse	Residential	Less Compatible	
RTH-3	Multifamily Zone	Townhouse	Residential	Less Compatible	
RGA	Multifamily Residential Zone	Garden	Apartment	Less Compatible	x
RGA-1	Multifamily Residential Zone	Garden	Apartment	Less Compatible	x
RGA-2	Multifamily Residential Zone	Garden	Apartment	Less Compatible	
RGA-3	Multifamily Residential Zone	Garden	Apartment	Less Compatible	
RGA-4	Multifamily Residential Zone	Garden	Apartment	Less Compatible	
RHA	Multifamily	Mid-Rise	Apartment	Less Compatible	

	Residential Zone				
RHA-1	Multifamily Residential Zone	Mid-Rise	Apartment	Less Compatible	x
OR	Office Research Zone			Conditionally Compatible*	
OR-1	Office Research Zone			Conditionally Compatible*	
OR-2	Office Research Zone			Conditionally Compatible*	
OR-3	Office Research Zone			Conditionally Compatible*	
PD	Planned Development Zone			Conditionally Compatible*	x
FL	Federal Land Zone			More Compatible	
FH	Areas of Special Flood Hazard			More Compatible	
RTH-4	Multifamily Zone	Townhouse	Residential	Less Compatible	
RTH-5	Multifamily Zone	Townhouse	Residential	Less Compatible	
RTH-6	Multifamily Zone	Townhouse	Residential	Less Compatible	
RTH-7	Multifamily Zone	Townhouse	Residential	Less Compatible	
RTH-8	Multifamily Zone	Townhouse	Residential	Less Compatible	
RTH-9	Multifamily Zone	Townhouse	Residential	Less Compatible	
R-3	Age-Restricted Active Adult Zone			Less Compatible	
RMF-1	Residential Multifamily Zone			Less Compatible	
RMF-2	Residential Multifamily Zone			Less Compatible	
RMF-3	Residential Multifamily Zone			Less Compatible	
RMF-4	Residential Multifamily Zone			Less Compatible	
RMF-5	Residential Multifamily Zone			Less Compatible	

**Zones may allow uses that are less compatible; permit applications should be reviewed on a case-by-case basis to determine compatibility*

Borough of Tinton Falls Municipal Zoning Districts			Within 3000 ft of NWS Earle
Zone	Zoning Designation		
RA	Rural Residential	More Compatible	x
R-1	Single Family Residential	More Compatible	x
R-2	Single Family Residential	More Compatible	x
R-3	Residential	More Compatible	x
R-3-I	R-3 Residential Inclusionary	More Compatible	x
R-4	Residential	More Compatible	x
R-4-I	R-4 Residential Inclusionary	More Compatible	x
AR	Age Restricted	Less Compatible	x
CCRC/AH	Continuing Care Retirement Community	Less Compatible	
AH	Affordable Housing	Less Compatible	x
AARZ	Active Adult Redevelopment Zone	Less Compatible	
NC	Neighborhood Commercial	Conditionally Compatible*	x
HCC	Highway/Community Commercial	Conditionally Compatible*	
IOP	Industrial Office Park	Conditionally Compatible*	x
MFG	Manufacturing	Conditionally Compatible*	
MFG2	Manufacturing 2	Conditionally Compatible*	x
RET	Large Scale Planned Retail	Conditionally	

		Compatible*	
OS/GU	Open Space/Government Use	More Compatible	x
-	Route 66 Redevelopment Area	More Compatible	
TR	Transportation Corridor	More Compatible	

**Zones may allow uses that are less compatible; permit applications should be reviewed on a case-by-case basis to determine compatibility*

Wall Township Municipal Zoning Districts			Within 3000 ft	
Zone	Zoning Designation		of Earle	NWS
Wall Township				
R-5	Single-Family Residential	More Compatible		
R-7.5	Single-Family Residential	More Compatible		
R-10	Single-Family Residential	More Compatible		
R-15	Single-Family Residential	More Compatible		
R-20	Single-Family Residential	More Compatible		
R-25	Single-Family Residential	More Compatible		
R-30	Single-Family Residential	More Compatible		x
R-40	Single-Family Residential	More Compatible		
R-60	Single-Family Residential	More Compatible		x
RR	Rural Residential	More Compatible		
RR-5	Rural Residential Five-Acre (minimum lot size five acres)	More Compatible		
RR-6	Rural Residential (minimum lot size six acres)	More Compatible		
HD-8	Multifamily Residential	Less Compatible		
HD-12	Multifamily Residential	Less Compatible		
MH	Manufactured Housing	Less Compatible		
MHP	Mobile Home Park	Less		

		Compatible	
ML-25	Moderate/Low Income — 25	Less Compatible	
ML-3	Mount Laurel — 3	Less Compatible	
ML-6	Moderate/Low Income — Multifamily 6	Less Compatible	
ML-7	Moderate/Low Income — Multifamily 7	Less Compatible	x
ML-8B	Senior Citizen and Townhouse (eight DU/Acre)	Less Compatible	
MLC-3	Multifamily (three DU/acre)	Less Compatible	
MLC-7	Multifamily (seven DU/acre)	Less Compatible	
MLC-8	Multifamily (eight DU/acre)	Less Compatible	
MLC-8A	Mount Laurel Compliance — Multifamily	Less Compatible	
ML-8A	Multifamily (eight DU/acre)	Less Compatible	
ML-12	Moderate Low Income Multifamily (12 DU/acre)	Less Compatible	
ML-12A	Mount Laurel Contribution	Less Compatible	
MLCC	Mount Laurel Congregate Care (14 DU/acre)	Less Compatible	
MLC-RAC	Mount Laurel Compliance Residential Adult Community	Less Compatible	
MLC-RAC-2	Mount Laurel Compliance Residential Adult Community — 2	Less Compatible	
MLC-3.4	Mount Laurel Compliance	Less Compatible	
NB	Neighborhood Business	Conditionally Compatible*	
HB-20	Highway Business	Conditionally Compatible*	

HB-40	Highway Business	Conditionally Compatible*	x
HB-80	Highway Business	Conditionally Compatible*	
HB-120	Highway Business	Conditionally Compatible*	x
HB-200	Highway Business	Conditionally Compatible*	
CR-10	Commercial Recreation	Conditionally Compatible*	
CR-40	Commercial Recreation	Conditionally Compatible*	
OR-2	Office Research	Conditionally Compatible*	
OR-5	Office Research	Conditionally Compatible*	
OR-10	Office Research	Conditionally Compatible*	x
OP-2	Office Park	Conditionally Compatible*	
OP-10	Office Park	Conditionally Compatible*	
GI-2	General Industrial	Conditionally Compatible*	
GI-5	General Industrial	Conditionally Compatible*	
GI-10	General Industrial	Conditionally Compatible*	x
A-I	Airport Industrial	Conditionally Compatible*	
POS	Public Open Space	Conditionally Compatible*	x
OB-20	Office Business	Conditionally Compatible*	
OB-40	Office Business	Conditionally Compatible*	

**Zones may allow uses that are less compatible; permit applications should be reviewed on a case-by-case basis to determine compatibility*

Land Conservation

Land conservation refers to a series of tools designed to eliminate land use incompatibilities through voluntary transactions in the real estate market and local development process. These strategies are particularly effective because they advance the complementary goals of shifting future growth away from the base and its impacts, while protecting the environment and wildlife habitat, maintaining agriculture, and conserving open spaces and rural character.

The Readiness and Environmental Protection Initiative (REPI) is available at Federal level for encouraging land conservation around military sites (described in Chapter 4). This program grants the military the ability to enter into agreements with eligible entities, such as local governments, non-governmental organizations, and willing land owners to secure conservation easements on property in the vicinity of, or ecologically related to, a military installation or military airspace. REPI applications have been made in the past by Monmouth County, and the County should continue to pursue this program to seek funding for future potential land conservation designations.

Local governments can participate in the conservation process by acting as direct cost-sharing partners with the military in conservation easement purchases or by aligning their infrastructure and land use policy to reinforce a rural/agricultural character of areas around military installations. Monmouth County's Farmland Preservation and Parks and Open Space programs have a history of preserving land or acquiring conservation easements and should continue preservation efforts around NWS Earle, where feasible. Preserving additional farmland and parkland within the MIA or 3,000 ft. buffer area is compatible with military operations at NWS Earle.

Other Methods

Localities can also consider the Transfer Development Rights (TDR) or Purchase Development Rights (PDR) programs. In its simplest form, a TDR program encourages reduction or elimination of development in areas a community desires to preserve (sending areas – in this case, within 3,000 ft. around NWS Earle) and an increase in development in areas it wishes to grow (receiving areas – in this case, areas outside the 3,000 ft. buffer). Once a locality establishes a TDR or PDR ordinance, land owners can choose to participate in the program or not. If they participate, sending areas are rezoned to a lower density and the owners enter into a deed restriction that spells out the amount of land development that can occur on the property. Once recorded, the sending site owner is able to sell a commodity created by the community's TDR ordinance – a transferable development right. Similarly, in receiving areas, developers can elect to use the TDR option or not. They can develop per the base zoning code, or can elect to use the TDR option where they must buy a specified number of TDRs in order to achieve a higher, more intense level of development.

In a PDR program the property owners are given the option of recording a deed restriction on their properties ensuring permanent preservation, while retaining ownership. In return, the property owners are allowed to sell the development rights severed from the sites. Unlike TDR, the purchase of the development rights is made with public dollars which could come from bond proceeds, grants, special taxes or general funds. The New Jersey and Monmouth County Farmland Preservation programs operate in this way.

Both programs can be difficult to implement and require oversight and administration but remain as options with the potential to reduce density within the 3,000 foot buffer area around NWS Earle.

B. TRANSPORTATION

Transportation by roadway, rail and sea all play a vital role in the success of the NWS Earle mission. Within the mission of the Base, to provide munitions to the Navy Fleet, each means of transportation is used in some form and each has its own set of issues.

Monmouth County has multiple modes of transportation to provide Monmouth County residents with links to both the New York City and Philadelphia metro regions. Twenty-seven miles of the Garden State Parkway traverse the eastern portion of the County, connecting with Atlantic City to the south, and Newark and New York City to the north. Seventeen miles of Interstate 195 run east/west through the southern portion of the County, providing connections to the New Jersey Turnpike, Mercer County, Pennsylvania, and the Atlantic coastline. In addition, there are approximately 233 miles of state roads and 381 miles of county roads.

I. LAND MOBILITY

1. STRATEGIC HIGHWAY NETWORK (STRAHNET)

Throughout the years the Navy has used differing methods of delivering ordinance but in 2017 the ordinance is delivered to the Base by trucks on overland routes. The designated routes are referred to as part of the nationwide Strategic Highway Network (STRAHNET) that are defined as roads that provide “defense access, continuity, and emergency capabilities for movements of personnel and equipment in both peace and war.”

In the case of NWS Earle, the defined route is along the Route 195 corridor to the STRAHNET connector of NJSH Route 34 north (see Figure 5.07). This section of roadway merges with Route 33 for a mile within Wall Township then diverges, with the STRAHNET continuing north on Route 34 to the Earle entrance and main gate area of Mainside. There are certain traffic movements along the Route 33-34 corridor that are difficult for large trucks, such as turning north onto Route 34 from Route 33. These should be investigated further with the NWS Earle mission in mind.

Other STRAHNET issues that were specifically identified as relating to Earle are circulation and economic concerns expressed by the two municipalities, Howell and Wall townships. Both are located along the southern portion of Earle in the Route 33 – Route 34 corridor. Both concerns are addressed elsewhere in the JLUS.

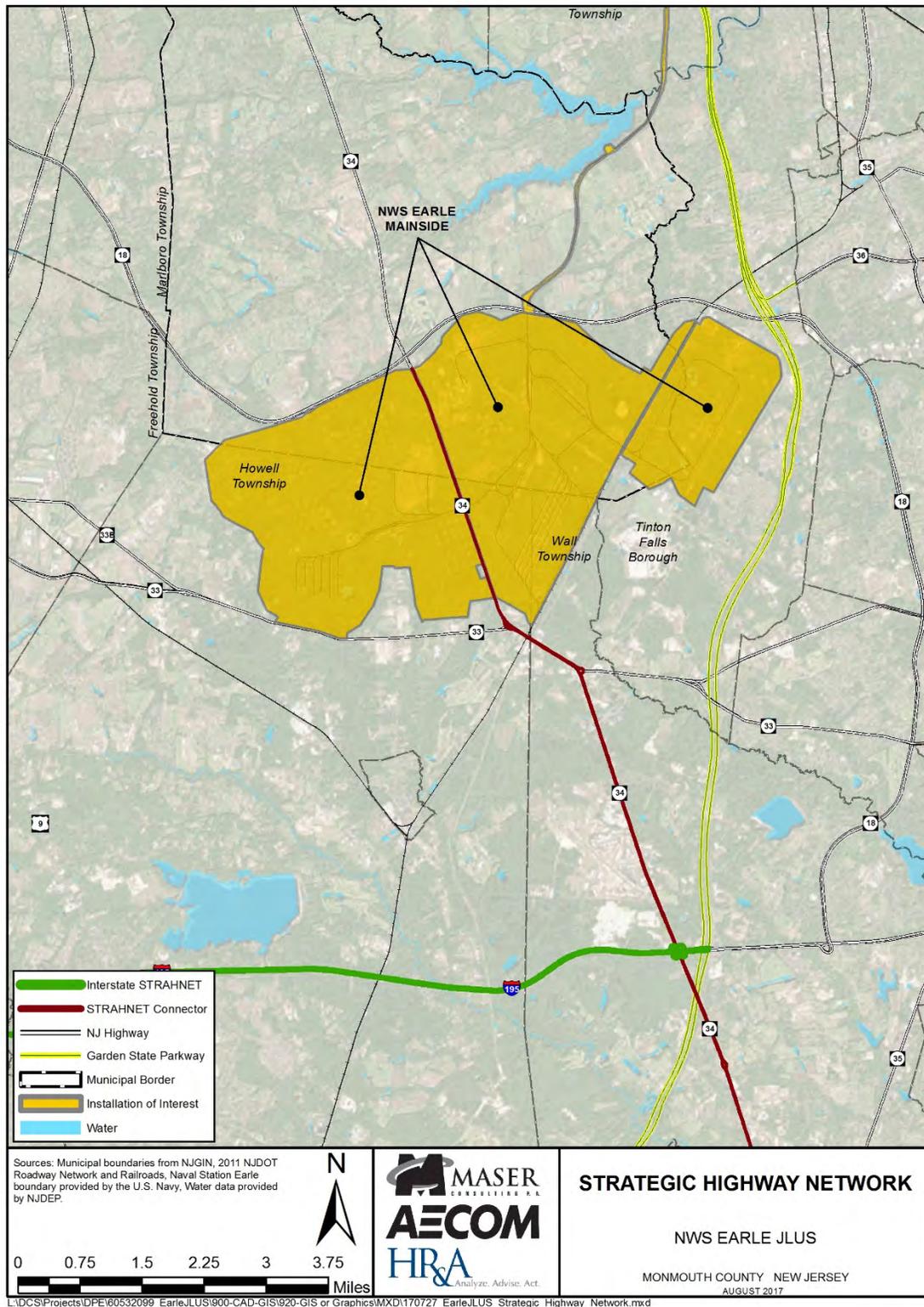


Figure 5.08 Strategic Highway Network near NWS Earle

2. COASTAL EVACUATION ROUTES

Another issue related to transportation and NWS Earle, involves the designated Coastal Evacuation Routes and their relationship to the operations and mission of the base. Having access to the Sandy Hook Bay, access to the Pier Complex comes from Normandy Road which crosses over the NJSH Route 36 corridor and provides a secure access point to the water (see Figure 5.08).

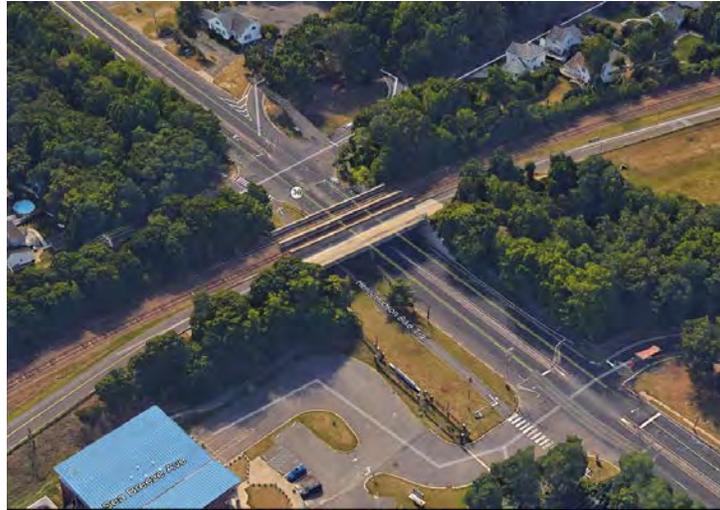


Figure 5.09 Aerial of Normandy Road at Route 36 looking Southeast (Google Earth view)

On each side of the Pier, in Middletown Township and the adjacent communities of Keansburg, Atlantic Highlands, and Highlands, Route 36 is the primary evacuation route and for a number of other towns located south and along the shoreline including Sandy Hook, Sea Bright and Monmouth Beach, Route 36 provides the only north and west link (see Figure 5.09).

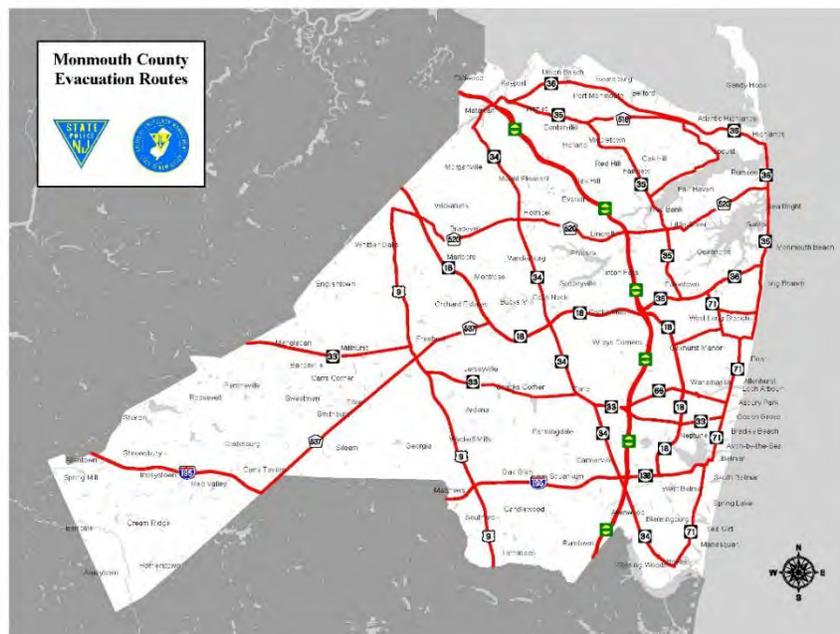


Figure 5.10 Monmouth County Evacuation Routes (Monmouth County)

3. NORMANDY ROAD / RAIL CORRIDOR:

The Normandy Road/Rail Corridor connects Mainside to the pier for transporting ordnance between the two areas. The tracks run down a consistent slope from the Mainside area to the Pier Complex loading docks. Originally double track, only the northern track is maintained today. Typically, an escorted ordnance train departs Mainside in the morning and returns in the afternoon/evening hours. The corridor bisects multiple local and state roads; along the corridor there are eight at-grade intersections, five overpasses, and four underpasses (see Figure 5.10).

The Normandy Road/Rail Corridor is a unique feature of the NWS Earle facility. The issue that makes this feature specific to NWS Earle is this rail line is owned by the Federal Government and that it acts as a standalone rail system that runs through a portion of Middletown Township.

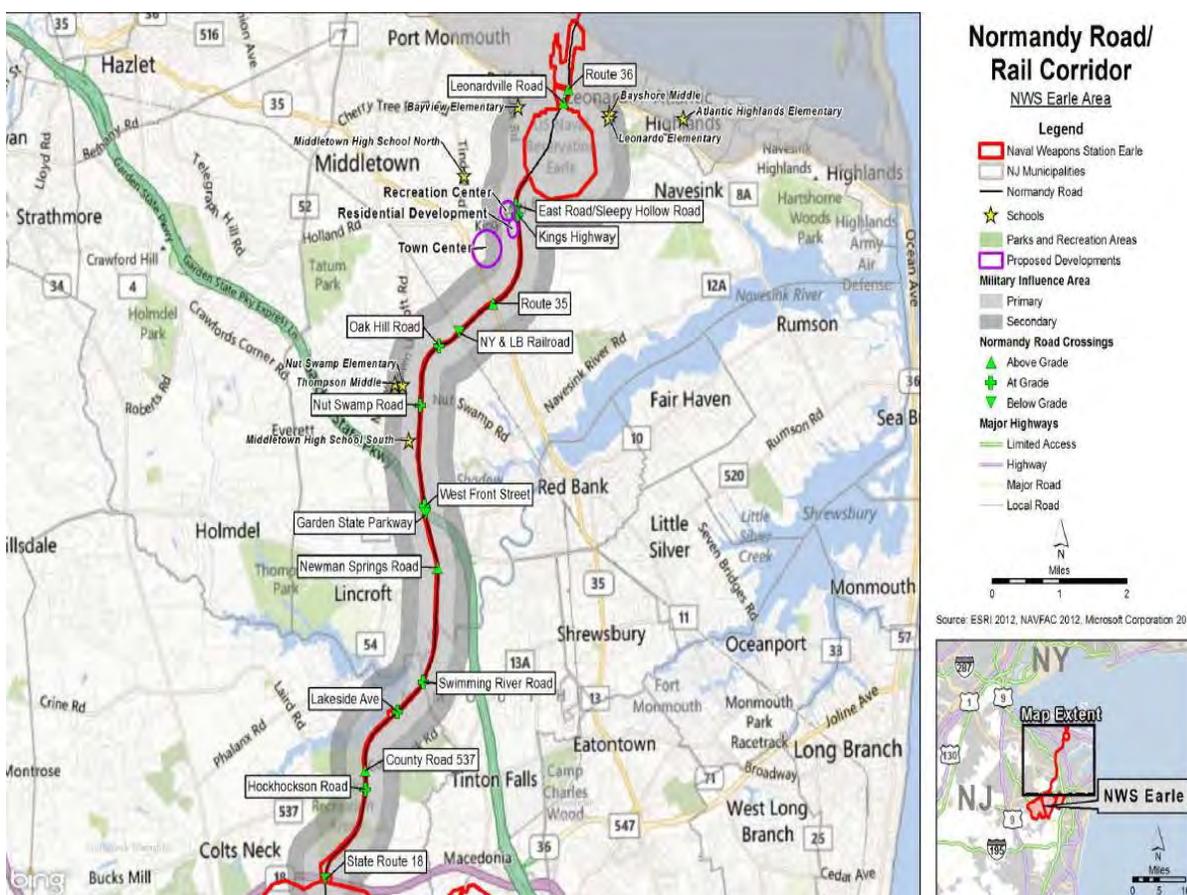


Figure 5.11 Normandy Road Rail Corridor (NWS Earle Master Plan)

Although the corridor is under exclusive jurisdiction, it lacks security fencing in accordance with standard Navy security requirements. Public vehicular traffic is prohibited on Normandy Road, with access granted solely by the Commanding Officer (e.g., school buses and limited government and private vehicles). However, at times unauthorized vehicles have been found driving along the road. When caught, NWS Earle security personnel can issue a ticket to the driver which is processed by the Federal Magistrate at Joint Base McGuire-Dix- Lakehurst. During the study process it was discovered that several driving navigational aids/apps do not recognize Normandy Road as a private government road and

actually direct travelers to it. Some investigation into how to change this was made, but no solutions were immediately found. Further investigation is needed to resolve this issue.

As described in the chapter on land use, Normandy Road is surrounded by a variety of existing development, including residential units, recreational facilities, and a number of schools. Residential land uses immediately adjacent to the road corridor are a significant security issue for the base. Other land uses also pose public safety concerns and the potential for noise complaints. A land use analysis conducted by NWS Earle in 2014 determined that there were 1,705 acres of residential land use within the Primary MIA along Normandy road, and 1,697 acres within the Secondary MIA, for a total of 3,402 acres of residential land use within the MIA of Normandy Road.

II. SEA MOBILITY

NWS Earle has a designated security zone area that extends from the shoreline perpendicularly into the Sandy Hook Bay. This area encompasses the Earle Pier Complex and is located within a section of Middletown Township between the neighborhoods of Belford and Leonardo. The Navy is responsible for regular maintenance of the channel and ship berthing area to provide suitable depths.



Figure 5.12 View of Pier looking South (NWS Earle Master Plan)

1. MILITARY ACCESS TO PIERS/TRESTLE

Pursuant to its authorities in section 7 of the Rivers and Harbors Act of 1917 (40 Stat 266; 33 U.S.C. 1) and Chapter XIX, of the Army Appropriations Act of 1919 (40 Stat 892; 33 U.S.C. 3), NWS Earle, acting through the Army Corps of Engineers, has established a Restricted Area in 33 CFR part 334 (33 CFR 334.102) about its piers and terminal channel in the Sandy Hook Bay. The Restricted Area represents a 750-yard perimeter around the trestles and pier complex. To better protect authorized vessels transiting the Terminal Channel and mooring at the Earle piers from acts of terrorism and other incidences of a similar nature during explosives loading and unloading, the Commanding Officer (CO), Naval Weapons Station has established this Restricted Area to be enforced at all times. This enables the U.S. Navy to restrict vessel traffic in a portion of Sandy Hook Bay. These regulations are also necessary to protect the public from potentially hazardous conditions that may exist as a result of military use within the area. Regulation 33 CFR 334.10 also allows the Navy to restrict use of the Terminal Channel. Vessels are only authorized to cross the Terminal Channel at such times as no naval vessels are transiting the channel.

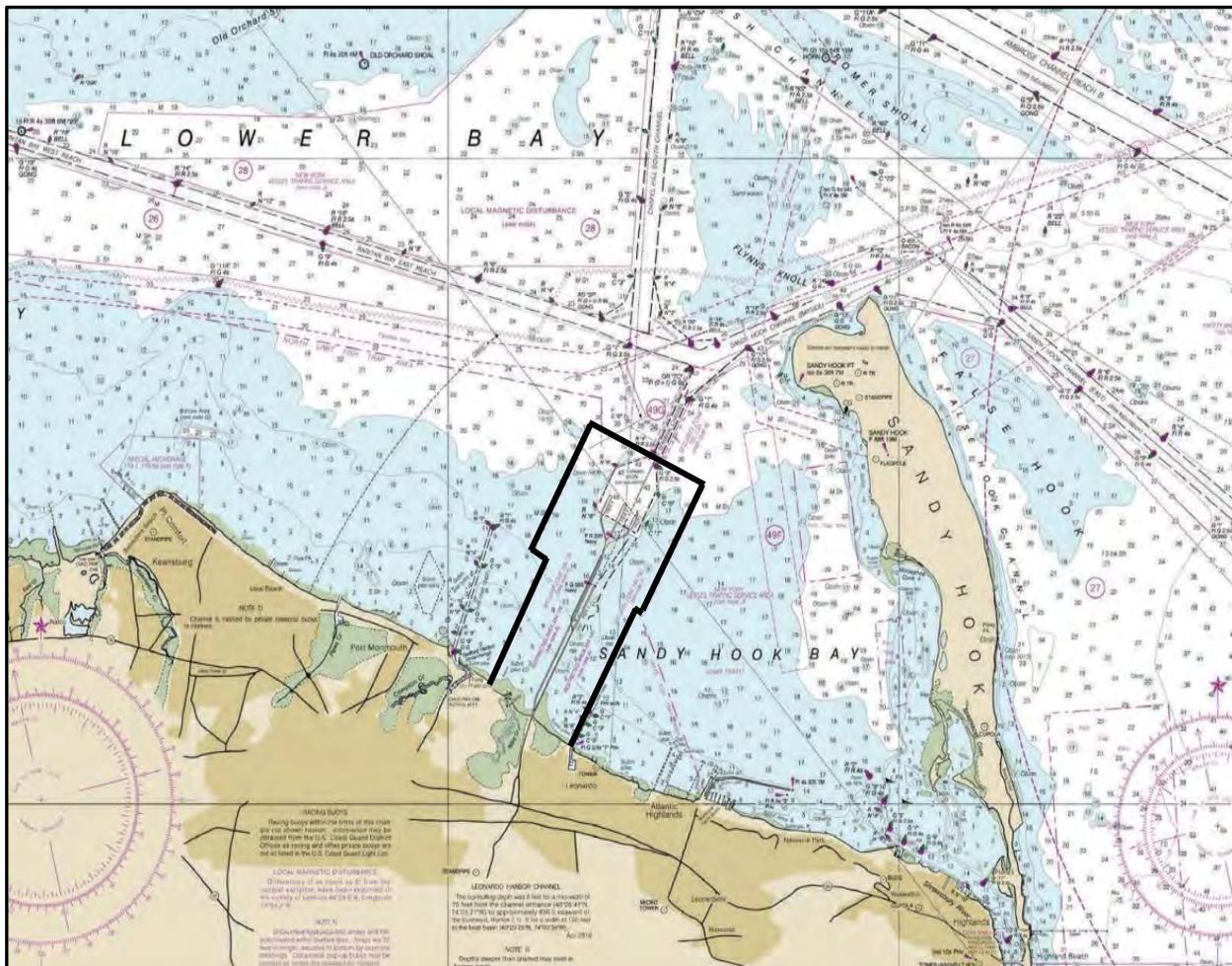


Figure 5.13 Earle Pier Restricted Zone Depicted on Nautical Chart of Lower Sandy Hook Bay

2. FERRY PASSENGER ROUTE SERVICES

Terminals located in Highlands and Atlantic Highlands, to the east of the Pier Complex, offer SeaStreak ferry service to Wall Street's Pier at 11th and East 35th Streets. NY Waterway ferry service to West 39th street, Pier 11, World Financial Center, and Jersey City is available from Middletown's Belford Terminal, located to the west.

Annually, ferries shuttle 900,000 passengers between points in Monmouth County and New York City, 90% of whom are commuters. In the first quarter of 2015, the Belford Ferry Terminal saw an average daily ridership of approximately 1,689 passengers; Highlands and Atlantic Highlands marina terminals served on average 2,743 daily riders. SeaStreak offers a variety of trips and packages to encourage non-work related trips. Between May and October, trips from Highlands to Martha's Vineyard are offered, as well as summer-season direct trips from lower Manhattan to Sandy Hook, trips involving Broadway and sports game packages, and more.

The ACS estimated that ferry ridership slightly increased between 2006 and 2014, although this change was not statistically significant, therefore it is possible that ferry ridership either remained the same or actually declined. In contrast, data from the New York Metropolitan Transportation Council shows that average daily ridership from Monmouth County ports declined by approximately 4.7% from 2006 to 2014. In 2006 the total average weekday ridership for Monmouth County's three ports, Belford, Atlantic Highlands, and Highlands, was 5,142, which decreased to 4,899 in 2014.

3. RECREATIONAL BOATING IN THE BAY

The New Jersey Bayshore Region is a popular site for beach and boating tourism during the summer months. Along with the Belford and Atlantic Highlands terminals (which are used by private commuting ferry services), and the resident fishing fleet, there are numerous marinas and public beaches providing waterfront access to Raritan /Sandy Hook Bay for recreational boating and surf fishing. The number of private watercraft in the bay swells during the summer months. Sailboats and fishermen on occasion sometimes stray into the Navy Restricted Area, which violates Navy security regulations.

NWS Earle tenants have cited concerns that the existing Restricted Area (shown on the National Oceanographic Atmospheric Administration (NOAA) navigation chart for the area) may not be sufficient in size. In addition, the existing routes for ferry services from New York City to Atlantic Highlands and Highlands cross immediately adjacent to the Restricted Area, potentially posing a concern when these routes are not strictly followed due to wind, currents, or other navigational influences.

Navy personnel from the NWS Earle Explosive Safety Office (ESO) have also noted that public recreational use in proximity to the Pier Complex is a concern especially when loading and unloading ordnance. NWS Earle Security utilizes security boats in order to deter unwanted commercial and recreational vessels from getting too close to the Navy Pier and ordnance operations. NWS Earle Security also relies on the United States Coast Guard (USCG) and Monmouth County Sherriff's Department boats to address trespassers in the Restricted Area.

Sandy Hook Bay area is a popular with many marine oriented users and during the summer months increases with a wide array of water crafts, including Jet skis, kayaks and paddleboards. The NWS Earle Explosive Safety Office (ESO) has noted that public recreation use in proximity to the Pier Complex is of concern, especially when there are operations taking place. The base Security operations have

positioned buoys at the perimeter points of the restricted area and, as previously noted, uses security boats to deter unwelcomed commercial and recreational vessels from getting too close to the Pier or shoreline areas. This constant vigil of the water is necessary to assure that there are no stray vessels and while the Navy has other means of discouraging intrusion, it would prefer to provide educational information supplied to boaters in this area for their edification.

III. AIR (AIR SPACE AND OVER FLIGHTS)

As previously noted, the Monmouth County Executive Airport located in Wall Township, is available for local charter and corporate flights. NWS Earle tenants note concerns regarding the overflight of the installation by private aircraft and the consequences of potential security issues. There have also been several instances in which private aircraft were flying over all parts of the installation at what appear to be less than the 500-foot Minimum Safe Altitude, as determined by the Federal Aviation Administration (FAA).

Monmouth County Executive Airport located about 3 miles southeast of Mainside is the landing/takeoff site for a number of area flights, including banner planes that fly along Sandy Hook Bay and shore during the summer months.

Another concern with regards to overflight is the potential use of small drones, or “unmanned aircraft systems” (UAS). Model airplanes, typically used for recreational purposes, have come under increasing scrutiny in recent years due to the fact that there is no true physical difference between model airplanes and what constitutes a “drone”; both fall under the definition of an unmanned aircraft system. There is a model airplane use area located in the County Park System’s Dorbrook Recreation Area, which could serve as a launch site for UAS over NWS Earle. Dorbrook is located within the MIA, just north of Mainside and adjacent to a section of Normandy Road. Currently the FAA has no restrictive regulations regarding model airplanes (beyond that they do not interfere with other aircraft), but the FAA does advise that they fly no higher than 400 feet above the surface (FAA 2007). Once notified of the concern the Monmouth County Park System has agreed to relocate the model aircraft field to another location, possibly to a different park.

C. UTILITIES

The basic utilities and infrastructure required to service a facility such as NWS Earle, include roads, water supply, sewer collection and treatment, and electric service and distribution. The Transportation section of this Compatibility Assessment has addressed the roadway network around the Mainside and Waterfront areas, the pier, Sandy Hook Bay as a marine resource, and the Normandy Road-Railroad system.

Middletown, Tinton Falls, and portions of Howell and Wall to the south have various levels of utilities available in the areas immediately around NWS Earle, although development pressure in recent years has increased the desire to consider extending full utility services closer to the Base perimeter areas.

The two distinct areas that comprise Earle residential and office facilities (Mainside and Pier Complex) both have public water supplied by New Jersey American Water Company and electric service from Jersey Central Power and Light (JCP&L), a FirstEnergy company. Each area utilizes a different sanitary sewerage facility as explained below.

SEWER

The existing utility infrastructure associated with NWS Earle in the Mainside Administration area, is a standalone Sewage Treatment Plant owned and administered by the Navy with a sewer collection system and tertiary treatment facilities. The number of military personnel stationed on the base fluctuates but was much greater in times past. The treatment facilities were sized accordingly and the reduction in the number of families and Navy personnel on station has created a minimal flow situation within the plant. These facilities are located within the Township of Colts Neck. Outside of Earle, Colts Neck Township almost exclusively uses individual septic systems. The Military Sealift Command Fire Training facility is located off Route 33 in Howell Township. Howell is within the Manasquan River Regional Sewerage Authority (MRRSA) franchise area and sewer service is available along parts of Route 33, including at the adjacent County Fire Academy.

The sewer infrastructure for the Pier Complex is linked with the Township of Middletown Sewerage Authority (TOMSA) facility located in the neighborhood of Belford directly west of the pier. The Pier also has a connection to TOMSA which accepts sewage from ships, allowing the Navy to have the ships in port for a greater amount of time, as the holding tanks are of limited size and could overflow if not emptied regularly.

The TOMSA treatment facility is located on Raritan Bay and is potentially vulnerable to coastal storms. In correspondence with Brian Rischman, P.E., Staff Engineer, Township of Middletown Sewerage Authority, the following information about TOMSA and the treatment plant was provided:

“The Authority incurred approximately \$1M in damages as a result of (Superstorm) Sandy. The majority of expenses were related to coastal flooding of the wastewater treatment plant. FEMA 406, insurance and TOMSA funds were used for restoration. FEMA 404, FEMA 406 and TOMSA funds were used for hazard mitigation.

The hazard mitigation projects for TOMSA are nearly complete. The projects generally consisted of raising a pump station above the 500 year flood plain, installing flood barriers on treatment plant buildings, relocating some critical plant equipment above the 500 year flood plain and installing sump pumps in treatment plant buildings which have basements. Plans were also put in place to relocate Authority vehicles outside flood susceptible areas leading up to a potential flood event.

The Authority's treatment plant is located within the 100-year flood plain. A number of the Authority's 14 pump stations are located next to waterways although only a few have a history of flooding.

The Authority's collection system extends through the bay side sections of Middletown. Although manholes are generally not damaged by flood waters, they can serve as a source of inflow during a flood. This causes extra flow at the treatment plant and in extreme cases can cause the plant to exceed its capacity.”

A follow-up recommendation would be to identify, prioritize, and provide estimated costs for the at-risk lift stations and additional features within the sewage collection system that might impact operations.

WATER

The NWS Earle website notes:

“All facilities located in the Mainside Administration area are connected to a public water supply (New Jersey American Water Company). Water for the public supply network comes from surface water

intakes, reservoirs, and deep wells. No public water supply wells or surface water intakes are located on the NWS Earle facility. A combination of private wells and public water from the New Jersey American Water Company serves businesses and residences in areas surrounding the Mainside facilities.”

Potable water distribution for the Belford area of Middletown Township, located to the north of the Pier Complex, is provided via the regional water company's water tower on top of Garrett Hill which is in the middle of the Chapel Hill Area of NWS Earle.

ENERGY/ELECTRIC

Energy compatibility and availability refers to the amount of energy needed to fulfill the mission of the base on a daily basis. Over the last decade the Navy has been focusing on energy strategies that help to increase security, promote energy efficiency and reduce reliance on foreign sources of fossil fuels through investment in renewable energy. Toward this end the base has become involved with a number of initiatives.

There is concern that a voltage drop in the Waterfront area is possible, as noted by JCP&L, necessitating, in their view, the Monmouth County Resiliency Project for Electric. A Microgrid Feasibility Study has been funded by a \$150K grant from the NJ Board of Public Utilities (BPU) to Middletown Township. The 30MW to 50MW capacity project will likely produce electricity through several different types of generation (solar, natural gas, biofuel, etc.) and be capable of indefinite operation during emergencies. The final report is expected to be available in 2018.

The Navy is also considering a recommendation that was made to provide large scale photovoltaic (PV) or other types of electric generation in the Tinton Falls area of NWS Earle. This plan is being evaluated in the hopes that additional generation capacity could provide grid stability at the JCP&L Atlantic Substation or be directly connected to high demand facilities (such as potential future development at the former Charles Wood Area of Ft Monmouth, outlet stores, schools, etc.).

STORMWATER

While there is no regional stormwater system, a good portion of NWS Earle is wooded and there are wetlands associated with some of the perimeter areas. With most of the area draining to perimeter streams this has been the cause of some storm and drainage problems with adjacent areas. The areas associated with Swimming River, McLees Creek and Ware Creek have been noted and will be addressed.

D. CLIMATE RESILIENCE

I. COASTAL FLOODING AND CLIMATE RESILIENCE

NWS Earle is susceptible to damage from flooding caused by storm surge, and may experience frequent impacts from tidal and nuisance flooding in the future. The base sustained over \$50 million in damage at the waterfront including a loss of infrastructure and flooding of Navy buildings critical to operations resulting from Superstorm Sandy. Sea levels have risen by an average rate of 1.5 inches per decade over the period of record in Atlantic City (Figure 5.14), a total of just over 1.3 ft. since 1911 (NOAA / National Ocean Service Center for Operational Oceanographic Products and Services, 2013) . Future changes in sea level will affect the frequency and severity of tidal and storm flooding in local Bayshore communities. NWS Earle will see increasingly frequent flooding from tidal waters and storm surge, adversely affecting surrounding communities and ecosystems.

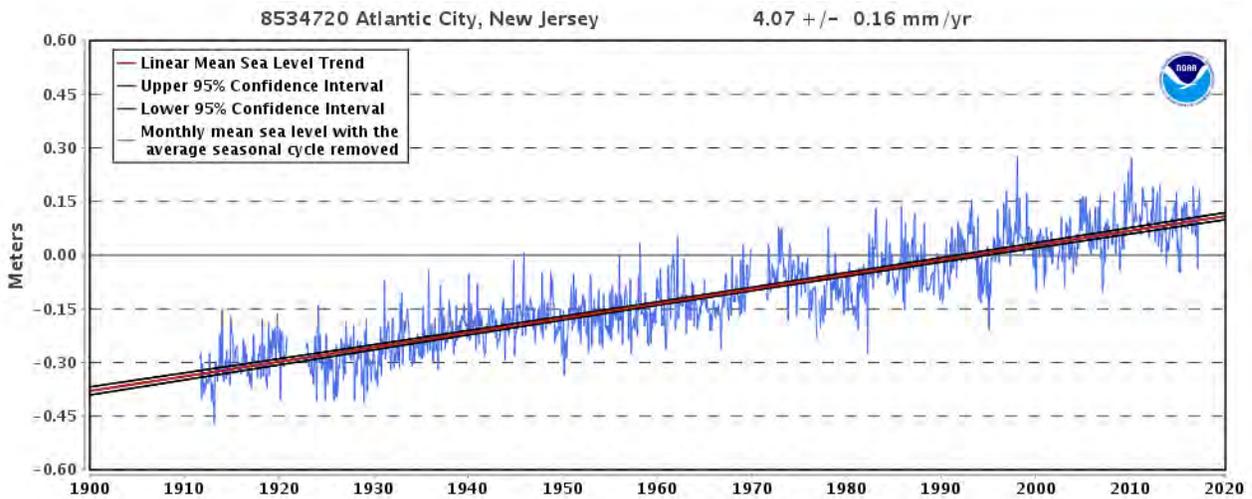


Figure 5.14 Mean Sea Level Trend in Atlantic City, NJ (1911 – 2017)

Coordination among federal, state and local governmental entities will be necessary to both develop and implement solutions to protect against current and future coastal flooding. The JLUS serves as an opportunity to increase coordination and develop solutions that are mutually beneficial to NWS Earle and nearby municipalities. In 2017, the Naval Facilities Engineering Command (NAVFAC) issued a handbook to aid personnel in planning and designing to enhance the climate resilience of military installations (Leidos Inc. & Louis Berger Inc., 2017). The first steps in the handbook instruct the user to assess future exposure and investigate investment in both hard and soft infrastructure solutions for the installation and the surrounding communities. The project team conducted an exposure assessment as part of the JLUS to identify potential impacts to existing and planned infrastructure across the installation and surrounding communities.

The JLUS project team evaluated asset exposures within the military influence area (MIA) to develop recommendations for increasing the resilience of NWS Earle and the surrounding communities. The first section reconciles different probabilistic and scenario-based projections for regional sea level at Sandy Hook, NJ. The second section describes the methodology used to develop extreme water levels for exposure assessment within the study area. The final section describes the assets exposed to current and future coastal flooding events.

PART 1: RECONCILIATION OF SCIENTIFIC DATA

The JLUS project team reviewed the New Jersey Climate Adaptation Alliance (NJCAA) Science and Technical Advisory Panel (STAP) guidance (Kopp et al., 2016) against the NAVFAC Climate Adaptation Handbook and sea level change guidance (Hall et al., 2016; Leidos Inc. & Louis Berger Inc., 2017), and *Global and Regional Sea Level Rise Scenarios for the United States* (Sweet et al., 2017). The JLUS project team's review suggests that global sea level change projections and methods for local adjustments (i.e. vertical land movement (VLM), ocean circulation, ice melt, etc.) are generally consistent among the reports.

Changes in sea level are caused by both global and regional phenomena. All reports consider additional volumes of water generated from melting glaciers, thermal expansion of a warming ocean, and how much water stored in land contributes to changes in GMSL (Sweet et al., 2017). In addition to these changes, regional factors can also influence sea level change, including how land moves related to changes in glacial mass and sediment compactions, which are reflected in regional effects on both sea

surface height and vertical land movement. One methodological difference between the STAP and NAVFAC guidance Kopp et al. (2016) is the influence of VLM on the relative change in sea level (Hall et al., 2016; Kopp et al., 2016; Kopp et al., 2014). Hall et al. (2016) use GPS observational measurements, whereas the STAP assumptions use a statistical analysis of tide gauge data to estimate the net effect of VLM and long-term geoid changes associated with GIA (Kopp et al., 2016; Kopp et al., 2014). Sweet et al. (2017) conduct a reconciliation between GPS methods used by Hall et al. (2016) and Kopp et al. (2014) to demonstrate a high degree of agreement at tide-gauge locations along the Mid-Atlantic Coast. However, given the local site-specific nature of vertical land movement, VLM can be highly variable at small scales. While differences may not be material for this JLUS process, NAVFAC and local communities should consider VLM using the best available data at the smallest scale when conducting structure specific engineering and design processes.

The NJCAA STAP sea-level rise (SLR) projections for New Jersey are presented in Table 5.07 (Kopp et al., 2016). The estimates are ranges of sea-level rise, based on Kopp et al. (2014) for the Atlantic City tide gauge (projections for the Sandy Hook and Cape May tide gauges differ minimally from Atlantic City).

Table 5.07 STAP Probabilistic SLR Projections for New Jersey (ft.)

	Central Estimate	'Likely' Range	1-in-20 Chance	1-in-200 Chance	1-in-1000 Chance
Year	<i>50% probability SLR meets or exceeds...</i>	<i>67% probability SLR is between...</i>	<i>5% probability SLR meets or exceeds...</i>	<i>0.5% probability SLR meets or exceeds...</i>	<i>0.1% probability SLR meets or exceeds...</i>
2030	0.8 ft	0.6 – 1.0 ft	1.1 ft	1.3 ft	1.5 ft
2050	1.4 ft	1.0 – 1.8 ft	2.0 ft	2.4 ft	2.8 ft
2100 Low emissions	2.3 ft	1.7 – 3.1 ft	3.8 ft	5.9 ft	8.3 ft
2100 High emissions	3.4 ft	2.4 – 4.5 ft	5.3 ft	7.2 ft	10 ft

Estimates are based on (Kopp et al. 2014). Columns correspond to different projection probabilities. For example, the 'Likely Range' column corresponds to the range between the 17th and 83rd percentile; consistent with the terms used by the Intergovernmental Panel on Climate Change (Mastrandrea, Heller, Root, & Schneider, 2010). All values are with respect to a 1991-2009 baseline. Note that these results represent a single way of estimating the probability of different levels of SLR; alternative methods may yield higher or lower estimates of the probability of high-end outcomes.

Future effects of sea-level change in coastal areas in New Jersey can be summarized, with respect to a 1991–2009 baseline (equivalently, a year 2000 baseline) mean sea level datum, as the following:

1. It is likely¹ that coastal areas of New Jersey will experience sea-level rise between 1.0 and 1.8 feet prior to 2050, regardless of future greenhouse gas emissions. Under a worst-case scenario, these communities could see as much as 2.8 feet of sea-level rise by 2050 (See Table 5.07).
2. Sea-level change after 2050 increasingly depends upon the evolution of future global greenhouse gas emissions. The STAP used the Representative Concentration Pathways (RCPs) to represent possible high-greenhouse-gas-emission and low-greenhouse-gas-emission futures (Moss et al., 2010; van Vuuren et al., 2011). The high-emissions scenario is based on RCP 8.5 and represents a world in which there are few efforts to limit greenhouse gas emissions. The low-emissions scenario is based on RCP 2.6 and represents a world in which future greenhouse emissions levels are greatly reduced to provide a good chance of meeting the international goal of avoiding global mean temperatures more than 2°C (3.6° F) above pre-industrial levels.
 - a. Under the high-emissions scenario, it is likely that coastal areas of New Jersey will experience between 2.4 and 4.5 feet of sea-level rise by 2100.

- b. Under the low-emissions scenario, it is likely that coastal areas of New Jersey will experience between 1.7 and 3.1 feet of sea-level rise by 2100.
 - c. A worst case (1-in-1000 chance) of sea-level rise of 10 feet of sea-level rise in coastal areas of New Jersey is physically possible (See Table 5.07).
3. Across scenarios, the likely range of sea-level rise in 2100 spans from 1.7 feet to 4.5 feet. However, regardless of scenario, there is at least a 1-in-20 chance of sea-level rise exceeding 1.7 feet before 2050 (See Table 5.07).

Federal guidance set forth by Hall et al. (2016) for NWS Earle is presented in Table 5.08. Whereas the NJCAA STAP projections provide a probabilistic range for practitioners to consider, NAVFAC guidance provides a scenario based framework with upper and lower bounds for consideration by local military planners and engineers. Sweet et al. (2017) (See Table 5.09) use a similar scenario-based approach, also instructing practitioners to select at least two scenarios to reflect reasonable planning parameters based on planning horizon and risk tolerance.

Table 5.08 CARSWG / SERDP Scenario SLR Projections for NWS Earle (Hall et al., 2016)

	Lowest (0.5 m Global)	Low	Medium	High	Highest (2.0 m Global)
2035	0.6	0.9	1.3	1.3	1.6
2065	1.3	1.7	2	3.1	4
2100	1.4	2.3	4.4	5.9	8.3

All values are relative to the global mean sea level 1983-2001 (1992 Tidal Datum). To reference to the 2000 datum used for NJ STAP and Sweet et al. 2017, subtract 0.1 ft. for comparison. For example, when referenced to the same datum, the NJ STAP 2100 High Emissions 1-in-20 chance estimate (5.3 ft.) can be compared to the NAVFAC High Scenario (5.8 ft.).

Table 5.09 NOAA Regional SLR Projections (Sweet et al., 2017)

	Lowest (0.3 m)	Low (0.5 m)	Medium (1.0 m)	High (1.5 m)	Highest (2.0 m)	Extreme (2.5 m)
2030	0.6	0.7	1.0	1.4	1.7	1.7
2050	1.0	1.2	1.8	2.5	3.2	3.6
2100	1.8	2.3	4.6	6.7	9.5	11.5

All values are relative to the global mean sea level 1991-2009 (2000 Tidal Datum).

The JLUS project team finds that the regional sea level change projections by the STAP, NAVFAC, and NOAA are generally consistent, noting small exceptions in the methodologies for assessing VLM and differences in the highest estimate scenarios. The ‘Extreme’ (11.5 ft.) scenario presented by Sweet et al. (2017) exceeds the ‘1-in-1000 Chance’ (10 ft.) and ‘Highest’ (8.3 ft.) scenarios of the Kopp et al. (2016) and Hall et al. (2016) projections respectively because the ‘Extreme’ scenario includes assumptions about ice-shelf collapse not considered in the other studies (DeConto & Pollard, 2016; Sweet et al., 2017). Additionally, Hall et al. (2016) note the discrepancy in the ‘Highest’ scenario when reviewing the probabilistic approach of Kopp et al. (2014) to recommend the 8.3 ft. upper bounds limit for global SLR. However, ‘Medium’ scenario projections for both Hall et al. (2016) and Sweet et al. (2017) fall within the ‘Likely Range’ of projections determined by NJCAA STAP panel. ‘Low’ estimates among the studies are also consistent between each other, generally reflecting significant achievements in emissions reductions through 2100.

PART 2: WATER LEVELS FOR FLOOD EXPOSURE ASSESSMENT

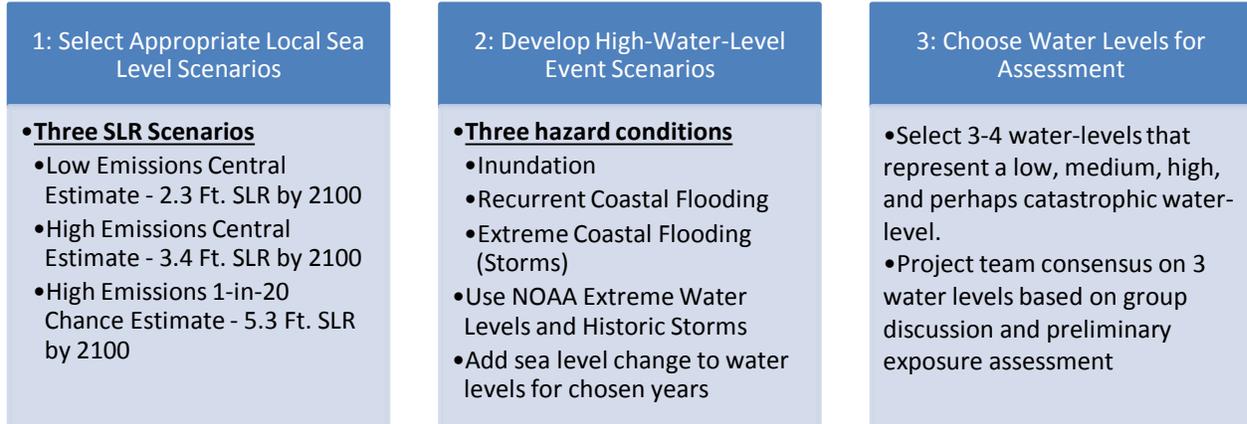


Figure 5.15 Process for Estimating Flood Exposure (Source: New Jersey Department of Environmental Protection (2017))

The NJCAA STAP framework, NAVFAC Handbook, and NOAA report set forth similar processes for developing extreme water levels to assess exposure to current and plausible future flood hazard conditions (Figure 5.15). The NJCAA recommend planning for at least two scenarios of sea level change, and three flood conditions (Kopp et al., 2016). The Navy Handbook recommends developing assessments that explicitly state assumptions regarding the climate phenomena (i.e. sea level change) and the weather phenomena (i.e. storm surge) that form the hazard (Leidos Inc. & Louis Berger Inc., 2017). Sweet et al. (2017) recommend a similar approach in evaluating at least two different levels of flooding – one at the likely range for nearer term less risk averse stakeholders and one that must take account for longer term unlikely events for long-lived critical infrastructure.

Recent local planning efforts in municipalities that neighbor NWS Earle developed assessment water levels for regional planning within the region that take a similar approach. NJ FRAMES (Fostering Regional Adaptation through Municipal Economic Scenarios) is a joint initiative of the New Jersey Department of Environmental Protection (NJDEP) and the Two River Council of Mayors to assess and protect against future coastal flooding in northern Monmouth County, NJ (New Jersey Department of Environmental Protection, 2017). The NJ FRAMES Project Team considered building high water level scenarios using sea-level rise values that reflect the STAP central estimates for 2030, 2050, 2100 low emissions and high emissions and the 1-in-20 chance 2100 high emissions scenario. The team used three SLR estimates from Table 5.07 to develop future water levels by adding the estimates to current or historic water levels that represent permanent inundation, recurrent flooding, and coastal storms:

- Low Emissions Central Estimate - 2.3 Ft. SLR by 2100
- High Emissions Central Estimate - 3.4 Ft. SLR by 2100
- High Emissions 1-in-20 Chance Estimate - 5.3 Ft. SLR by 2100

For comparison purposes, the 1-in-20 chance 2100 high emissions estimate (5.3 ft.) is similar to planning for the NAVFAC ‘High’ scenario of 5.9 feet, while the other estimates (2.3 and 3.4 ft.) fall within the bounds of the ‘Low’ and ‘Medium’ NAVFAC scenarios. The scenarios reflect the capability to assess potential impacts if a future with significant GHG emission reductions is envisioned and impacts that reflect a future without significant GHG emission reductions over a longer-term planning horizon.

The local NJ FRAMES team projected water levels associated with future events by adding the SLR value for each of the 3 projections above to NOAA's Annual Exceedance Probability (AEP) levels and historic storm tide records using the Sandy Hook, NJ Tide gauge. The subsequent analysis generates water levels to assess exposure between 1 ft. and 14 ft. above current Mean Higher High Water (MHHW)⁹ to assess exposure to the various conditions through 2100 (Table 5.10). Consistent with guidance from the Navy Handbook and the NJCAA STAP recommendations, water levels for comprehensive flood exposure assessment represent three types of flooding – permanent inundation, recurrent coastal flooding, and flooding related to coastal storms.

Table 5.10 NJ FRAMES Projected Water Levels Relative to 2000 MHHW

	2000	2030	2050	2100
Low Emissions Central Estimate - 2.3 Ft. SLR by 2100				
Hurricane Sandy	8.3	9.1	9.7	10.6
1% Chance Flood (100-year flood)	6.7	7.5	8.1	9
10% Chance Flood (10-year flood)	3.9	4.7	5.3	6.2
99% Chance Flood (Annual flood)	1.6	2.4	3	3.9
Permanent Inundation (MHHW)	0	0.8	1.4	2.3
High Emissions Central Estimate - 3.4 Ft. SLR by 2100				
Hurricane Sandy	8.3	9.1	9.7	11.7
1% Chance Flood (100-year flood)	6.7	7.5	8.1	10.1
10% Chance Flood (10-year flood)	3.9	4.7	5.3	7.3
99% Chance Flood (Annual flood)	1.6	2.4	3	5
Permanent Inundation (MHHW)	0	0.8	1.4	3.4
High Emissions 1-in-20 Chance Estimate - 5.3 Ft. SLR by 2100				
Hurricane Sandy	8.3	9.4	10.3	13.6
1% Chance Flood (100-year flood)	6.7	7.8	8.7	12
10% Chance Flood (10-year flood)	3.9	5	5.9	9.2
99% Chance Flood (Annual flood)	1.6	2.7	3.6	6.9
Permanent Inundation (MHHW)	0	1.1	2	5.3

Table 5.11 NAVFAC Projected Extreme Water Levels Relative to 1992 MHHW

	1992	2035	2065	2100
Low Scenario – 2.3 Ft. SLR by 2100				
1% Chance Event	7.9	8.6	9.4	10.0
2% Chance Event	6.9	7.6	8.4	9.0
5% Chance Event	5.9	6.6	7.4	8.0
20% Chance Event	4.6	5.3	6.1	6.7
Medium Scenario – 4.4 Ft. SLR by 2100				
1% Chance Event	7.9	9.0	9.7	12.1
2% Chance Event	6.9	8.0	8.7	11.1
5% Chance Event	5.9	7.0	7.7	10.1
20% Chance Event	4.6	5.7	6.4	8.8
High Scenario – 5.9 Ft. by 2100				
1% Chance Event	7.9	9.0	10.8	13.6
2% Chance Event	6.9	8.0	9.8	12.6
5% Chance Event	5.9	7.0	8.8	11.6
20% Chance Event	4.6	5.7	7.5	10.3

⁹ Mean Higher High Water (MHHW) is the average of the higher high water height each tidal day observed over the National Tidal Datum Epoch.

With respect to future water levels to assess the three flooding conditions, consistent with STAP and NAVFAC recommendations, the NJ FRAMES team assessed water levels associated with future events including NOAA's Annual Exceedance Probability (AEP) at a nearby tide gauge (Kopp et al., 2016; Leidos Inc. & Louis Berger Inc., 2017). Comparable NAVFAC extreme water level assessments for NWS Earle are indicated in Table 5.11. Differences in assessment levels can be attributed to different methodologies used to calculate the exceedance probabilities at the tide gauge (Hall et al., 2016). For example, Table 5.08 indicates a height of 6.7 ft. above MHHW for a 1% chance event, whereas Table 5.09 indicates a height of 7.9 ft. above MHHW for a 1% chance event. However, the assessment levels used in the NJ FRAMES analysis, which include a Sandy level higher than the NAVFAC 1% chance event, fully encompass the range of current extreme water levels to serve as the baseline for flood projections. For example, using the 'High' scenario for a 1% chance event in 2100 (13.6 ft. above MHHW), NAVFAC planning guidance would fall within the potential range of values (i.e. 14 ft. above MHHW) generated during the NJ FRAMES deliberations. The NJ FRAMES analysis additionally accounts for potentially more frequent annual events, nuisance flooding, and inundation during high-tide.

Table 5.12 Water Levels above Current MHHW Assessed for NJ FRAMES Analyses (Sandy Hook, NJ)

		Water Level	What High Water Level Condition Does This Height Represent?	How does this water level relate to recent events at Sandy Hook?
Permanent Inundation	Recurrent Coastal Flooding	3 ft.	<ul style="list-style-type: none"> An Annual (99% AEP) Flood in 2050 Permanent Inundation (MHHW) under a High Emission Scenario in 2100 	<ul style="list-style-type: none"> In January 2017, a water level associated with a Nor'easter reached approximately 2.8 feet above MHHW.
	Coastal Storm Flooding	7 ft.	<ul style="list-style-type: none"> A 100-Year (1% AEP) Flood today A 10-Year (10% AEP) Flood under a High Emission Scenario in 2100 An Annual (99% AEP) Flood under a low probability, high consequence High Emission Scenario in 2100 	<ul style="list-style-type: none"> Hurricane Sandy reached a water level of 8.3 feet above MHHW, slightly above this assessment.
		12 ft.	<ul style="list-style-type: none"> A 100-Year (1% AEP) Flood under a low probability, high consequence High Emission Scenario in 2100 Hurricane Sandy under a High Emission Scenario in 2100 	<ul style="list-style-type: none"> The historical record for this tide gauge (i.e. since 1910) has never recorded a water level this high.

The Navy Handbook provides flexibility in planning for many hazards across different time scales (Leidos Inc. & Louis Berger Inc., 2017). Planning for future MHHW (inundation), recurrent coastal flooding, and coastal storm floods that exceed the 10% chance event set forth a broad range of hazards around which water levels for exposure assessment can be developed. The NJ FRAMES project team decided to evaluate water levels of 3, 7, and 12 feet above Mean Higher High Water (MHHW) to allow for a balanced assessment of near-term and long-term risks across the three flood conditions for assessment. In addition, assets that are most sensitive at lower water levels (1 or 2 ft. above MHHW), such as coastal wetlands with emergent marsh species, may be more exposed to near term impacts of sea level changes (New Jersey Department of Environmental Protection, 2017).

The JLUS project team recognizes that there must be balance between assessments that specifically respond to the needs of an individual site with those that allow for consistency and collaboration within the region. The NJ FRAMES process, which uses sea level change science and a planning framework that is consistent with those that inform NAVFAC guidance, established assessment levels of 3, 7, and 12 feet above MHHW to inform future planning in the region. While asset specific analyses conducted by NAVFAC may differ slightly in hazards and planning horizon, the JLUS project team used the same

assessment levels as NJ FRAMES to inform recommendations and allow for consistency among municipal, county, state and federal stakeholders and participants across the planning processes.

II. COASTAL FLOODING EXPOSURE ASSESSMENT

The project team created potential exposure mapping following the NJFRAMES process for water levels of 1, 2, 3, 7, and 12 feet above Mean Higher High Water (MHHW) (See Section 5D.1 - Table 5.10). Local stakeholders can use the water levels to show how different events might affect the study area now and in the future. The project team used these water levels to assess Bayshore area assets' exposure to persistent and reoccurring flooding, as well as increasing exposure to inundation from storm surges. The maps show Coastal Facilities, including the locations of Emergency Facilities taken from the County Hazard Mitigation Plan, and a listing of Public and Semi-Public Facilities located along the Bayshore area to either side of the NWS Earle Pier Complex.

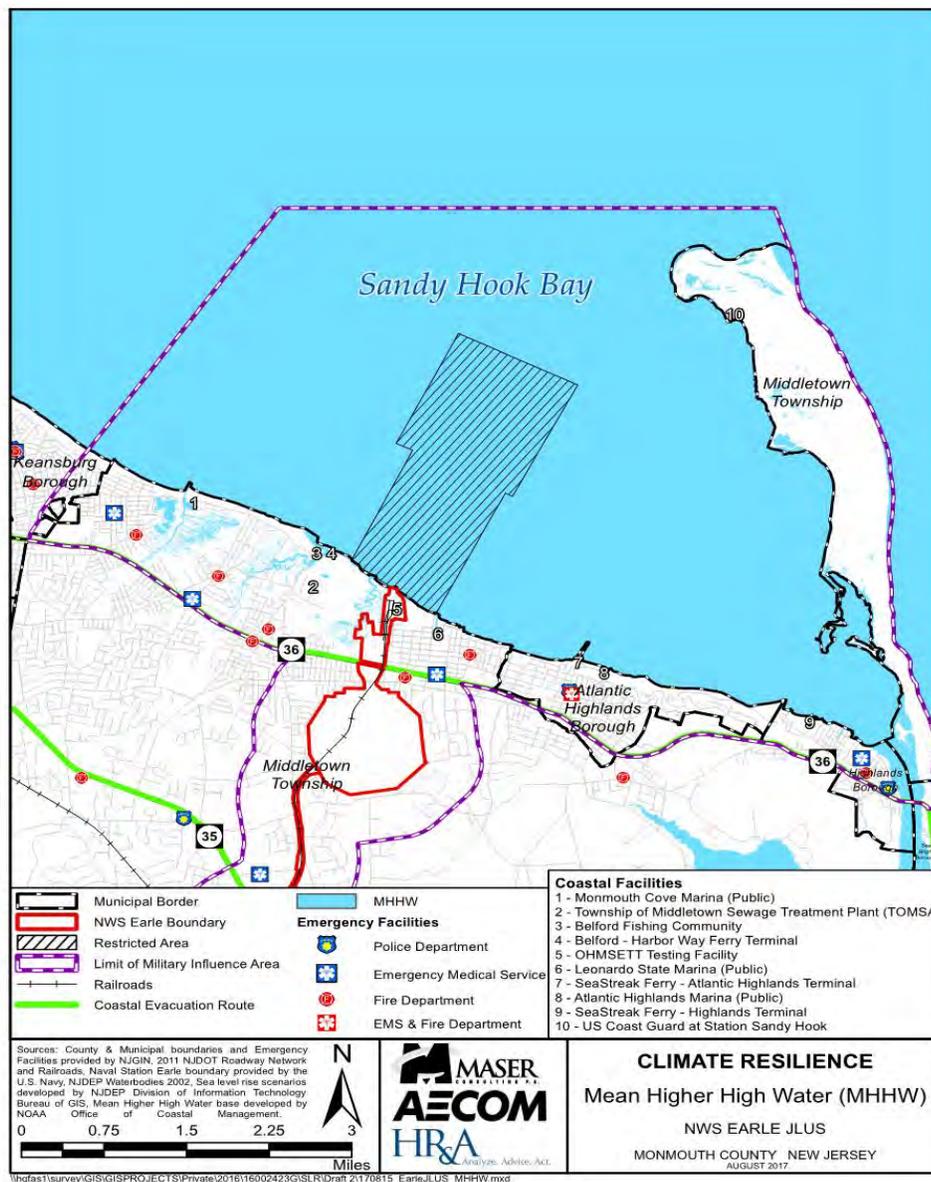


Figure 5.16 NWS Earle Exposure Assessment with Coastal Flooding Base Map (MHHW)

Coastal Facilities include both critical facilities and water-dependent uses. Water-dependent uses, such as marinas, must be located adjacent to the water in order to function, as opposed to water-related uses. Water-related uses, such as dockside restaurants or boat sales and repairs, may derive locational waterfront advantages, but are often accessory to a water-dependent business. The New Jersey Department of Environmental Protection's N. J. A. C. 7:7 Coastal Zone Management Rules provides an extensive listing of uses and requirements with shoreline areas.

Emergency Facilities for Middletown Township, Highlands Borough, Atlantic Highlands and Keansburg include:

1. Police Departments
2. Emergency Medical Services
3. Fire Departments
4. EMS & Fire Departments

The Coastal Facilities are located along the shoreline, generally labeled from West to East, and include:

1. Monmouth Cove Marina (Public - County)
2. Township of Middletown Sewage Treatment Plant (TOMSA)
3. Belford Fishing Community
4. Belford Ferry Terminal (Public - County)
5. OHMSETT Testing Facility (located on NWS Earle property)
6. Leonardo State Marina (Public - State)
7. SeaStreak Ferry – Atlantic Highlands Terminal
8. Atlantic Highlands Marina (Public - Municipal)
9. SeaStreak Ferry – Highlands Terminal
10. US Coast Guard Station at Sandy Hook

The Coastal Facilities are indicated because of their direct relationship between business operations and the Sandy Hook Bay as a commercial and recreational waterbody. Several local marinas and ferry terminals may be exposed to future flooding, but may have some opportunity to adapt to changing conditions while maintaining their waterfront location. Other facilities, like the OHMSETT Testing Facility and the TOMSA Treatment Plant, may need to steel their facilities against long term impacts of flooding and changing water levels because of limited capabilities to otherwise mitigate site flooding. Visiting ships docked at the NWS Earle pier, along with the entire pier complex itself, are dependent upon the TOMSA Treatment facilities. Therefore, an increase in the frequency and magnitude of flooding can potentially jeopardize the military operations. Local stakeholders may wish to conduct additional studies on other critical infrastructure in the Bayshore area on which the military is dependent.

There are two important assumptions to clarify regarding the exposure assessment:

1. The inundation maps and modeling presented reflect still water elevations. The analyses do not include additional impacts from waves and wind.
2. The inundation maps and modeling do not account for future improvements in the Port Monmouth area that may protect the community from storm surge related flooding.

Coastal flood hazards are commonly measured relative to current MHHW to assess exposures to potential daily flooding during high tides. Currently, inundation areas appear in coastal marshes along Ware Creek, as well as marshes within and around Sandy Hook. One would expect these areas to be inundated periodically during high tides. As sea levels rise, few additional exposures occur to critical or identified facilities at 1 foot above MHHW and 2 feet above MHHW (Figure 5.17 & 5.18).

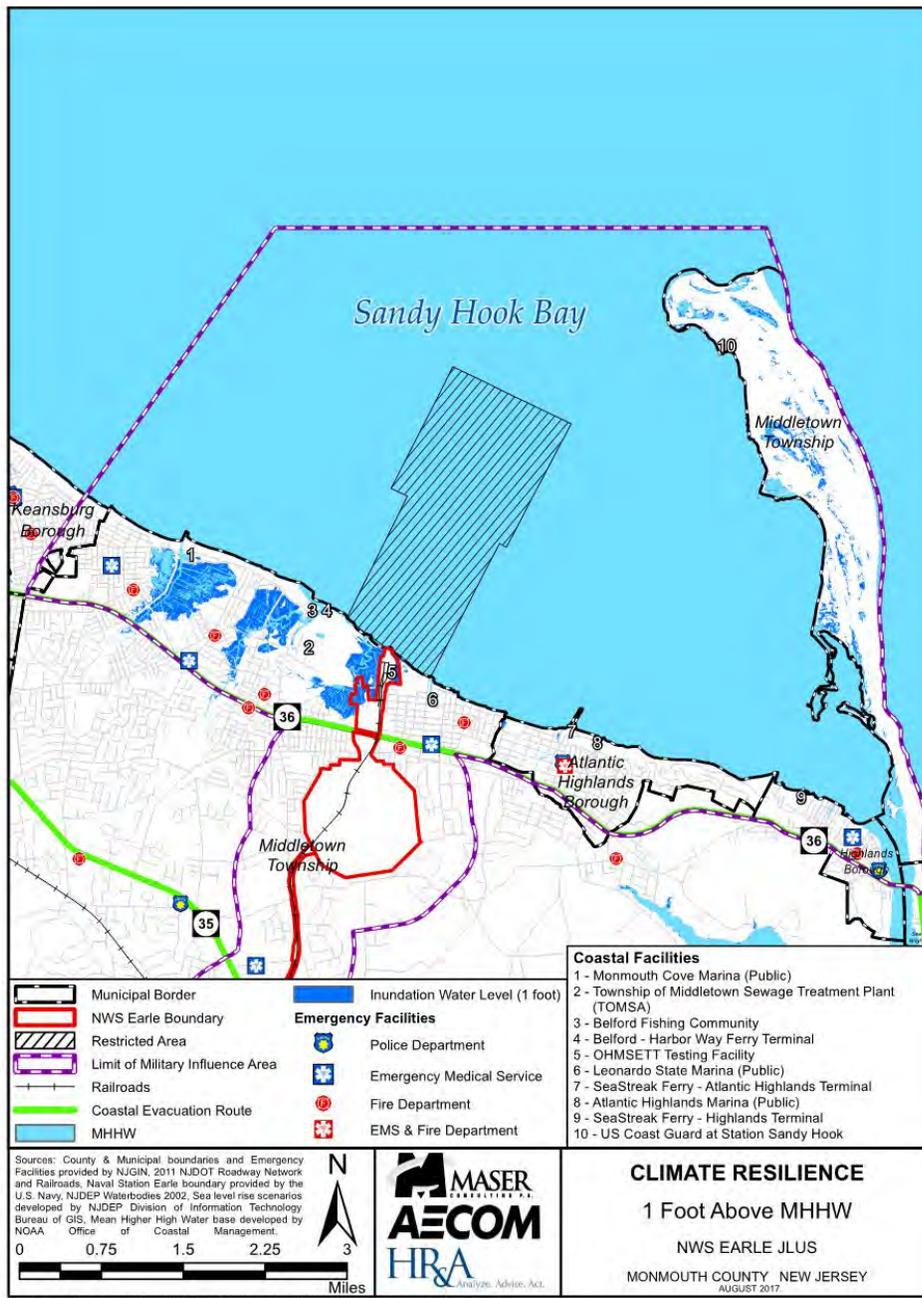


Figure 5.17 Exposure Assessment with Coastal Flooding 1 ft. above MHHW

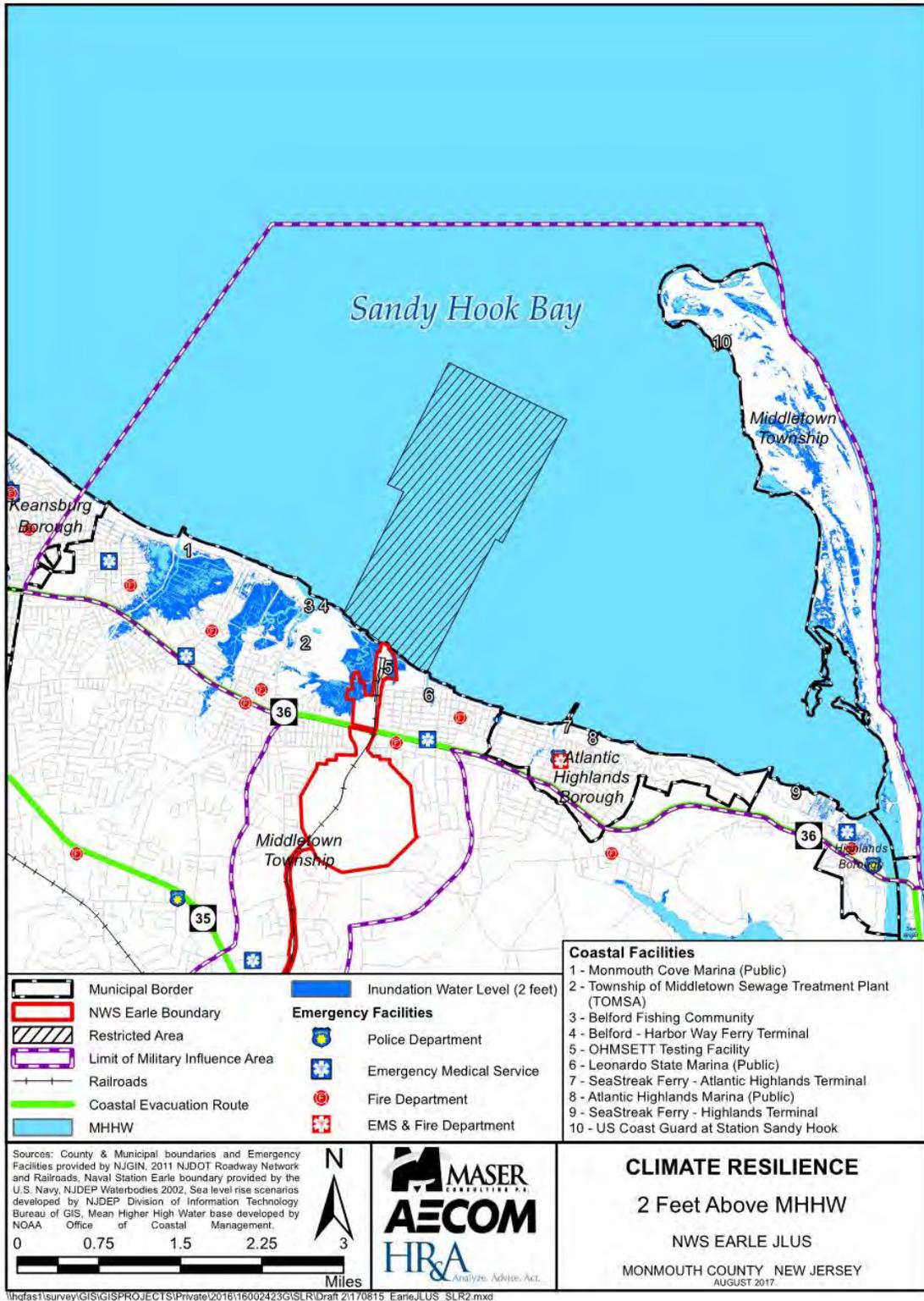


Figure 5.18 NWS Earle Exposure Assessment with Coastal Flooding 2 ft. above MHHW

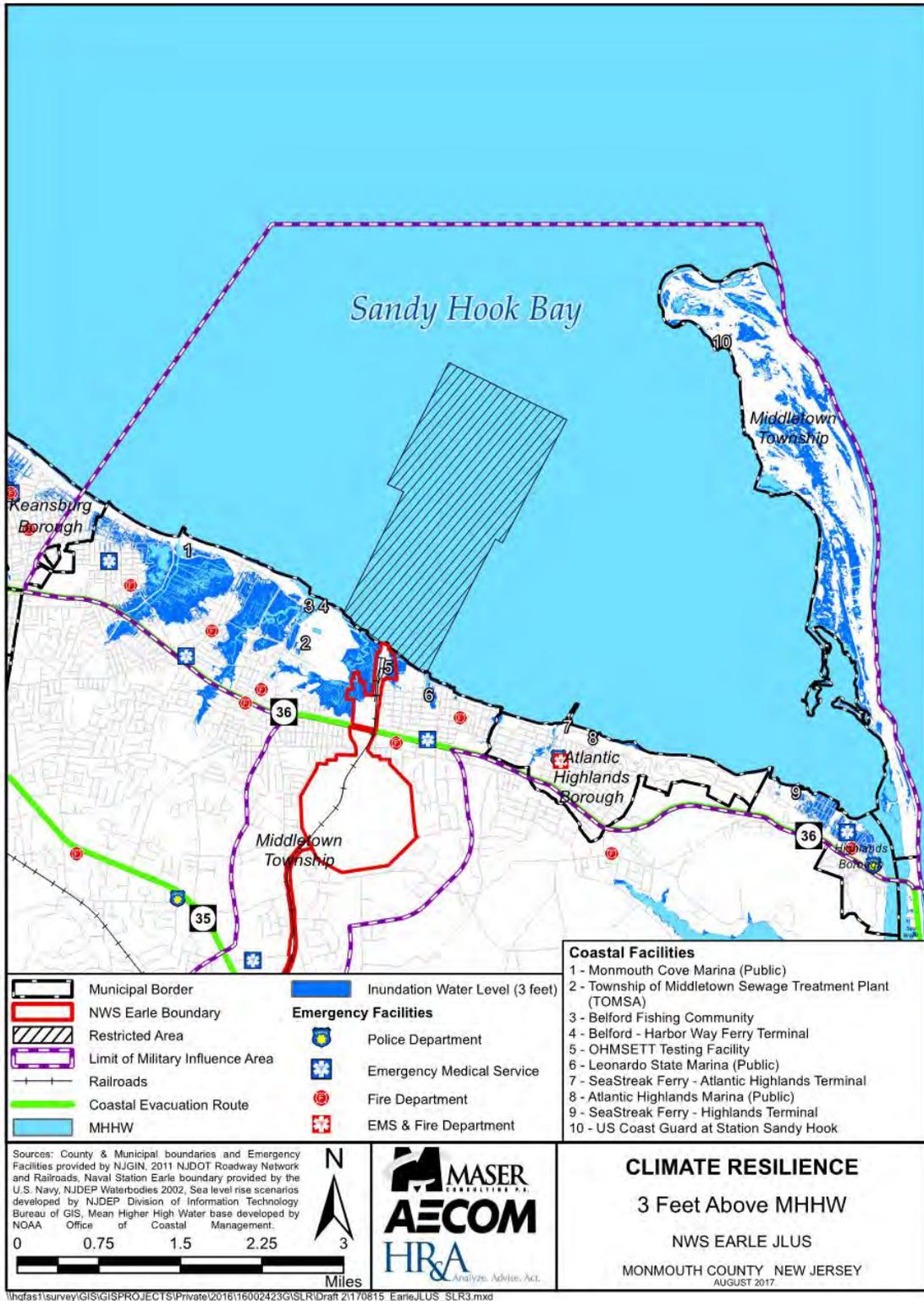


Figure 5.19 NWS Earle Exposure Assessment with Coastal Flooding 3 ft. above MHHW

Analysis of the mapping for 1 foot, 2 feet, and 3 feet above MHHW indicates that roadways in the Leonardo, Belford and Port Monmouth areas may be subject to increased nuisance flooding. The salt marshes surrounding Ware Creek and nearby Port Monmouth may become more frequently exposed to flooding if natural processes are unable to keep pace with the change in water levels. Salt marshes are plant communities that help to stabilize the Bayshore and store water. Any change in water level will affect these plants and the ecological communities' ability to thrive and could ultimately cause their deterioration.

If the NWS Earle Pier Complex is to remain in its current location, critical facilities and ecosystems may be exposed when flooding reaches 3 feet above MHHW (Figure 5.19). While this analysis suggests such an exposure will not prevent these facilities from being operational, it could create some operational challenges. According to tide gauge records at Sandy Hook, such conditions exist today during major Nor'easters and will increase in frequency. This could eventually reflect tidal flooding on an almost daily basis using between a low and medium SLR scenario (See Table 5.07).

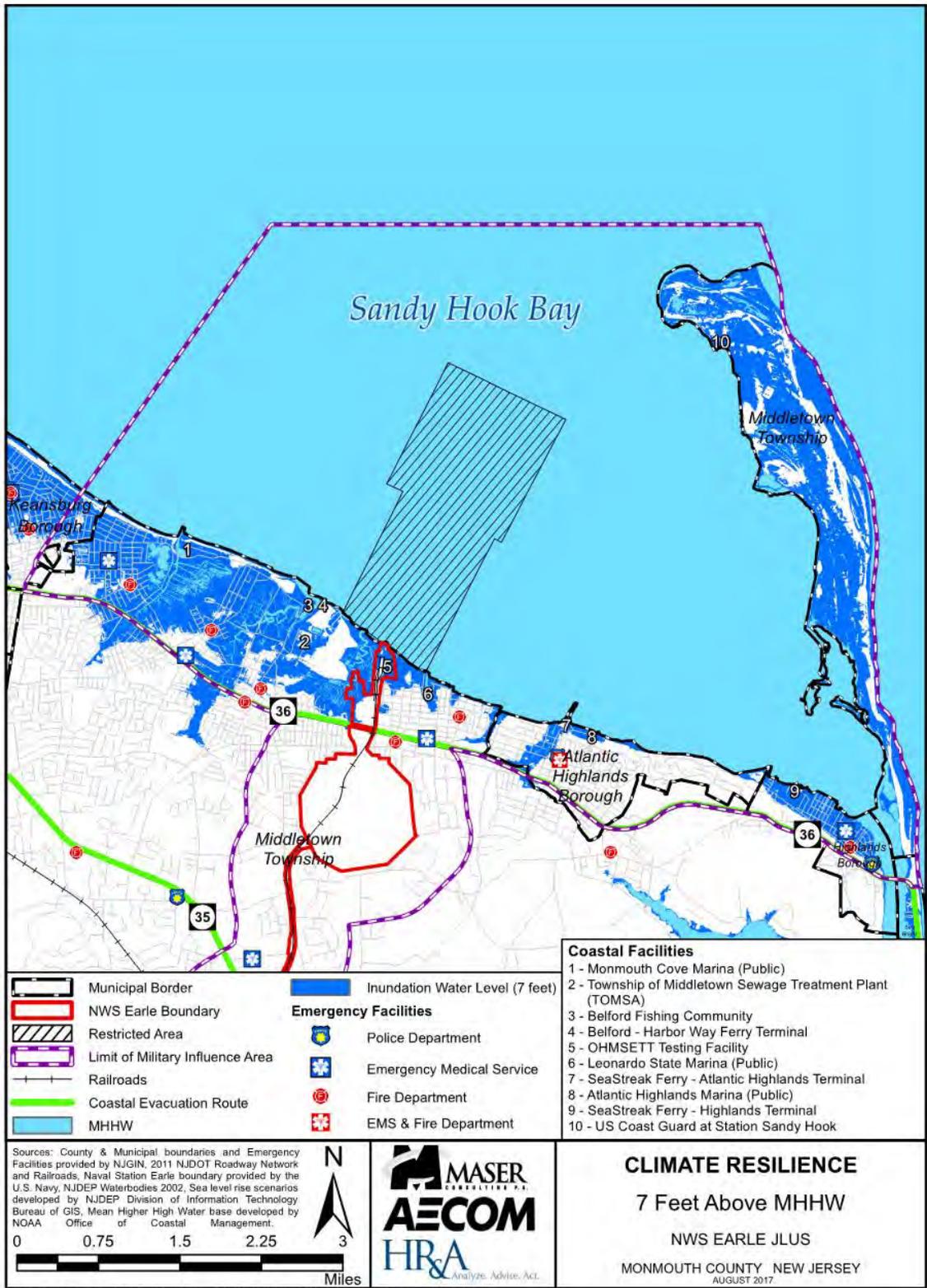


Figure 5.20 NWS Earle Exposure Assessment with Coastal Flooding 7 ft. above MHHW

The potential impacts increase when evaluating a 7 feet above MHHW event (Figure 5.18). Such an event currently reflects a large coastal storm, but could possibly reflect an Annual Flood under a 5.3 foot (between Medium and High) long term sea level change scenario. At this level, critical infrastructure, including the municipal sewage treatment plant (TOMSA), will be exposed to rising water levels. As noted in the Recommendation Section E.3, the plant has pursued mitigation projects which generally consisted of raising a pump station, installing flood barriers, relocating some of the critical plant equipment, and installing sump pumps. Current improvements and investments will help, but additional long-range planning and investment may be necessary to prevent more frequent future exposure to flooding.

At 7 feet above MHHW, The Highlands Marina, the Leonardo State Marina, and other waterfront transportation terminals will be exposed to flooding. The terminals may still be able to preserve basic functions, but future conditions will require operational changes, and potential on-site relocation of facilities.

It appears that most of the Emergency Facilities in the study area would not be inundated, and could remain operable throughout the evaluated scenarios. However, the greatest impacts to these facilities would likely be from inundated roads, such as NJSH Route 36, that provide access between the facilities and the neighborhoods which they serve. In particular, facilities and areas in Keansburg and North Middletown extending to Port Monmouth, to the west of the NWS Earle Pier Complex, may have impassable roadways. Another small section of Route 36 in Atlantic Highlands Borough, east of NWS Earle, could also be inundated.

The Normandy Road corridor and most of the NWS Earle Pier Complex on the north side of Route 36 has been designed and built to be above this flood level. While there may be difficulty accessing the pier complex from the Route 36 gate, the Navy should be able to conduct logistical operations at the pier complex.

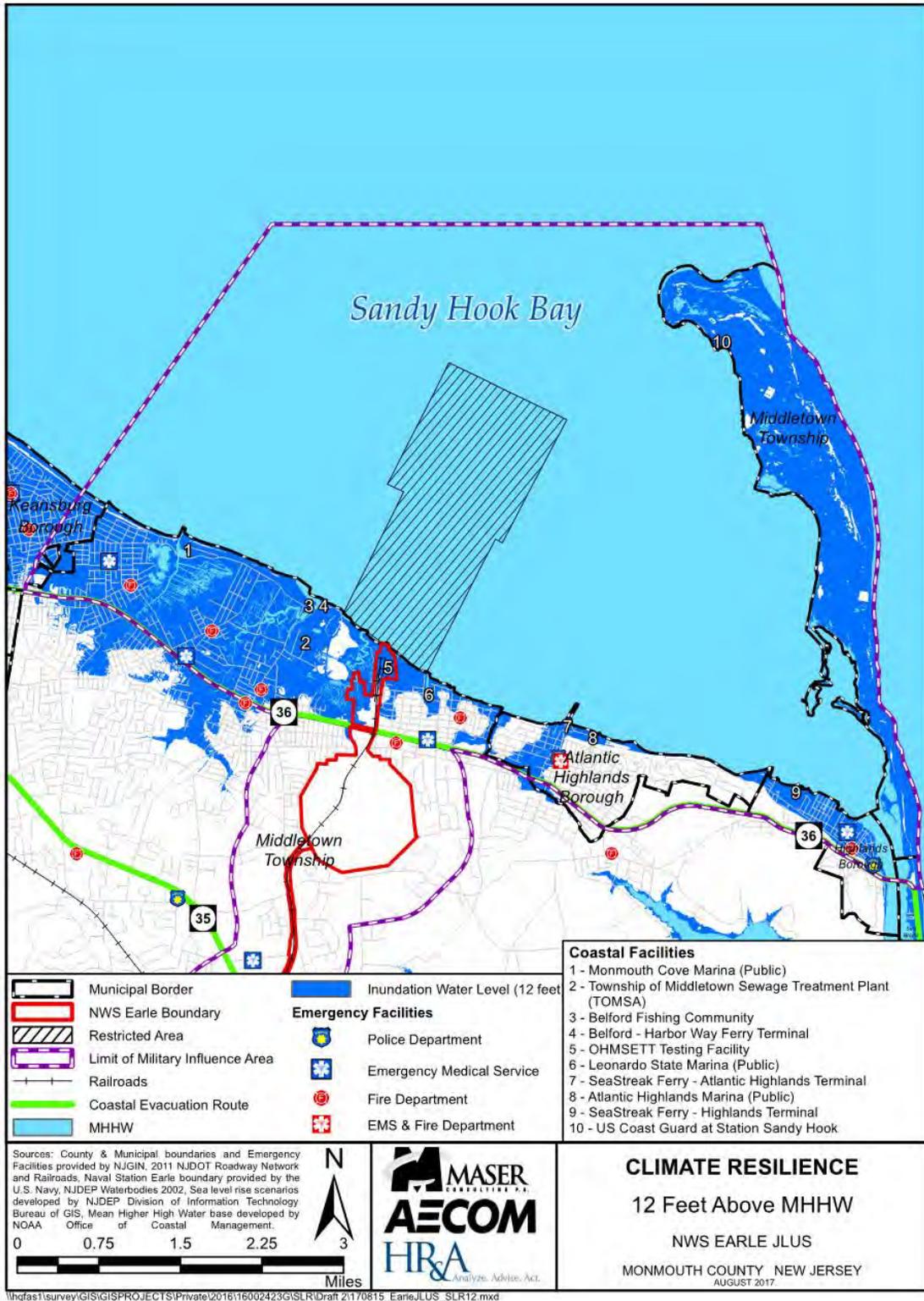


Figure 5.21. NWS Earle Exposure Assessment with Coastal Flooding 12 ft. above MHHW

At 12 feet MHHW (Figure 5.20), much of the study area to the north of State Route 36 will be inundated. The areas of North Middletown, Port Monmouth and Belford are exposed to flooding, as well as sections of Leonardo and Atlantic Highlands, and most of Highlands. Emergency facilities, in particular Fire Stations, may have difficulty responding. Long stretches of Route 36, and possibly alternative Evacuation Routes, may be flooded during such events.

Marinas, ferry terminals, and other water-dependent activities will be severely hindered or incapacitated by the inundation. Related residential areas will be inundated and it is likely that many businesses will shut down during the event, and possible for a time after an event while damage is assessed and repairs are undertaken.

At this point, the NWS Earle Pier area will also be inundated, in particular the area where Normandy Road meets the Pier. There are opportunities to raise the transition area to prevent inundation at the pier complex. Normandy Road and the overpass of Route 36 will still provide viable near-term access to the pier complex, but eventual modifications to the piers and the facilities and structures in this area may be required. The Navy has relocated some critical facilities after the effects of Sandy in this area, but future planning and programming may need to incorporate a long-range adaptation strategy for other facilities in this area. The Navy has started these discussions for NWS Earle as part of their long term capital planning and design efforts.

While it is not likely that such an event will occur in the near or medium term, long-term infrastructure decisions should consider future coastal storm exposures when making long or immobile investments. A vulnerability assessment of TOMSA facility should be considered to understand the future feasibility of operations at the current site.

The exposure assessment demonstrates that there may be near term vulnerabilities to infrastructure and ecological resources from coastal storms. As sea levels rise, damaging events may become more frequent, while the magnitude of flooding from storm surge is likely to increase. The next section provides alternatives to reduce future exposure of the assets identified to more frequent tidal flooding and higher magnitude future storm surge events.

III. CURRENT PROJECTS & LOCAL ISSUES

Since 1999, the U. S. Army Corp of Engineers has been assessing a 21-mile long stretch of the Bayshore centered on the Leonardo area of Middletown Township. Their feasibility study was nearly complete when the area was significantly impacted by Superstorm Sandy, causing the Corps to take another look and amend the study. The final study was released in 2016 and project design is currently underway and is expected to focus on elevating between 10 and 25 structures out of the one percent floodplain, as determined by FEMA.

In the fall of 2016, the Army Corps broke ground on the second phase of their Port Monmouth Hurricane and Storm Damage Reduction Project. This phase includes constructing a 2,661 linear foot floodwall, levees, a tide gate, pump stations and road improvements that will reduce flooding. The project is scheduled for completion in 2020. Phase 1, completed in July 2015, consisted of beach nourishment, dune construction, vegetation and restoration, groin work, and the extension of the fishing pier. As this project is immediately within the delineated MIA of the NWS Earle pier complex, it may serve as a template for future stabilization and resiliency projects in this area.

During the NWS Earle JLUS planning research and investigation stage the need for future resiliency measures were identified for several specific sites and issues. Some of these issues are known to the

Base and the County Departments of Public Works and Engineering, and there has been co-operation to find solutions and work in unison. Recommendations in Section 6 of this JLUS provide direction for continued co-operation between the Navy, Monmouth County, the local communities, and organizations concerned with the health and well-being of the Sandy Hook Bay. The particularly cited items and locations included:

1. CULVERTS ALONG NORMANDY ROAD

There are several locations where box culverts under Normandy Road work to detain and release stormwater in such a way as to reduce the potential for downstream flooding.



Figure 5.22 Aerial view of Normandy Road culverts at McClees Creek

However, increased sedimentation and siltation within the culvert openings over time has, in some cases, drastically reduced the volumes that can flow freely. Clearing out the culverts to prevent flooding along Normandy Road and upstream of the culverts must be regionally coordinated to prevent an increase in downstream flooding, and would best be done by the County working with the Navy.

2. OYSTER RESTORATION IN SANDY HOOK BAY AT NWS EARLE

NY/NJ Baykeeper, an environmental nonprofit organization, has been working with the Navy on a pilot oyster restoration project between Trestle 1 and Trestle 1A of the NWS Earle pier. Over five years of research proved that the water quality was appropriate for oysters to flourish. In the summer of 2015, the Baykeeper began seeding oyster castles, interlocking concrete blocks, inside five hundred gallon setting tanks located on Navy property. Once the oyster larvae attached to the castles and grew to a suitable size, the castles were put in place on the bay bottom. The next phase will be to place around a thousand oyster castles to the west of the Navy piers. Creating an offshore reef could provide habitat for marine life, reduce maximum wave height by dissipating wave energy before hitting the shore, and encourage sediment deposit to rebuild the beach, which according to the U.S. Navy, has receded 250 to 300 feet since the 1940s.



Figure 5.23 Photo of typical Oyster Castle

3. STORM DRAINAGE IN ADJACENT MIDDLETOWN NEIGHBORHOODS

There is an area of Leonardo in Middletown Township where the current stormwater drainage system does not function properly to remove stormwater from a low area directly adjacent to the elevated Normandy Road. Over the past few years the Navy has been working with neighborhood to find a solution that would alleviate the situation. In partnership with the Monmouth County Mosquito Extermination Commission, drainage ditches on Navy property were de-snagged to improve water flow but additional engineering measures may need to be investigated as conditions change.



Figure 5.24 Graphic Representation of Stormwater Drainage issue in Leonardo

4. WARE CREEK AND SHORELINE AREAS

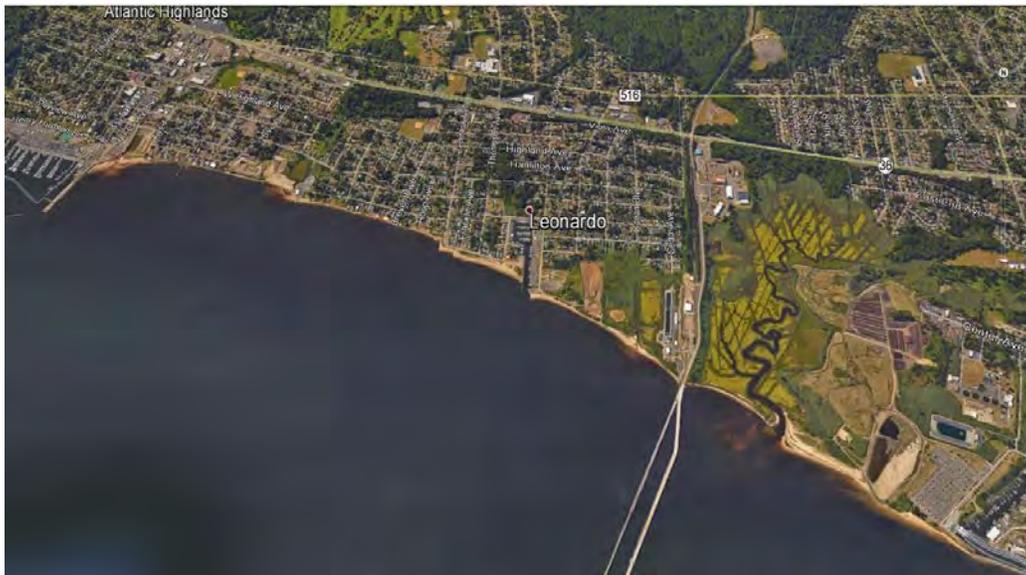


Figure 5.25 Aerial View from Sandy Hook Bay looking south, Ware Creek is the area to the right or west of the pier (Google Earth image)

There was a previously proposed grant application to the National Fish and Wildlife Federation (NFWF) entitled the Monmouth-Ocean Storm Resiliency Project in this immediate area. The grant was to improve stormwater capacity and storm surge resistance along the coast. NWS Earle is a key partner in this effort and the Project was scheduled to begin with Ware Creek, the mouth of which is located on county-owned land, adjacent to Navy property

The Ware Creek project intends to:

- Open existing mosquito ditches to drain stormwater outfalls;
- Improve internal marsh tidal flow to support fish habitat and discourage invasive species;
- Nourish the marsh with appropriate solid materials to prevent conversion into open water and to increase its value resisting storm surge;
- Improve existing stormwater outfalls for greater output and surge resistance;
- Stabilize existing dune system using a “living shorelines” approach, minimizing cost and maximizing ecological benefit; and
- Construction of a 150 foot oyster reef from the mouth of the creek to the NWS Earle pier.

While the grant did not receive funding in that round, the projects goals and intentions remain, and the groups involved continue to seek other sources of funding.

In January 2017 the Naval Facilities Engineering Command Headquarters (NAVFAC) released their Installation Adaptation & Resilience Climate Change Planning Handbook. The workbook is available on line and was intended to assist military installation planners analyze and develop viable climate resilience strategies. Appendix D of that report provides fact sheets for Adaptation Action Alternatives that address four broad approach categories:

- **Structural** – employs a built structure to alter the flow of floodwaters to protect a large area from damage (e.g., levee, storm surge barrier);
- **Natural and Nature-based** – employs natural features to enhance resiliency (e.g., dunes, beaches, salt marshes, oyster and coral reefs, barrier islands, forests, shade trees);
- **Facilities** – employs construction techniques to reduce flood damage to a specific asset (e.g., floodproofing, building to a more resilient standard, small-scale structures such as, a berm); and
- **Non-facilities** – employs non-construction techniques such as infrastructure siting, management, or maintenance to reduce flood damage (e.g., land use modifications, real estate actions, community coordination, operational changes, and modified maintenance routines).

Within the four categories, the handbook offers a number of examples of approaches. Each fact sheet includes discussion of appropriate uses and limitations. The available fact sheets are:

Structural Adaptation Approaches

1. Levees
2. Storm Surge Barrier Gates
3. Seawalls
4. Revetments
5. Off-shore Breakwaters
6. Modification of Existing Structures

Natural and Nature-based Adaptation Approaches

7. Preserve and Restore Natural Coastal Defenses
8. Beach Nourishment
9. Barrier Island Restoration
10. Vegetated Dunes
11. Living Shorelines (Edging and Sills)
12. Living Breakwaters (Oyster and Coral Reefs)

Facilities Adaptation Approaches

13. Flood Proofing
14. Materials Replacement
15. Relocation of Vulnerable Components
16. Protection with Small Scale Structures

Non-facilities Adaptation Approaches

17. Land Use Modifications
18. Real Estate Actions
19. Community Coordination
20. Operational Changes
21. Modified Maintenance Routines

All four categories listed and a number of these strategies have been considered throughout this JLUS planning process. A few have already been enacted, for example, 12. Living Breakwaters, an Oyster Reef has been installed on either side of the pier and will soon be enlarged and expanded. NWS Earle employed the strategy identified as 15. Relocation of Vulnerable Components, post-Sandy by relocating a building that was within the flood waters to higher ground, and raising another facility above potential flood elevation in the Pier Complex area.

Potentially there are a number of the approaches that could be realistically employed in the Sandy Hook Bay area, but more investigation and research would be required prior to any design. Review of these fact sheets could be helpful prior to deciding on site specific resiliency strategies.

6. JLUS RECOMMENDATIONS

Based on feedback received from the Policy Committee, General Advisory Committee, Technical Advisory Groups, and public stakeholders, this chapter documents a set of 37 recommended actions to promote compatibility and coordination among the JLUS partners involved in this project. As described in Chapter 3, there is on-going coordination among the State, County, municipalities and NWS Earle, but there is not a consistent approach to military-community compatibility issues. This JLUS process has revealed opportunities to improve this situation through better communication and coordination on infrastructure and land use planning, mutual economic development initiatives, regional and local transportation improvements, security enhancements around base properties, and coordinated climate adaptation and resiliency measures for waterfront areas. These mutual and agreed upon recommendations are presented in this chapter to guide a long-term effort to improve the quality of life for this region surrounding this important Department of Defense (DoD) asset in central New Jersey.

A. RECOMMENDATION CATEGORIES

The Implementation Plan for this JLUS is organized into seven sections representing the different types of recommendations. These categories represent the issues facing the NWS Earle region in improving military-community compatibility. In some cases, they are typical of other military installations in other areas in the country, but in most cases, the recommendations are specific to NWS Earle and the type of operations at this base, as well as the local land use and economic conditions of the municipalities that surround the installation. The recommendation categories are:

- **Communication/Outreach:** Efforts needed to improve communication and coordination between the base and surrounding municipalities.
- **Land Use:** Proposed changes to land use planning, affordable housing and density issues, farmland preservation, conservation of sensitive and buffer lands, and other land-based compatibility measures within the MIA surrounding NWS Earle.
- **Economic Development:** Mutually beneficial economic development initiatives in the areas surrounding NWS Earle.
- **Transportation:** Proposed improvements to transportation facilities on land, water (Raritan/Sandy Hook Bay), and air in the region surrounding the base.
- **Utilities:** Joint and mutually beneficial utility system projects.
- **Climate Resilience:** Joint efforts to improve resilience and reduce future risk from sea level rise, storm events and localized/nuisance flooding.
- **Security:** Proposals to improve security around the military facilities and assets at NWS Earle.

Following a discussion of the recommendations in each category, an implementation plan is presented that summarizes these in a matrix format and documents several important aspects: 1) Which organizations or municipalities should be involved in implementation; 2) The timeframe and priority for implementation assigned to each recommendation; and range of estimated costs and potential funding sources. It should be noted these recommendations are non-binding and result from the cooperative planning effort involved in this JLUS. Further action is necessary to implement each recommendation, which will occur subsequent to this JLUS effort. In some cases, individual municipalities or organizations can proceed on their own and in other cases, coordination should involve multiple parties. This is typical

of the JLUS process and has worked successfully in other communities facing similar issues across the country. An Implementation Committee, with an organizational structure similar to the JLUS Committee structure would be helpful to further these actions over time.

B. SPECIFIC RECOMMENDATIONS

A. Communications/Outreach

As described in Chapter 3, there are already a number of on-going communication and coordination efforts that aid in the relationship NWS Earle has with its surrounding jurisdictions. Additional efforts were identified in this JLUS process that could further enhance this relationship. Six separate actions are recommended to improve different aspects of communication between the municipalities and base. Most of these are not expensive and would not be difficult to implement even in the short-term.

Recommendation A.1: Pursue additional cooperation between the Navy, County departments, and NWS Earle municipalities addressing facility maintenance, security, emergency response, etc.

Discussion: A number of joint projects and mutual aid agreements have been established between NWS Earle and either the County or surrounding municipalities to address issues common to both parties. This recommendation encourages further exploration of these types of projects/agreements to maximize the benefits to both the base and residents in the surrounding communities over time. Specific areas needing attention could be identified through a continued dialogue with representatives from all parties, including the Navy, County and/or each of the five municipalities adjacent to the base as applicable (Colts Neck, Howell, Middletown, Tinton Falls, and Wall).

Recommendation A.2: Improve notification processes to share proposed land development submittals and plan amendments, zoning changes and comprehensive plan updates within 3,000 feet of the installation boundaries.

Discussion: The State of New Jersey has already adopted legislation* recognizing buffer areas of 3,000 feet around military installations where zoning changes, plan amendments, and proposed developer submittals are to be shared with registered military facilities within the municipality. However, education regarding this notification process is necessary to ensure it is in place and followed rigorously to keep the installation informed of proposed changes near its borders. Through this process, potentially incompatible land uses can be monitored and comments received from the installation before the municipality makes any final decisions. Since zoning, planning and land use changes are implemented at the municipal level, this recommendation applies to the five Earle municipalities: Colts Neck, Howell, Middletown, Tinton Falls, and Wall.

*(CHAPTER 41: AN ACT concerning land use adjacent to military facilities, amending P.L.1975, c.291 and P.L.1995, c.249 and supplementing P.L.1975, c.291 and chapter 18A of Title 52 of the Revised Statutes)

Recommendation A.3: Conduct noise study documenting sound levels and potential areas of impact from the NWS Earle Explosive Ordnance Disposal (EOD) range. Develop mitigation plan jointly with any impacted communities.

Discussion: NWS Earle tenants use an EOD range at Mainside to train selected personnel in disposing of unexploded ordnance as part of their standard training regimen. This can occur up to once a week but the timing varies depending on training schedules and needs. Since noise from the EOD range can be heard off-base, a noise study would be useful to identify higher or disturbing noise levels which

potentially go beyond base boundaries and specifically which areas and municipalities are possibly affected. Other Naval weapons stations have conducted similar noise studies of their ordnance training activities, and implemented mitigating measures. A similar study could therefore be beneficial for NWS Earle and the surrounding jurisdictions. Once this data is available, follow-up consultation between the installation and any affected municipality could occur to consider a plan of action to mitigate adverse effects, if there are any.

Recommendation A.4: Continue to educate the general public about the NWS Earle mission and the need to respect security boundaries along Normandy Road, in Sandy Hook Bay, and on Bayshore beaches adjacent to the pier.

Discussion: In general, many people in the region are aware of NWS Earle's mission but many are not. The wooded boundary at Mainside is an effective buffer, and many people are not aware of what goes on behind the fence, inside the base boundaries. At the Waterfront, the purpose of the Navy piers, which extend for miles into the Bay, and the operations that occur on these piers, are not well understood. There are also restricted signs along Normandy Road, but people may not know why this roadway is restricted or the exact use it serves for the Federal government. More education about NWS Earle for the general public would be helpful, particularly to encourage respect for the security necessary to maintain NWS Earle operations. In general, the more informed the public is about the NWS Earle mission and its boundaries, the less chance there is for an inadvertent breach in security, which in turn can negatively affect base operations and the safety of community residents. Several educational efforts began as part of the JLUS. Fact sheets about the pier complex and Normandy Road were prepared and distributed at various meetings and posted to web sites. Marinas closest to the Earle pier complex expressed willingness to provide information with future client contracts. The NJ Sea Grant Consortium volunteered to post information about the security zone around the pier complex on their web site. These efforts should continue and be expanded over time (see related Recommendation D.4).

Recommendation A.5: Collect base employee data on residences (by zip codes) and spending patterns useful for municipal/county economic development purposes.

Discussion: NWS Earle employs over 800 people. Having data on where these employees reside and their general spending patterns could help the County identify potential economic development strategies that cater to this workforce and complement their other employer-oriented programs. Monmouth County is welcoming to NWS Earle as a major employer but would like to continue to grow and diversify its economic base. Any data or statistics that can be shared with the County would help its economic development program going forward, which in turn would be advantageous to base employees in enhancing their quality of life while employed at the base.

B. Land Use

Encouraging compatible land use and putting into effect controls to regulate this is a goal for many communities with proximity to military installations across the country. Few planning documents at the local level recognize NWS Earle and consider its mission in current land use planning and zoning. The recommendations in this category are intended to enhance local planning by establishing buffer areas around the base in which municipalities would consider compatible development and redevelopment in their future land use and zoning initiatives. In addition, preserving farmland, conserving environmentally sensitive lands, and expanding buffers around the base as a natural barrier is recommended to prevent encroachment and increase the safety of citizens throughout the region. Five land use recommendations are proposed to address these issues.

Recommendation B.1: Formally recognize 3,000 ft. buffer from NWS Earle boundaries in jurisdiction planning documents. Encourage compatible land development and zoning within this buffer. Direct incompatible development to more suitable areas outside the MIA. Consider implementing applicable land development controls recommended.

Discussion: As noted in Recommendation A.2 above, New Jersey legislation recognizes a 3,000 feet buffer from NWS Earle boundaries for notification purposes for land use changes. The County and municipalities should recognize both this buffer area and the MIA in all respective planning documents. When new comprehensive plans and zoning documents are updated, each municipality within the 3,000 ft. buffer area should consider their proximity to the base and encourage compatible zoning and land uses. For safety reasons, incompatible uses, such as new medium to high density residential housing, should be avoided in the area immediately adjacent to base boundaries. Other land use considerations could be made within the larger MIA surrounding base property by both the County and the eight additional municipalities included in the MIA (Atlantic Highlands, Eatontown, Farmingdale, Freehold, Highlands, Keansburg, Neptune, and Ocean). A number of tools are available to revise planning documentation at the local level to discourage development which is incompatible with NWS Earle missions and operations. These were discussed in Chapter 5 (see Section 5.a.ii) and could be considered over time by each jurisdiction when updating their respective planning documents.

Recommendation B.2: Encourage the NJ Military Ombudsman and the New Jersey Office for Planning Advocacy to discuss the mission of NWS Earle with other state agencies to educate them regarding the need to maintain compatible land uses within in the MIA. Discourage incompatible uses such as high density housing particularly within the MIA and at the NWS Earle buffer.

Discussion: Historically vacant parcels adjacent to NWS Earle are now being targeted for high density housing in order to accommodate state mandated affordable housing allocations, posing new safety and social/environmental justice issues. The New Jersey Council on Affordable Housing (COAH) considers undeveloped buffers within military installations as ‘vacant land’ and includes it in their calculations. Affordable housing should not be channeled into or adjacent to weapons stations and other similar military installations. Within the installations, wooded buffers serve an important safety and security purpose and should be maintained. More compatible uses at the boundaries include agriculture, office, and industries that support the military mission or base personnel. Additional changes to state policies are needed to encourage the prioritization of public acquisition funding applications for compatible uses in the MIA, such as through the state Green Acres, Blue Acres, and Farmland Preservation programs.

Recommendation B.3: Identify and pursue purchase of land that could provide additional NWS Earle buffer, storm/flooding protection, and/or environmental enhancement.

Discussion: Other communities across the country have realized the potential that undeveloped land around their military bases can have in providing a buffer area between these military operations and nearby civilian communities. The land areas that have inherent development constraints, such as flood prone land, wetlands, or properties with other environmentally sensitive features, can be prime targets to serve as buffer areas around an installation. At Joint Base McGuire-Dix-Lakehurst, land set aside for pinelands ecosystem protection has helped serve this purpose. The same goal should be considered for natural areas with sensitive environmental resources or other development constraints within the MIA surrounding NWS Earle property. Direct purchase or purchase of development rights by the County, state or municipality of these properties, often working with land conservation organizations, such as the Nature Conservancy, Trust for Public Land or a New Jersey-based conservation group, is recommended where possible as the opportunity arises and suitable properties are identified.

Recommendation B.4: Pursue REPI funding to preserve farms and add to the County Park System land preservation program in the MIA and immediately adjacent to the Normandy Road corridor to maintain and expand these compatible uses.

Discussion: As discussed in Chapter 4, DoD's REPI program provides Federal funding for purchase of land near military bases that can serve as buffer areas. The County unsuccessfully pursued REPI funding in 2015 and 2016. The County should continue to apply going forward. Land that serves as a buffer and maintains compatible uses, such as property targeted for farmland preservation or the Park System land preservation program are priority areas for protection. These areas were identified in Chapter 5 and are recommended for protection to encourage compatible land development within the vicinity of NWS Earle.

Recommendation B.5: Encourage additional farmers in the MIA to enter into farmland preservation programs.

Discussion: The County's farmland preservation program is seeking additional farmers in the MIA to enter into agreements for easements that permanently retire development rights on their farms and ensure that the land remains devoted to agricultural uses. Farmland is a highly compatible land use surrounding the base. Providing farmers with more information on the available programs and seeking additional farmland for preservation within the MIA will benefit the County, the installation and local farmers alike and is recommended as a sound land use strategy for the region.

C. Economic Development

The base contributes to the economic vitality of the surrounding communities and the region but has not often been considered in the economic development goals of local stakeholders. Growing populations and increased development in surrounding municipalities require more collaboration between the base and the local economy. The next generation of planning documents and economic development programs should consider the spending power of base personnel, the hiring potential of the Navy, as well as shared safety concerns amid growing activity. Six recommendations address these economic development-related issues.

Recommendation C.1: Conduct marketing events to educate local NJ contractors about Federal contracting opportunities at NWS Earle (and other bases, e.g., Joint Base McGuire-Dix-Lakehurst, if a broader program is desired).

Discussion: As stated in Section 2, procurement of goods and services at the base has an estimated economic impact on the surrounding communities of more than \$842,000 per year. As a means of furthering the positive impacts of the base on the surrounding municipalities, Monmouth County and economic development advocacy groups, such as the Monmouth Ocean Development Council (MODC) could partner to conduct educational events for the local business community about the Federal contracting process and opportunities at this and other military bases, such as the nearby Joint Base McGuire-Dix-Lakehurst or Picatinny Arsenal. The Federal procurement process may be difficult to manage for smaller companies, particularly seeking opportunity notifications. Educating local contractors can simplify the process of bidding, improving both the service at the base and support of the local economy.

Recommendation C.2: Create local workforce development programs in conjunction with active Navy training and staff recruitment activities.

Discussion: The Navy is a significant employer at the base for both enlisted military members and civilians. There has been no direct effort, however, to recruit locally or for local educational institutions

to prepare residents for Navy employment. Feedback from base personnel suggests that the Navy has interest in developing programs to recruit and train new staff members across civilian positions. Local business leaders, educational institutions, the County, and municipalities should coordinate with the Navy to develop skills, education, and training programs to match anticipated positions. In addition, the Navy should provide listings to these organizations as they become available.

Recommendation C.3: Coordinate efforts on marketing NWS Earle land and water assets to attract additional Federal or other government tenants over time.

Discussion: NWS Earle contains over 10,000 acres of land at Mainside, over 700 acres at the Waterfront, and numerous support facilities at both locations. The last Master Plan created for the base (July 2014) identified potential growth areas for additional Federal or other government agency development within the installation boundaries. To maximize the land area and facilities on-base, the County and State, working with the Navy, could join in cooperative efforts to advertise these assets and increase awareness of this secure site for additional tenants. This effort over time may increase the employee population on-base which will serve the long-term economic development interests of both parties.

Recommendation C.4: Conduct a study of the Route 33/34 corridor that could spur economic development and/or redevelopment with compatible uses, including the provision of new services for personnel stationed at NWS Earle.

Discussion: NJSH Route 34 is part of STRAHNET. The Route 33/34 Corridor includes NJSH Route 34 from US 195 in the south to CR 537 in the north and NJSH Route 33 from the Garden State Parkway in the east to the 33/33 Business split in the west. This area includes the one mile segment occupied jointly by Routes 33 and 34. An economic development study of the Route 33/34 corridor surrounding the base is needed to better understand market-supportable uses along the roadway. Discussions with multiple stakeholders have revealed that this corridor should be considered for redevelopment opportunities as it passes through multiple municipalities. More study is needed to determine viable compatible uses based on market demands and land use controls, as well as to identify retail or commercial uses that would also be marketable to Navy personnel. A more detailed study focused on the economic and demographic profile of the immediate area, as well as Navy personnel needs, can support municipalities in developing strategies to activate this key corridor. In August 2017 the Wall Township Committee passed a resolution authorizing a redevelopment assessment of the Township's part of the corridor.

Recommendation C.5: Continue to stay involved as part of the Port Belford redevelopment planning group and similar local initiatives.

Discussion: The Port Belford Redevelopment Plan set forth ambitious redevelopment goals, design standards, and resiliency measures aimed at revitalizing the area. The redevelopment area is significant for both Middletown and the base, as it is bordered by the Raritan Bay shoreline and the installation's Waterfront Complex western boundary. It is also a center of economic activity for Middletown's Bayshore. As Middletown Township begins to implement measures from this plan, key stakeholders at the Navy and the County-level should continue to be engaged with this and similar efforts in neighboring communities through regular communication and input.

Recommendation C.6: Promote recreational amenities in the Bayshore Region, as outlined in the Bayshore Region Strategic Plan (2006), in conjunction with NWS Earle requirements near secure waterfront areas and the pier. Promote continued use of County Park lands including Bayshore Waterfront Park, Henry Hudson Trail, Popamora Point, and Mount Mitchell as locations that draw tourists to waterfront destinations and encourage the County Park System and NWS Earle to work together to reduce potential conflicts.

Discussion: The 2006 Bayshore Region Strategic Plan identified four key economic development issues facing the area and recommended strategies to address these issues, many of which are related to the Bayshore region and the waterfront area occupied by the Navy pier. Most important to the relationship between the pier and Middletown is the recommendation to market and brand the Bayshore region as a destination for local and regional tourists. More specifically, the Plan recommended that municipalities retain fishing and maritime industries and work to draw tourists to waterfront destinations. Furthermore, continued use and possible expansion of County Park lands in the MIA, including Bayshore Waterfront Park, Henry Hudson Trail, Popamora Point, and Mount Mitchell, should be promoted as key locations that draw tourists to waterfront destinations and provide additional buffering of NWS Earle from incompatible uses.

Any actions taken to maintain or increase waterfront activities consistent with these recommendations could present conflicts to NWS Earle's pier operations, such as the potential for safety concerns for recreational boaters in the waters near the pier. To minimize future conflicts, Bayshore municipalities and the County Park System should work in conjunction with the base on all marketing and branding materials related to the waterfront and surrounding areas to provide the appropriate information to civilian users and visitors about restrictions.

Recommendation C.7: In order to promote the retention of existing farmland, encourage farmers in the MIA to work through the County's Grown In Monmouth and Sustainability Planning initiatives to identify new venues and linkages for local agricultural products.

Discussion: Farming is a very compatible use for the MIA. Farms in this area tend to be small and Right-to-Farm issues often occur when non-farming neighbors are close. The sustainability of small agricultural operations is challenging. In order to assist local farmers remain in the MIA, careful attention to sustainability tools and programs are necessary. Monmouth County's Grown In Monmouth initiative focuses on assisting local farmers promote their agricultural products. Long term goals of the County Divisions of Planning and Economic Development include identifying additional sustainability measures such as making new business connections and expanding value-added agricultural opportunities. Possible connections with NWS Earle should be investigated, such as encouraging the Base to buy locally grown produce and marketing shares in area Community Supported Agriculture (CSA) programs. It is important, therefore to encourage farmers in the MIA to work within County programs.

D. Transportation

As stated in Section 5.B., transportation by roadway, rail and sea all play a vital role in the success of the NWS Earle's mission. To support the mission of the Base - to provide munitions to the Navy Fleet - each means of transportation is used in some form and each has its own set of issues as they relate to the surrounding communities. Monmouth County has multiple modes of transportation available to provide Monmouth County residents with links to both the New York City and Philadelphia metro regions, including a private airport, NJ Transit rail and bus lines, privately run Ferry services to lower Manhattan, and a roadway system that has classifications from Interstate to County and local routes. Six separate transportation-related recommendations address issues related to these transportation systems serving both the base and the surrounding communities.

Recommendation D.1: Conduct a corridor study along Route 33-34 to improve traffic conditions including STRAHNET access/egress and outmoded or undersized turning movements. Include recommended roadway & intersection improvements in MPO transportation project lists for priority funding.

Discussion: As noted in Sections 5.b.i.1. and 5.b.i.2 respectively, the Route 33/34 Corridor is part of the STRAHNET transportation route for NWS Earle and one of the Coastal Evacuation Routes, as identified in the County Hazard Mitigation Plan. This established stretch of roadway functions as an important conduit for the area's commuter traffic between Route 195 and the central and northern NJ region, and between the Trenton/Freehold area and the Garden State Parkway and shore areas. The present condition of this area corridor, while functional, is by modern standards outdated. The traffic circle dates from the 1940-50s and outmoded turning movements between Routes 33 and 34 impact Base traffic directly. Based on discussions with stakeholders, a recommendation is proposed to conduct a traffic-related corridor study. This could be done in tandem with an Economic Redevelopment Study for the corridor (See Recommendation C.3).

Recommendation D.2: Review options for modifying signalization for at-grade intersections along the Normandy Road corridor to alleviate current issues identified by NWS Earle municipalities.

Discussion: In meeting with the Monmouth County representatives of Public Works and Engineering, and with Middletown Township, it was noted that there are issues relating to the at-grade intersections of Normandy Road and a number of local and county road crossings. These issues have to do with signalization and safety concerns for vehicles crossing Normandy Road. Initial discussions have begun by looking at the means by which NWS Earle can work with the local authorities to provide some level of co-operative oversight and regular maintenance of these intersections. Further coordination is needed to improve signalization and the operability of these intersections for both the Navy and the general public.

Recommendation D.3: Conduct a study of traffic calming measures to alleviate speeding through Farmingdale on CR 524 (Main Street), which is a local connector between I-195 and NWS Earle (NJSH 33/34).

Discussion: County Route 524 lies south of NWS Earle and is a local connector road through the County from Interstate Route 195 to Route 33. This road provides an alternative to Route 34 as a north-south access route but goes through residential and commercial areas in downtown Farmingdale Borough. As part of the outreach conducted through the JLUS process, the Borough requested that traffic studies investigate means of slowing down traffic in this area, reducing the potential for accidents, which in turn will improve access to the base. The study could include a review of potential ways to increase the enforcement of the speed limit.

Recommendation D.4: Improve notification at all Bayshore marinas of the secure/restricting boating zone around NWS Earle piers.

Discussion: A meeting was held with representatives of the local recreational boating community. In attendance were representatives from the State Marina and Boat Ramp in Leonardo and the County's Monmouth Cove Marina, which have very close proximity to the Navy pier. A tri-fold flyer has been developed by NWS Earle that describes the security restrictions and zone around the pier complex. The State Marina representatives stated that they had distributed this information to boaters, and the County Marina requested that they be provided copies to give include with their 2018 contracts. It was determined that further liaison from NWS Earle would be helpful to ensure that both marinas had copies of this information to distribute to recreational boaters prior to their boating activities in Sand Hook Bay.

Recommendation D.5: Encourage support for accelerated maintenance of Sandy Hook channel.

Discussion: At a meeting held with representatives of groups that have interest in the future use, safety, and health of the Sandy Hook Bay, which included representatives of the NY/NJ Baykeeper's Office, the

NY-NJ Harbor and Estuary Program/Hudson River Foundation, and the NJ Sea Grant Consortium and the recreational boating community, the continuing health and maintenance of navigable channels was discussed. All parties, including representatives from NWS Earle agreed that the ability of the Bay to accommodate navigation is a must and that measures should be investigated that could possibly accelerate the cycles of maintenance for the channels.

Recommendation D.6: Coordinate with local airports and the FAA to reinforce overflight limitations over NWS Earle property. Provide airports with maps illustrating restricted airspace boundaries.

Discussion: There have been discussions with Wall Township with regards to the existing private airport located along Route 34, south of the base. A small portion of the approach-way to the airport overlaps with the base, and there needs to be further discussion, including outreach to the airport operators and public education related to the safety and security restrictions of overflights over NWS Earle property.

E. Utilities

Enhancing municipal utility systems that jointly serve NWS Earle and the surrounding communities can be a direct benefit to all parties. Providing uninterrupted utility service during storm events is particularly important to maintain critical assets on both the civilian and military sides of the fence. Three recommendations are proposed to augment utility systems serving the area, including involvement in one effort which is already underway, sponsored by the New Jersey Board of Public Utilities (BPU).

Recommendation E.1: Encourage joint participation in Microgrid Feasibility Studies to analyze the potential for establishing uninterrupted power supplies that provide additional resiliency for key government functions.

Discussion: NWS Earle and County representatives have been involved in initial discussions with Middletown Township for the potential of creating a microgrid in the waterfront area that would serve both the surrounding communities and NWS Earle. The discussions are ongoing. More information is available at <http://www.elp.com/articles/2017/07/n-j-utilities-board-develops-13-microgrids-to-improve-storm-resiliency.html>. BPU recently provided a grant to fund a feasibility study for this microgrid system. NWS Earle should consider participating in additional similar studies that could be mutually beneficial in other communities around the base. The local communities should consider working with NWS Earle and the County, where appropriate, on more of these types of projects to improve resiliency and protect key government facilities from extended power interruptions.

Recommendation E.2: Pursue solar options to provide supplementary power to the installation and surrounding community. Coordinate this with other BPU-funded microgrid studies.

Discussion: NWS Earle representatives have been active participants in the discussion of the potential of creating a microgrid in the Tinton Falls Borough that would conceivably use solar energy as part of the supplementary power. There have been numerous alternatives discussed for the possible size and location of facilities, and the discussions are on-going with BPU. There is an intention to advance a Request for Proposals to conduct a Feasibility Study in the near future.

Recommendation E.3: Investigate additional flood-proofing measures for sewage treatment facilities serving NWS Earle and surrounding neighborhoods.

Discussion: According to Brian Rischman, P.E., Staff Engineer for the Township of Middletown Sewerage Authority (TOMSA), approximately \$1M in damages occurred from coastal flooding of the Middletown wastewater treatment plant as a result of Superstorm Sandy, which hit the area on October 29, 2012.

FEMA 406 insurance and TOMSA funds were used for restoration of the plant. FEMA 404, FEMA 406 and TOMSA funds have been used for hazard mitigation. The hazard mitigation projects are nearly complete (as of mid-2017). The projects generally consisted of raising a pump station above the 500-year floodplain, installing flood barriers on treatment plant buildings, relocating some of the critical plant equipment above the 500-year floodplain, and installing sump pumps in treatment plant buildings which have basements. Plans were also put in place to relocate Authority vehicles outside flood susceptible areas prior to future potential flood events.

The Authority's treatment plant is located within the 100-year floodplain. A number of the Authority's 14 pump stations are located next to waterways although only a few have a history of flooding. The Authority's collection system extends through the Bayshore sections of Middletown, including NWS Earle Waterfront facilities, and serves ships when they are at-port. Although manholes are generally not damaged by flood waters, they can serve as a source of inflow during a flood. This causes extra flow at the treatment plant and, in extreme cases, can cause the plant to exceed its capacity.

A recommendation is proposed to investigate additional flood-proofing measures, at-risk lift stations, and the overall collection system serving the plant to assist TOMSA in the ability to keep storm-related water out of the treatment systems. This will also better ensure continuous wastewater treatment service for both the Middletown Bayshore neighborhoods and the Navy facilities and ships at the NWS Earle Waterfront. Similar studies could investigate potential resiliency issues for the Bayshore Outfall Authority and other sewage management agencies in the MIA.

F. Climate Resilience

As stated in Chapter 1, a main goal of this JLUS was to address climate resilience. In 2012 NWS Earle suffered \$50 million in damage from Superstorm Sandy. The region at large also had significant storm damage during this event, including loss of power over an extended period of time (one-two weeks). Rising sea level will exacerbate this problem in the future. A number of Federal, state and local efforts are underway to take proactive steps leading towards better resilience of the region's critical assets, including facilities at NWS Earle. A detailed analysis of the potential risk associated with climate resilience (including storm surge, sea level rise, and localized/nuisance flooding) for the coastal area surrounding NWS Earle was provided in Chapter 5. Nine separate recommendations are made that seek to reduce this risk, through short, mid and long term actions and involving participation at all levels of government, as well as private and commercial entities and other local organizations.

Recommendation F.1: Encourage coordinated Federal, State, County, and Middletown Township effort to implement a naturalized beach erosion/shoreline protection project protecting both Navy and County/community waterfronts. Encourage the continuation of habitat restoration work at Bayshore Waterfront Park.

Discussion: At the present time, the U.S. Army Corps of Engineers (USACE) is constructing a section of the Port Monmouth Hurricane and Storm Damage Risk Reduction Project on the Sandy Hook Bay shoreline west of the Navy's Pier Complex and has also conducted a Preliminary Assessment for the Leonardo, Raritan Bay, and Sandy Hook Bay Coastal Storm Risk Management Project (See Section 5.d.ii.). The Naval Facilities Engineering Command's *Climate Change Planning Handbook on Installation Adaptation and Resiliency* was also recently published (January 2017) that delineates recommended climate adaptation approaches.

A recommendation is made to coordinate an effort between the USACE and the Navy to develop specific applications that can be used in this area. Possible locations for such measures could potentially be on County property. There are several county assets with proximity to the waterfront including the Belford Ferry Terminal, the closed Belford Landfill property, the N-61 confined disposal facility, and several County Park System properties. These properties might be available for coordinated projects. Bayshore Waterfront Park has been the site of several habitat restoration projects which should be continued and expanded to increase storm resiliency.

Recommendation F.2: Develop a Marsh & Dune Restoration Plan that identifies where Navy dredge material can be beneficially used for storm protection. Coordinate with all parties prior to the Navy's next navigational channel and ship berthing dredging effort, including the County Division of Public Works and Engineering and the County Park System to determine if their facilities in the Bayshore might be suitable locations.

Discussion: A recommendation was made to encourage the beneficial reuse of clean dredge materials to create, maintain, or expand wetlands in the Bayshore (Sandy Hook to NWS Earle area) and reduce or eliminate high-risk flood zones. In a meeting with groups that have interest in the future use, safety, and health of the Sandy Hook Bay, representatives of NY/NJ Baykeeper, the Hudson River Foundation, and the NJ Sea Grant Consortium were in attendance. During this meeting, the Hudson River Foundation noted that they are currently conducting testing of the materials in the Raritan River channel for the NJ Department of Transportation to assess future dredging and reuse. Coordination of efforts to provide dredged material to enhance the shoreline and reduce flood prone area hazards would benefit all parties. Beneficial re-use of dredge spoils to enhance storm protection could be possible, but this will depend upon the analysis of the dredged materials in the channel for pollutants and contaminants to determine reuse potential.

Recommendation F.3: Investigate potential joint stormwater management improvement projects to reduce local flooding in the Leonardo community adjacent to the Navy's waterfront property.

Discussion: As noted in Section 5.d.ii.3., there is an isolated low area within the Leonardo neighborhood of Middletown Township adjacent to the Pier Complex and Normandy Road. There are plans to provide relief through a storm drain that would cross NWS Earle's Waterfront area and release the stormwater into Ware Creek on the western side. Further coordination on this effort benefiting both the Leonardo community and the Navy is needed.

Recommendation F.4: Continue to work with NJ FRAMES as they develop resiliency recommendations.

Discussion: The New Jersey Department of Environmental Protection (DEP) and officials in the Two Rivers region of northeastern Monmouth County are working together as part of the New Jersey Fostering Regional Adaptation through Municipal Economic Scenarios (NJ FRAMES) project. NWS Earle and the County are also participating. In August 2017 NJ FRAMES began their Two Rivers Mapping Project encouraging the public to identify facilities in their communities that should be part of focused flood-resiliency planning efforts. DEP will use information from this effort to develop protective strategies. As part of the campaign, the community is asked to identify public buildings, police and fire stations, municipal buildings, hospitals or urgent care centers, schools, important businesses, and popular gathering spots.

A portion of the NJ FRAMES study area includes Middletown Township and some MIA municipalities. The JLUS study has created mapping to identify Emergency Facilities and key Coastal Facilities (See Section 5.d). The JLUS mapping will complement the NJ FRAMES information as potential source material and will be shared.

During the JLUS process, coordination with NJ FRAMES has been very beneficial to all involved. The County and the Navy should continue to work with DEP on their three-year NJ FRAMES project even after the JLUS grant ends.

Recommendation F.5: Conduct site specific vulnerability assessments of critical assets exposed to future flood hazards, including: TOMSA facilities, Ferry Terminals, Marinas, etc.

Discussion: There have been a number of resiliency measures contemplated for this area during past years, and many of these plans look at the region or shoreline. It is recommended that a study be conducted to identify Critical Assets throughout the coastal region, beyond the area covered by the NJ FRAMES study, and once identified, encourage further investigation as to a range of characteristics - from the value of land and buildings, the value of businesses, and some idea as to replacement or relocation costs - to assist in future resiliency efforts. The individual business and structures would need to be surveyed, and some determination made as to sustainability in their present locations and configurations. This analysis of critical assets could benefit the Navy at NWS Earle – at both Mainside and the Waterfront – the County, the surrounding municipalities, and the local business community.

Recommendation F.6: Consistent with economic development plans, identify water-dependent uses in the study area and determine future adaptive capacity and other working waterfront uses.

Discussion: As noted in Section 5.d.ii.5., and related to recommendation F.5 above, the ability of existing businesses to adapt to changing conditions is a longer-range planning effort, but one that should be investigated.

Recommendation F.7: Continue to encourage improvement in Community Rating System (CRS) certifications by leveraging additional resilience efforts to generate analyses that will qualify for CRS points.

Discussion: As delineated on the FEMA website (<https://www.fema.gov/community-rating-system>), *The Community Rating System (CRS) recognizes and encourages community floodplain management activities that exceed the minimum NFIP standards. Depending upon the level of participation, flood insurance premium rates for policyholders can be reduced up to 45%. Besides the benefit of reduced insurance rates, CRS floodplain management activities enhance public safety, reduce damages to property and public infrastructure, avoid economic disruption and losses, reduce human suffering, and protect the environment. Technical assistance on designing and implementing some activities is available at no charge. Participating in the CRS provides an incentive to maintaining and improving a community's floodplain management program over the years. Implementing some CRS activities can help projects qualify for certain other Federal assistance programs.*

The Monmouth County Master Plan, Section 12.0 Community Resiliency (page 12-19) discusses the Monmouth County Community Rating System (CRS) Assistance Program whereby the county serves as a CRS planning and support system, holding quarterly CRS Users Group meetings to provide a peer learning forum for municipalities to learn about the CRS program, exchange strategies for program advancement, and the opportunity to ask the county for professional assistance, at no cost to the municipality. The County CRS Assistance Program is the first regional assistance program in Region II and should continue to assist municipalities improve their ratings.

Recommendation F.8: Consistent with the identification of work locations, identify critical transportation routes that may be subject to future storm damage and periodic inundation from nuisance flooding that would prevent commuting or base access to NWS Earle.

Discussion: As noted in Section 5.b.i.2, the Route 36 Corridor is one of the Coastal Evacuation Routes identified in the County Hazard Mitigation Plan, and the NWS Earle Pier Complex has a vehicular entrance located on Route 36 adjacent to the Normandy Road overpass. This is an important point of access for commuting purposes and should be given serious consideration as part of any study of the effects of periodic inundation in the larger region.

Previous studies have mapped the extent to which flooding can potentially affect the Bayshore areas from both the east and west, and while Normandy Road seems to provide an effective means of access, there are areas along Route 36 that are flood prone. These areas should be studied and means of providing continuous access should be sought.

Public and employee access to the Mainside area is located on Route 34, and while this area is above current flood prone elevations, there are other low areas around the perimeter that should be investigated and mapped.

Recommendation F.9: Sea level rise raises the baseline conditions for all types of coastal flooding. Revise County and local planning documents to reflect water level rise and exposure assessment that is integrated into coastal flood hazard planning using frameworks consistent with the Navy Handbook and Federal guidance. Also, work with the NJ Department of Transportation (DOT) and the Department of Environmental Protection (DEP) on integration consistency.

Discussion: As noted in Section 5.d, NAVFAC's *Climate Change Planning Handbook*, Installation Adaptation and Resilience section (January 2017), contains a wealth of information for integration of adaptation approaches for a range of categories of facilities. The four approaches addressed in this Handbook should be reviewed within the context of County and local planning documents:

- Structural Adaptation Approaches
- Natural and Nature-based Adaptation Approaches
- Facilities Adaptation Approaches
- Non-facilities Adaptation Approaches

Recent efforts, including NJ FRAMES and other coastal flood exposure assessments, should use the methodology in Section 5.d to integrate the concepts of sea level change and storm surge into their assessments of coastal hazards, rather than treat sea level change as a hazard unto itself. Some examples of how this process can be applied is included in the summary of the preliminary assessment and recommendations conducted by the U.S. Army Corps of Engineers for the neighboring Leonardo area of Middletown Township (also described in Section 5.d), and in the process of construction of shoreline stabilization presently being enacted in Port Monmouth.

G. Security

Security at NWS Earle is paramount and a major focus for base leadership. Gates, fences, surveillance, and security patrols help maintain this at the four land and water based facility assets that make up the base: Mainside, Waterfront, Normandy Road, and the Pier Complex. This security is also conducted as a joint effort through cooperation between on-base security forces and local law enforcement agencies at both the County and municipal level. Two recommendations address additional security issues that would be helpful to the installation and increase safety both on and off-base in the future.

Recommendation G.1: Work with local flying clubs/organizations and the state to establish legislation enforcing limits on drone operations over military installations in New Jersey.

Discussion: Drones have become increasingly popular for both commercial and recreational use. Drones with cameras are commonplace, such as ones used by real estate professionals to photograph properties for marketing purposes. However, flying these over a military installation or any other secure complex can be an obvious security concern. When made aware of issues related to drones, the County Park System offered to investigate relocating the current model aircraft field at their Dorbrook Recreation Area to a location that would be away from the base boundary.

Statewide legislation prohibiting drones over military installation boundaries for any purpose could be particularly advantageous since other installations besides NWS Earle (e.g., Joint Base McGuire-Dix-Lakehurst, and Picatinny Arsenal) would benefit. This legislation should be pursued as a means to address this issue and control unregulated drone use over all active military installations in the state.

Recommendation G.2: Add additional signage to limit pedestrian circulation on the beach near the secure area surrounding NWS Earle piers during low and high tide conditions. Coordinate security patrols by Navy and local law enforcement.

Discussion: Security personnel at NWS Earle have indicated issues exist with trespassing on base property at the pier complex by unauthorized civilians, particularly beach goers and tourists during the summer season and particularly at low tide when it's easy to walk a considerable distance offshore. Additional signage along the beach and in the water would be helpful and is recommended to help control this issue. In addition, more coordination with on-base and off-base security personnel to patrol the Bayshore near the installation, particularly during the summer season, is recommended. Further coordination on these and other related security issues could be achieved through discussion and possible amendments to joint security agreements already being considered and established between NWS Earle, the County and Middletown Township.

7. IMPLEMENTATION PLAN

The Implementation Plan for this JLUS is organized into seven sections representing the seven recommendation categories of Chapter 6. These categories represent the issues facing the NWS Earle region in improving military-community compatibility. In some cases, they are typical of other military installations in other areas in the country, but in most cases, the recommendations are specific to NWS Earle and the type of operations at this base, as well as the local land use and economic conditions of the municipalities that surround the installation.

A. RECOMMENDATION METHODOLOGY

The recommendations resulting from the NWS JLUS were presented and described in Chapter 6. This chapter provides these same recommendations in a matrix format along with additional information useful for implementation. The matrix contains the following information in separate columns for each recommendation:

- **Number and Category** - corresponding to the seven separate categories or groups of recommendations (communications, land use, economic development, etc.).
- **Issue** – summary of encroachment issue being addressed by each recommendation.
- **Recommendation** - as included and described in Chapter 6.
- **Jurisdiction/Organization Involved** – identification of which municipality, governmental agency, and/or private-sector entity is affected by the recommendation and should be involved in implementation.
- **Timeframe** – time period expected for the recommendation’s implementation, as follows:
 - Short-term: 0-3 years
 - Mid-term: 3-7 years
 - Long-term: greater than 7 years
- **Priority** – a ranking of high, medium, or low priority for implementing each recommendation based on the stakeholders’ input during the interviews, feedback during the JLUS planning process, and research by the consultant team over the course of the study. Recommendations identified as high priority should be examined first for implementation funding. To this effect, an initial discussion with OEA for potential funding of one or more of the high priority recommendations was held at the December 2017 Policy and General Advisory Committee meeting.
- **Estimated Cost** – an initial estimate of the cost involved in implementation of each recommendation. This falls into four categories indicated by \$ signs:
 - \$ = Less than \$50,000
 - \$\$ = \$50,000 - \$100,000
 - \$\$\$ = \$100,000 - \$250,000
 - \$\$\$\$ = greater than \$250,000
- **Potential Funding Source** – identification of potential funding sources or entities who could contribute (in part or in full) the cost involved in each recommendation’s implementation.

As mentioned in Chapter 6, these recommendations are non-binding and result from the collaborative planning process involved in this JLUS. They may change over time, along with some of the parameters described above and included in the matrix, but represent the consensus opinion of the stakeholders

and consultants at the conclusion of this study. A follow-on implementation committee or similar entity will continue to dialogue the issues affecting the civilian municipalities surrounding NWS Earle, along with the recommended studies and projects to improve this military-community relationship overtime.

NWS Earle JLUS													
Recommendations Matrix - Final													
3-Nov-17													
Category	Issue	Recommendation	Jurisdiction/Organization Involved						Timeframe	Priority	Estimated Cost	Potential Funding Sources	
			Federal/ Navy	State	County	NWS Earle Municipalities	MIA Municipalities	Private/Other Organizations					
A.1	Communications/Outreach	Local Cooperation	Pursue additional cooperation between Navy, County departments, and NWS Earle municipalities addressing facility maintenance, security, emergency response, etc.	x		x	x			Short	High	\$	N/A
A.2		Development & Planning Notifications	Improve notification processes to share proposed land development submittals and plan amendments, zoning changes, and comprehensive plan updates within 3000 ft of installation boundaries.	x		x	x			Short	High	\$	N/A
A.3		Noise	Conduct noise study documenting sound levels and potential areas of impact from the NWS Earle EOD range. Develop mitigation plan jointly with any impacted communities.	x		x	x	x		Mid	Low	\$\$	Federal/DoD (Navy Munitions Command)
A.4		Public Education	Continue to educate the general public about the NWS Earle mission and the need to respect security boundaries along Normandy Road, in Sandy Hook Bay, and on Bayshore beaches adjacent to the pier.	x		x	x	x		Long	Moderate	\$	N/A
A.5		Data Gap	Collect base employee data on residences (by zip codes) and spending patterns useful for municipal/county economic development purposes.	x		x				Mid	Low	\$	Federal (OEA), State, County

	Category	Issue	Recommendation	Jurisdiction/Organization Involved						Timeframe	Priority	Estimated Cost	Potential Funding Sources
				Federal/ Navy	State	County	NWS Earle Municipalities	MIA Municipalities	Private/Other Organizations				
B.1	Land Use	Compatible Land Development	Formally recognize 3000 ft. buffer from NWS Earle boundaries in jurisdiction planning documents. Encourage compatible land development and zoning within this buffer. Direct residential and institutional development to more suitable areas outside the MIA. Consider implementing applicable land development controls recommended in the toolbox.			x	x	x		Mid	Moderate	\$\$\$	County, Municipal, Federal (OEA)
B.2		Land Use and Preservation in the MIA	Encourage the NJ Military Ombudsman and the New Jersey Office for Planning Advocacy to discuss the mission of NWS Earle with other state agencies to educate them regarding the need to maintain compatible land uses within in the MIA. Discourage incompatible uses such as high density housing particularly within the NWS Earle buffer.	x	x	x	X	X		Short	High	N/A	N/A
B.3		Land Conservation	Identify and pursue purchase of land that could provide additional NWS Earle buffer, storm/flooding protection, and/or environmental enhancement.	x	x	x	x	x	x (Land conservation NGOs)	Long	High	\$\$\$	NJDEP Green Acres, NJDEP Blue Acres, County Municipal Open Space Program (for lands owned or leased by a municipality)
B.4		Land Conservation & Farmland Preservation	Pursue REPI funding to preserve farms and add to the County Park System land preservation program in the MIA and immediately adjacent to the Normandy Road corridor to maintain and expand compatible uses.	x		x (MCPS MCADB)	x	x	x (private land owners)	Short	Moderate	\$\$\$	Readiness & Environmental Integration (REPI) Program
B.5		Farmland Preservation	Encourage additional farmers in the MIA to enter into farmland preservation programs.		x	x (MCADB)	x	x	x (private land owners)	Short	Moderate	\$\$\$ (cost varies by location, development potential & cost share)	State/County/Municipal cost share and/or Non-Profit programs, NJ State Agriculture Dev. Committee Municipal Planning Incentive Grant (PIG) Program

	Category	Issue	Recommendation	Jurisdiction/Organization Involved						Timeframe	Priority	Estimated Cost	Potential Funding Sources
				Federal/ Navy	State	County	NWS Earle Municipalities	MIA Municipalities	Private/Other Organizations				
C.1	Economic Development	Use of Local Contractors	Conduct marketing events to educate local NJ contractors about Federal contracting opportunities at NWS Earle (and other bases, e.g., Joint Base McGuire-Dix-Lakehurst, if a broader program is desired).	x	x	x	x	x	x (Monmouth-Ocean Development Council (MODC))	Short	Moderate	\$	MODC
C.2		Workforce Development	Create local workforce development programs in conjunction with active Navy training and staff recruitment activities.	x	x	x (Co. Div. of Workforce Development)	x	x	x (Monmouth-Ocean Development Council (MODC))	Mid	Moderate	\$	MODC, Federal/Navy
C.3		Maximizing Use of Base Assets	Coordinate efforts on marketing NWS Earle land and water assets to attract additional Federal or other government tenants over time.	x	x	x				Mid	Moderate	\$	State, County
C.4		Route 33/34 Redevelopment	Conduct a study of the Route 33/34 corridor that could spur economic development and/or redevelopment with compatible uses, including the provision of new services for personnel stationed at NWS Earle.	x	x	x	x			Mid	High	\$\$	Federal (OEA), State (NJTPA), County
C.5		Port Belford Redevelopment Plan	Continue to stay involved as part of the Port Belford redevelopment planning group and similar local initiatives.	x		x	x (Middletown)			Short	Moderate	\$	N/A
C.6		Implementation of Bayshore Region Strategic Plan	Promote recreational amenities in the Bayshore Region, as outlined in the Bayshore Region Strategic Plan (2006), in conjunction with NWS Earle requirements near secure waterfront areas and the pier. Promote continued use of County Park lands including Bayshore Waterfront Park, Henry Hudson Trail, Popamora Point, and Mount Mitchell as key locations that draw tourists to waterfront destinations and encourage the County Park System and NWS Earle to work together to reduce potential conflicts.	x		x	x (Middletown)		x (Monmouth-Ocean Development Council (MODC))	Short	Moderate	\$	N/A

	Category	Issue	Recommendation	Jurisdiction/Organization Involved						Timeframe	Priority	Estimated Cost	Potential Funding Sources
				Federal/ Navy	State	County	NWS Earle Municipalities	MIA Municipalities	Private/Other Organizations				
C.7		Increase Economic Opportunities for Agricultural Sustainability	In order to promote the retention of existing farmland, encourage farmers in the MIA to work through the County's Grown In Monmouth and Sustainability Planning initiatives to identify new venues and linkages for local agricultural products.			x (Divisions of Planning and Economic Development)	x	x	x (Local businesses such as grocery stores, restaurants & landscapers)	Short	Moderate	\$	N/A

	Category	Issue	Recommendation	Jurisdiction/Organization Involved						Timeframe	Priority	Estimated Cost	Potential Funding Sources
				Federal/ Navy	State	County	NWS Earle Municipalities	MIA Municipalities	Private/Other Organizations				
D.1	Transportation	Land: Vehicular Traffic	Conduct a corridor study along Route 33-34 to improve traffic conditions including STRAHNET access/egress and outmoded or undersized turning movements. Include recommended roadway & intersection improvements in MPO transportation project lists for priority funding.	x	x	x	x			Mid	High	\$\$\$ (does not include funding for project design & construction)	Federal (OEA), State (NJDOT, NJTPA), County
D.2		Land: Vehicular Traffic	Review options for modifying signalization for at-grade intersections along the Normandy Road corridor to alleviate current issues identified by NWS Earle municipalities	x	x	x	x (Middletown, Colts Neck, Tinton Falls)			Short	High	\$ (does not include funding for project design & construction)	State (NJDOT, NJTPA), County
D.3		Land: Vehicular Traffic	Conduct a study of traffic calming measures to alleviate speeding through Farmingdale on CR 524 (Main Street), which is a local connector between I-195 and NWS Earle (NJSH 33/34).			x		x (Farmingdale)		Mid	Moderate	\$\$ (does not include funding for project design & construction)	State (NJDOT, NJTPA), County
D.4		Bay: Recreational Boating	Improve notification at all Bayshore marinas of the secure/restricting boating zone around NWS Earle piers.	x	x	x	x	x	x (local marinas, primarily in Atlantic Highlands)	Short	Moderate	\$	N/A
D.5		Bay: Channel Dredging	Encourage support for accelerated maintenance of Sandy Hook channel.	x	x	x			x (Private dredging contractor(s))	Long	Moderate	\$\$\$\$	Federal/DoD, FEMA, EPA, State (NJDEP)
D.6		Air: Airspace Control	Coordinate with local airports and the FAA to reinforce overflight limitations over NWS Earle property. Provide airports with maps illustrating restricted airspace boundaries.	x		x			x (Monmouth Jet Center)	Mid	Low	\$\$	FAA, County

	Category	Issue	Recommendation	Jurisdiction/Organization Involved						Timeframe	Priority	Estimated Cost	Potential Funding Sources
				Federal/ Navy	State	County	NWS Earle Municipalities	MIA Municipalities	Private/Other Organizations				
E.1	Utilities	Microgrid	Encourage joint participation in Microgrid Feasibility Studies to analyze the potential for establishing uninterruptible power supplies that provide additional resiliency for key government functions.	x	x	x	x (Middletown)		x (private energy developers, JCP&L)	Long	Moderate	\$\$\$	BPU Distributed Energy Resource (DER) Microgrid Feasibility Study Program
E.2		Solar Energy	Pursue solar options to provide supplementary power to the installation and surrounding community. Coordinate this with other BPU-funded microgrid studies.	x	x	x	x (Tinton Falls)		x (private energy developers, JCP&L)	Long	Moderate	\$\$\$	BPU Distributed Energy Resource (DER) Microgrid Feasibility Study Program
E.3		Sewage Treatment	Investigate flood-proofing measures for sewage treatment facilities servicing NWS Earle and surrounding neighborhoods.	x	x	x	x	x	x (Township of Middletown Sewage Authority, Bayshore Outfall Authority, Neptune Treatment Plant)	Long	Moderate	\$\$\$\$	FEMA Hazard Mitigation Assistance Grants, State, County, NJEIT

	Category	Issue	Recommendation	Jurisdiction/Organization Involved						Timeframe	Priority	Estimated Cost	Potential Funding Sources
				Federal/ Navy	State	County	NWS Earle Municipalities	MIA Municipalities	Private/Other Organizations				
F.1	Climate Resilience	Storm Surge/Water Levels	Encourage coordinated Federal, State, County, and Middletown Township effort to implement a naturalized beach erosion/shoreline protection project protecting both Navy and County/community waterfronts. Encourage the continuation of habitat restoration work at Bayshore Waterfront Park.	x	x	x	x (Middletown)			Long	Moderate	\$\$\$ (for study; does not include funding for project implementation)	Federal, State, County, Municipal, NJEIT, FEMA Hazard Mitigation Assistance Grants
F.2		Storm Surge	Develop a Marsh & Dune Restoration Plan that identifies where Navy dredge material can be beneficially used for storm protection. Coordinate with all parties prior to the Navy's next navigational channel and ship berthing dredging effort, including the County Division of Public Works and Engineering and the County Park System to determine if their facilities in the Bayshore might be suitable locations.	x	x (NJDEP & NJDOT Maritime Resources)	x (MCPS & Div. of Public Works & Engineering)	x (Middletown)	x (Keansburg, Highlands, Atlantic Highlands)	x (Raritan Baykeeper, NJ Sea Grant Consortium, NY-NJ HEP/Hudson River Foundation, Marine Trades Association)	Short	High	\$ (does not include dredging costs)	Federal, State (NJDEP), County, Municipal
F.3		Localized Flooding	Investigate potential joint stormwater management improvement projects to reduce local flooding in Leonardo community adjacent to the Navy's waterfront property.	x		x	x (Middletown)			Mid	High	\$\$\$\$	FEMA Hazard Mitigation Assistance Grants, State, County, Municipal, NJEIT
F.4		NJ FRAMES	Continue to work with NJ FRAMES as they develop resiliency recommendations.		x	x			x (Navesink Watershed Municipalities)	Short	Moderate	\$	TDB
F.5		Vulnerability Assessment	Conduct site specific vulnerability assessments of critical assets exposed to future flood hazards, including: TOMSA facilities, Ferry Terminals, Marinas, etc.	x	x	x	x	x		Mid	Moderate	\$\$\$\$	Federal
F.6		Water-dependent Uses	Consistent with economic development plans, identify water-dependent uses in the study area and determine future adaptive capacity and other working waterfront uses.			x		x	x	Mid	Moderate	\$\$	Federal

	Category	Issue	Recommendation	Jurisdiction/Organization Involved						Timeframe	Priority	Estimated Cost	Potential Funding Sources
				Federal/ Navy	State	County	NWS Earle Municipalities	MIA Municipalities	Private/Other Organizations				
F.7		Community Rating System	Continue to encourage improvement in Community Rating System (CRS) certifications by leveraging additional resilience efforts to generate analyses that will qualify for CRS points.		x	x	x	x		Short	Moderate	\$	State, County
F.8	Climate Resilience (continued)	Transportation Corridors	Consistent with the identification of work locations, identify critical transportation routes that may be subject to future storm damage and periodic inundation from nuisance flooding that would prevent commuting or base access to NWS Earle.	x	x	x	x	x		Short	High	\$\$	State (NJDOT, NJTPA), County
F.9		Local Planning Documents	Sea level rise raises the baseline conditions for all types of coastal flooding. Revise County and local planning documents to reflect water level rise and exposure assessment that is integrated into coastal flood hazard planning using frameworks consistent with the Navy Handbook and Federal guidance. Also, work with the NJ Department of Transportation (DOT) and the Department of Environmental Protection (DEP) on integration consistency.		x	x	x	x		Long	High	\$\$	County, Municipal

	Category	Issue	Recommendation	Jurisdiction/Organization Involved						Timeframe	Priority	Estimated Cost	Potential Funding Sources
				Federal/ Navy	State	County	NWS Earle Municipalities	MIA Municipalities	Private/Other Organizations				
G.1	Security	Drones	Work with local flying clubs/organizations and the state to establish legislation enforcing limits on drone operations over military installations in New Jersey.	x	x					Long	Low	\$\$ (does not include fees for political assistance or lobbying)	State
G.2		Beach Access	Add additional signage to limit pedestrian circulation on the beach near the secure area surrounding NWS piers during low and high tide conditions. Coordinate security patrols by Navy and local law enforcement.	x		x	x (Middletown)			Short	Moderate	\$\$	Federal, State, County, NJDEP
	Legend												
	Timeframe:	Cost:											
	Short = 0-3 years	\$ = <\$50,000											
	Mid = 3-7 years	\$\$ = \$50,000-100,000											
	Long = > 7 years	\$\$\$ = \$100,000-250,000											
		\$\$\$\$ = >\$250,000											

B. NEXT STEPS

The Joint Land Use Study (JLUS) has been a positive tool to engage the communities that surround the base and in particular those that comprise the NWS Earle property; Colts Neck, Howell, Wall, Tinton Falls and Middletown. The dialogue that has begun between the municipalities, the County and the Base has expanded the lines of communication and allowed all of the parties to openly express their interests and concerns. While the mission of the NWS Earle is defending the national interests of the United States through the safest manner possible, that ability of the local municipalities to enter conversations about their particular concerns proved invaluable. As the process moves forward, and the JLUS itself reaches completion, this opening of the communication channels between the various governmental agencies and stakeholders with an interest in this region should remain active. This report outlines a wide range of recommendations with descriptions of action items, and an Implementation Matrix that provides timelines, possible costs and potential funding sources. All of these items will need follow up and diligence to have them enacted.

There have been similar studies conducted throughout the country that have established differing methods of continuing the planning process. One example called for drafting of a Memorandum of Understanding (MOU) to be signed by the public agencies and military representatives that commits the parties to work together to collectively address and find solutions for issues identified in the JLUS. Another study led to the creation of Regional Executive Steering Committees (RESC), roughly akin to the typical JLUS Policy Committee, and a Regional Planning Committee (RPC), roughly equivalent to the General Advisory Committees (GAC) created for this JLUS. Both bodies are intended to be Consensus Based Collaborative Bodies who meet regularly to discuss ongoing issues and to move the Implementation Matrix items forward as funding or interest become available. They are not intended to be regulatory or administrative bodies, but to act as a liaison between the base and the local governing bodies.

The other precedent found for the implementation of JLUS recommendations tends to look at the Base as part of a more regional planning strategy, with a Regional Coordination Committee (RCC), composed of representatives of the various communities who have enacted resolutions supporting the Joint Land Use Study recommendations. Each entity is allocated two voting members to assist in the implementation of land development recommendations consistent with the intent of the JLUS, perform public outreach, and provide direction. The other agencies and partners in the JLUS, while not voting members, such as the Base Commander or their designated Liaison, the Department of Defense Office of Economic Adjustment (OEA), area Chambers of Commerce, or other State and County agencies serve in a consulting capacity.

In a State such as New Jersey, with home rule by the local governing bodies on matters pertaining to land use and zoning, there might be a hybrid committee set up that could both work on implementation of the study recommendations and review development plans submitted within the 3,000 foot buffer and MIA areas around the base, providing joint recommendations back to the local Planning and Zoning Boards. This type of arrangement can assure that all parties are aware of what is being submitted for

planning approvals in the sensitive areas around the base, and by working together, find possible equitable solutions to potential conflicts.

The future success of the NWS Earle JLUS will be based upon the ability of all parties who have come to the table to develop the plan, to continue to work together in the near and long term to see that the best planning practices are carried forward, adapted and enacted to meet the challenges identified. An implementation committee is necessary to move the JLUS recommendations to implementation as funding is available, improving long-term base and community resiliency and ensuring consistency between local planning decisions and the ongoing mission of Naval Weapons Station Earle.