



# Naval Research Laboratory

## Installation Master Plan

Naval District Washington

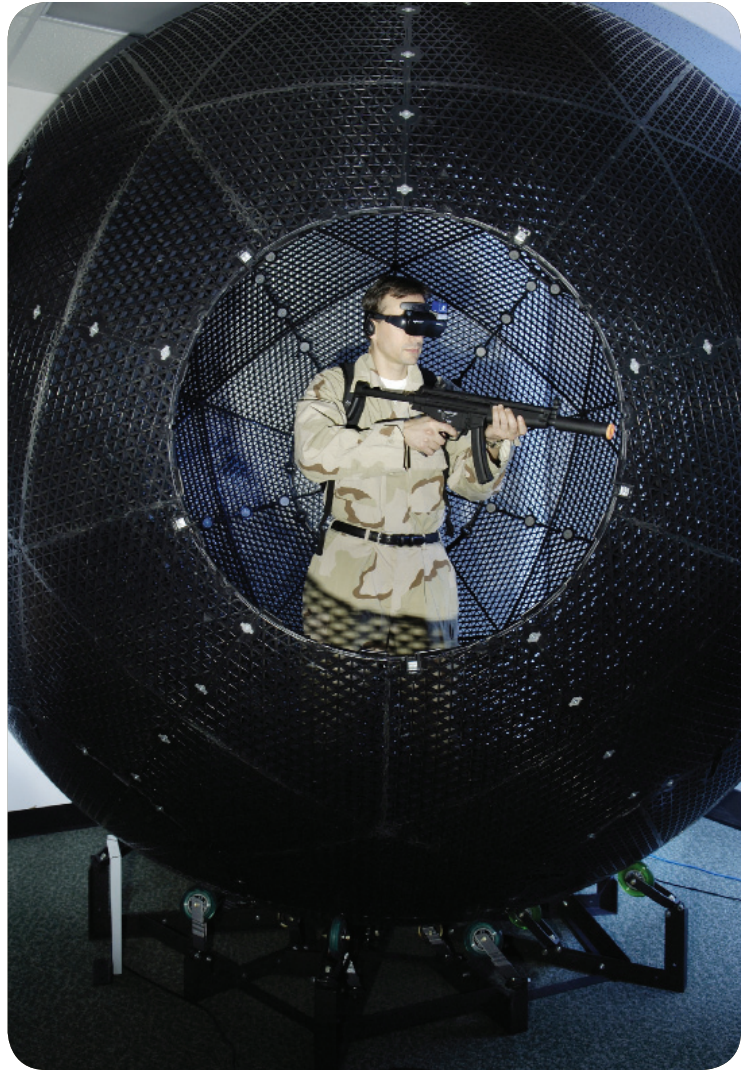
NAVAL FACILITIES ENGINEERING COMMAND







## Naval Research Laboratory Installation Master Plan



February 2015

Prepared for:



Prepared by the Joint Venture of:





# Table of Contents

<b>1.0 Executive Summary</b>	<b>5</b>	<b>5.0 Master Plan Program</b>	<b>87</b>
1.1 Major Directorates and Divisions	5	5.1 Population	87
1.2 Location	7	5.2 Parking	87
1.3 Vision and Guiding Principles	7	5.3 Program Projects	88
1.4 Population and Parking Program	8	5.4 Program Phasing	90
1.5 Existing Facility Assets	10	<b>6.0 Appendix</b>	<b>93</b>
1.6 Future Land Use and Framework Plans	12	6.1 Installation Appearance Plan	93
<b>2.0 Introduction</b>	<b>21</b>	6.2 Historic Preservation Analysis	96
2.1 Purpose	21	6.3 Historic Preservation Compliance	97
2.2 Methodology	23		
2.3 Master Plan Vision and Guiding Principles	23		
2.4 Installation Mission, Functions, and Responsibilities	25		
2.5 Location	26		
2.6 Local Planning Authorities	28		
2.7 Regional Context and Planning Initiatives	28		
2.8 Historical Development	32		
<b>3.0 Existing and Emerging Conditions</b>	<b>33</b>		
3.1 Existing Land Use	33		
3.2 Existing Natural and Manmade Features	37		
3.3 Encroachment Impacts	48		
3.4 Existing Facility Assets	49		
3.5 Major Utilities	56		
3.6 Existing Circulation Network	58		
<b>4.0 Framework Plan</b>	<b>63</b>		
4.1 Overview	63		
4.2 Planning Strategies	63		
4.3 Near-Term Outlook	80		
4.4 Long-Term (20-year) Outlook	84		

## List of Figures

Figure 1-1 Regional Map	6	Figure 3-11 Electric Line Corridor Map	56
Figure 1-2 Program Projects	9	Figure 3-12 STORMwater Line Corridor Map	56
Figure 1-3 Existing Facility Assets Map	11	Figure 3-13 WASTEwater line Corridor Map	56
Figure 1-4 Existing Land Use Plan	13	Figure 3-14 Water Line Corridor Map	57
Figure 1-5 Near-Term Land Use Plan	13	Figure 3-15 Central Steam Line Map	57
Figure 1-6 Long-Term Land Use Plan	14	Figure 3-16 Chilled Water System Map	57
Figure 1-7 Future Roadway Circulation and Parking Strategies Plan	15	Figure 3-17 Regional Transportation Map	59
Figure 1-8 Future Development Parcels Strategies Plan	15	Figure 3-18 NRL Transportation Map	60
Figure 1-9 Future Activity Hubs Strategies Plan	15	Figure 3-19 Metro Access and Bus Routes Map	62
Figure 1-10 Future Multimodal Circulation Strategies Plan	15	Figure 3-20 Bicycle Routes Map	62
Figure 1-11 Future Open Space and Pedestrian Circulation Strategies Plan	16	Figure 3-21 Internal Shuttle Route Map	62
Figure 1-12 Future Security Enhancements Strategies Plan	16	Figure 4-1 Future Conceptual Circulation and Parking Strategies (Overlaid on Existing Conditions)	64
Figure 1-13 Future Energy Strategies Plan	16	Figure 4-2 Future Roadway Circulation and Parking Framework Plan	65
Figure 1-14 Future Stormwater Management Strategies Plan	16	Figure 4-3 Future Conceptual Development Parcel Strategies (Overlaid on Existing Conditions)	66
Figure 1-15 Near-Term Framework Plan	18	Figure 4-4 Future Development Parcels Framework Plan	67
Figure 1-16 Long-Term Framework Plan	19	Figure 4-5 Future Conceptual Activity Hub Strategies (Overlaid on Existing Conditions)	68
Figure 2-1 RIMP 2.0 Model Base	22	Figure 4-6 Future Activity Hubs Framework Plan	69
Figure 2-2 Master Planning Methodology	23	Figure 4-7 Future Conceptual Multimodal Strategies (Overlaid on Existing Conditions)	70
Figure 2-3 Regional Map	27	Figure 4-8 Future Multimodal Circulation Framework Plan	71
Figure 2-4 Vicinity Land Use Map	31	Figure 4-9 Future Conceptual Open Space Strategies (Overlaid on Existing Conditions)	72
Figure 3-1 Existing Land Use Map	35	Figure 4-10 Future Open Space and Pedestrian Circulation Framework Plan	73
Figure 3-2 Existing Natural Features Map	38	Figure 4-11 Future Conceptual Security Enhancement Strategies (Overlaid on Existing Conditions)	74
Figure 3-3 Existing Cultural Features Map	41	Figure 4-12 Future Security Enhancement Strategies Plan	75
Figure 3-4 Existing Operational Constraints Map	45	Figure 4-13 Future Energy Strategies Plan	77
Figure 3-5 Land Suitability Analysis Map	46	Figure 4-14 Future Stormwater Management Strategies Plan	79
Figure 3-6 Developable Areas Map	47	Figure 4-15 Near-Term Framework Plan	81
Figure 3-7 Existing Facility Assets Map	53	Figure 4-16 Near-Term Land Use Plan	83
Figure 3-8 Building Condition Map	55		
Figure 3-9 Building Age Map	55		
Figure 3-10 Building Height Map	55		

Figure 4-17 Long-Term Framework Plan	85
Figure 4-18 Long-Term Land Use Plan (Shown on Existing Conditions)	86
Figure 5-1 Program Projects	89
Figure 6-1 Historic Resources Contributing to the Historic District	99

## List of Tables

Table 1-1 Program Population & Parking	8
Table 1-2 Program Projects	8
Table 1-3 Existing Facility Assets	10
Table 1-4 Comparison of Existing, Near-Term, and Long-Term Land Uses	12
Table 3-1 Existing Land Use Areas	33
Table 3-2 Inventory of Historic Properties	40
Table 3-3 Conditional and Restricted Development Constraints	46
Table 3-4 Facility Classes	49
Table 3-5 Facility Assets	51
Table 3-5 Facility Assets (continued)	52
Table 3-6 Summary of Building Condition	54
Table 3-7 Summary of Building Age	54
Table 3-8 Summary of Building Height	54
Table 3-9 Summary of Existing Parking	58
Table 4-1 Guiding Principles Key	63
Table 4-2 Roadway Circulation And Parking Strategies Matrix	64
Table 4-3 Development Parcels Strategies Matrix	66
Table 4-4 Activity Hubs Strategies Matrix	68
Table 4-5 Multimodal Circulation Strategies Matrix	70
Table 4-6 Open Space and Pedestrian Circulation Strategies Matrix	72
Table 4-7 Security Enhancement Strategies Matrix	74
Table 4-8 Energy Strategies Matrix	76
Table 4-9 Stormwater Management Strategies Matrix	78
Table 4-10 Comparison of Existing and Near-Term Land Uses	82
Table 4-11 Comparison of Near-Term and Long-Term Land Uses	84
Table 5-1 Program Population & Parking	88
Table 5-2 Programmed Projects	88
Table 5-3 Development Plan Phasing	91

## Acronyms and Abbreviations

ACP	Access Control Point
AT/FP	Anti-Terrorism / Force Protection
AWI	Anacostia Waterfront Initiative
BFR	Basic Facility Requirement
CBE	Categorization of the Built Environment
CCSD	Conventional Construction Standoff Distance
CFIP II	Corporate Facilities Investment Plan II
CFR	Code of Federal Regulations
DC SHPO	District of Columbia State Historic Preservation Office
DCOP	District of Columbia Office of Planning
DoD	Department of Defense
EIFS	Exterior Insulation and Finish System
ESQD	Explosive Quantity Distance arcs
FRES	Facility Readiness and Evaluation System
ft	feet
FY	Fiscal Year
GIS	Geographic Information System
HVAC	Heating, Ventilation, and Air Conditioning
IAP	Installation Appearance Plan
ICRMP	Integrated Cultural Resource Management Plan
iNFADS	Internet Naval Facilities Assets Data Store
IPMP	Integrated Pest Management Plan
JBAB	Joint Base Anacostia-Bolling
kV	Kilovolt
LID	Low Impact Development
m	meter
MILCON	Military Construction
MOA	Memorandum of Agreement
N/A	Not Applicable
NAVFAC	Naval Facilities Command
NCPC	National Capital Planning Commission
NCR	National Capital Region
NDW	Naval District Washington
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NRL	Naval Research Laboratory
NSV2035	Navy Shore Vision 2035
ONR	Office of Naval Research
ONR GSIP	Office of Naval Research Global Shore Infrastructure Plan
PEPCO	Potomac Electric Power Company
psi	pounds per square inch
PWD	Public Works Department
R&D	Research and Development
RDT&E	Research, Development, Testing, and Evaluation
RIMP	Regionally Integrated Master Program

sf	square feet
SOP	Standard Operating Procedure
SOV	Single Occupancy Vehicle
TNT	Trinitrotoluene
UFC	Unified Facility Criteria

## 1.0 Executive Summary

As the Navy moves into the 21st Century, efficient shore installation management must improve. Recent unprecedented employment growth is occurring resulting in the need to expand, relocate, and renovate facilities. This growth has impacts to infrastructure, buildings, environment, security, transportation, and quality of life; all of which need to be effectively managed. At first, the Naval District Washington (NDW) developed the Regionally Integrated Master Program (RIMP), which provided broad master planning directives for the entire NDW region. Next, the master plans for the individual installations are to be updated.

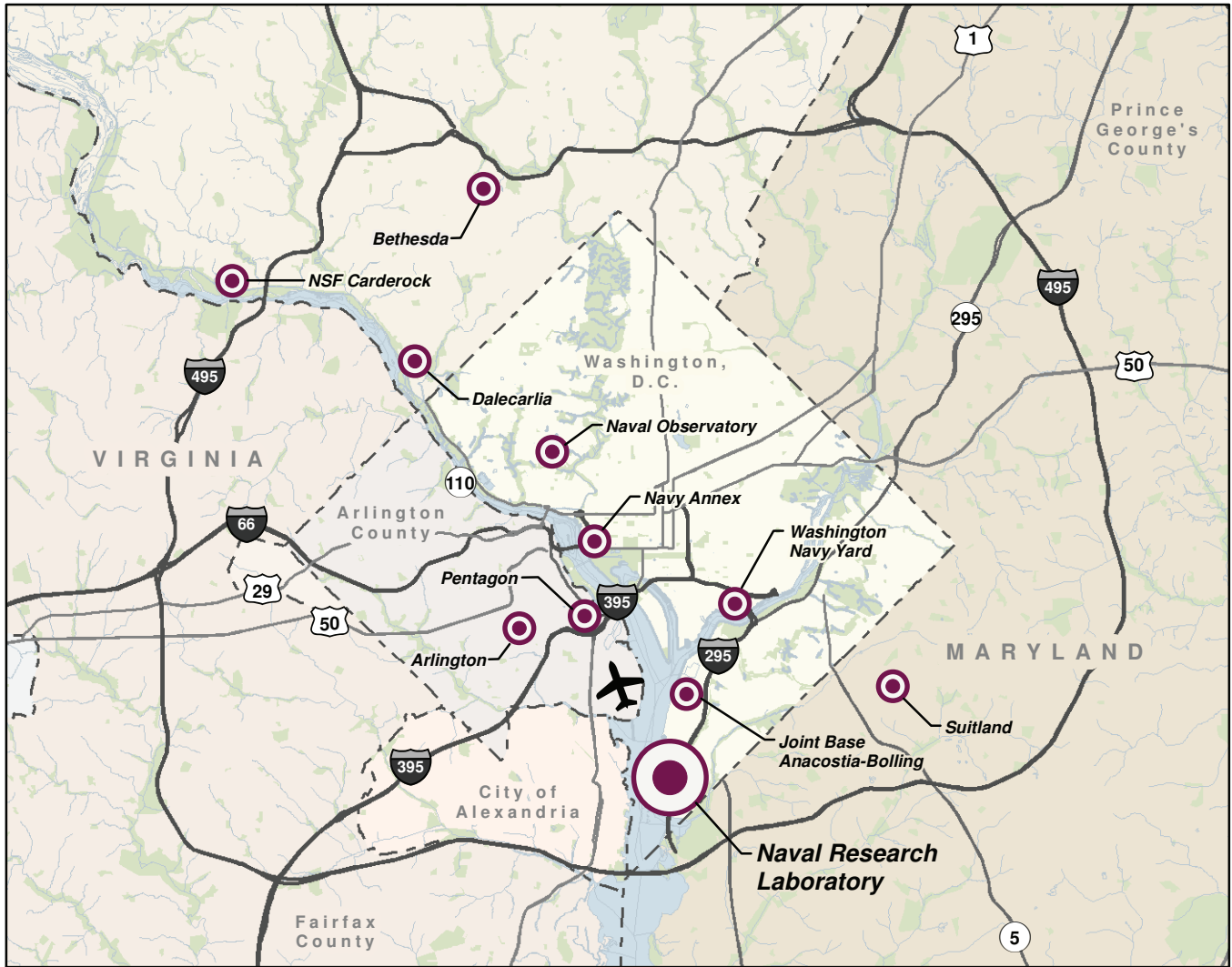
To ensure the goals of the RIMP are achieved and executed at the local-level, this installation master plan document sets the framework strategies for the efficient disposition of land and facilities. This master plan follows a unique structure and process that was developed by the Naval Facilities Engineering Command (NAVFAC) of Washington.

## 1.1 Major Directorates and Divisions

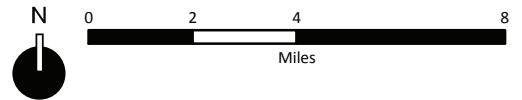
The Naval Research Laboratory (NRL) is comprised of several directorates and divisions with specific functions and research specialties. These include the following organizations:

- Executive Directorate (Code 1000).
- Acoustics Division (Code 7100).
- Center for Bio/Molecular Science and Engineering (Code 6900).
- Chemistry Division (Code 6100).
- Electronics Science and Technology Division (Code 6800).
- Information Technology Division (Code 5500).
- Institute for Nanoscience (Code 1100).
- Laboratory for Computational Physics and Fluid Dynamics (Code 6400).
- Marine Geosciences Division (Code 7400).
- Marine Meteorology Division (Code 7500).
- Materials Science and Technology Division (Code 6300).
- Oceanography Division (Code 7300).
- Optical Sciences Division (Code 5600).
- Plasma Physics Division (Code 6700).
- Radar Division (Code 5300).
- Remote Sensing Division (Code 7200).
- Research and Development Services Division.
- Spacecraft Engineering Department (Code 8200).
- Space Science Division (Code 7600).
- Space Systems Development Department (Code 8100).
- Tactical Electronic Warfare Division (Code 5700).

FIGURE 1-1 REGIONAL MAP



- Interstate Highways
- US Highways and Selected State Highways
- County Boundary
- Park/Green Space
- Ronald Reagan National Airport
- Navy Installation



Sources:  
 Washington Metropolitan Area  
 Transit Authority, 2007  
 Washington, D.C. OCTO/GIS, 2010  
 Naval District Washington, 2010











## 1.2 Location

The NRL is located in the Anacostia neighborhood of southwest Washington, D.C. between the Potomac River and Interstate 295 (I-295) (see Figure 1-1). The installation is approximately 132 acres in size. It is bounded by Joint Base Anacostia-Bolling Air Force Base (JBAB) on the north, the Bellevue Military Housing on the east, and the District of Columbia Blue Plains Wastewater Treatment Plant on the south. Several major arterial roads are in close proximity to the installation: Interstate 95/495 (I-95), Interstate 295 (I-295), Maryland 295, U.S. 50, and South Capitol Street. Metrorail access is provided by the Green Line at the Congress Heights Station (2.6 miles), Anacostia Station (3.4 miles), Southern Avenue Station (3.6 miles), and Huntington Station (6.0 miles), King Street Station (6.6 miles) and Eisenhower Station (7.2 miles from NRL).

## 1.3 Vision and Guiding Principles

**This NDW Master Plan for the Naval Research Laboratory integrates premier facilities within a historic framework to create a campus that serves as the principal Navy activity center for research, development, testing, and evaluation in a safe, secure, and sustainable environment.**

The vision statement provides an over-arching image that the Navy wishes to achieve for its installation. This image of the future state is captured within ten guiding principles that provide strategies to achieve the vision. The guiding principles were derived from stakeholder input and extracted from regulatory guidance. They include the following:

-  Compact Development.
-  Infill Development.
-  Circulation Networks.
-  Horizontal Development.
-  Vertical Development.
-  Sustainable Landscape Elements.
-  Low Impact Development & Stormwater Management.
-  Configuration and Utilization.
-  Energy Conservation and Production.
-  Lifecycle/Mitigation Planning.

## 1.4 Population and Parking Program

### Summary

The following information summarizes existing and future conditions for NRL:

#### Existing

- Land Area: 132 acres.
- Installation population: 4,872 (employees).
- Building Floor Area: over 3 million square feet .
- Total Parking Spaces: 2,814 parking spaces (2,745 available to employees).
- Comprised of 11 land use areas, with Research, Development, Test and Evaluation; Administrative and parking as the primary land uses.

#### Near-Term (5 years)

- Land Area: 132 acres.
- Installation population: 5,487 (employees).
- Building Floor Area: over 3 million square feet.
- Total Parking Spaces: 2,681 parking spaces (2,585 available to employees).
- No anticipated changes in land use.

Due to minimal mission changes, the employee population is expected to increase by two percent annually. (Table 1-1). The envisioned program to accommodate this growth extends five-years. Population and program projections were generated primarily by the NRL Corporate Facilities Investment Plan II (CFIP II). The methodology of the CFIP II is further explained in Chapter 5. Additional information from the ONR GSIP, Basic Facility Requirements (BFRs), Internet Naval Facilities Assets Data Store (iNFADS), Public Works Department (PWD) interviews, and planning direction from the Regionally Integrated Master Program (RIMP) also contributed to the development of the projected program. Table 1-2 summarizes the program projects. Map ID numbers in the table correspond with those in Figure 1-2.

**TABLE 1-1 PROGRAM POPULATION & PARKING**

Year	Population	Employee Parking	Pop:Parking Ratio
2012	4,872	2,745	1 : 1.77
Near-term (5 years)	5,487	2,585	1 : 2.12

Source: Naval Facilities Command (NAVFAC) WASHINGTON.

**TABLE 1-2 PROGRAM PROJECTS**

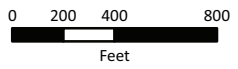
Map ID	Project	Buildings	New Construction (GSF)	Reno. (GSF)	Demo. (GSF)
1	R-04	97		14,813	
2	P-041	New A59 Addition	108,812		
		33, 34A, 35, 53, 55, 68, 69, 125			131,673
3	R-275	65/75		97,875	
4	P-090	New 149 Addition	2,300		
			<b>111,112</b>	<b>112,688</b>	<b>131,673</b>

Source: ONR GSIP, September 2011, NRL PWD.

FIGURE 1-2 PROGRAM PROJECTS



- Installation Boundary
- Water
- Road
- Parking
- Existing Sidewalk
- Green Area
- Trees
- Existing Building
- Renovation Project
- Demolition Project
- New Facilities



Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010  
 The northern extent of the installation

## 1.5 Existing Facility Assets

Table 1-3 lists over 3 million square feet of built space that currently exist on the installation.

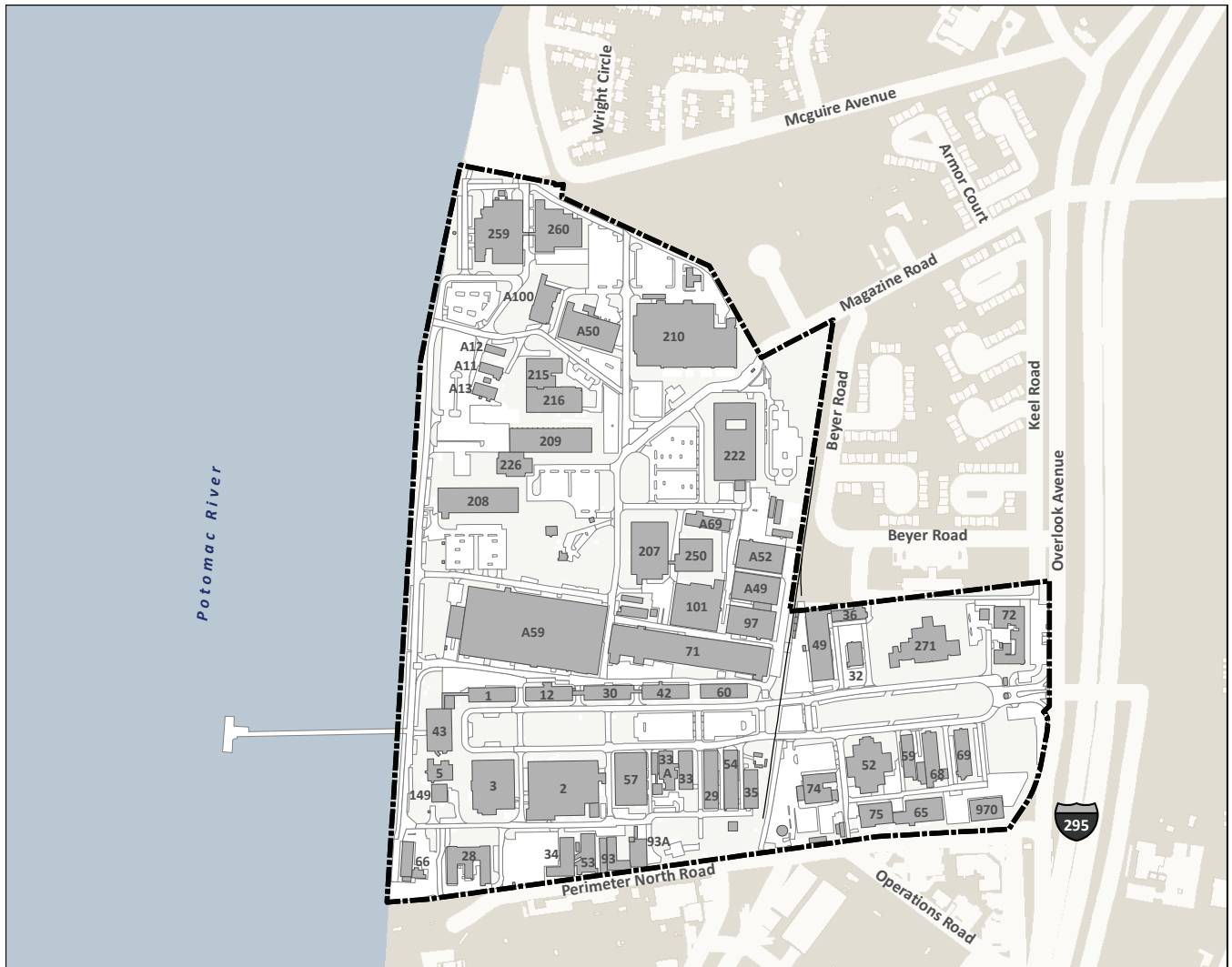
**TABLE 1-3 EXISTING FACILITY ASSETS**

Facility No.	Name	Area (sf)	Stories
1	LABORATORY	45,089	4
2	LABORATORY	120,806	2
3	MATERIALS LABORATORY	76,832	3
5	LABORATORY	8,339	1
12	LABORATORY	47,509	3
28	CAFETERIA-AUDITORIUM	57,025	2
29	NAVFAC WASH SHOP	15,222	1
30	LABORATORY	54,555	3
32	SUPPLY	18,255	3
33	LABORATORY	20,911	2
34	LABORATORY	23,812	2
35	LABORATORY	20,060	2
36	GARAGE	7,223	1
38	TRANSFORMER PARTS STORAGE	120	1
42	LABORATORY	59,473	4
43	ADMINISTRATION	73,309	4
49	SHIPPING RECEIVING-STOR	30,988	1
52	RECREATION	45,219	2
53	LABORATORY	24,391	2
54	LABORATORY	30,256	2
55	LABORATORY	1,868	1
57	R&D SUPPORT	44,132	2
59	LABORATORY	36,786	4
60	LABORATORY	52,060	4
65	LABORATORY	48,323	3
66	SECURE LAB/OFFICE	7,248	1
68	LABORATORY	29,986	2
69	LABORATORY	28,468	2
71	PLASMA PHYSICS LAB	135,319	2
72	ADMINISTRATION	31,548	2
74	ACCELERATOR BUILDING	18,365	2
75	LABORATORY	49,663	4
76	LABORATORY	2,421	1
81	LABORATORY	1,286	1
82	HAZARDOUS WASTE FACILITY	1,825	2
83	RADIAC BUILDING	1,851	1
93	STEEL STORAGE BUILDING	8,100	1
97	LABORATORY	24,240	1
101	PLASMA PHYSICS LAB	39,357	1
105	PUMP HOUSE BESIDE BLDG.149	81	1
106	GATE HOUSE/MAIN ENT/	936	1
125	LABORATORY	5,443	2
149	HEATING PLANT	10,768	1

Facility No.	Name	Area (sf)	Stories
150	HAZARDOUS WASTE STORAGE	162	1
151	MAIN GATE HOUSE	247	1
152	MAGAZINE ROAD GATE HOUSE	65	1
200	COOLING TOWER 4500TC	1,638	1
205	STORAGE FACILITY	144	1
206	STORAGE FACILITY	144	1
207	CHEMISTRY LABORATORY	150,662	4
208	ELECTRONICS LABORATORY	149,831	4
209	SPACE SCIENCE LAB	146,078	4
210	TEW LABORATORY	303,100	3
214	WIND TUNNEL (ASSOC W/210)	1,296	1
215	OPTICAL SCIENCES	38,160	3
216	ELECTRO OPTICS	51,370	3
222	OPERATIONS/TECH SVC BLDG	108,797	2
226	AUDITORIUM	15,046	2
240	LABORATORY	12,903	3
246	PRIMARY SWITCHING STA/69KV	3,525	1
250	NANOSCIENCE INSTITUTE	32,329	2
259	LABORATORY BUILDING	108,310	3
260	ELECTRONIC SYSTEMS LAB	91,745	3
267	SALT DOME	1,257	1
269	CHILLED WATER PLANT 600	899	1
970	LABORATORY	24,881	2
1000	QUARTERS A, BLDG A21	3,978	2
12B	STAND-BY GENERATOR	109	1
222A	BLDG 222 ANNEX	1,980	1
2B	BLDG 2 SOUTH ADDITION	2,400	1
33A	LABORATORY	15,440	2
34A	RESEARCH OFFICE	546	1
35B	ELECTRICAL SUB-STATION	518	1
43A	LABORATORY	4,203	1
709T	SLUDG GAS HSE BTN 28 & 34	170	1
72A	TRAINING FACILITY	1,968	1
93A	STEEL STORAGE BLDG	7,164	1
97A	CENTER COMPUTATIONAL SCIENCE	2,464	1
A100	LABORATORY	20,185	2
A11	LABORATORY	4,312	2
A12	LABORATORY	5,280	2
A13	LABORATORY	5,195	1
A20	QUARTERS B	1,918	2
A47	CHILLED WATER PLANT 4500	4,600	1
A49	APPLIED MATHEMATICS BLDG	23,830	2
A50	OPTICS LAB	31,081	1
A51	ENVIRONMENTAL RESPONSE UNIT	1,926	1
A52	STOREHOUSE	23,600	1
A59	SPACECRAFT LAB	261,650	3
A69	LABORATORY	10,080	1

Source: Internet Naval Facilities Assets Data Store (INFADs), 2010.

FIGURE 1-3 EXISTING FACILITY ASSETS MAP



 Installation Boundary



0 200 400 800  
Feet

Sources:  
Washington, D.C.  
Department of Transportation, 2010  
Washington, D.C. OCTO/GIS, 2006  
ESRI - Streetmap USA, 2007  
NRL PWD, 2011  
Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

## 1.6 Future Land Use and Framework Plans

### Near-Term Land Use Plan

Overall, the minimal program changes for population and projects have resulted in no change to the land uses over the next five years (near-term). Most renovation and new construction projects are located within appropriate land uses without the need of modifying the plan. Near-term land use actions are described below and shown in Table 1-4 and Figure 1-5.

#### Administrative

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

#### Base Support

Area increases in size slightly by encompassing the front gate into this use.

#### Industrial

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

#### Open Space/Preservation

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

#### Parking

There will be minimal changes to existing facilities; therefore,

no changes in land use area will occur. Parking is consolidated or included within another land use. Parking area reduces in size but parking quantities remain the same.

#### Pier

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

#### Research, Development, Testing, & Evaluation

The facilities within the RDT&E land use will undergo the most change with several facility demolitions, renovations and a new construction project proposed. These occur within the current RDT&E land use boundaries. Table 1-4 summarizes the change in land use acreage associated with the new Laboratory.

#### Recreation

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

#### Storage

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

#### Training

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

#### Utility

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

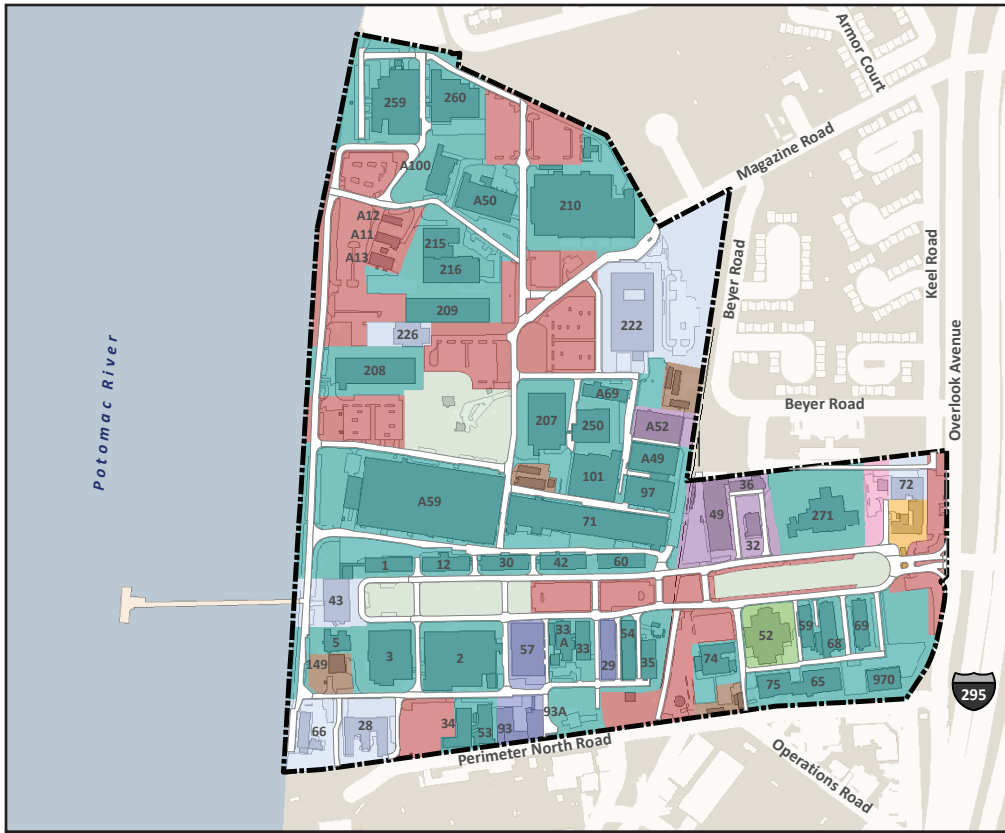
**TABLE 1-4 COMPARISON OF EXISTING, NEAR-TERM, AND LONG-TERM LAND USES**

Land Use Areas	Existing		Near-Term		Long-Term	
	Total Acreage	Percent of Total	Total Acreage	Percent of Total	Total Acreage	Percent of Total
Administrative	12.94	9.84	12.94	9.84	12.94	9.84
Base Support	0.96	0.73	1.65	1.26	2.15	1.64
Industrial	3.11	2.37	3.11	2.37	3.11	2.37
Open Space/Preservation	8.17	6.22	8.17	6.22	8.17	6.22
Parking	27.44	20.88	26.48	20.15	21.11	16.06
Piers	0.51	0.39	0.51	0.39	0.51	0.39
RDT&E	69.16	52.62	69.43	52.82	74.3	56.53
Recreation	1.39	1.06	1.39	1.06	1.39	1.06
Storage	4.41	3.36	4.41	3.36	4.41	3.36
Training	0.97	0.74	0.97	0.74	0.97	0.74
Utility	2.38	1.81	2.38	1.81	2.38	1.82
<b>Total</b>	<b>131.44</b>	<b>100</b>	<b>131.44</b>	<b>100</b>	<b>131.44</b>	<b>100</b>

Note: Data above are responsive to only those values currently existing in iNFADS, Facility Readiness and Evaluation System (FRES), and Geographic Information System (GIS) source data and do not account for any null values if applicable.

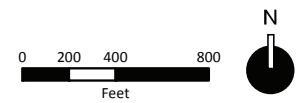
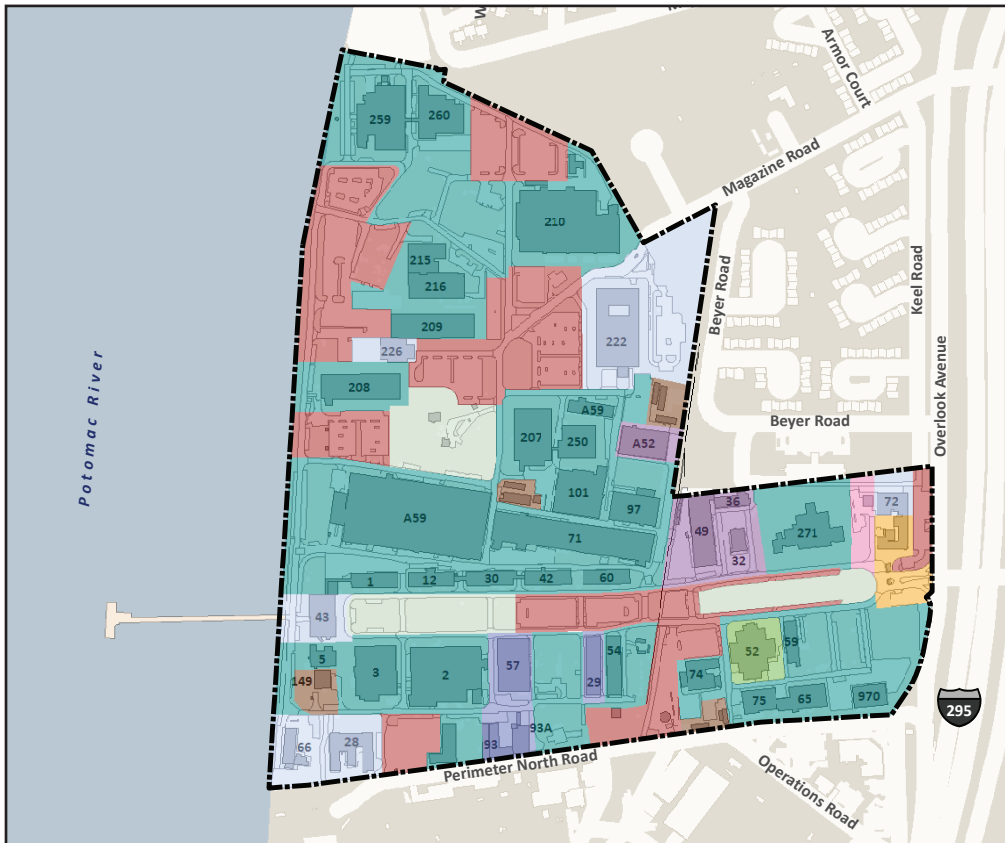
Source: NAVFAC Washington in conjunction with EMA, 2008; Washington, D.C., GIS, 2008; ESRI - Streetmap USA, 2005, iNFADS 2009; FRES 2009.

FIGURE 1-4 EXISTING LAND USE PLAN



- Administrative
- Base Support
- Industrial
- Open Space/Preservation
- Parking
- Piers
- RDT&E
- Recreation
- Storage
- Training
- Utility

FIGURE 1-5 NEAR-TERM LAND USE PLAN



Sources:  
 Washington, D.C. Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

## Long-Term Land Use Plan

Within the long-term (20 years) time frame of the NRL Master Plan, the changes to the land use are brought about by the reduction of parking. As surface lots are consolidated and potentially converted to garages, it decreases the land area needed for this use that can be converted to other functions. Long-term intentions are to utilize this available land for base support and RDT&E. Further study is needed to determine the feasibility and funding of this strategy.

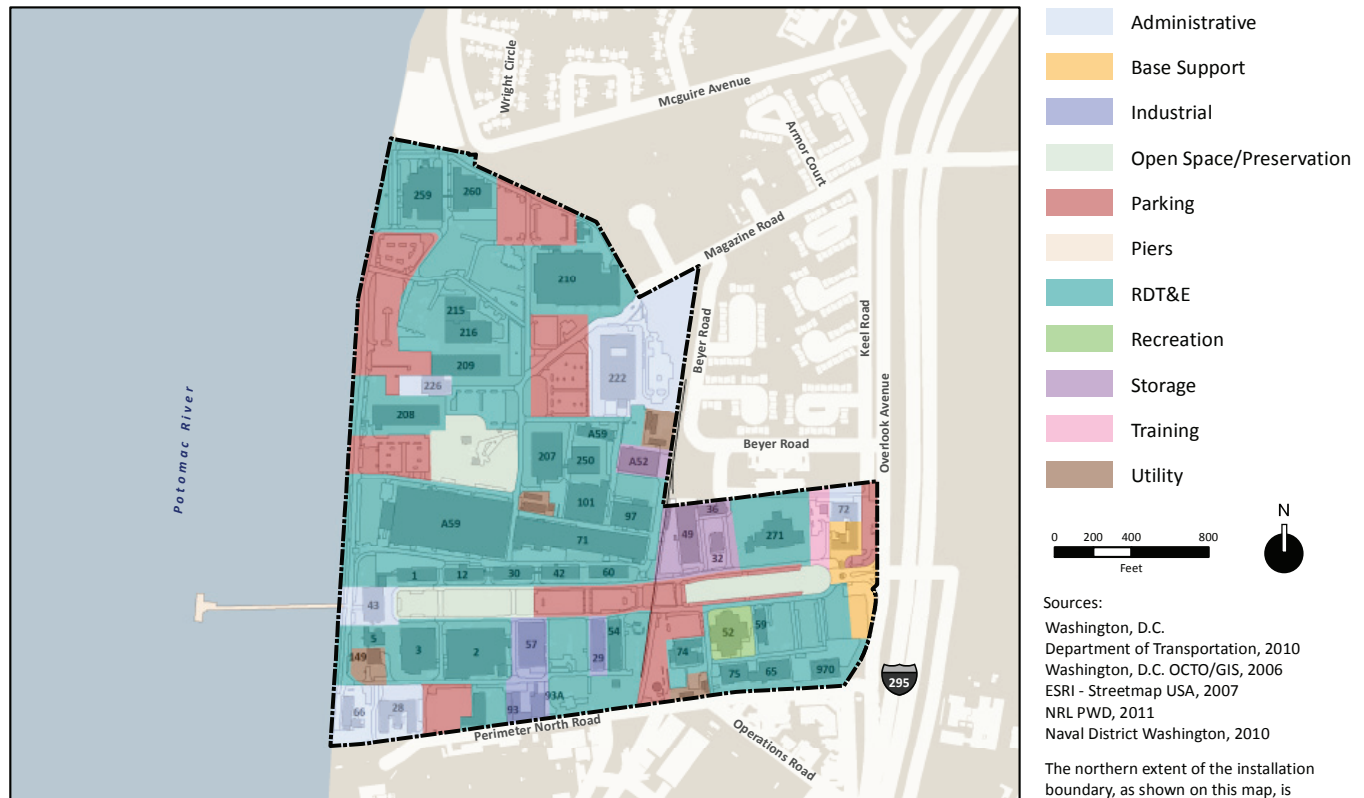
## Planning Strategies

Planning strategies are the basis of the future plan for the installation. They take the issues mandated by the guiding principles and give physical form to those objectives. The following planning strategies focus on major infrastructure and planning systems that make up the future framework plan. More detailed information about each strategy can be found in Chapter 4.

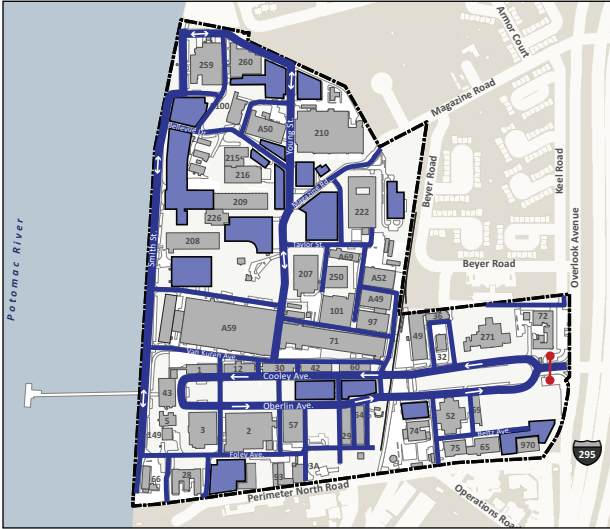
- **Roadway Circulation and Parking:** directs strategies for how the system of roads and parking take form (Figure 1-7).

- **Development Parcels:** directs where future development can occur by indicating land parcels suitable for redevelopment, re-purposed, or preserved for open space (Figure 1-8).
- **Activity Hubs:** directs where the majority of personnel are to be located and their available access to social amenities (Figure 1-9).
- **Multimodal Circulation:** directs how alternative means of transportation can be implemented to reduce the dependency on single-occupancy vehicle trips (Figure 1-10).
- **Open Space and Pedestrian Circulation:** directs how to preserve existing open spaces and the pedestrian connections that make the installation a walkable place (Figure 1-11).
- **Security Enhancements:** directs the needs for AT/FP while dealing with realities of existing facilities (Figure 1-12).
- **Energy:** directs strategies for renewable energy production and reduction in energy consumption (Figure 1-13).
- **Stormwater Management:** directs strategies for stormwater management across the installation (Figure 1-14).

FIGURE 1-6 LONG-TERM LAND USE PLAN

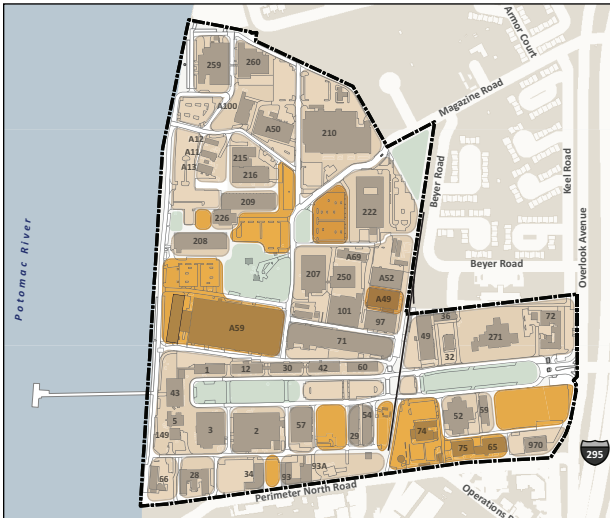


**FIGURE 1-7 FUTURE ROADWAY CIRCULATION AND PARKING STRATEGIES PLAN**



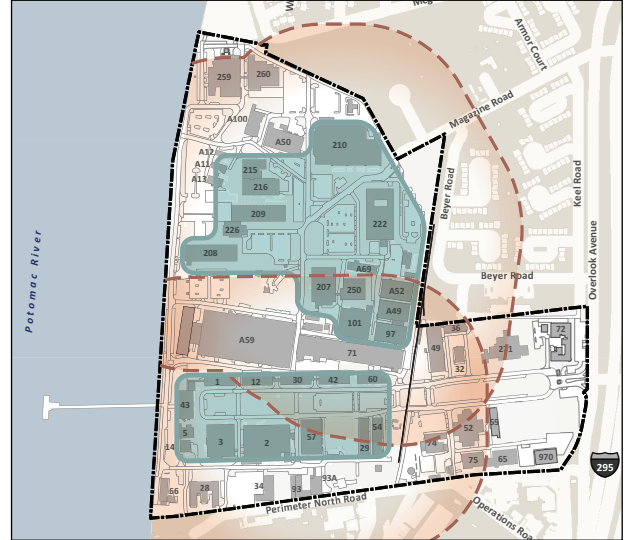
Strategies for roads and parking placement ensure an easy means of navigating through the installation and consolidating parking to reduce impervious surface lots.

**FIGURE 1-8 FUTURE DEVELOPMENT PARCELS STRATEGIES PLAN**



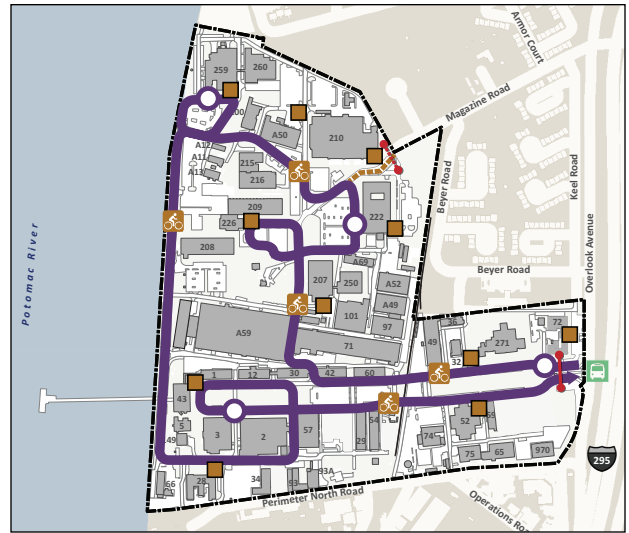
Strategies for development parcels identify areas for redevelopment/infill, renovation/retrofitting, or open space.

**FIGURE 1-9 FUTURE ACTIVITY HUBS STRATEGIES PLAN**



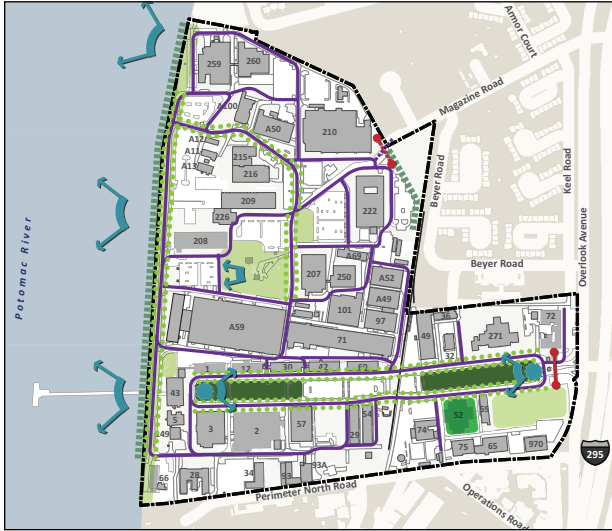
Activity hubs identify areas of concentrated administrative office functions (blue areas) and community support facilities (red areas) to ensure each is within easy walking distance.

**FIGURE 1-10 FUTURE MULTIMODAL CIRCULATION STRATEGIES PLAN**



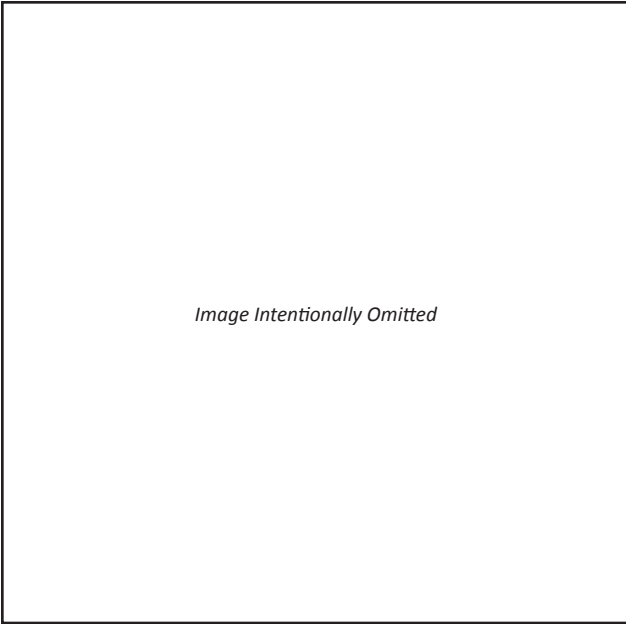
Strategies for a multi-modal network designate installation routes for various transit systems to connect with regional services.

**FIGURE 1-11 FUTURE OPEN SPACE AND PEDESTRIAN CIRCULATION STRATEGIES PLAN**

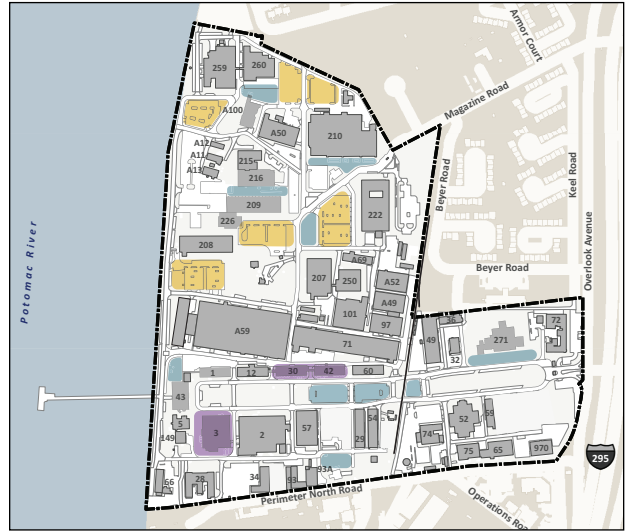


Open space and pedestrian circulation strategies plan for a complete network of walkways that connect people to facilities and outdoor spaces.

**FIGURE 1-12 FUTURE SECURITY ENHANCEMENTS STRATEGIES PLAN**

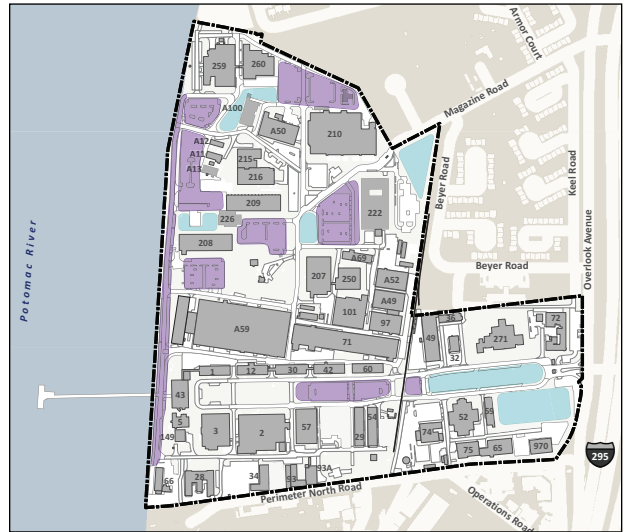


**FIGURE 1-13 FUTURE ENERGY STRATEGIES PLAN**



Strategies for energy include locating opportunity areas for solar, wind, and geothermal power production as well as buildings that can incorporate innovative sustainable systems in new construction and renovation.

**FIGURE 1-14 FUTURE STORMWATER MANAGEMENT STRATEGIES PLAN**



Strategies for stormwater management identify areas suitable for bioretention, pervious pavement, and underground retention systems.

## Near-Term Framework Plan

The guiding principles listed previously were used to develop each of the planning strategies to ensure that near-term plans would meet the needs and wants of the stakeholders. See Chapter 4 for the various planning strategies that went into developing the near-term framework plan (Figure 1-15). The framework plan provides a broad vision of development without being locked into a specific program beyond the five-year project list. This framework plan:

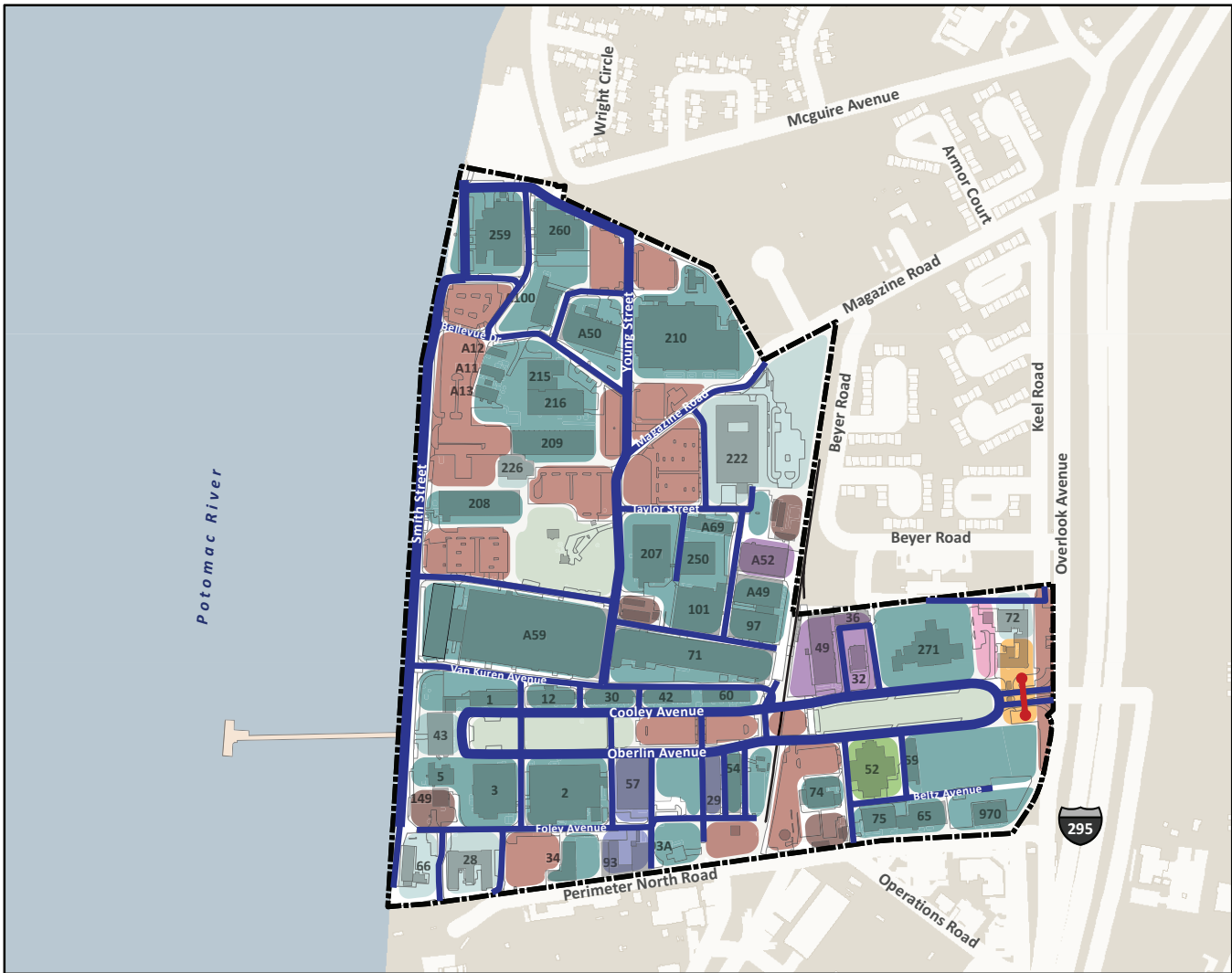
- Accommodates growth 5 years into the future, when the population is anticipated to increase by 615 people to a total of 5,487.
- Absorbs population growth into existing and proposed facilities through strategic moves and efficient re-use of space.
- Preserves open space for recreation, ceremonial, and informal uses.
- Maintains the character of the NRL and the arrangement of the streets and blocks.
- Reserves parcels for development that may occur in the long-term future.

## Long-Term Framework Plan

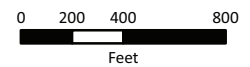
The long-term planning considerations are to address issues that are anticipated beyond the time frame of this master plan (Figure 1-16). Although beyond the ability to reasonably anticipate the needs of these emerging issues, the considerations represent an opportunity for further study. As NRL continues to undergo changes in mission, trends notions can undergo further study and evaluation to ascertain how they can best meet the needs of NRL.

- 1 Renovate Building 3 for the Bio/Molecular Science and Engineering Division.
- 2 Renovate Buildings 30 & 42 for Information Technology Division.
- 3 Target existing buildings and land parcels for adaptive reuse, expansion, or redevelopment.
- 4 Realign roads to improve circulation and connections.
- 5 Facilitate better north-south vehicular circulation.
- 6 Reconfigure parking lots for better efficiency.
- 7 Relocate surface parking spaces throughout the installation into structured parking garages (If funding is approved and transit services to NRL improve).
- 8 Study ways to mitigate future flooding along the shoreline (Smith Street) and to protect the Potomac River from stormwater runoff.

FIGURE 1-15 NEAR-TERM FRAMEWORK PLAN



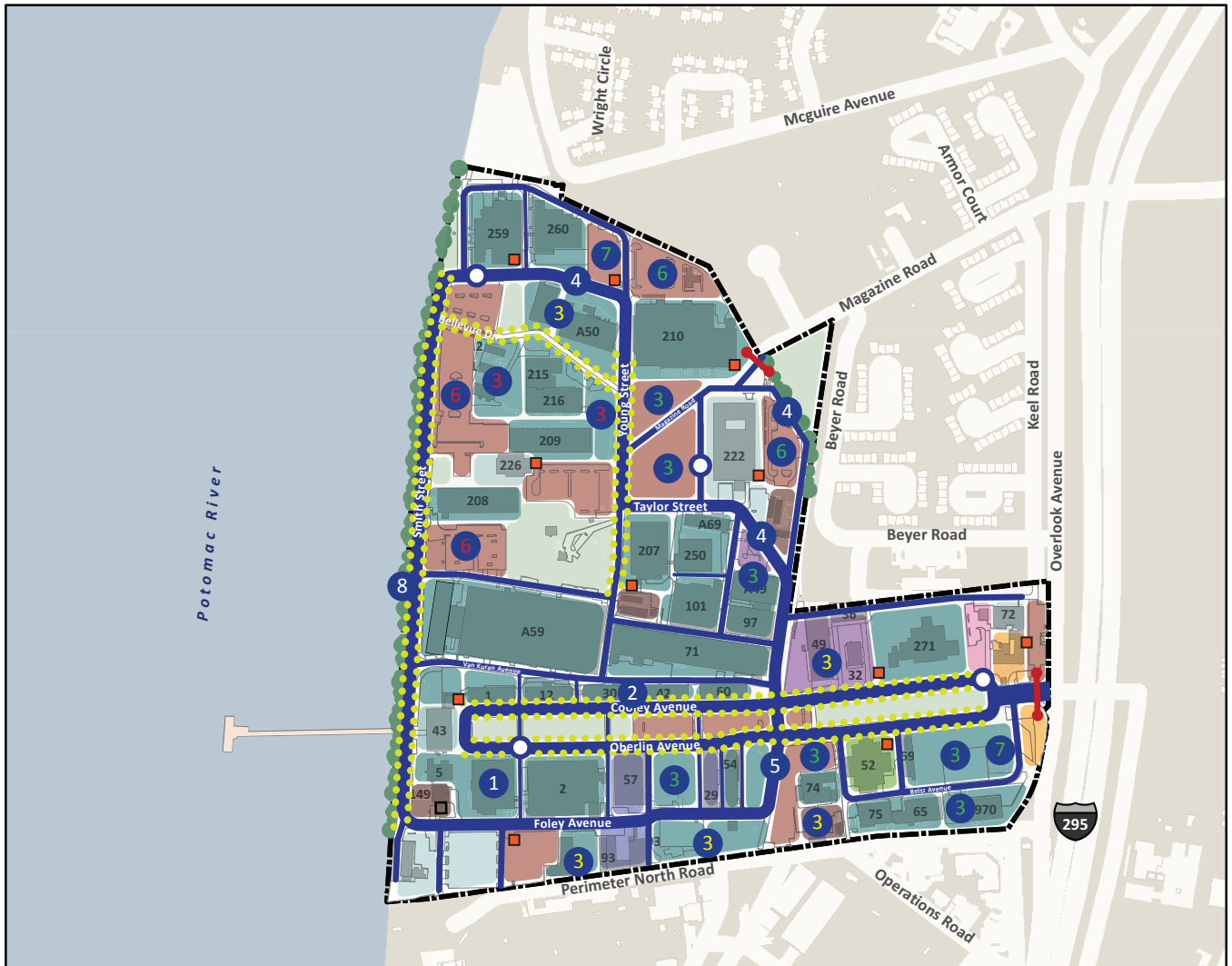
- Installation Boundary
- Roads
- Gate
- Administrative
- Base Support
- Industrial
- Open Space/Preservation
- Parking
- Piers
- RDT&E
- Recreation
- Storage
- Training
- Utility



Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

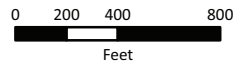
FIGURE 1-16 LONG-TERM FRAMEWORK PLAN



- Installation Boundary
- Roads
- Gate
- Administrative
- Base Support
- Industrial
- Open Space/Preservation
- Parking
- Piers
- RDT&E
- Recreation
- Storage
- Training
- Utility
- Long-Range Construction

- Streetscape Improvements
- Bike racks and/or Bikeshare Stations
- Shuttle Stop
- Buffer Planting

- Project Location Categories
- Preferred Location
  - Alternative Location
  - Discouraged Location



Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

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## 2.0 Introduction

### 2.1 Purpose

As the Navy moves into the 21st Century, efficient shore installation management must improve. Recent unprecedented employment growth for the region has resulted in the expansion, relocation, and renovation of facilities and infrastructure. This growth has impacts to mission, environment, security, transportation, and quality of life; all of which need to be effectively managed. At first, the Naval District Washington (NDW) developed the Regionally Integrated Master Program (RIMP), which provided broad master planning directives for the entire NDW region. The RIMP consists of four planning documents:

- Existing Conditions Report.
- Existing Constraints Report.
- Proposed Land Use Report.
- Land Use Analysis Report.

To ensure the goals of the RIMP are achieved and executed at the local-level, this installation master plan document sets the framework strategies for the efficient disposition of land and facilities. This master plan follows a unique structure and process that was developed by the Naval Facilities Engineering Command (NAVFAC) of Washington. This ensured compliance in regards to:

- The RIMP processes and procedures.
- Consistency between the various NDW installations.
- Meeting specific NAVFAC requirements.

The RIMP planning documents provide conceptual regional land use recommendations to 2035. To ensure that the goals of the RIMP are achieved and executed at the installation level, this master plan builds upon and adapts the RIMP's regional land use recommendations and provides an installation-specific framework while enhancing and redefining a singular vision and program for the Naval Research Laboratory's mission and goals.


















The ability to implement the long-term goals of the RIMP can be impacted by several factors beyond NDW's control: these include the Department of Defense (DoD) mission and realignment [i.e., Base Realignment and Closure (BRAC)], tenant mission growth and movement, and funding. This NRL Master Plan comprehensively focuses on executable projects as they relate to installation facilities, utilities, transportation, land use, and the environment.

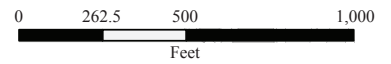
This master plan presents information in three broad topics:

- **Planning Guidance:** Acknowledges the mission requirements specific to the installation as well as the master plan vision and guiding principles that will offer guidance in shaping the future of the installation.
- **Evaluation of Existing Conditions:** Takes inventory of the current state of the installation and its immediate surroundings. Understanding the context helps inform what constraints and opportunities exist.
- **Planning Outlook:** Presents strategies for achieving the demands of the future population and program projections to be expected within the time frame of this document.

FIGURE 2-1 RIMP 2.0 MODEL BASE



- |   |   |  |
|---|---|--|
|  Family & Bachelor Housing |  Parking                 |  |
|  Temporary Lodging         |  Mission Cluster         |  |
|  Recreational Uses         |  Mission Complex         |  |
|  Training                  |  Open Space/Preservation |  |
|  Utilities                 |  Installation Boundary   |  |
|  Storage                   | <b>Background</b>   |  |
|  Industrial Complex        |  Operating Site          |  |
|  Town Center               |  Existing Facilities     |  |
|   |  Water                   |  |
|   |  Surrounding Area        |  |

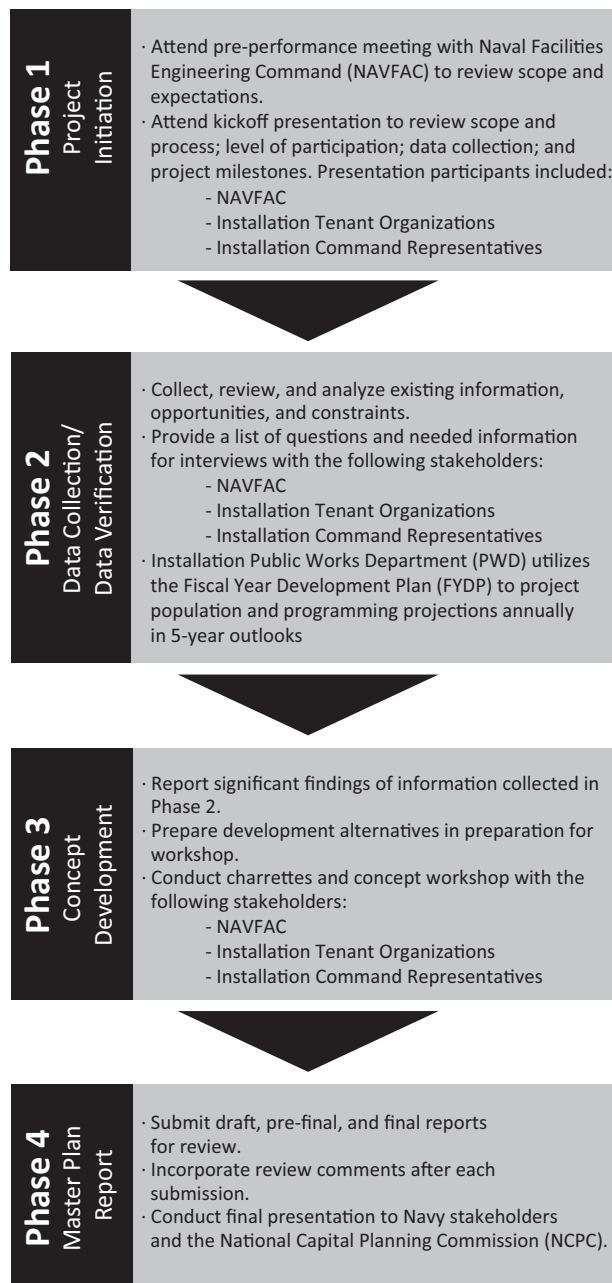


## 2.2 Methodology

Agencies are encouraged to review master plans on a periodic basis to insure that both inventory material and development proposals are current. Such reviews should be conducted at least every five years. Sponsoring agencies should advise the Commission of the results of such reviews and provide to the Commission proposed schedules for the updating of master plans on a five-year cycle when updating is determined to be needed.

The master plan is updated concurrently with the Transportation Management Plan (TMP) and together direct future development of the installation. Figure 2-2 shows the methodology used to create the NRL Master Plan.

**FIGURE 2-2 MASTER PLANNING METHODOLOGY**



## 2.3 Master Plan Vision and Guiding Principles

The vision and guiding principles provide the over-arching directive for this Naval Research Laboratory Master Plan. They serve as objective measurements to ensure the master plan is achieving the desired long-term intentions for an efficient and effective installation that offers a high quality of life for its population. They were derived from the Office of Naval Research (ONR) Global Shore Infrastructure Plan (GSIP) completed in September 2011. The GSIP aimed to provide world-wide perspective on the infrastructure requirements that support the missions assigned to the Office of Naval Research. The data presented in the ONR GSIP is the end result of a planning process that included input from a variety of sources, including facility information from the CFIP's 2009 update and interviews with NRL stakeholders.

### Vision Statement

**This NDW Master Plan for the Naval Research Laboratory integrates premier facilities within a historic framework to create a campus that serves as the principal Navy activity center for research, development, testing, and evaluation in a safe, secure, and sustainable environment.**

### Guiding Principles

Guiding principles provide concrete directives for developing an effective list of recommendations that direct the master plan. The following set of guiding principles, which directs development on all ONR installations.



#### Compact Development

- Limit new construction within areas already serviced by infrastructure.
- Implement dense configurations of infrastructure into grids or clusters.
- Minimize distances between buildings and security setbacks.



#### Infill Development

- Encourage future development within the gaps of existing development.
- Encourage long-term development on surface parking lots when feasible.



### Circulation Networks

- Focus development around transit corridors.
- Locate transit stops within walking distance of each other.
- Create an interconnected multi-modal transit network.
- When necessary separate vehicles from pedestrian or mission activity.
- Facility ingress and egress at the gate.
- Maximize existing circulation corridors to accommodate both vehicles and pedestrians.
- Establish a comprehensive transportation network that provides access to all areas and transit systems.
- Establish a way-finding system to identify transit and encourage its use.



### Horizontal Development

- Integrate a mix of compatible uses within compact development patterns.
- Create pedestrian-oriented spaces.
- Preserve land for future growth and unanticipated mission requirements.
- Preserve historic landmarks and districts.
- Minimize encroachment that negatively impacts mission.



### Vertical Development

- Locate compatible uses within the same building.
- Mandate multi-story construction that conserves land by reducing building footprint.
- Encourage multi-story parking structures to reduce the amount of surface lots.



### Sustainable Landscape Elements

- Increase the amount of vegetation to improve environmental and aesthetic conditions.
- Preserve existing vegetation and habitat to the extent possible.
- Utilize plantings to improve view sheds.
- Provide landscaping to enhance public places for recreation and gathering.
- Landscaping should support AT/FP measures.



### Low Impact Development and Stormwater Management

- Preserve natural features that can be utilized for stormwater management.
- Consolidate surface parking to reduce impervious surface and land consumption.
- Use pervious pavements where feasible.
- Compact alignment including in-fill, mixed-use, and multi-story solutions.
- Minimize street widths while maintaining adequate fire protection access.
- Reserve areas for stormwater management systems. When site constraints are present utilize innovative technologies.



### Configuration and Utilization

- Buildings should be properly configured to meet mission needs.
- Encourage building widths that allow adequate indoor daylighting.
- Optimize the reuse and repurposing of buildings to accommodate new functions.
- Historic structures shall be adapted and reused where possible.



### Energy Conservation and Production

- When feasible locate renewable energy production and/or distribution facilities.
- Establish local energy plants within development districts or clusters to distribute hot water, chilled water, and steam.
- Enable green energy production systems to be located in available open spaces, parking lots, or roof tops.



### Lifecycle/Mitigation Planning

- Implement highest quality construction to ensure longest life cycle and return on investment.
- Replace aging and inefficient facilities that exceed their life cycle expenses.
- Avoid development within floodplains and flood hazard areas whenever possible, otherwise mitigation is needed.
- Consider property values as a catalyst to maximize its mission use.

## 2.4 Installation Mission, Functions, and Responsibilities

In 1992, the Secretary of the Navy consolidated Navy Research, Development, Test and Evaluation Engineering facilities and Fleet Support facilities into a single corporate community, expanding the existing Naval Research Laboratory. NRL aligned with the ONR and four warfare-oriented centers: the Naval Air Warfare Center; the Naval Command Control and Ocean Surveillance Center; the Naval Surface Warfare Center; and the Naval Undersea Warfare Center.

The NRL operates as the Navy's full-spectrum multidisciplinary program of scientific research and advanced technological development directed toward: maritime materials, techniques, equipment, systems; and ocean, atmospheric, space sciences, and related technologies. In fulfillment of this mission, the NRL:

- Initiates and conducts broad research in scientific areas of interest to the Navy.
- Conducts scientific exploratory and advanced technological development.
- Develops technological expertise, and prototype systems applicable to specific projects.
- Assumes responsibility as the Navy's principal Research and Development (R&D) activity in areas of unique professional competence.
- Performs scientific research and development for the Navy, DoD, and other Government agencies.
- Serves as the lead Navy activity for space technology and space systems development and support.
- Serves as the lead Navy activity for mapping, charting, and geodesy research and development for the National Geospatial-Intelligence Agency.



*Aerial view of the NRL installation (middle), with the Blue Plains waste water treatment plant (foreground), and JBAB ((upper middle). Source: NRL*



*The Virtual Training Environment (VIRTE) project is a NRL program that researches and develops training simulators for the Navy and Marine Corps expeditionary warfare.*

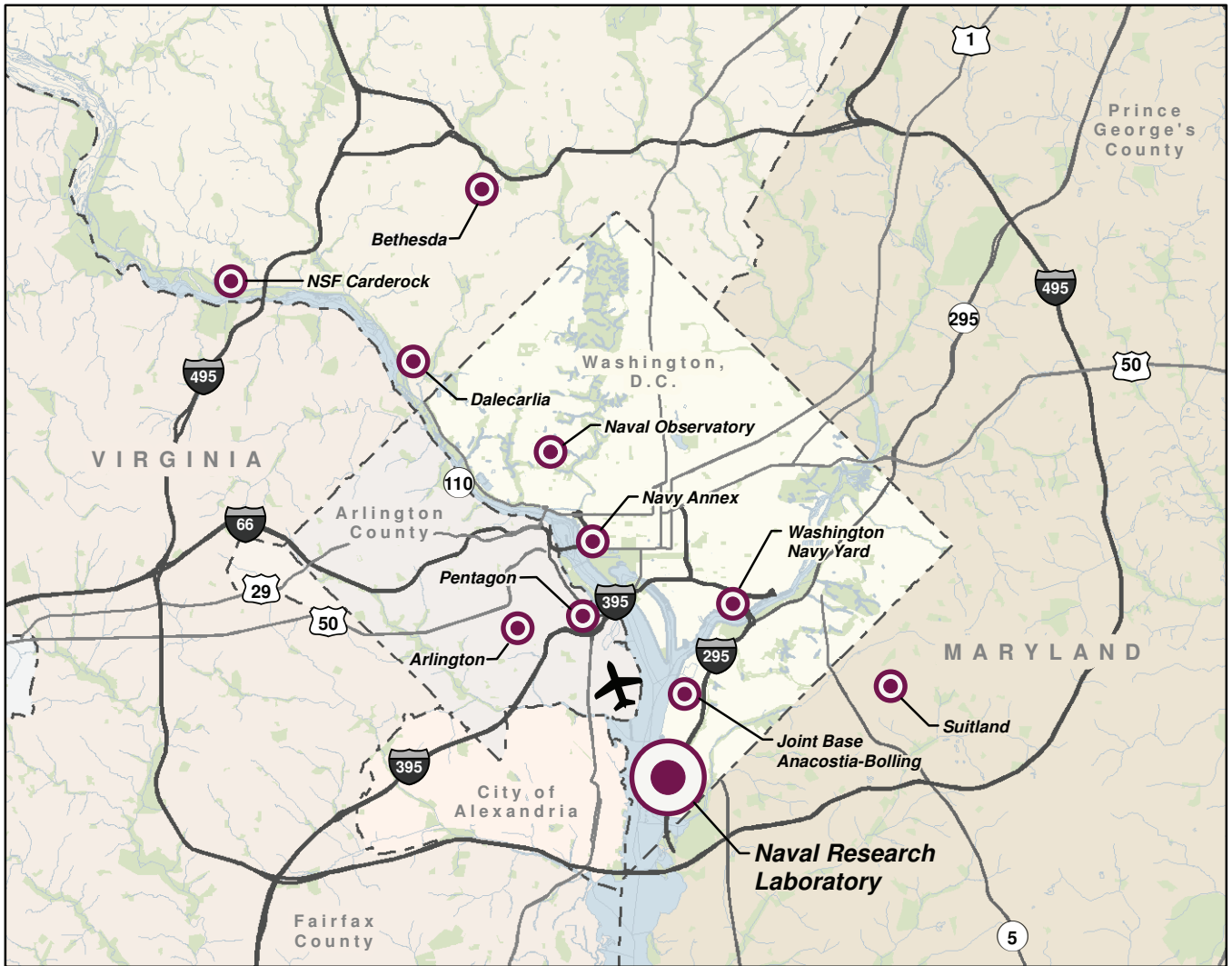


*View of the Naval Research Laboratory from the Potomac River.*  
Source: NRL.

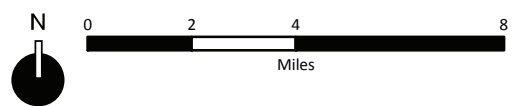
## 2.5 Location

The NRL is located in the Anacostia neighborhood of southwest Washington, D.C. between the Potomac River and Interstate 295 (I-295) (see Figures 2-3 and 2-4). The installation is approximately 132 acres in size. It is bounded by Joint Base Anacostia-Bolling Air Force Base (JBAB) on the north, the Bellevue Military Housing on the east, and the District of Columbia Blue Plains Wastewater Treatment Plant on the south. Several major arterial roads are in close proximity to the installation: Interstate 95/495 (I-95), Interstate 295 (I-295), Maryland 295, U.S. 50, and South Capitol Street. Metrorail access is provided by the Green Line at the Congress Heights Station (2.6 miles), Anacostia Station (3.4 miles), Southern Avenue Station (3.6 miles), and Huntington Station (6.0 miles), King Street Station (6.6 miles) and Eisenhower Station (7.2 miles from NRL).

FIGURE 2-3 REGIONAL MAP



-  Interstate Highways
-  US Highways and Selected State Highways
-  County Boundary
-  Park/Green Space
-  Ronald Reagan National Airport
-  Navy Installation



Sources:  
 Washington Metropolitan Area  
 Transit Authority, 2007  
 Washington, D.C. OCTO/GIS, 2010  
 Naval District Washington, 2010

## 2.6 Local Planning Authorities

The National Capital Planning Act enables the National Capital Planning Commission (NCPC) to be the central planning agency for the federal government in the National Capital Region. NCPC is empowered with review authority over all federal development projects to ensure orderly and coordinated development of the federal government in the region and consistency with the Comprehensive Plan for the National Capital. Therefore, the development strategies contained in the Naval Research Laboratory Master Plan are intended to meet NCPC requirements as well as be consistent with the policies of the Comprehensive Plan for the National Capital. These policies include:

- Consulting with local agencies to ensure that federal workplaces enhance the design qualities and vitality of their communities.
- Planning federal workplaces to be compatible with the character of the surrounding properties and community and, where feasible, to advance local planning objectives such as neighborhood revitalization.

While the review process remains the same regardless of where a project is located, NCPC has approval authority over all federal projects located in the District of Columbia (40 U.S.C. 8722(b)(1) and (d)), and advisory authority for projects located in the environs (40 U.S.C. 8722(b)(1)).

## 2.7 Regional Context and Planning Initiatives

Several planning initiatives and development projects within the vicinity of the NRL may have impacts. These regional initiatives include:

### Anacostia Waterfront Initiative

The Anacostia Waterfront Initiative (AWI) Framework Plan guides the revitalization of the District of Columbia's waterfront from the Washington Channel to the Kenilworth Aquatic Gardens. Organized according to five themes, the Framework Plan identifies vibrant new places for people to live, work, and play. The component of the plan with the most impact to the NRL is the Anacostia Riverwalk.

The goal of the Riverwalk is to create a 16-mile trail along the Anacostia and Potomac Rivers that connects unique District waterfront destinations. The planned trail system includes a section that connects Poplar Point/Frederick Douglas Bridge with the Woodrow Wilson Bridge. Once completed, the trail will parallel I-295 and pass by the eastern boundary of the NRL in order to avoid entering installation property. This trail will facilitate bicycling as an alternative transportation method to travel between the NRL and other parts of the region, potentially reducing the number of vehicles on the roads.



*Aerial illustration of the Anacostia Waterfront Initiatives Target Areas. Source: Anacostia River Parks Target Area Plan & Riverwalk Design Guidelines, 2004.*

## St. Elizabeths West Campus Master Plan

The U.S. Department of Homeland Security is consolidating its offices throughout the District of Columbia Metro Area into eight sites, one of which is St. Elizabeths. The 176-acre site, northeast of NRL, includes the entire west campus and a portion of the east campus of St. Elizabeths. It will be home to 14,000 Federal employees.

Several infrastructure projects are proposed in the St. Elizabeths West Campus Master Plan in an effort to reduce the impact of increased vehicular traffic on the area. They include a new access road that will connect Firth Sterling Avenue and Malcolm X Avenue, and a redesign of the I-295/Malcolm X Avenue interchange. However, even with these infrastructure improvements, the redevelopment of St. Elizabeths will likely increase vehicular traffic in the area.

## St. Elizabeths East Redevelopment Framework Plan

A 2008 plan released by the District of Columbia Office of Planning (DCOP) envisions the reuse of 170 acres on the eastern portion of St. Elizabeths historic campus to serve the needs of the District and surrounding communities. The *St. Elizabeths East Redevelopment Framework Plan* ensures that new development is sensitively incorporated into the historic setting and facilitates the creation of a mixed-use, transit oriented, revitalized neighborhood. The redevelopment plan includes four distinct centers within the campus and will take up to 30 years to complete.

This framework plan can increase the number of residents and employees in the areas near the NRL, which will result in greater traffic congestion on local roads. However, new and improved transit, food, and retail services will become available where such amenities are currently unavailable or limited. These services can lead to an improved overall quality of life for the NRL employees.

## Bellevue: Embracing the Revitalization

Authored by DCOP in 2009, *Bellevue: Embracing the Revitalization*, is the small area plan for the Bellevue neighborhood located east of NRL. The plan provides a framework to guide redevelopment in Bellevue, and identifies three sites that are under-used and have potential to catalyze further redevelopment.

Bellevue and the Congress Heights neighborhood are two of the twelve targeted neighborhoods in the Neighborhood Investment Fund Program. Projects in those neighborhoods are eligible for city funds if they meet the goals outlined in each neighborhood's respective Neighborhood Investment Fund plan.

Similar to the *St. Elizabeths East Redevelopment Framework Plan*, the implementation of this area plan can bring more people, traffic, and services to the area near the NRL.



*St. Elizabeths West Campus Master Plan.*  
Source: [www.jjr-us.com](http://www.jjr-us.com).



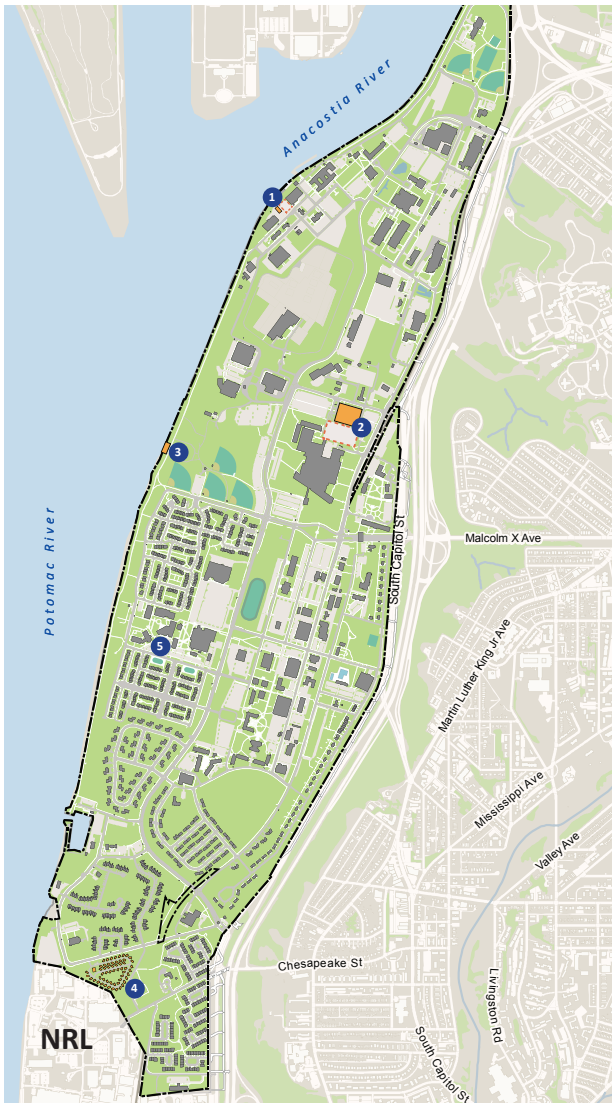
*St. Elizabeths East Redevelopment Framework Plan.*  
Source: <http://www.stelizabethseast.com>.



*Conceptual rendering of residential units after redevelopment in the Bellevue Neighborhood.*  
Source: <http://planning.dc.gov>.



Firth Sterling Avenue, Barry Farm conceptual Rendering  
Source: www.dc.gov



- 1 Building 29 Demolition and Replacement
- 2 DIA Parking Garage Demolition and Replacement
- 3 Waterfront Amphitheater and DC Water Platform
- 4 Recreational Vehicle Park
- 5 Parklet Pilot Program

JBAB Five-year Demolition and Construction Projects  
Source: May 2013 Draft Master Plan

## Barry Farm

The District, in collaboration with the residents of the Barry Farm community, has started a process to revitalize a public housing site in Ward 8's historic Anacostia area. The Barry Farm community is approximately 5 miles north and west of NRL. In December 2006, the DC Council approved the Barry Farm/Park Chester/Wade Road Community Revitalization Plan with a goal to redevelop the existing public housing development into a mixed-income, mixed-use community where residents will have access to housing options affordable at all income levels. The Barry Farm proposal is part of the DC New Communities Initiative (NCI); a comprehensive public-private partnership focused on redeveloping key areas of DC.

The overall planned development program includes: 1,341 market rate residential units, 432 affordable residential units, 144,244 gross square feet of retail, and will cost \$550 million in several separate projects (including Sheridan Station and Matthews Memorial Terrace). At a minimum, the project will seek Leadership in Energy and Environmental Design (LEED) Silver Certification. It is anticipated that this revitalization will bring additional traffic to the area surrounding the installation.

## Joint Base Anacostia-Bolling Master Plan

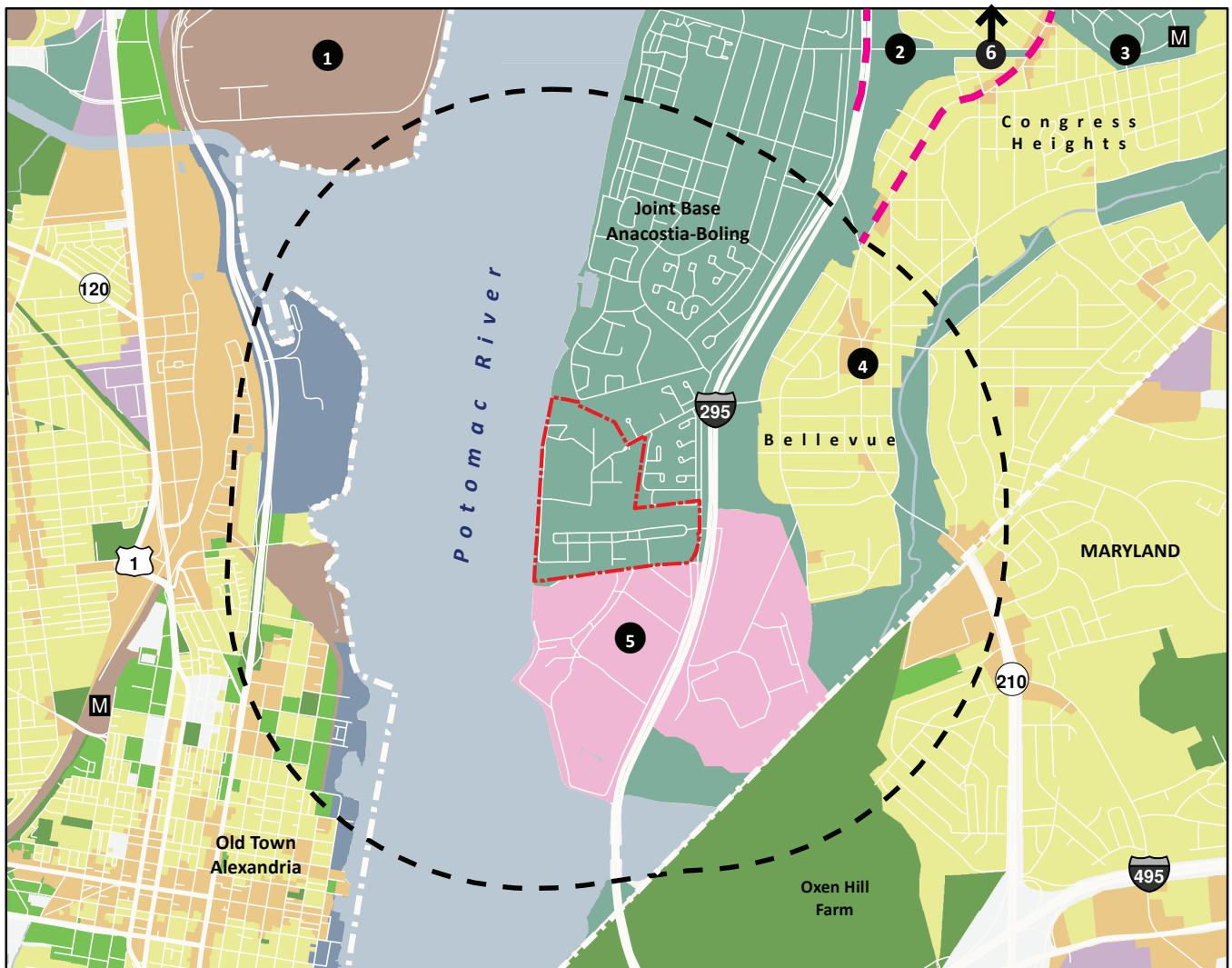
Joint Base Anacostia-Bolling (JBAB) is located directly to the north of the NRL, on a site approximately 905 acres in size. The JBAB Master Plan responds to the significant urban growth occurring in the region. The development in the vicinity of JBAB changes the context of the installation and has the potential to benefit or threaten the quality of missions, both current and future, within the installation fenceline. The master plan includes a five-year development program to serve as the initial step in implementation of the installation's long-term development vision. It also includes a long-range framework plan that will direct future development over the next 20 years.

## DC Streetcar Land Use Study

The District of Columbia Department of Transportation (DDOT) initiated a program to reestablish streetcar service in the District. The purpose of the DC Streetcar is to provide high-capacity and high-quality transit service to residents and invest in infrastructure that will catalyze economic development. The recommended plan includes a network of streetcar lines operating in eight corridors.

As the District agency responsible for the system planning, design, financing and construction of the project, DDOT has collaborated with other agencies, including the Office of Planning, to ensure that efforts are coordinated and benefits of the investment are maximized. In the spring of 2010, the DC Office of Planning (OP) initiated the Streetcar Land Use Study to investigate impacts of the proposed system on land uses, as well as job access, quality of life and housing affordability. The DC OP's primary goal was to ensure overarching vision and goals for the District are furthered by the new system.

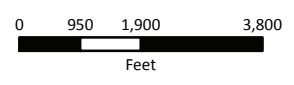
FIGURE 2-4 VICINITY LAND USE MAP



- 1 Ronald Reagan National Airport
- 2 Malcolm X Avenue
- 3 St Elizabeth's Campus
- 4 South Capitol Street
- 5 Blue Plains Wastewater Treatment Plant
- 6 Barry Farm

- M Metro Station
- Installation Boundary
- - - 1 Mile Radius
- Commerical
- Public Works
- Government
- Residential

- Mixed Use
- Industrial
- Open Space
- Utility and Transportation
- Waterfront
- Proposed Street Car Lines



Washington, D.C. Office of Zoning, 2008  
 Washington Metropolitan Area Transit Authority, 2007  
 Washington, D.C. OCTO/GIS, 2010  
 City of Alexandria GIS, 2010  
 Sources: Arlington County GIS, 2009  
 Prince George's County GIS/PG Atlas, 2011  
 USDA National Agricultural Imagery Program (NAIP), 2005 & 2009  
 NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

## 2.8 Historical Development

A newspaper interview with Thomas Edison 97 years ago led to the creation of the Naval Research Laboratory. In the interview, Edison recommended that the Federal Government create an all-purpose laboratory for research into military and naval matters. Secretary of the Navy Josephus Daniels took the opportunity created by Edison's public comments to enlist Edison's support. Edison agreed to serve as the head of a new body of civilian experts - the Naval Consulting Board - to advise the Navy on science and technology. The Board's most ambitious plan was the creation of a modern research facility for the Navy. Congress allocated \$1.5 million for the institution in 1916, but wartime delays and disagreements within the Naval Consulting Board postponed construction until 1920. The initial construction effort included the original five buildings, foundations for a radial brick chimney, three railroad spur tracks, the sea wall, a coal bin, and related site work.

Only four major buildings were added to NRL between 1923 and the outbreak of World War II. These were used by the Laboratory's two original divisions: Radio and Sound which performed research in the fields of high-frequency radio and underwater sound propagation. Through the developments by these divisions, the NRL was able to work gradually toward its goal of becoming a broadly based research facility. By the beginning of World War II, five new divisions had been added: Physical Optics, Chemistry, Metallurgy, Mechanics and Electricity, and Internal Communications.

Total employment at the Laboratory jumped from 396 in 1941 to 4,400 in 1946, expenditures from \$1.7 million to \$13.7 million, and the number of projects from 200 to about 900. By 1943, 25 additional acres had been added to the NRL which doubled the size of the installation. To provide space for the additional population, over 40 new buildings were constructed increasing the number of buildings from 23 to 67. Although NRL established itself as a permanent facility through its contribution to the war effort, much of the construction during the war years was temporary.

In 1946, the NRL was transferred to the administrative oversight of the ONR and the Laboratory's focus shifted to emphasize research in long-range basic and applied investigations in a broad range of the physical sciences. A group of largely autonomous scientific divisions were unified into an institution with a clear mission and a fully coordinated research program.

Post World War II Era demonstrated the need for additional research programs in military technology. Funding was short for new construction, so NRL was forced to retrofit new and expanded programs into old, overcrowded and obsolete facilities. The result was additional temporary construction and rehabilitation of existing facilities. By the late 1950s it was apparent that expansion and new construction were needed. Of special concern was the lack of proximity of related research functions that resulted from hasty wartime planning and construction.



1941 Aerial photograph of NRL looking South  
Source: [www.nrl.navy.mil](http://www.nrl.navy.mil).

By 1960, the original NRL site was completely built out, and more land was needed for expansion. In 1963, the Navy Yard Annex, north of the original NRL site, was declared excess and transferred land ownership to the NRL creating expansion capabilities for the installation.

Because funding at the NRL had been modest in the 1970s, only one major building was constructed between 1972 and 1984. Since 1984 seven major facilities have been constructed on the NRL and several existing facilities have undergone renovation. This construction was due to the growth in missions to include research concerning the Navy's environments of earth, sea, sky, and space. New facilities include the Wind Tunnel, Electronic Systems Laboratory, Nanoscience Institute, and the Center for Computational Science.

Today the NRL is the Navy's lead laboratory in space systems research, fire research, tactical electronic warfare, microelectronic devices, artificial intelligence, ocean and atmospheric sciences. It presently focuses its research efforts on new Navy strategic interests in the 21st century. The NRL scientists and engineers are working to give the Navy the special knowledge, capabilities, and flexibility to succeed in a dynamic environment. While continuing its programs of basic research that help the Navy anticipate and meet future needs, NRL also moves technology rapidly from concept to operational use when high-priority, short term needs arise. The interdisciplinary and wide-ranging nature of NRL's work keeps the installation at the forefront of discovery and innovation, solving naval challenges that benefit the nation as a whole.

### 3.0 Existing and Emerging Conditions

#### 3.1 Existing Land Use

The Naval Research Laboratory functions as the all-purpose research laboratory for the Navy, conducting a broad program of scientific research, technology and advanced development. The Research, Development, Testing & Evaluation (RTD&E) functions represent the primary functions that are evenly distributed across the installation within specialized facilities. Most of the other land use functions support the primary RDT&E mission.

The existing land use map presents the current conditions on the installation (see Figure 3-1). Each land use refers to the activity that takes place in physical or functional form. Table 3-1 summarizes the types of land uses at this installation.

The land uses listed below include a definition, description of the activities, and tally of where they occur. The definitions were derived from the following sources: RIMP 2.0, Unified Facilities Criteria (UFC) 2-000-05N Category Codes, and Navy Shore Vision 2035 (NSV2035) Shore Capability areas.

**TABLE 3-1 EXISTING LAND USE AREAS**

Land Use Area	Total Acreage	Percent (%) of Total
Administrative	12.94	9.84
Base Support	0.96	0.73
Industrial	3.11	2.37
Open Space/Preservation	8.17	6.22
Parking	27.44	20.88
Piers	0.51	0.39
RDT&E	69.16	52.62
Recreation	1.39	1.06
Storage	4.41	3.36
Training	0.97	0.74
Utility	2.38	1.81
<b>Total</b>	<b>131.44</b>	<b>100</b>

Note: Data above are responsive to only those values currently existing in iNFADS, and GIS source data and do not account for any null values if applicable.

Source: NAVFAC Washington in conjunction with EMA, 2008; Washington, D.C., Geographic Information System, 2008; ESRI - Streetmap USA, 2005, iNFADS 2009.



View of Building 43, the main administration building, from across the Potomac River in Alexandria, Virginia.

Source: NRL.

## Administrative

Refers to facilities that accommodate headquarters and office-type functions; professional activities; business and data-processing equipment; and house records, files, and administrative supplies for normal operations. The functions performed are primarily logistical and personnel management conducted by official military and civilian personnel of the NRL. Associated functions permitted in this land use include are food service, outpatient clinics, auditoriums, banks, post offices, data processing center, libraries, and gyms.

Five areas on the NRL function as administrative land uses. They are spread across the installation and include:

- Building 222 - Operations / Technology Service Building located at the eastern perimeter at the Bellevue Housing Gate.
- Building 226 - Auditorium, which is attached to the Space Science Laboratory.
- Building 43 - the main administrative building for the installation, located at the western end of the Central Mall.
- Buildings 66 and 28 - office spaces and an auditorium located in the southwest corner of the installation.
- Building 72 - classroom space, located in the north wing of the Visitor Control Center, human resources office and post office



Building 72 provides Base Support as the Visitor's Center for the Naval Research Laboratory

Source: NRL.

## Base Support

Refers to facilities associated with public safety and installation-wide services. These uses include: fire/emergency, police/security, conference centers, dependent schools, child development centers, religious facilities, pet kennels, transit stations, and installation gates. Functions being performed are essential installation operations that serve all installation personnel and essential visitors.

Base support encompasses the primary entrance gate and Building 72 at Overlook Avenue on the eastern perimeter of the installation.

## Industrial

Refers to facilities and real property associated with the processing, manufacturing, and/or maintenance of motorized vehicles, sea vessels, aircraft, weapons, munitions, and navigational/radar equipment. Facilities include: maintenance/production shops, docks, hardstands, apron pavement, warehouses, and container storage areas. Real property associated with these facilities may entail safety quantity distance arcs, buffers, and storage.

Industrial areas are located on the southern perimeter of NRL. Within these areas are the NAVFAC Wash Shop in Building 29, the steel storage warehouses in Buildings 93 and 93A, and the R&D support facility in Building 57.

## Open Space/Preservation

Refers to real property dedicated for outdoor public use, and for the protection of natural/cultural features. Examples include: parks, ceremonial parade fields, habitat preservation areas, and viewsheds.

The Open Space and Preservation land use encompasses two areas on the NRL. The first is the open green space surrounding Quarters A and B, where archeological resources do exist and shall be preserved. The second area covers the historic central mall that acts mainly as a formal green space and preserves the viewshed to the main administrative facility and the waterfront.



## Parking

Refers to areas and facilities on the installation where parking for organizational and non-organizational vehicles is the primary function. Areas include paved surfaces or stabilized areas that are expressly designated for parking.

Large surface parking lots are spread throughout the installation and provide the majority of vehicle parking for employees and visitors. The highest concentrations of parking occur in the north central and northwestern sections of the installation because of their adjacency to the large RDT&E and administrative facilities. Access to these areas are primarily from Magazine Road and Bellevue Drive.

## Research, Development, Testing, and Evaluation

Refers to facilities and associated areas that are used directly in theoretical and/or applied RDT&E operations. They may be comprised of basic laboratory bench-type modules; larger set-ups of bench-type laboratory activities which are larger than the basic lab module; systems simulation centers including data processing laboratories; and one-of-a-kind facilities such as tow tanks, environmental chambers, and wind tunnels. Facilities may also include office space, and research support functions such as food service, storage, libraries, and auditoriums.

This land use represents the largest area and greatest number of personnel on the NRL. Facilities are dispersed throughout the installation.

## Recreation

Refers to facilities that support recreation activities for all authorized personnel in order to promote physical fitness, teamwork, leadership, skill development and environmental ethics. Eligible personnel include official military and civilian personnel of the installation, visitors to the installation, and transient personnel/families. Outdoor facilities include: athletic fields/courts/rinks; swimming pools; dog parks; playgrounds; marina/port operations; and amphitheaters. Indoor facilities include: gymnasiums; fitness centers; and youth centers. Each type of facility may be accompanied by supporting food service.

Building 52, located at the intersection of Oberlin Avenue and Tucker Street, is the only facility on the NRL designated as the Recreational land use.

## Storage

Refers to facilities and real property associated with keeping quantities of equipment and supplies critical to mission activities. Facilities include the housing of: general supplies; cold storage; open storage areas; fuels and non-propellants; and ammunition. Storage facilities may have associated real property for the purposes of: establishing safe distances when dangerous materials are being stored; creating visual buffers to limit sight lines into the facilities; or to allow for outdoor storage areas.

Two areas on the NRL are identified as the Storage Land Use. The first encompasses Building A52, which is a general storehouse to accommodate materials and equipment to maintain the installation. The second area is north of Cooley Avenue, adjacent to the railroad lines. Located within this area are: Building 49 - Shipping & Receiving Storage, Building 32 - Supply Building, and Building 36 - Garage. They provide storage and equipment services to support the RDT&E mission of the installation.

## Utilities

Refers to centralized facilities that are associated with electric power; heating and cooling; water; sewage and waste. It may serve as the source point of generation or as a transfer point within a larger infrastructure system from which it distributes the above services throughout the installation.

Four locations on the NRL are designated as the Utilities land use. They are spread throughout the installation and include:

- Facilities that house the heating plant (Building 149).
- Chilled water plant (Building A47).
- Electrical sub-station and switch (Buildings 35B and 246).
- Storage for hazardous waste materials (Buildings 82 and 50).



A panoramic view of the NRL from the Potomac River shows the dense urban environment and flat topography along the Potomac River waterfront. Source NRL.

## 3.2 Existing Natural and Manmade Features

The following section illustrates the features that exist on the NRL and their implications. Only features with major impacts to planning are considered. They include the following:

- **Natural Features:** including: watercourses, floodplains, wetlands, soils, significant features, topography, vegetation, and wildlife habitats.
- **Cultural Resources:** including: sites, structures, landscapes, and objects of scientific, historic, religious, or ceremonial importance.
- **Operational Constraints:** including those posed by mission activity such as: hazardous materials and waste, easements, setbacks, Explosive Safety Quantity Distance (ESQD) arcs, and utilities.

Information from prior studies such as the RIMP 2.0, data maintained by NAVFAC, and field surveys of the installation were used to define the baseline features of the NRL.

### Natural Features

#### Topography

The NRL topography is relatively flat with an overall slope of about one percent. Elevations on the installation range from approximately ten feet at the seawall to the northeast of Building 72, north of the main gate. No significant topographic or geologic features are present on the installation that inhibit development.

#### Geology & Soils

The majority of soils at the NRL consist of Udorthents, Galestown, and Urban Land Series. Udorthents series soils are heterogeneous earthy fill material consisting of organic and inorganic material from various sources; constituting about 80 percent of this soil type. The other 20 percent of this soil type is construction fill. The Urban Land Series consists mostly of paved areas and miscellaneous artificial fill.

Generally, with reference to soils, the entire installation is buildable although the areas of Udorthents series soils are subject to subsidence. In addition, some of the Urban Land Series are subject to seasonal wetness. Development in these areas will require further study to determine specific foundation requirements for new facilities.

#### Floodplain and Flood Hazard

The NRL is situated in the Coastal Plain partially within the 100-year floodplain of the Potomac River. The 100-year floodplain occurs at 16.3 feet above sea level on the western boundary of the installation. The area affected is approximately 21 acres in size and impacts several structures used for RDT&E and storage. Appropriate planning measures required in response to floodplain hazards are outlined in Executive Order 11988: Floodplain Management.

#### Surface Water

No surface water exists within the installation boundaries. The western edge of the installation is the Potomac River, which creates the waterfront.

#### Wetlands

No wetlands are present on the NRL.

#### Stormwater

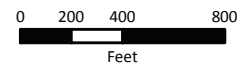
The storm sewer system consists of approximately 40,000 linear feet of vitrified clay and concrete pipe. This system is separate from the sanitary sewer system, carrying only surface water runoff. The system has 25 outfalls that discharge directly into the Potomac River.

The installation is in compliance with the current requirements of the Municipal Separate Storm Sewer System permit.

FIGURE 3-2 EXISTING NATURAL FEATURES MAP



- 2 Foot Elevation Contour Line
- 100 Year Floodplain
- 500 Year Floodplain
- Udorthents Series Soils



Sources:  
 Washington, D.C. Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

## Vegetation and Wildlife

Urban development has altered the naturally occurring vegetation and wildlife. Existing vegetation on the installation is comprised of an artificially maintained mix of exotic and native tree, shrub, and herbaceous perennial species. No known invasive species of vegetation are present. Several stands of mature trees remain throughout the installation and shall be preserved in the future. The oldest trees are located around the historic Quarters A. They include Silver Maple, American Basswood, White Ash, and Sycamores. Animal species are indicative of cities and include squirrels, raccoons, feral cats, rodents, gulls, pigeons, starlings, and sparrows.

## Threatened & Endangered Species

No documented threatened and endangered species are present at the NRL.

## Air Quality

According to National Ambient Air Quality Standards, the NRL is within an area of excess air pollution. Pollution in this area is caused by emissions from vehicles, electric utilities and industrial facilities that create ozone-causing chemical compounds.

NRL holds a Title V regulating permit that enables NAVFAC to operate the boiler plant located in Building 149. NRL staff monitors permit requirements to fund and coordinate visible emission testing of the boilers.

## Natural Features Planning Considerations

Summarized below are considerations that shall be taken with regard to natural features at NRL when contemplating new development shown in Figure 3-2.

- Development on the Udorthents Series soils may require special engineering to reinforce the structure against poor drainage, subsidence, and erosion.
- New development and renovations within the floodplain shall comply with existing local codes and ordinances for safety and security of the facility and occupants.
- Native vegetation on the installation shall be maintained where possible to preserve the landscape, enhance the installation, and maintain habitats for urban wildlife.

## Cultural Resources

Due to its location on the shores of the Potomac River in the District of Columbia and its early role as the Bellevue Annex of the Naval Gun Factory, the NRL is eligible for listing as a National Register of Historic Places (NRHP) historic district. Numerous properties contribute to its historical significance and are eligible for listing on the NRHP. They are summarized in Table 3-2 and shown in Figure 3-3.

Cultural resources at the NRL represent three important development periods in the history of the installation, and represent the architectural style of the era in which they were constructed.

- 1873-1919: Naval Gun Factory, Bellevue Annex:**  
 Resources constructed during this period for the Naval Gun Factory, Bellevue Annex are located in two areas in the north-central portion of the installation. These include Quarters A and A20 (Quarters B) and Magazines A11, A12, and A13. Quarters A originally served as the Commandant's Residence for the Naval Gun Factory. Building A20 was the original carriage house associated with the residence. It was constructed much later than Quarters A and was extensively altered when it was renovated into a residential quarters. The three magazine structures are constructed with simple Italianate detailing. They may represent relatively rare examples of 19th-century military facilities.
- 1920-1938, First Phase of Growth:** During this time period, the NRL was acquired, developed, and planned similar to private sector industrial laboratories of the time. The site plan of a central mall surrounded by laboratory buildings has influenced the subsequent development of the NRL property. In spite of some alterations to individual buildings, this complex still retains its original appearance and industrial character. The original five structures of 1920-1923 at the west end of the mall and Building 12 served as the first research and development facilities on the installation.
- 1939-1945, World War II Era:** During World War II, the NRL expanded its programs and personnel, and constructed many new permanent, semi-permanent, and temporary buildings. Due to the prominent role the NRL played in World War II, several facilities on the installation are historic and eligible for listing on the NRHP.

The above facilities may be eligible for the NRHP. Four other features contribute to NRL's NRHP eligible historic district, shown in Figure 3-3.

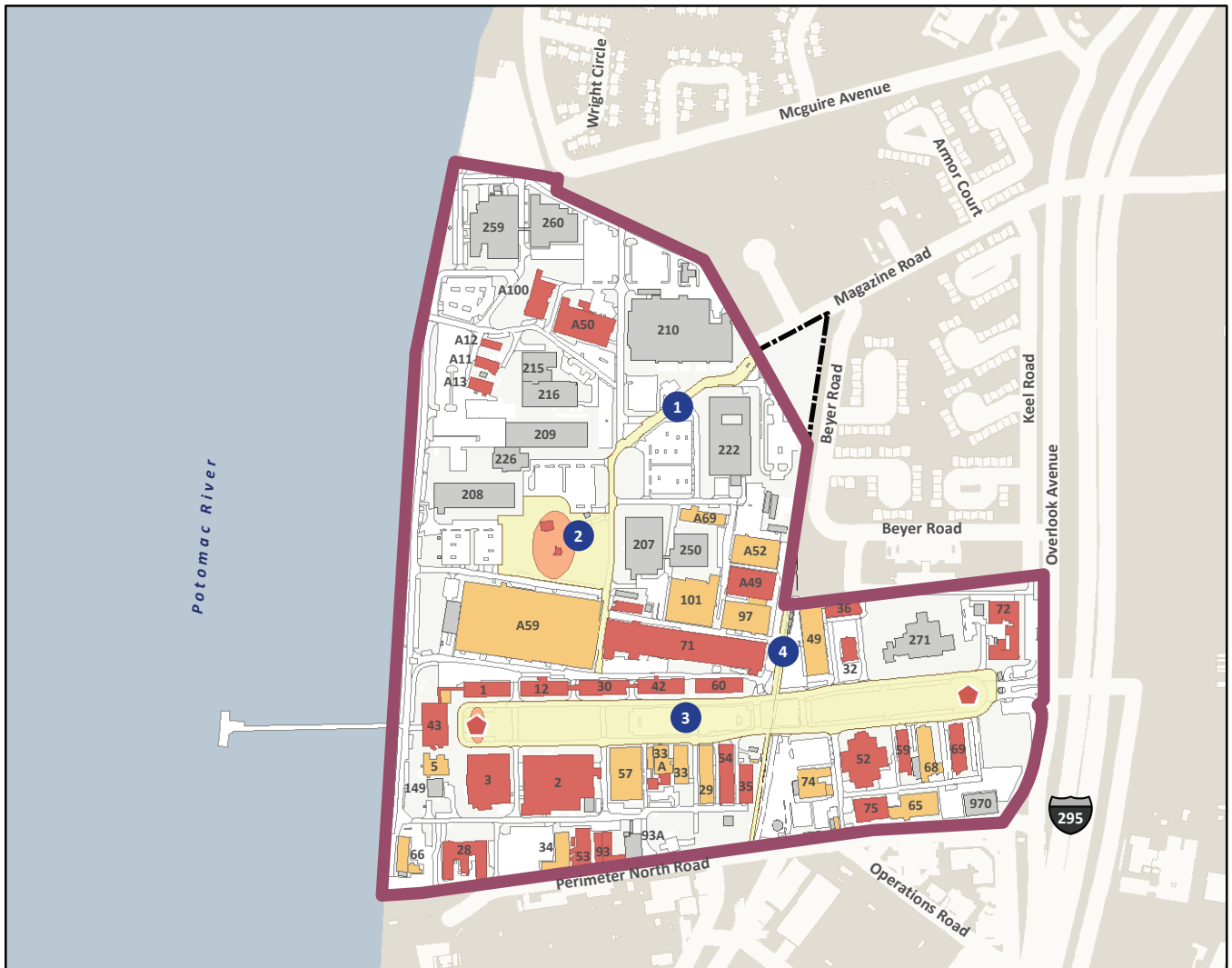
- 1 Magazine Road
- 2 Green space around Quarters A and Quarters B
- 3 Central Mall
- 4 CSX Railroad Right-of-Way

TABLE 3-2 INVENTORY OF HISTORIC PROPERTIES

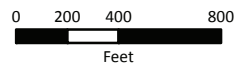
Facility	Bldg. No.	Year Built	NRHP Status
LABORATORY	1	1921	Contributing
LABORATORY	2	1921	Contributing
MATERIALS LABORATORY	3	1946	Contributing
HEAT PLANT	5	1921	Non-Contributing
LABORATORY	12	1926	Contributing
STAND-BY GENERATOR	12B	1945	Contributing
CAFETERIA-AUDITORIUM	28	1940	Contributing
LABORATORY	29	1940	Non-Contributing
LABORATORY	30	1941	Contributing
SUPPLY	32	1942	Contributing
LABORATORY	33	1941	Non-contributing
LABORATORY	33A	1943	Non-contributing
LABORATORY	33C	1943	Contributing
ADMINISTRATION	34	1942	Non-contributing
LABORATORY	34A	1942	Contributing
LABORATORY	35	1942	Contributing
ELECTRICAL DISTRIBUTION	35B	1940	Contributing
GARAGE	36	1942	Contributing
PUBLIC WORKS SHOP	38	1942	Non-contributing
LABORATORY	42	1942	Contributing
ADMINISTRATION	43	1943	Contributing
LABORATORY	43A	1945	Non-contributing
WAREHOUSE	49	1943	Non-contributing
RECREATION	52	1944	Contributing
LABORATORY	53	1944	Contributing
LABORATORY	54	1944	Contributing
LABORATORY	55	1944	Contributing
PUBLIC WORKS SHOP	57	1944	Non-contributing
LABORATORY	59	1944	Contributing
LABORATORY	60	1945	Contributing
LABORATORY	65	1945	Non-contributing
WAREHOUSE	66	1945	Non-contributing
LABORATORY	68	1944	Non-contributing
LABORATORY	69	1945	Contributing
PLASMA PHYSICS LAB	71	1946	Contributing
ADMINISTRATION	72	1943	Contributing
ACCELERATOR BUILDING	74	1953	Non-contributing
LABORATORY	81	1953	Non-contributing
HAZARDOUS WASTE FACILITY	82	1957	Non-contributing
RADIAC BUILDING	83	1957	Contributing
STEEL STORAGE BUILDING	93	1958	Contributing
LABORATORY	97	1919	Non-contributing
LABORATORY	101	1919	Non-contributing
QUARTERS A	A21	1874	Contributing
LABORATORY	A11	1919	Contributing
LABORATORY	A12	1874	Contributing
LABORATORY	A13	1874	Contributing
QUARTERS B	A20	1914	Contributing
CHILLED WATER PLANT 4500	A47	1938	Contributing
APPLIED MATHEMATICS BLDG	A49	1940	Contributing
OPTICS LAB	A50	1940	Contributing
PUBLIC WORKS SHOP	A51	1940	Contributing
LABORATORY	A52	1940	Non-contributing
LABORATORY	A59	1941	Non-contributing
LABORATORY	A69	1943	Non-contributing
LABORATORY	A100	1953	Contributing

Source: NRL ICRMP, 2006.

FIGURE 3-3 EXISTING CULTURAL FEATURES MAP



- Installation Boundary
- Proposed NRHP Historic District Boundary
- Archeological Site
- Contributing Structures
- Non-Contributing Structures
- Contributing Sites (Non Archeological)
- Monuments



Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.



*A bust of Thomas Edison at the NRL front gate honors his role in founding the Laboratory.*

### Archeological Resources

Prehistoric and historic archeological sites at NRL include any undisturbed land on the property. NRL has two such areas: the land around Quarters A and B, and the green space at the western edge of the central mall near Building 43. These areas have been surveyed and were found to be archeological sites. The open space surrounding the residential quarters does not appear to have undergone any major ground disturbing activity and has shown evidence of prehistoric occupation. The western edge of the central mall has shown evidence for archeological artifacts.

### Cultural Feature Planning Considerations

Summarized below are considerations that shall be taken with regard to cultural features at NRL when contemplating new development shown in Figure 3-3.

- Future Development within the NRL shall be in compliance with the requirements of the National Historic Preservation Act (NHPA).
- Structures eligible for the NRHP shall be maintained as closely as possible to their original state.
- The site plan of the central mall shall maintain its current configuration to preserve the historic layout and axial viewshed of the installation. Development shall be prohibited in this area.
- Development within archaeological sites shall follow federal regulations and guidelines, and aim to preserve or remove the findings.

### Cultural Resource Management

Cultural resources for the installation are managed under the NRL Integrated Cultural Resource Management Plan (ICRMP), which provides a five-year strategy for making decisions about cultural resource management activities and compliance procedures. The ICRMP:

- Integrates NRL's cultural resource program with ongoing mission activities.
- Allows ready identification of potential conflicts between the NRL's mission and its cultural resources.
- Identifies compliance actions necessary to keep mission essential properties and acreage ready for use.

## Operational Constraints

### Hazardous Materials and Waste

*Content Intentionally Omitted*

### Solid Waste

*Content Intentionally Omitted*

### Asbestos & Lead-Based Paint

*Content Intentionally Omitted*

### Polychlorinated Biphenyl Transformers

*Content Intentionally Omitted*

### Radon

*Content Intentionally Omitted*

### Pesticides/Herbicide/Fertilizers

*Content Intentionally Omitted*

### Ammunition, Electronic, and Explosive Storage Constraints

*Content Intentionally Omitted*

## Noise

*Content Intentionally Omitted*

## Airfields

*Content Intentionally Omitted*

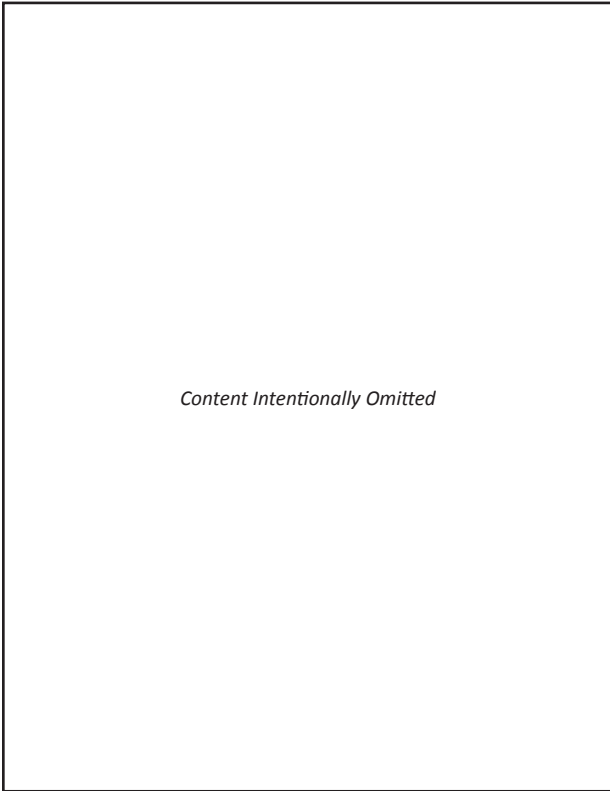
## Easements

*Content Intentionally Omitted*

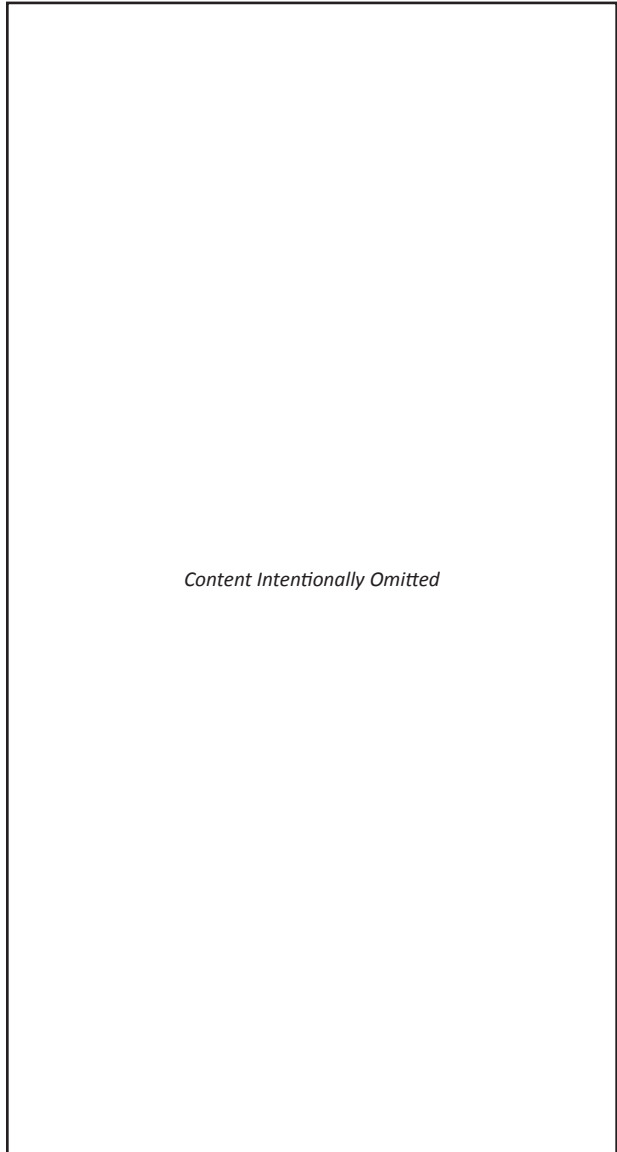
## Air Emissions

*Content Intentionally Omitted*

Anti-Terrorism / Force Protection



Operational Constraints Planning Considerations



Frequency Spectrum



**FIGURE 3-4 EXISTING OPERATIONAL CONSTRAINTS MAP**

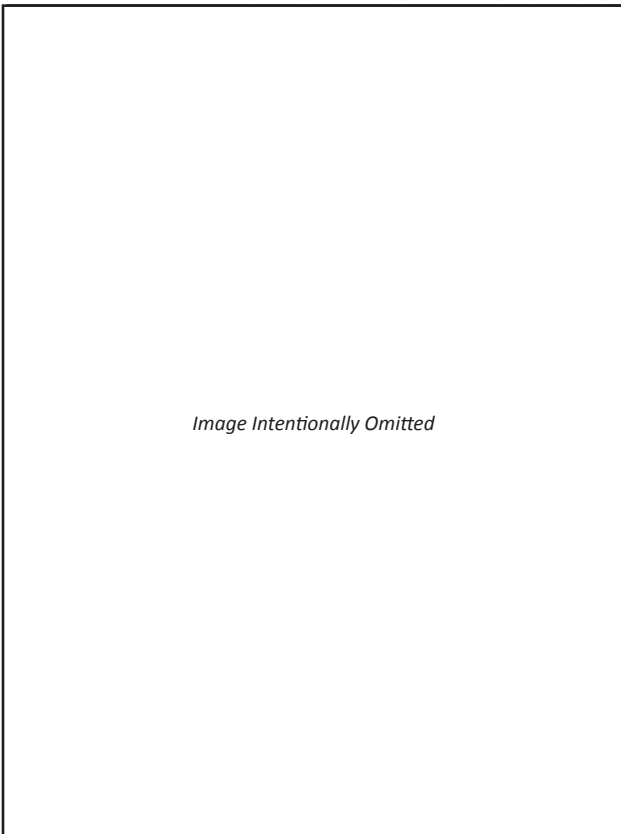


*Image Intentionally Omitted*

**TABLE 3-3 CONDITIONAL AND RESTRICTED DEVELOPMENT CONSTRAINTS**

*Table Intentionally Omitted*

**FIGURE 3-5 LAND SUITABILITY ANALYSIS MAP**



### Land Suitability Analysis

The natural, cultural, and operational features that were described in this chapter impose limitations on the installation’s future growth and development potential. Based on these limitations, land suitable for development can be analyzed. Two types of land suitability are illustrated in Figure 3-5. Land suitability types are classified below:

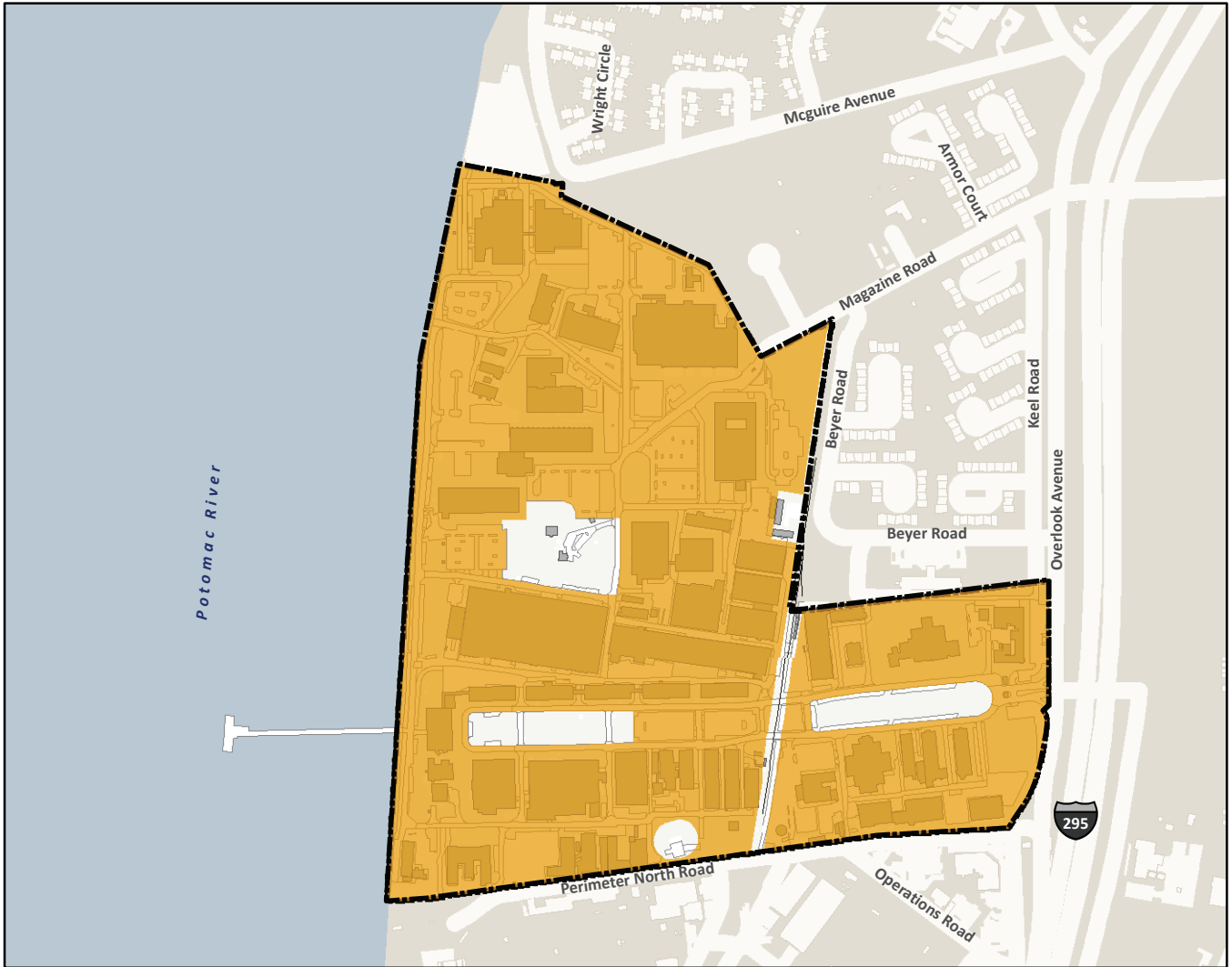
- **Unrestricted to Development:** denotes areas that do not have constraining factors. Due to the amount of environmental constraints, no areas fall into this category.
- **Conditional to Development:** denotes areas with constraining features that will need mitigation to offset the impacts caused by future development. Mitigation is considered to be reasonably achieved if proper processes are implemented.
- **Restricted to Development:** delineates areas with constraining factors considered difficult to mitigate if development were to occur in these locations. While it is possible to develop here, it may be cost-prohibitive, time-consuming, and/or too overtly difficult to mitigate the impact.



Before proposing development within these areas, the value of the existing features and the potential to mitigate their disruption shall be considered carefully. Table 3-3 lists the natural and man-made constraints that contribute to the constraints that are either “Conditional” or “Restricted” to development.

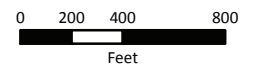
### Developable Areas

The Developable Areas Map, shown in Figure 3-6, represents the existing suitability assessments, and illustrates the areas where development can occur. The developable areas will provide the basis for development opportunities at NRL. While there are numerous considerations beyond those reflected in this graphic, new development at the installation will be directed toward these areas.

FIGURE 3-6 DEVELOPABLE AREAS MAP

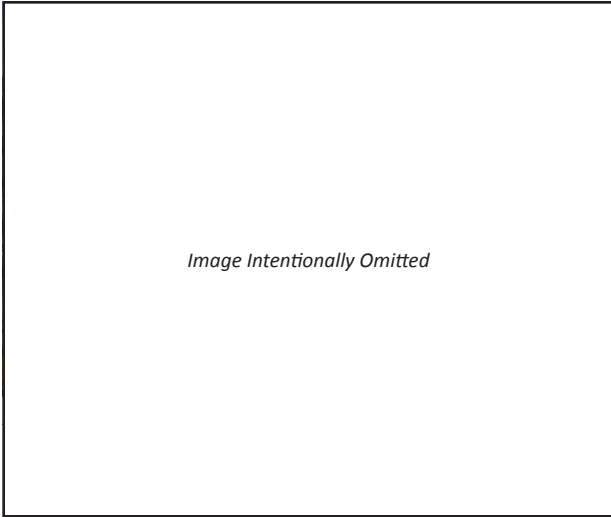
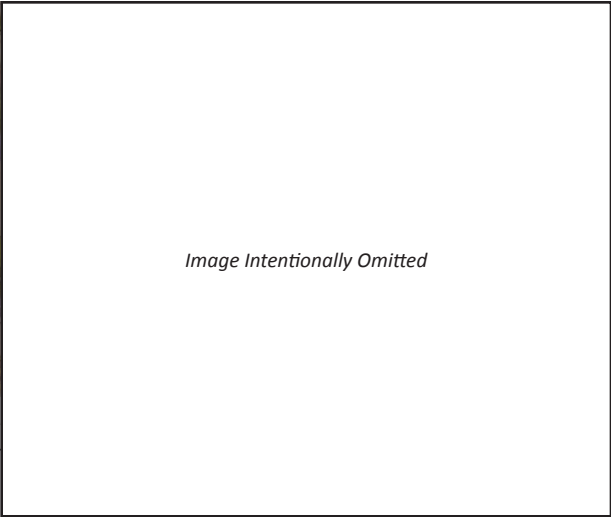


-  Installation Boundary
-  Developable Area

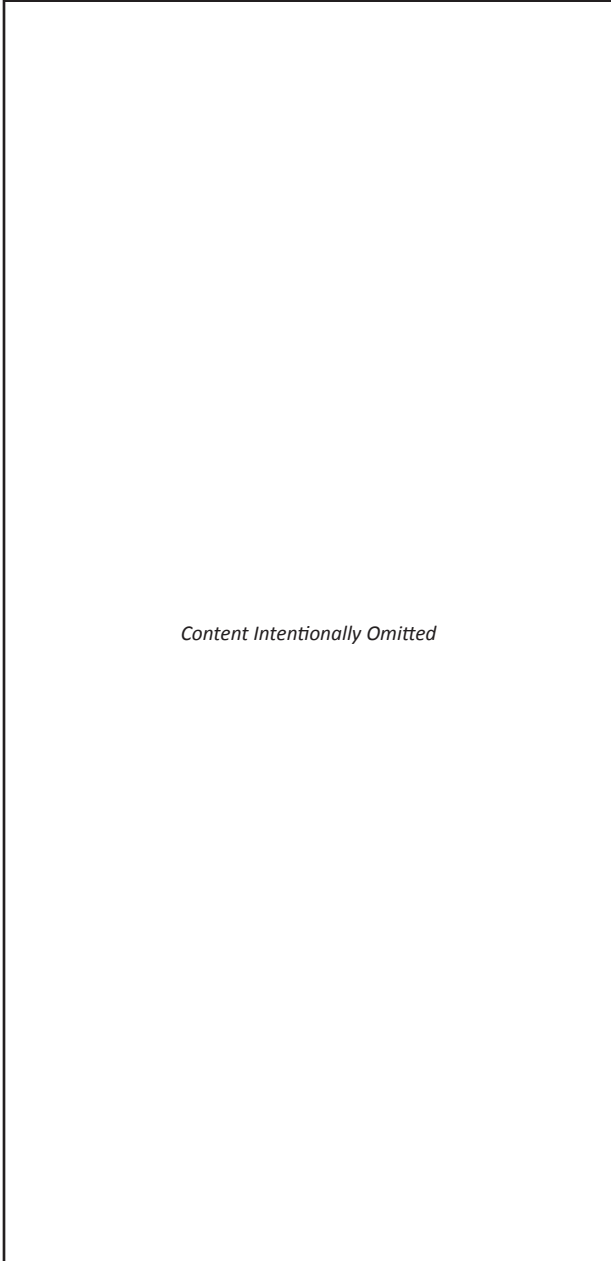
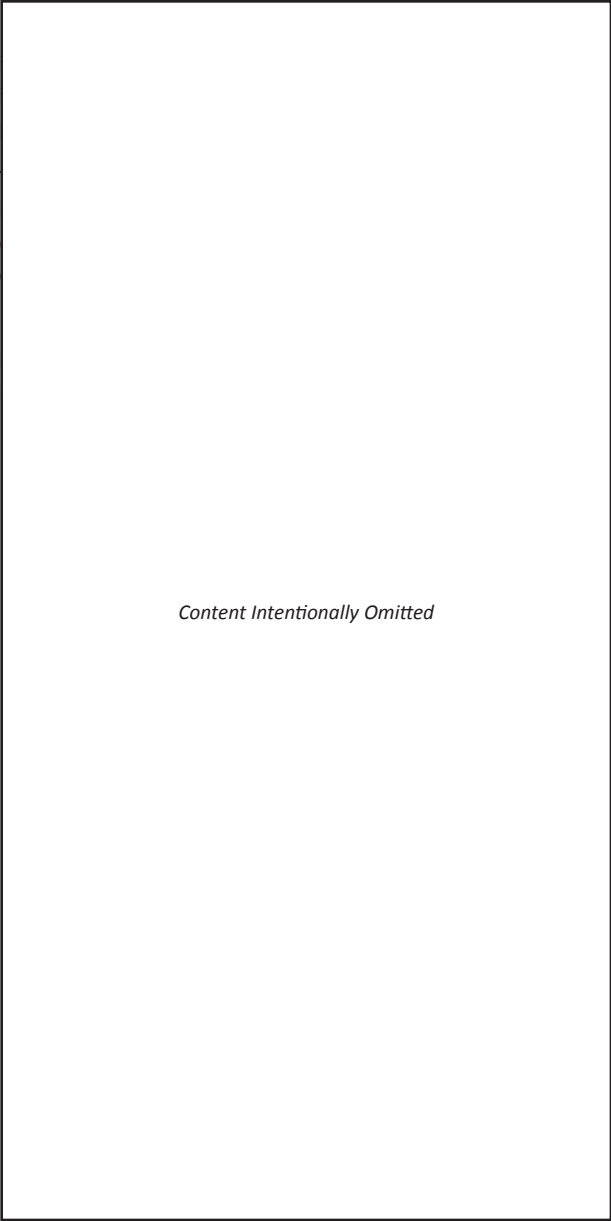


Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

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**3.3 Encroachment Impacts**



### 3.4 Existing Facility Assets

The following section analyzes the existing conditions of facilities present on the NRL.

#### Types of Facilities

Based on the category codes of the iNFADS data, eight facility types are found on the NRL (Table 3-4).

**TABLE 3-4 FACILITY CLASSES**

Category Code	No. of Facilities	Square Footage	% of Total
Operational & Training (100)	1	1,968	0.08
Maintenance & Production (200)	9	85,544	2.8
Research, Development, Test, and Evaluation (300)	54	2,559,713	83.5
Supply Facilities (400)	2	54,588	1.8
Medical (500)	1	288	0.02
Administration (600)	10	264,479	8.6
Housing and Community (700)	5	74,084	2.4
Utilities and Ground Improvements (800)	11	24,295	0.8
Total	93	3,064,959	100.00

Note: Data above is responsive to only those values currently existing in iNFADS and GIS source data and does not account for any null values if applicable.

Source: iNFADS, 2010.

#### Operational and Training

Presently, only Building 72A, a training facility located west of the Visitor’s Center, is identified as Operational and Training.

#### Maintenance and Production

The Maintenance and Production facilities on the NRL are spread across the installation and support either the RDT&E mission or maintenance of the installation. These include Buildings 57 - R&D Support, 93 and 93A - Steel Storage Warehouses, 29 - NAVFAC Wash Shop, A51 - Public Works Shop, and 36 - Public Works Garages.



The Nanoscience Research Laboratory in Building 250 is one of several research and development facilities on the NRL. Source: NRL.

#### Research, Development, Test, and Evaluation

The distribution of facilities informs the land use, which shows the Naval Research Laboratory is predominantly a RDT&E installation. These RDT&E facilities are located throughout the installation, but most cluster either in the northern campus or around the central mall in the south side of the installation. The major facilities in this category include:

- Building 210 - TEW Laboratory.
- Building A59 - Spacecraft Laboratory.
- Building 207 - Chemistry Laboratory.
- Building 208 - Electronics Laboratory.
- Building 209 - Space Science Laboratory.
- Building 71 - Plasma Physics Laboratory.
- Building 250 - Nanoscience Research Laboratory.
- Building 1.
- Building 2.
- Building 12.
- Building 30.
- Building 42.
- Building 60.



*Building 43 was one of the first administrative facilities constructed on the NRL.*

### Supply Facilities

Located in the center of the eastern perimeter, Buildings A52- General Storehouse and 49 - Shipping/Receiving Storehouse are identified as Supply Facilities.

### Medical

The only medical facility on the NRL is the medical clinic located in Building 72 - Visitor's Center near the installation's Main Gate.

### Administration

Administrative facilities follow second as the most prevalent type of facility on the NRL. The largest of these is Building 222 - Operations/Technical Services Building, which mainly supports the RDT&E mission of the installation. Other facilities in this category includes Buildings 43 and 72 - installation Administration, 32 - installation Supply Offices, and 226 - Auditorium. Similar to the Maintenance and Production facilities, these buildings are spread across the installation.

### Housing and Community

Compared to the RDT&E and Administrative facilities on the installation, facilities categorized as Housing and Community are minimal. While the majority in this category are gatehouses for the Access Control Points (ACPs) on the installation, the largest Housing and Community facility is the Recreation Center, which includes sports and equipment for the employees of the installation.

### Utilities and Ground Improvements

This category includes facilities on the NRL that provide services necessary for the installation to function:

- Building 35B and 246 - Electrical Substation.
- Building 105 - Pump House.
- Building 149 - Heat Plant.
- Buildings A47 and 269 - Chilled Water Plants.
- Building 82 - Hazardous Waste Storage.

**TABLE 3-5 FACILITY ASSETS**

Facility No.	Name	Area (sf)	Building Height	Stories	Year Built
1	LABORATORY	45,089	53	4	1921
2	LABORATORY	120,806	45	2	1921
3	MATERIALS LABORATORY	76,832	51	3	1946
5	LABORATORY	8,339	38	1	1921
12	LABORATORY	47,509	53	3	1926
28	CAFETERIA-AUDITORIUM	57,025	40	2	1940
29	NAVFAC WASH SHOP	15,222	21	1	1940
30	LABORATORY	54,555	56	3	1941
32	SUPPLY	18,255	38	3	1942
33	LABORATORY	20,911	25	2	1941
34	LABORATORY	23,812	26	2	1942
35	LABORATORY	20,060	27	2	1942
36	GARAGE	7,223	15	1	1942
38	TRANSFORMER PARTS STORAGE	120	10	1	1942
42	LABORATORY	59,473	66	4	1942
43	ADMINISTRATION	73,309	49	4	1943
49	SHIPPING RECEIVING-STOR	30,988	17	1	1943
52	RECREATION	45,219	42	2	1944
53	LABORATORY	24,391	25	2	1944
54	LABORATORY	30,256	25	2	1944
55	LABORATORY	1,868	18	1	1944
57	R&D SUPPORT	44,132	31	2	1944
59	LABORATORY	36,786	41	4	1944
60	LABORATORY	52,060	66	4	1945
65	LABORATORY	48,323	44	3	1945
66	SECURE LAB/OFFICE	7,248	15	1	1945
68	LABORATORY	29,986	32	2	1944
69	LABORATORY	28,468	40	2	1945
71	PLASMA PHYSICS LAB	135,319	40	2	1946
72	ADMINISTRATION	31,548	35	2	1943
74	ACCELERATOR BUILDING	18,365	32	2	1953
75	LABORATORY	49,663	52	4	1953
76	LABORATORY	2,421	11	1	1946
81	LABORATORY	1,286	14	1	1953
82	HAZARDOUS WASTE FACILITY	1,825	22	2	1957
83	RADIAC BUILDING	1,851	12	1	1957
93	STEEL STORAGE BUILDING	8,100	17	1	1958
97	LABORATORY	24,240	16	1	1919
101	PLASMA PHYSICS LAB	39,357	16	1	1919
105	PUMP HOUSE BESIDE BLDG.149	81	9	1	1973
106	GATE HOUSE/MAIN ENT/	936	19	1	1962
125	LABORATORY	5,443	18	2	1973
149	HEATING PLANT	10,768	56	1	1973
150	HAZARDOUS WASTE STORAGE	162	12		1986
151	MAIN GATE HOUSE	247	8	1	1985
152	MAGAZINE ROAD GATE HOUSE	65	8	1	1983
200	COOLING TOWER 4500TC	1,638	18	1	1965
205	STORAGE FACILITY	144	8	1	1966

**TABLE 3-5 FACILITY ASSETS (CONTINUED)**

Facility No.	Name	Area (sf)	Building Height	Stories	Year Built
206	STORAGE FACILITY	144	8	1	1966
207	CHEMISTRY LABORATORY	150,662	57	4	1971
208	ELECTRONICS LABORATORY	149,831	61	4	1965
209	SPACE SCIENCE LAB	146,078	50	4	1968
210	TEW LABORATORY	303,100	55	3	1977
214	WIND TUNNEL (ASSOC W/210)	1,296	14	1	1989
215	OPTICAL SCIENCES	38,160	66	3	1987
216	ELECTRO OPTICS	51,370	58	3	1993
222	OPERATIONS/TECH SVC BLDG	108,797	29	2	1967
226	AUDITORIUM	15,046	22	2	1968
240	LABORATORY	12,903	72	3	1995
246	PRIMARY SWITCHING STA/69KV	3,525	29	1	1967
250	NANOSCIENCE INSTITUTE	32,329	24	2	2003
259	LABORATORY BUILDING	108,310	76	3	1987
260	ELECTRONIC SYSTEMS LAB	91,745	70	3	1991
267	SALT DOME	1,257	31	1	2008
269	CHILLED WATER PLANT 600	899	17	1	2009
970	LABORATORY	24,881	26	2	1988
1000	QUARTERS A, BLDG A21	3,978	25	2	1874
12B	STAND-BY GENERATOR	109	13	1	1945
222A	BLDG 222 ANNEX	1,980	18	1	1995
2B	BLDG 2 SOUTH ADDITION	2,400	17	1	1987
33A	LABORATORY	15,440	25	2	1943
34A	RESEARCH OFFICE	546	12	1	1942
35B	ELECTRICAL SUB-STATION	518	10	1	1940
43A	LABORATORY	4,203	15	1	1945
709T	SLUDG GAS HSE BTN 28 & 34	170	9	1	1984
72A	TRAINING FACILITY	1,968	17	1	1989
93A	STEEL STORAGE BLDG	7,164	15	1	1985
97A	CENTER COMPUTATIONAL SCIENCE	2,464	12	1	1996
A100	LABORATORY	20,185	23	2	1953
A11	LABORATORY	4,312	21	2	1919
A12	LABORATORY	5,280	17	2	1874
A13	LABORATORY	5,195	17	1	1874
A20	QUARTERS B	1,918	20	2	1914
A47	CHILLED WATER PLANT 4500	4,600	18	1	1938
A49	APPLIED MATHEMATICS BLDG	23,830	22	2	1940
A50	OPTICS LAB	31,081	39	1	1940
A51	ENVIRONMENTAL RESPONSE UNIT	1,926	13	1	1940
A52	STOREHOUSE	23,600	22	1	1940
A59	SPACECRAFT LAB	261,650	48	3	1941
A69	LABORATORY	10,080	20	1	1943

Source: iNFADs, 2010.



## Building Age, Condition, Height

The internet Navy Facility Assets Data Store (iNFADS) is the official inventory system for land, buildings, structures, and utilities owned or leased by the Navy. It provides the basis for analyzing the age, conditions, and heights of buildings at the NRL. This analysis allows an understanding of current building conditions and their viability as future assets to the long-range master plan vision.

### Condition

<i>Content Intentionally Omitted</i>
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### Age

As shown in Table 3-7 and Figure 3-9, the oldest buildings are located in the northern section of the installation, which correlates directly with the development of the NRL around the central mall in the early 1900s. Most of these structures are over 60 years of age because development strategies in the past have purposely kept existing facilities, and re-purposed them for new uses. The result is an inventory of old structures that strive to support current and future missions. Newer facilities were developed in the northern section, which is indicative of successive eras of expansion and growth, and new research and development missions added to the installation. The newest facilities represent the most recent expansion to accommodate additional RDT&E missions and technology advancements.

### Height

As shown in Figure 3-10, the largest facilities on NRL tend to also be the tallest facilities on the installation. These facilities correlate with the fact that the RDT&E mission of the installation requires high bay / laboratory space to house the equipment necessary to perform the research. The lowest facilities on the installation, which are the most numerous, are one- to two-story facilities for administrative spaces, installation maintenance facilities, or smaller RDT&E laboratories. The rest are facilities ranging between 20 to 40 feet tall. They function as laboratories, RDT&E storage warehouses, or larger administrative office spaces. Table 3-8 summarizes the facilities by building height for the NRL.

**TABLE 3-6 SUMMARY OF BUILDING CONDITION**

<i>Table Intentionally Omitted</i>
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**TABLE 3-7 SUMMARY OF BUILDING AGE**

Building Age	No. of Facilities	% of Total
0 - 30 Years	23	21.98
31 - 60 Years	19	20.87
61 - 90 Years	43	47.25
91 - 120 Years	4	4.30
121 - 150 Years	3	3.22
Total	94	100.00

Note: Data above is responsive to only those values currently existing in iNFADS, and GIS source data and does not account for any null values if applicable.

Source: iNFADS, 2010.

**TABLE 3-8 SUMMARY OF BUILDING HEIGHT**

Building Height	No. of Facilities	% of Total
0 - 20 Feet	40	43.01
21 - 40 Feet	30	32.25
41 - 60 Feet	17	17.20
61 - 80 Feet	7	7.52
Total	94	100.00

Note: Data above is responsive to only those values currently existing in iNFADS and GIS source data, and does not account for any null values if applicable.

Source: iNFADS, 2010.

FIGURE 3-8 BUILDING CONDITION MAP

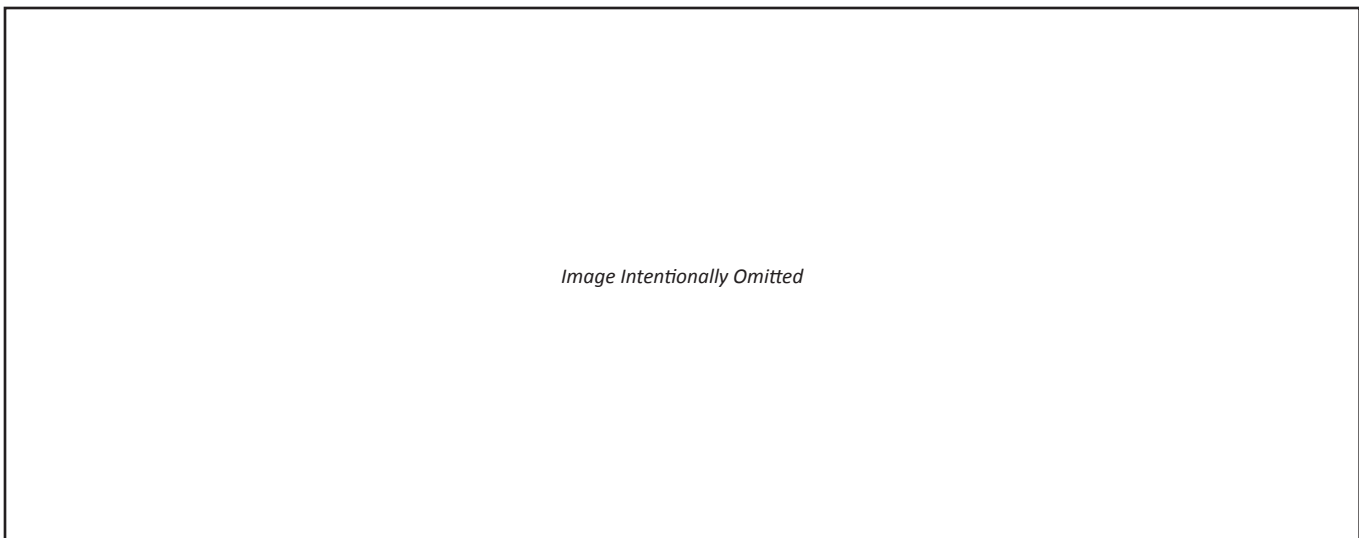


FIGURE 3-9 BUILDING AGE MAP

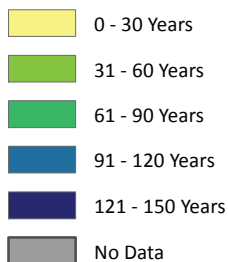
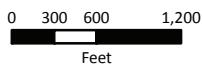
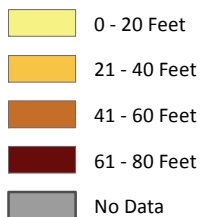
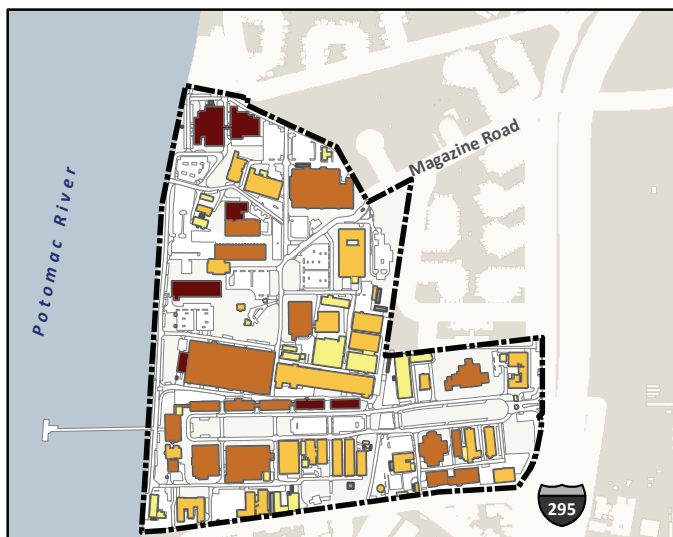


FIGURE 3-10 BUILDING HEIGHT MAP



Washington, D.C. Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010  
 InFADS, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.



### 3.5 Major Utilities

*Content Intentionally Omitted*

#### Electric

*Content Intentionally Omitted*

#### Stormwater / Storm Sewer System

*Content Intentionally Omitted*

#### Wastewater / Sanitary Sewer

*Content Intentionally Omitted*

#### Water

*Content Intentionally Omitted*

**FIGURE 3-11 ELECTRIC LINE CORRIDOR MAP**

*Image Intentionally Omitted*

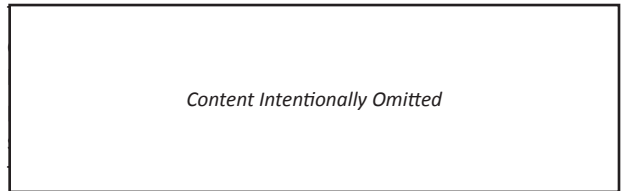
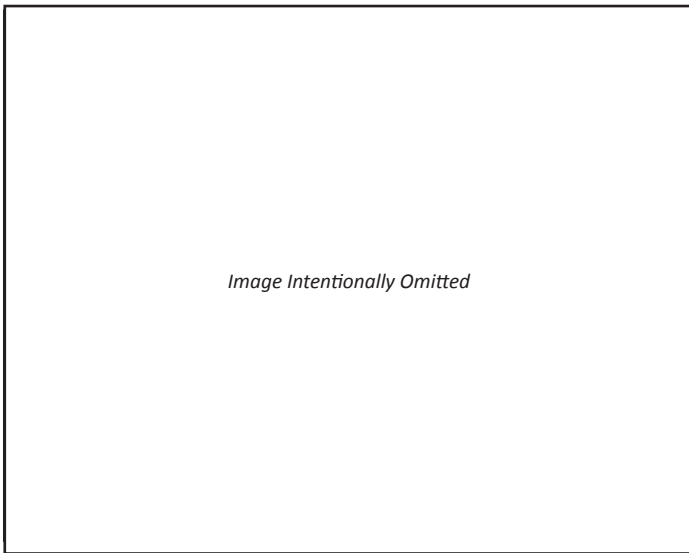
**FIGURE 3-12 STORMWATER LINE CORRIDOR MAP**

*Image Intentionally Omitted*

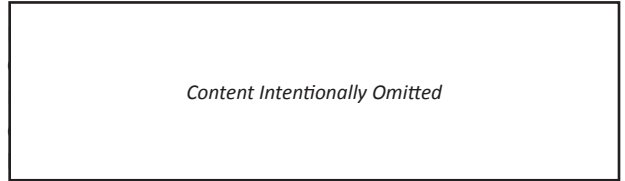
**FIGURE 3-13 WASTEWATER LINE CORRIDOR MAP**

*Image Intentionally Omitted*

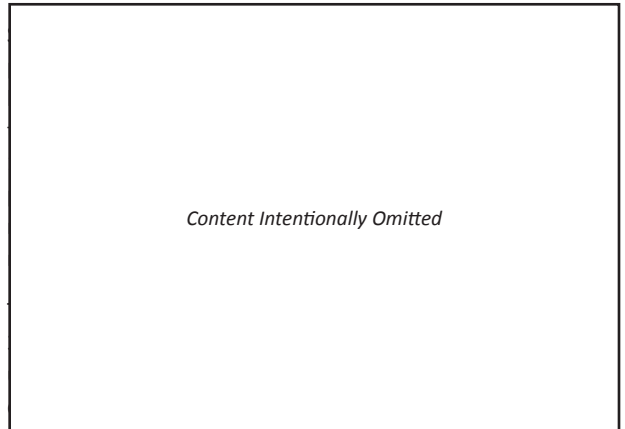
**FIGURE 3-14 WATER LINE CORRIDOR MAP**



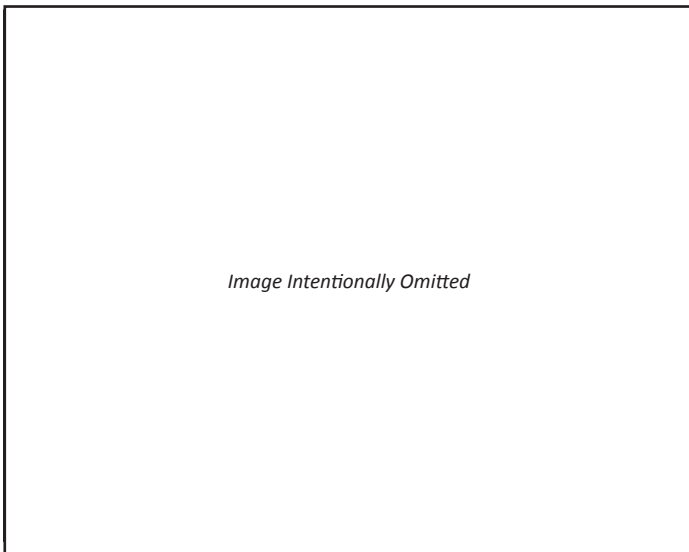
**Natural Gas**



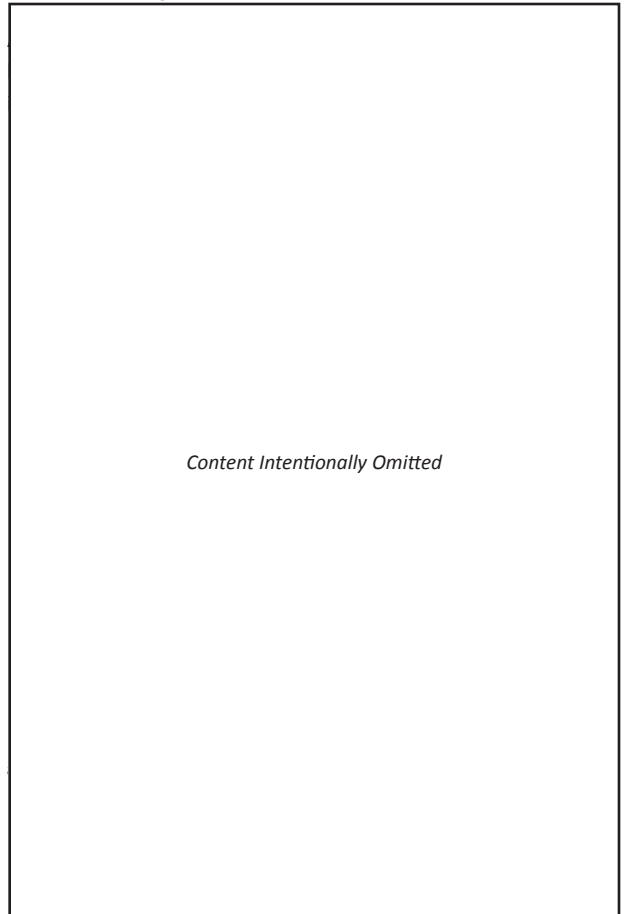
**Steam**



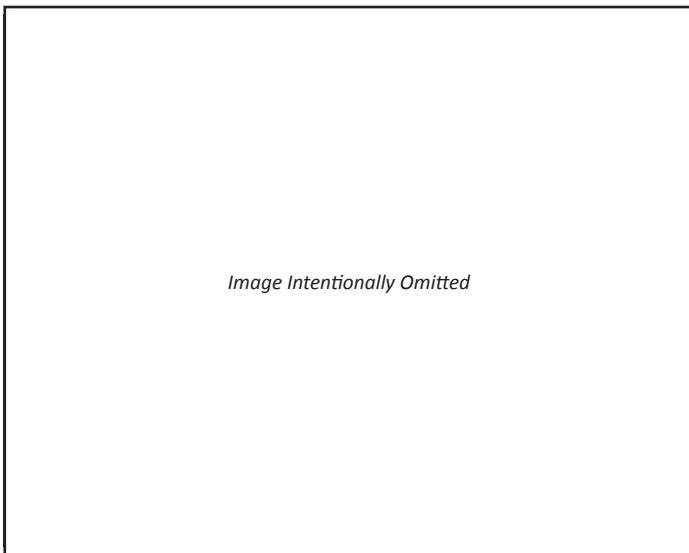
**FIGURE 3-15 CENTRAL STEAM LINE MAP**



**Chilled Water System**



**FIGURE 3-16 CHILLED WATER SYSTEM MAP**



## 3.6 Existing Circulation Network

### Surrounding Road Network

The NRL is bounded by Interstate 295 (I-295) on the eastern perimeter of the installation (Figure 3-17). I-295, also known as the Anacostia Freeway, runs parallel to the Potomac and Anacostia Rivers, and connects with Interstate 95-495/Capital Beltway in Maryland and Interstate 395-695/Southeast-Southwest Freeway in the District of Columbia. Access to the installation is via Overlook Avenue SW traveling southbound on I-295 and Shepherd Parkway SW for northbound traffic.

Other principal arterials such as South Capitol Street and the Suitland Parkway provide accessibility to the surrounding region via I-295. Minor arterials, collector roads, and local streets provide an organic arrangement of travel corridors for local access.

### Ingress/Egress Points

Primary access to the NRL is through the Main Gate on Overlook Avenue SW. The gate is connected to the central mall area via Cooley and Oberlin Avenues. Access problems to the installation can occur at the Main Gate when there is an accident or heavy traffic on I-295.

Another gate exists at the terminus of Magazine Road at the northeast perimeter. This North Gate is currently closed for operation.

### Internal Road System

Major primary roadways on the NRL include (Figure 3-18):

- Cooley and Oberlin Avenues, which form a one-way loop road oriented east-west connecting to the Main Gate.
- Magazine Road is the primary north-south road connecting the North Gate to the southern section of the installation.
- Smith Street parallels the Potomac River along the waterfront and provides access to major parking areas and the pier.

Secondary roads on the NRL provide access to the parking lots and facilities on the installation.

Due to the development pattern of the installation, the NRL is divided functionally into two areas: the northern campus and the southern central mall. Each area has its own circulation system and parking lots. Magazine Road and Cooley Avenue are the primary roads serving each area; however, they are not directly connected. Due to the lack of a major connecting roadway between the two areas, north/south vehicular travel on the installation must traverse behind buildings, around parked cars, or between Buildings 30 and 42, Buildings 1 and 12, and Buildings 12 and 30.

To minimize the movement of large trucks and semi-trailers within the NRL, small delivery trucks re-deliver supplies and materials from the supply and storage facilities located on Cooley Avenue to many different locations throughout the NRL. This delivery system creates additional vehicle trips and inconvenience.

### Parking

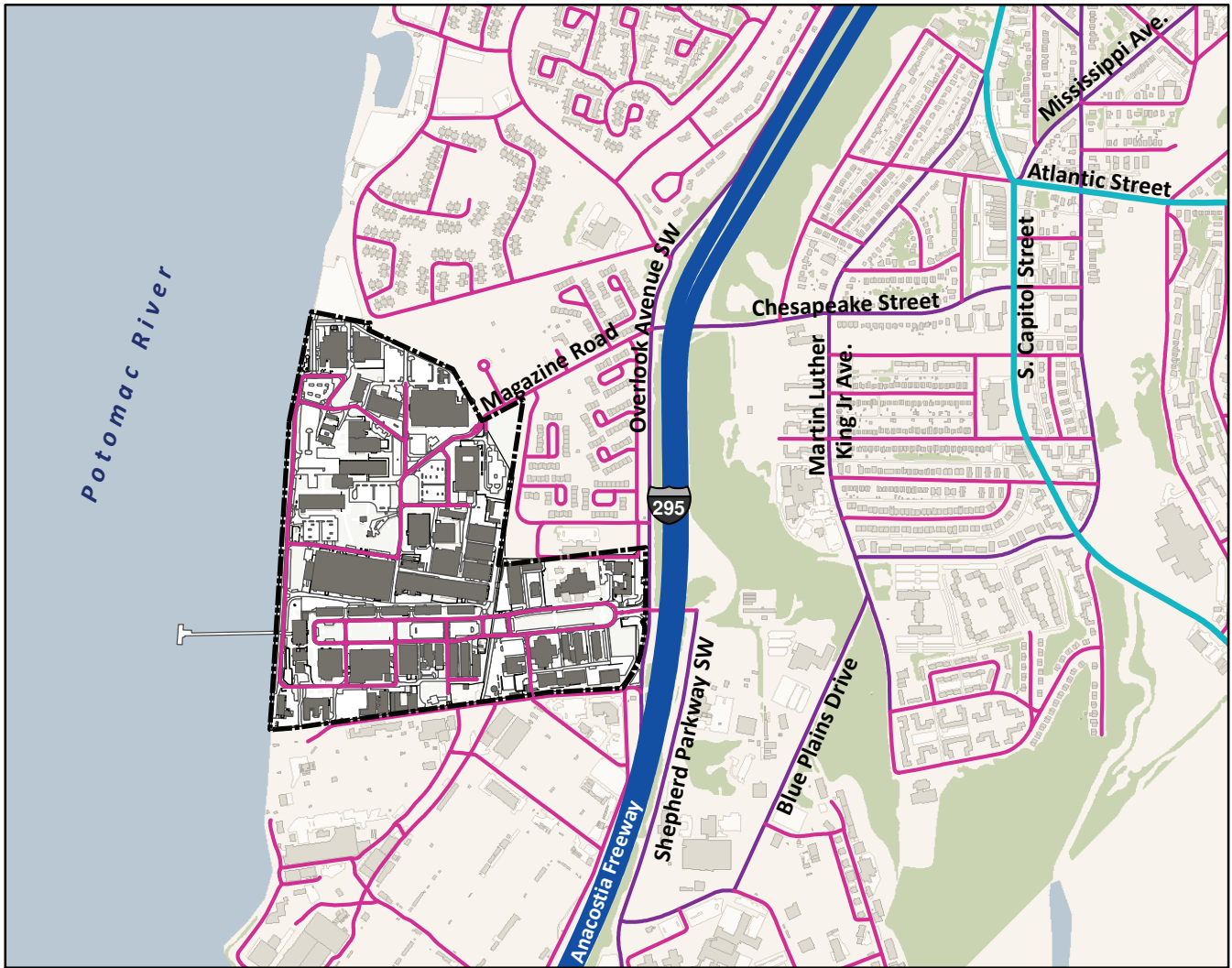
NRL has a total of 2,814 parking spaces on the installation comprised of both employee and non-employee parking. Most spaces are unrestricted for all employees, and handicapped and reserved parking for specific individuals or events. A small percentage is designated non-employee parking for visitors, government vehicles, and loading areas. Refer to Table 3-9 for parking counts.








**TABLE 3-9 SUMMARY OF EXISTING PARKING**

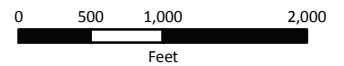
Employee Parking		Non-Employee Parking	
Type	Spaces	Type	Spaces
Unrestricted	2,341	Visitor	16
Handicapped	44	Gov't Vehicle	49
Reserved	360	Loading	4
Total	2,745	Total	69

Source: NAVFAC, 2012.

FIGURE 3-17 REGIONAL TRANSPORTATION MAP



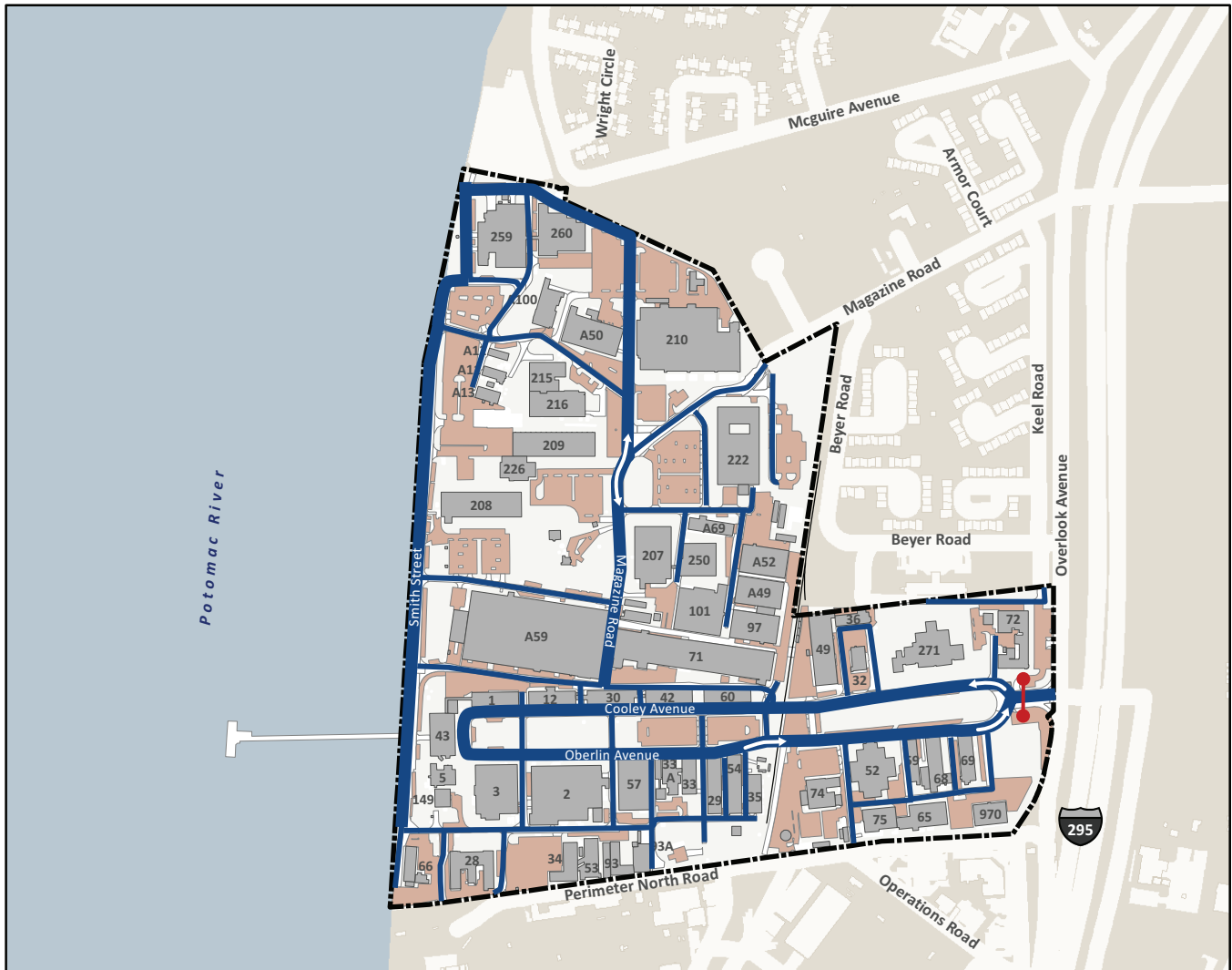
-  Installation Boundary
-  Interstate Highway
-  Other Freeway and Expressway
-  Principal Arterial
-  Minor Arterial
-  Collector Road
-  Local Road








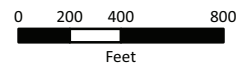
Sources:  
 Washington Metropolitan Area Transit Authority, 2007  
 Washington, D.C. OCTO/GIS, 2010  
 NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

FIGURE 3-18 NRL TRANSPORTATION MAP



-  Access Control Point
-  Installation Boundary
-  Primary Roads
-  Secondary Roads
-  Parking Area



Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.



A Washington Metropolitan Area Transit Authority Metrobus arrives at the Anacostia Metro Station.  
Source: [www.wmata.com](http://www.wmata.com).

### Public Transit and Shuttle Buses

The Washington, D.C. Metrorail (or Metro) and Metrobus are operated by the Washington Metropolitan Area Transit Authority. The Metro has five lines with 86 stations in Washington, D.C., Virginia and Maryland while Metrobus has 319 routes and over 12,000 stops in the Washington metropolitan area.

The Congress Heights Metro Station on Green Line is 2.6 miles away from the NRL and the Anacostia Metro Station is approximately 3 miles away. Both stations are not close enough to walk to (Figure 3-19). The A4/A5 bus provides service between the Anacostia Metro Station and D.C. Village with stops outside the NRL. The route splits at the southern end of the route; the A4 serves Fort Drum and the A5 serves the Blue Plains Wastewater Treatment Plant. King Street Metro Station, Eisenhower Metro Station, and Huntington Metro Station are located across the Potomac River, approximately six to seven miles from NRL by vehicle. Direct public transportation from these metro stations to NRL does not exist at this time.

Maryland Transit Administration provides commuter bus service to the NRL via the 907 bus line. The 907 line originates in LaPlata, Maryland with Park and Ride locations available at South Potomac Church and at St. Charles Towne Plaza. The bus makes stops at the NRL and JBAB, then continues into the District. The run time from LaPlata to the NRL is approximately one hour, and the bus runs approximately every 30 minutes during peak periods.

Currently an internal shuttle service carries NRL employees/visitors to locations within the installation (Figure 3-21). The shuttle provides employees with access to various facilities. The internal shuttle bus stops as necessary along the route to pick-up or discharge passengers.

NRL has no shuttle service to other installations or transit facilities.



Capital Bikeshare station.  
Source: [www.capitalbikeshare.com](http://www.capitalbikeshare.com).

### Pedestrian and Bicycle Facilities and Amenities

Sidewalks generally exist along primary and secondary roadways and adjacent to facilities on the NRL. They provide connections between facilities and access to most of the parking lots.

No designated bicycle lanes are in the vicinity of the NRL (Figure 3-20). Bicyclists must share the road with vehicles, making it difficult for employees to commute safely via bicycle to the installation. The closest road designated with signed bicycle routes is Overlook Avenue SW.

Across the Potomac River is the Mount Vernon Trail, a paved multi-use recreation trail that parallels the Potomac River for 18 miles from Theodore Roosevelt Island to Mount Vernon, Virginia (George Washington's estate). No direct connection to the Mount Vernon Trail exists from the NRL unless bicyclists use roads.

Washington, D.C. has organized bicycle rentals in multiple locations via the Capital Bikeshare program. Bikeshare locations north of the NRL include: the Anacostia Metro Station, Good Hope Road and Martin Luther King Avenue SE, and the Anacostia Library.

### Emergency Services

The central division of the NDW Fire Department provides fire and rescue services for not only the NRL, but JBAB and the Washington Navy Yard. Fire Station 3, Engine 43 and Hazmat 43 are designated to the NRL and are located on the installation. Additionally, Fire Station 1 on JBAB provides backup support to the installation. NDW Fire Department also has mutual aid agreements with the District of Columbia Fire Department and the Prince George's County, Maryland, Fire Department to provide additional aid if needed on the installation and vice versa if aid is needed adjacent to the NRL.

The Fraternal Order of Police, NDW provides security for the NRL at the gates and on the installation.








-  Installation Boundary
-  Metro Stations
-  A4/A5 (Anacostia/Ft Drum Line)
-  MTA 907 Line
-  2 Mile Radius
-  3 Mile Radius
-  State Boundary

FIGURE 3-19 METRO ACCESS AND BUS ROUTES MAP





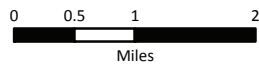
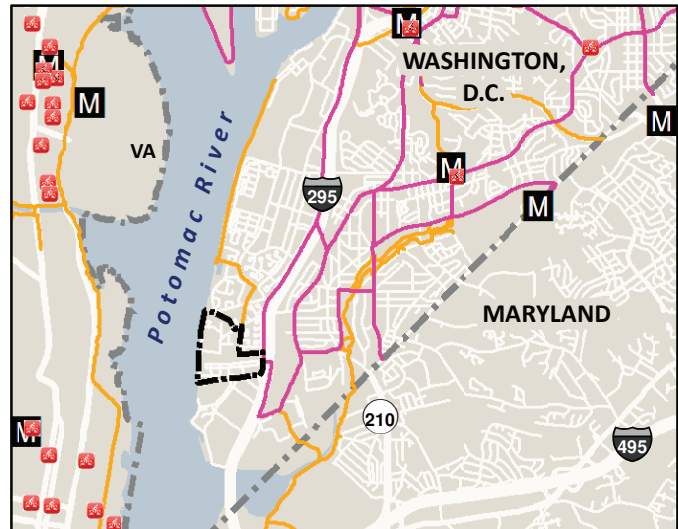
-  Capital Bikeshare Station
-  Signed Bicycle Route

FIGURE 3-20 BICYCLE ROUTES MAP




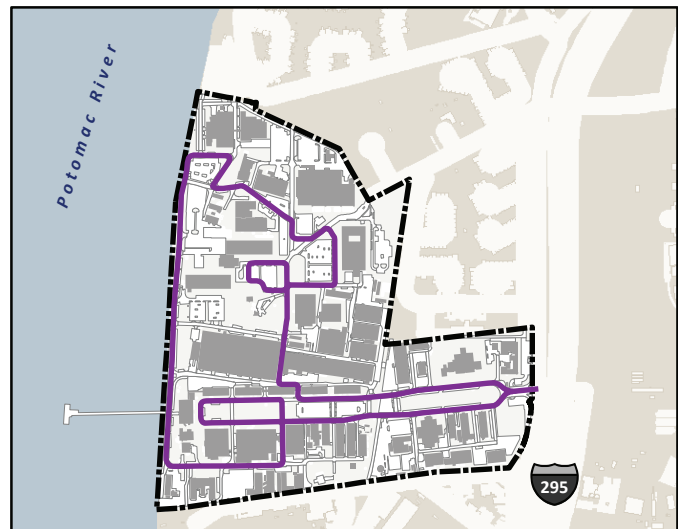
-  Internal Shuttle Route

FIGURE 3-21 INTERNAL SHUTTLE ROUTE MAP



Washington, D.C. Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 PG Atlas, 2011  
 Source: NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

## 4.0 Framework Plan

### 4.1 Overview

This chapter presents the framework plan which provides an adaptable blueprint to control, coordinate, and direct change. Arriving at this plan involves developing planning strategies, creating a framework plan and establishing a future land use plan. Each step builds upon the former to provide direction for achieving the overall vision for the installation. The process occurs in the following sequential steps:

- **Planning Considerations:** understand the opportunities and constraints posed by existing conditions, and the potential future issues presented in the previous chapters.
- **Planning Strategies:** examines installation-wide planning systems and determines how they can be shaped to accommodate future capacity.
- **Framework Plan:** synthesizes the planning strategies into an overall plan that serves as the long-range master plan.
- **Land Use Plan:** describes what land use changes will be needed to accommodate the future population and proposed projects. It is derived from a broad directive given at a regional-level.











## 4.2 Planning Strategies

Planning strategies are the basis of the future plan for the installation. They take the issues mandated by the guiding principles and give physical form to those objectives. The planning strategies presented in this section focus on major infrastructure and planning systems that include:

- Roadway Circulation and Parking.
- Development Parcels.
- Activity Hubs.
- Multimodal Circulation.
- Open Space and Pedestrian Circulation.
- Security Enhancements.
- Energy.
- Stormwater Management.

Each planning strategy is then measured by the guiding principles to ensure objectives are met. Each principle is summarized in the following table:

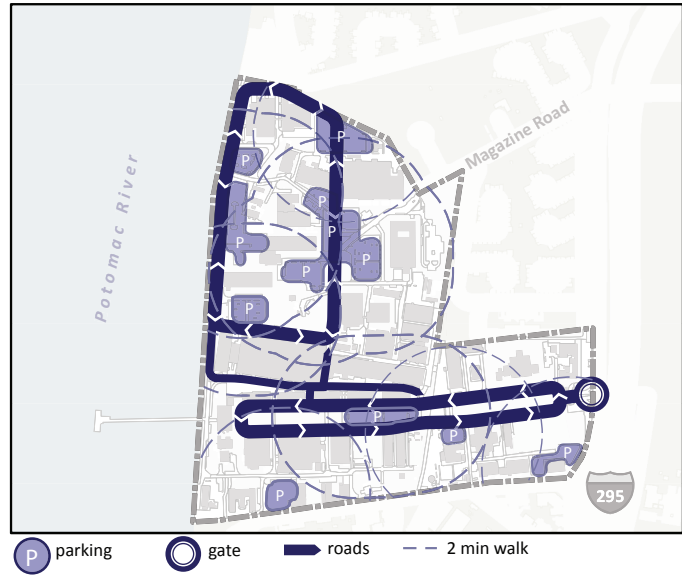
**TABLE 4-1 GUIDING PRINCIPLES KEY**

Icon	Guiding Principle
	Compact Development
	Infill Development
	Circulation Networks
	Horizontal Development
	Vertical Development
	Sustainable Landscape Elements
	Low Impact Development and Stormwater Management
	Configuration and Utilization
	Energy Conservation and Production
	Lifecycle / Mitigation Planning

## Roadway Circulation and Parking

The roadway circulation and parking strategies build upon the existing network of streets and parking areas (Figure 4-2). Figure 4-1 illustrates the two primary circulation loops in the north and south campuses that serve the installation well. However, there is still a narrow connection between the two loops for north-south access between Buildings A59 and 71. The configuration of the facilities in this area limits the ability to drastically alter the road configurations. In the long-term an alternate connection shall be considered to resolve this circulation issue. The framework plan is based on the following strategies summarized in the table below.

**FIGURE 4-1 FUTURE CONCEPTUAL CIRCULATION AND PARKING STRATEGIES (OVERLAID ON EXISTING CONDITIONS)**

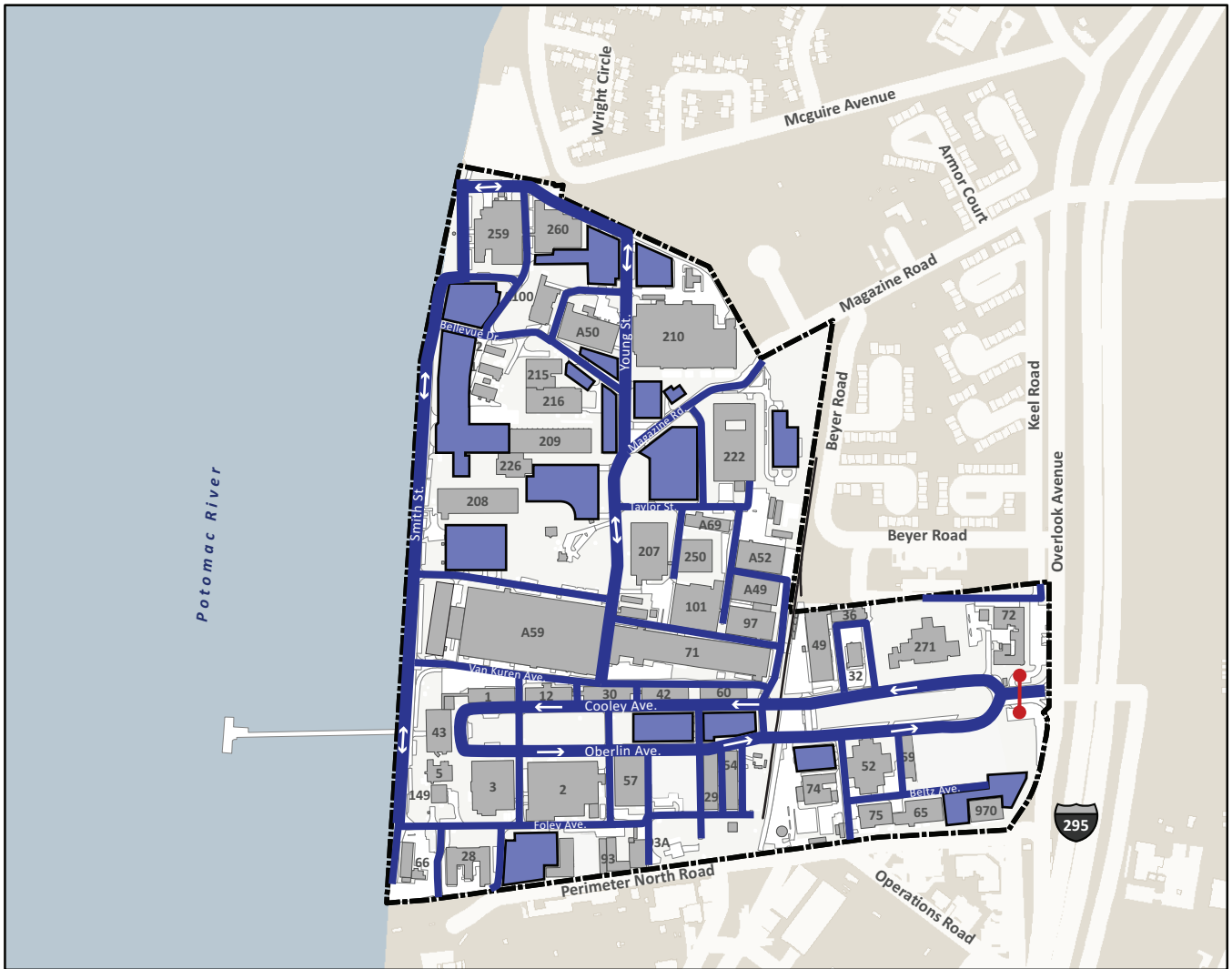


Two primary loops provide vehicle access on NRL. A southern loop that accesses facilities along the central mall, and a northern loop that accesses facilities north of building A59. Parking is generally well distributed with short walking distances between cars and buildings.

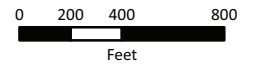
**TABLE 4-2 ROADWAY CIRCULATION AND PARKING STRATEGIES MATRIX**

Strategies										
Maintain the two primary circulation loops of: Cooley Avenue/ Oberlin Avenue, and Van Kuren Avenue/Magazine Road/ Young Street/Smith Street.		✓		✓		✓		✓		✓
Maintain parking areas that are adjacent to large administrative and R&D facilities for ease of access by commuting personnel.	✓	✓	✓					✓		✓
Strive to limit the increase of parking spaces. This will help to shift the employee to parking ratio towards NCPC mandates.				✓			✓	✓		✓
Improve traffic signs and markings on Van Kuren Avenue and Magazine Road to reduce conflicts between pedestrians and vehicles.		✓	✓					✓		✓

FIGURE 4-2 FUTURE ROADWAY CIRCULATION AND PARKING FRAMEWORK PLAN



- Roads
- Gates
- Primary Parking Areas



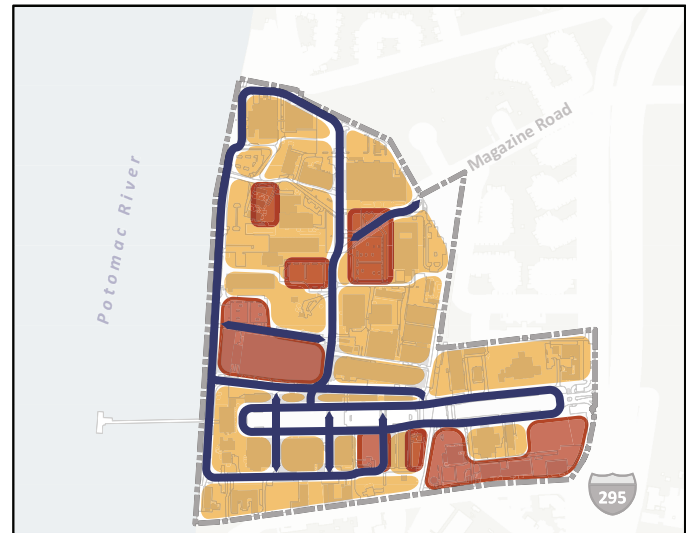
Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

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## Development Parcels

The development parcel strategies build upon the industrial complex pattern that is already established. Figure 4-3 clearly distinguishes developed parcels from parcels with potential for future development. Development parcels are delineated land bays that designate distinct facilities and open spaces (Figure 4-4). They align with the Land Use Plan to direct where future program elements shall be located. The framework plan is based on the following strategies summarized in the table below.

**FIGURE 4-3 FUTURE CONCEPTUAL DEVELOPMENT PARCEL STRATEGIES (OVERLAID ON EXISTING CONDITIONS)**



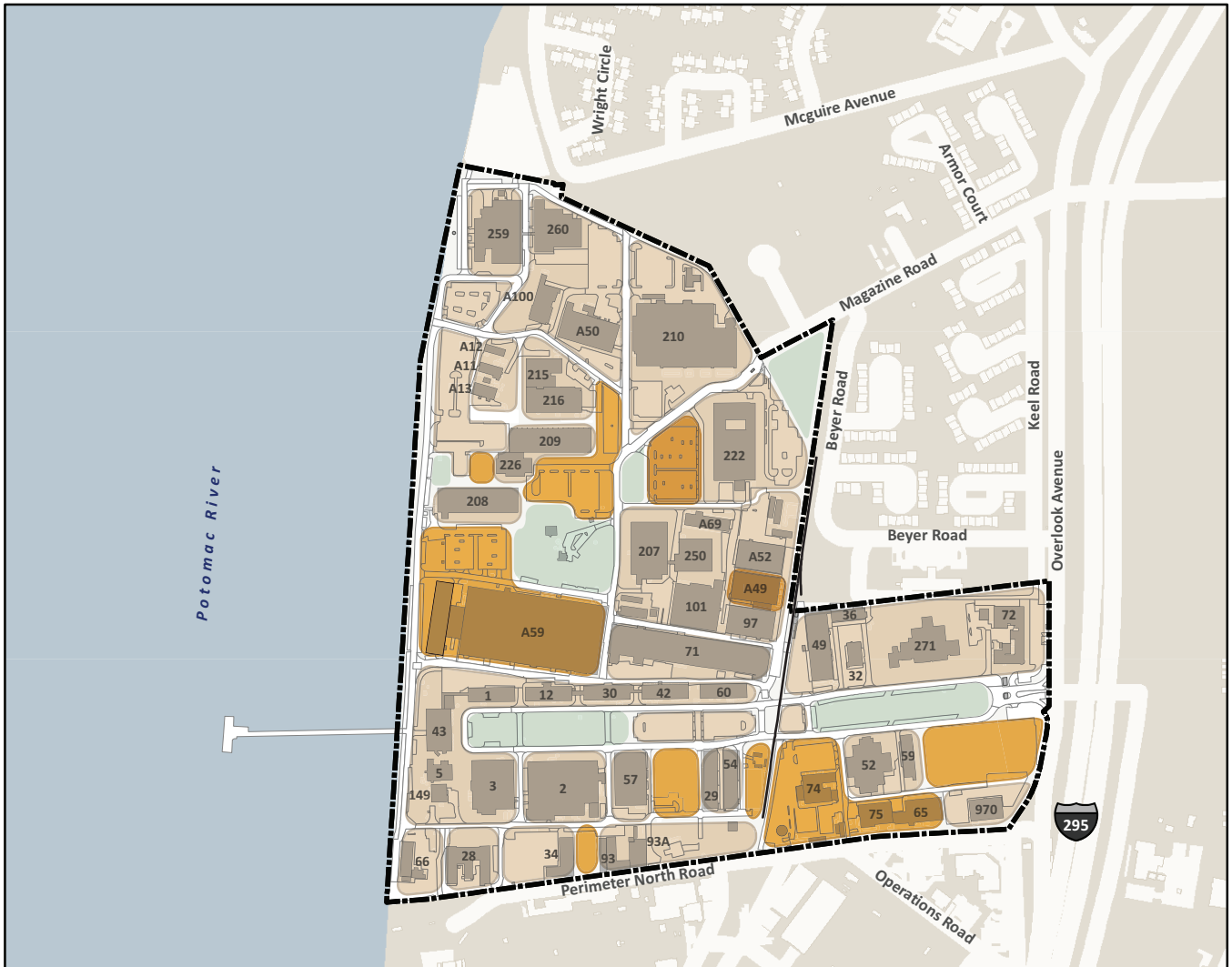
Legend: ■ developed parcel    ■ redevelopment/renovation parcel

*Land parcels on the NRL support large R&D complexes necessary to meet mission requirements. Several parcels can be prime locations for redevelopment/renovation in the long-term.*

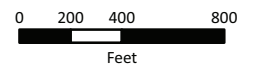
**TABLE 4-3 DEVELOPMENT PARCELS STRATEGIES MATRIX**

Strategies										
Demolish facilities that are unable to be reconfigured and/or retrofitted for new uses. Proper documentation of historic resources will be needed prior to demolition. Over the long-term, these sites will serve as development parcels for new construction to support emerging technologies and mission requirements.	✓	✓		✓	✓	✓	✓	✓		✓
Utilize demolition sites as open space in the short-term, but potential development can occur in the long-term.	✓	✓		✓	✓	✓	✓	✓		✓
Ensure that new construction and renovation of existing facilities can be adapted and reconfigured in the future as the nature of research always evolves and changes.	✓	✓						✓		✓
Concentrate on renovating and remodeling existing facilities to provide properly configured spaces for the types of research at the NRL.	✓	✓		✓	✓	✓	✓	✓		✓
Encourage long-term future development on surface parking lots and consolidate parking into more compact areas.	✓	✓		✓	✓	✓	✓	✓		✓

FIGURE 4-4 FUTURE DEVELOPMENT PARCELS FRAMEWORK PLAN



- Developed Parcels
- Parcels for Redevelopment/Renovation
- Reserved Open Space



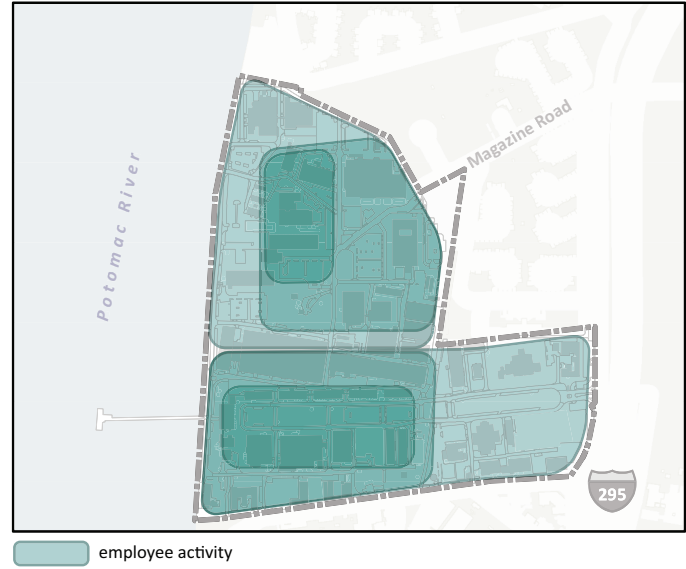
Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

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## Activity Hubs

Activity hubs are areas where high concentrations of primary RDT&E facilities occur. These represent dense employment centers of people (Figure 4-5). The framework plan (Figure 4-6) is based on the following strategies summarized in the table below.

**FIGURE 4-5 FUTURE CONCEPTUAL ACTIVITY HUB STRATEGIES (OVERLAID ON EXISTING CONDITIONS)**



Employment is congregated in north and south campuses on the installation. Areas shown in the darkest blue reflect the highest concentrations of employee activity.

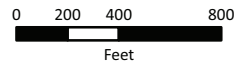
**TABLE 4-4 ACTIVITY HUBS STRATEGIES MATRIX**

Strategies										
Encourage infill development in the future to maintain dense clusters of activity hubs and close proximity between buildings and various functions.	✓	✓		✓	✓			✓		✓
Improve upon community services, locate within activity hubs where employees are concentrated.	✓	✓		✓	✓			✓		✓
Encourage long-term future development on surface parking lots and consolidate parking in the most dense sections of the installation.	✓	✓		✓	✓			✓		✓

FIGURE 4-6 FUTURE ACTIVITY HUBS FRAMEWORK PLAN



- Prominent Employment Hubs
- 2.5 minute walking distance



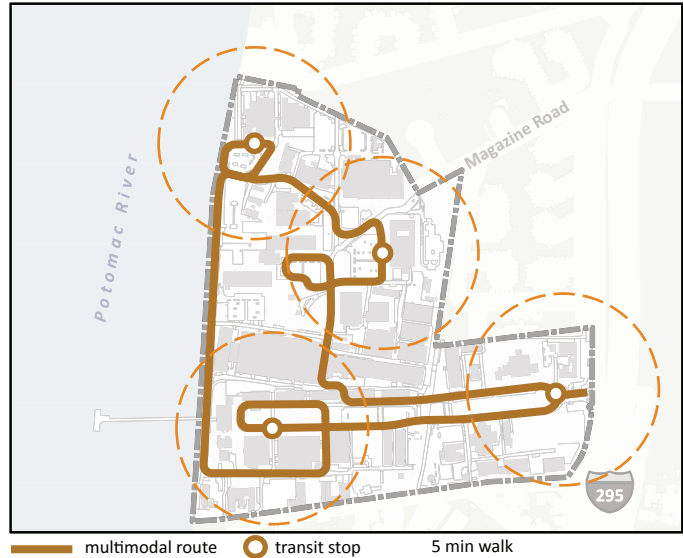
Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

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## Multimodal Circulation

The multimodal transit strategies indicate how various types of shuttle, bicycle, and other public oriented transit services can be incorporated throughout the installation. The ultimate goal is to build upon existing infrastructure to better link and overlap pedestrian/transit corridors to offer efficient and reliable alternatives to the car. The framework plan is based on the following strategies summarized in the table below.

**FIGURE 4-7 FUTURE CONCEPTUAL MULTIMODAL STRATEGIES (OVERLAID ON EXISTING CONDITIONS)**

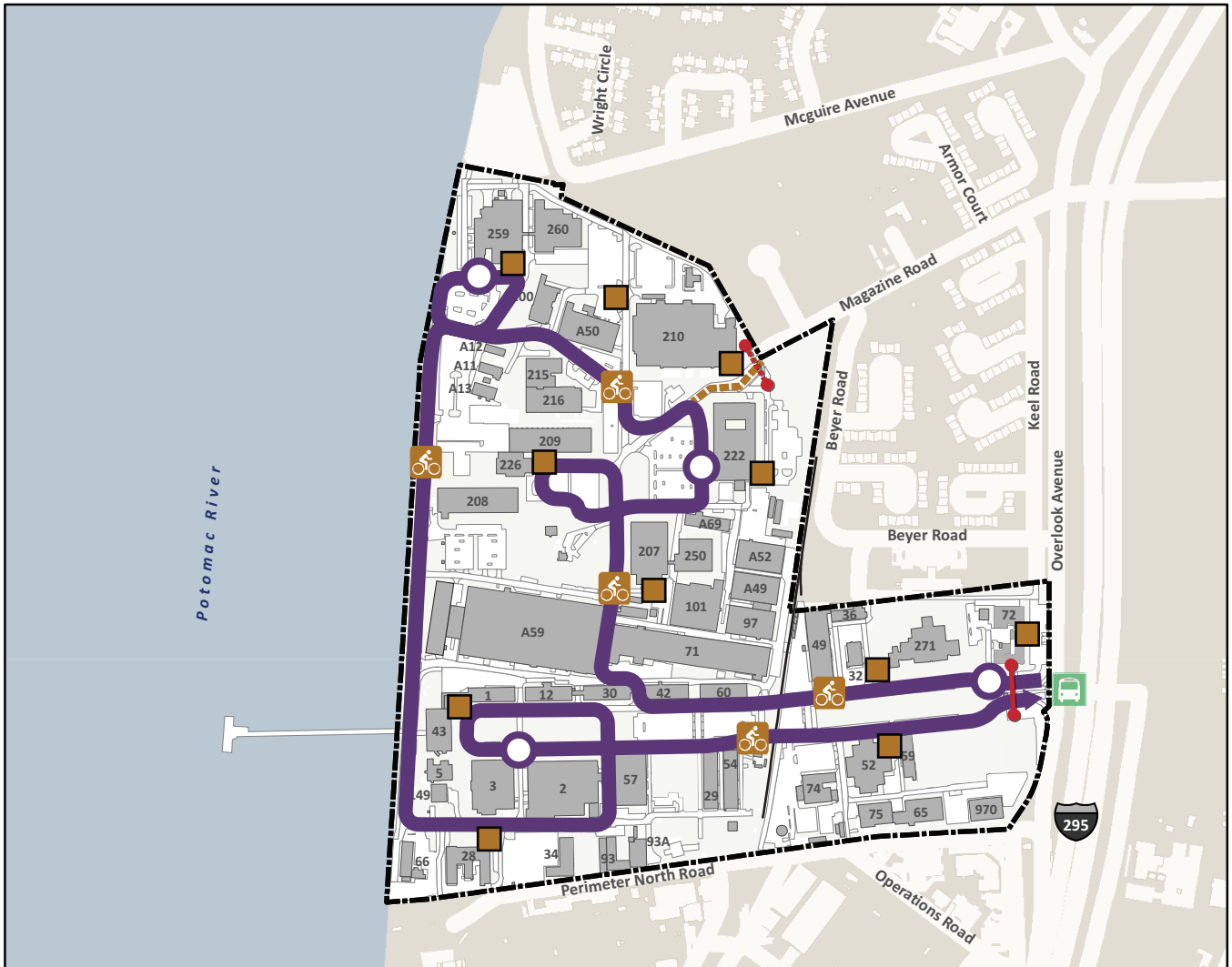









*Linking the internal shuttle with the regional public transit system can create a seamless network of routes and stops that are within a 2-3 minute walking distance from most buildings.*

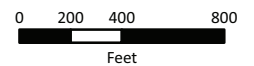
**TABLE 4-5 MULTIMODAL CIRCULATION STRATEGIES MATRIX**

Strategies										
Continue to circulate the internal shuttle service through the installation, along a designated route. The shuttle service will stop as necessary along the route to pick-up or discharge passengers as necessary. The stops shown are notional.			✓					✓	✓	✓
Expand upon external shuttle services to provide more frequent trips between other DoD installations and the Pentagon.			✓					✓	✓	✓
Expand bicycle access to include designated routes, signage, bicycle storage, and shower/locker rooms. The Magazine Road Gate could be re-opened to accept bicyclists if funding and staffing can be acquired.			✓					✓	✓	✓
Create a wayfinding system that identifies and encourages use of public transit.			✓					✓		✓
Ensure an alignment between pedestrian corridors and multimodal circulation to enable a synergy within the installation.			✓					✓	✓	✓
Install bikeshare stations at entrance gates and key interior locations that can service activity hubs.			✓					✓	✓	✓

FIGURE 4-8 FUTURE MULTIMODAL CIRCULATION FRAMEWORK PLAN



-  Proposed Internal Shuttle Route & Stops
-  Operational Gates
-  Future Gate (pending funding)
-  Public Transit
-  Bicycle Routes
-  Future Bicycle Route (pending gate opening)
-  Bicycle Storage / Bikeshare Station



Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

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## Open Space and Pedestrian Circulation

The open space strategies help to preserve significant outdoor green spaces so they remain viable amenities at the installation. Linking open spaces with pedestrian corridors creates an integrated network that encourages pedestrian access to facilities and green spaces.

Pedestrian circulation is limited to sidewalks along primary and secondary roadways, or adjacent to facilities for access. A continuous system is lacking on the installation, since not all areas have safe and convenient access. Most personnel walk through parking lots and buildings to reach their destinations. A continuous network will accommodate pedestrians and promote walkability on the installation. The framework plan is based on the following strategies summarized in the table below.

**FIGURE 4-9 FUTURE CONCEPTUAL OPEN SPACE STRATEGIES (OVERLAID ON EXISTING CONDITIONS)**

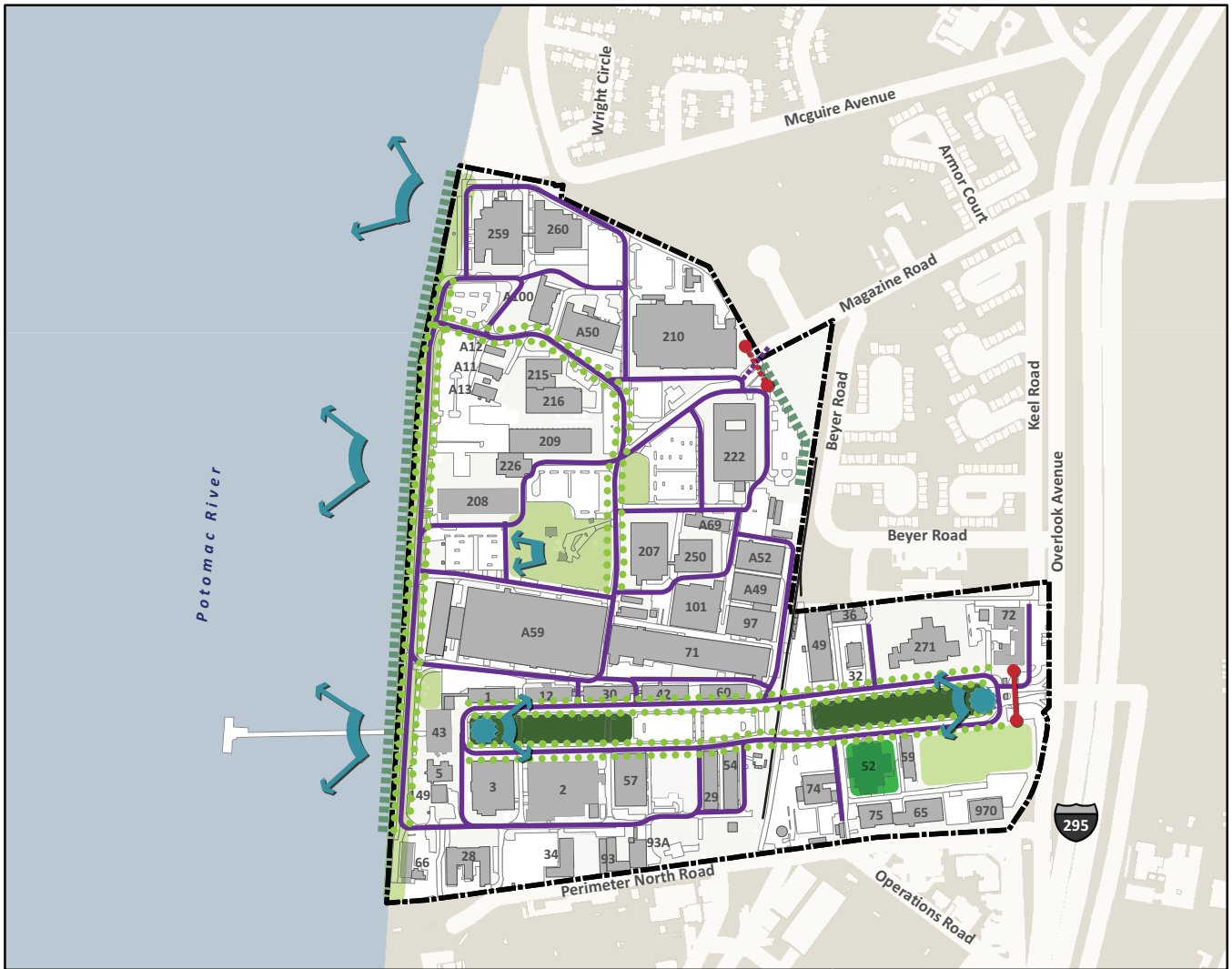


*Prominent green spaces on the NRL shall be preserved, and a comprehensive network of pedestrian links shall be established.*

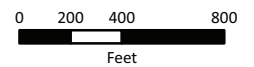
**TABLE 4-6 OPEN SPACE AND PEDESTRIAN CIRCULATION STRATEGIES MATRIX**

Strategies										
Preserve existing open spaces and their distribution to ensure that green space is within a close walking distance.						✓	✓	✓		✓
Transform former building sites into open spaces until redevelopment actions occur.				✓		✓	✓	✓		✓
Ensure that open spaces can support a wide range of activities.				✓		✓		✓		✓
Establish a comprehensive pedestrian network to provide access to all areas of the installation. Align pedestrian corridors with multimodal circulation networks enable and enhanced mobility experience. The Magazine Road Gate could be re-opened to pedestrians if funding and staffing can be acquired.	✓	✓	✓	✓		✓		✓		✓
Improve upon the streetscape to reinforce the hierarchy of circulation infrastructure.		✓	✓	✓		✓		✓		✓
Improve and expand upon site furnishings and landscaping to promote walkability across the installation.	✓	✓		✓		✓	✓			✓
Enable open spaces to serve an environmental function for stormwater management, and habitat restoration.				✓		✓	✓	✓		✓
Preserve areas for ceremonial functions such as the Central Mall.				✓		✓	✓	✓		✓
Strategically increase the amount of tree and buffer planting on both sides of Smith Street to improve the buffer planting along the riverfront, while maintaining the research capacity and circulation access of this area.				✓		✓	✓			✓
Preserve and expand upon existing vegetation and landscaping to enhance the aesthetics of the installation and provide environmental benefits.				✓		✓	✓	✓		✓
In keeping with Low Impact Development, landscapes shall be low maintenance, drought tolerant, and adaptive to urban conditions.						✓	✓	✓		✓

FIGURE 4-10 FUTURE OPEN SPACE AND PEDESTRIAN CIRCULATION FRAMEWORK PLAN



- Open Space Areas
- Active Recreation Facilities
- Ceremonial Green Spaces
- Operational Gates
- Future Gate (pending funding)
- Primary Pedestrian Routes
- Future Pedestrian Route (pending gate opening)
- Prominent Streetscape
- Vegetated Buffer
- Viewsheds
- Landmarks/Monuments



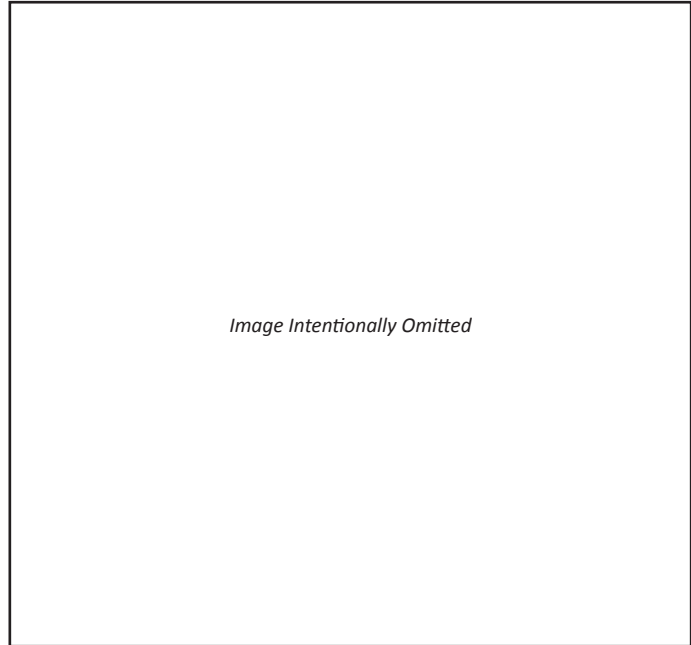
Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
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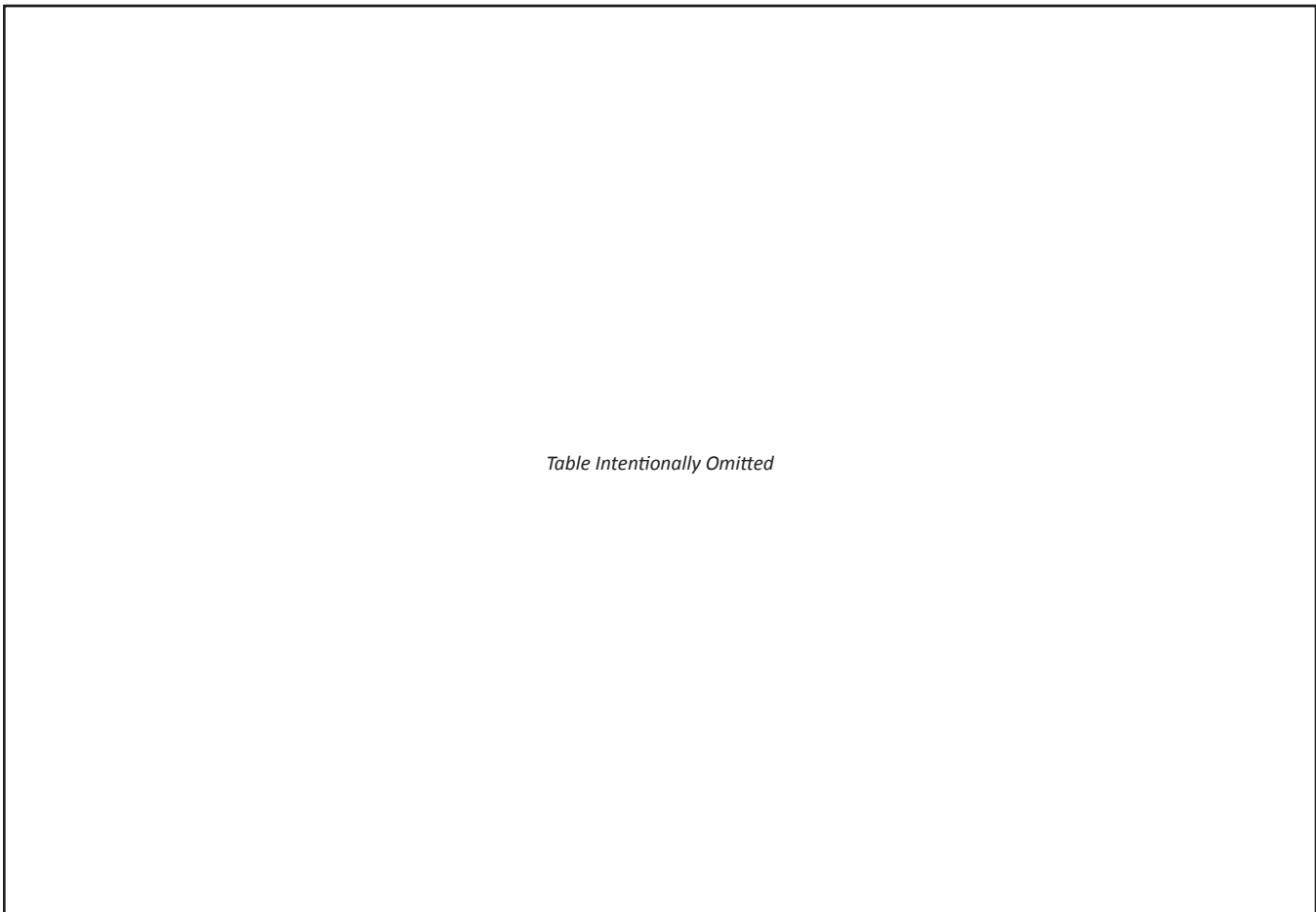
## Security Enhancements

Balancing the security needs for AT/FP and the realities of infrastructure and buildings already in place will continue to be a long-term issue. Some of the following strategies used singly or in conjunction with one another can help to increase the security potential and further meet AT/FP requirements. (Figure 4-12) The framework plan is based on the following strategies summarized in the table below.

**FIGURE 4-11 FUTURE CONCEPTUAL SECURITY ENHANCEMENT STRATEGIES (OVERLAID ON EXISTING CONDITIONS)**

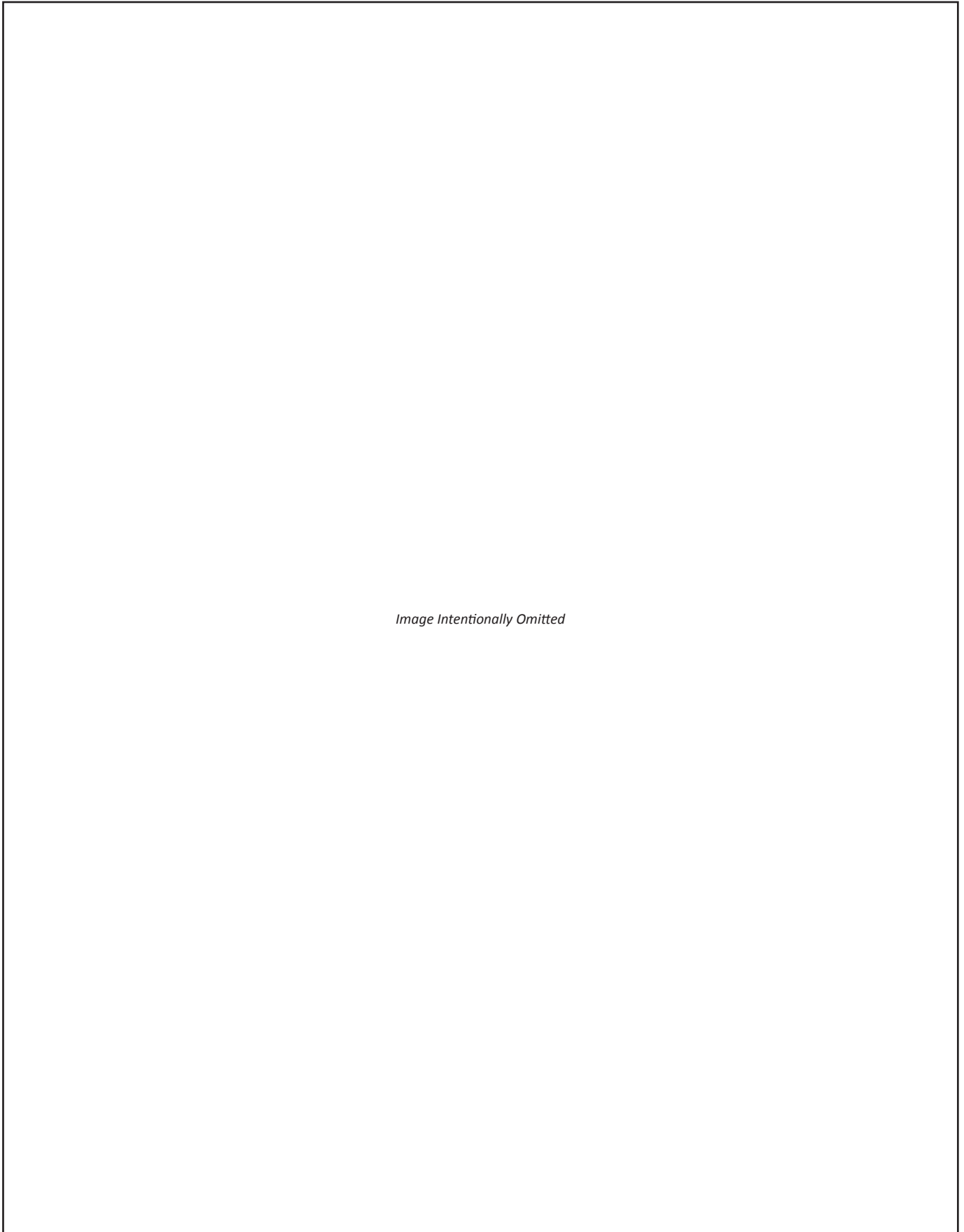


**TABLE 4-7 SECURITY ENHANCEMENT STRATEGIES MATRIX**



*Table Intentionally Omitted*

**FIGURE 4-12 FUTURE SECURITY ENHANCEMENT STRATEGIES PLAN**



*Image Intentionally Omitted*

## Energy Strategies

The Navy is mandated by many executive orders, policies, and regulations to reduce energy consumption. The NDW installations have already implemented energy management plans (Energy Vision 2035) that aim to conserve energy resources. Other strategies might also include the generation of electricity with renewable resources such as solar and wind. The framework plan is based on the following strategies summarized in the table below.



Solar panels in parking areas can provide shelter while generating energy.

TABLE 4-8 ENERGY STRATEGIES MATRIX











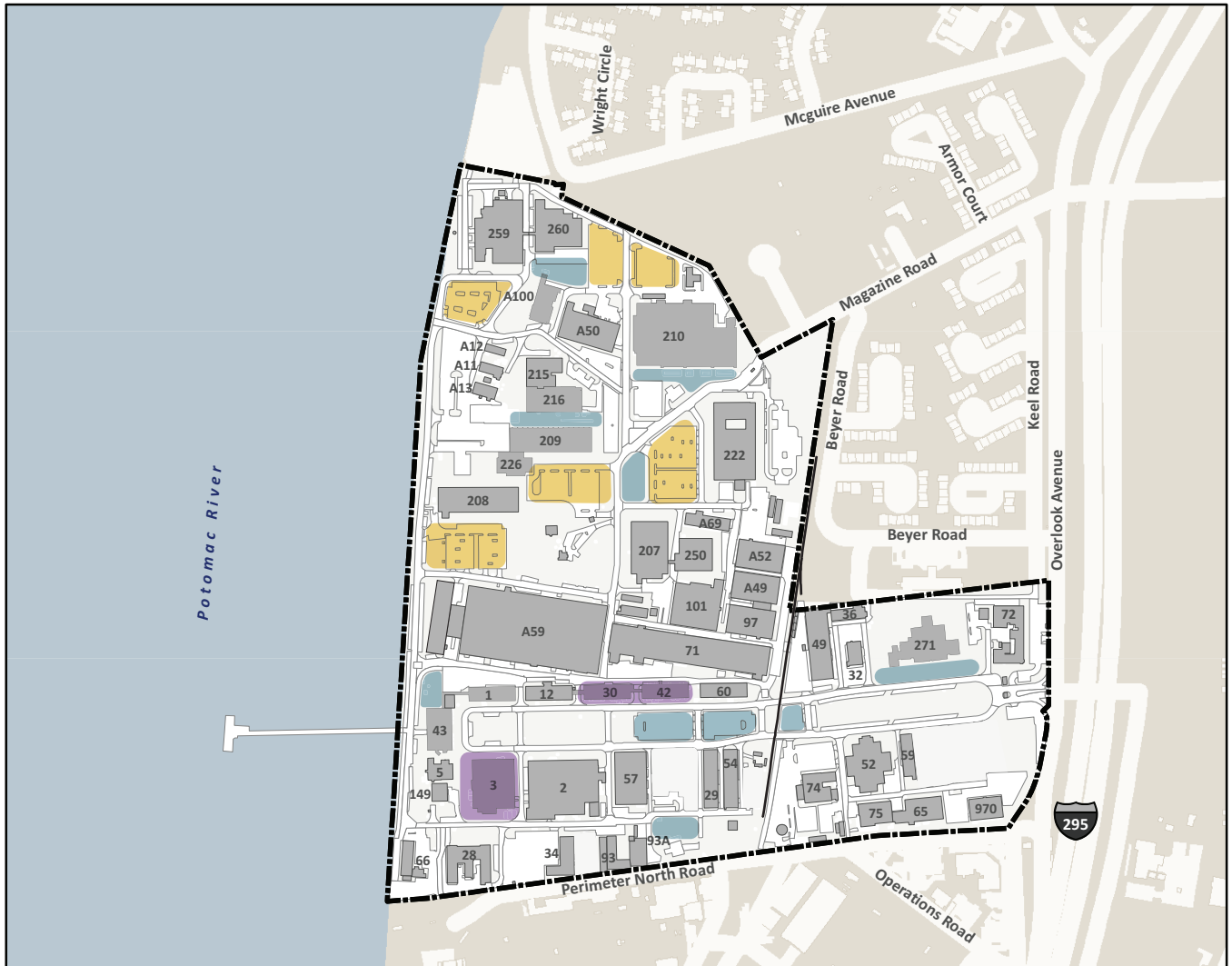
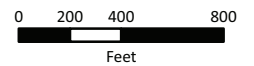
Strategies										
Study the potential for parking lots to accommodate solar or wind power systems that can generate electricity for the installation, or to contribute to the regional power grid.		✓				✓	✓	✓	✓	✓
Incorporate renewable energy generation into site design and new construction or renovation of existing buildings. Use of innovative building materials can also conserve energy.		✓				✓	✓	✓	✓	✓
Potentially using geothermal in existing open areas and parking lots. Consider servicing multiple buildings rather than individual facilities to gain better efficiencies.		✓		✓		✓	✓	✓	✓	✓
Renovating and retrofitting existing buildings is always a greener solution than new construction. The initiative to re-purpose buildings on the NRL shall continue as this is the biggest resource and cost savings that can be implemented.		✓				✓	✓	✓	✓	✓
Retrofit existing buildings with solar or wind power generation when possible, or incorporate into new construction.						✓	✓			✓

FIGURE 4-13 FUTURE ENERGY STRATEGIES PLAN



- Geothermal Opportunity
- Solar or Wind Energy Opportunity Areas
- Existing Building Improvement Opportunities



Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

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## Stormwater Management Strategies

Stormwater management has seen great advancements in the techniques, methods, and technologies of controlling urban runoff. These innovations have resulted in better management and environmental conditions. The Navy is mandated by laws, executive orders, and other policies to implement runoff controls, particularly because of Navy property within the Chesapeake Bay watershed. The framework plan is based on the following strategies summarized in the table below.



Green roofs can insulate the building as well as collect rainwater and reduce energy costs.



Bioretention swales can filter stormwater runoff and prevent erosion.

**TABLE 4-9 STORMWATER MANAGEMENT STRATEGIES MATRIX**











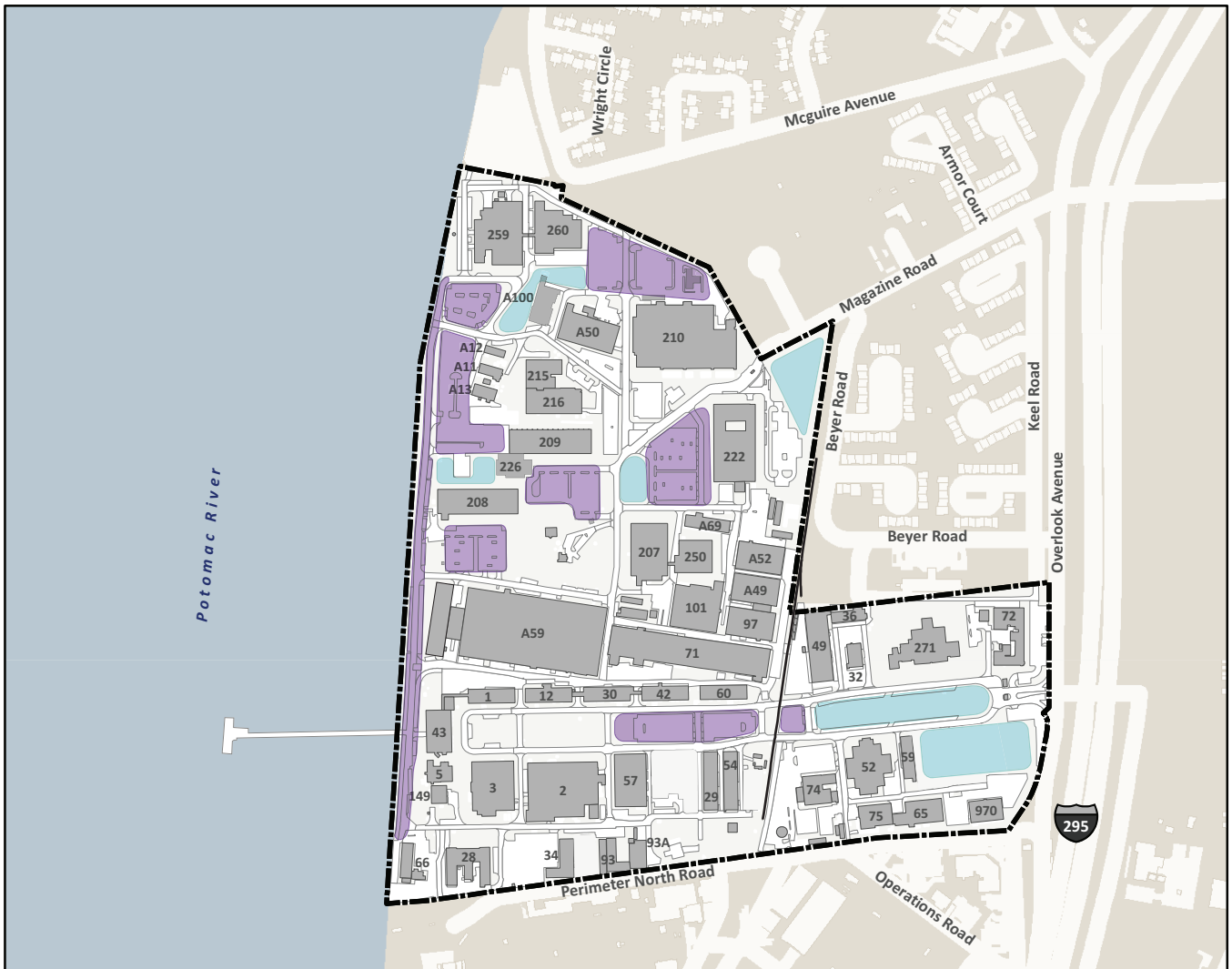
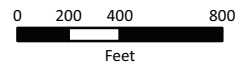
Strategies										
Encourage rain gardens or other bioretention areas within open spaces and parking lots to increase the ability to retain and filter stormwater runoff.		✓				✓	✓			✓
Retrofit existing buildings with green roofs when possible, or incorporate into new construction.						✓	✓			✓
Retrofit existing surface parking lots with underground retention systems and pervious pavements during re-pavement projects.		✓					✓			✓
Structured parking, if funding becomes available, can be constructed in the long term to reduce the amount of impervious pavement surface.	✓		✓		✓			✓		✓
Capture rainwater from rooftops throughout the installation and store in cisterns to be used in grey water applications such as toilets and landscape irrigation.							✓	✓		✓
Replace paving on Smith Street and associated on-street parking with pervious paving to increase retainage of runoff and improve the buffering qualities of facilities along the riverfront. This can be accomplished during repaving improvements with careful consideration to circulation access and RDT&E needs.		✓					✓			✓

FIGURE 4-14 FUTURE STORMWATER MANAGEMENT STRATEGIES PLAN



- Raingarden/Bioretenion Oppotunity Area
- Underground Retention/Pervious Pavement Oppotunity Area



Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

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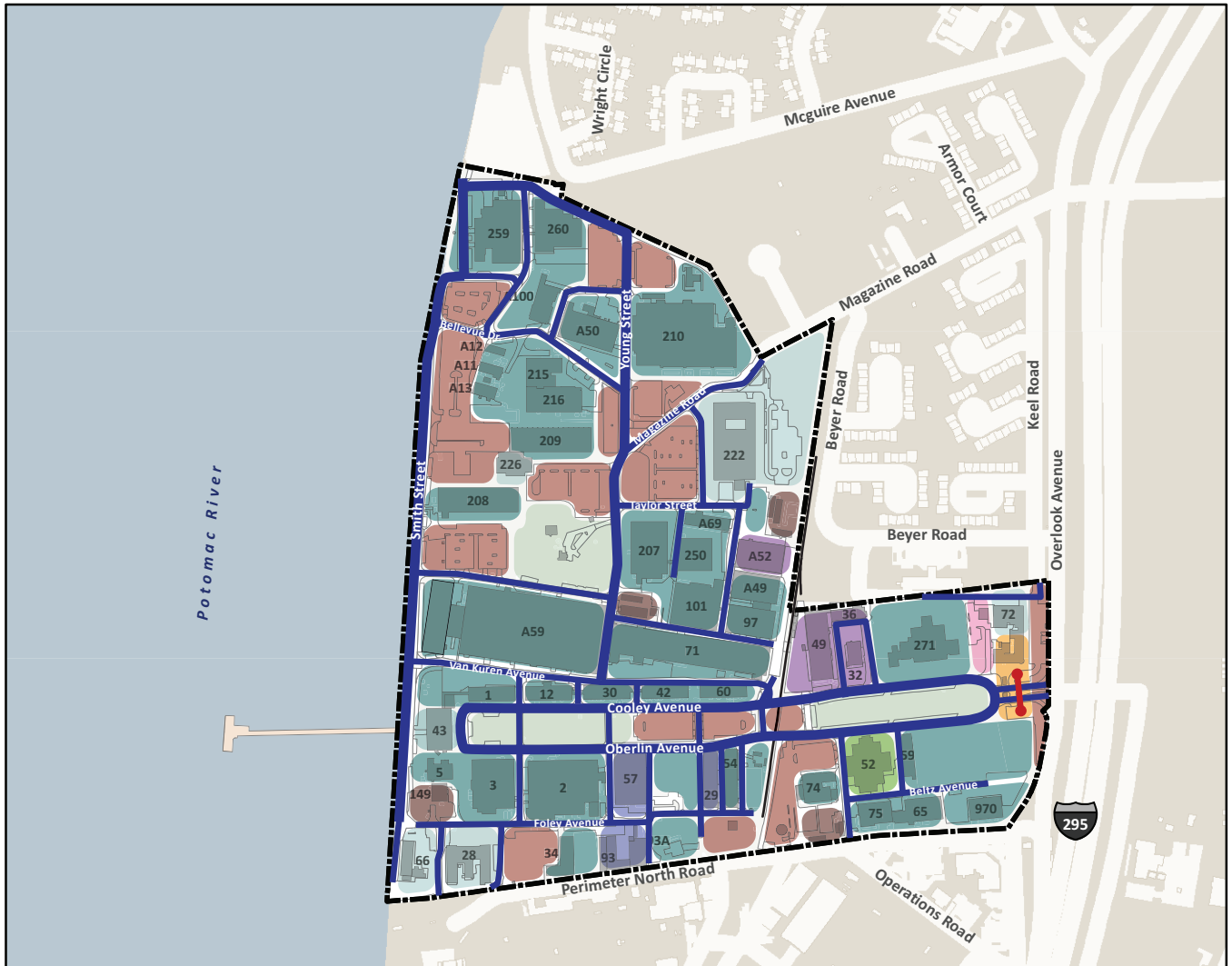
## 4.3 Near-Term Outlook

### Near-Term Framework Plan

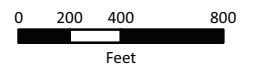
The Framework Plan (Figure 4-15) for the NRL recommends broad planning initiatives within the near-term (five years) that represent types and locations of development without being tied to specific projects. The general nature of this plan provides the flexibility to accommodate an uncertain future, yet provides enough guidance that will not become easily outdated. The framework plan:

- Accommodates growth 5 years into the future, when the population is anticipated to increase by 615 people to a total of 5,487.
- Absorbs population growth into existing and proposed facilities through strategic moves and efficient re-use of space.
- Preserves open space for recreation, ceremonial, and informal uses.
- Maintains the character of the NRL and the arrangement of the streets and blocks.
- Reserves parcels for development that may occur in the long-term future.

FIGURE 4-15 NEAR-TERM FRAMEWORK PLAN



- Installation Boundary
- Roads
- Gate
- Administrative
- Base Support
- Industrial
- Open Space/Preservation
- Parking
- Piers
- RDT&E
- Recreation
- Storage
- Training
- Utility



Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

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## Near-Term Land Use Plan

The land uses from the RIMP 2.0 Model Base (Figure 2-1) are transposed into the UFC 2-000-05N land use categories and shown in Figure 4-16. This conversion allows an easy comparison with the existing land use map described in Chapter 3.

Due to minimal population growth and the proposed locations of the planned projects for the next five years, no change in land use is proposed (Table 4-10). Most projects outlined in the next chapter are located within areas where the proposed function matches the current use. Future land use actions are described below. Definitions for the land uses can be found in the Chapter 3.

**TABLE 4-10 COMPARISON OF EXISTING AND NEAR-TERM LAND USES**

Land Use Areas	Existing		Near-Term	
	Total Acreage	Percent of Total	Total Acreage	Percent of Total
Administrative	12.94	9.84	12.94	9.84
Base Support	0.96	0.73	1.65	1.26
Industrial	3.11	2.37	3.11	2.37
Open Space/ Preservation	8.17	6.22	8.17	6.22
Parking	27.44	20.88	26.48	20.15
Piers	0.51	0.39	0.51	0.39
RDT&E	69.16	52.62	69.43	52.82
Recreation	1.39	1.06	1.39	1.06
Storage	4.41	3.36	4.41	3.36
Training	0.97	0.74	0.97	0.74
Utility	2.38	1.81	2.38	1.81
<b>Total</b>	<b>131.44</b>	<b>100</b>	<b>131.44</b>	<b>100</b>

Note: Data above are responsive to only those values currently existing in iNFADS, Facility Readiness and Evaluation System (FRES), and Geographic Information System (GIS) source data and do not account for any null values if applicable.

Source: NAVFAC Washington in conjunction with EMA, 2008; Washington, D.C., GIS, 2008; ESRI - Streetmap USA, 2005, iNFADS 2009; FRES 2009.

### Administrative

Area increases in size to encompass the front gate and parking lot associated with this use.

### Base Support

Area increases in size by encompassing the parking near the front gate into this use.

### Industrial

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

### Open Space/Preservation

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

### Parking

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur. Parking is consolidated or included within another land use. Parking area reduces in size but parking quantities remain the same.

### Pier

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

### Research, Development, Testing, & Evaluation

The facilities within the RDT&E land use will undergo the most change with several facility demolitions and a new construction project proposed. These occur within the current RDT&E land use boundaries. Table 4-10 summarizes the change in land use acreage associated with the new Laboratory.

### Recreation

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

### Storage

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

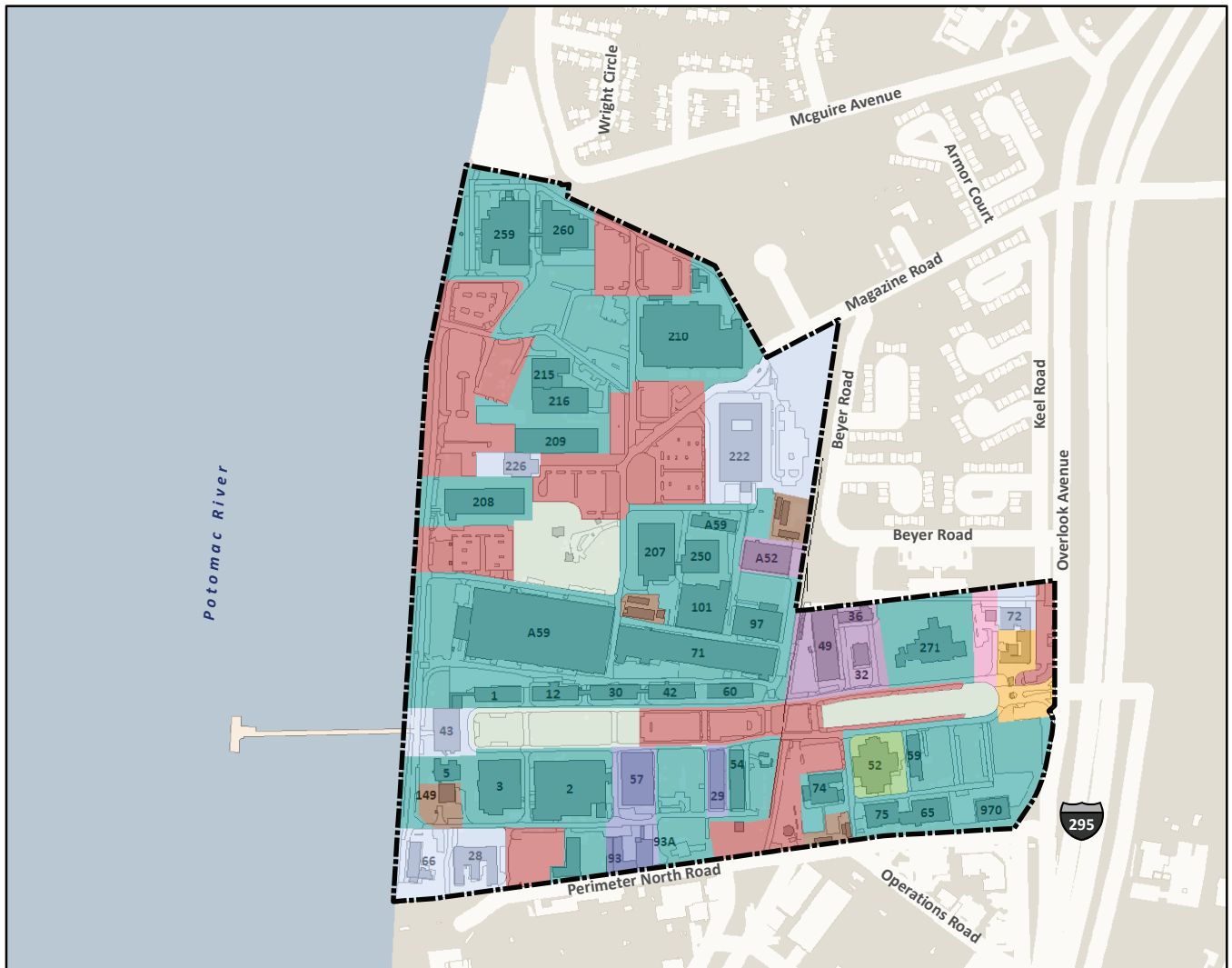
### Training

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

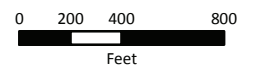
### Utility

There will be minimal changes to existing facilities; therefore, no changes in land use area will occur.

FIGURE 4-16 NEAR-TERM LAND USE PLAN



- Administrative
- Base Support
- Industrial
- Open Space/Preservation
- Parking
- Piers
- RDT&E
- Recreation
- Storage
- Training
- Utility



Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

## 4.4 Long-Term (20-year) Outlook

Although this Naval Research Laboratory Master Plan strategies and framework plans extends only five years into the future, there are several planning issues to consider for the installation for the long term (up to 20 years). These issues include internal improvements to infrastructure, environmental sustainability, and encroachment.

### Long-Term Framework Plan

The long-term planning considerations are to address issues that are anticipated beyond the time frame of this master plan. Although beyond the ability to reasonably anticipate the needs of these emerging issues, the considerations represent an opportunity for further study. As NRL continues to undergo changes in mission, trends notions can undergo further study and evaluation to ascertain how they can best meet the needs of NRL. The summary of long-term considerations listed below are keyed to the plan shown in Figure 4-17.

- 1 Renovate Building 3 for the Bio/Molecular Science and Engineering division or construct a new facility to meet their mission and space requirements.
- 2 Renovate Buildings 30 & 42 for the expansion of the Information Technology Division.
- 3 Target existing buildings and land parcels for adaptive reuse, expansion, or redevelopment as existing functions vacate, consolidate, or the facilities are no longer viable for mission needs.
- 4 Realign roads to improve circulation and connections between the north and south campuses.
- 5 Facilitate better north-south vehicular circulation with road improvements. CSX lines to remain in place if they cannot be abandoned.
- 6 Reconfigure parking lots for better efficiency; thereby, enabling the consolidation of parking into less areas.
- 7 If funding is available and National Capital Region transportation improvements have been made serving NRL, relocate surface parking spaces throughout the installation into structured parking garages in order to reduce impervious surface, increase open space, and potentially create opportunities for new building construction to meet future mission requirements.
- 8 Study ways to mitigate future flooding along the shoreline (Smith Street) and to protect the Potomac River from stormwater runoff. Designation of a 100-ft open space buffer along the shoreline eliminating surface parking will be considered if study results indicate it would be the best method for mitigation and protection.

## Long-Term Land Use Plan

Within the long-term (20 years) time frame of the NRL Master Plan, the changes to the land use are brought about by the reduction of parking. As surface lots are consolidated and potentially converted to garages, it decreases the land area needed for this use that can be converted to other functions. Long-term intentions are to utilize this available land for base support and RDT&E. Further study is needed to determine the feasibility and funding of this strategy.

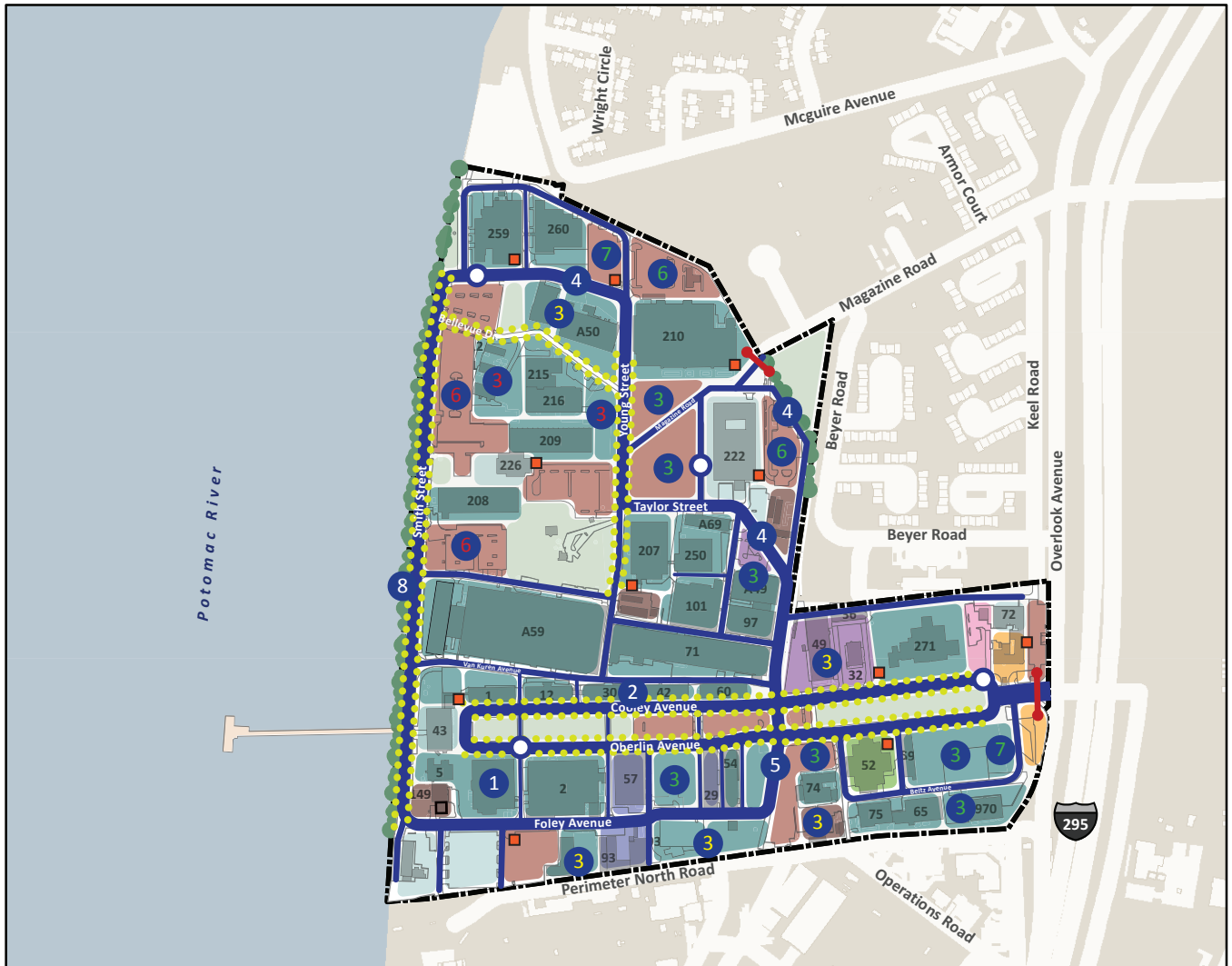
**TABLE 4-11 COMPARISON OF NEAR-TERM AND LONG-TERM LAND USES**

Land Use Areas	Near-Term		Long-term	
	Total Acreage	Percent of Total	Total Acreage	Percent of Total
Administrative	12.94	9.84	12.94	9.84
Base Support	1.65	1.26	2.15	1.64
Industrial	3.11	2.37	3.11	2.37
Open Space/ Preservation	8.17	6.22	8.17	6.22
Parking	26.48	20.15	21.11	16.06
Piers	0.51	0.39	0.51	0.39
RDT&E	69.43	52.82	74.3	56.53
Recreation	1.39	1.06	1.39	1.06
Storage	4.41	3.36	4.41	3.36
Training	0.97	0.74	0.97	0.74
Utility	2.38	1.81	2.38	1.82
<b>Total</b>	<b>131.44</b>	<b>100</b>	<b>131.44</b>	<b>100</b>

Note: Data above are responsive to only those values currently existing in iNFADS, Facility Readiness and Evaluation System (FRES), and Geographic Information System (GIS) source data and do not account for any null values if applicable.

Source: NAVFAC Washington in conjunction with EMA, 2008; Washington, D.C., GIS, 2008; ESRI - Streetmap USA, 2005, iNFADS 2009; FRES 2009.

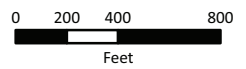
FIGURE 4-17 LONG-TERM FRAMEWORK PLAN



- Installation Boundary
- Roads
- Gate
- Administrative
- Base Support
- Industrial
- Open Space/Preservation
- Parking
- Piers
- RDT&E
- Recreation
- Storage
- Training
- Utility
- Long-Range Construction

- Streetscape Improvements
- Bike racks and/or Bikeshare Stations
- Shuttle Stop
- Buffer Planting

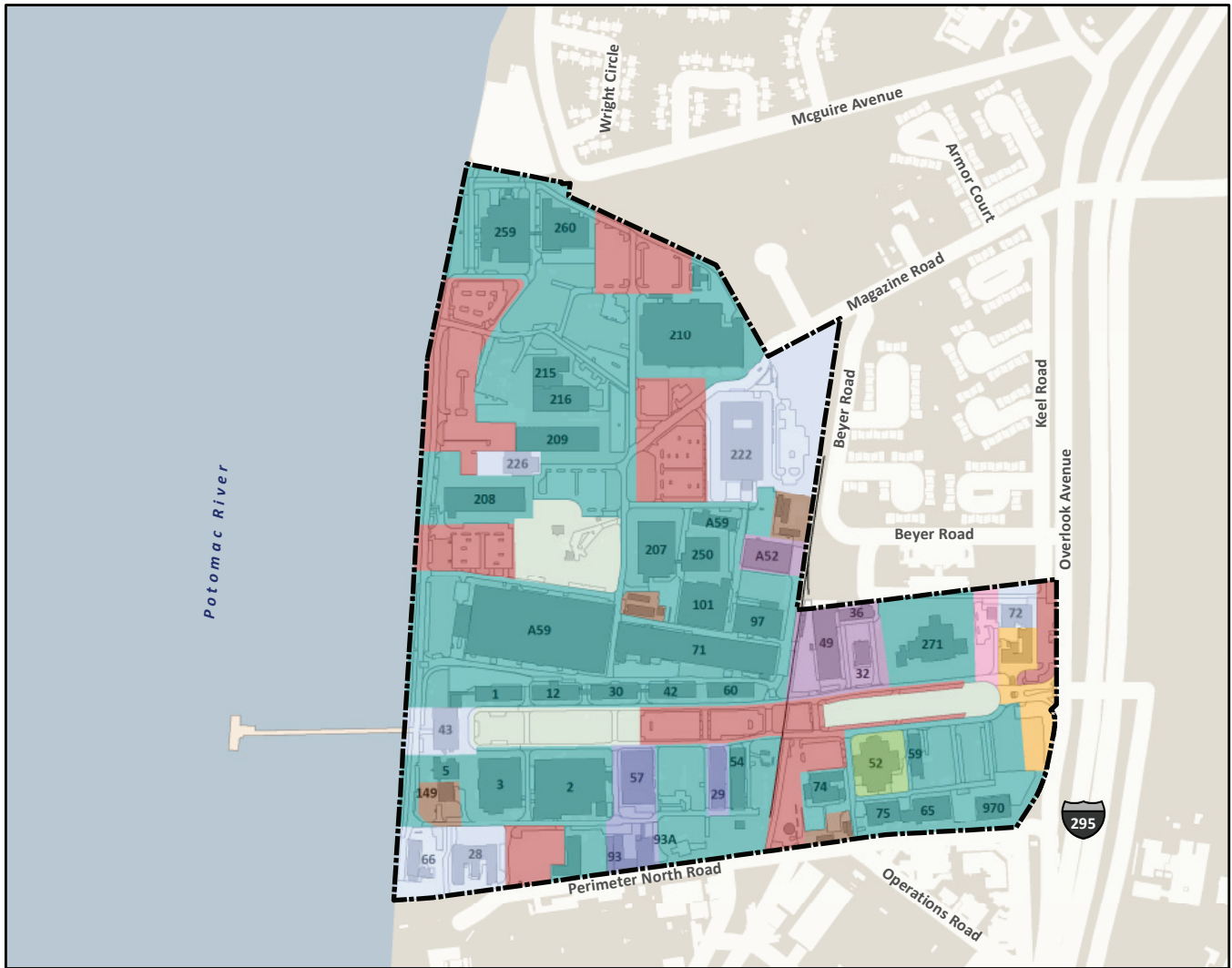
- Project Location Categories**
- Preferred Location
  - Alternative Location
  - Discouraged Location



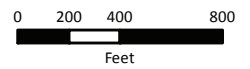
Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

FIGURE 4-18 LONG-TERM LAND USE PLAN (SHOWN ON EXISTING CONDITIONS)



- Administrative
- Base Support
- Industrial
- Open Space/Preservation
- Parking
- Piers
- RDT&E
- Recreation
- Storage
- Training
- Utility



Sources:

- Washington, D.C. Department of Transportation, 2010
- Washington, D.C. OCTO/GIS, 2006
- ESRI - Streetmap USA, 2007
- NRL PWD, 2011
- Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

## 5.0 Master Plan Program

This chapter summarizes the envisioned program for NRL including projected population and programmed projects planned for the next five years and its impact on parking. These projections were generated primarily by the NRL Corporate Facilities Investment Plan II (CFIP II), with input from the ONR GSIP, BFRs, iNFADS, PWD interviews, and planning direction from the RIMP.

The CFIP data collection process consisted of two parts: a web-based data collection tool, and follow-up interviews with each division. The primary information collected from each division included:

- Projected evolution in the division mission in the 5-year time frame in response to the changing DoD research and development requirements and priorities.
- Facilities required to accomplish their future mission.
- Personnel requirements to accomplish the projected evolution of the vision mission.

All information was compiled into a summary spreadsheet. It ultimately illustrated how division research areas, and the space required to fulfill them, will evolve over time.

### 5.1 Population

Due to minimal mission changes, the employee population is expected to increase minimally at the NRL over the next five years. Growth is projected to only increase two percent annually, resulting in approximately 615 new personnel over the near-term time frame (Table 5-1).

## 5.2 Parking

The National Capital Region (NCR) guidelines per the Comprehensive Plan attaches considerable importance to the issue of parking supply and its relation to the employee population served. NRL is situated within the Historic District of Columbia where the parking-to-employee ratio goal set by the National Capital Planning Commission (NCPC) is one parking space for every four employees (1:4). The Comprehensive Plan provides special consideration to federal facilities such as NRL with non-office missions such as laboratories and warehousing, and where multiple employee shifts occur. In these instances special consideration is given to meeting the 1:4 parking ratio.

The Comprehensive Plan guidelines also make a direct correlation between acceptable parking ratios and proximity to Metrorail, and the overall quality of available transit services and walking distances/conditions in the region. Therefore, federal facilities such as NRL need to be accessible to Metrorail and other transit services as well as have an acceptable walking environment for pedestrians.

With 2,745 employee parking spaces and a current population of 4,872 employees, the current parking ratio at NRL is 1:1.77. As additional personnel are stationed at NRL over the near-term, the ratio of parking spaces to employees will shift to 1:2.12, when carpool, vanpool, and handicapped spaces are included in the parking ratio calculation (Table 5-1). Due to unforeseeable mission requirements and funding restrictions, it is not possible with the near-term timeframe of the Master Plan to meet the 1:4 parking ratio.

**TABLE 5-1 PROGRAMMED POPULATION & PARKING**

Year	Employee Population	Employee Parking	Parking Ratio
2012	4,872	2,745	1 : 1.77
Near-term (5 years)	5,487	2,585	1 : 2.12

Source: NAVFAC, 2012

General Note: NCP's preferred parking ratio is 1:4.00.

Although unable to meet NCP's parking ratio goals, NRL is committed towards doing its part in reducing the use of single occupancy vehicles (SOVs). It will strive towards a 1:4 parking ratio over the long-term if several of the following infrastructure improvements can be implemented to bolster alternative means of accessing the installation:

- Reliable shuttle service to and from the metro is established.
- DDOT develops viable and efficient transportation infrastructure that supports non-SOV commuting options such as HOV facilities, or other such comparable off-installation improvements.
- Additional bus service is provided to the installation with expanded routes to the surrounding region.
- Explore the possibilities of having a station at NRL if there is ever a possibility of extending the DC Streetcar farther south.
- Improvements are made to the pedestrian and bicycle infrastructure that better links NRL with the surrounding neighborhood and transit systems.
- Change the current method used to calculate parking ratios by not including both carpool and vanpool spaces within the employee parking ratio.

## 5.3 Program Projects

Based on the CFIP II documentation, the NRL currently has an aging infrastructure threatening to become an impediment to the performance of the Lab's research functions, and will become an increasingly larger problem in the future." Correcting the infrastructure problem has become the focus of the CFIP II and this master plan. The overall trend is to demolish facilities that are beyond their life-cycle, renovate and modernize existing facilities, and construct new facilities where necessary. Over the next five years, over 350,000 square feet of facilities will be impacted on the NRL, and cost approximately \$95 million dollars (Table 5-2 and Figure 5-1).

### Demolition Projects

**Buildings 33, 34A, 35, 53, 55, 68, 69, and 125.** Eight facilities are associated with project number P-041 - Space Systems Technology Lab. This demolition in coordination with the new construction of the Space Systems Technology Laboratory will result in a net footprint reduction of 56,519 square feet of facility space, which is in line with the Navy's goal of reducing its facility footprint. Furthermore, the combined construction and renovation project (108,812 GSF) compensates for most of the deficit of 117,000 square feet for this type of space at the NRL.

Planning alternatives determined that demolition is the most viable option. The primary rationales are the inability to adequately reconfigure and/or retrofit the buildings for new uses. The tight spacing of structural walls and columns cannot accommodate modern RDT&E functions which require greater open floor area. The extensive reconfiguration needed to move columns and walls would drastically alter the appearance and jeopardize the structural integrity of the buildings.

**TABLE 5-2 PROGRAM PROJECTS**

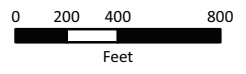
Phase	Map ID	Project	Buildings	Description	Funding Source	New Construction (GSF)	Renovation (GSF)	Demolition (GSF)	Costs (\$FY2009)	
One FY 14	1	R-04	97	Renovate south facade and abate existing hazardous building materials	SRM		14,813		\$3.578M	
Two FY 16-17	2	P-041	New A59 Addition	Construct 3-story addition to A59 for the Space Technology Laboratory	MILCON	108,812			\$48.772M	
			33, 34A, 35, 53, 55, 68, 69, 125	Demolish facilities and consolidate divisions into A59 addition	MILCON			131,673		
	3	P-275	65/75	Renovate entire buildings for Electronics Science & Technology Division			97,875		\$31.735M	
	4	P-090	New 149 Addition	Construct Combined Generation Plant - electricity and steam	MILCON	2,300			\$10.900	
<b>Program Total</b>							<b>111,112</b>	<b>112,688</b>	<b>131,673</b>	<b>\$94.985M</b>

Source: ONR GSIP, September 2011, NRL PWD.

FIGURE 5-1 PROGRAM PROJECTS



- Installation Boundary
- Water
- Road
- Parking
- Existing Sidewalk
- Green Area
- Trees
- Existing Building
- Renovation Project
- Demolition Project
- New Facilities



Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

## Renovation & Repair Projects

**Building 97.** The project restores the south facade of Building 97 which is currently very deteriorated, and includes the abatement of hazardous building materials. Due to ATRP requirements, adjacent parking will be removed. This will reduce parking on the installation by approximately 20 spaces.

**Building 65/75.** This project represents a whole building major renovation of Buildings 65/75 for the Electronic Science and Technology Division (Code 6800), currently located in Buildings 208 and A11. The renovations will reduce parking by approximately 50 spaces.

## New Construction Projects

**Building A59 Addition.** Project P-041 – Space Systems Technology Lab constructs a 108,813 square feet facility addition. The facility will include 75,154 square feet of newly constructed space and 33,659 square feet of renovation to Building A59 to accommodate the laboratory's needs. The requirement is based on the need to conduct space systems technology research and to accommodate the equipment associated with that type of research. The facility is also required as NRL research expands into other research fields that will be needing space.

Based on the August 2011 installation visit, the facilities currently serving this function were evaluated to be in poor or failing condition. These facilities are not sized and configured properly to meet the demands for space systems research. Additionally, the existing function, by being located in several locations, creates a fractured directorate with dispersed employees. The implementation of P-041 would reduce parking by 90 spaces.

During the planning phase, several locations were examined for placement of the addition. These included along the north and south sides of Building A59 as well as a location remote from the building. The remote location was rejected because immediate proximity of employees and equipment could not be achieved. The locations to the north and south sides of the building were also rejected due to impacts to circulation routes that would become severed by the building placement and thereby disrupting mission viability for the directorate and the installation as a whole.

The chosen location to the west was determined to be the best location to meet mission and directorate requirements. The future design of the addition will need to consider special engineering and architectural design to minimize viewshed and flooding impacts. In addition, building design will comply with Executive Order 11988: Floodplain Management and DoD regulations for planning and sustainability.

**Building 149 Addition.** Project P-090 – Construct a new Combined Generation Plant that will house a combustion-powered turbine for electricity production, and a steam generator that uses waste heat from the turbine to generate steam. Four megawatts of electricity and 14,000 pounds of steam will be produced to enable the installation to reduce its strain on the local power grid and increase self-reliance in power generation. There is little or no anticipated impact to land use, transportation, existing facilities, or current personnel. New construction will add approximately 2,300 square feet on the south side of Building 149 and is scheduled to begin in FY16. The location is mandated by requirements to connect directly with existing infrastructure that is considered immovable. The future design will consider special engineering and architectural design to minimize viewshed and flooding impacts. In addition, building design will comply with Executive Order 11988: Floodplain Management and DoD regulations for planning and sustainability.

## 5.4 Program Phasing

Table 5-3 shows the time frame and phasing for the proposed projects for the next five years. The following bullets provide a phasing strategy for the proposed projects:

- Renovate the exterior facade of Building 97 and remove hazardous building materials for improved life/health/safety conditions to occupants.
- The addition to Building A59 (P-041) will need to be constructed first to allow those divisions in the facilities proposed for demolition (Buildings 33, 34A, 35, 53, 55, 68, 69, 125) to be consolidated into the new facility. Following the division relocations, the facilities scheduled for demolition can be removed.
- The renovation of Buildings 65/75 can occur simultaneously with project P-041 or next, depending on funding availability, to create space for the Electronic Science and Technology Division relocation from Building 208 and A11.
- The addition to Building 149 will be constructed simultaneously with P-041 and the renovation of buildings 65/75. The site is currently vacant so construction is not contingent upon any demolition.

**TABLE 5-3 DEVELOPMENT PLAN PHASING**

Map ID	Project Information	FY 2014				FY 2015				FY 2016				FY 2017						
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
Building 97																				
1	Project #: R-04																			
	Renovate: 14,813 SF																			
	SRM Funding																			
	Cost (\$000): \$3.578																			
Building A59 Addition																				
2	Project #: P-041																			
	Construct: 108,812 SF																			
	Demolish: 131,673 SF																			
	MILCON Funding																			
	Cost (\$000): \$48.772																			
Building 65/75																				
3	Project #: P-275																			
	Renovate: 97,875 SF																			
	MILCON Funding																			
	Cost (\$000): \$31.735																			
Building 149 Addition																				
4	Project #: P-090																			
	Construct: 2,300 SF																			
	MILCON Funding																			
	Cost (\$000): \$10.900																			

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## 6.0 Appendix

### 6.1 Installation Appearance Plan

The Installation Appearance Plan (IAP) provides direction for designing and developing the NRL improvements projects. At this time, an IAP has not been performed for the NRL; therefore the recommendations noted in this documents are only preliminary. It is the recommendation of the master plan that an IAP study be performed to evaluate the visual environment and identify areas that need improvements. Until funding appropriations can be made for further study and development of an IAP, no commitments can be made at this time on the following strategies for the areas listed below.

#### Urban Design

Due to the rapid development of NRL's facilities, the overall urban design fabric lacks cohesion. As it is the premiere research laboratory for the Navy, a pleasant environment is important for employees and visitors alike. The appearance of the installation shall be important as it affects morale and the quality of life for its employees. Recommendations include:

- Improve the circulation network by improving the roadway materials and markings.
- Establish a comprehensive pedestrian network to promote walking on the installation.
- Enhance the built environment with consistent landscaping and site amenities.
- Infilling development on cleared sites to maximize land utilization and preserve natural and cultural features.
- Establish a comprehensive signage system for pedestrians and multimodal transportation systems.
- Build upon the architectural and landscape styles of the Central Mall as the visual focus of the NRL.



*Landscaping on the Central Mall shall be preserved to enhance the viewshed and unify the Installation.*  
Source: NRL.



*A bust of Thomas Edison at the NRL front gate honors his role in founding the Laboratory.*

## Landscape Architecture

The landscape at the NRL is inadequate in many areas of the installation. Areas like the Central Mall, that have good landscaping shall be emulated throughout to improve the visual appearance. The following recommendations provide guidance that can improve the overall aesthetics and create unity within the installation. These include:

- Creating consistent street tree plantings that provide shade and visual continuity, and enhance the pedestrian environment.
- Coordinate the character and style of site amenities including benches, tables and chairs, trash receptacles, light posts, and shelters. These shall relate to the scale and architecture of the surrounding buildings.
- Utilizing consistent pavement materials along primary and secondary routes.
- Screening utility and service areas.
- Providing buffers along the perimeter to screen incompatible uses such as Bellevue Housing and Blue Plains Wastewater Treatment Plant.
- Screening parking areas where necessary to maintain the viewshed.

- Defining outdoor recreational spaces with landscaping to provide separation and privacy.
- Providing accent planting at the entrances to the installation as well as key facilities.
- Continuing to frame the views along the Potomac River with trees.
- Preserving and enhancing existing landscaped areas such as the Central Mall.

## Entry Gate Design

Visually, NRL's main gate and visitor's center are aesthetically pleasing. The World War II Era architecture of the Visitor's Center is accentuated with appropriately scaled and designed landscaping. The entry island and signage is properly branded with the NRL's seal and title. It is also emphasized with low landscape plantings. The southern section of the main gate, currently used as a parking lot, can implement additional landscaping to soften its appearance and add visual interest.

## Signage

Signage on the NRL is a minimal system of building identification signs and standard roadway traffic control signs. It is recommended that a directional signage system be implemented to provide pedestrians and vehicles wayfinding on the installation. This signage shall be scaled to accommodate pedestrian and vehicular traffic. It shall also identify multimodal transit to encourage the use of public transportation and alternative modes to commute to the NRL.

## Paint Color Schemes

The NRL ICRMP determines the building and trim colors for the installation. All buildings on the installation will remain the same colors as was originally planned and constructed.

## Architecture

Because the NRL was developed in stages over the past ninety years, buildings were constructed in a variety of styles. However, the buildings shown in Figure 3-22, are the most pronounced due to their architectural character, scale, and location. These include:

- **Buildings 43, 1, 12, 30, 42, and 60** were designed in the industrial decorative style along the west end of the central mall. Additionally, the antenna atop Building 43 is an important landmark on the NRL and acts as a wayfinding device.
- **Building A59** was originally a facility for the Naval Gun Factory. Its massive size, construction, and central location set it apart from surrounding facilities.
- **Building 207, 208, and 209** are postwar modern facilities resembling a modern business complex.

- **Building 259** is a modern minimalist style facility designed to meet its specific research and development mission. Its radar domes are visually prominent from across the Potomac River, and for viewers passing by in boats and water taxis.

Buildings at the NRL are generally grouped in four areas, which correspond with the time period when they were constructed. The earliest construction is around the west section of the central mall (see Figure 3-22). This arrangement of buildings was typical of the early Twentieth Century industrial architecture that produced small buildings placed in groups along a central mall or spine. The formal arrangement creates a unified frontage along the Central Mall. The axial relationship of buildings with the main entrance as well as the mature landscaping, reinforces the formality of the plan.

To ensure visual design that blends with the context of the NRL, all new construction, proposed additions, or alterations to existing buildings shall be compatible with the adjacent buildings in terms of scale, proportion, form, massing, materials, and color. This recommendation establishes visual unity across the NRL. Guidelines for the treatment of existing buildings architecture and new construction protocols are found in the NRL ICRMP.

The condition of many facilities on the NRL is poor and in need of repair or replacement. As renovations and development occur, the following recommendations are made to ensure that buildings are visually compatible with each other. The recommendations include:

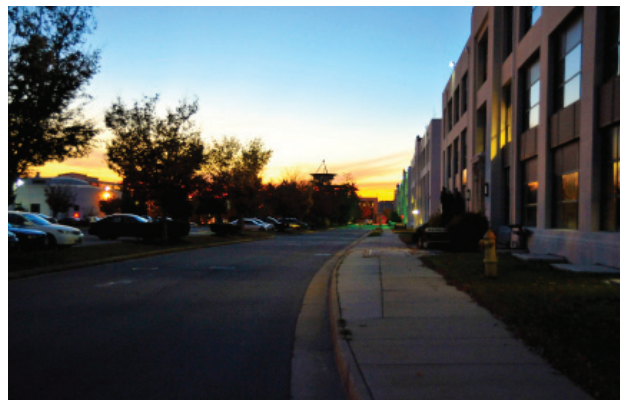
- Any proposed additions or alteration to existing buildings shall be compatible with the original building design in terms of scale, proportion, form, massing, materials, and color.
- The continued use of white paint with dark-brown trim for the Central Mall facilities, and medium tan with dark brown trim for all others on the installation shall be maintained.
- All exterior materials that are natural shall be left as natural in color and not painted.
- Window fenestration shall reflect the patterns found in adjacent similar buildings.
- Entrances shall reflect the patterns found in adjacent similar structures to create unity.
- Any proposed alterations or additions to historic buildings must be handled in a sensitive manner in order to respect the architectural character of the original building. If the building is on the National Register of Historic Places, or is eligible for nomination, the design must follow the guidelines established in the Secretary of the Interior's Standards for Rehabilitation. The design of alterations or additions to buildings not on the Register shall also follow the guidelines.

- Adaptive reuse of historic facilities shall be encouraged as outlined in the master plan in Chapter 5.

All new construction and renovations projects identified in Chapter 5 shall follow these guidelines, especially regarding historic buildings. This guidance may apply to the selection of the colors, use of natural materials, replacement of windows and doors, or adaptive reuse of historic facilities. For further guidance refer to the NRL Cultural Resource Manager.



*The new Laboratory of Autonomous Systems Research's architectural style matches that of the Industrial Decorative prevalent along the Central Mall.*  
Source: NRL.



*The Central Mall, at dusk, is a scenic route on the NRL because of its formal arrangement, Industrial Decorative style architecture, and mature landscaping.*  
Source: NRL.

## 6.2 Historic Preservation Analysis

This section provides guidance on impacts to identified historic properties on the NRL; and the status of compliance with Section 106 of the NHPA of 1966.

### Section 106 Policy and Procedures

#### Policy

Section 106 of the NHPA requires Federal agencies such as the Navy to take into account the effects of their undertakings on historic properties that are either listed or eligible for listing on the NRHP. Undertakings refer to all projects that have the potential for an effect or change to a historic property. Historic properties may include archeological sites, buildings, landscapes, structures, and objects.

As a general rule, the Navy will design all ground-disturbing, construction, or maintenance projects to avoid damage to historic properties that are listed or eligible for listing. Advisory Council regulations 36 Code of Federal Regulations 800 mandate that the Navy first consult with the District of Columbia State Historical Preservation Office (D.C. SHPO), before initiating formal Advisory Council consultation. In practice, the Advisory Council usually concurs with any agreement reached with the D.C. SHPO. If it has been determined that a historic property will be affected by an undertaking, the listed process and documentation shall be provided to the D.C. SHPO at the initiation of the project and consultation process.

As identified earlier in this master plan, the following historic properties have been identified as eligible for listing on the NRHP, and will be impacted by the master plan programmed projects:

- Buildings 34A, 35, 53, 55, 69, and 75.

Plans to mitigate impacts shall follow the procedures stated in the ICRMP for the NRL, and comply with the Section 106 of the NHPA. No archeological or architectural resources exist at the NRL currently listed on the NRHP.

#### Procedure

Single-occurrence undertakings are those that involve single actions not of a routine or repetitive nature, such as development of a vacant site, construction and demolition projects, or major rehabilitation of a building or structure. They comprise most of the projects that require Section 106 compliance. The principal steps involved in Section 106 compliance for most single-occurrence undertakings are listed below:

- Intensive professional surveys that evaluate any National Register resources in the area of impact from the undertaking.

- NRL representatives consulting with the SHPO to reach agreement on (a) whether all eligible resources have been identified; (b) which resources (if any) are eligible for the National Register; (c) the nature of effects on National Register resources; and (d) measures to mitigate any adverse effects on the resources.
- If the NRL and the SHPO reach agreement concerning listed or eligible National Register resources, NRL drafts a Memorandum of Agreement (MOA) for signature by the Commanding Officer, NRL; the SHPO; and the Advisory Council. The undertaking may then proceed.
- If professionals performing the intensive survey conclude that potentially eligible resources do not meet National Register criteria, and the D.C. SHPO concurs with this conclusion, documentation of the concurrence is sent to the Council, and the project may proceed.
- If the NRL and the SHPO cannot reach an agreement on questions of eligibility for the National Register, the NRL will request a determination of eligibility from the National Park Service. If the Naval Research Laboratory and the SHPO cannot agree on the nature of the project's effect or on mitigation of the effect, the case is referred to the Advisory Council.

#### Mitigating Adverse Effects

In a mitigation proposal for an undertaking that will adversely affect a district, building, structure, or object (architectural resources), the significant features of the resource involved are first identified, followed by a description of the effect the project will have on those significant features. Measures for mitigating any potential adverse effect(s) are then proposed.

If destruction or damage to an architectural resource cannot be avoided, measures may be recommended with the Section 106 documentation, such as recording the affected resource according to the documentation standards of the Historic American Buildings Survey and the Historic American Engineering Record. The level of documentation required is determined in consultation with the D.C. SHPO and the Cultural Resources Division staff in the National Park Service Regional Office through whom the documentation will be transmitted to the Library of Congress.

Once a mitigation proposal has been negotiated that is acceptable both to NRL and to the SHPO, the NRL drafts a MOA in accordance with Advisory Council regulations. The MOA is signed by the Commanding Officer, Naval Research Laboratory, forwarded to the SHPO for execution, and sent to the Advisory Council for ratification. After the MOA has been ratified by the Advisory Council, the agreed mitigation program must be carried out as soon as possible or in accordance with a schedule included in the agreement. The undertaking may then proceed. The MOA may be amended at a later date, if it becomes necessary.

## 6.3 Historic Preservation Compliance

This section explains how the master plan complies with the Secretary of the Interior's standards for treatment of historic properties and what sections will require additional consultation with interested parties.

### Treatment of Historic Districts, Buildings, and Structures

The Department of the Navy's 1997 Historic and Archaeological Resources Protection Planning Guidelines formally introduced Categorization of the Built Environment (CBE) as a tool for the treatment of buildings and structures, specifically those listed in or eligible for listing in the NRHP. The concept behind CBE is that while all such "historic properties" by definition possess "significance," they cannot be treated or managed in the same manner or to the same degree. CBE considers both a property's relative significance (as compared with other historic properties) and its contemporary value to the Navy (a realistic consideration of what can be done with the property today or in the future). Although the 1997 Historic and Archaeological Resource Protection Planning Guide guidelines are considered to be superseded, the Navy may continue to use the treatment categorization system that was first established in those guidelines.

Historic properties with the greatest significance and/or contemporary value to the Navy such as those contributing to the NRL Historic District are to be protected and conserved to the greatest extent possible (see Figure 6-1). These properties generally have a high level of integrity, have outstanding characteristics, or are of central importance in defining a historic district. Such properties include aspects of the built environment that are worthy of long-term preservation and investment because they possess high integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following standards:

- Possess central importance in defining or maintaining the historic, architectural, or cultural character.
- Have outstanding architectural, engineering, artistic, or landscape architectural characteristics.
- Have unusual importance for the interpretation of cultural history or tradition.
- Represent a significant investment of resources that shall not be wasted if it can be avoided.
- Have considerable potential for continuing or adaptive use either by the Navy or by others.
- Are otherwise highly valued by the Navy or the civilian community.

The recommended treatment for these properties is as follows:

- Maintain and repair in accordance with the recommended procedures in the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings.
- Give priority to the continued and adaptive use of the property.
- Consider demolition only as a last option, and validate with independent analysis.

Other historic properties may be considered for long-term preservation, depending on their level of significance, suitability for adaptive reuse, and the relative costs of adaptive reuse. Determining the acceptable level of treatment for these properties will depend on the following factors:

- What is the historic property's role in maintaining the character of the installation, a significant aspect of the installation, or a historic district?
- Does the property represent an outstanding example of an architectural style, engineering methods, artistic values, or landscape architecture?
- How does the property contribute to the interpretation of history, industrial development, military strategy, military organization, or military tradition?
- Will loss of the property constitute a relatively minor or a significant loss to a larger entity, such as a historic district?
- What is the property's potential for continued or adaptive use?
- Does the property represent a significant investment of resources, such as materials or energy, but not such a great investment that its destruction will constitute a major waste of such resources, or does it represent such an investment but with no plausible potential for continued or adaptive use?
- What is the property's level of integrity?
- Is destruction or deterioration of the property inevitable because of factors beyond the control of the Navy?

Depending on consideration of the above factors, the recommended treatments may include:

- Maintain and repair in accordance with the recommended procedures in the Secretary's Standards.
- Continue use and adaptive use of the property in carrying out the installation's or activity's mission and in assisting tenant activities in carrying out their missions.
- Prepare documentation before a property is demolished, substantially altered, or substantially deteriorated.

A property that does not need to be maintained for historic preservation purposes meets the following criteria:

- Is found not eligible for inclusion in the NRHP in accordance with NHPA of 1966, as amended, 36 CFR 800 or 36 CFR 60.
- Is significant to events less than 45 years in the past at the time of evaluation, is not included in the NRHP, and does not possess exceptional significance.
- Is found in accordance with the NHPA of 1966, as amended, 36 CFR 800 or 36 CFR 60 to be a noncontributing element within a property included in or eligible for inclusion in the NRHP.
- Is a World War II temporary building subject to the terms of the World War II Temporary Building Programmatic Agreement.

Properties that meet one or more of these criteria need not be documented prior to their destruction or alteration. Note that this guidance does not mean that an installation can do whatever it wishes with these properties. For example, if replacing or adding to such a property can introduce visual elements into a historic district or the setting of an individual NRHP-eligible property, Section 106 consultation will be required.

### The Secretary of Interior's Standards

The implementing regulation for the NHPA of 1966, as amended, requires the Navy to resolve adverse effects to historic properties through avoidance, minimization, or mitigation. The Secretary of Interior's standards address this regulation through the following treatment options for historic buildings:

- **Restoring** or accurately returning a property to a particular period(s) of time.
- **Reconstructing** or recreating a non-surviving property through new construction.
- **Preserving** or maintaining a property's existing form, integrity, and materials.
- **Rehabilitating** or adapting a property for a compatible or continued use while preserving its significant features.

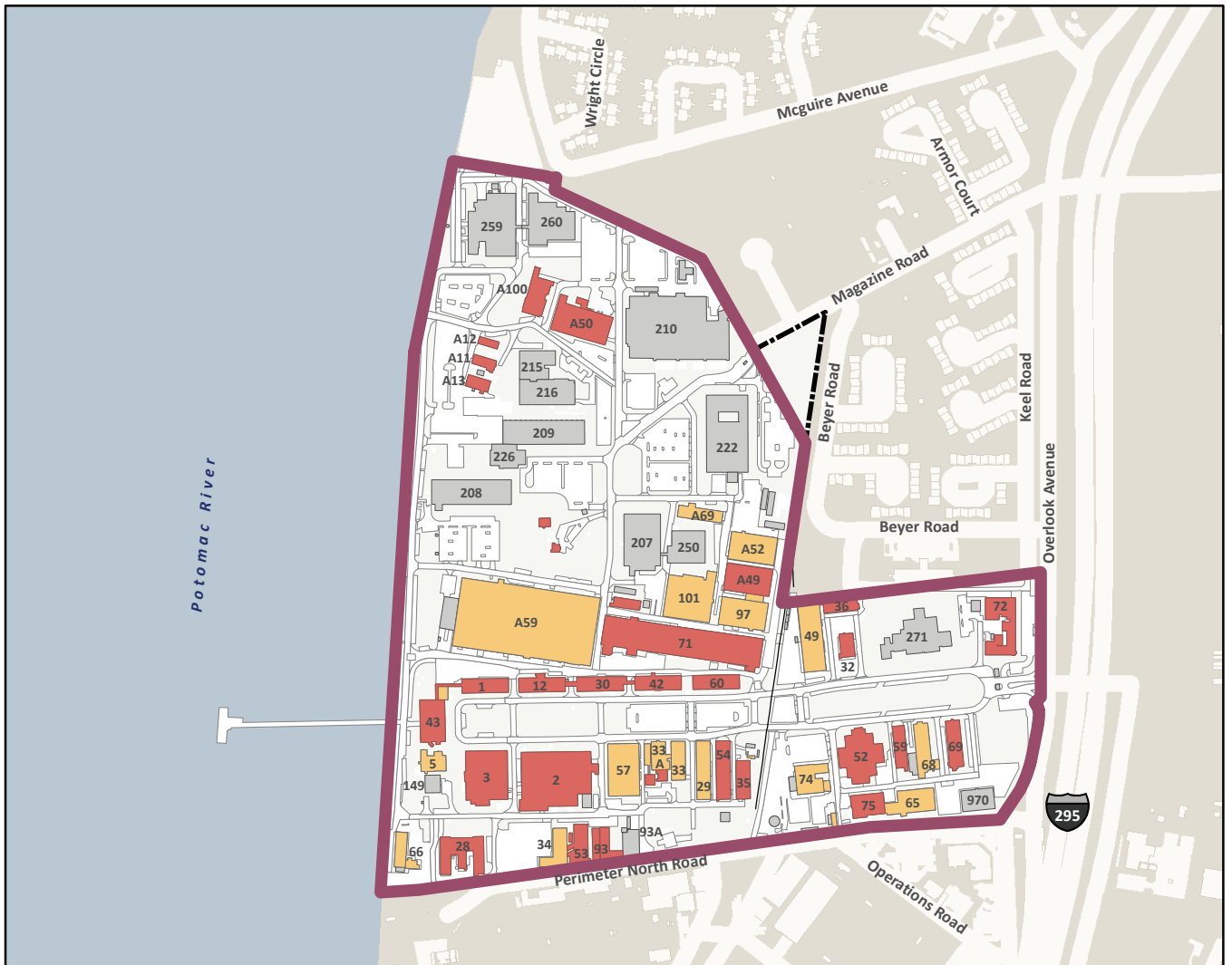
The last three options, reconstructing, preserving and rehabilitating, are most appropriate to the inventory of historic buildings at NRL. The U.S. Department of the Interior, National Park Service, has developed standards and guidelines for the implementation of each treatment option for historic buildings. Management of cultural resources requires the development of treatment strategies tailored to the significance of the historic property. Although treatment options and corresponding standards and guidelines are general in nature, they do provide a framework for making decisions. Treatment decisions take into account a building's historic significance, relative importance in history, physical condition, and proposed use. For further details on treatment options, refer to the NRL's ICRMP.





### Implications

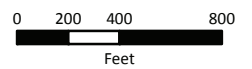
As shown in Figure 6-1, most of NRL's facilities are categorized as either contributing or not-contributing to the NRL Historic District, including the facilities identified for improvement projects in Chapter 5. Below is guidance for each site regarding compliance with treatment protocols of historic properties.

- Buildings 33 C, 34A, 35, 53, 55, 69, and 75 are all contributing resources to the historic district. These buildings are scheduled for demolition to provide space for the construction of new facilities in the long-term and to consolidate divisions. Before demolition, the property shall be documented in accordance with Section 106 standards and documentation submitted to the D.C.SHPO.
- Buildings 65, 74, and 81 are all non-contributing resources that are scheduled for renovation. These buildings have no historical significance as individual structures, but their renovations may have an impact on the historic district. Consultation with the NRL Cultural Resource Manager regarding the impacts of their removal shall occur prior to renovation.
- Construction of the A59 addition shall be complementary to the historic context in which these facility will reside and blend with the existing building and surroundings.

FIGURE 6-1 HISTORIC RESOURCES CONTRIBUTING TO THE HISTORIC DISTRICT



-  Installation Boundary
-  Proposed NRHP Historic District Boundary
-  Contributing Structures
-  Non-Contributing Structures



Sources:  
 Washington, D.C.  
 Department of Transportation, 2010  
 Washington, D.C. OCTO/GIS, 2006  
 ESRI - Streetmap USA, 2007  
 NRL PWD, 2011  
 Naval District Washington, 2010

The northern extent of the installation boundary, as shown on this map, is approximate and is not suitable for legal, engineering, or surveying use.

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