SUBASE New London JLUS

SUBASE New London

Joint Land Use Study

December 2017

PREPARED UNDER CONTRACT WITH:

SCCOG Southeastern Connecticut Council of Governments

PREPARED BY:

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Ninigret Partners

THANK YOU,
project partners:

Southeastern Connecticut Council of Governments

Naval Submarine Base New London

Town of Groton

City of Groton

Town of Ledyard

Town of Waterford

Town of Montville

City of New London

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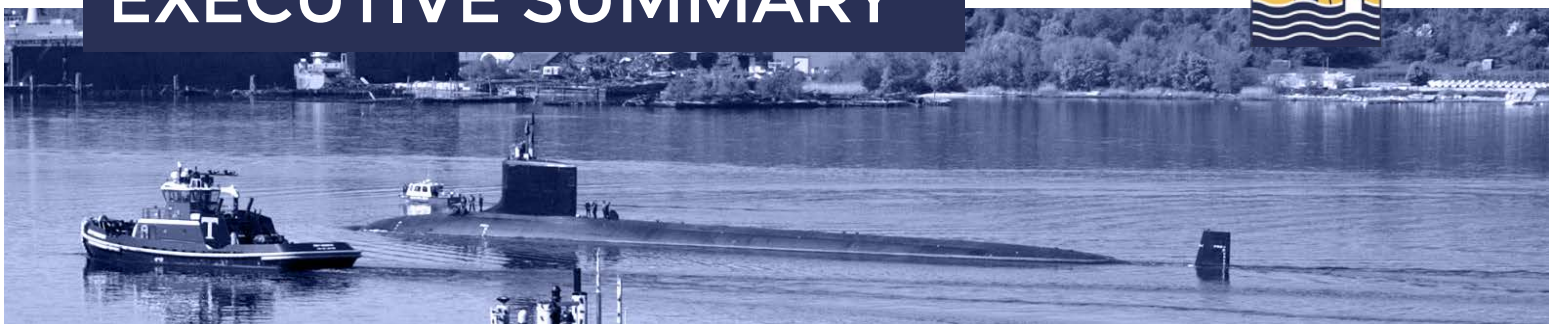
ACRONYMS

ACOE	Army Corps of Engineers
ADT	Average Daily Traffic
BAH	Basic Allowance for Housing
BBC	Balfour Beatty Communities
BRAC	Base Realignment and Closure
CAD	Confined Aquatic Disposal
CBDG	Community Block Development Grant
CEDS	Comprehensive Economic Development Strategy
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality Improvement
CMEEC	Connecticut Municipal Electrical Energy Cooperative
CPA	Connecticut Port Authority
CTDOT	Connecticut Department of Transportation
CVRR	Central Vermont Railroad
DEEP	Department of Energy & Environmental Protection
DoD	Department of Defense
DoE	Department of Education
EOL	Explosive Operating Location
ELDS	Eastern Long Island Sound Disposal Site
EPA	Environmental Protection Agency
ESQD	Explosive Safety Quantity Distance
FEMA	Federal Emergency Management Agency
FNP	Federal Navigation Projects
GDEB	General Dynamics Electric Boat
GDP	Gross Domestic Product
IBA	Important Bird Area
IDP	Installation Development Plan
IMPLAN	Impact Analysis for Planning
JIC	JLUS Implementation Committee
JLUS	Joint Land Use Study
LEA	Local Education Agency
LID	Low Impact Development
LODES	Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics
MCP	Municipal Coastal Program
MDP	Municipal Development Plan
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MPTN	Mashantucket Pequot Tribal Nation
MS4	Municipal Separate Storm Sewer System
MSIF	Main Street Improvement Fund
MWR	Moral Welfare and Recreation
NDDB	Natural Diversity Data Base
NECR	New England Central Railroad
NFIP	National Flood Insurance Program
NLDS	New London Disposal Site
NMDD	Nautilus Memorial Design District
NSMRL	Naval Submarine Medical Research Laboratory
NSSF	Naval Submarine Support Facility
OEA	Office of Economic Adjustment
OFHEO	Office of Federal Housing Enterprise Oversight
OMA	Office of Military Affairs
OSTA	Office of the State Traffic Administration
PAO	Public Affairs Office
PC	Policy Committee
PILOT	Payment in Lieu of Taxes
POCD	Plan of Conservation and Development
PPP	Public Private Partnership
PPV	Public Private Venture
RCDA	Renaissance City Development Association
RPOCD	Regional Plan of Conservation and Development
SCCOG	Southeastern Connecticut Council of Governments
SCRPA	Southeastern Connecticut Regional Planning Agency
SEAT	South East Area Transit
seCTer	Southeastern Connecticut Enterprise Region
SUBASE	Submarine Base
TC	Technical Committee
TIF	Tax Increment Financing
TIGER	Transportation Investment Generating Economic Recovery
TRIP	Thames River Innovation Places
UCONN	University of Connecticut
USCG	United States Coast Guard
USCGA	United States Coast Guard Academy
WPCA	Water Pollution Control Authority
WPRD	Water Protection Resource District

SUBASE New London Joint Land Use Study

EXECUTIVE SUMMARY



A Joint Land Use Study (JLUS) is a cooperative land use planning effort between local governments and military installations. It seeks to ensure the lasting compatibility of military installations and their neighboring communities. A JLUS creates a policy framework and recommends strategies that support a healthy economy, environment, and community, while safeguarding the military mission.

This JLUS is focused around Submarine Base New London (SUBASE) and its neighbors. The Department of Defense (DoD) Office of Economic Adjustment (OEA), with contributions from the Southeastern Connecticut Council of Governments (SCCOG) and participating municipalities, funded this study.

PROJECT GOALS

Compatible community development. Encourage collaborative planning to ensure future development is compatible with military training and operations and supports waterfront economic development.

Reduced operational impacts on adjacent lands. Seek ways to reduce the installation's impact on its neighbors and protect the public health, safety, and welfare of those living near the military installation.

Who Guides the JLUS?

Two committees guided the JLUS. The Policy Committee (PC) was comprised of the SUBASE Captain and City, Town, and State electeds and executive staff. The Technical Committee (TC) was made up of City and Town planning staff, representatives from State and federal agencies, and other stakeholders. Community members provided input and guidance by submitting comments and feedback to PC and TC members, online through the project website, and in public workshops.

Study Area

This JLUS focuses on areas where SUBASE operations may impact its neighbors and where development and other civilian activities may impact the SUBASE. It includes the SUBASE and the municipalities surrounding it or in close proximity: Town of Groton, City of Groton, Ledyard, New London, Waterford, and Montville.

PROJECT SPONSOR/MANAGER

Southeastern Connecticut Council of Governments

MEMBER MUNICIPALITIES

City of Groton

Town of Groton

Town of Ledyard

Town of Montville

City of New London

Town of Waterford

Figure 0.1. *SUBASE New London JLUS study area (SCCOG, ESRI, FHI datasets)*

Figure 0.2. *The USS Nautilus, the first nuclear submarine, was christened and entered into the Thames River in 1954 (U.S. Navy).*

SUBASE New London

SUBASE New London became the Navy's first Submarine Base in 1916, is considered "Home of the Submarine Force," and is a key component of a defense industry cluster in southeastern Connecticut. The SUBASE's primary missions are homeporting and deploying fast attack submarines and training the submarine force. A third of the Navy's Attack Submarine Force is located at the SUBASE.

The Naval Submarine School graduates nearly 40,000 submariner students annually. Nearly all U.S. Navy submariners are stationed at SUBASE New London for a portion of their careers.

The SUBASE has an annual payroll of approximately $534 million, and its presence supports related industries, such as Electric Boat's thousands of employees working in submarine manufacturing, design, and engineering. Protection of the SUBASE is critical to national security and the region's economy.

Compatibility Issues and Strategies

TRANSPORTATION

ISSUES

Accessing the SUBASE. Around the SUBASE, congestion, a lack of transit, no turnaround area, and poor walking and bicycling conditions can make it challenging to get to and from the SUBASE.

ESQD arcs along Route 12. A short section of Route 12 near the SUBASE's North Gate is located within the SUBASE's explosive safety quantity distance (ESQD) arcs. The ESQD arcs outline a required safety area around weapons storage. Increased traffic congestion in the area may be an issue in the long term.

Electric Boat parking and truck traffic. Electric Boat employee parking is limited, and as new employees are hired, Groton's neighborhoods may be impacted. Likewise, residents are concerned about truck traffic using their neighborhood streets.

STRATEGIES

TRANSIT IMPROVEMENTS

- Develop a "Mobility Hub" on Crystal Lake Road to accommodate a bus stop and pick-up/drop-off area.
- Modify the SEAT Run 2 route to stop closer to the Main Gate, and increase its frequency.
- As needed, provide shuttle service between the SUBASE, Electric Boat, other employment centers, and housing.

CONGESTION RELIEF

- Develop a traffic management plan to relieve congestion along Crystal Lake Road.

BICYCLE AND PEDESTRIAN IMPROVEMENTS

- Encourage bicycling to the SUBASE through a variety of measures.
- Implement a bike share between the SUBASE and Electric Boat.

DEVELOPMENT REVIEW

- Minimize transportation impacts through development review and enforcement.

Figure 0.3. *Transportation conditions at SUBASE (Google Earth)*

THAMES RIVER

ISSUES

Submarine turning and in-water structures. The new Block V Virginia-class submarines requires a wider turning basin and dredging area in the Thames River. This may impact the vacant dock structures across the river from the SUBASE.

In-water traffic and base security. Development upriver could increase vessel traffic near the SUBASE. Fast moving vessels are of particular concern.

Dredged materials disposal. Continued cost-effective disposal of dredged material from the Thames River channel is critical for the SUBASE and local businesses.

Environmental protection and climate change. The SUBASE and municipalities are addressing, planning, and designing to minimize environmental impacts and adapt to climate change.

STRATEGIES

PLANNING

- Develop mutually beneficial solutions to turning movement/ dredging/marina conflict.

BOATER AND COMMUNITY EDUCATION

- Designate a no-wake zone and educate about proper boater behavior near the SUBASE.
- Raise awareness of the SUBASE's environmental efforts.

COORDINATION AND MONITORING

- For projects that will increase in-water traffic, coordinate with municipalities and developers to build awareness of security concerns.
- Support CT Department of Energy and Environmental Protection's (DEEP's) efforts to maintain in-water disposal sites for clean dredged material.
- Continue coordinating on climate change best practices.

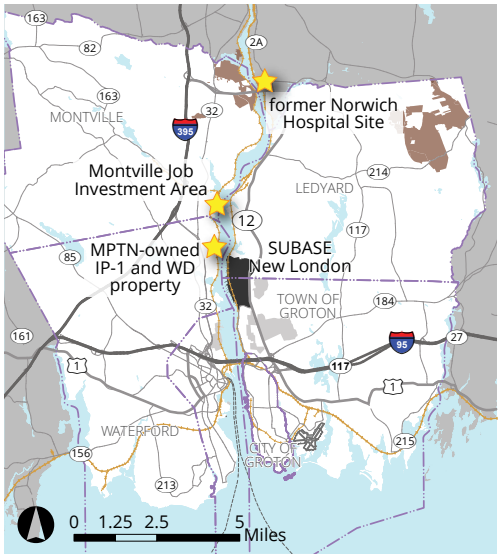


Figure 0.4. *Sites that could redevelop and increase in-water traffic past the SUBASE*

Figure 0.5. *SUBASE biologists supporting wildlife management efforts (Secretary of Defense)*

LAND USE AND DEVELOPMENT

ISSUES

Crystal Lake Rd development. The SUBASE and neighbors would like to encourage development on the SUBASE's southern border that is visually appealing, serves SUBASE personnel and the surrounding community, and minimizes negative impacts.

Development with views into the SUBASE. Multistory development across the Thames River with views of the SUBASE's high value waterfront assets is a security concern for the SUBASE.

Operational impacts. Residents across the river from the SUBASE have noted impacts from light on the SUBASE piers, noise from generators, and other waterfront operations.

STRATEGIES

COMPATIBLE DEVELOPMENT

- Update the Nautilus Memorial Design District regulations to encourage compatible development on Crystal Lake Rd.
- Coordinate planning efforts between the SUBASE and Towns of Waterford and Groton to ensure compatible development. Where views are a concern, consider purchasing property for open space or reducing the allowed development capacity.
- Provide a communication channel for residents to voice their concerns to the SUBASE about noise, light, and air quality impacts. Where possible, alleviate these issues.

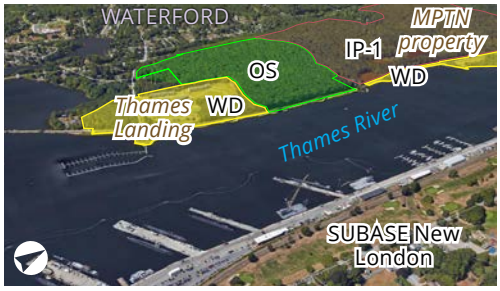


Figure 0.6. *Key Waterford properties and zoning districts across the river from the SUBASE (Google Earth)*

Figure 0.8. *New London and Groton are building on their assets and working to increase their attractiveness to talented workers*

LAND USE AND DEVELOPMENT (CONTINUED)

ISSUES

Housing. Providing a variety of housing to accommodate SUBASE and Electric Boat workers is a local and regional challenge.

Community livability and economic development. The Navy and JLUS municipalities share an interest in supporting economic development, especially in a way that increases livability and attracts new Electric Boat employees to live locally.

STRATEGIES

HOUSING

- Update the JLUS municipalities' zoning regulations to encourage new housing development.

COMMUNITY LIVABILITY AND ECONOMIC DEVELOPMENT

- Plan and pursue funding to improve the livability (e.g., make more pedestrian friendly and mix uses better) of downtowns and neighborhood centers.
- Sustain and enhance communication between Electric Boat and associated municipalities regarding growth.

Figure 0.9. *Volunteer service members help strengthen ties with their communities (U.S. Navy)*

Figure 0.10. *Allocation of fair fee payments, particularly to local schools, is an issue (theday.com)*

COORDINATION AND COST SHARING

ISSUES

Integrated community. Community members expressed a desire for more interaction and integration between military and civilian community members.

Cost sharing. The SUBASE and municipalities have complex agreements and funding sources that pay for shared services, such as education, utilities, police, and parks. Community members expressed concern that the allocations are not always fair.

JLUS implementation. It can be unclear how the organizations participating in the JLUS will continue to work together to implement recommendations.

STRATEGIES

ENHANCED COORDINATION AND INTEGRATION

- Continue shared service arrangements (e.g., fire, water) and explore opportunities to enhance services and more efficiently allocate resources.
- Expand efforts to coordinate joint military and civilian activities and open on-base programs.
- Establish an MOU amongst JLUS parties to guide JLUS implementation steps.

EDUCATION COST SHARING

- Address issues with cost sharing for education by researching best practices, advocating for more Federal Impact Aid, and seeking additional funds for local school districts.

NEXT STEPS

Establishing a Memorandum of Understanding (MOU) is likely to be JLUS participants' first step to coordinate implementation. Other next steps are highlighted in the JLUS report's "Short-term Actions" section on page 112. A JLUS Implementation Committee, comprised of select PC and TC members will initiate implementation, monitor progress, and encourage parties to revisit and update the strategies as needed.

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CHAPTER 1
Introduction

SUBASE
New London
JLUS

SUBASE NEW LONDON JLUS PROCESS

Figure 1.1. *SUBASE New London JLUS development phases*

OVERVIEW

A Joint Land Use Study (JLUS) is a cooperative land use planning effort between local government and military installations. It seeks to ensure the lasting compatibility of military installations and their neighboring communities. A JLUS creates a policy framework and recommended strategies that support a healthy economy, environment, and community, while safeguarding the military mission.

This JLUS is focused around Submarine Base New London (SUBASE) and its neighboring Towns of Groton, Ledyard, Waterford, and Montville, and Cities of Groton and New London. The study is sponsored and managed by the Southeastern Connecticut Council of Governments (SCCOG). This is a 12-month effort primarily funded by the Department of Defense (DoD) Office of Economic Adjustment (OEA) with contributions from SCCOG and participating municipalities.

WHY DOES THE JLUS PROGRAM EXIST?

Many military installations were originally located in remote areas and conflicts between military operations and their neighboring communities can arise as development around installations intensifies and expands. Through the JLUS process, these growth conflicts can be anticipated, identified, and prevented. There have been over 130 JLUS's completed since the program's inception.

WHAT ARE TYPICAL JLUS RECOMMENDATIONS?

JLUS recommendations may include revisions to community planning documents and land use and development controls, such as zoning. They may also include efforts to improve public relations, education, and coordination between the military installation and its neighboring communities.

The JLUS itself will not change any land use requirements, authorize new military activities, or evaluate individual projects in the area.

Project Process

The SUBASE New London JLUS project was developed in four phases. The culmination of Phases 1 through 4 is this document, which includes a summary of the study area, the compatibility analysis, and implementation strategies.

PROJECT SPONSOR

Southeastern Connecticut Council of Governments

MEMBER MUNICIPALITIES

City of Groton

Town of Groton

Town of Ledyard

Town of Montville

City of New London

Town of Waterford

PROJECT CONSULTANT TEAM

MAKERS architecture and urban design

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Ninigret Partners

PROJECT GOALS

- **Compatible community development.** Encourage cooperative land use planning between SUBASE New London and the surrounding communities to ensure future development is compatible with military training and operations. Collaborate to support waterfront economic development.
- **Reduced operational impacts on adjacent lands.** Seek ways to reduce the installation's impact on its neighbors and protect the public health, safety, and welfare of those living near the military installation.

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CHAPTER 2
Study Area Profile

SUBASE
New London
JLUS

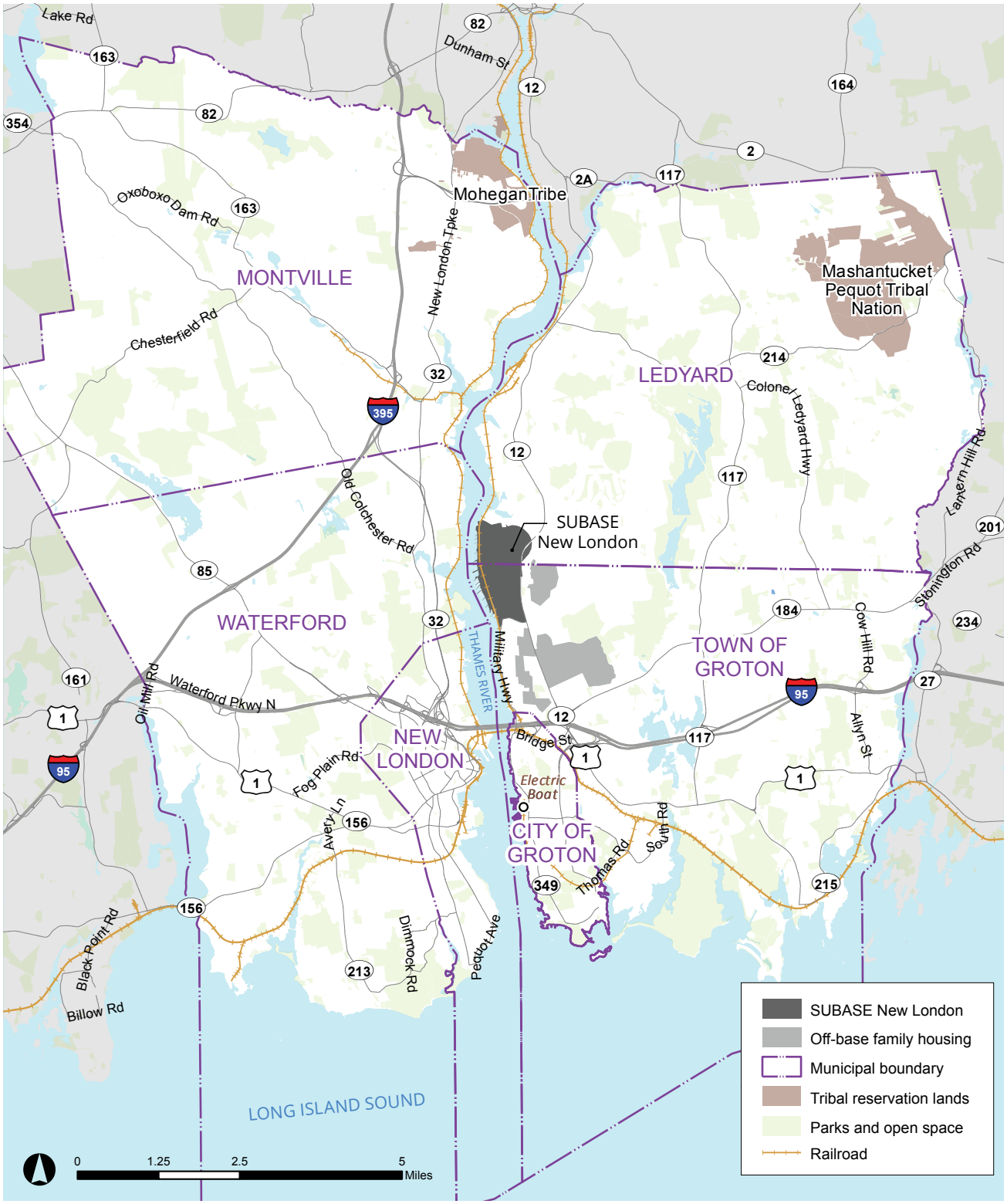

Figure 2.1. *SUBASE New London JLUS study area (SCCOG, ESRI, FHI datasets)*

INTRODUCTION

This JLUS focuses on areas where SUBASE operations may impact its neighbors and where development and other civilian activities may impact the SUBASE.

The study area includes the SUBASE and the municipalities surrounding or in close proximity to the SUBASE: Town of Groton, City of Groton, Ledyard, New London, Waterford, and Montville.

This chapter describes the study area's regional context and the governance, population, land use, transportation, economy, and environmental and cultural resource context relevant to this JLUS. Additional regional context information is provided in Appendix A. This is followed by an overview of the primary JLUS participants: SUBASE New London, six riverfront municipalities, and other key stakeholders.

REGIONAL CONTEXT

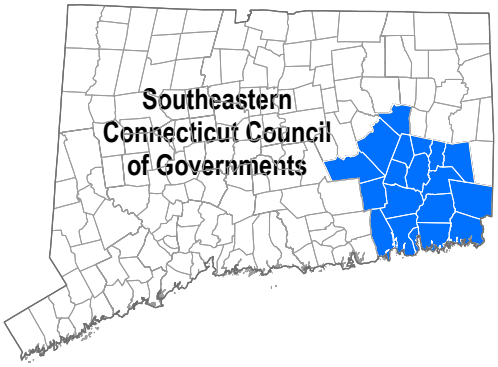

Figure 2.2. *Southeastern Connecticut planning region (SCCOG Land Use Inventory [2011])*

SOUTHEASTERN CONNECTICUT COUNCIL OF GOVERNMENTS

With the abolishment of counties in Connecticut in the late 1950s, legislation was enacted to allow the voluntary formation of regional planning organizations by municipalities. In January 1961, the Southeastern Connecticut Regional Planning Agency (SCRPA) was formed to perform regional land use and transportation planning. Representatives of member towns' planning commissions served on the agency.

In October 1992, SCRPA transitioned into the SCCOG, which includes chief elected officials of southeastern Connecticut municipalities on its board. SCCOG works to address intergovernmental issues impacting the region's towns including transportation, emergency management, housing, economic development, human service delivery, and land use planning.

SCCOG today consists of 22 member municipalities, including the six in this JLUS study area, and counts as affiliate non-voting members two federally recognized Native American tribes, the Mashantucket Pequot Tribal Nation and the Mohegan Tribe. The SUBASE and the U.S. Coast Guard Academy (USCGA) send liaisons to represent their interests at Regional Council meetings.

SCCOG Responsibilities

- Making a regional plan of conservation and development (POCD);
- Assisting municipalities in the region, as well as state and other public and private agencies;
- Providing advisory review;
- Functioning as the region's Metropolitan Planning Organization (MPO) and coordinating transportation planning in southeastern Connecticut;
- Serving as a technical resource to member municipalities;
- Aiding in solutions of regional issues; and
- Providing a collective voice for the region.

Regional Issues

Regional Plans of Conservation and Development (RPOCD) are required by State statute to be prepared at least every ten years. The RPOCDs serve as a guide for councils of governments and member municipalities "to promote with the greatest efficiency and economy the coordinated development of its area of operation and the general welfare and prosperity of its people" (CGS 8-35a). SCCOG's 2017 RPOCD includes nine topic areas that address a number of challenges affecting southeastern Connecticut, including an aging population, continued over-reliance on a few key industries, and dispersed development patterns.

- **Economy and Fiscal Health.** As a significant portion of residents in the region enter retirement, a potential shortage of workers could impact the region's key industries: casino gaming, defense manufacturing, and defense. Also, the heavy dependence on property tax revenue by municipalities in the region affects their fiscal health. There is a growing recognition that diversifying the regional economy and retaining existing manufacturers is needed.
- **Housing.** It is increasingly difficult for households in the region to find affordable housing and there are limited choices beyond single-family homes in a rural or suburban context. A variety of options to meet the needs of all residents is needed.
- **Transportation.** The region's dispersed development patterns have affected its ability to provide public transportation service at frequencies and to locations that serve its residents. This is a particular challenge for residents who cannot drive or lack access to a vehicle. This issue is likely to increase with an aging population.
- **Utilities.** Rural and some of the suburban areas may be limited in their capacity to provide adequate utility infrastructure and service to support denser housing and increased commercial activity. This is due to limited public water, wastewater treatment, and natural gas supplies.
- **Agriculture.** This vital part of the region's history, identity, and economy is changing. The number of small farms is growing, though farmed acreage has not kept pace with this growth. Also, more than half of farmers in the region are 60 or older.
- **Historic Preservation.** The age of buildings in the region adds complexity and cost to maintenance and retrofit projects which can delay development.

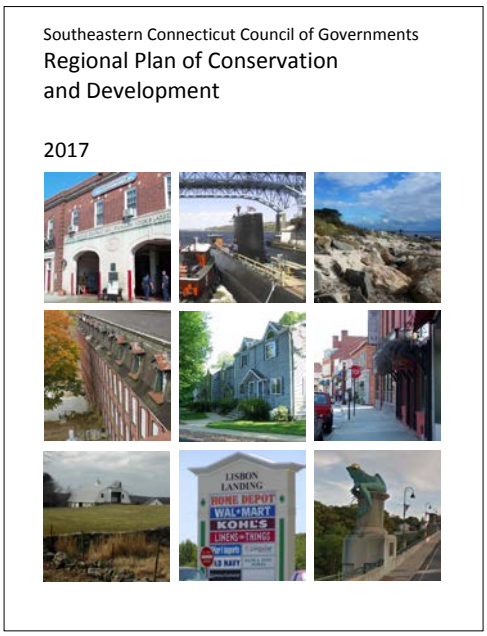

Figure 2.3. *SCCOG's Regional Plan of Conservation and Development (2017)*

- **Open Space and Natural Resources**. Protecting the region's open space and natural resources is key to its economy and quality of life. Water quality, in particular, is necessary for fishing and outdoor recreation tourism.
- **Resilience.** Some locations such as downtown New London, Mystic, and important natural habitats will experience increased flooding due to sea level rise and more frequent severe storms.
- **Local Capacity and Participation.** In the face of decreasing aid from the State of Connecticut, there is a growing need to share resources and expertise among cities and towns in the region.

POPULATION

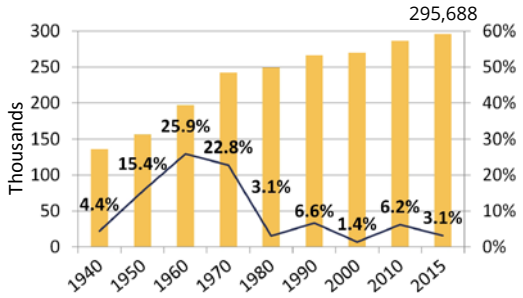

Figure 2.4. *Population change 1950-2005, southeastern Connecticut region (SCCOG and U.S. Census Bureau)*

Within southeastern Connecticut, the majority of residents live either in an urban (46 percent) or suburban (44 percent) community, with the remaining nine percent living in a rural community. Since its peak in the post-WWII era, population growth has significantly decreased in urban municipalities and slowed in suburban municipalities. Other changes to population characteristics include:

- Significant increase in median age,
- Greater ethnic diversity,
- Increase in number of one-person households, and
- Decrease in median income.

Table 2.1 *JLUS municipalities' existing and projected populations*

	2015 POPULATION	PROJECTED 2020 POPULATION	PROJECTED 2025 POPULATION	PROJECTED 2030 POPULATION	PROJECTED 2035 POPULATION	PROJECTED 2040 POPULATION
Town of Groton*	39,986	40,322	40,639	40,332	39,765	38,622
New London	27,423	29,022	29,972	30,885	31,604	31,875
Waterford	19,427	18,908	18,317	17,621	16,785	15,996
Ledyard	15,057	14,709	14,466	14,167	13,736	13,315
Montville	19,635	19,548	19,410	19,168	18,795	18,356

Source: 2015 population based on 2011-2015 ACS 5-year estimates. Town population projections: Connecticut State Data Center, "2015 to 2040 Population Projections for Connecticut," August 2017 edition, http://ctsdc.uconn.edu/2015_2040_projections/.
*Town of Groton population and population projections include the City of Groton.

LAND USE

Figure 2.5 shows the distribution of land uses within the study area. Over 45 percent of land is developed (primarily residential); New London is almost 82 percent developed. Designated open space makes up nearly 17 percent of total land area, and Native American Tribal Reservations make up 3 percent. Over one-third (34.5 percent) of total land is classified as undeveloped. For more detail on the mix of land uses by municipality, see Table 2.2.

Table 2.2 *SCCOG land use coverage by municipality (acres) [2017]*

	GROTON *	NEW LONDON	LEDYARD	MONTVILLE	WATERFORD	OVERALL	OVERALL %
Low Density Residential	843	83	4,094	4,881	3,367	13,268	13.8%
Medium/High Density Residential	4,814	1,114	1,827	2,288	2,683	12,748	13.3%
Industrial - intensive	486	154	290	647	361	1,938	2.0%
Industrial - extractive	126	0	79	830	28	1,063	1.1%
Commercial	760	248	275	260	901	2,450	2.6%
Institutional	1,631	507	519	604	974	4,231	4.4%
Mixed Urban Use	0	37	8	0	0	34	0.0%
Transportation, Communication & Utility (TCU)	2,437	728	1,004	1,421	2,289	7,879	8.2%
Total Developed Land	**11,097**	**2,895**	**8,096**	**10,931**	**10,603**	**43,611**	**45.4%**
Open Space (w/Cemeteries)	4,408	317	2,963	3,081	2,304	12,996	13.5%
Active Recreation	304	107	318	381	648	1,886	2.0%
Agriculture	143	0	592	582	126	1,443	1.5%
Total Designated Open Space	**4,855**	**424**	**3,873**	**4,044**	**3,078**	**16,325**	**17.0%**
Native American Tribal Reservation	0	0	2,335	567	0	2,902	3.0%
Undeveloped	**2,992**	**178**	**10,172**	**12,105**	**7,697**	**33,126**	**34.5%**
Total Acres	**18,944**	**3,519**	**24,476**	**27,647**	**21,378**	**95,964**	**100.0%**

Source: Southeastern Connecticut region, SCCOG (2017)

* Separate land use numbers for the Town of Groton and City of Groton were unavailable.

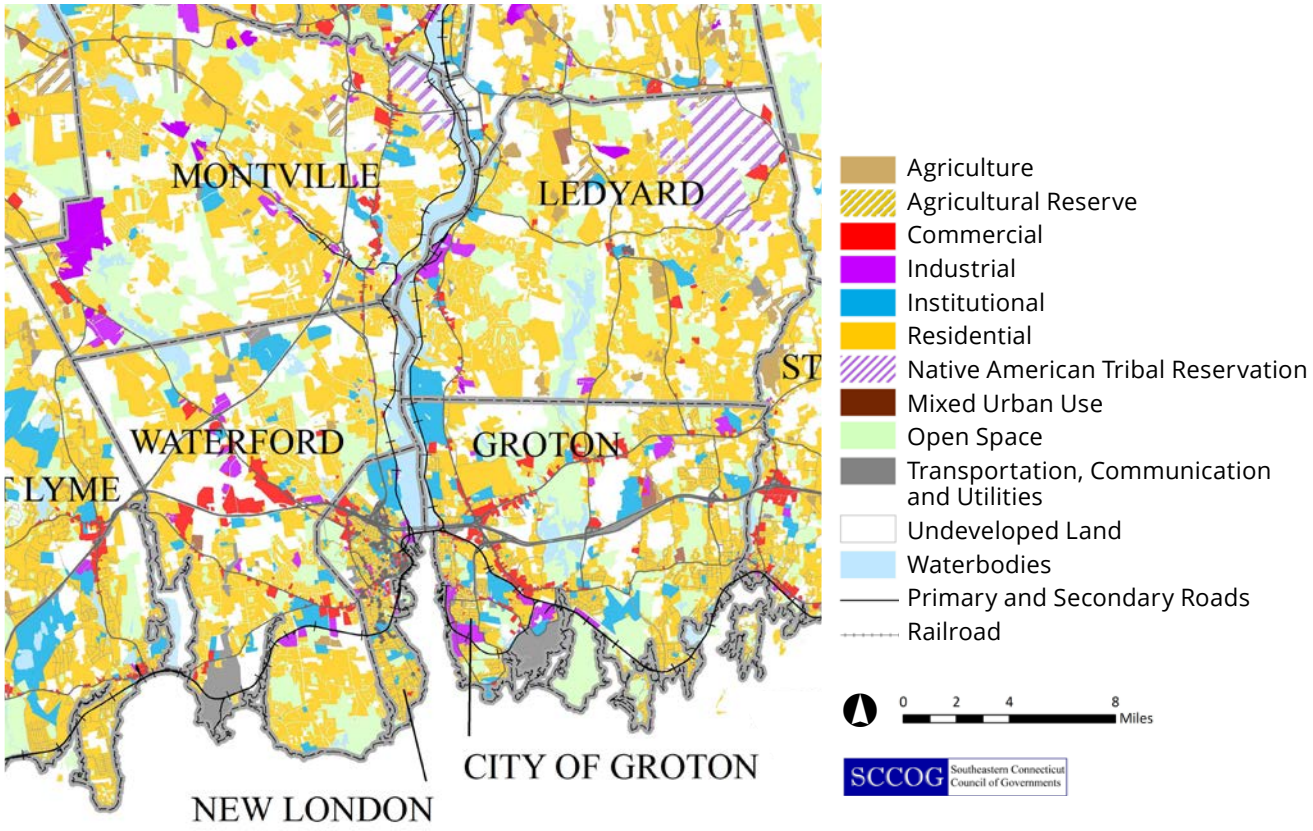

Figure 2.5. *Southeastern Connecticut region 2017 generalized land use (SCCOG Regional Plan of Conservation and Development, 2017)*

TRANSPORTATION

This section summarizes existing transportation conditions, planned transportation projects, and transportation issues and opportunities in the study area relevant to the JLUS.

Vehicular

The classifications of roadways throughout the study area are shown in Figure 2.6. Two interstate highways – U.S. Interstate 395 (I-395) and Interstate 95 (I-95); one state highway (US 1), and eight state routes cross the area. The average daily traffic (ADT) on these roadways is shown in Figure 2.7. The routes with the highest volumes (between 20,000 and 35,000 vehicles/day) are Route 85 through Waterford, Route 32 through Waterford and New London, Route 12 through Ledyard and Groton, and Route 1 in Groton. I-395 and I-95 are estimated to carry between three to five times the amount of traffic on any state route within the study area.

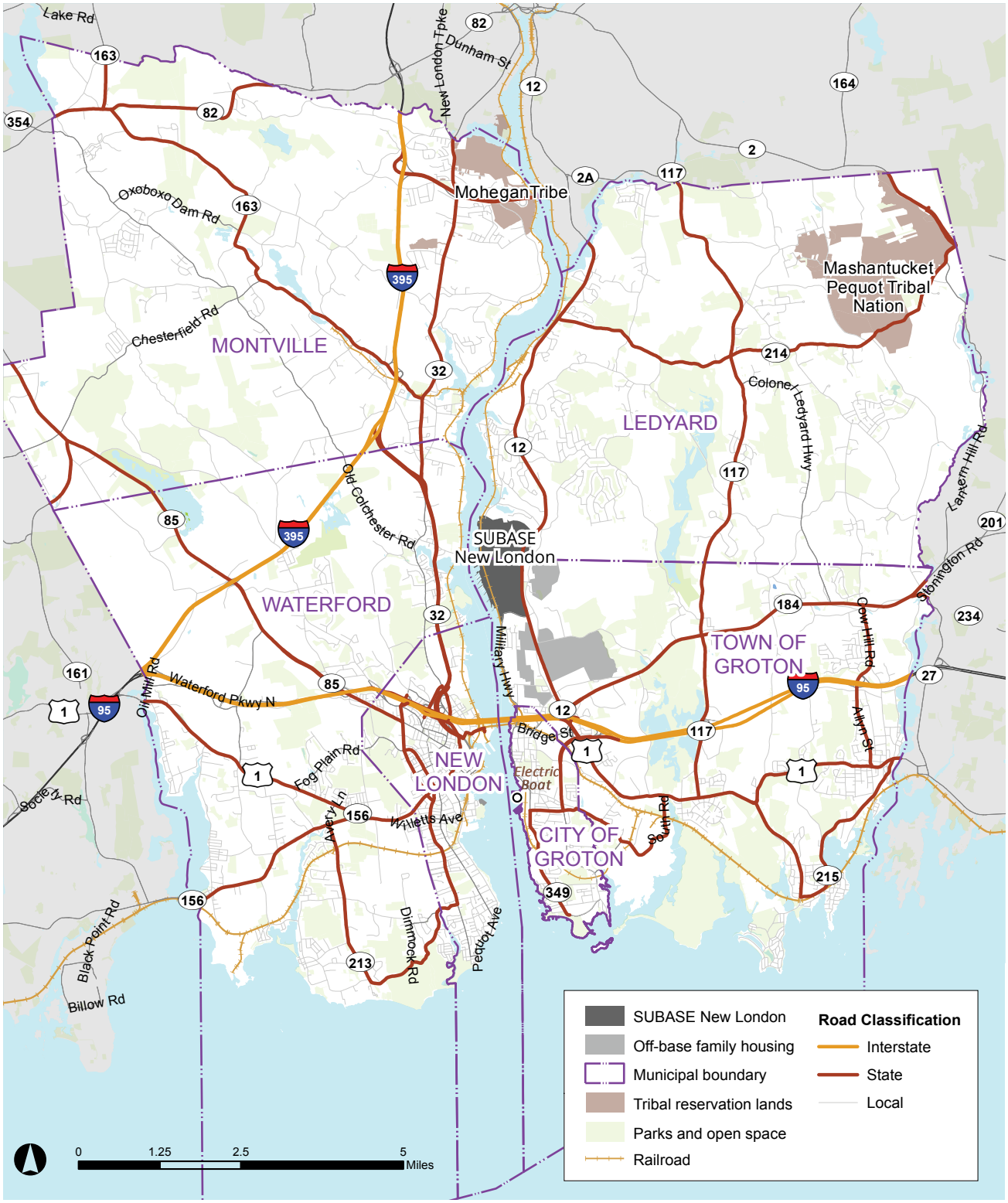

Figure 2.6. *Roadway classes (Connecticut Department of Transportation transportation related mapping)*

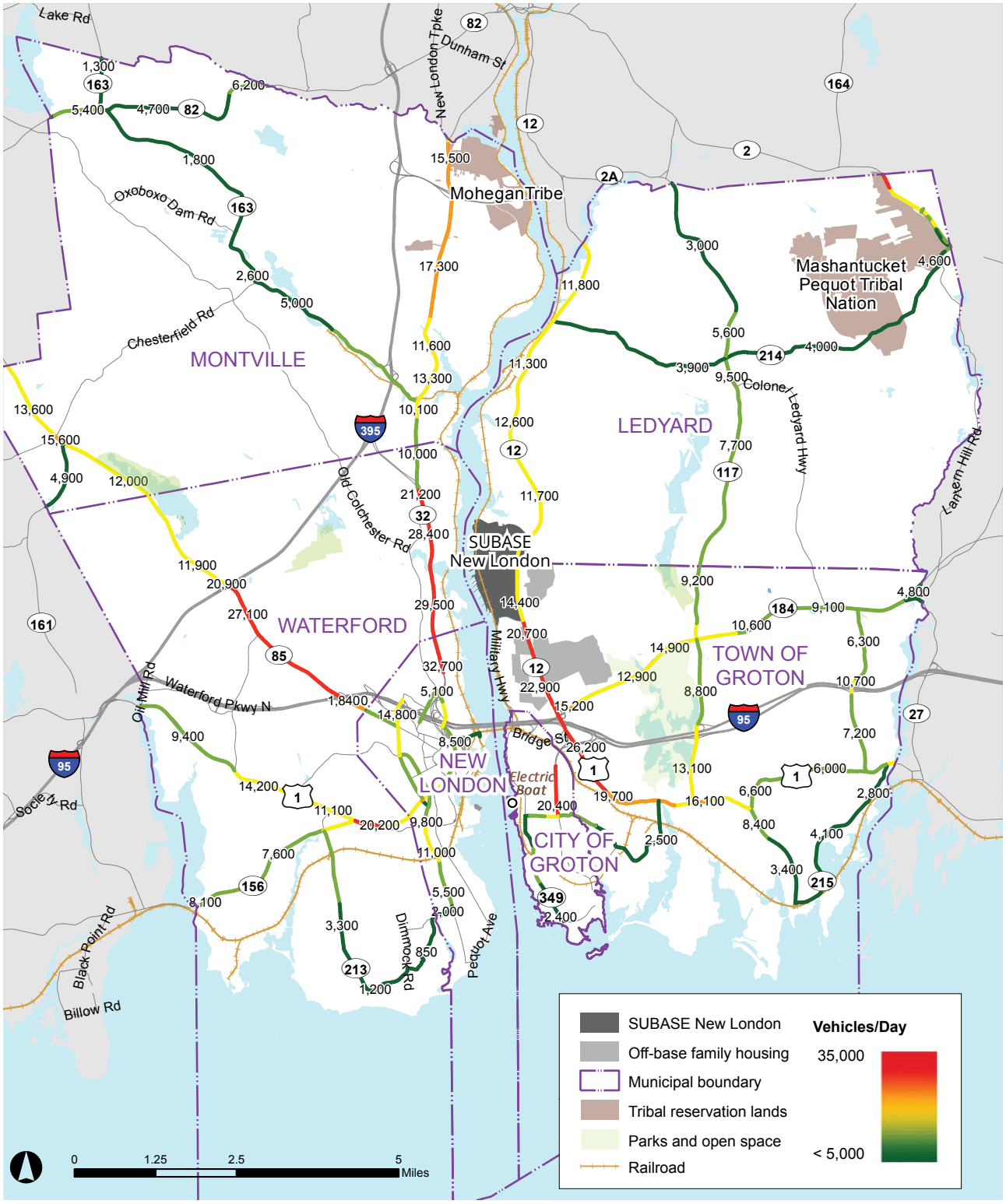

Figure 2.7. *2015 average daily traffic volumes on state routes (Connecticut Department of Transportation traffic monitoring volume information)*

CONGESTION

Regional congestion issues are generally associated with summer recreational traffic on I-95, including incidents or extremely high traffic volumes on summer weekends and the “spill over” effect onto local roadways. Local congestion issues relevant to the JLUS are generally associated with access to the SUBASE and Electric Boat facilities in Groton and New London.

Regional destinations and demand generators pertinent to this study include Electric Boat, downtown New London, downtown Groton, SUBASE New London, and the casinos. This is discussed in more detail in the Transportation section of the Compatibility Analysis; see page 71.

Public Transportation

Within the study area, public transportation services include:

- Regional and local bus service provided by Southeast Area Transit (SEAT); routes indicated in Figure 2.8,
- Commuter rail service between New London and New Haven, provided by Shoreline East (CTDOT),
- Intercity rail service provided by Amtrak with a stop at New London's Union Station,
- Greyhound's national bus service with stops in New London (adjacent to Union Station) and the Foxwoods Resort and Casino,
- A variety of ferry services from downtown New London, and
- Groton/New London Regional Airport.

The City of New London has an impressive intermodal hub with Union Station and the ferry terminals located within easy walking distance to downtown destinations.

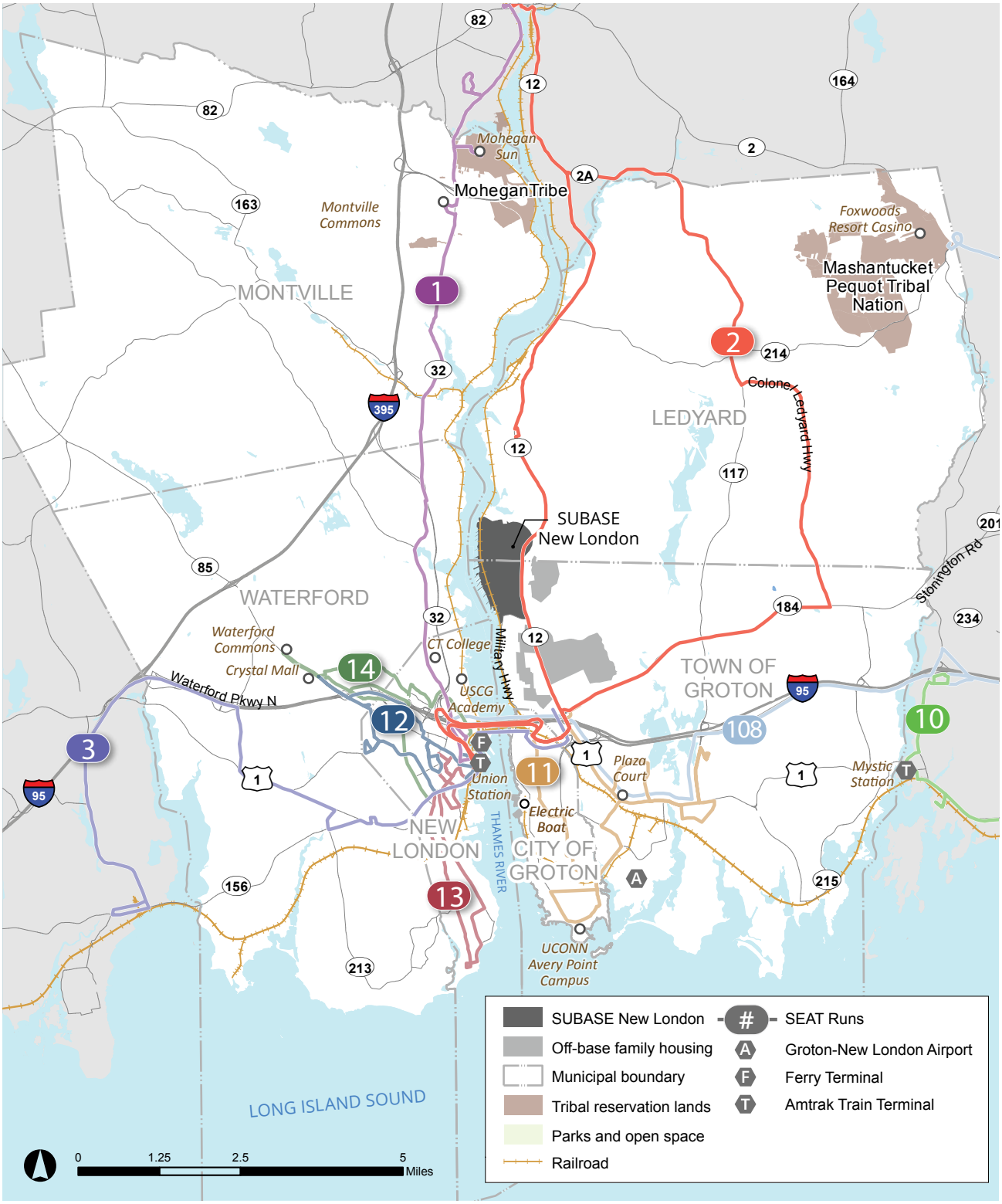

Figure 2.8. *Existing public transportation (Southeast Area Transit District System Route Map, Google Maps)*

BUS SERVICE

SEAT provides bus and shuttle service throughout the study area. Only one of the SEAT routes (Run 2) currently passes near the SUBASE. It operates along Route 12 between 7am and 5pm. Average headways for Run 2 are approximately two hours. From the SUBASE, the service runs south to Groton Square (in Groton), Plaza Court (in Groton), and then to Water Street (in downtown New London). In 2015, SCCOG prepared a report entitled "SEAT Bus Study," which documented existing conditions and made recommendations to improve service. According to the study, there are approximately 201 riders that use Run 2 on the average weekday. This is slightly lower than the average weekday ridership across all of the SEAT routes. SEAT is currently facing funding challenges.

Additionally, regional bus service (provided by Greyhound and Trailways) is available to and from a variety of locations throughout New York and New England from the New London Bus Station located at Union Station.

COMMUTER RAIL

New London Union Station also provides access to passenger trains running on Shore Line East. This commuter rail service, owned by CTDOT, runs ten trains per average weekday between New London and New Haven. Shore Line East stops in Old Saybrook, Westbrook, Clinton, Madison, Branford, and Guilford. There is also limited service to Bridgeport and Stamford.

INTERCITY RAIL

New London Union Station provides access to Amtrak passenger trains running on the Northeast Regional Railroad. The Northeast Regional Railroad runs from Boston through Providence, New York City, Philadelphia, and Baltimore to Washington D.C. There are 18 Northeast Regional trains per day on the average weekday. Each train has between seven to ten passenger cars.

Figure 2.9. *SEAT public bus*

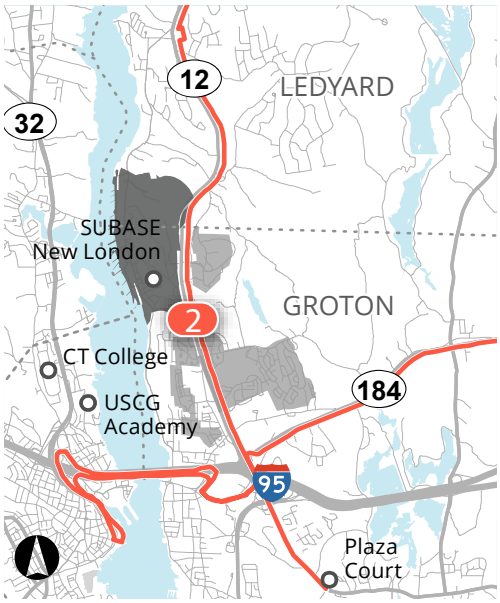

Figure 2.10. *Southeast Area Transit Run 2 (Seatbuslive.com)*

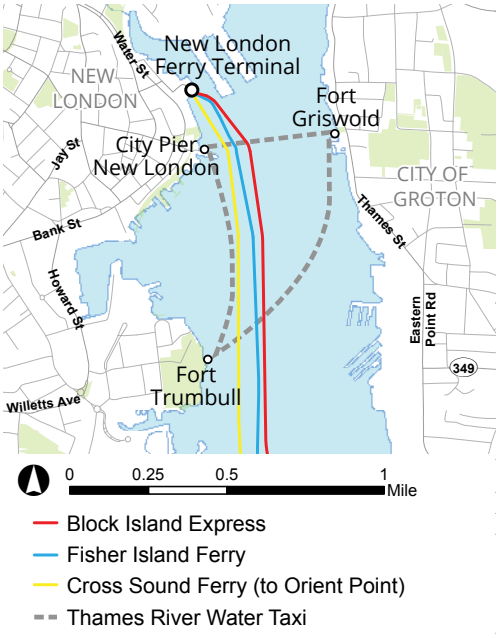

Figure 2.11. *Map of regional ferry services (SCCOG, Thames River Water Taxi)*

FERRY SERVICE

There are three regional ferry services in the area serving New London, New York, and Rhode Island. The Block Island Express Ferry provides service from New London to Block Island, Rhode Island and operates between 8:30am and 6:30pm. The Cross Sound Ferry provides service from New London to Orient Point, Long Island, New York and operates daily from 7am and 7pm. The Fishers Island Ferry provides service from New London to Fishers Island, New York and operates daily between 9am-1pm. All three ferries depart from the Cross Sound Ferry Terminal, located off of Water Street in downtown New London north of New London Union Station.

A water taxi also runs seasonally between Fort Griswold in Groton, City Pier in New London, and Fort Trumbull in New London (see "Heritage Park and Water Taxi" on page 28).

REGIONAL AIRPORT

The State-owned Groton-New London Airport is located in the Town of Groton on its southern coastline. The airport is for public use; however, there is currently no scheduled service from the facility.

Bicycle and Pedestrian

ROUTE 12 AND CRYSTAL LAKE ROAD AT SUBASE

Conditions along Route 12, Crystal Lake Road, and at the main SUBASE entry are challenging and create some disincentives to walking and biking. Issues include high vehicular traffic levels, uninviting sidewalks, narrow to non-existent shoulders for bicycling, and poor street crossings. Bicyclists have to wait in the vehicle queue at the SUBASE gate.

Figure 2.12. *Narrow bike and pedestrian conditions on Gold Star Memorial Bridge*

There have been and are ongoing efforts to improve conditions for bicyclists and pedestrians in the area. A separated multi-purpose pathway on Pleasant Valley Road that runs parallel to Route 12 about 300 feet to the west provides a safe and pleasant north-south connection through the area and between the SUBASE and the Gold Star Bridge. Conditions on Crystal Lake Road will be much improved when an ongoing project is completed (see page 21).

In addition, a lack of buildings and businesses along Route 12 creates an uninteresting and potentially intimidating walking and biking experience.

CITY OF GROTON

Thames Street runs along the east side of the Thames River in the City of Groton and is accessible from the SUBASE via Route 12 or Military Highway. Thames Street has several small retail shops and restaurants. The close proximity of Thames Street to the Thames River makes walking and biking along this roadway a unique experience.

NEW LONDON

The most walkable area within the study region is downtown New London, which has many small retail shops, restaurants, government offices, private offices, and hotels. Sidewalks on both sides of most downtown New London roads provide a strong walking infrastructure. Vehicle speeds within downtown New London are generally fairly low, which enables bicyclists to travel easily on the roads. Downtown New London is a major destination within the study area and the state.

Accessing downtown New London from the SUBASE or vice versa by foot or by bike requires bicyclists and pedestrians to cross the Gold Star Memorial Bridge and use a narrow walkway directly adjacent to Interstate 95. This is not an inviting environment for bicyclists or pedestrians.

REGIONAL TRAILS

There are numerous recreational trails within many of the wooded areas in the study area, including the Cross Town Trail, a popular recreational trail in the Town of Groton. The planned Tri-Town Trail, shown in Figure 2.13, is expected to run through Ledyard and the Town of Groton. This will be an off-road multipurpose trail, intended primarily for recreation. Its location is not ideal for commuting from the area's employment centers.

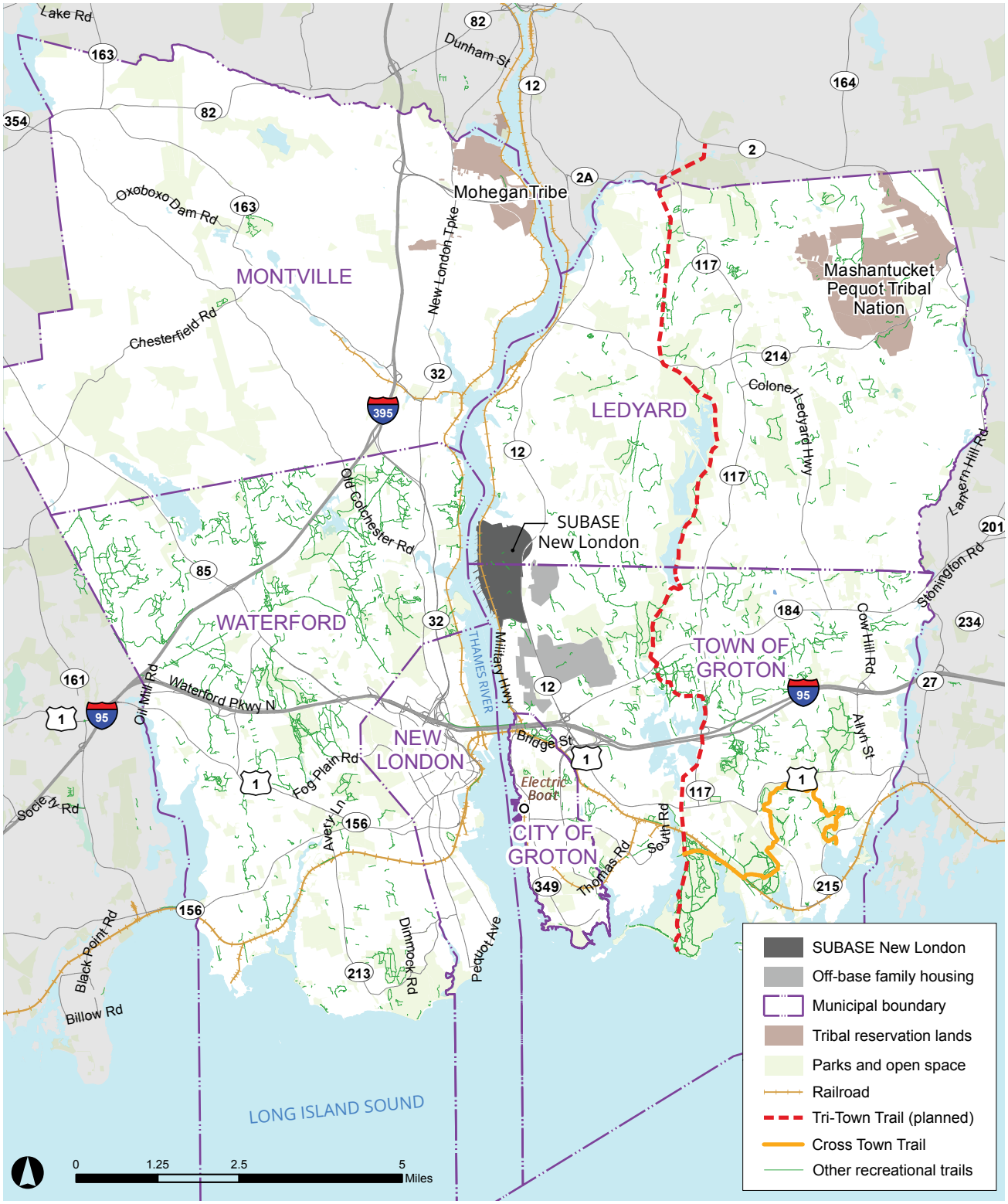

Figure 2.13. *Major regional trails (SCCOG, ESRI, GrotonGIS datasets)*

Planned Transportation Projects

NEW ENGLAND CENTRAL RAILROAD UPGRADE

The New England Central Railroad (NECR) runs along the west side of the Thames River (through New London, Waterford, and Montville) and is primarily used to transport freight. The NECR received a Transportation Investment Generating Economic Recovery (TIGER) grant in 2016 to upgrade its infrastructure to accommodate the modern freight car, which weighs up to 143 tons. This upgrade will allow for a greater number of trains carrying larger loads to pass through the study area.

CRYSTAL LAKE ROAD RECONSTRUCTION

Crystal Lake Road, which connects Route 12 with the Main Gate for SUBASE New London, is currently being reconstructed. The reconstruction involves the widening of Crystal Lake Road, the construction of a multi-use trail along its southern side, and the realignment of Military Highway with the SUBASE Main Gate. The project extends the multi-use pathway southward along Route 12 to connect with the existing pathway on Pleasant Valley Road. Project completion is scheduled for June 2018.

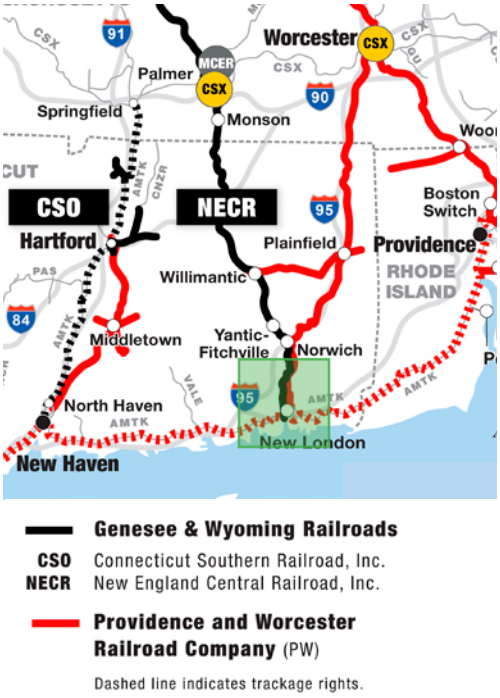

Figure 2.14. *New England Central Railroad route with JLUS study area in green (Genesee and Wyoming Railroad Inc.)*

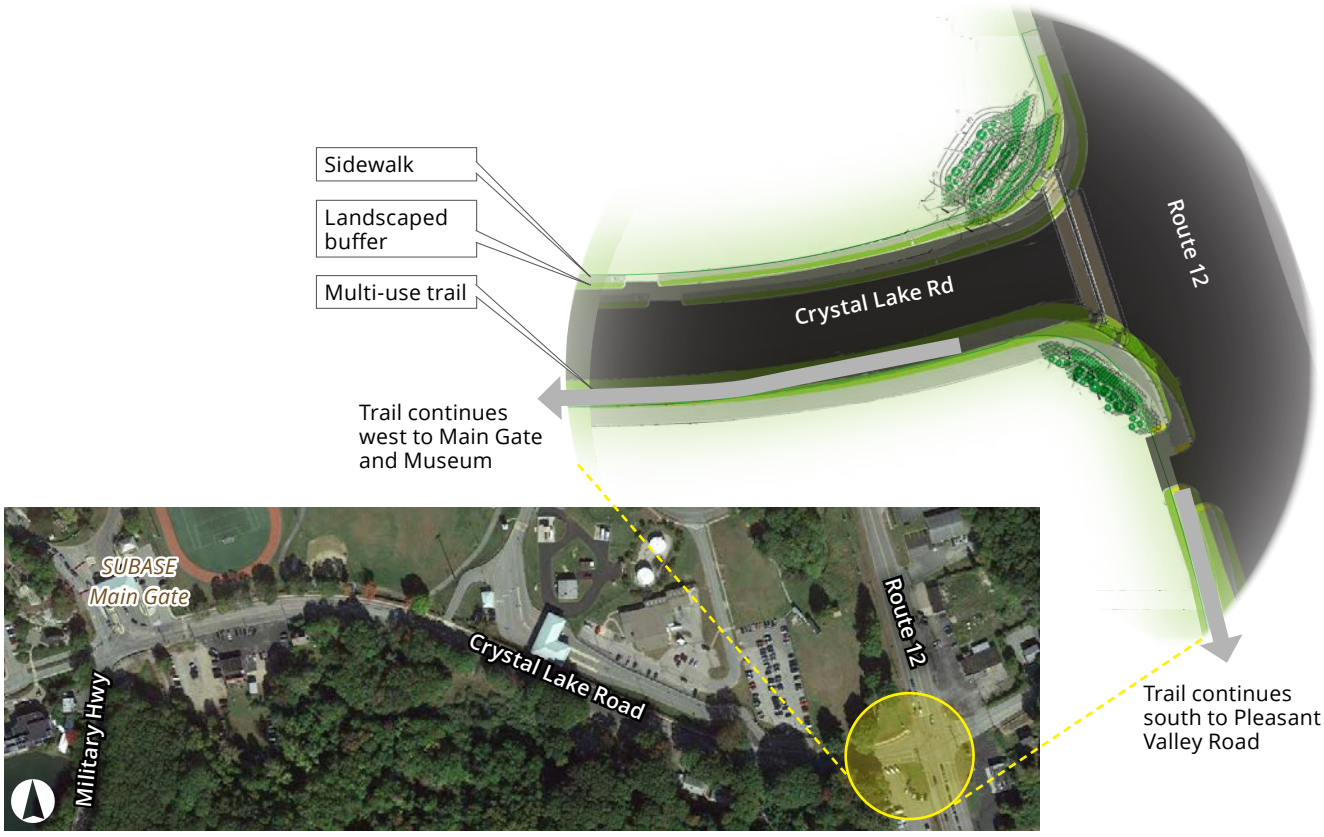

Figure 2.15. *Existing aerial view and design for Crystal Lake Road improvement (Town of Groton Office of Planning and Development Services [OPDS])*

BY THE NUMBERS

The JLUS communities have $10.8 billion in gross domestic product (GDP) and $5.8 billion in personal income. They represent approximately 85,000 employees with employee compensation of $5.4 billion.

ECONOMY

In terms of jobs, Electric Boat and the SUBASE are the most critical elements of the local economy. The ship building sector generates more income than the next 12 largest industries combined – roughly $1.1 billion versus $835 million – a difference of about $265 million. The industry categories employing more than 1,000 people in the JLUS area are listed in Table 2.3. For a summary of the economic impact of the SUBASE, see "Economic Impact" on page 31.

In terms of wage income from employment covered by unemployment insurance, manufacturing represents 31 percent of the income. The next closest industry is the healthcare sector at 18 percent. Professional and technical services represent another 10 percent of wages.

Government-related employment, which includes the Tribal Gaming Authority, is the largest source of jobs in the region. This category employs almost 31,000 people with payrolls exceeding $1.5 billion. In terms of private industry, healthcare and social services is the largest employer. Manufacturing remains a key contributor to the region's employment base with nearly 15,000 people.

Table 2.3 *Leading private industries in study area*

DESCRIPTION	EMPLOYMENT	INCOME ($)
Ship building and repairing	9,252	$1,078,951,514
Full-service restaurants	3,243	$80,809,788
Real estate	2,260	$26,372,478
Scientific research and development services	2,053	$306,825,321
All other food and drinking places	2,010	$56,703,231
Hospitals	1,880	$154,361,316
Limited-service restaurants	1,826	$37,726,656
Retail - General merchandise stores	1,629	$46,758,901
Retail - Clothing and clothing accessories stores	1,620	$39,477,683
Nursing and community care facilities	1,485	$64,652,945
Retail - Food and beverage stores	1,113	$33,772,239
Offices of physicians	1,075	$106,697,508
Hotels and motels, including casino hotels	1,023	$38,578,798

Source: Impact Analysis for Planning (IMPLAN) economic impact model using Connecticut zip codes 06320, 06355, 06349, 06339, 06340, 06353, 06370, 06375, 06382, and 06385; Ninigret Partners analysis

Trends

One way to measure industry performance is to look at the number of businesses and jobs moving in and out of the area. New London County has gained 332 establishments since 2009 (a 5 percent increase) and 2,435 private employees since 2009 (a 3 percent increase). The data reveals that:

- The construction industry, by number of firms, has seen a major contraction, but the remaining firms are larger. Similarly, although manufacturing lost 14 firms, employment in the field increased.
- Healthcare, retail, and hospitality saw the most hires, with increases of over 1000 employees each.
- Business headquarters (management of companies and enterprises) has seen a significant increase in employment (66 percent or 331 jobs).

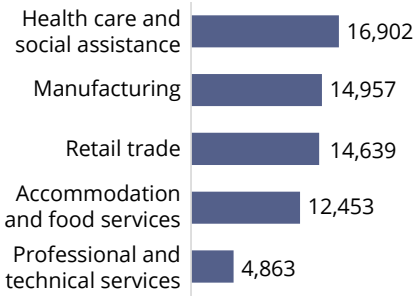

Figure 2.16. *Top five private industries by employment, New London County (Ninigret Partners analysis of CT Labor Market Information and Quarterly Census of Employment and Wages data)*

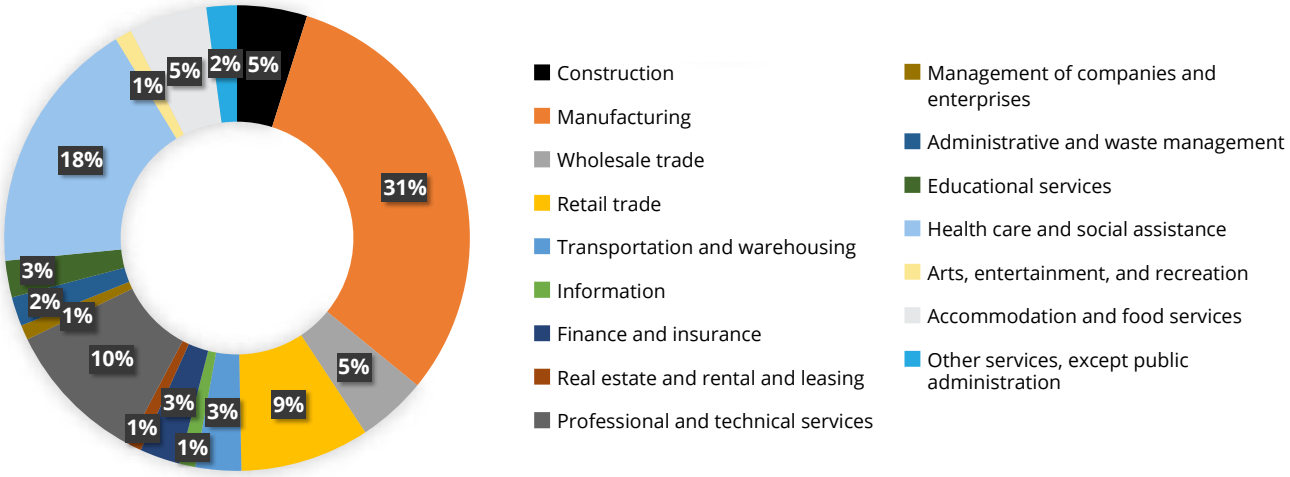

Figure 2.17. *Covered wage income, New London County (Ninigret Partners analysis of CT Labor Market Information and Quarterly Census of Employment and Wages data)*

- Professional technical services has shown a major decline in employment (over 1,000 employees) but has added 53 new businesses. However, the loss of these jobs, particularly if they result in departures from the region, will put a strain on disposable income levels.
- Retail and hospitality, which represent over 2,000 jobs and 50 businesses, are dependent on disposable income and disposable income growth (from increases in population or income levels) to remain healthy. For example, the over 1,000 employee decline in professional technical employment reduced regional income by $97 million. Almost 5,000 hospitality jobs would need to be created to replace that income in the region.

Also relevant to this JLUS is the projected growth of Electric Boat. The company expects to add 1,300 employees in 2017 in their Connecticut offices at their Groton and New London campuses. To account for attrition and new work, Electric Boat, which now employs more than 15,000 workers company-wide, will need to hire between 14,000 and 20,000 people to reach 18,000 employees by 2030.

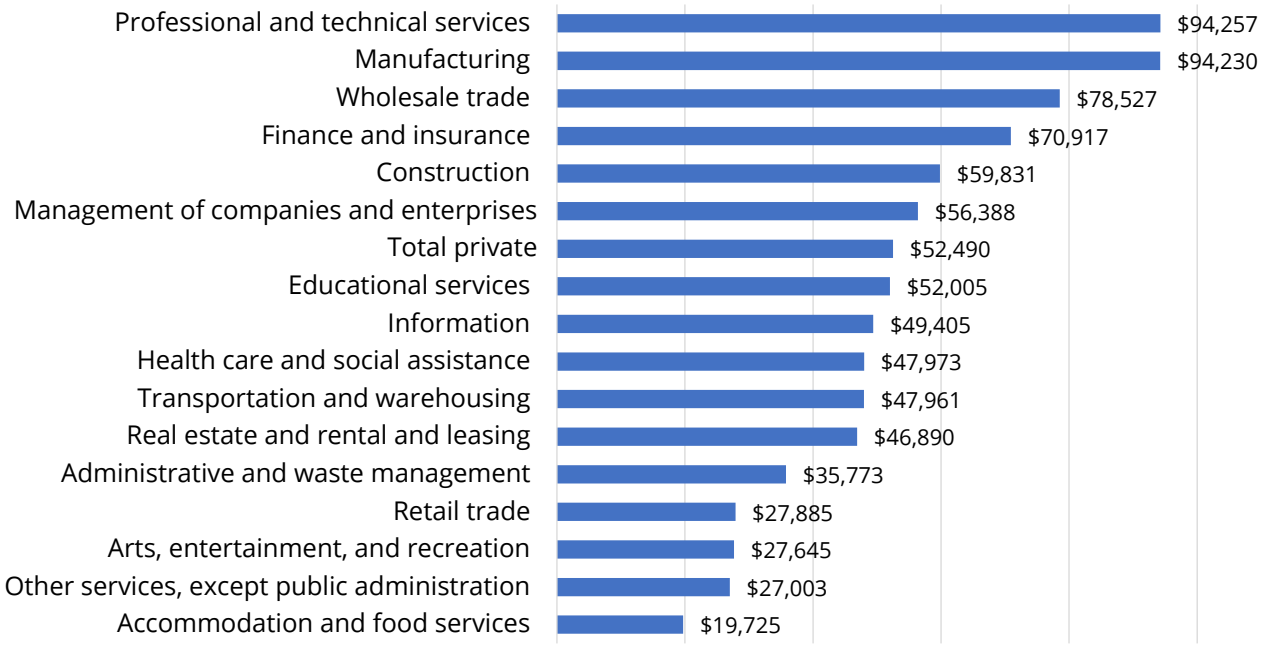

Figure 2.18. *Average salary - 2015 New London County (Ninigret Partners analysis of CT Labor Market Information and Quarterly Census of Employment and Wages data)*

Housing

Housing demand and activity in the region is influenced by five major factors:

- High-wage manufacturing jobs are being replaced with significantly lower-paying service jobs,
- Urban municipalities are generally not growing quickly,
- Zoning policies reflect the dependence of towns and cities on property taxes,
- Limited infrastructure systems inhibit higher density development, and
- Limited suitable sites without extensive investment hinder development.

HOUSING MARKET PERFORMANCE

Housing values remain approximately 21 percent below their 2006 peak, although they have been on a steady climb since 2013. See Figure 2.19. Rental prices have shown a steady increase over the last six years according to the latest available data. Rents across all unit types are approximately $1.05 per square foot (See Figure 2.20) and, for one bedroom units, are approximately $1.33 per square foot.

Rents around the SUBASE tend to be a little higher than rents at units across the river, though SUBASE proximity does not appear to be a major driver in rental prices. See Figure 2.21.

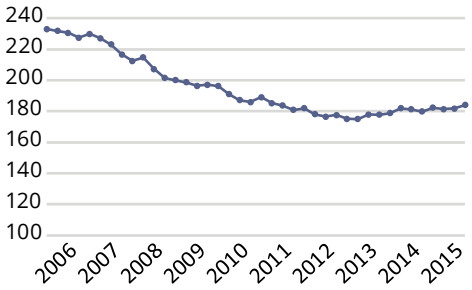

Figure 2.19. *Office of Federal Housing Enterprise Oversight (OFHEO) Housing Market Price Index New London County and SE CT - 063 (OFHEO Housing Market Price Index)*

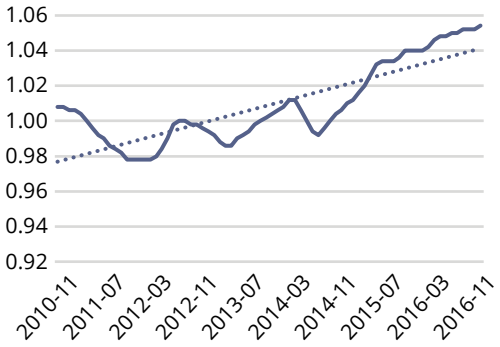

Figure 2.20. *Zillow Rental Housing Index – all types (per sq ft) (Zillow data, New London Metro)*

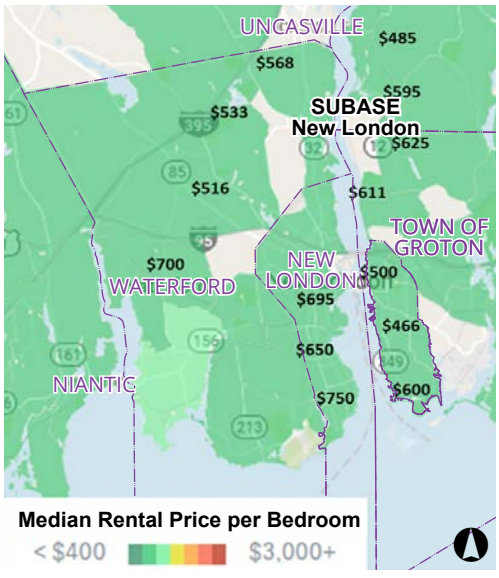

Figure 2.21. *Median rental price per bedroom (Trulia maps – Ninigret Partners Analysis)*

Figure 2.22. *Comprehensive Economic Development Strategy for Southeastern CT report*

Economic Initiatives

COMPREHENSIVE ECONOMIC DEVELOPMENT STRATEGY (CEDS)

A regional Comprehensive Economic Development Strategy (CEDS) was prepared by the region's economic development agency, the Southeastern Connecticut Enterprise Region (seCTer). CEDS are intended to improve the regional economy through the creation of a shared vision. An approved CEDS plan is required to qualify for certain federal programs and to be identified as an Economic Development District. The 2017 CEDS process identified a series of core economic clusters in southeastern Connecticut including:

- Defense and advanced manufacturing,
- Tourism,
- Healthcare,
- Bioscience,
- Agriculture, fishing, food product, and
- Maritime industries (excluding defense).

Three major actions were recommended:

1. Get stakeholders aligned behind one regional vision and one regional identity, and understand the benefit of operating as one united region.
2. Create the culture of collaboration, build capacity, develop new systems, and strengthen networks necessary to compete in the new highly connected economy.
3. Develop strategies that will lead to the creation of a more vibrant economy.

Goals were identified across seven major areas including governance, resilience and readiness, competitiveness and innovation, quality of life, workforce, transportation, and education. Goals with the potential to have an influence on the JLUS include:

- 1B: Reduce barriers /uncertainty for developers to attract development and facilitate investment in the region,
- 2RF: Reduce conflict between the built environment and ecosystem function,
- T2: Facilitate a holistic visitor experience through increased and better coordinated transportation and wayfinding to area attractions, and
- T3: Continue to advocate for investment in freight rail capacity and facilitate development of abutting properties.

PORT OF NEW LONDON

New London is home to State Pier operations and the only State-controlled Port facility. Port facilities and associated services employ an estimated 85 people including 75 longshoremen. Over the last decade an estimated $40 million has been invested in the Port (The Day, December 2016). Port activity has fluctuated and is still below volumes prior to the Great Recession of the late 2000s. Fewer ships today are bringing in more tonnage per vessel call. Cruise ship activity has decreased.

In January 2017 the State Bond Commission awarded $4.5 million to support repairs and improvements at the State Pier. This will also enable 24-hour commercial fishing access to the Central Vermont Railroad (CVRR) Pier and relocation of a fishing fleet from a prime redevelopment location at Fort Trumbull to the CVRR Pier.

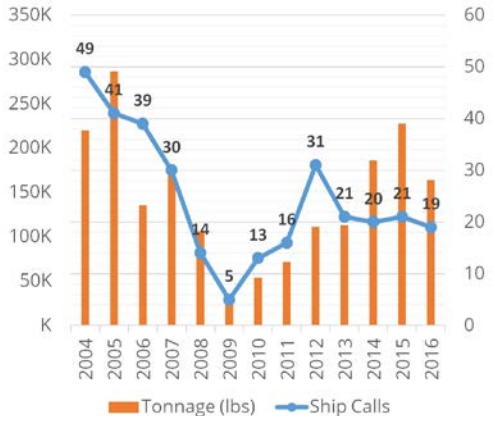

Figure 2.23. *New London State Pier vessel calls and tonnage (NOAA National Marine Fisheries Service [https://www.st.nmfs.noaa.gov/pls/webpls/MF_LPORT_HIST.RESULTS])*

THAMES RIVER INNOVATION PLACE (TRIP)

The municipalities of Groton and New London received a $50,000 grant to plan for innovation and pursue designation as an Innovation Place in the State of Connecticut. Spark Makerspace and CURE Innovation Commons are co-leading the effort, and other anchor institutions and organizations are involved. The group submitted the plan in April 2017 (Southeastern Connecticut Comprehensive Economic Development Strategy, 2017), and in June 2017, it was announced that the Thames River communities were awarded the designation, along with three other communities, for matching up to $700,000 in implementation grants.

As a designated Innovative Place, the Thames River area is positioned for the following opportunities:

- Planning grants to develop an Innovation Places Master Plan and Implementation Application;
- Implementation grants to provide some funding to implement the Master Plan; and
- Agency alignment, which encourages state agencies to favor applications for financial and technical assistance for projects in areas designated as Innovation Places.

Figure 2.24. *State Pier complex, with CVRR (left) and Admiral Shear (right) finger piers (CTDOT)*

Figure 2.25. *Thames River Heritage Park water taxi*

HERITAGE PARK AND WATER TAXI

The Thames River Heritage Park (a boundary-less conceptual park) connects historical sites on the Thames River including two State parks. The goal of the Heritage Park is to celebrate local history and draw tourism to local businesses. Starting in 2014 as a demonstration project, a water taxi was initiated that connects Fort Griswold in Groton, City Pier in New London, and Fort Trumbull in New London. There are plans to expand water taxi service to a new pier at the Nautilus Memorial/Submarine Force Library and Museum. Other regional destinations could include State parks, University of Connecticut at Avery Point, and Mitchell College.

ENVIRONMENTAL AND CULTURAL RESOURCES

The SUBASE New London JLUS Study Area contains a large variety of natural and cultural resources including rivers, streams, open space, and historic resources. While these resources are important to the region, they are less directly relevant to the issues pertinent to the JLUS. Relevant issues are summarized below; other background environmental and cultural resources information can be found in Appendix A.

Thames River

The Thames River bisects the study area and runs toward Norwich from Long Island Sound, which connects to the Atlantic Ocean. The river has an industrial heritage as a shipbuilding and naval port and accommodates ferry service, fishing fleets, and recreational boating. Environmental and cultural stewardship of this resource was emphasized as a high priority during JLUS outreach.

Designated Historic Properties

The study area contains a large number of historic properties, including those listed individually on the National Register of Historic Places and those within National Register Historic Districts. The largest concentration occurs in the City of New London. All of the municipalities within the study area, with the exception of the Town of Montville, also contain Local Historic Districts, though none are in the immediate vicinity of the SUBASE. The SUBASE contains the National Register-listed USS Nautilus, the first nuclear-powered submarine in the world, two National Register-eligible properties, and a small historic district.

JLUS STAKEHOLDERS

This section provides an overview of the primary JLUS participants: SUBASE New London, six riverfront municipalities, and key stakeholders.

SUBASE NEW LONDON

SUBASE New London began as a naval yard and storage depot in 1868, then became the Navy's first Submarine Base in 1916. Today, the installation is considered "Home of the Submarine Force" and is a key component of a defense industry cluster in southeastern Connecticut. A third of the Navy's Attack Submarine Force is located at the SUBASE.

In addition to the 687 acres on base, SUBASE New London also has over 530 acres off base. This includes five family housing areas in the Town of Groton within two miles of the SUBASE as well as other community support, and recreation facilities within the region. The SUBASE serves active military personnel and a large military dependent, retiree, and survivor community. Forty percent of military personnel live in the barracks on base, 35 percent live in the local community, and 25 percent live in off base military family housing managed by Balfour Beatty Communities. There are 1,895 units in the off base family housing accommodating 1,109 military and 452 non-military families.

FAST FACTS

- **Land Area:**
  687 acres on base / 1.1 square miles
  530+ acres off base / 0.8 square miles
- **Total Population:** 32,800 (includes military living on and off base and does not include non-military families living in military family housing)
- **Active / reserve military personnel / drilling reservists:** 6,500+
- **Family members and retirees:** 24,000
- **Civilian employees and contractors:** 2,300
- **Total military payroll:** $534M

Figure 2.26. *SUBASE New London, with Submarine Force Library and Museum in the foreground (MC1(SW/AW) Bill Larned)*

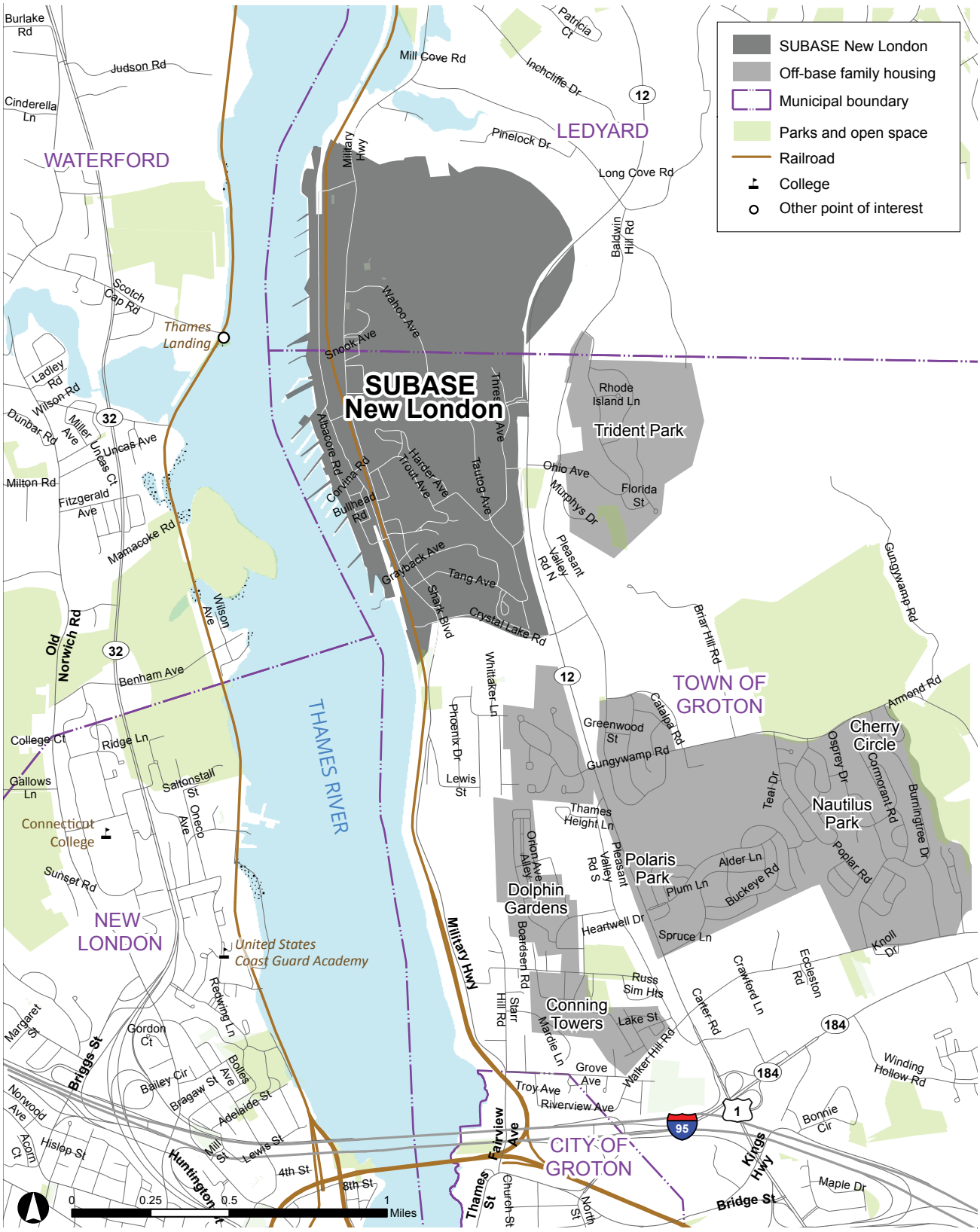

Figure 2.27. *SUBASE New London, located in the Towns of Groton and Ledyard, along the east side of the Thames River (SCCOG, ESRI, FHI datasets)*

Mission

The SUBASE's primary missions are homeporting and deploying fast attack submarines and training the submarine force. SUBASE New London is homeport to 15 nuclear attack submarines and hosts more than 70 tenant commands (i.e., activities located on base but part of a different chain of command). The Naval Submarine School provides comprehensive training of officer and enlisted submariners, graduating nearly 40,000 students annually. Nearly all U.S. Navy submariners are stationed at SUBASE New London for a portion of their careers.

Economic Impact

In total, SUBASE New London generates approximately $714 million in economic activity. SUBASE New London employed approximately 10,400 people in 2015 including around 700 contractors. Total payroll equaled approximately $534 million. This payroll is equivalent to 9.8 percent of employee compensation and 12 percent of the employment base in the study area.

In addition to payroll and contractor spending, military personnel and civilian employee spending creates an induced economic impact. According to the Economic Impact Analysis for Planning (IMPLAN) model for 10 zip codes surrounding the base, their spending creates an additional 1,067 jobs and an additional $157 million in economic activity in the area. Base military pay is

Table 2.4 *SUBASE New London economic impact statistics*

SUBASE NEW LONDON	
Active duty	8,057
Military family members	8,093
Civilian employees	2,396
Active duty payroll	$387.5M
Civilian payroll	$146.4M
Local procurement	$5.4M
Exchange sales	$17.7M
Induced impact	$157M
Total economic activity*	$714M

Source: Navy Region Mid-Atlantic (2015); Ninigret Partners analysis using IMPLAN Online data for JLUS area zip codes

**Commissary and Exchange employment, salaries, and sales were deducted from the model results to avoid double counting. Retirees were not included as SUBASE-only retirees are not tracked. Approximately 3,100 retired Department of Defense (all military branches) personnel live within 40 miles of the base and receive approximately $78 million in pensions.*

MAJOR TENANTS

- **Undersea Warfighting Development Center and Submarine Squadrons –** develops and evaluates submarine tactics and provides support and maintains personnel and material readiness for assigned submarines
- **Submarine Learning Center and New London Naval Submarine School –** develops submarine training curricula and provides training for officers and enlisted personnel
- **Naval Submarine Medical Research Laboratory and the Naval Undersea Medical Institute –** provides medical research, training, and technical support to meet the requirements of Navy Medicine
- **Naval Submarine Support Facility –** provides submarine maintenance and support

Figure 2.28. *Submarine at SUBASE New London (Petty Officer 2nd Class Erin Hamilton)*

SUBASE NEW LONDON TIMELINE

1868 U.S. Government received 85.73 acres as gift from State of Connecticut and City of New London to establish Navy Yard

1872 New London facilities formally designated as a Navy Yard

1912 Efforts of Rep Edwin Higgins (Norwich) saved the Base from abandonment by the Navy

1916 Navy designated facility as nation's first permanent continental submarine base

1917 Submarine School established

WWI Increased activity at the base; 81 new buildings completed/under construction

1920s Activities slowed at SUBASE

WWII Base footprint increased from 86 buildings on 112 acres to 280 buildings on 497 acres; Submarine force significantly influenced the outcome of the war

1946 Naval Submarine Medical Research Laboratory (NSMRL) established

1954 World's first nuclear-powered attack submarine SSN 571 Nautilus commissioned

1959 SUBASE New London was the biggest submarine base in the world (330 buildings on 550 acres)

1961 Need for housing prompted construction of four Bachelor Enlisted Quarters and off-base housing

1964 Submarine Safety Center established

1969 Submarine Force Library and Museum, a gift from Electric Boat, was formally established

1960s New missions began (Naval Security Group Activity Groton)

1974 Naval Submarine Support Facility (NSSF) designated as separate command

1992 Holy Loch Submarine Refit Site closed

1993 SUBASE survived Base Realignment and Closure (BRAC) proposal, which would have relocated the submarines while maintaining the Naval Submarine School

1995 SUBASE survived BRAC process, although Naval Undersea Warfare Laboratory was closed

2005 SUBASE survived BRAC process studying total Base closure

2009 The State created the Connecticut Office of Military Affairs (OMA) to proactively coordinate efforts to prevent base closure/downsizing

2016 Joint Land Use Study initiated

* BRAC (Base Realignment and Closure) is a process used by the U.S. federal government to increase the efficiency of the Department of Defense by recommending certain military bases for closure or realignment of missions to other facilities. Authorized by Congress through the Defense Base Closure and Realignment Act of 1990, BRAC is an independent entity made up of nine commissioners.

Figure 2.29. *SUBASE New London timeline*

supplemented by a housing allowance for those military personnel who choose to live off-base. Housing allowances are tied to pay grade. For the lowest pay grade, E-1 with dependents, has a monthly allowance of $1,377 or $16,524 per year. The highest pay grade, an O-7 with dependents, has a monthly allowance of $2,349 or $28,188 per year.

Thames Riverfront

Vessels travel in the Thames River navigation channel from the mouth of the Thames to Norwich. The ability for submarines to transit and navigate to and from the SUBASE using the navigation channel is critical to the SUBASE's mission.

DREDGING AND DISPOSAL

Block V Virginia-class submarines, currently in development, will be 85 feet longer than existing subs. Dredging will be required to accommodate these new submarines at the SUBASE, as they require a longer pier and turning radius. To accommodate this increase, Pier 32 will be replaced and Pier 31 will be extended. Figure 2.30 depicts proposed dredging areas associated with this project.

The SUBASE routinely dredges the Thames River every fifteen to twenty years to maintain access for the submarines and other Navy activities. Routine dredging of the Thames River had typically utilized the New London Disposal Site (NLDS), which borders Connecticut and New York. At the end of December 2016, the NLDS was closed.

The EPA subsequently permitted the Eastern Long Island Sound Disposal Site (ELDS), a new 1.3 square mile site intended to meet the region's needs for the next 30 years (see Figure 2.31). However, the State of New York released an Intent to Sue in December 2016, citing concerns over Long Island Sound's environmental health. New York State would like to see open water disposal in all of Long Island Sound eliminated. To address this concern, the Navy has built two Confined Aquatic Disposal (CAD) Sites south of the base (see Figure 2.30). An additional CAD cell to accommodate dredged spoils is desired.

ENVIRONMENT

Superfund site classification

Several site contamination remediation projects within SUBASE boundaries have been recently completed or are in progress through cleanup efforts. The SUBASE is expected to have its classification as a Superfund site removed in the near future.

RELEVANT PLANS

- **Encroachment Action Plan, July 2010.** The Encroachment Action Plan is an internal document that identifies encroachment challenges and recommendations for action. Relevant issues are addressed in this JLUS.
- **SUBASE New London Master Plan, January 2010.** The 2010 Master Plan guides the SUBASE's development through 2025.
- **Installation Development Plan (IDP).** The SUBASE is currently developing an IDP that will replace the 2010 Master Plan. This was not available to review during the JLUS process.

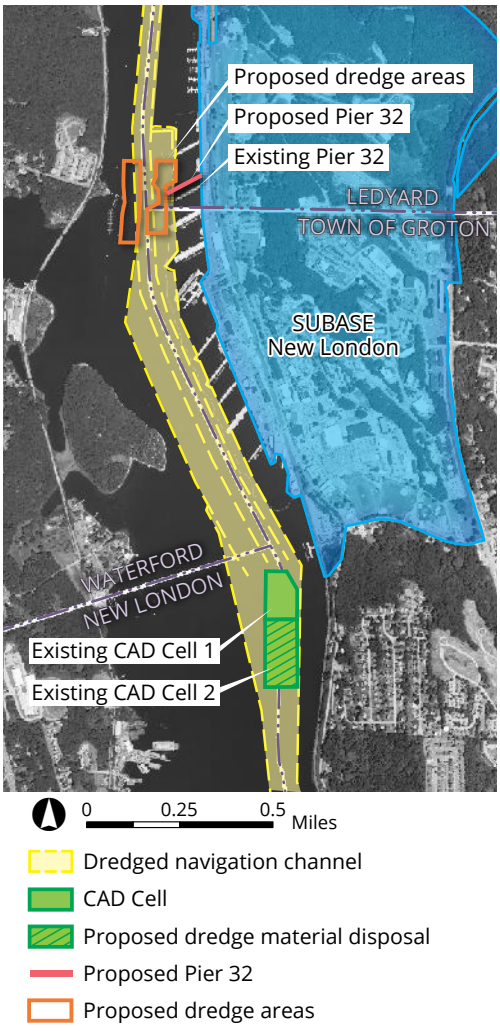

Figure 2.30. *Dredge areas and CAD cells (SUBASE New London Public Affairs Office)*

Figure 2.31. *Long Island Sound dredge disposal sites (EPA, dredged material management in Long Island Sound)*

Transportation

Three operational gates allow entry to SUBASE New London. The Main Gate operates 24 hours/day, allowing commercial and noncommercial traffic to enter. All visitors are required to enter through this gate. It is located on the western end of Crystal Lake Road at the intersection with Military Highway. Approximately 6,000 vehicles enter the Main Gate each day. The average daily traffic on Crystal Lake Road is approximately 20,000 vehicles/day (2007, see Figure 2.7 on page 14).

The Commercial Gate is located just west of the Crystal Lake Road and Route 12 intersection. This gate is used predominately for commercial traffic and is operational Monday through Friday from 5:30am to 1:30pm. Approximately 2,500 vehicles enter the Commercial Gate each day (in 2007).

The North Gate is located on the northern end of Military Highway, approximately 1,000 feet south of Sleepy Hollow Pentway. The North Gate operates Monday to Friday from 5:30am to 8:00am and 2:00pm to 5:30pm. Trucks are not permitted to use the North Gate. Approximately 800 vehicles enter the North Gate each day (in 2007).

EXPLOSIVE SAFETY QUANTITY DISTANCE ARCS

An Explosive Operating Location (EOL), such as a magazine, transfer point, or operating building will normally cast what is termed an Explosive Safety Quantity Distance (ESQD) arc, or "explosive arc." The ESQD arc size and shape depends on the function of the EOL and the quantities/types of explosives permitted. Land adjacent to installations that fall within this arc may not be suitable for certain types of development. At SUBASE New London, a small portion of the ESQD arc generated by a weapons storage facility extends onto a portion of Route 12 (see Figure 2.33).

Figure 2.32. *Road conditions at Crystal Lake Road (Google Earth)*

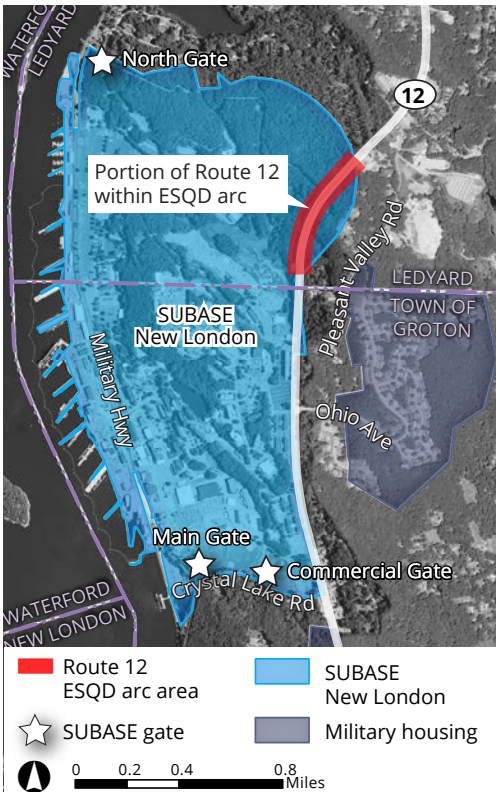

Figure 2.33. *SUBASE gates and Route 12 ESQD arcs (Google Earth and SUBASE New London)*

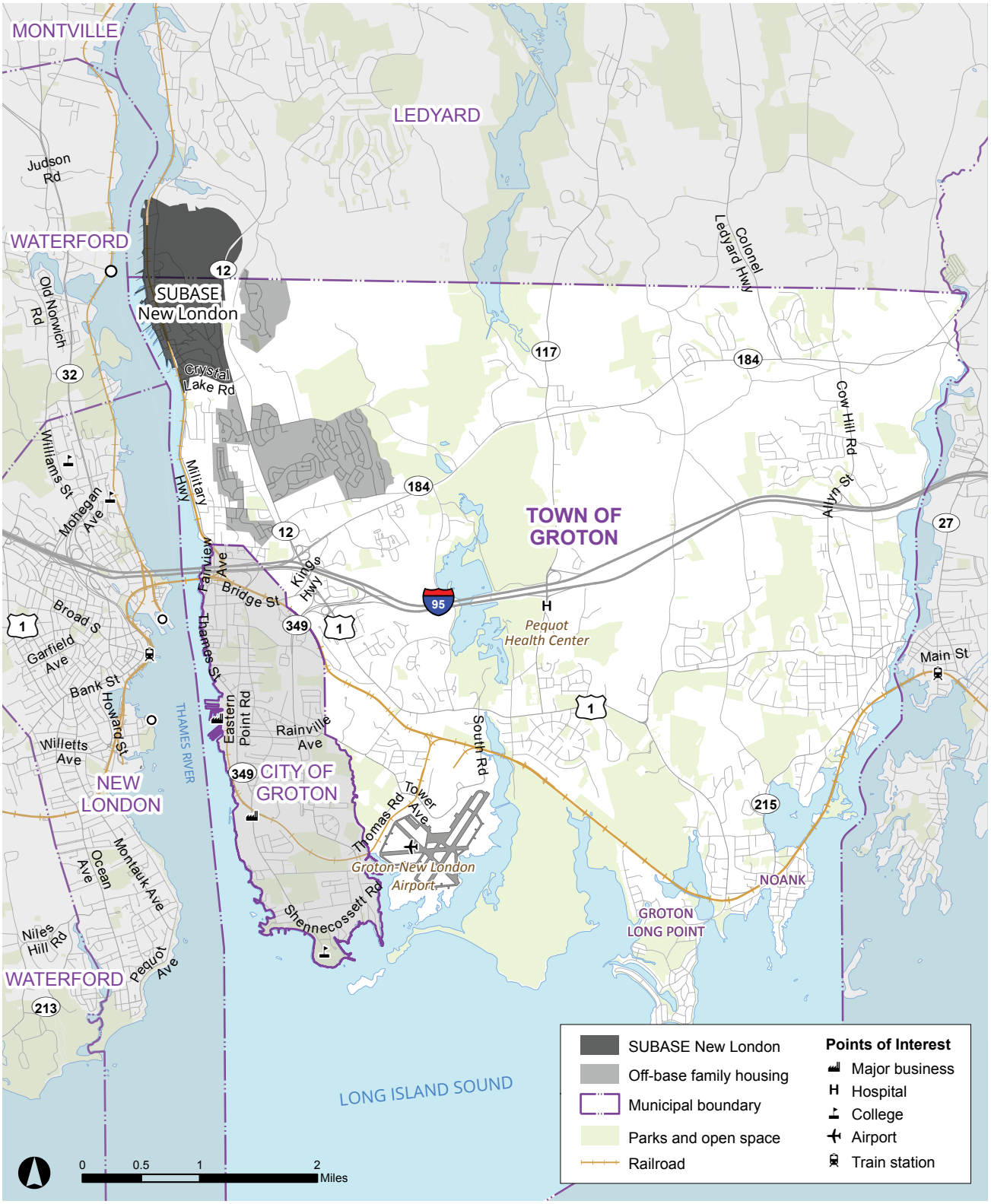

Figure 2.34. *Town of Groton (SCCOG, ESRI, FHI, GrotonGIS datasets)*

TOWN OF GROTON

The Town of Groton is located between the Thames River and Mystic River 10 miles from the Rhode Island border. The lack of a central village and a "town green" has led to a dispersed development pattern. Today this is reflected in the variety of political subdivisions which share some governance and public services with the Town, including the City of Groton, Groton Long Point, and Noank.

The Town was incorporated in 1705 and has a strong maritime tradition. The American Revolution, shipbuilding, whaling, fishing, and coastal defense have helped shape Groton's history. Ironclads were produced at local shipyards during the Civil War and in 1912 the first diesel submarine was launched from Groton. During WWII 74 submarines were built in the Town and in 1954 the world's first nuclear submarine was commissioned here.

Throughout the 20th century the Town was shaped by coastal tourism, defense spending, and the Interstate system. Growth was mostly tied to submarine production at the General Dynamics Electric Boat shipyard and operations at SUBASE New London during WWII and the Cold War. The Town's population has remained relatively stable since 1970, with between 38,000 and 41,000 residents.

A significant portion of SUBASE New London lies within the boundaries of the Town of Groton. (The SUBASE's main offices and housing were previously located in New London, thus the namesake.) SUBASE New London is Groton's largest employer.

Land Use Context

EXISTING LAND USES

As of 2017, approximately 84 percent of land within the Town (including all political subdivisions such as the City of Groton) is committed to development or open space, while the rest is vacant or agricultural. The largest land uses include residential (30 percent) and parks and open space (25 percent). Between 1998 and 2012, the largest growing land use categories was for transportation, residential, and industrial.

FAST FACTS

- **Population:** 39,986
- **Land Area:** 49.5 square miles
- **Population Density:** 808 people per square mile
- **Occupied Housing Units:** 16,260
- **Average Household Size:** 2.46
- **Rental Household Rate:** 51.7%
- **Employed Residents Over Age 16**: 23,956
- **Median Household Income:** $62,137
- **Bachelor's Degree or Higher Attainment:** 37.3%

Figure 2.35. *Town of Groton near the SUBASE (Google Earth)*

RELEVANT PLANS

- **Plan of Conservation and Development**. The Town's POCD was updated in October 2016.
- **Municipal Coastal Program (MCP).** The 2014 MCP addresses land use issues in the Town's coastal management area.

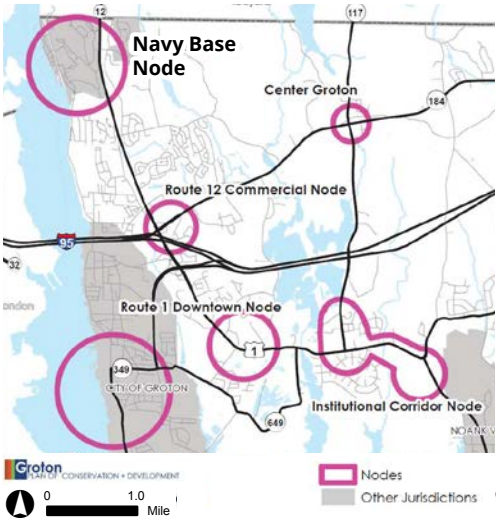

Figure 2.36. *SUBASE New London and adjacent properties are one of several "nodes" identified in the Town's 2016 POCD update (Town of Groton, 2015 POCD)*

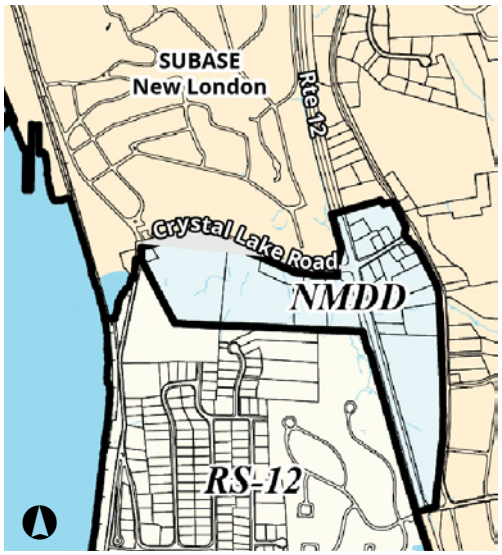

Figure 2.37. *Nautilus Memorial Design District (Town of Groton, 2015 POCD)*

JOBS/HOUSING BALANCE

Unlike many of its neighbors, the Town of Groton has more jobs than residents, and 20 percent of people who work in the Town also live there. Though that is a greater proportion than in New London or Waterford, the Town would like to continue attracting residents and workers. The Economic and Market Trends Analysis by Camoin Associates (referenced in the 2016 Town of Groton POCD) noted the Town lacks a "sense of place" which reduces its appeal as a place to live. Also concerned with its reliance on large employers, the Town is working to further diversify its economic base by supporting small and medium-size businesses. The Town is starting to address this by creating more pedestrian-friendly nodes of development.

LAND ADJACENT TO BASE

The area around SUBASE New London has been designated as a "node of development" in the Town's POCD since 2002 (see Figure 2.36). The designation means the area has its own policy objectives related to community character, land use, infrastructure, and the environment. The area is proposed for off-base and tourism uses to serve Navy personnel. Multifamily uses are to serve as a transition between the SUBASE and low-density residential areas.

Additionally, the Town of Groton has codified "design districts" in the zoning regulations to specifically encourage development of certain nodes and guide their terms of use, intensity, and design character. The 80-acre Nautilus Memorial Design District (NMDD) includes Navy and adjacent property along Route 12 and Crystal Lake Road (see Figure 2.37). The District has been in place since the early 1980s and is intended to preserve and enhance the entryway to the Nautilus Memorial and Submarine Force Library and Museum as major tourist destinations. Hotels, restaurants, financial services, daycare facilities, and other tourist commercial or residential service uses are targeted for this district. However, development in the NMDD has been minimal, and the POCD notes a need to reevaluate its purpose and requirements.

2016 ZONING AUDIT

The Town recently completed a zoning audit as part of a larger legislative policy initiative to increase revenues. In addition to maximizing economic development opportunities, the audit's findings emphasize updating the code with clear and concise language to increase predictability, integrate best practices and changing demographics, and provide consistency with the POCD.

Transportation

CRYSTAL LAKE ROAD PEDESTRIAN IMPROVEMENT

The Town's 2014 Capital Improvement Program includes a 10-foot multipurpose path running the length of Crystal Lake Road. This project, expected to be complete in June 2018, will connect Navy housing units south of the base with the Main Gate. See Figure 2.15 on page 21 for more information.

Thames Riverfront

WATER QUALITY

Though coastal water quality has improved in recent years thanks to upstream communities' investments in wastewater treatment, pollution remains a concern for the Town. The Thames River adjacent to the Town along with seven coastal areas are impaired for marine life and commercial shell fishing due to industrial and municipal discharges. The Town utilizes a Coastal Site Plan Review process to identify potential impacts to shoreline resources and maintains a Municipal Coastal Program (MCP), which addresses land uses in the coastal zone. The MCP acknowledges that local and state coastal programs are not applicable to federal property. However, it suggests that the Town offer stormwater planning services or expertise to Navy leadership to ensure future development at SUBASE New London protects river water quality.

WATERFRONT DEVELOPMENT CONFLICTS

The POCD notes the potential for conflicts between competing waterfront uses. Private residential development can reduce public access, drive out water-dependent industries, and degrade the coastal environment.

SEA LEVEL RISE

The POCD acknowledges that sea level rise will eventually cause low lying areas to be within 100-year and 500-year flood risk categories. The Groton-New London Airport and associated industrial park are among the Town's most vulnerable infrastructure; they are at risk of coastal flooding and sea level rise.

PUBLIC ACCESS

The Town is generally considered to have good public access with State and Town parks, road ends, easements, boat launches, and public docks. However, many residents perceive a lack of coastal access, especially for handicapped users. The POCD suggests continuing to add new public access points along the coastline.

Figure 2.38. *Aerial view of Crystal Lake Road (Google Earth)*

Figure 2.39. *Crystal Lake Road improvements under construction*

Figure 2.40. *Example of public access at docks in the Town of Groton*

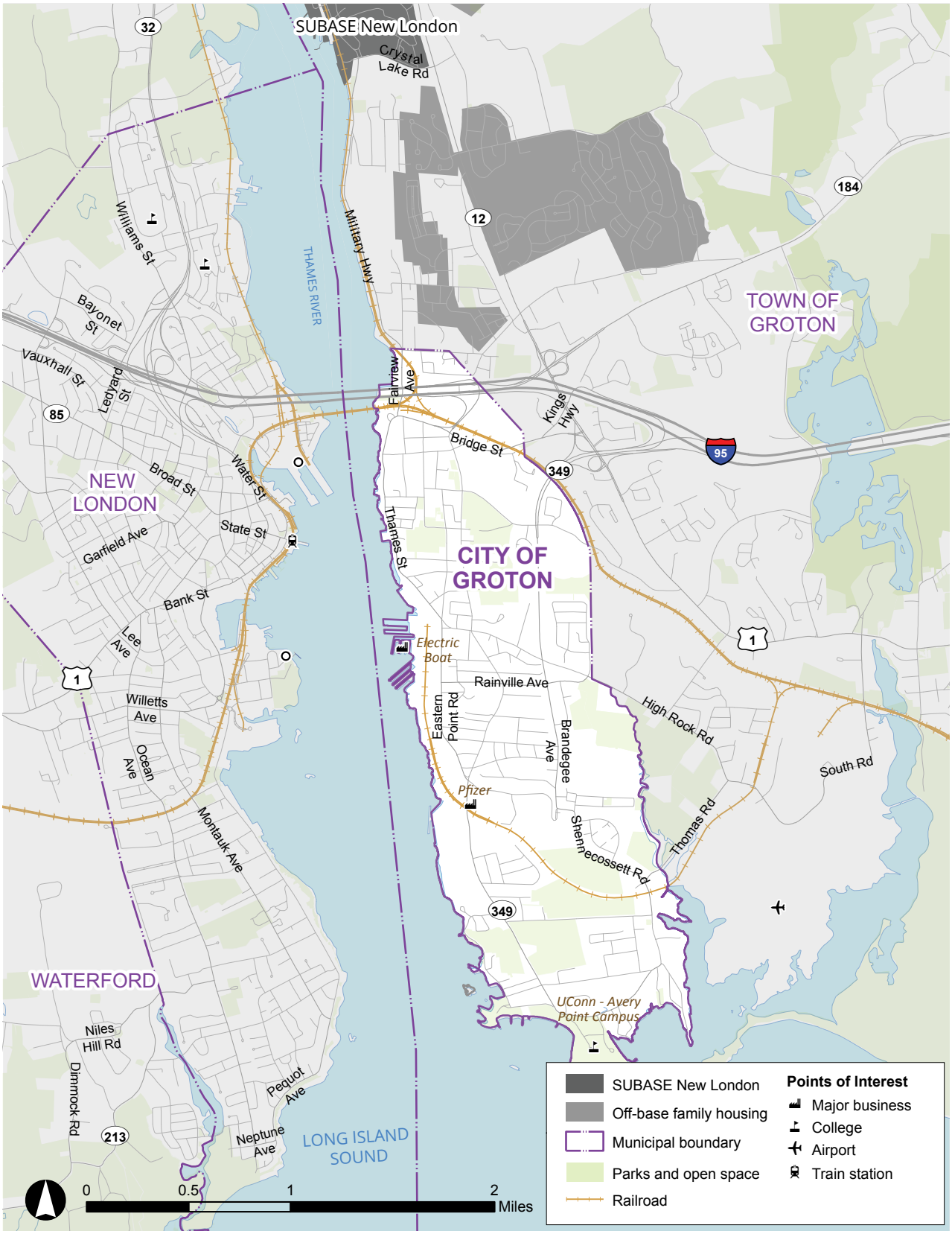

Figure 2.42. *City of Groton (SCCOG, ESRI, FHI, GrotonGIS datasets)*

CITY OF GROTON

The City of Groton, a political subdivision of the Town of Groton, is located on the eastern bank of the Thames River. While the Town of Groton was initially created in 1705, the City was designated as a separate borough in 1904 for the purpose of establishing a public utility company. The borough incorporated in 1964. The City provides public works, fire, police, and planning services within its own boundaries, while the Town provides education and social services.

After initial settlement, the area along the eastern bank of the Thames River developed a focus on shipbuilding. Due to the strategic importance of the Thames River, Fort Griswold was established on the Groton side of the river (opposite Fort Trumbull) to defend the area. Throughout the early to mid-20th century, the City saw significant economic growth due to its location, water access, and transportation system. This growth was tied to submarine production at the General Dynamics Electric Boat shipyard and operations at SUBASE New London during World War II and the Cold War. During this time, southeastern Connecticut had the most defense-dependent economy in the nation.

The City's population peaked during the 1960's at just over 10,000 people. Since that time, submarine production slowed, household sizes have decreased, and residential growth has dispersed throughout southeastern Connecticut. The population has declined to the current estimate of approximately 9,300 people, and growth is expected to be relatively modest in future years. The City is home to the Pfizer Corporation's largest pharmaceutical research facility and the University of Connecticut's Avery Point campus. The Navy continues to rely on the contracted services and facilities provided by the General Dynamics Electric Boat shipyard in the City.

FAST FACTS

- **Population:** 9,305
- **Land Area:** 3.1 square miles
- **Population Density:** 3,002 people per square mile
- **Occupied Housing Units:** 4,281
- **Average Household Size:** 2.17
- **Rental Household Rate:** 58.5%
- **Employed Residents Over Age 16**: 5,476
- **Median Household Income:** $52,244
- **Bachelor's Degree or Higher Attainment:** 28.2%

Figure 2.43. *Electric Boat company facilities are a dominant feature along the City of Groton's waterfront (Google Earth)*

RELEVANT PLANS

- **Plan of Conservation and Development.** The City's POCD was published in 2008. An update effort is anticipated in two years.
- **Harbor Management Plan.** City of Groton Harbor Management Commission developed this in 2006. It guides the management and use of the City's waters and waterfront.

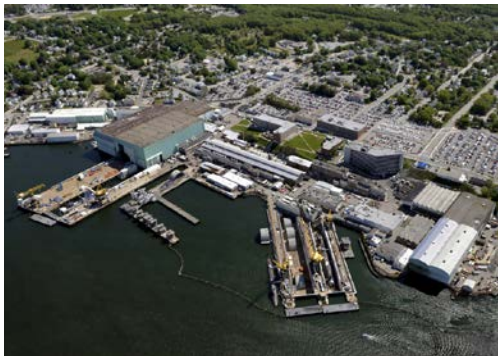

Figure 2.44. *Electric Boat shipyard - Groton campus (breakingdefense.com)*

Land Use Context

The City's POCD identifies the following land use characteristics, trends, and strategies:

- **Land availability.** Approximately 97 percent of land within the City is either developed or dedicated open space, meaning there is little vacant land available for future growth.
- **Walkable, complete communities.** There is a desire for more walkable and mixed-use development patterns. Notable opportunities are the historic Thames Street district and the auto-oriented Five Corners commercial area. However, redevelopment has been slow to occur in these areas.
- **Five Corners redevelopment.** Residents and employees have indicated a strong desire to develop a "city center" at Five Corners with more retail uses providing a variety of services. The area has redevelopment and infill potential due to the substantial amount of land used for Electric Boat employee parking. If these parking lots are replaced with structured parking, redevelopment should be encouraged to enhance the area for residents and Electric Boat employees.
- **Electric Boat growth.** Electric Boat has plans for major capital retooling to prepare to construct the Columbia-class submarines alongside Virginia-class submarine production. The capital improvements will be within the shipyard's existing footprint and are anticipated to exceed $500 million.
- **Housing.** The City has one of the most diverse and affordable housing stocks in the southeast Connecticut region. Even so, the City is actively working on housing issues, and its POCD promotes the following policies:
  - Enable greater diversity in the City's housing options,
  - Promote strategies to help address the housing needs of an aging population and for housing options that are more affordable, and
  - Allow mixed-use developments to provide opportunities for additional housing diversity.

Transportation

The POCD recognizes the challenges of maintaining access to the Electric Boat shipyard − State Route 349 is the primary roadway to and from the facility. During peak hours some traffic (including truck traffic) spills over to residential neighborhoods. The POCD says narrowing residential streets could help discourage through-traffic on residential streets and, in the long term, the City should work to limit access to Route 349 .

Parking for Electric Boat employees has long been a challenge for the City. Some nearby property owners rent out yard space to help accommodate the workers' parking.

Thames Riverfront

The City spans approximately 3.5 miles of Thames River shoreline between the SUBASE and Long Island Sound. Its plans identify the following goals and themes related to the river:

- **Sea level rise.** The waterfront is intensely developed for industrial and recreational uses, but some low-lying areas are threatened by sea level rise and some shoreline development is not water dependent. City policy calls for a gradual retreat of uses not reliant on water access and increasing public access to the shoreline (POCD).
- **Thames River water quality.** The City has concerns with water quality and experiences occasional closing of shellfish beds due to polluted runoff. The New London-Groton area is identified as a federal priority for non-point pollution management (POCD).
- **Working waterfront.** The Harbor Management Plan supports maintaining the working waterfront, secure areas around the Electric Boat Shipyard, and clear shipping lanes and access to waterside industrial facilities.

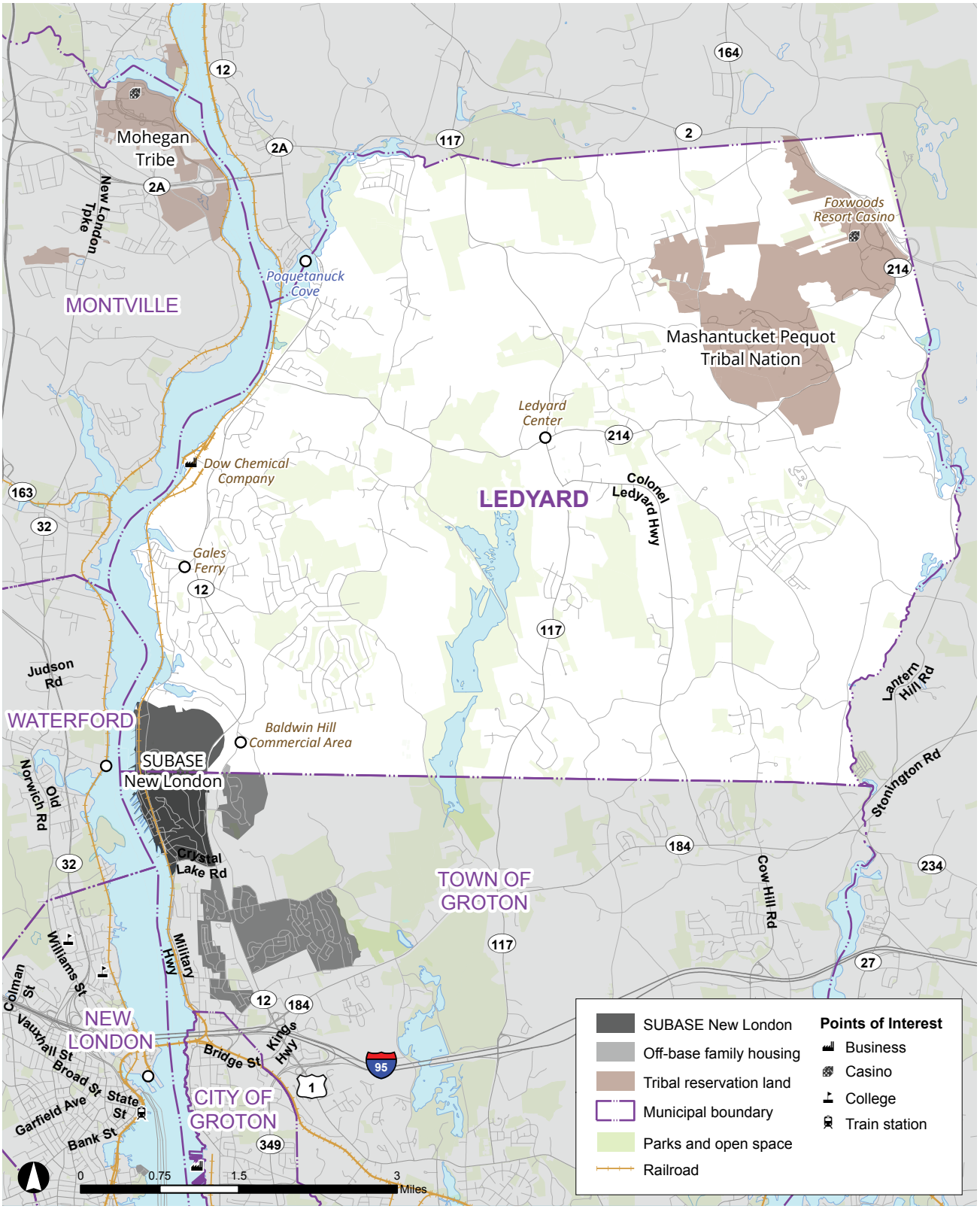

Figure 2.45. *Town of Ledyard (SCCOG, ESRI, FHI, Town of Ledyard Planning and Development Department datasets)*

TOWN OF LEDYARD

Ledyard is a bedroom community for the region. Its residents are generally interested in protecting the area's rural character and the value of their single family neighborhoods. During the 1950s and 1960s, Ledyard tripled its population, largely due to the increase in defense manufacturing jobs in Groton and New London. The population slightly declined in the 2000s and is projected to decline from approximately 15,000 currently to 14,400 by 2025, mostly due to larger family households transitioning to smaller retiree households.

Foxwoods Resort Casino is located on the Mashantucket Pequot Tribal Nation's land within Ledyard, about eight miles from SUBASE New London. Foxwoods employs nearly 8,000 people; the jobs are primarily in the service industry.

The northern portion of the SUBASE is located in Ledyard.

FAST FACTS

- **Population:** 15,057
- **Land Area:** 38.1 square miles
- **Population Density:** 395 people per square mile
- **Occupied Housing Units:** 5,704
- **Average Household Size:** 2.64
- **Rental Household Rate:** 18%
- **Employed Residents Over Age 16**: 8,735
- **Median Household Income:** $84,825
- **Bachelor's Degree or Higher Attainment:** 38.1%

Figure 2.46. *Town of Ledyard aerial photo, north of the SUBASE (Google Earth)*

RELEVANT PLANS

Plan of Conservation and Development. The Town's fifth and latest POCD was adopted in 2004 with amendments in 2005 and 2009.

Figure 2.47. *The Dow Trinseo industrial complex with SUBASE New London to the south in the background (Google Earth)*

Land Use Context

ENVISIONED GROWTH

Ledyard plans to generally retain its land use pattern with moderately higher intensity residential redevelopment envisioned at the Ledyard Center and Gales Ferry. Zoning in these areas supports walkable, mixed-use neighborhoods. Little growth is expected and limited areas allow multifamily development. In Gales Ferry, only a handful of sites may redevelop with condominiums. Some high end townhomes have been developed recently on Route 117. Hillcrest, a new senior housing development in Montville, has been performing well, so similar development may be expected in Ledyard.

Commercial redevelopment is expected at the Dow Trinseo industrial complex at Allyn's Point, currently used by American Styrenics. The property is 153 acres and accessible by barge, rail, I-95, and I-395. It is mostly vacant; Trinseo was located in the complex but closed in 2015 and Dow Chemical Company maintains minor operations on the site. Unless the site were developed as a major distribution point, its development is unlikely to generate large traffic volumes.

LAND ADJACENT TO SUBASE

Much of the land bordering the SUBASE has been deeded to Ledyard as open space. However, the underdeveloped Baldwin Hill Commercial Area and a 400-acre area, separated from the base by a small strip of preserved open space, could redevelop with housing and/or light industrial uses (see Figure 3.33 on page 93). Underdeveloped parcels on the northern SUBASE boundary zoned Medium Density Residential District Uses (R-40) could redevelop with approximately 20 units. Though zoning allows a greater intensity of land uses, the market does not currently support much redevelopment in this area.

Transportation

ROUTE 12

There is occasional congestion on Route 12. Traffic generators include:

- Electric Boat employees living in Norwich (Electric Boat is expected to grow),
- The Mohegan Sun casino, and
- The Mohegan Tribe's potential redevelopment of the former state hospital ("Norwich Hospital") site in Preston.

In 2016, Ledyard applied for (but did not receive) a $500,000 grant from the 2016 Main Street Investment Fund (MSIF) to improve Route 12's streetscape with pedestrian infrastructure and landscaping from Chapman Lane to Christy Hill/King's Highway.

There is an approximately 800 foot stretch of Route 12 near the SUBASE's north gate is encumbered by an ESQD weapons arc. Joint planning with the SUBASE regarding any future major traffic generators will be important. See "Explosive Safety Quantity Distance Arcs" on page 35 for more information.

TRANSIT

Ledyard has limited transit and its ridership on SEAT is the lowest in the region. The SEAT route (Run 2) is primarily on Route 12 and connects New London, Groton, Ledyard, and Norwich. See "Bus Service" on page 17 for more information.

Figure 2.48. *Transportation issues along Route 12 (Google Earth)*

Thames Riverfront

NATURAL RESOURCES

Shellfish beds have been recently reintroduced to the Thames River and the community is interested in additional waterfront open space opportunities. The Poquetanuck Cove, on the border of Preston and Ledyard, is viewed federally and locally as a pristine and important natural asset.

RECREATIONAL WATER ACCESS

Some recreational opportunities exist along the river but the railroad along the coast limits water access and opportunities for marina development.

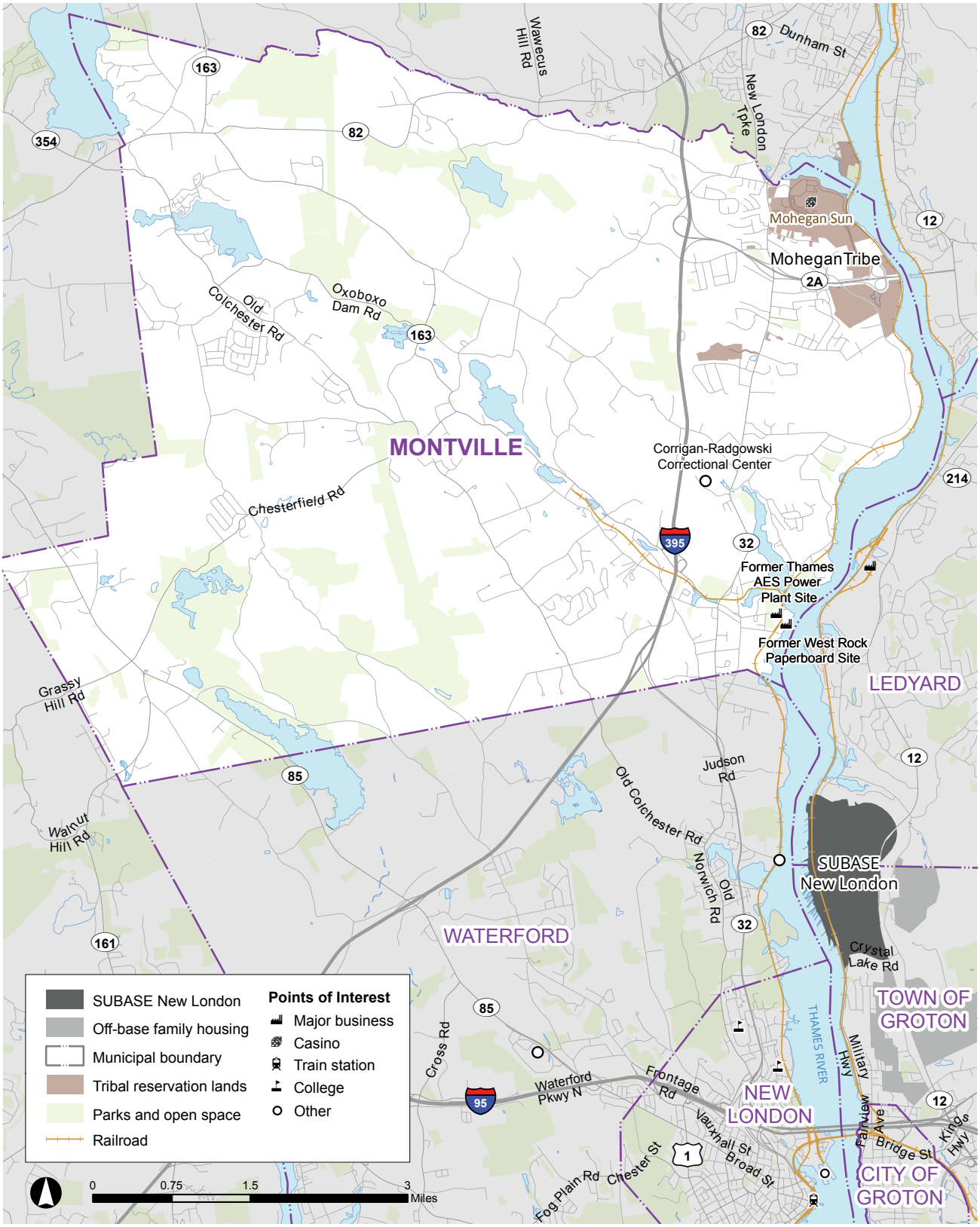

Figure 2.49. *Town of Montville (SCCOG, ESRI, Town of Montville Planning Department datasets)*

TOWN OF MONTVILLE

The Town of Montville is located north of the Town of Waterford and bordered to the east by the Thames River. Conflict between European settlers and Native Americans led to a tumultuous colonial period, and it wasn't until 1994 that three centuries of land claims were settled between the Town, the Mohegan Tribe, and State and federal governments.

Originally part of New London, Montville split off and became a separate incorporated town in 1786. Since post-WWII suburbanization peaked in the 1970s, population growth has been modest. More recent population numbers are skewed by a State correctional facility located in the Town.

Mohegan Sun, one of the largest casino resorts in the United States, is located on the Mohegan Reservation on the northern border of Montville, the southern boundary of Norwich, and the Thames River. It employs approximately 8,000 people and is one of the Town's largest employers.

FAST FACTS

- **Population:** 19,635
- **Land Area:** 42 square miles
- **Population Density:** 468 people per square mile
- **Occupied Housing Units:** 6,868
- **Average Household Size:** 2.86
- **Rental Household Rate:** 18%
- **Employed Residents Over Age 16**: 10,286
- **Median Household Income:** $70,036
- **Bachelor's Degree or Higher Attainment:** 21.2%

Figure 2.50. *Mohegan Sun casino (Mohegan Tribal Gaming Authority)*

Figure 2.51. *Trading Cove and Mohegan Sun (Google Earth)*

Figure 2.52. *Former AES Thames Power Plant and WestRock paperboard plant sites (Google Earth)*

Land Use Context

As of 2010, approximately 50 percent of Montville's land area is vacant. However, significant environmental constraints throughout the Town – namely wetlands and steep slopes – will limit future development. Most households are single family and over half of Montville's residences were built between 1940 and 1979.

Thames Riverfront

EXISTING IN-WATER TRAFFIC

The POCD notes that while the river has been dredged to a depth of 30 feet up to Norwich, freight and passenger ferry service has decreased significantly in recent decades. Most activity is focused at the State Pier in New London.

POTENTIAL TRAFFIC GENERATORS

Future boat access to Trading Cove (bordering Norwich, Mohegan Sun, and Montville) is under consideration. However, providing safe access to the Cove would entail: 1) extending deep water access from the main channel on the Thames to the Cove and 2) replacing the fixed span New England Central Railroad bridge (see Figure 2.51) with a movable structure. This project would be expensive and result in significant environmental impacts.

Montville's Future Land Use map designates the former site of the WestRock paperboard plant and AES Thames Power Plant as a Job Investment Area. This encourages infrastructure investment that could allow for commercial, light industrial, industrial, and mixed-use municipal uses. The property generated barge traffic in the past, and redevelopment may do so in the future.

RELEVANT PLANS

Plan of Conservation and Development.
The Town's POCD was updated in 2010.

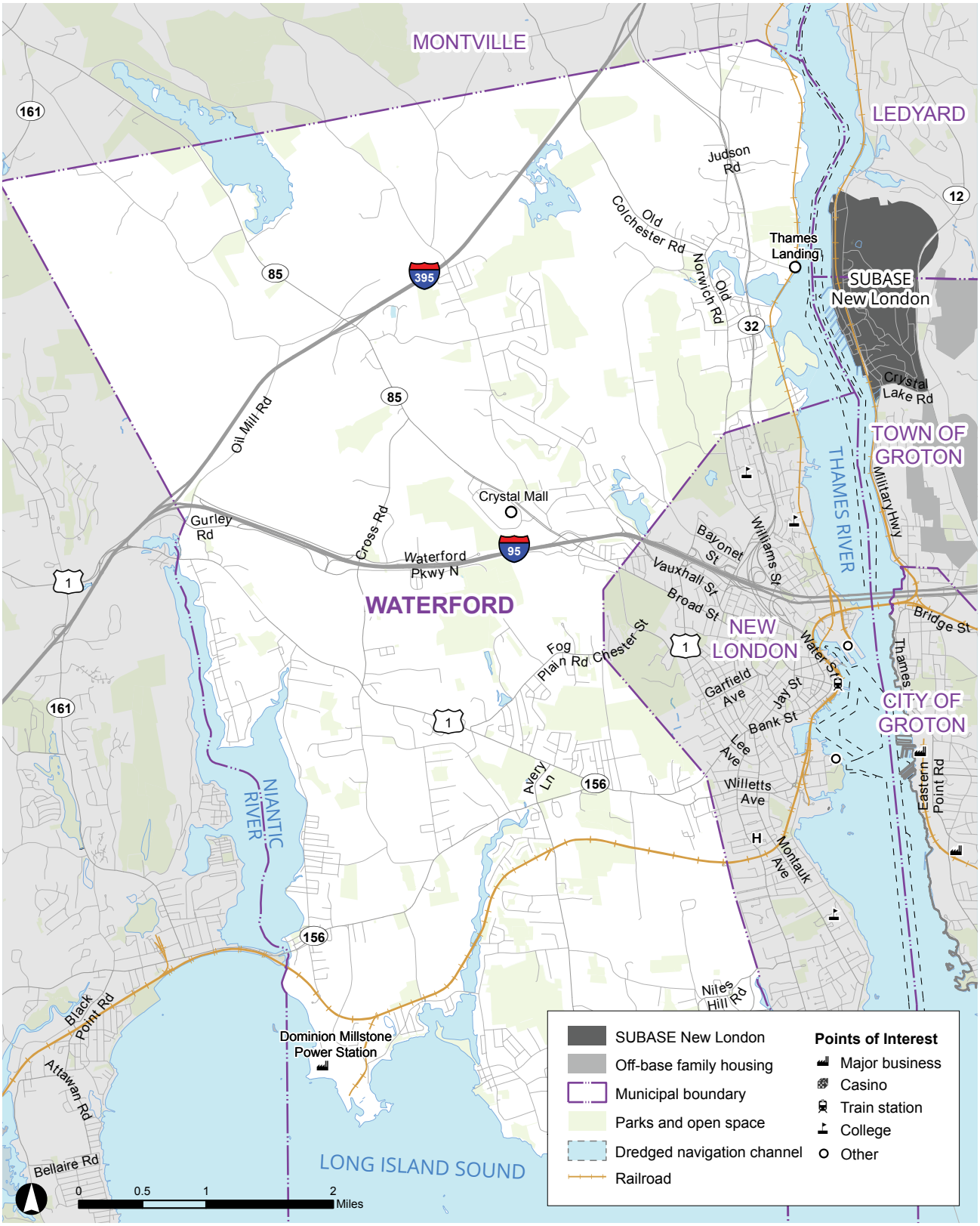

Figure 2.53. *Town of Waterford (SCCOG, ESRI, FHI, Town of Waterford Planning and Development Department GIS datasets)*

TOWN OF WATERFORD

Waterford is a suburban municipality bounded by water on three sides: the Niantic River to the west, the Thames River to the east, and Long Island Sound to the south. It is located just west of New London. Waterford disbanded from New London in 1801 and has since changed from a rural farming community into a suburban residential community. Current population is estimated to be approximately 19,500. Population is projected to decline through the year 2025 to approximately 19,200.

COMMERCIAL TAX BASE

In the 1960s and 1970s, three nuclear power plants were constructed at Millstone Point and were a major source of property tax revenue for Waterford. These plants enabled Waterford to significantly improve the community while maintaining relatively low taxes. In the late 1990s, deregulation of the electric industry resulted in sale of the plants and operational change, which substantially decreased the municipal tax base. That said, Waterford still has a larger commercial tax base than the region's other suburbs, due to the continued presence of Millstone Power Station and regional retail centers such as the Crystal Mall. Waterford's non-residential taxable property is also the highest valued in the region, ahead of Groton, New London, and Norwich.

EMPLOYMENT

Like many surrounding communities, Waterford and the General Dynamics Electric Boat Shipyard grew substantially with the increased SUBASE activity from the Submarine Base during World War II and the Cold War. Since that time, economic activity related to defense has slowed and transitioned to an entertainment-related economy led by the two Tribes' casinos. Waterford is home to a number of business that have some synergy with SUBASE New London, such as Sonalysts, a defense contractor that has branched out into media production, and the Millstone Power Station, a power plant that employs Navy veterans.

FAST FACTS

- **Population:** 19,427
- **Land Area:** 33.2 square miles
- **Population Density:** 585 people per square mile
- **Occupied Housing Units:** 7,839
- **Average Household Size:** 2.48
- **Rental Household Rate:** 15.1%
- **Employed Residents Over Age 16**: 10,410
- **Median Household Income:** $75,956
- **Bachelor's Degree or Higher Attainment:** 35.1%

RELEVANT PLANS

Plan of Conservation and Development. The Town's latest POCD was published in 2012.

Land Use Context

ENVISIONED GROWTH

The 2012 POCD identifies several defining elements of Waterford's community structure:

- The Civic Triangle area, which acts as a community focal point,
- The areas of concentrated development in Quaker Hill, Mago Point, Pleasure Beach, Ridgewood Park, Jordan Village, Oswegatchie, and Cohanzie,
- Greenspaces (open space or low-intensity areas), and
- Major business areas such as Crystal Mall, Business Triangle, Millstone Point, and Route 1 at Clark Lane.

Approximately 59 percent of the Town's land area is considered developable in the future. Developable land in the Quaker Hill area with views of the SUBASE is of particular importance to the JLUS. Approximately 78 percent of areas in Waterford are zoned for residential uses.

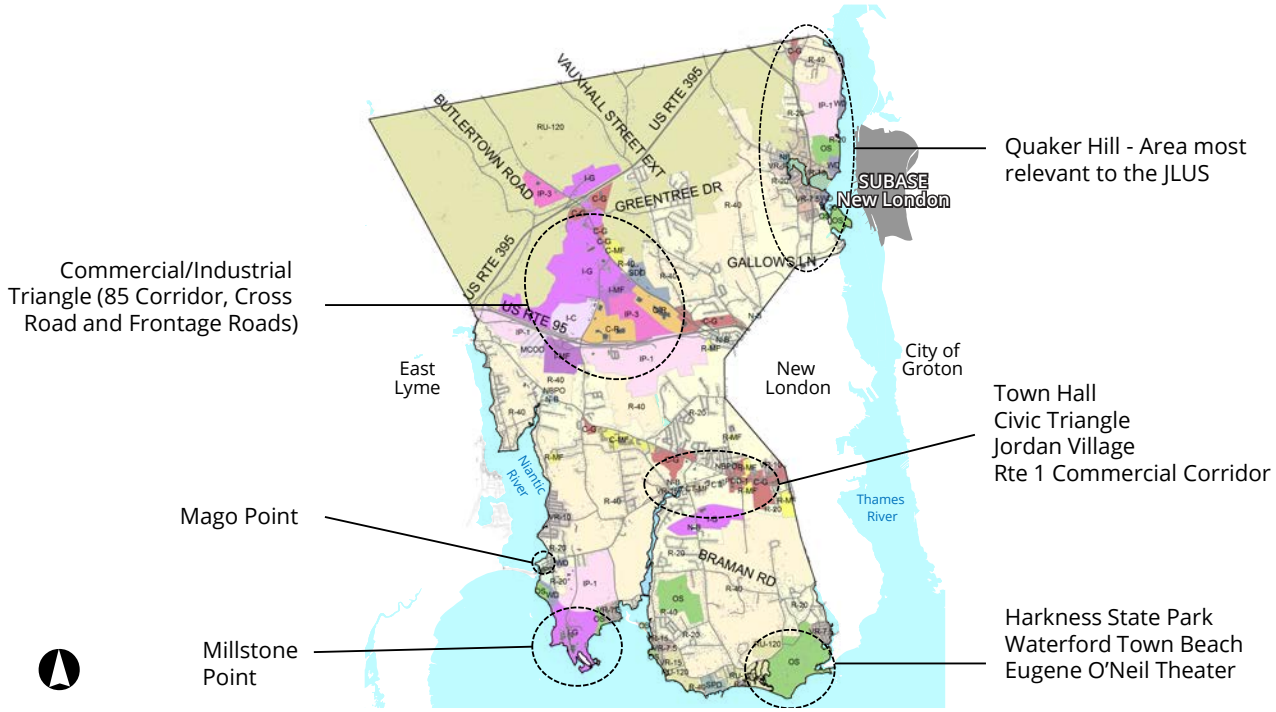

Figure 2.54. *Town of Waterford community structure and zoning (Town of Waterford Planning and Development Department)*

HOUSING

The POCD recognizes the need to add diversity to available housing, particularly to serve the needs of an aging town population. Most of the growth is expected to be in the Town Center area, with some anticipated along Route 85, Route 32, and US 1.

LAND FACING THE SUBASE

Quaker Hill. Quaker Hill is a village intended for concentrated, mixed-use development across the river from the SUBASE surrounding Smith Cove. It is zoned Village Residential and Neighborhood Business. Large residential lots could be subdivided to accommodate additional residences. Significant growth is not expected.

Thames Landing. The Thames Landing is a residential condominium development in the Waterfront Development zone northeast of Smith Cove. Sixty-six of the 110 permitted units have been constructed. An associated adjacent marina is under separate ownership.

Waterfront Development (WD) zones. The narrow strip of WD-zoned land east of the rail line is held by a few property owners. Rail crossings would likely be needed for the land to develop. The WD zone south of Thames Landing is vacant and buildable. Multifamily housing with a building height limit of 35-40 feet is allowed through a special permit that addresses impacts such as traffic.

General Industrial (IP-1) zone. The Mashantucket Pequot Tribal Nation owns a large parcel of IP-1 zoned land. The property is accessible by water, rail, and road (pending construction of an access road to Route 32). Previously owned by Electric Boat, there are dredge materials and old dry docks on site that would require remediation to be redeveloped. IP-1 zoning allows for a range of industrial uses. Portions of the site are not buildable due to steep slopes and flood zones.

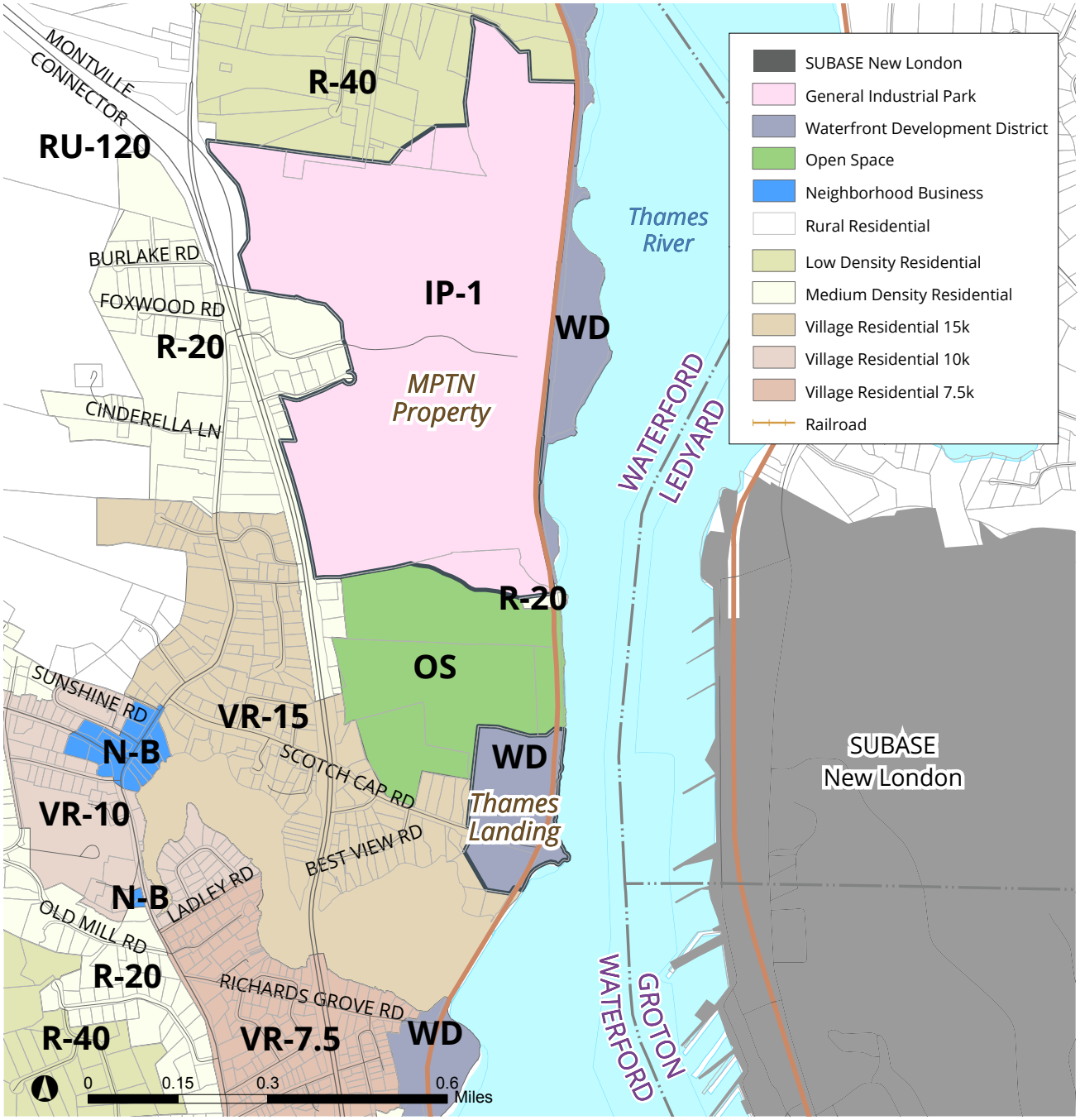

Figure 2.55. *Zoning across river from SUBASE (Town of Waterford Planning and Development Department)*

CLIMATE CHANGE

Waterford is actively working on addressing climate change and was recently awarded $175,000 from the Community Development Block Grant – Disaster Recovery (CDBG-DR) fund to complete a Climate Change Vulnerability, Risk Assessment, and Adaptation study. This will help the Town assess the potential climate change impacts of sea level rise, storm surge, and heavy rainfalls on public infrastructure and natural resources. The study will also evaluate regulations, policies, and planning tools and provide recommendations to increase resiliency and prioritize capital projects. Results of the study may impact the locations and intensity of future development.

Thames Riverfront

The marina docks mentioned under "Thames Landing" on page 55 are located across the Thames River from the SUBASE. The marina is separated from the condos by a railroad, has never been used due to the lack of a public railroad crossing, and is falling into disrepair. A modification to the existing permits would be required to change the proposed marina use. With recent plans for the construction of the larger Virginia-class Block V submarines, the docks' location conflicts with dredging required to facilitate the larger submarine turning movements.

Figure 2.56. *Thames Landing Marina across the river from the SUBASE (Google Earth)*

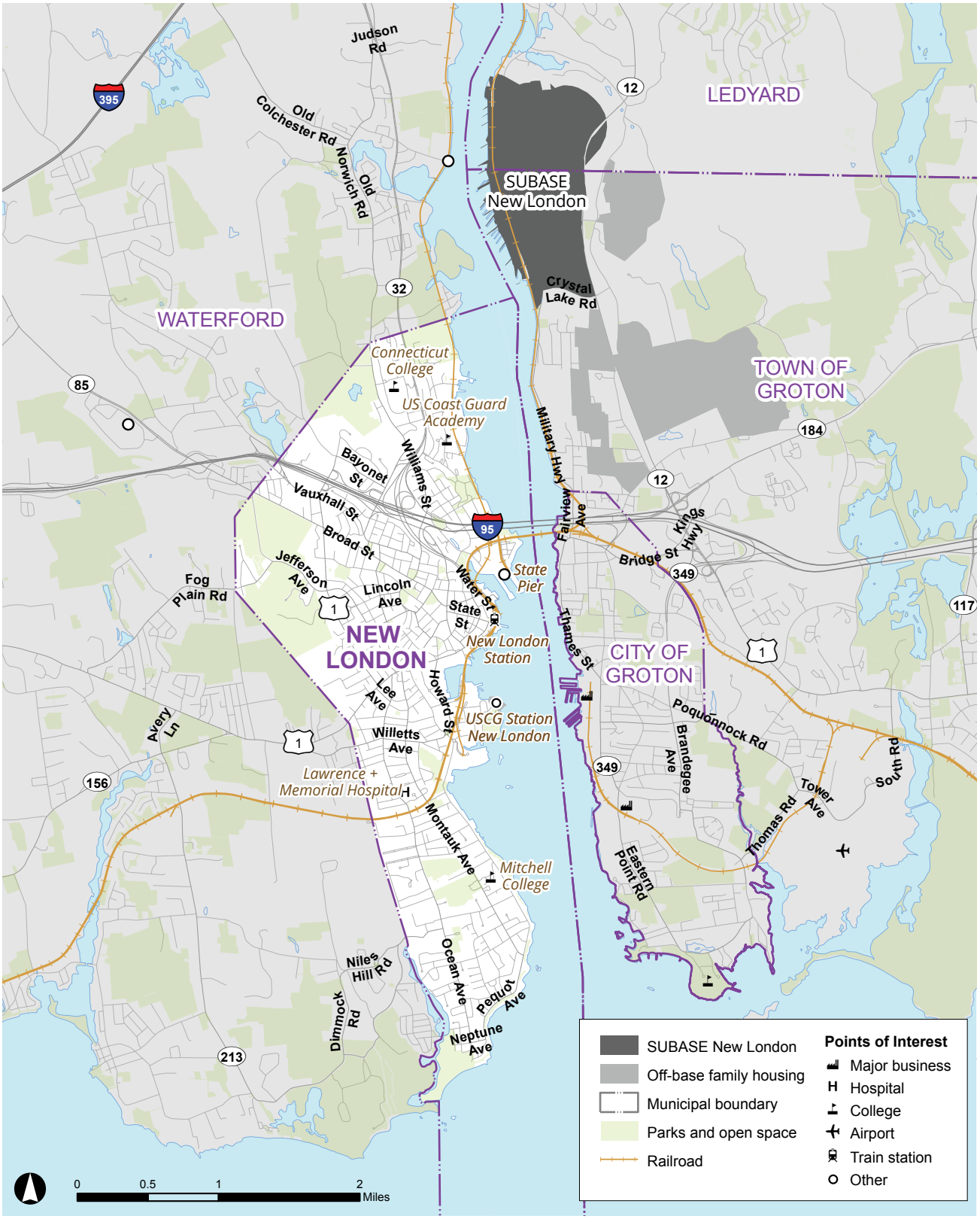

Figure 2.57. *City of New London (SCCOG, ESRI, New London Office of Planning and Development datasets)*

CITY OF NEW LONDON

The City of New London is a municipality located on the western bank of the Thames River. Founded in 1646, New London originally encompassed a larger land area and included today's Towns of Stonington, Groton, Ledyard, Montville, Salem, Waterford, East Lyme, and Fishers Island. Over time, these areas established themselves as separate municipalities. New London was formally incorporated as a City in 1784 and runs as a strong mayor-council form of government. New London is a one of the smallest cities in Connecticut at 5.54 square miles.

New London's population peaked at over 34,000 residents in the 1960s with a slow decline until the 2000s. Recent years have seen an uptick and the current population is estimated to be approximately 27,000. The population of New London is projected to decline through the year 2025 to approximately 21,800.

In the early 19th century, New London was one of the world's three busiest whaling ports. Similar to other nearby cities, New London's economy was tied to the strong maritime history and its prime location on the Thames River and Long Island Sound. By 1909, the whaling industry had left. New London has undergone periods of growth in shipbuilding, maritime trade, manufacturing, and most recently in retail and service center development.

Like other surrounding communities, New London's economy has relied on submarine production at General Dynamics Electric Boat shipyard and operations at SUBASE New London. While defense-related production has declined in recent times, some maritime businesses and institutions persist as major employers for New London, including Cross Sound Ferry and the U.S. Coast Guard Academy. New London is actively diversifying the local economy. The trade, financial, and service sectors have seen an increase in local employment.

FAST FACTS

- **Population:** 27,423
- **Land Area:** 5.54 square miles
- **Population Density:** 4,950 people per square mile
- **Occupied Housing Units:** 10,770
- **Average Household Size:** 2.55
- **Rental Household Rate:** 64.8%
- **Employed Residents Over Age 16**: 15,241
- **Median Household Income:** $36,250
- **Bachelor's Degree or Higher Attainment:** 22.1%

RELEVANT PLANS

- **Plan of Conservation and Development.** The City's last POCD was published in 2007. New London is currently developing an updated POCD with expected adoption by October 2017. The draft POCD follows four fundamental planning principles—Grow Strategically, Promote Livability, Leverage Assets, and Implement Plans.

  The latest POCD update is not yet published, but will emphasize New London's interest in economic development and targeting revitalization in appropriate places to position the City for future economic growth.

- **Harbor Management Plan.** The City of New London Port Authority, the Office of Development and Planning, and the RCDA are beginning to create a Harbor Management Plan. The Port Authority released a Request for Qualifications and Proposals in February 2017 to develop the plan.

Land Use Context

Downtown New London is the largest area with compact and walkable development in the region. Approximately 95 percent of land within the City is either developed or dedicated open space, leaving about 475 acres of vacant or undeveloped land available for future growth.

Local large institutions include the United States Coast Guard Academy, Connecticut College, Mitchell College, Lawrence and Memorial Hospital, and Coast Guard Station New London. Their presence has provided economic and cultural benefits to the City; however, these properties are tax-exempt and occupy over 2,000 acres, nearly 54 percent of the City's total land. This has hampered the City's ability to generate sufficient revenue to support essential public services.

HOUSING

The 2007 POCD recognizes that despite its small land area, New London has a wide diversity of housing opportunities for its residents, with some of the more affordable housing in the state. Despite that, research by the Partnership for Strong Communities shows that housing in the City is expensive relative to median household income, with 48 percent of renters and 38 percent of homeowners spending 30 percent or more of their income on housing. Additionally, renters comprise a much higher proportion of occupied housing units (57 percent) than in the rest of New London County (29 percent). Multifamily housing makes up a substantial part of the housing stock, at 61 percent of units. Downtown has an Incentive Housing Overlay Zone to encourage affordable housing. A number of recently built or approved projects (Harbour Towers, City Flats, Mansfield Road apartments, and Parcel J at Shaw's Cove Office Park) will add over 200 units of housing in the area.

FORT TRUMBULL

The historic fort site hosted the Naval Undersea Warfare Center's Navy Underwater Sound Laboratory until 1996, when it merged with a similar facility in Rhode Island. The large site has been a State park since 2000. An Electric Boat office complex with 4,000 employees, the growing Lawrence + Memorial Hospital with 2,500 employees, and other industrial uses are near the park. The City is interested in redevelopment; the non-profit Renaissance City Development Association (RCDA) developed the Fort Trumbull Municipal Development Plan (MDP) in 2000, and the Yale Urban Design Workshop developed the Fort Trumbull Vision in 2011. The seasonal water taxi stops at Fort Trumbull.

Figure 2.58. *Aerial view of Fort Trumbull (CT DEEP)*

Transportation

Downtown New London serves as an important multi-modal transportation hub for the region, offering rail, ferry, water taxi, deep water port, and bus service.

Thames Riverfront

Waterfront development. The waterfront in New London has played an important role in its history. The City of New London and its residents are interested in making better use of their waterfront and improving public access in and around the harbor, marinas, ferry terminal, water taxi docks, and City Pier.

Navigation channels. The POCD supports maintaining existing navigation channels in the Thames River for submarine passage and other local maritime activities, in particular the Port of New London's efforts to expand activities at the State Pier. With excellent access to I-95, I-395, and the New England Central Railroad (NECR) line linking it to the rest of the state, region, Canada and beyond, State Pier is positioned to support increased port activity.

Figure 2.59. *Views of New London waterfront (CT DEEP)*

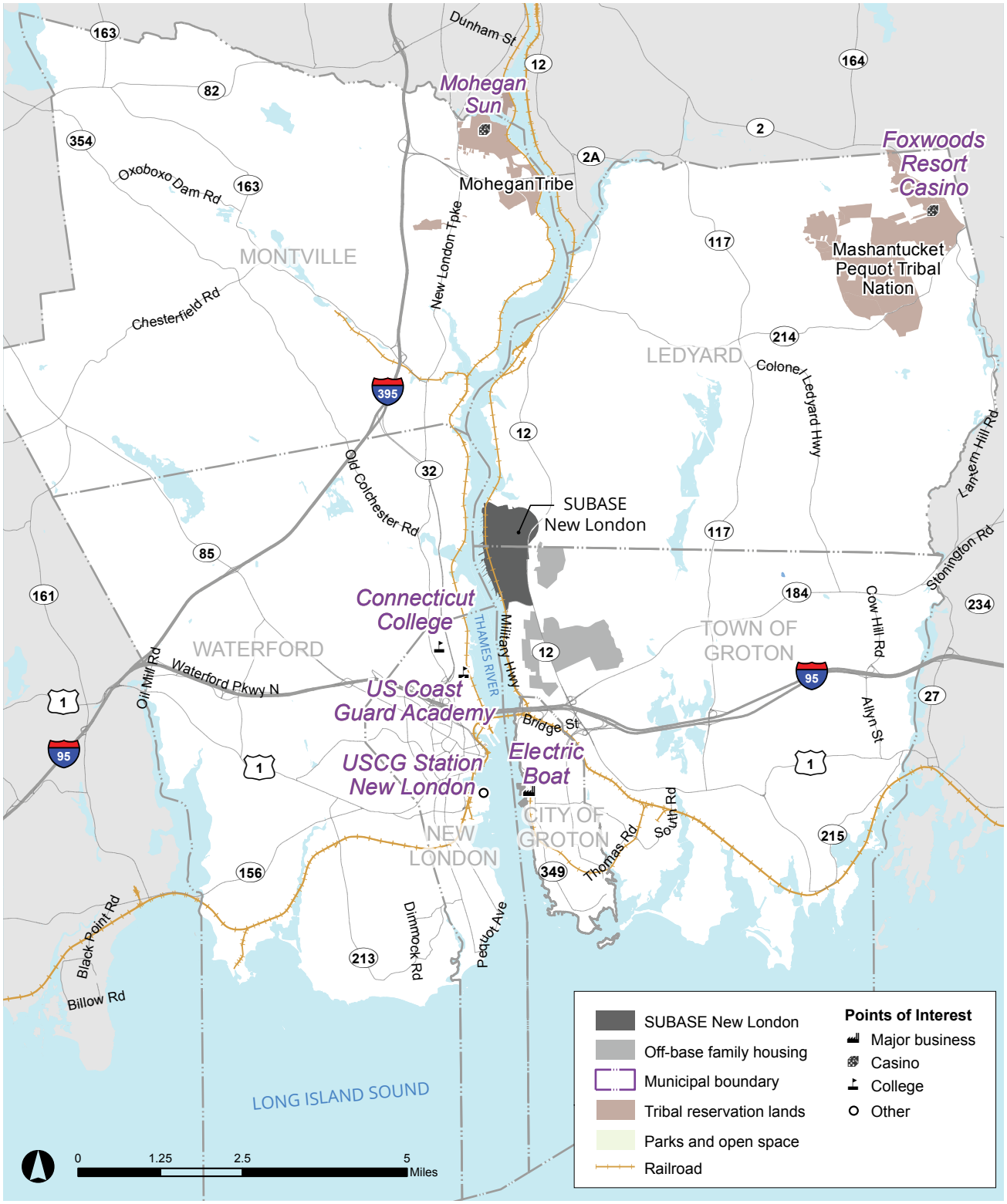

Figure 2.60. *Other JLUS stakeholders (SCCOG, ESRI, FHI, JLUS municipality GIS datasets)*

OTHER STAKEHOLDERS

Mashantucket Pequot Tribal Nation

The Mashantucket Pequot Tribal Nation is a Native American tribe, descended from the Pequot people. Approximately 1,000 enrolled members make up the Tribe, which was federally recognized in 1983. Their 1,350-acre reservation was established in 1666 and is one of North America's oldest. It is located in the northeast corner of Ledyard and held in trust by the Bureau of Indian Affairs. Additionally, the Mashantucket Pequot Tribal Nation has approximately 288 acres of off-reservation trust land.

Figure 2.61. *Mashantucket Pequot Museum and Research Center (*pequotmuseum.org)

The Mashantucket Pequot Tribal Nation opened Foxwoods Resort Casino in 1986 with major additions in 1992. It is one of the largest casinos in the world as measured by the amount of gambling space and number of slot machines. As one of the State's highest tax payers and largest employers, it positively impacts the regional economy by contributing more than $4 billion through the tribal gaming revenue-sharing agreement enacted in 1993. Under this agreement, the Tribes (both the Mashantucket Pequot Tribal Nation and the Mohegan Tribe) contribute 25 percent of slots revenue to the State, in return for the exclusive rights to operate casinos in Connecticut. The Casino's revenues have funded investment in their community, including the Mashantucket Pequot Museum and Research Center, the largest and most comprehensive Native American museum in the country.

Figure 2.62. *Foxwoods Resort Casino (Foxwoods.com)*

Mohegan Tribe

The Mohegan Tribe is a Native American tribe whose sovereignty has been formally documented for over 350 years in the Treaty of Hartford, although federal recognition did not happen until 1994. That same year, the Mohegan Nation (Connecticut) Land Claim Settlement Act was passed. In this, the Mohegan Tribe extinguished its claims to land based upon aboriginal title in Connecticut. In exchange, the State approved Mohegan gaming operations and transferred 800 acres in trust to establish the Mohegan Reservation on the Thames River near Uncasville. Approximately 1,920 members are enrolled in the Mohegan Tribe.

Figure 2.63. *Mohegan Sun casino (Mohegan Tribal Gaming Authority)*

The Mohegan Sun casino was opened in 1996 and is one of the state's largest employers. Similar to the Mashantucket Pequot Tribal Nation, the Mohegan Tribe has a revenue-sharing system with the State where 25 percent of slots revenues go to the Mohegan-Pequot Fund. This pays for vital State and municipal services. In addition, the Mohegan Tribe pays $500,000 each year to the Town of Montville in lieu of taxes.

In 2003, the Mohegan Tribe worked with neighboring municipalities to develop a water sharing plan, the Thames Basin Regional Water Interconnection Project. It involved Groton, Ledyard, Montville, Norwich, Preston, Waterford, the Mohegan Tribe, and multiple water utilities. The project extends water services to those lacking in water resources, providing water quality and pressure for household, commercial, and industrial uses. This effort is critical to future development in the region.

Figure 2.64. *Submarine at Electric Boat (General Dynamics Electric Boat)*

Electric Boat

Headquartered in Groton, General Dynamics Electric Boat (Electric Boat or EB) has been the main producer of submarines for the U.S. Navy for over 100 years. Electric Boat is one of the largest employers in the state, with 11,300 employees (with close to 8,000 in Groton). Alongside the SUBASE, Electric Boat is a primary economic force in the region. The company's local facilities and activities include:

- Approximately 2,800 employees at the Groton shipyard, directly working in manufacturing,
- Nearly 3,200 people at their design and engineering facility in New London,
- Operation of the Nuclear Regional Maintenance Department and the floating dry dock shipping port at the SUBASE, and
- Support of the SUBASE's waterfront repair.

As a result of several recently awarded contracts, Electric Boat plans to significantly increase production for the following projects:

- Ten Virginia-class submarines over 10 years for $17.6 billion (approved in 2014) and
- Twelve Columbia-class submarines (proposed).

To accomplish this, Electric Boat plans to invest $500 million in major capital improvements within its existing footprint and hire 1,300 employees in 2017. Employment at Electric Boat is anticipated to reach 18,000 people by 2030. The increase as well as a growing birth rate among Electric Boat employees will drive demand for housing, childcare, and schools in the region.

Connecticut College

Established in 1911, Connecticut College is a liberal arts college located on the northern end of New London. Primarily a residential four-year undergraduate institution, Connecticut College's 2016 undergraduate enrollment was 1,865 students. The College is New London's third largest employer, with 875 employees. Through the Payment in Lieu of Taxes (PILOT) program, the State exempts Connecticut College as a private, non-profit, higher education institution from property taxes in support of educational services as a public benefit. The State reimburses the City of New London a portion of the taxes (e.g., $2.2 million in 2013) that the College would have paid if it were a for-profit business.

Figure 2.65. *Connecticut College campus (conncoll.edu)*

U.S. Coast Guard Academy

The U.S. Coast Guard Academy (USCGA), founded in 1876, is located in New London on the Thames River. The campus occupies 103 acres along the shoreline. The Academy is highly selective and charges no tuition, although it requires a five-year active duty service commitment upon graduation. As of 2015, 912 cadets were enrolled. All students are housed on campus.

Figure 2.66. *Satterlee Hall, USCGA (uscga.edu)*

U.S. Coast Guard Station New London

Located next to historic Fort Trumbull, the United States Coast Guard (USCG) Station New London has gone through a number of tenant and occupancy changes although the land itself has been a military use since 1798. The USCG has been sited in its current configuration since 1997, with the closure of the Naval Undersea Warfare Center New London.

The USCG Station's personnel consists of one officer, 45 active duty enlisted personnel, 13 reservists, 10 auxiliarists, and 240 volunteer auxiliarists. Missions include: Search and Rescue, Recreational Boating Safety, Maritime Law Enforcement, Military Readiness, Pollution Response, and Port Security, which includes enforcement of two permanent security zones protecting military assets along the Thames River. USCG Station New London also maintains the communication guard, provides logistical support to vessels, and hosts the USCG Cutter CHINOOK.

Figure 2.67. *USCG Station New London (USCG)*

OMA MISSION

The OMA directly reports to the Governor and is in the Department of Economic and Community Development. OMA's mission is to:

- Coordinate efforts to prevent the closure or downsizing of the Naval Submarine Base in Groton,
- Support Connecticut's military families and enhance their quality of life,
- Advocate for Connecticut's defense industry, a major component of the state's economy and an engine of innovation and quality production for our Armed Forces,
- Encourage retention of established defense missions and the relocation of new ones to the state; and
- Serve as liaison to the Connecticut congressional delegation on defense and military issues.

Connecticut Office of Military Affairs

The State of Connecticut created the Connecticut Office of Military Affairs (OMA) in 2009 to proactively support the military presence in Connecticut. This was in response to the third BRAC round that had considered SUBASE New London closure. See the timeline graphic on page 32 for information about the 1993 and 2005 BRAC rounds. Local municipalities, seCTer, SCCOG, and the State joined together to combat these proposals.

The OMA pioneered State support of the military by authorizing a $40 million bond to invest in infrastructure and enhance military value in Connecticut. The OMA identifies projects with the Navy and invests $2 to $3 million every two or three years in the SUBASE. This money is an investment in preserving an estimated $5.7 to $7 billion of State economic activity.

MAJOR INITIATIVES

The OMA has strategically invested in projects such as: training facilities, boiler replacement (replaced 1960s with 2000s technology), dive lockers, galleys, land purchases for encroachment mitigation, and railroad advanced security design. OMA funded projects must have military value and be aligned with State goals. Current initiatives include:

- **Microgrid**. The State contributed $1.2 million for advanced design of fuel cells with renewable clean energy and natural gas to enhance energy security. The source provides eight megawatts of power with a peak output of approximately 18 megawatts. This project installed microgrids on base serving the SUBASE and off base serving the community.
- **Railroad advanced security**. The OMA is supporting an encroachment mitigation project that addresses security concerns related to the railroad passing through the SUBASE. The project includes design for an intrusion detection system that would alleviate the monitoring requirement.

Connecticut Port Authority

The Connecticut Port Authority was created in 2014 to bring together the State's three deepwater ports (New London, New Haven, and Bridgeport) under a single statewide port authority. These deepwater ports are where the bulk of Connecticut's commercial maritime industry operates. The Ports play an important economic role in terms of jobs, economic activity, and tax revenue.

The aim of the Port Authority is to coordinate the development and promotion of the benefits of the State's Ports and maritime economy in a unified manner. The Connecticut Port Authority represents a major commitment by the state to invest in port infrastructure to create jobs and attract private investment. As a quasi-public authority, the Port Authority has the power to issue bonds and is financially autonomous from the state. It is governed by a 15-member board of directors and includes State officials, community leaders, Port Authority professionals, and individuals with knowledge related to trade, marine transportation, and finance.

The Port Authority is also involved in finding and securing State and federal funds for dredging, improving infrastructure, and maintaining the navigability of ports and harbors. This is something of mutual interest to SUBASE New London, which requires clear navigation channels to continue its military mission.

Connecticut Department of Energy and Environmental Protection (CT DEEP)

The Connecticut Department of Energy and Environmental Protection was created in 2011 with the consolidation of the Department of Environmental Protection, the Department of Public Utility Control, and energy policy staff from other areas of state government. The department is charged with conserving, improving, and protecting Connecticut's natural resources and environment as well as making cheaper, cleaner and more reliable energy available for the people and businesses of the state. In addition, they play a role in rebuilding Connecticut's economy and creating jobs.

CT DEEP is involved in boating-related activities, as well as the issuance of permits for regulated coastal activities including development and dredging.

Figure 2.68. *CT Port Authority logo (CT Port Authority)*

CONNECTICUT PORT AUTHORITY DUTIES

- Coordinate port development, focusing on private and public investments,
- Pursue state and federal funds for dredging and other infrastructure improvements and maintain navigability of all ports and harbors,
- Work with the Department of Economic and Community Development and state, local, and private entities to maximize the ports' and harbors' economic potential,
- Support and enhance the overall development of maritime commerce and industries, and
- Coordinate the state's maritime policy and serve as the governor's principal maritime policy advisor.

Source: http://www.portsct.com/portsct/cwp/view.asp?a=4856&q=579014

Figure 2.69. *CT DEEP logo (CT DEEP)*

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CHAPTER 3
Compatibility Analysis

SUBASE
New London
JLUS

TRANSPORTATION, p. 71

- Congestion around the SUBASE
- Lack of transit serving the SUBASE
- No turnaround area near the SUBASE
- Poor biking & walking conditions to/from the SUBASE
- Significant travel demand
- ESQD arcs along Route 12
- Parking for Electric Boat employees
- Truck traffic around Electric Boat

- Transit improvements
- Congestion relief
- Bicycle & pedestrian improvements
- Development regulations updates

THAMES RIVER, p. 82

- Submarine turning & in-water structures
- In-water traffic & base security
- Dredged materials disposal
- Environmental protection
- Climate change

- Planning
- Boater & community education
- Coordination & monitoring

LAND USE & DEVELOPMENT, p. 88

- Crystal Lake Road development
- Development with views into the SUBASE
- Operational impacts
- Housing
- Community livability & economic development

- Compatible development
- Housing
- Community livability & economic development

COORDINATION & COST SHARING, p. 99

- Integrated community
- Cost sharing

- Enhanced coordination & integration
- Cost sharing agreements

ISSUES **RELATED STRATEGIES**

INTRODUCTION

This section summarizes JLUS issues and areas of shared interest identified by the Policy and Technical Committees, project stakeholders, and public workshop and survey participants. Issues are grouped into four categories: Transportation, Thames River, Land Use and Development, and Coordination and Cost Sharing. Strategies respond to these issues, often address multiple issues simultaneously, and are categorized as indicated on the previous page.

TRANSPORTATION

ISSUES

Congestion around the SUBASE. Vehicle traffic on Crystal Lake Road–the main entryway to SUBASE New London–regularly backs up to Route 12 and along Route 12 as far south as the Gungywamp Road intersection. This queuing occurs in the morning peak hours when workers and commercial trucks are entering the SUBASE's Main Gate. The queue lengths are especially long when there are special events, gate closures, or security threats which require vehicles entering the SUBASE to be more closely screened. The principal contributor to the queuing is the time required to examine and search each vehicle entering the SUBASE.

Impacted stakeholders: SUBASE, Town and City of Groton, Ledyard, area motorists

Figure 3.1. *Transportation conditions at SUBASE (Google Earth)*

Figure 3.2. *Poor biking and walking conditions on Crystal Lake Road next to the SUBASE*

Lack of transit service serving the SUBASE. There is a lack of frequent public transportation options to and around the SUBASE, which increases use of private vehicles. This puts additional stress on the limited amount of parking available for workers at the SUBASE and in the surrounding Town of Groton, an issue especially acute on the SUBASE's waterfront during operations and refits.

The Southeast Area Transit (SEAT) bus route that runs near the SUBASE (Run 2-Norwich/Groton/New London) has average headways of approximately two hours. The long headways on this route make using the bus service inconvenient for SUBASE workers and personnel, leading to low ridership.

Impacted stakeholders: SUBASE, Town of Groton, transit-dependent persons traveling to/from SUBASE

No turnaround area near the SUBASE. There is no turnaround area on Crystal Lake Road near the SUBASE's Main Gate, which prevents SEAT buses from stopping near the gate. The bus currently stops at Crystal Lake Road and Route 12, which necessitates a 0.5 mile walk to the Main Gate. The lack of turnaround area is also an issue for private vehicles (including taxis and car sharing services like Uber and Lyft) wishing to pick up fares at the Main Gate without having to enter the Base; cars are now required to turn near the entrance to the SUBASE or the Submarine Force Library and Museum.

Impacted stakeholders: SUBASE, Town of Groton

Poor biking and walking conditions to/from the SUBASE. Conditions on Route 12, Crystal Lake Road, Military Highway, and at the Main Gate pose challenges and disincentives to walking and bicycling to and from the SUBASE. These include a combination of high vehicular traffic levels, uninviting or missing sidewalks, narrow to non-existent shoulders for bicycling, and poor street crossings.

A separated multipurpose pathway on Pleasant Valley Road, which runs parallel to Route 12 about 300 feet to the west provides a good north-south connection through the area and between the SUBASE and the Gold Star Memorial Bridge. A major street improvement project now under construction will include a new separated multiuse pathway on Crystal Lake Road and Route 12 to connect with the Pleasant Valley Road multipurpose pathway (see "Crystal Lake Road Reconstruction" on page 21 for more information). While these changes will dramatically improve bicycle and pedestrian conditions near the SUBASE, there is still room for improvement.

Impacted stakeholders: SUBASE, Town of Groton, Ledyard

Significant travel demand. Travel demand between major employers and major activity nodes in the area is increasing. Relevant trips and destinations include:

- Between Electric Boat and the SUBASE. Workers regularly travel between Electric Boat's Groton campus and the SUBASE. Efficient travel in both directions is critical to the operation of both facilities. Currently, the only practical way to travel between these locations is by private vehicle. This does not accommodate workers without a vehicle and adds to parking issues in both locations.

  Impacted stakeholders: SUBASE, Town and City of Groton, Electric Boat

- Between New London, Electric Boat, and the SUBASE. Electric Boat and SUBASE personnel commute between New London (notably Electric Boat's Fort Trumbull campus), the SUBASE, and Electric Boat's Groton campus. Single occupant vehicular trips are the predominant travel mode. Some workers commute by bicycle across the Gold Star Memorial Bridge to the SUBASE

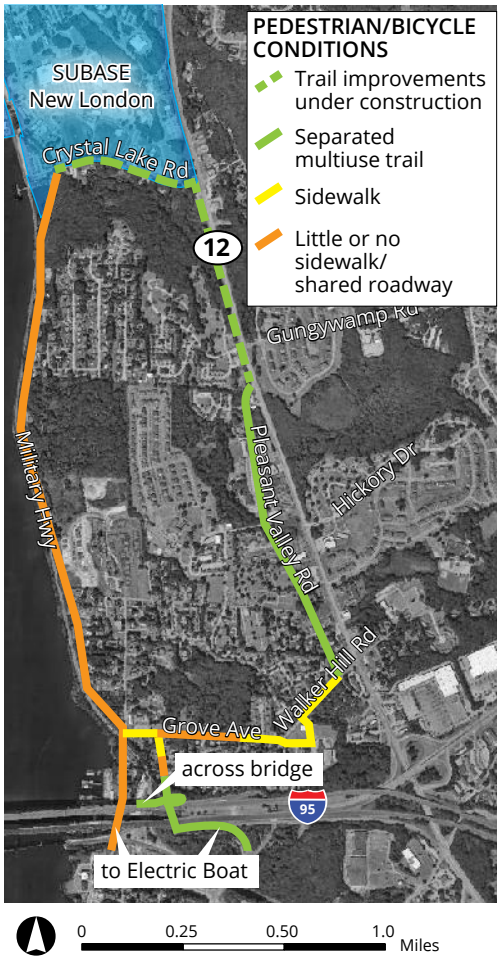


Figure 3.3. *Pedestrian/bicycle trails conditions near the SUBASE (Google Earth, Town of Groton Bicycle, Pedestrian & Trails Master Plan [2005])*

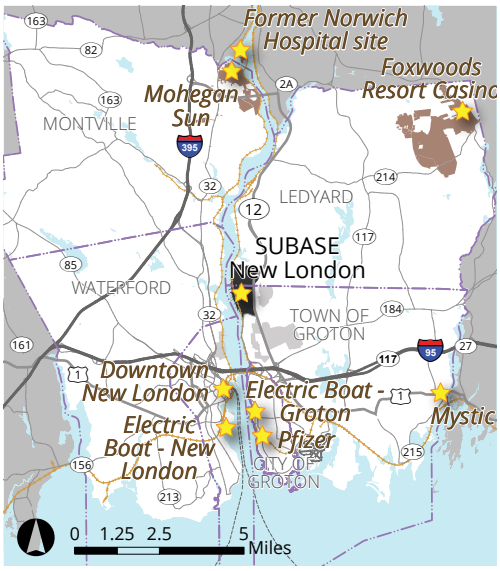


Figure 3.4. *Major traffic generators map*

Figure 3.5. *Norwich Hospital site looking west towards Mohegan Sun (theday.com)*

FORMER NORWICH HOSPITAL

In May 2017, the Preston Redevelopment Agency approved an agreement that allows the Mohegan Tribal Gaming Authority to redevelop the former Norwich Hospital property, a long-vacant 393-acre site (see Figure 3.22 on page 84). The proposed $200 million to $600 million development would include a marina, hotel, retail and entertainment complexes (including a waterpark, theme park, and synthetic ski areas), a senior living center, and a public river walk park. This agreement also releases $10 million in state bond money pledged by Governor Dannel P. Malloy to complete environmental cleanup of the site.

or Electric Boat's Groton campus. This requires use of the very narrow bicycle pathway on the bridge. While Electric Boat does run a shuttle bus between their two campuses with stops at the New London parking garage, public transit between these destinations is difficult. The bus ride from New London to the SUBASE takes only 20 minutes, but only five buses serve this route per day, and it requires a half mile walk between the SUBASE gate and nearest bus stop. The transit connection between New London and Groton's Electric Boat campus requires a one mile walk or a bus transfer with an extended delay between buses.

Impacted stakeholders: SUBASE, Town and City of Groton, New London, Electric Boat

- To the Casinos and associated entertainment complexes. Foxwoods Resort Casino, on the Mashantucket Pequot Reservation in Ledyard, and the Mohegan Sun casino, on the Mohegan Indian Reservation in Montville, attract large numbers of people from across the Northeastern United States. The most common major roadways used to access these casinos are Interstates 95 and 395 and State Routes 2, 2A, and 32. Both Tribes are planning to add family-oriented amenities to attract additional customers and the Mohegan Tribe has recently released plans to redevelop the former Norwich Hospital site in Preston, which will potentially add traffic along Route 12. The traffic and transportation impacts of the casinos have been studied extensively; studies show that continued growth may require capacity upgrades to highways and investment in public transportation.

  Impacted stakeholders: SUBASE, Ledyard, Town and City of Groton, Mohegan Tribe, Mashantucket Pequot Tribal Nation

Explosives Safety Quantity Distance (ESQD) arcs along Route 12. A short section of Route 12 near the SUBASE's North Gate is located within the SUBASE's ESQD arcs. The ESQD arcs outline a required safety area around weapons storage in the case of an explosion. The SUBASE has purchased property on both sides of the roadway in this location, eliminating the potential for development along this stretch. However, enough traffic travels along the approximately 800 feet of Route 12 within the arc for that segment to be considered an "inhabited building." This condition requires the SUBASE to obtain a waiver to continue storing weapons in the current location. As a result, increased traffic congestion in the area may be an issue in the long term.

Impacted stakeholders: SUBASE, Ledyard, development along Route 12

Parking for Electric Boat employees. Vehicular parking to accommodate varying Electric Boat employment levels has been a challenge for decades. Specifically, around the Groton campus, many resourceful property owners have rented yard space to help meet this need. With the anticipated increase in employees, accommodating parking will be an increasing challenge. Additional structured parking is unlikely to be developed due to the variable nature of employment and high construction costs.

Impacted stakeholders: Electric Boat, City of Groton, New London

Truck traffic around Electric Boat. As Electric Boat has grown, residential neighborhoods in the surrounding area have seen an increasing amount of truck traffic near the southern end of the campus. Trucks often use these narrow streets as they circle back to the highway after making their deliveries. This is a concern for residents in the area.

Impacted stakeholders: Electric Boat, Town and City of Groton,

Other issue considered but eliminated

Critical personnel or supply access to SUBASE via Route 12. This issue was considered, in terms of whether large development along Route 12 could affect the ability for critical personnel or supplies to access the SUBASE. Most notably, the Dow Trinseo industrial complex in Ledyard (see Figure 2.47 on page 46 for a map) could increase traffic if developed as a major distribution point. As all projects will be required to mitigate transportation impacts through the permitting process, they are unlikely to affect the ability for critical personnel or supplies to access the SUBASE.

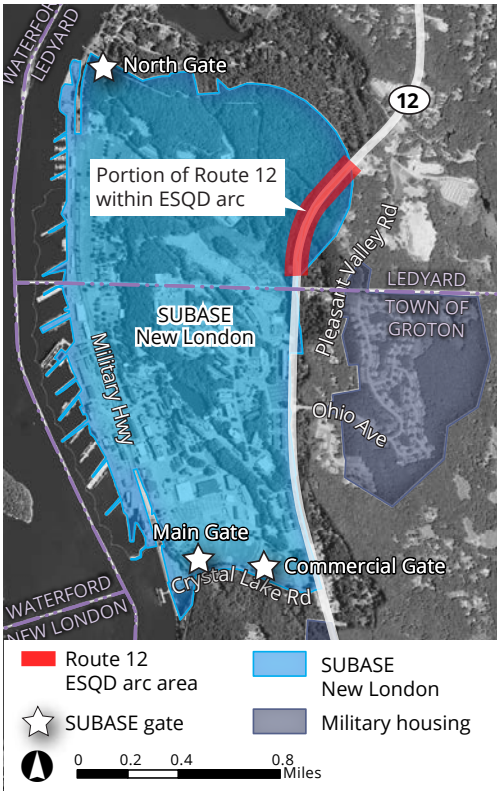


Figure 3.6. *Section along Route 12 within SUBASE ESQD arc (Naval Submarine Base New London Master Plan [2010] and Google Earth)*

Figure 3.7. *Electric Boat parking on paved residential lots*

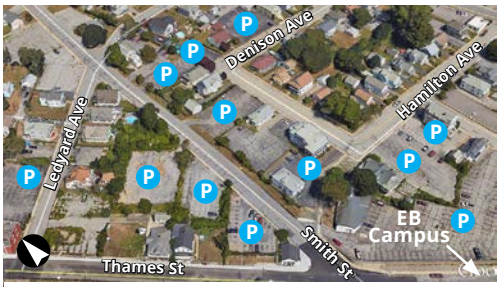


Figure 3.8. *Area adjacent to Electric Boat campus and remote parking lots (Google Earth)*

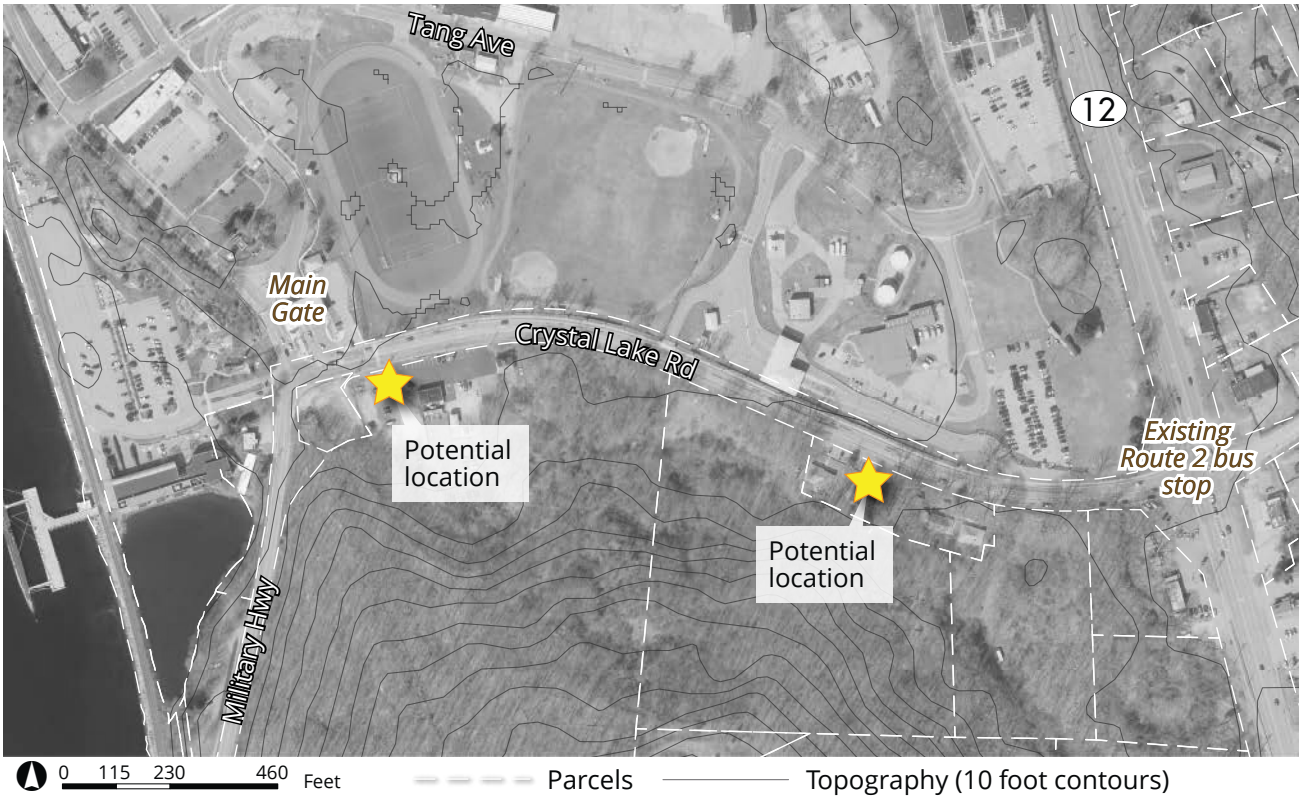


Figure 3.9. *Potential mobility hub locations (FHI)*

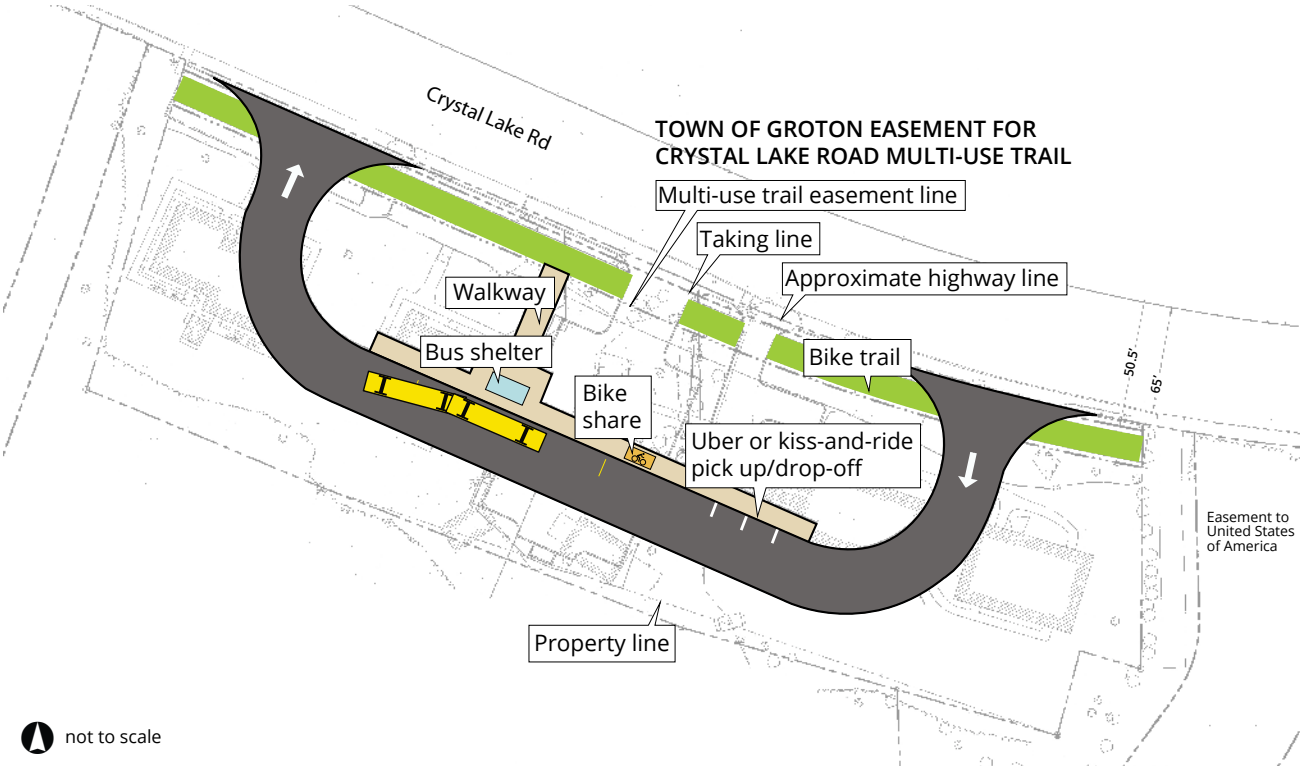


Figure 3.10. *Potential design for mobility hub on Crystal Lake Road (overlaid on Crystal Lake Road easement schematic (FHI)*

STRATEGIES

Transit improvements

T1. "Mobility Hub" on Crystal Lake Road. A "mobility hub" on Crystal Lake Road would address multimodal transportation challenges and improve access to and from the SUBASE. A "mobility hub" is an area that consolidates a variety of transportation-related services to facilitate multimodal and intermodal travel. Typically, a mobility hub is placed at a major transit station; however, the concept is applicable anywhere that a variety of transportation options can benefit travelers. In this case, this study recommends exploring such a facility on Crystal Lake Road as a complement to the current upgrade.

Figure 3.9 shows location options that could be pursued, depending on willingness of property owners to sell and funding availability for land acquisition. Ideally, the mobility hub would be located close to the Main Gate and the Submarine Force Library and Museum near the Crystal Lake Road and Military Highway intersection. The mobility hub could be constructed in conjunction with new development as a public private partnership with applicable property owners, potentially in exchange for density bonuses allowing increased site development.

In addition to providing a place for buses and private vehicles to turn around, the space could be used for a bike-share station, car-share parking, and/or car service (e.g., Uber or Lyft) pick up and drop off area. This would improve access for bicyclists, pedestrians, and transit users and reduce vehicle congestion along Crystal Lake Road and demand for parking at the SUBASE. This would also allow the SEAT bus Run 2 to stop much closer to the SUBASE's Main Gate. This location is also in close proximity to the water taxi stop, to be developed in a new pier adjacent to the Submarine Force Library and Museum.

Impacted stakeholders: Town of Groton, SUBASE, Crystal Lake Road property owners, CTDOT, SEAT

T2-3. Improved SEAT bus service for Run 2. Along with a more convenient bus stop near the Main Gate, improved SEAT bus service along Run 2 would likely attract more ridership and provide improved transit mobility for the SUBASE visitors and personnel. A slight deviation of the route onto Crystal Lake Road (T2) and more frequent service (T3) would add a more viable and attractive public transit option.

Impacted stakeholders: SEAT, SUBASE, Town of Groton, JLUS municipalities

Figure 3.11. *Main Gate to the SUBASE (NBC Connecticut)*

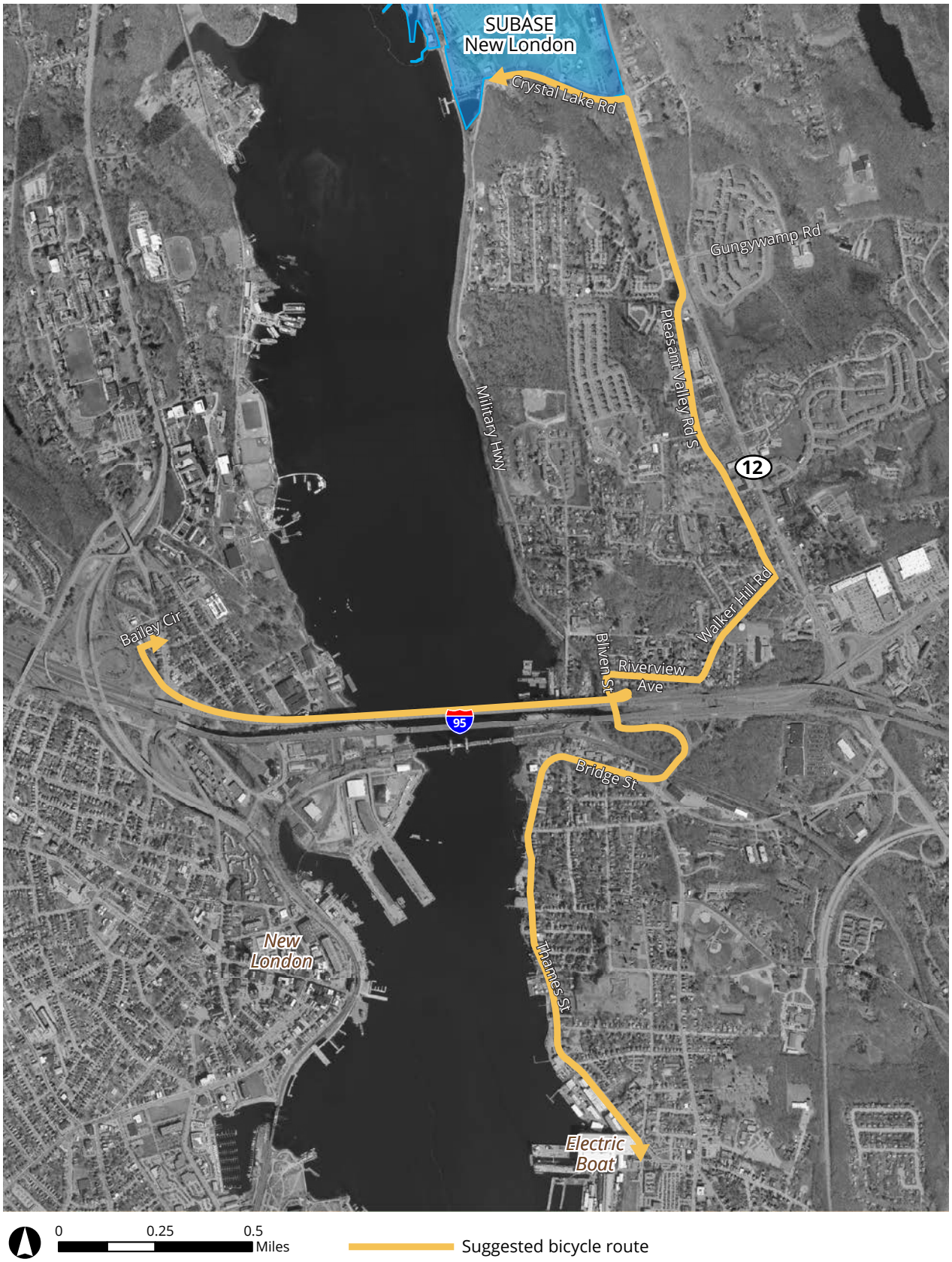


Figure 3.12. *Potential bicycle routes between SUBASE New London, Electric Boat, and New London (FHI)*

T4. Direct shuttle service between Electric Boat and the SUBASE. Implementing a shuttle bus between Electric Boat and the SUBASE would accommodate the travel demand and facilitate the synergy between the two organizations. This service would help reduce congestion along Crystal Lake Road and alleviate parking needs. It could be targeted to prescreened riders and circulate to key destinations on the SUBASE and the Electric Boat campuses.

Electric Boat already runs a shuttle between its campuses and remote parking lots and is open to coordinating with the SUBASE to add stops if demand warrants. The first step will be to identify demand for this service by quantifying the number of trips and start/end points on the SUBASE and Electric Boat campus.

Impacted stakeholders: SUBASE, Electric Boat

Figure 3.13. *Private shuttle service serving housing (Christopher Luker)*

T5. Shuttles from off-campus housing. Direct shuttle service during peak commuter hours between current or future concentrations of off-campus housing (e.g., downtowns and growing mixed-use centers) or park-and-rides and Electric Boat and the SUBASE would reduce the number of private vehicles traveling to and parking demand on the SUBASE and Electric Boat facilities.

Impacted stakeholders: SUBASE, Electric Boat

Congestion relief

T6. Traffic management plan for the SUBASE. The highest levels of congestion along Crystal Lake Road are a result of unexpected gate closures, security threats, and large events. A traffic management plan could help mitigate the traffic and vehicle delays during these special times. The SUBASE could coordinate with the State Highway Operations Center, which has an area-specific system set up to broadcast alerts. Variable message signs along Route 12 and other information sources such as the SUBASE's social media alerts should be part of this plan. Such signs and alerts could inform drivers of gate closures and transportation alternatives to the Crystal Lake Road area. The Town of Groton has access to variable message signs that could be used to provide information during an emergency or major event.

Impacted stakeholders: SUBASE, Town of Groton, CTDOT

Figure 3.14. *Example of variable message sign (signindustry.com)*

Bicycle & pedestrian improvements

T7. Identify and sign preferred bike routes between the SUBASE and key destinations/safe bicycling campaign. Figure 3.12 shows the most appropriate bicycling routes between the SUBASE, downtown New London, and the Electric Boat Groton campus. These routes could be signed and a "safe bicycling" campaign undertaken to educate bicyclists and drivers in the

Figure 3.15. *Example of bike share program (Bicycle Transit Systems and Cycle Hop)*

Figure 3.16. *Example of pedestrian-friendly environment (Seattle Department of Transportation)*

area. The current bike and pedestrian pathway on the Gold Star Memorial Bridge, which is part of the preferred network, should be upgraded in conjunction with design of bridge improvements. New London and the City of Groton are working on plans to improve the gateways to the bridge on both sides of the river. Bicycle racks could be added to Electric Boat shuttles.

Impacted stakeholders: Town and City of Groton, New London, SUBASE, Electric Boat, CTDOT

T8. Bike share at mobility hub and Electric Boat. A bike share facility could be provided at the proposed mobility hub on Crystal Lake Road and at both Electric Boat facilities. Maintenance of bicycles is one issue that would need to be considered. Local programs such as the one in Mystic rely on volunteers to maintain bicycles.

Impacted stakeholders: SUBASE, Electric Boat, City of Groton

Development regulations updates

T9. Minimize transportation impacts to Route 12 through the development review process. There are a number of planned or potential major developments in the study area including development of the former Norwich State Hospital site along Route 12 in Preston. As part of the local and state permit and application review process, some key issues related to transportation impacts should be considered:

- Review major developments north of the SUBASE on Route 12 to reduce the chances of congestion in the stretch of Route 12 that traverses the weapons arc.
- Consider traffic management, traffic safety, speed control (e.g., street design that slows traffic and encourages use of alternate routes), and multimodal infrastructure enhancements to limit or mitigate project impacts.
- Consider avoiding up-zones that would result in significant increases to traffic through the area.

It is important to note that development of this corridor is critical to economic development goals of the surrounding communities and there may be significant resistance to actions that run counter to this goal. Though there is no immediate action required, this issue should be monitored closely over time.

Impacted stakeholders: JLUS municipalities, CT Office of the State Traffic Administration (OSTA), SCCOG, SUBASE, Tribes, Electric Boat, Preston

T10. Minimize transportation impacts to City of Groton neighborhoods through development review and enforcement. Issues related to truck traffic and remote parking lots associated with Electric Boat operations could be addressed by reviewing Electric Boat expansion plans to ensure:

- Truck routes are identified and enforced to minimize impacts to neighborhoods.
- Adequate parking with shuttle connections or safe walking infrastructure, depending on the proposed parking location.

Impacted stakeholders: City of Groton, Electric Boat

T11. Update the Nautilus Memorial Design District regulations to promote higher density pedestrian-friendly development. Updates to the use, provisions, procedures, and development/design standards are needed to facilitate development along Crystal Lake Road that improves the pedestrian environment and potentially augments transit ridership. Ideally, uses would generate demand for some commercial amenities that could serve Town of Groton residents and SUBASE personnel. See strategies starting on page 94 for more detailed regulation update suggestions.

Impacted stakeholders: Town of Groton, SUBASE

THAMES RIVER

Much of the area's economic vitality depends on the Thames River. The SUBASE and municipalities share an interest in protecting the river's ecological function while enhancing its use for commerce, recreation, transportation, and enjoyment.

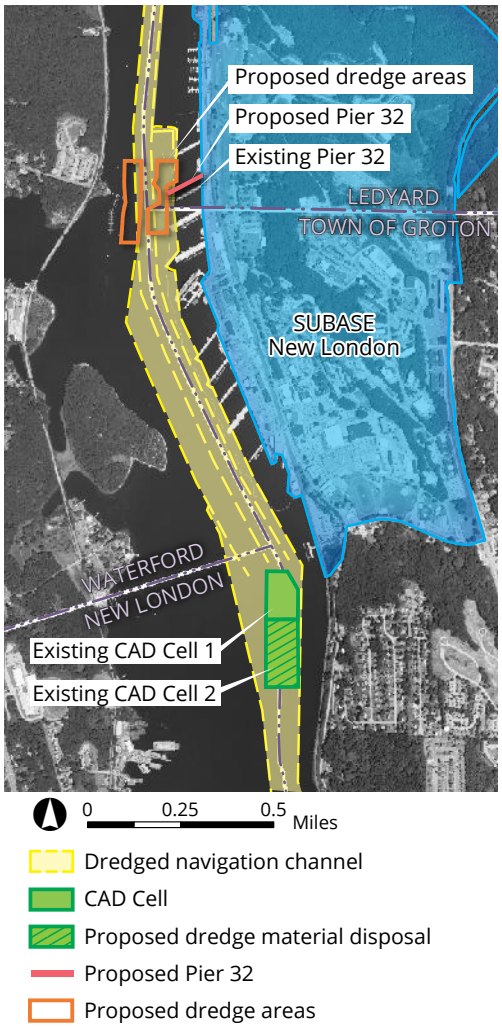


Figure 3.17. *Location of in-water structures in Thames River at SUBASE New London (Draft EA for the Proposed Demolition/Replacement of Pier 32 and Demolition of Pier 10 at SUBASENLON, NAVFAC)*

ISSUES

Submarine turning and in-water structures. The new Block V Virginia-class submarines, three of which are slated for completion by 2024, are 85 feet longer than the existing submarines at the SUBASE. This vessel class requires a wider turning basin in the Thames River, larger dredging area, longer piers, and updated infrastructure. The new turning radius and increased dredge area may impact the vacant dock structures at the Thames Landing Marina across the river in Waterford. The Thames Landing Marina is vacant and in disrepair. This facility is currently in bankruptcy proceedings, and there are additional complications associated with tax delinquency.

In March 2017, the SUBASE published the Draft Environmental Assessment for a project that will accommodate the new submarines by replacing Pier 32 and extending Pier 31.

Impacted stakeholders: SUBASE, Waterford

In-water traffic and base security. Increased recreational activity and marine commerce up river has the potential to increase vessel traffic alongside the SUBASE. Specific concerns include the wake from fast moving vessels or vessels that come to a complete stop near the SUBASE.

Development that could appreciably increase vessel traffic along this stretch of the river includes:

- Montville Riverfront Job Investment Area. The site of the former WestRock paperboard plant and AES Thames Power Plant (see Figure 3.19) has been designated as a Job Investment Area on Montville's Future Land Use Map and targeted for commercial, light industrial, industrial, and mixed-use development. The property generated barge traffic in the past, and redevelopment may do so in the future.

  Impacted stakeholders: SUBASE, Montville

- Mashantucket Pequot Tribal Nation (MPTN)-owned property in Waterford. The MPTN's large waterfront site along Route 32 is zoned General Industrial (IP-1) and Waterfront Design District (WD) (see Figure 3.20). Based on past industrial uses, some environmental remediation may be required prior to new development. Future development along the riverfront could increase in-water barge and/or recreational traffic in the Thames.

  Impacted stakeholders: SUBASE, Waterford, Mashantucket Pequot Tribal Nation

- Commuter/tourist ferries and/or water taxi service. Though passenger ferry or water taxi service may increase between downtown New London and the Submarine Force Library and Museum, this would not increase in-water traffic alongside the SUBASE.

  Impacted stakeholders: SUBASE, Town and City of Groton, New London

Figure 3.18. *Areas with potential in-water traffic and base security concerns.*

Figure 3.19. *Location of former AES Thames and WestRock paperboard plant (Google Earth)*

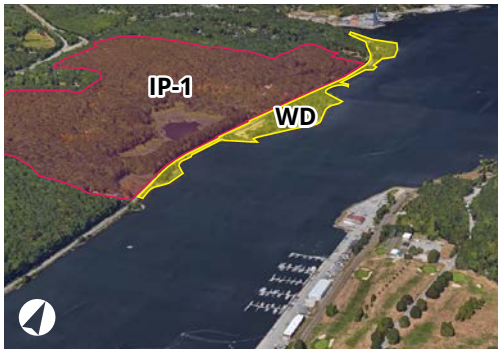


Figure 3.20. *Location of Mashantucket Pequot Tribal Nation-owned IP-1 and WD property (Google Earth)*

Figure 3.21. *Former Norwich Hospital site location*

- Norwich Hospital Site development. The Mohegan Tribal Gaming Authority plans to develop a theme park, hotels, a marina, and housing on the 393-acre former Norwich State Hospital property in Preston. The plan's Property Disposition and Development Agreement was unanimously approved by the Preston Redevelopment Agency in May 2017. The proposed marina would have 50 boat slips and could increase the number of recreational boats transiting by the SUBASE.

  Impacted stakeholders: Mohegan Tribal Gaming Authority, SUBASE

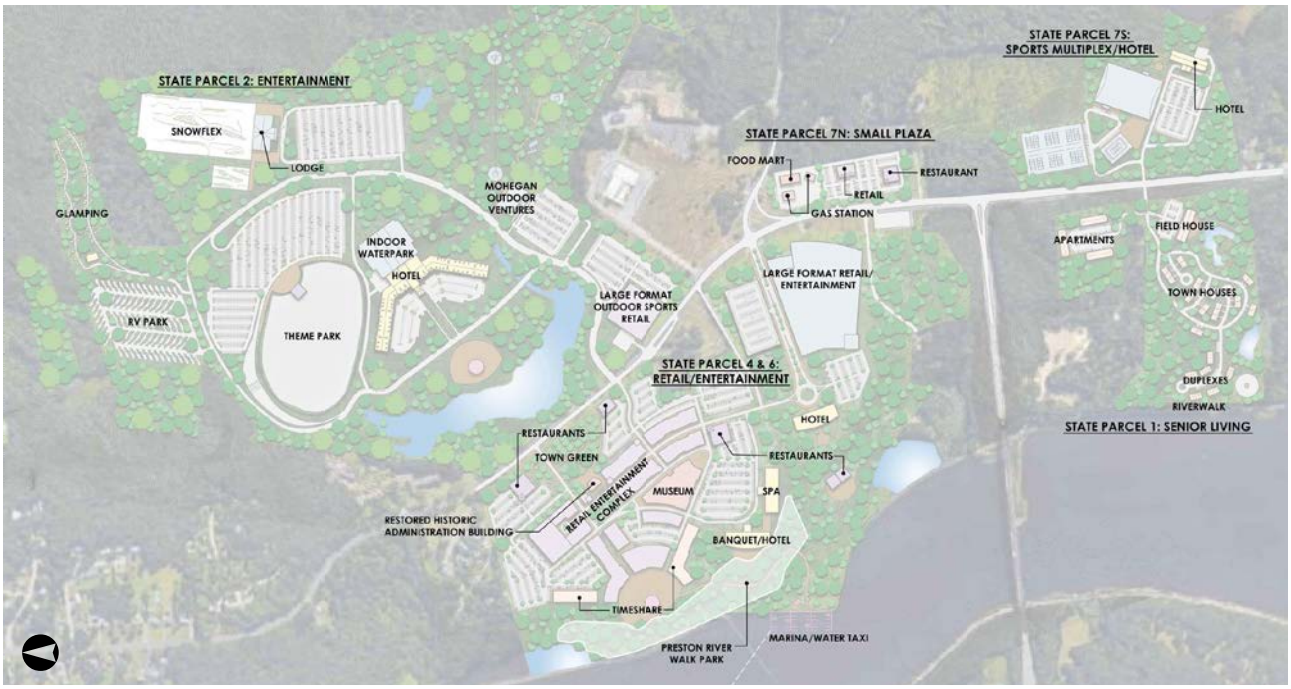


Figure 3.22. *Former Norwich Hospital site redevelopment site plan (Mohegan Tribal Gaming Authority)*

Figure 3.23. *Location of dredge disposal sites in Long Island Sound (U.S. EPA)*

Dredged materials disposal. Cost-effective disposal of dredged material from the Thames River channel is critical for the SUBASE and many businesses along the river. Current SUBASE dredging will use the Contained Aquatic Disposal (CAD) cells in the waters adjacent to the SUBASE. Navigation channel dredging will likely use the recently approved Eastern Long Island Sound Disposal Site (ELDS). The existing CAD cells appear to have adequate volume for current needs.

Impacted stakeholders: SUBASE, Electric Boat, CT Port Authority, CT DEEP, JLUS municipalities

Figure 3.24. *Demonstration projects, like this rain garden, are an opportunity for the SUBASE to highlight its environmental protection efforts (Secretary of Defense)*

Figure 3.25. *SUBASE biologists supporting wildlife management efforts (Secretary of Defense)*

Environmental protection. Online survey and workshop participants identified environmental protection as an important issue to address in the JLUS. According to the Environmental Protection Agency's (EPA) Superfund page for SUBASE New London, the SUBASE has completed numerous environmental improvements, including the cleaning up of 38 of 40 identified Superfund sites, expanding alternative fuel consumption, improving recycling practices, installing several rain gardens, reducing water and air pollution, and supporting wildlife management efforts in the area.

Impacted stakeholders: SUBASE

Climate change. The SUBASE, Electric Boat, rail lines, and riverfront infrastructure are susceptible to sea level rise, storm surges, and heavy rainfall. New pier designs and waterfront improvements at the SUBASE are being designed with these risks in mind. Ongoing coordination to stay current on evolving science and best practices could be beneficial for all JLUS municipalities.

Impacted stakeholders: SUBASE, Electric Boat, JLUS municipalities

Other issue considered but eliminated

Shellfish and sturgeon resurgence. The region is seeing a resurgence of shellfish beds and sturgeon fish. These uses are compatible with SUBASE operations, and the SUBASE and riverfront municipalities have a shared interest in protecting the river's ability to support these economic opportunities.

STRATEGIES

Planning

TR1. Explore creative solutions to address turning basin/ dredging conflict. These may include:

- Developing plans depicting the areas that may require modification to accommodate future submarine turning movements,
- Developing strategies to limit activities that would conflict with future submarine turning movements, such as conservation and restrictive easements,
- Working with property owners to support removal of the existing dock structures currently under enforcement by CT DEEP, and
- Addressing coastal access requirements as they relate to the marina and adjacent residential development.

Impacted stakeholders: Waterford, SUBASE, Marina property owners, CT DEEP

Boater & community education

TR2. No wake zone designation and boater education. Some security issues could be alleviated through the designation of a "no wake zone" near the SUBASE (there are federal regulations that prohibit vessels from stopping – see Figure 3.26 and Federal Regulation 33 CFR 334.75 call-out box). Designation on navigational maps, inclusion in the CT DEEP Connecticut Boaters Guide (www.ct.gov/deep/boatersguide), and posting user-friendly information at area marinas and on boater-oriented websites could increase boater awareness of these zones.

Impacted stakeholders: SUBASE, CT DEEP

TR3. Education about SUBASE environmental protection efforts. The SUBASE could increase awareness of efforts to improve the environment by producing, posting, and distributing materials that highlight their environmental cleanup and restoration efforts. These materials could highlight successes (see "Environmental protection" on page 86 for examples), be posted on SUBASE New London's website, and distributed at community meetings and SUBASE briefings.

Impacted stakeholders: SUBASE

Coordination & monitoring

TR4. Monitor projects that will increase river traffic. Coordinating with affected municipalities and developers of large upstream riverfront properties would help increase awareness of the SUBASE's mission, security concerns, and appropriate boater behavior.

Impacted stakeholders: SUBASE, JLUS municipalities, CT DEEP

TR5. Support efforts to establish additional in-water disposal sites for clean dredged material. Support CT DEEP's efforts to maintain in-water disposal sites for clean dredged material, and ensure the recently approved in-water disposal site is available to the SUBASE, Electric Boat, and surrounding municipalities.

Impacted stakeholders: CT DEEP, SUBASE, JLUS municipalities, Electric Boat

TR6. Continue to coordinate regarding climate change. A variety of efforts are happening in the region around these issues including structures overseen by the University of Connecticut (UCONN), SCCOG, and municipalities such as Waterford, who is developing a Climate Change Vulnerability, Risk Assessment and Adaptation Study. Continued coordination could be beneficial to help the SUBASE, waterfront businesses, and municipalities stay current on evolving science and best practices.

Impacted stakeholders: SUBASE, JLUS municipalities, SCCOG, UCONN

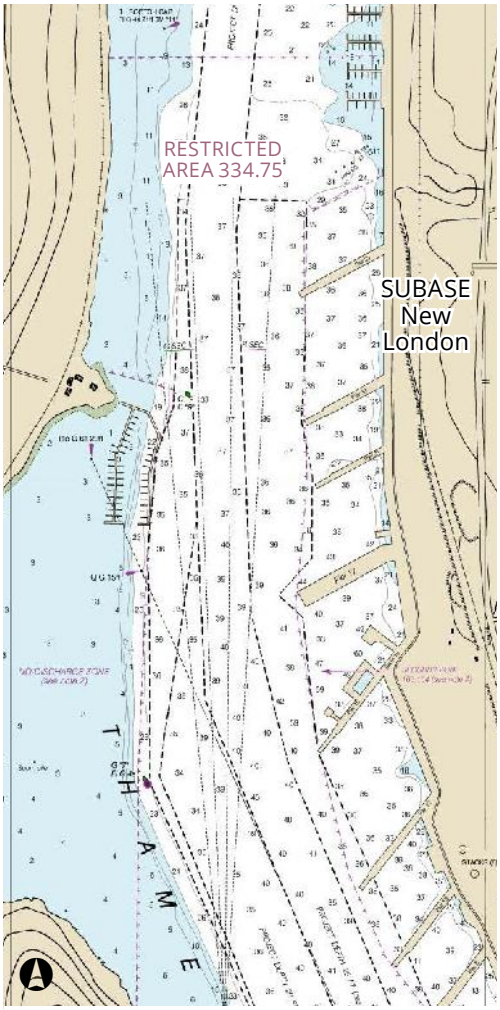


Figure 3.26. *Nautical map for New London harbor and vicinity (cropped to SUBASE area) (NOAA's Office of Coast Survey)*

THAMES RIVER RESTRICTED AREA

Federal Regulation 33 CFR 334.75 (b) (1): Vessels and other watercraft within the designated navigation channel may proceed through the restricted area at normal operating speeds without stopping. Vessels and watercraft may also utilize the water area within the restricted area located between the western edge of the designated channel and the western shore for fishing, anchoring and other recreational uses.

LAND USE & DEVELOPMENT

GROTON ZONING AUDIT FINDINGS

The Town of Groton completed a zoning and subdivision audit in 2016 that examined the Nautilus Memorial Design District. Key findings include:

- District does not have a clear list of permitted uses.
- All uses are subject to approval by both the Zoning Commission and Planning Commission, which adds time and unpredictability to the review process.
- Design criteria are vague, creating unpredictability for developers and administrative challenges for staff and decision makers.
- Site development requires a significant amount of property consolidation.
- The vision for the area is poorly defined.

ISSUES

Crystal Lake Road development. The SUBASE and surrounding municipalities would like to encourage compatible development along Crystal Lake Road adjacent to the SUBASE that is visually appealing, serves SUBASE personnel and the surrounding community, and minimizes negative impacts to the SUBASE main gate, Crystal Lake Road, Submarine Force Library and Museum, and existing upland residential uses. The property along Crystal Lake Road is within the Nautilus Memorial Design District (NMDD), which has not successfully encouraged compatible new development (see sidebar – Groton Zoning Audit Findings). Desirable uses for this area include restaurants, hotels, personal service uses, and multifamily housing that is designed in a pedestrian-friendly manner and minimizes impacts to SUBASE safety and circulation.

Impacted stakeholders: SUBASE, Town of Groton, property owners along Crystal Lake Road

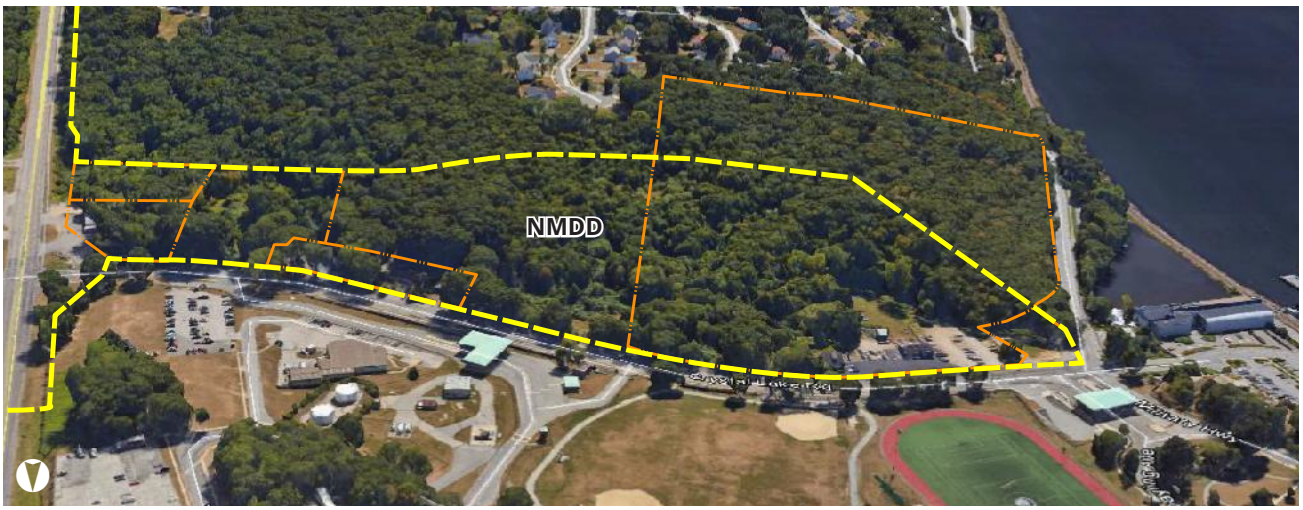


Figure 3.27. *Nautilus Memorial Design District (NMDD) is highlighted in yellow; property lines in orange. SUBASE and surrounding municipalities would like to encourage compatible development in this area. (Google Earth, Groton GIS)*

Development with views into the SUBASE. The following locations are of particular interest for the JLUS.

Waterford's Waterfront Development (WD) District properties. Existing and possible new multistory development across the Thames River from SUBASE New London within the Town of Waterford is a security concern for the SUBASE. Residents of Thames Landing, the development immediately across from the SUBASE, have direct views of the SUBASE's high value waterfront assets. The Town issued a Special Permit for the development in 1988, development began in the late 1990s, and an amendment to the dwelling unit mix was approved in 2003. Additional buildings that were permitted under the original approval and halted after initial foundation work was completed are now under construction. Remaining permitted units are expected to be constructed within several years.

A vacant property immediately to the south of Thames Landing is also within the Waterfront Development District and features direct views into the SUBASE. There is no permitted or proposed development on this property at this time.

Impacted stakeholders: SUBASE, Waterford, property owners

Cross river public access. The Town of Waterford is exploring opportunities for public access to the river and mandated this as a condition of Thames Landing's development. Due to a variety of permitting, legal, and financial challenges associated with the marina, this riverfront access component was never developed. The New England Central Rail Road tracks are a significant barrier to waterfront access and would be difficult to cross; a pedestrian-only crossing may be feasible. SUBASE stakeholders have indicated that views from public open spaces into sensitive areas of the SUBASE are less concerning, though the design of spaces should consider SUBASE security and the SUBASE would monitor use of the open space.

Impacted stakeholders: SUBASE, Waterford, property owners

CROSS RIVER ZONING

The Thames Landing and vacant property to the south are within Waterford's Waterfront Development District. Since these properties have direct views into sensitive areas of the SUBASE, the use provisions are particularly important:

- District allows for a variety of water dependent uses by right, including parks, marinas, boat sales, storage, rental, and repair, and sales and rental of water-based recreational equipment.
- District allows multifamily, retail, restaurants, offices, and hotels with a special use permit (approved by the Commission and subject to special use/design regulations).
- Maximum building height is 25 feet, though there are height incentives in this district that could allow buildings as tall as 45 feet.
- Maximum density is 8 dwelling units per acre.

Figure 3.28. *Waterford Thames Landing development*

Figure 3.29. *Key Waterford properties and zoning districts across the river from the SUBASE (Google Earth)*

Mashantucket Pequot Tribal Nation property. The Mashantucket Pequot Tribal Nation owns a large site along the Waterford riverfront including parcels zoned General Industrial (IP-1) and Waterfront Design District (WD) just upstream of the SUBASE. While the site contains water, rail, and potential Route 32 highway access, it is heavily wooded and has steep slopes. Based on past industrial uses, the WD-zoned portions of the site may require some environmental remediation to develop. The IP-1 zone allows for a range of industrial uses plus offices, medical clinics, sports clubs, hotels/motels, restaurants, and trade schools. Though the Tribe has not specified plans to develop this property, Town planners noted that given the on-site challenges for industrial uses, a rezone request could be possible. Development at this site has the potential for views into sensitive areas of the SUBASE.

Impacted stakeholders: SUBASE, Waterford, Mashantucket Pequot Tribal Nation

Light, noise, and air quality impacts on SUBASE neighbors. Residents across the river from the SUBASE have noted impacts from light on the SUBASE piers, noise from generators, and other waterfront operations.

Impacted stakeholders: SUBASE, local residents

Housing. Providing housing to accommodate the fluctuating population of SUBASE and Electric Boat workers has long been a local and regional challenge. Within the next decade, the influx of workers projected for Groton's Electric Boat campus poses a major opportunity (primarily for the City and Town of Groton and to a lesser extent, New London).

While the anticipated influx of new workers can bring transportation, service, and other impacts to these communities, a higher percentage of these workers living closer to Electric Boat and the SUBASE would reduce local and regional transportation impacts and provide local economic development benefits. The US Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES) 2014 data (provided by the OnTheMap tool) estimate that 81 percent of Groton's workers commute from other towns and cities, which adds congestion without much economic benefit.

A notable challenge for the communities surrounding the Electric Boat campuses is to provide the type and quality of housing in a context that attracts Electric Boat workers. Whereas the surrounding areas have plenty of single family housing, project participants have indicated that the areas in close proximity to the Electric Boat campuses lack higher quality multifamily housing.

Impacted stakeholders: JLUS municipalities

Figure 3.30. *Navy housing at Nautilus Park II (Balfour Beatty Communities)*

Figure 3.31. *State Pier in New London (CTDOT)*

Figure 3.32. *Coastal public access for Electric Boat workers and City of Groton residents*

Community livability and economic development. The Navy and JLUS municipalities share an interest in supporting and encouraging small and large businesses and entrepreneurship, keeping their "working" waterfronts, developing walkable, mixed-use neighborhoods, and offering more diverse and appealing housing options. Continued growth of cargo volumes at the Port of New London is a priority for the State, and the SUBASE and JLUS municipalities share an interest in supporting this growth.

Considering Electric Boat's location and anticipated employment surge, the City and Town of Groton would like to benefit from the company's growth. This includes enticing more workers to live, shop, and recreate within the City and Town. To accomplish this, a broad array of community livability improvements are needed, including:

- Improved waterfront access and recreation for workers and residents;
- More quality housing options for a range of incomes;
- Increased activation of the Thames River as a source of recreational, residential amenity, and commercial opportunity;
- Enhanced appearance, including improved streetscapes and pedestrian access, particularly within commercial areas and along routes connecting Electric Boat facilities to businesses and services;
- Encouraged re-investment in and enhancement of existing properties; and
- Enhanced existing and establishment of new pedestrian-oriented mixed-use nodes, such as along Thames Street and Five Corners in the City of Groton.

Additionally, the Town of Groton seeks to leverage the positive aspects of the SUBASE and minimize potential negative impacts along Crystal Lake Road and Route 12.

Another potential issue for the Town of Groton is the calculation of local income levels' effect on the Town's ability to attract economic development and investment. Three thousand five hundred military personnel live in Groton, and their income does not reflect the basic allowance for housing (BAH) they receive. Hence, the statistics show slightly lower incomes than the actual means military personnel have available. Rough calculations estimate that including the BAH could increase the income statistics approximately 5% in Groton. Per capita income might increase from $34,353 to $35,955, and household income from $60,157 to $62,962. Relaying these estimates to potential investors could be useful.

Impacted stakeholders: SUBASE, Electric Boat, Port of New London, CT Port Authority, JLUS municipalities

Other issue considered but eliminated

SUBASE security along Town of Ledyard border. Much of the land bordering the northern end of the SUBASE has been deeded to Ledyard as open space or is zoned at very low residential densities, minimizing potential conflicts. The Baldwin Hill Commercial Area and a 400-acre R-40 zone, separated from the SUBASE by a small strip of land, could redevelop with housing and/or light industrial uses. However, the low level of development potential and lack of views into sensitive areas limits the potential conflicts.

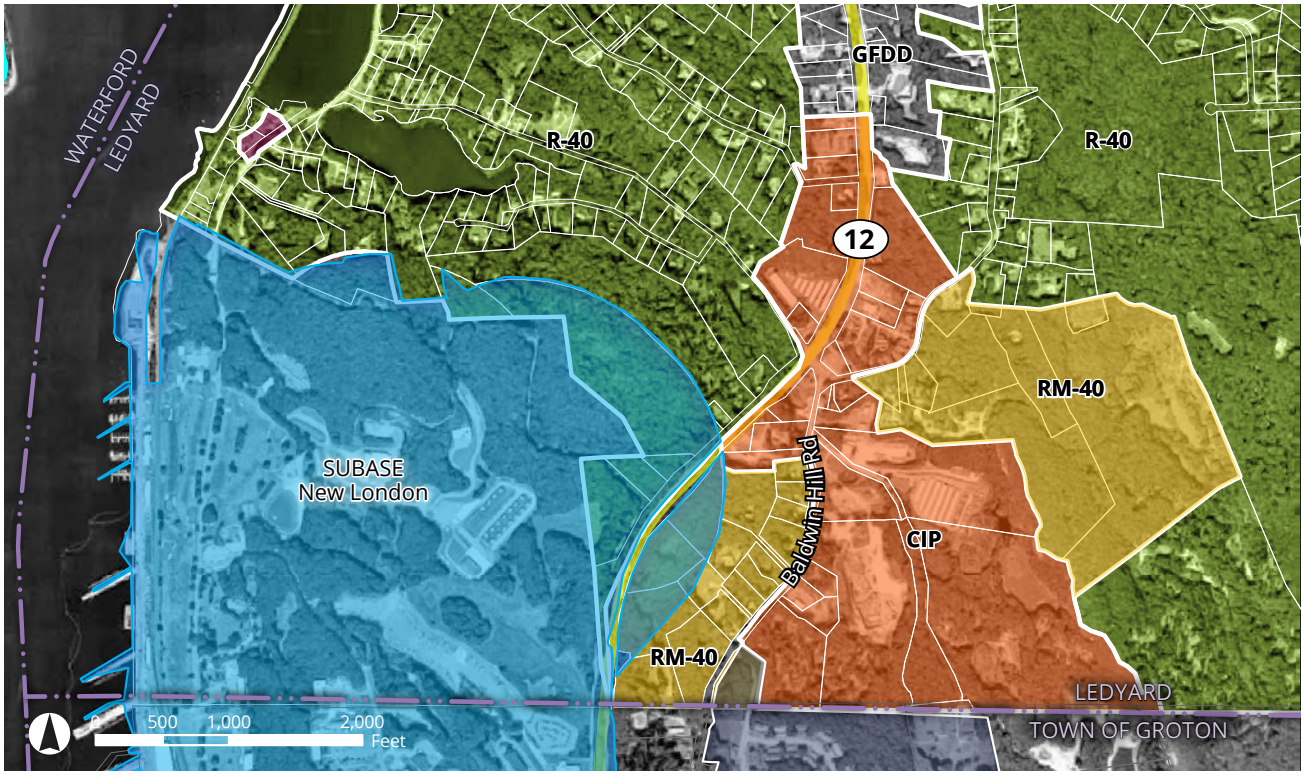


Figure 3.33. *Properties at the Ledyard/SUBASE border include the Baldwin Hill commercial area (Commercial/Industrial Park [CIP] zone in orange) and R-40 and RM-40 residential zones (Google Earth, Ledyard Planning and Zoning Department)*

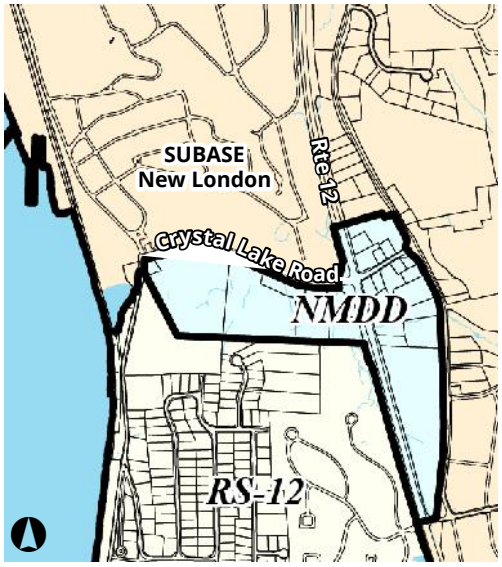


Figure 3.35. *Nautilus Memorial Design District (2016 Town of Groton POCD)*

STRATEGIES

Compatible development

LU1. Update the zoning along Crystal Lake Road. The Town of Groton completed a comprehensive audit of their zoning and subdivision regulations in 2016 that recommended possible updates to the Nautilus Memorial Design District (NMDD) zoning. The Town has not yet updated their zoning regulations to implement these recommendations. Per analysis of existing zoning, the 2016 audit, and discussions with Town planning staff and JLUS participants, this study recommends that the Town update the NMDD provisions as set forth in Appendix B. Recommendations include review process updates, use and density provisions changes, and design standards development.

Impacted stakeholders: Town of Groton, SUBASE

Figure 3.34. *Comparison of existing conditions and example potential development along Crystal Lake Road (Google Streetview)*

LU2. Coordinate with the SUBASE to review relevant Town of Groton planning efforts. This could include monitoring proposed plans, regulation changes, and applicable development projects. For example, the Town and SUBASE could map shared interest planning areas and identify specific projects or features of potential concern (such as building height in areas with views of sensitive SUBASE assets). Then, using the map, the Town and SUBASE could collaborate to develop a streamlined system for the Town to identify and communicate potential projects of concern to the SUBASE.

Impacted stakeholders: Town of Groton, SUBASE

LU3. Coordinate with the SUBASE to review relevant Town of Waterford planning efforts. See related coordination considerations noted for the Town of Groton above. In addition, possible pro-active options to reduce direct line of sight concerns in the areas pictured in Figure 3.29 on page 90 include:

- Crafting and adopting an overlay zone on WD-zoned sites that reduces the residential density for these properties and perhaps adds special design standards and criteria for siting buildings, windows, and landscaping elements to minimize direct line of sight opportunities.
- Considering a partnership involving the Town, SUBASE, and potentially CT OMA to purchase key developable sites for public open space.
- Considering down-zoning some or all of the WD-zoned properties across the river to a less intensive residential or other zone.

Impacted stakeholders: Waterford, SUBASE, CT OMA

Figure 3.36. *Thames Landing development on Waterford riverfront (Town of Waterford Planning and Development Department)*

Figure 3.37. *Example high amenity, pedestrian-friendly multifamily and mixed-use development*

LU4. Provide a communications channel to address quality of life issues surrounding the SUBASE. Provide a point of contact for the public to ask questions and voice concerns. Also consider, when not affecting operations, repositioning and/or shading lights, replacing equipment with lower emissions versions, and installing noise dampening features.

Impacted stakeholders: SUBASE, neighboring property owners, Town of Groton, Waterford

Housing

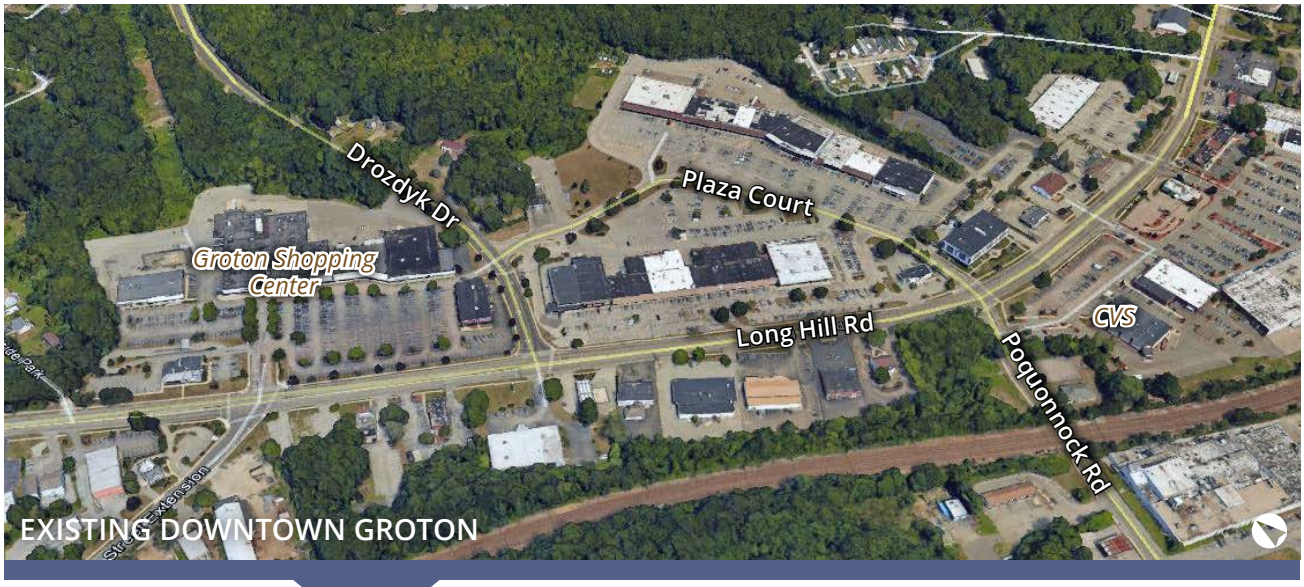
LU5. Update the JLUS municipalities' zoning regulations to encourage new housing development. Appendix B includes suggestions for the six participating municipalities to amend regulations to attract a larger variety of quality housing development to support SUBASE personnel and Electric Boat workers. These are based on review of existing zoning regulations and intended as suggestions to consider by each municipality as they examine their housing regulations.

Impacted stakeholders: Town of Groton, City of Groton, New London, Waterford, Montville, Ledyard

Community livability & economic development

LU6. Prepare and implement a master plan for the Town of Groton's downtown. Developing a master plan was suggested in Groton's 2016 POCD and reiterated in the 2016 zoning audit as a critical first step to help transform this automobile oriented center into a more vibrant mixed-use downtown. By creating a more pedestrian friendly place with a mixture of uses, downtown Groton could become an attractive option for housing Electric Boat and SUBASE workers.

Impacted stakeholders: Town of Groton




EXAMPLE PEDESTRIAN-ORIENTED DEVELOPMENT

Figure 3.38. *Groton's 2016 POCD recommends that a master plan be developed to help transform downtown into a more vibrant pedestrian-friendly area. Tax increment financing could be a funding mechanism to support the implementation of such a master plan.*

LU7. Pursue grants/funding and private investment for planning, engineering, and constructing community revitalization improvements. Given the enormous impact of Electric Boat and SUBASE New London in southeastern Connecticut, community redevelopment efforts that improve the area's competitiveness for talent are a priority. The future of federal and State programs that could help finance community development efforts is uncertain. Thus, this study recommends continuing to investigate Tax Increment Financing (TIF) as a potential financing tool for improving downtown Groton. The Town of Groton's 2016 zoning audit suggested TIF as an excellent tool to initiate strategic physical improvements (e.g., access, circulation,

Figure 3.39. *New London and Groton are building on their assets and working to increase their attractiveness to talented workers*

and safety) that will upgrade the downtown's visual appearance. It also communicates the Town's commitment to stimulating change and private investment in the area to property owners and prospective developers.

Additional funding sources might include economic development funds through the State Bond Commission process (if this program continues). Moreover, if other State programs like the Responsible Growth and Transit-Oriented Development Grant Program or CTNext Innovation Places continue, these programs could fund planning, engineering, and construction comnmunity development improvements. Another potential area of investigation is how/if Office of Economic Adjustment funding could support these initiatives.

The Town of Groton and other interested municipalities may also further study the impact of military basic allowances for housing on actual income levels in their communities. Sharing this information with potential private investors may help to attract additional investment.

Impacted stakeholders: Town of Groton, JLUS municipalities, OEA

LU8. Sustain and enhance communication between Electric Boat and associated municipalities. While all participants emphasized that the relationship between Electric Boat and the Town and City of Groton is good, there is some room for improvement in ongoing coordination. This could include establishing a central point of contact and/or scheduling regular meetings to share information and coordinate plans.

Impacted stakeholders: City of Groton, Town of Groton, Electric Boat, New London

Figure 3.40. *New London waterfront (Patch.com)*

LU9. Support New London's continued transformation. New London's continued transformation is critical to attracting talent and supporting innovation in the region. During the Thames River Innovation Places process, a number of key features including innovation assets, redevelopment hotspots, transportation links, and recreational amenities were identified in New London. New London's efforts to encourage development of the Fort Trumbull area, the Hodges Square neighborhood at the base of the Gold Star Memorial Bridge, and the area around the planned National Coast Guard Museum are strategies to capitalize on these assets.

Impacted stakeholders: New London

COORDINATION & COST SHARING

ISSUES

Integrated community. Though the region is proud of the area's history and supports the defense mission, some community members noted during JLUS planning that they feel disconnected from the SUBASE and members of the military. Security requirements limit community members from entering the SUBASE, and typical two-year assignments limit the ability of service members to fully integrate into the community.

Impacted stakeholders: SUBASE, JLUS municipalities

Cost sharing. Connecticut elementary and secondary schools are facing fiscal difficulties due to reductions in State of Connecticut funding and increasing service costs.

The SUBASE's family housing sits on federally-owned land; hence, property taxes are not collected. However, Federal Impact Aid funds have been provided to local municipalities since the Truman administration to offset the impact of lost property tax revenue (see Federal Impact Aid sidebar and Appendix C: Resources, page C-7, for more information). Some municipalities assert that the Impact Aid does not cover the cost of education for students living on federally-owned land, and the issue is exacerbated by the Impact Aid formula, which allocates a smaller amount for children of civilian families than military families.

The impact on the Groton School District is significant. For military families, the Town receives $3,000 in Federal Impact Aid per Navy family child in local schools; however, the cost to the local schools is closer to $15,000 per child. There are currently minimal fees collected on behalf of the non-military families in these communities with children attending public schools.

Management of Department of Defense (DoD) family housing units, including those at the SUBASE, has been privatized (see PPV Family Housing sidebar). Balfour Beatty Communities (Balfour Beatty) manages the SUBASE's family housing. Though privatized, local municipalities remain eligible for Federal Impact Aid. Since the federal funds compensating for the lack of property taxes are

PPV FAMILY HOUSING

Navy Family Housing includes 1895 units which currently house 1,109 military families and 452 non-military families on about 530 acres predominately located in the Town of Groton. All of this housing, along with almost all Navy Family Housing, has been privatized. This means that, as a part of a public/private venture (PPV), a private company is contracted to own, operate, maintain, and manage the housing developments. The Navy retains ownership of the land and some utilities. Service members have priority, however, if military demand is satisfied, the PPV partner may rent units to others.

The Navy, City of Groton, Town of Groton, and Balfour Beatty coordinate with each other to provide services to the family housing developments through a complex series of agreements. These arrangements are helpful, challenging, and warrant continuous cooperation.

Figure 3.41. *Aerial view of public/private venture (PPV) military family housing (Google Earth)*

FEDERAL IMPACT AID

The U.S. Department of Education financially assists local education agencies (LEAs; i.e., school districts) where tax-exempt federal properties impact their tax base. The funding is calculated based on number of students connected to the federal property. See Appendix C: Resources, page C-7, for more information.

A DoD Impact Aid Program for Military Connected School Districts supplements the DoE Impact Aid. When at least 20% of the students are military dependent, the LEA is also eligible for DoD Impact Aid, when appropriated by Congress.

Both funds may be used without restriction.

separate from the rental agreement between tenants and Balfour Beatty, some feel this is an unfair advantage over other private development owners. However, this perceived advantage is offset by the contract requirement that Balfour Beatty may only charge the amount of the military member's housing allowance.

The Town of Groton, the City of Groton, and the SUBASE have several other cost sharing service arrangements involving police, parks, utilities, and fire services. While the cost allocations for these services are less than what the Town would receive in private property taxes, the agreements attempt to allocate costs and provide services most efficiently and effectively for the SUBASE, Town, and City.

A community survey completed as part of the JLUS highlighted these issues as some of the most important to address in the JLUS. These issues are likely to become more significant in the future.

Impacted stakeholders: Town of Groton, Groton School District, United States Department of Education (U.S. DoE)/Department of Defense (DoD)

JLUS implementation and coordination. It can be unclear how the organizations participating in the JLUS will continue to work together to implement recommendations. Establishing a framework for continued coordination can help ensure consistent progress toward JLUS goals.

Impacted stakeholders: SUBASE, JLUS municipalities, potentially other stakeholders

STRATEGIES

Enhanced coordination & integration

CC1. Explore additional shared service opportunities. The Town of Groton and the SUBASE coordinate around numerous services, but there may be additional opportunities to enhance service and efficiently allocate resources. Where opportunities have been identified and where beneficial, organizational support would help these complex arrangements be realized. Improved coordination during emergencies is one such opportunity (see the Traffic Management Plan Strategy on page 79).

Impacted stakeholders: SUBASE, Town of Groton, Ledyard

CC2. Expand coordination efforts on joint civilian and military community activities. Local service clubs, municipal governments, organizations, and businesses in the surrounding municipalities could make a specific effort (beyond what already occurs) to include military personnel in community activities. By the same token, the SUBASE could expand their events and opportunities to invite members of the community onto the SUBASE to enhance the sense of community. The SUBASE could also consider expanding its focus on the importance of community service to its service members.

Impacted stakeholders: SUBASE, JLUS municipalities

CC3. Open on base programs. Working with Navy Housing and Morale, Welfare, and Recreation (MWR) programs, the SUBASE could explore the potential to open some programs and services to the local community where there is space available. Opening these activities could also generate revenue for MWR programs. This may not be feasible due to security requirements, but opportunities to include a limited number of people or open up services for special events could be explored.

Impacted stakeholders: SUBASE

Figure 3.42. *The SUBASE has many shared services agreements with local jurisdictions (grotonutilities.com)*

CC4. Establish a Memorandum of Understanding (MOU) to guide coordination moving forward. JLUS committees often establish a framework to work together after JLUS completion. The PC and TC would designate some of their members to continue as a JLUS Implementation Committee (JIC). The JIC would then develop an MOU to identify participants, points of contact, communication methods, a meeting schedule, and intent to continue to work together to implement the JLUS. See Appendix C, page C-3, for sample MOU language.

Impacted stakeholders: SCCOG, CT OMA, JLUS municipalities, SUBASE, potentially other stakeholders

Figure 3.43. *Volunteer service members help strengthen ties with their communities (U.S. Navy)*

Cost sharing agreements

CC5. Address issues with the cost sharing agreements for education:

- Research best practices and advocate for a solution. The allocation of a fair payment of fees to local municipalities for public utilities, services, and education is a national issue. It could be worthwhile to research solutions at other, similarly impacted communities. The Association of Defense Communities and National Association of Federally Impacted Schools (NAFIS) have been working on these issues and may be good resources (see Appendix C: Resources, page C-7). Military communities could coordinate through their State Offices/ Departments of Military Affairs and lobbyists to advocate for a national solution.
- Advocate for Federal Impact Aid formula reassessment. Another aspect of the issue is the low amount of Federal Impact Aid per student relative to the cost to educate a student. The U.S. Congress, considering the Department of Defense and Department of Education needs, could reassess this fee and consider adjusting it in communities where the cost of education has outpaced Impact Aid.
- Seek additional funds in lieu of taxes. Local municipalities may not be making use of all available federal funds entitled to federally-impacted communities. A Navy School Liaison Officer and/or CT OMA could arrange a workshop to educate local municipalities on additional federal aid. CT OMA and Town of Groton might consider researching the ability to negotiate a payment of a fee (in lieu of taxes) between Balfour Beatty and Groton. The fee would be passed onto property tenants and proceeds transferred to the Town of Groton/Groton School District.

Impacted stakeholders: CT OMA, Town of Groton, Groton School District, U.S. Congress/DoE/DoD

Figure 3.44. *Allocation of fair fee payments, particularly to local schools, is an issue (theday.com)*

CHAPTER 4
Implementation

SUBASE
New London
JLUS

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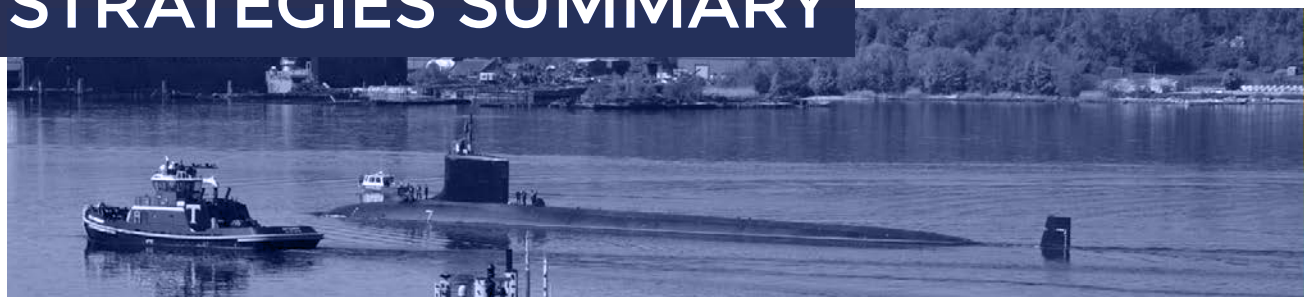
STRATEGIES SUMMARY



The following strategies reflect Policy Committee recommendations to maintain or enhance compatibility around SUBASE New London while advancing regional economic development goals. Prioritization is based on Policy and Technical Committee direction and considers public input from an online survey and community meetings. In general, high priorities for the municipalities and the SUBASE include strategies that further regional and waterfront economic development, address security or operational issues, and support fair cost sharing for local services.

Some of the following tasks may be accomplished with existing resources while others may require additional funding. Where applicable, potential funding sources are identified in the final column. For more details on the strategies, please see the Compatibility Analysis starting on page 69.

Table 4.1 *Strategies matrix key*

Priority	**H** = High **M** = Medium **L** = Low
Anticipated Timeframe	S (Short) = first 3 years; M (Middle) = between 4 and 10 years; L (Long) = between 11 and 20 years
Estimated Costs	$ = less than $10,000; $$ = $10,000 to $50,000; $$$ = greater than $50,000
JLUS municipalities	Town of Groton, City of Groton, City of New London, Town of Waterford, Town of Ledyard, and Town of Montville

STRATEGY	PRIORITY	RESPONSIBLE PARTIES (LEAD(S) IN BOLD)	ANTICIPATED TIMEFRAME	ESTIMATED COSTS	POTENTIAL FUNDING SOURCE
TRANSPORTATION (T)					
1. **Develop a "Mobility Hub" on Crystal Lake Road.** Partner with property owners, SEAT, bicycle advocates, and car-sharing/taxi services to seek funding for, design, and develop a multimodal hub near the SUBASE Main Gate. Consider including development incentives for private land donation.	M	**Town of Groton** **SUBASE** Crystal Lake Property Owners CTDOT SEAT	M	$$$	CTDOT OEA
2. **Modify SEAT Run 2 route** to stop closer to the SUBASE's Main Gate.	H	**SEAT** SUBASE Town of Groton	S-M	$	CMAQ SEAT member towns Farebox
3. **Increase frequency of SEAT Run 2 service.**	M	**SEAT** SUBASE JLUS municipalities	M	$$	CMAQ SEAT member towns Farebox
4. **Provide shuttle service between Electric Boat and the SUBASE**. Study the need for, plan, and implement a direct shuttle service between Electric Boat and the SUBASE. Study demand and add route to existing shuttle service.	H	**SUBASE** **Electric Boat**	S	$$	Public/ Private Partnership (PPP) (SUBASE and Electric Boat)
5. **Provide shuttles between off-campus housing, Electric Boat, and the SUBASE** during peak commute hours.	M	**SUBASE** **Electric Boat**	M	$$	PPP (SUBASE and Electric Boat)
6. **Develop a traffic management plan,** including variable message signs and social media alerts, to relieve congestion along Crystal Lake Road during unexpected gate closures, security threats, and large events. Tie into CTDOT's emergency communications system and utilize message signs provided by Homeland Security.	M	**SUBASE** Town of Groton CTDOT	S	$$	CTDOT Existing staff Homeland Security OEA

STRATEGY	PRIORITY	RESPONSIBLE PARTIES (LEAD(S) IN BOLD)	ANTICIPATED TIMEFRAME	ESTIMATED COSTS	POTENTIAL FUNDING SOURCE
7. **Encourage bicycling to the SUBASE** by: • Identifying and signing preferred bike routes between the SUBASE and key destinations, • Undertaking a "safe bicycling" campaign to educate anyone bicycling in the area, • Installing bike racks on Electric Boat shuttles, and • Coordinating with CTDOT's current review of the Gold Star Memorial Bridge to ensure upgrades to bike/ pedestrian path are included with any future bridge improvements and improving gateways on either end of the bridge.	M	**Town of Groton** **City of Groton** **New London** SUBASE Electric Boat CTDOT	S-L	$-$$	Existing staff CTDOT City of Groton New London OEA
8. **Implement a bike share between the SUBASE and Electric Boat** by installing the appropriate facilities (ideally at the proposed mobility hub and both Electric Boat locations).	L	**SUBASE** **Electric Boat** **City of Groton**	M	$$	TBD Private sponsorship (e.g., Electric Boat, Pfizer, Tribes)
9. **Minimize transportation impacts to Route 12 through development review and enforcement.** For any projects likely to increase traffic on Route 12 through the weapons compound safety arc area, require mitigation (e.g., measures to encourage regional traffic to use alternate routes) to ensure continued safety.	H	**JLUS municipalities** SCCOG CT OSTA SUBASE Tribes Electric Boat Preston	S-L	$	Existing staff
10. **Minimize transportation impacts to City of Groton neighborhoods through development review and enforcement.** Require Electric Boat expansion plans to identify: 1) neighborhood-appropriate truck routes and 2) adequate parking with shuttle and/or pedestrian connections.	H	**City of Groton** Electric Boat	S-L	$	Existing staff
11. **Update the Nautilus Memorial Design District regulations to promote higher density pedestrian-friendly development** to better facilitate appropriate new development along Crystal Lake Road. *Also see LU1.*	H	**Town of Groton** SUBASE	S	$	Existing staff OEA

STRATEGY	PRIORITY	RESPONSIBLE PARTIES (LEAD(S) IN BOLD)	ANTICIPATED TIMEFRAME	ESTIMATED COSTS	POTENTIAL FUNDING SOURCE
THAMES RIVER (TR)					
1. **Explore mutually beneficial solutions to eliminate turning movement/dredging/marina conflict.** Develop strategies to prevent future conflicts and support marina property owners in meeting dock removal and coastal access requirements.	H	**Waterford** SUBASE Marina property owners CT DEEP	S	$- $$$	Existing staff
2. **Improve boater/SUBASE security relationship** through the following: • Designate a no-wake zone near the SUBASE and include on navigational maps, and • Raise awareness of proper boater behavior near the SUBASE by posting user-friendly information in CT DEEP's Connecticut Boaters Guide, at area marinas, and on boater-oriented websites.	M	**SUBASE** **CT DEEP**	S-M	$-$$	Existing staff and TBD
3. **Educate about SUBASE environmental efforts** by producing materials that highlight the SUBASE's cleanup and restoration efforts and posting and distributing on SUBASE New London's website, during project environmental reviews, at community meetings, and at state of the SUBASE briefings.	L	**SUBASE**	S	$	Existing staff
4. **Monitor projects that will increase river traffic.** Coordinate with affected municipalities and developers of large upstream riverfront properties to increase awareness of the SUBASE's mission, security concerns, and appropriate boater behavior.	H	**SUBASE** **JLUS municipalities** CT DEEP Tribes	S-L	$	Existing staff
5. **Maintain in-water disposal sites for clean dredged material.** Ensure adequate in-water disposal sites are available to the SUBASE, Electric Boat, and surrounding municipalities.	H	**CT DEEP** **SUBASE** JLUS municipalities Electric Boat	S-L	$	Existing staff
6. **Continue to coordinate regarding climate change** to stay current on evolving science, best practices, and regional approach. Coordinate with ongoing regional efforts being led by SCCOG, the University of Connecticut, Waterford, etc.	M	SUBASE JLUS municipalities SCCOG UCONN	S-L	$	Existing staff

STRATEGY	PRIORITY	RESPONSIBLE PARTIES (LEAD(S) IN BOLD)	ANTICIPATED TIMEFRAME	ESTIMATED COSTS	POTENTIAL FUNDING SOURCE
LAND USE AND DEVELOPMENT (LU)					
1. **Update the Nautilus Memorial Design District regulations to encourage compatible development along Crystal Lake Road** near the SUBASE. Development should be visually appealing, serve SUBASE personnel and the surrounding community, and minimize negative impacts to the SUBASE main gate, Crystal Lake Road, Submarine Force Library and Museum, and upland residences. *Also see T11.*	H	**Town of Groton** SUBASE	S	$	Existing staff Potential OEA funds
2. **Coordinate with the SUBASE to review relevant Town of Groton planning efforts in areas of potential concern to the SUBASE,** including proposed plans, regulation changes, and applicable development projects. Collaborate to develop a streamlined notification process for project types that are of potential concern to the SUBASE.	H	**Town of Groton** SUBASE	S-L	$	Existing staff Potential OEA funds
3. **Coordinate with the SUBASE to review relevant Town of Waterford planning efforts** through the following activities: • Proactively address line of sight issues through zoning, development regulation, or design guideline updates, • Collaborate to develop a streamlined notification process for projects of the type and/or in the areas of potential concern to the SUBASE, and • Consider seeking partnerships to purchase key sites for public open space.	H	**Waterford** SUBASE CT OMA	S-L	$	Existing staff Potential OEA funds TBD
4. **Provide a communications channel to address quality of life issues surrounding the SUBASE.** Provide a point of contact to answer questions and discuss concerns.	M	**SUBASE** Town of Groton Waterford Neighboring property owners	S-L	$	Existing staff
5. **Update the JLUS municipalities' zoning regulations to encourage more housing options**. See Appendix B for potential actions for each municipality.	M	**JLUS municipalities**	S	$	Existing staff Potential OEA funds

* Not all municipalities support this strategy.

STRATEGY	PRIORITY	RESPONSIBLE PARTIES (LEAD(S) IN BOLD)	ANTICIPATED TIMEFRAME	ESTIMATED COSTS	POTENTIAL FUNDING SOURCE
6. **Prepare and implement a master plan for the Town of Groton's downtown** to set a comprehensive vision and steps to achieve a vibrant, mixed-use center attractive to Electric Boat and SUBASE workers.	M	**Town of Groton**	S	$$$	Existing staff and TBD
7. **Pursue funds for planning, engineering, and constructing community revitalization improvements** to attract talented workers. Investigate Tax Increment Financing and other potential funding opportunities listed in the Compatibility Analysis.	M	**Town of Groton** JLUS municipalities	S	$	Existing staff
8. **Sustain and enhance communication between Electric Boat and associated municipalities.** Set up periodic check-ins to coordinate ongoing initiatives.	H	**City of Groton Town of Groton Electric Boat New London**	S	$	Existing staff
9. **Continue transforming New London to attract talent and innovation activities.** In particular, continue to pursue development opportunities identified for: • The Fort Trumbull area and • The Hodges Square neighborhood (and coordinate with Groton-side efforts near the Gold Star Memorial Bridge).	M	**New London**	S-L	$	Existing staff CTNext

STRATEGY	PRIORITY	RESPONSIBLE PARTIES (LEAD(S) IN BOLD)	ANTICIPATED TIMEFRAME	ESTIMATED COSTS	POTENTIAL FUNDING SOURCE
COORDINATION AND COST SHARING (CC)					
1. **Continue shared service arrangements (e.g., fire, water) and explore opportunities** to enhance services and more efficiently allocate resources.	M	**SUBASE** **Town of Groton** Ledyard	M	$	Existing staff
2. **Expand efforts to coordinate joint civilian and military community activities**, such as: • Local organizations making a special effort to invite military members to events, • The SUBASE expanding their events to include community members, and • The SUBASE expanding their focus on community service.	M	**SUBASE** **JLUS municipalities**	S-L	$	Existing staff
3. **Open on-base programs.** Work with Navy Housing and Morale, Welfare, and Recreation (MWR) programs to explore the potential to open some programs and services to the community.	L	**SUBASE**	M	$	Existing staff
4. **Establish an MOU to guide coordination moving forward.** This would help ensure participants continue to work together to implement JLUS recommendations (tailored to the municipality) and establish points of contact for communication moving forward.	M	**SCCOG** CT OMA JLUS municipalities SUBASE Potentially other stakeholders	S	$	Existing staff OEA CT OMA
5. **Address issues with the cost sharing agreements for education:** • At the national level, research best practices and advocate for more Federal Impact Aid and other cost sharing solutions, and • Seek additional funds to augment the Impact Aid and fund local school districts.	H	**CT OMA** **Town of Groton** U.S. Congress U.S. DoE U.S. DoD Groton School District	S-M	$$	Existing staff

SHORT-TERM ACTIONS

The following actions list is intended to be a quick-start guide to near-term actions for each JLUS participant and stakeholder. The Strategies Summary, starting on page 105, identified these strategies as high priority and suggested immediate implementation. This list organizes them by lead (or important participant).

The MOU would likely be all parties' first step to improve coordination of further actions. However, if an MOU is determined unnecessary, or if some parties choose to not participate, each party would move on to the next actions on their list. Every few years, parties can individually or together (perhaps detailed in the MOU) revisit the strategies and identify their next steps.

In the following list, numbering refers to strategies as laid out in Chapter 3: Compatibility Analysis and the Strategies Summary table. Parties in parentheses indicate the lead(s) for each action. Note that parties may share responsibility for actions not listed in their respective sections; see the Strategies Summary for detail on non-lead responsible parties.

JLUS participants

SCCOG

CC4. Establish MOU to guide coordination moving forward. (SCCOG)

CT OMA

CC4. Establish MOU to guide coordination moving forward. (SCCOG)

CC5. Address issues with the cost sharing agreement. (CT OMA, Town of Groton)

SUBASE

CC4. Establish MOU to guide coordination moving forward. (SCCOG)

TR5. Maintain in-water disposal sites for clean dredged material. (CT DEEP, SUBASE)

TR4. Monitor projects that will increase river traffic. (SUBASE, JLUS municipalities)

T4. Provide shuttle service between Electric Boat and the SUBASE. (SUBASE, Electric Boat)

TOWN OF GROTON

CC4. Establish MOU to guide coordination moving forward. (SCCOG)

CC5. Address issues with the cost sharing agreement. (CT OMA, Town of Groton)

LU2. Coordinate with the SUBASE to review relevant Town of Groton planning efforts in areas of potential concern to the SUBASE. (Town of Groton)

LU9. Sustain and enhance communication between Electric Boat and associated municipalities. (City of Groton, Town of Groton, Electric Boat, New London)

T9. Minimize transportation impacts to Route 12 through development review and enforcement. (JLUS municipalities)

TR4. Monitor projects that will increase river traffic. (SUBASE, JLUS municipalities)

T11. Update the Nautilus Memorial Design District regulations to promote higher density pedestrian-friendly development. (Town of Groton)

LU1. Update the Nautilus Memorial Design District regulations to encourage compatible development along Crystal Lake Road. (Town of Groton)

CITY OF GROTON

CC4. Establish MOU to guide coordination moving forward. (SCCOG)

LU9. Sustain and enhance communication between Electric Boat and associated municipalities. (City of Groton, Town of Groton, Electric Boat, New London)

T10. Minimize transportation impacts to City of Groton neighborhoods through development review and enforcement. (City of Groton)

T9. Minimize transportation impacts to Route 12 through development review and enforcement. (JLUS municipalities)

TR4. Monitor projects that will increase river traffic. (SUBASE, JLUS municipalities)

NEW LONDON

CC4. Establish MOU to guide coordination moving forward. (SCCOG)

LU9. Sustain and enhance communication between Electric Boat and associated municipalities. (City of Groton, Town of Groton, Electric Boat, New London)

T9. Minimize transportation impacts to Route 12 through development review and enforcement. (JLUS municipalities)

TR4. Monitor projects that will increase river traffic. (SUBASE, JLUS municipalities)

WATERFORD

CC4. Establish MOU to guide coordination moving forward. (SCCOG)

TR1. Explore mutually beneficial solutions to eliminate turning movement/dredging/marina conflict. (Waterford)

LU3. Coordinate with the SUBASE to review relevant Town of Waterford planning efforts. (Waterford)

T9. Minimize transportation impacts to Route 12 through development review and enforcement. (JLUS municipalities)

TR4. Monitor projects that will increase river traffic. (SUBASE, JLUS municipalities)

LEDYARD

CC4. Establish MOU to guide coordination moving forward. (SCCOG)

T9. Minimize transportation impacts to Route 12 through development review and enforcement. (JLUS municipalities)

TR4. Monitor projects that will increase river traffic. (SUBASE, JLUS municipalities)

MONTVILLE

CC4. Establish MOU to guide coordination moving forward. (SCCOG)

TR4. Monitor projects that will increase river traffic. (SUBASE, JLUS municipalities)

Other stakeholders

MOHEGAN TRIBE

CC4. Establish MOU to guide coordination moving forward. (SCCOG)

T9. Minimize transportation impacts to Route 12 through development review and enforcement. (JLUS municipalities)

TR4. Monitor projects that will increase river traffic. (SUBASE, JLUS municipalities)

MASHANTUCKET PEQUOT TRIBAL NATION

CC4. Establish MOU to guide coordination moving forward. (SCCOG)

T9. Minimize transportation impacts to Route 12 through development review and enforcement. (JLUS municipalities)

TR4. Monitor projects that will increase river traffic. (SUBASE, JLUS municipalities)

SEAT

T2. Modify SEAT Run 2 route to stop at the Main Gate. (SEAT)

CT DEEP

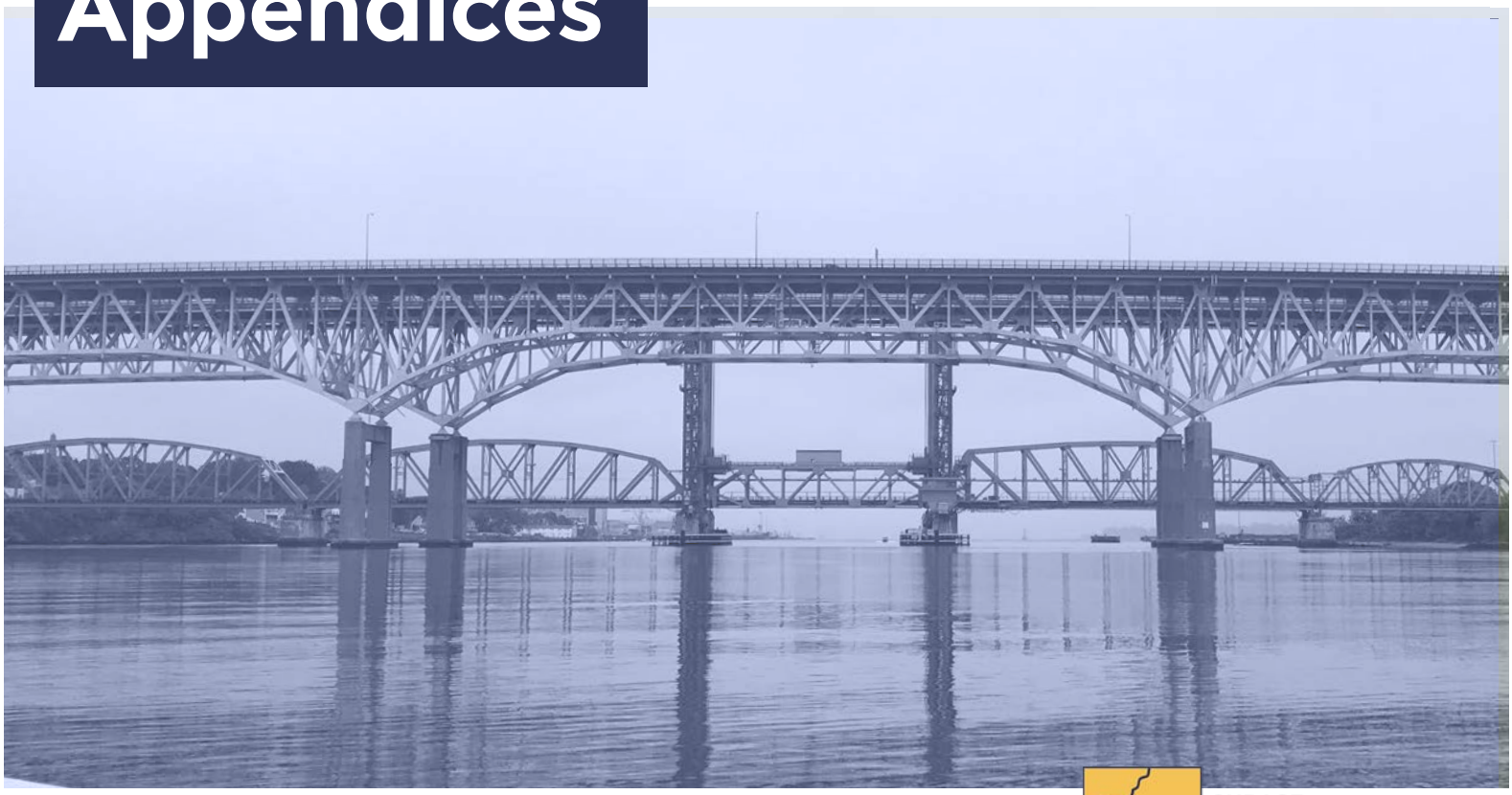
TR5. Maintain in-water disposal sites for clean dredged material. (CT DEEP, SUBASE)

ELECTRIC BOAT

LU9. Sustain and enhance communication between Electric Boat and associated municipalities. (City of Groton, Town of Groton, Electric Boat, New London)

T4. Provide shuttle service between Electric Boat and the SUBASE. (SUBASE, Electric Boat)

Appendices



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APPENDIX A:
Environmental & Cultural Resources

Photo credit: theday.com

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The SUBASE New London JLUS study area contains a large variety of natural and cultural resources including rivers, streams, open space, and historic resources.

WATER QUALITY AND STORMWATER RUNOFF

Waterways and receiving waters near urban and suburban areas are often adversely affected by stormwater runoff. Stormwater runoff affects water quality, water quantity, habitat and biological resources, public health, and the aesthetic appearance of urban waterways. The New London-Groton area is specifically identified as a priority area for management in the federally approved Section 6217 Coastal Non-Point Pollution Management Program for Connecticut. The Navy and municipalities have been addressing water quality and stormwater run-off in varying ways:

- **SUBASE New London:** Water quality is a concern at the SUBASE due to the use of chemicals and hazardous substances for operations at the base, as well as Installation Restoration Sites at the facility. However, water quality and stormwater are addressed through the SUBASE Municipal Separate Storm Sewer System (MS4) Permit. There is a new permit being issued for 2017, and the SUBASE will comply with this permit as well. The SUBASE also adheres to an overall Stormwater Management Plan.
- **City of Groton:** The City is incorporating "best management practices" for stormwater (such as vegetative buffers) into the City's zoning regulations. They also continue to require setbacks and buffers to separate development activities from water and coastal resources. Proper stormwater management is required in new development and the retrofitting of existing stormwater systems during redevelopment is required to minimize potential adverse impacts to wetlands and water quality.
- **Town of Groton:** Protection of water quality is Groton's top natural resource preservation priority. The Town has adopted low impact development (LID) regulations and has begun to retrofit Town-owned storm water basins and drainage structures.
- **City of New London:** The City has a policy to take actions to improve coastal water quality.
- **Town of Montville:** A goal of the Town is to guide intensive development away from water supply watersheds.
- **Town of Waterford:** Waterford has been a leader in Connecticut for implementing water quality treatment systems for storm drainage and promoting LID. The Town is also in the process of adopting stormwater regulations both in Zoning and Subdivision sections. They focus on LID, new MS4 requirements, and provisions to account for more frequent and intense storms in stormwater facility/site designs.

NONPOINT SOURCE POLLUTION

Runoff is a significant source of impairment to rivers and lakes (EPA.gov). Pollution from stormwater runoff is worse in urban areas due to the large amounts of impervious pavement that prohibits the infiltration of stormwater into the ground. Instead of filtering through the ground, untreated stormwater often travels from parking lots directly through pipes out to receiving waterways. This type of contamination is referred to as "Nonpoint Source" pollution and negatively impacts water quality.

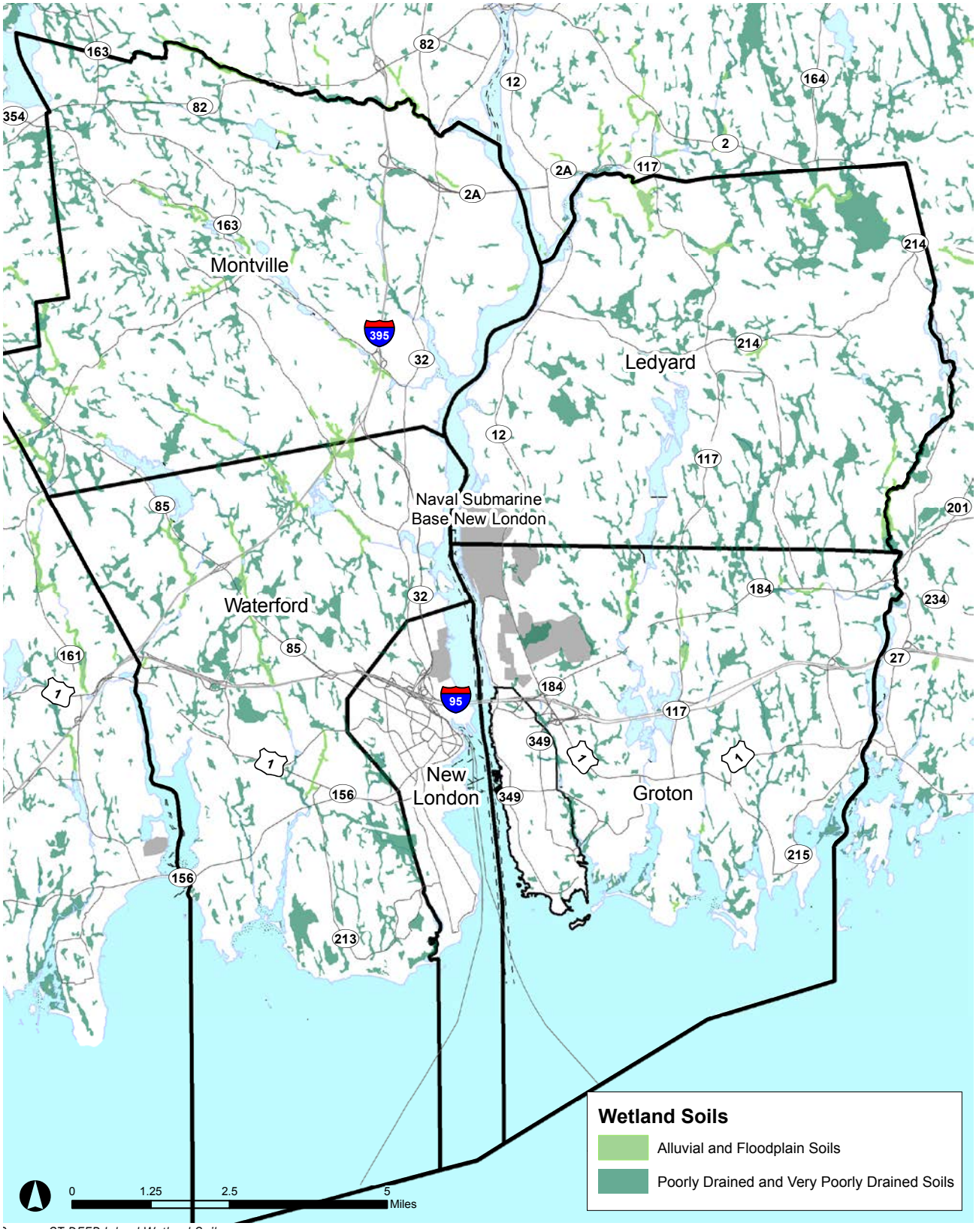

Figure A.1. *Study area wetland soils (CT DEEP Inland Wetland Soils)*

WETLANDS

Wetlands provide numerous beneficial services for people, fish, and wildlife. Some services include protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters, and maintaining surface water flow during dry periods (EPA.gov). Wetland soils are present throughout the study area (see Figure A.1) and are protected from development to preserve their ecological functions.

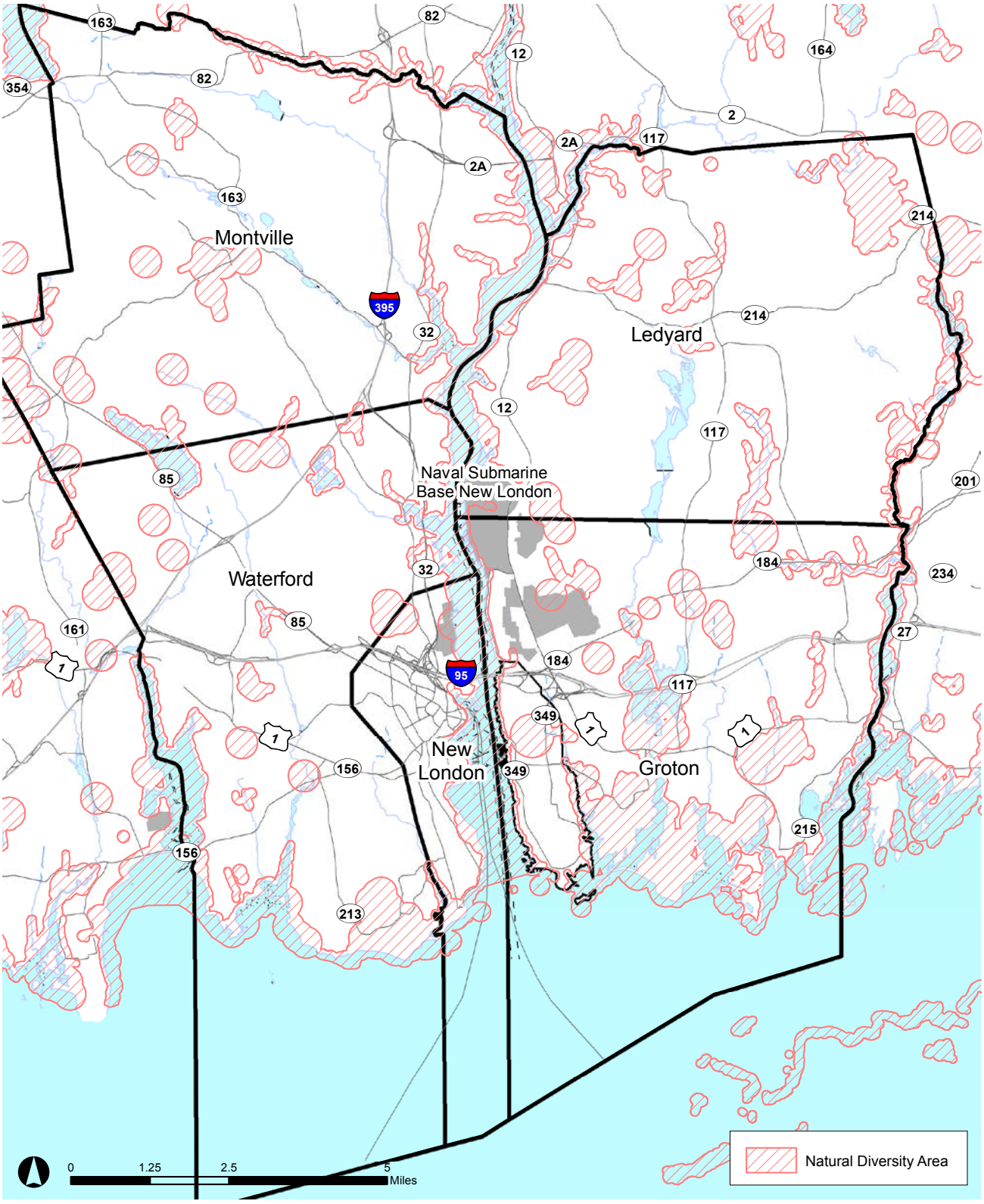

Figure A.2. *Natural diversity database areas (CT DEEP Natural Diversity Database areas [Dec 2016])*

CRITICAL HABITAT

The Natural Diversity Database (NDDB) map represents approximate locations of endangered, threatened, and special concern species, and significant natural communities in Connecticut. Although no threatened or endangered species have been documented or observed at the SUBASE, the Connecticut Department of Energy and the Environment (CT DEEP) has identified the Thames River riparian corridor and other water bodies in the study area (e.g., the Groton Reservoir and Lake Konomoc on the border of Waterford and Montville) as NDDB areas for their large diversity of species (see Figure A.2). Other NDDB clusters are spread evenly throughout the study area towns.

In addition to NDDB areas, Audubon has designated an Important Bird Area (IBA) on the west side of the Thames River across from the SUBASE. It includes Mamacoke Island, three coves, and two salt ponds. These areas provide critical habitat and important feeding areas for a variety of ducks that spend their winters in Connecticut, other species (e.g., Bald Eagles and American Coots) in the winter, and a variety of heron species during the summer (Dreyer, Askins, and Peterson, 2009). Development can impact NDDB and IBA resources.

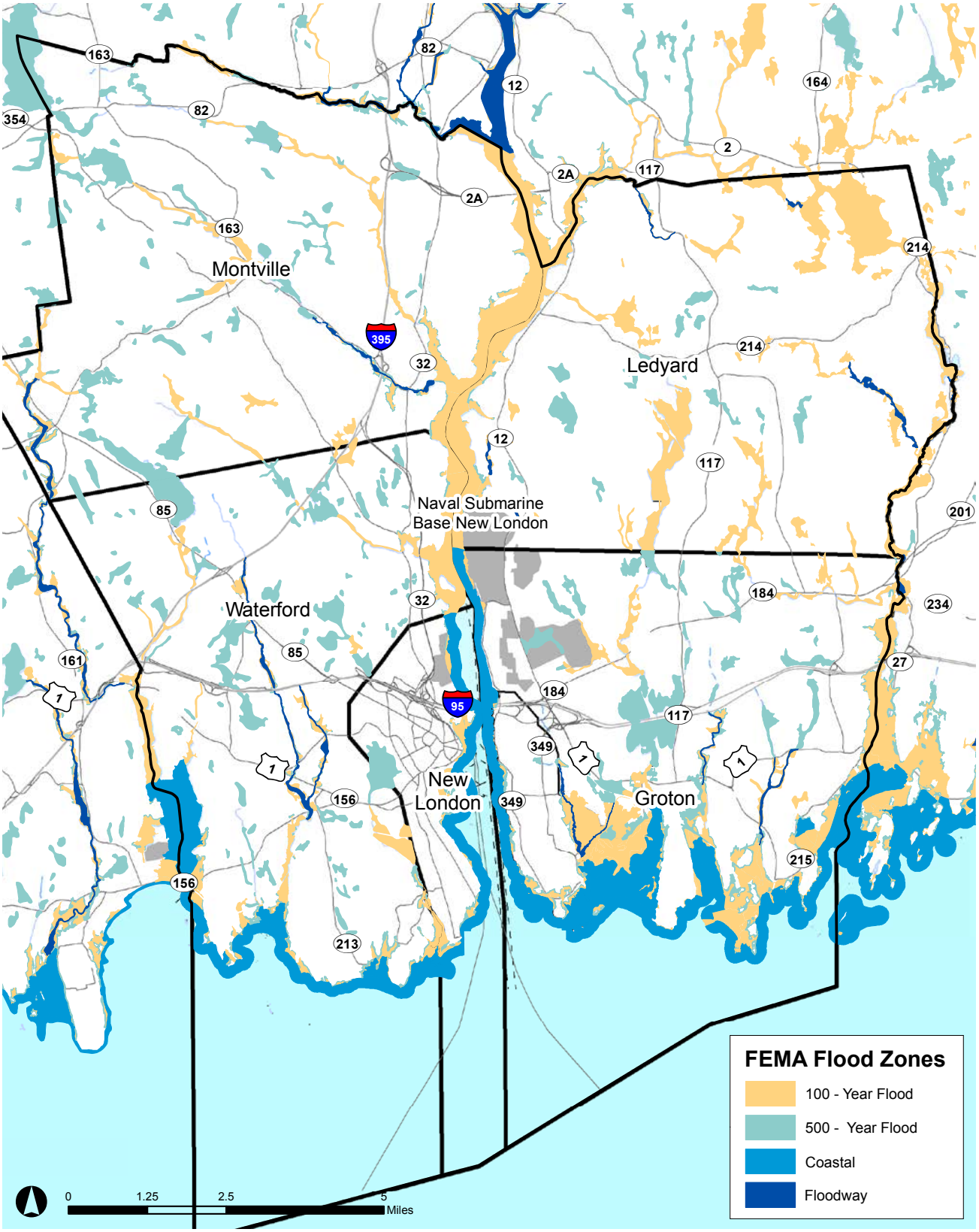

Figure A.3. *FEMA flood hazard zones (CT DEEP flooding and inundation, FEMA Flood Hazard Areas)*

FLOOD ZONES AND SEA LEVEL RISE

Waterfront properties in New London and Groton (including the SUBASE) fall within the Coastal Flood Zone. Waterfront properties in Waterford, Montville, and Ledyard fall within the 100-Year Flood Zone (see Figure A.3). Both are defined as having a one-percent or greater chance of flooding in a year (or a 26 percent chance of flooding over the life of a 30-year mortgage). The Coastal Flood Zone has an additional hazard associated with storm waves. In addition, sea level rise is predicted to cause the FEMA 100-year and 500-year flood zones to expand upland. The Navy and Thames River municipalities are considering flood hazards, sea level rise, and strategies regarding construction in floodplains, such as :

- **SUBASE New London:** Much of the Lower Base lies in 100- and 500-year flood plains and experiences periodic flooding. Wetlands are found in the northeast portion of the installation and along Rock Lake. The SUBASE site is hilly. In an effort to address sea level rise, the SUBASE elevated Piers 6 and 31. The construction of Pier 32 will also be elevated to comply with current FEMA regulations.
- **City of Groton:** The City of Groton seeks to minimize new development in the Coastal Flood Zone and is working with state and federal agencies to ensure that flood protection regulations reflect current standards regarding sea level rise. As the Electric Boat shipyard lies partially within the current 100-Year FEMA Flood Zone, rising sea levels and extreme weather could affect its long term operational resiliency. The City of Groton has expressed a desire for gradual retreat from low lying waterfront areas, especially for non-water-dependent uses.
- **Town of Groton:** Flood protection measures are included in the Town of Groton's zoning regulations. Groton protects floodplains further through additional review of special flood hazard areas. Land areas identified as prone to flooding by FEMA receive additional regulatory protection to allow the Town of Groton to participate in the National Flood Insurance Program (NFIP).
- **City of New London:** The City is continuing to evaluate the long-term implications of sea-level rise in all future planning and development activities.
- **Town of Montville:** Montville has many vacant properties along the waterfront. These areas should be considered carefully when discussing further development as some of these locations fall within 100-year flood zones.
- **Town of Waterford:** In addition to the Climate Change Vulnerability study funded through the CDBG-DR program (see page 57), the Town is updating its subdivision and zoning regulations to incorporate recommendations from that project to more proactively address sea level rise issues in land development.

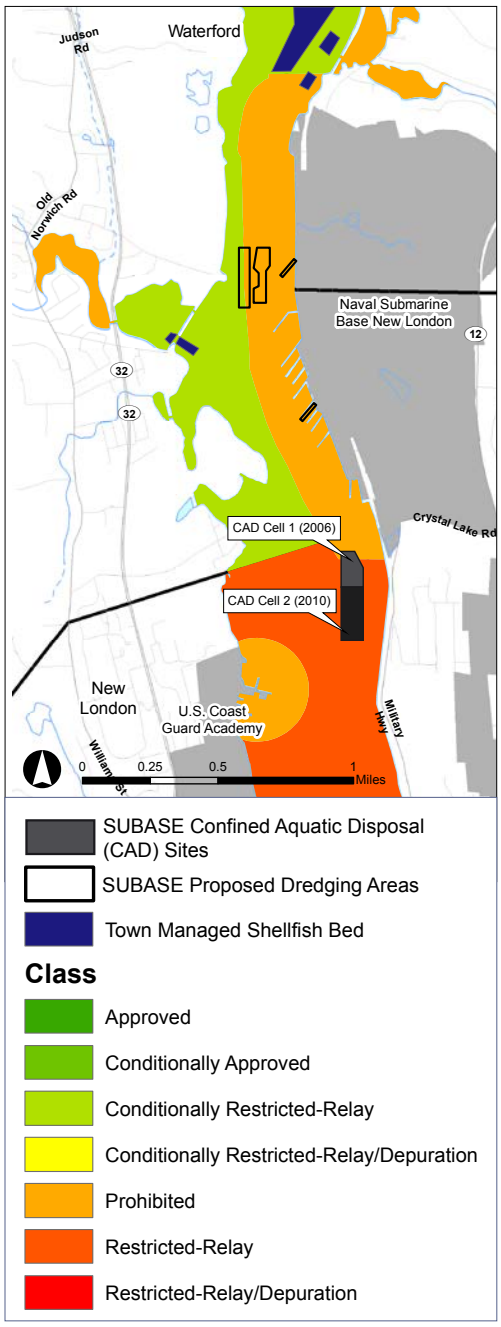

Figure A.4. *Proposed dredging locations and shellfish zones (CT DEEP shellfish classification and managed shellfish beds, SUBASE environmental resources)*

SHELLFISHING

Aquaculture activities, especially shellfish farming, north and south of the SUBASE has been increasing. Shellfish zones within the study area are shown in Figure A.4. Species found within these zones include Oyster, Hard-Shell Clam, and Soft-Shell Clam. Aquaculture requires clean water and undisturbed subaqueous bottom.

Shellfishing is prohibited immediately adjacent to the base on the Groton side of the Thames River. On the Waterford side, it is "Conditionally Restricted–Relay," meaning that under certain circumstances, shellfishing could be allowed (CT Department of Agriculture).

The Navy's environmental assessment for the Pier 32 replacement and dredging project considered shellfishing and other biological resources. It notes that dredging could adversely impact less than one acre of Waterford's potential shellfish area (in the Conditionally Restricted–Relay zone mentioned above). The Navy is not aware of active harvesting of the area, but Waterford may use the site to supply their recreational beds elsewhere. With minimization and mitigation measures such as pre- and post-dredging shellfish surveys, coordination with the Waterford Shellfish Commission prior to dredging, and adherence to dredging windows that avoid spawning season, the Navy does not expect any significant impacts to shellfish resources.

CULTURAL RESOURCES

Archaeological and Historical Context

New London, Waterford, East Lyme, and Groton have areas of high archaeological sensitivity. Over 100 Native American sites have been identified in this coastal and near-coastal zone, ranging from the earliest people, Paleoindians, to historic-period reservations for the Niantic, Pequot, and Mohegan Tribes. The coast was occupied intensively by Native Americans, and many burial sites have been found, especially in East Lyme. One Paleoindian site was found in an archaeological survey for a Navy housing project in Groton.

The area was settled early by Europeans, who were attracted to access to the rivers, Long Island Sound, and the sea. Early settlers were farmers and mariners, like Joshua Hempstead, whose house still stands in New London, and who chronicled 18th-century daily life in the greater area for nearly 50 years. The buried sites of early colonial homesteads are located in what might seem unlikely places, such as abutting a highway access ramp.

APPENDIX B
Zoning Recommendations

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The Land Use & Development section of the Compatibility Analysis includes suggestions for updates to several municipalities' zoning regulations to further area goals and address issues identified in the JLUS. Detailed recommendations for the Town and City of Groton, City of New London, and Towns of Waterford, Montville, and Ledyard are included in this section.

TOWN OF GROTON

Update the zoning along Crystal Lake Road. The Town of Groton completed a comprehensive audit of their zoning and subdivision regulations in 2016 that recommended possible updates to the Nautilus Memorial Design District (NMDD) zoning. The Town has not yet updated their zoning regulations to implement these recommendations. Per analysis of existing zoning, the 2016 audit, and discussions with Town planning staff and JLUS participants, this study recommends that the Town update the NMDD provisions as set forth below. Recommendations include review process updates, use and density provisions changes, and design standards development.

- Simplify the approval process (consider eliminating special or conditional use requirements);
- Eliminate the minimum lot size requirements for new development;
- Create a clear list of permitted uses and allow multifamily as a permitted use;
- Clarify the design objectives for the district, particularly the Crystal Lake Road frontages;
- Craft clear and predictable design standards that address building location and orientation, internal vehicular and pedestrian circulation, treatment along side and rear yards, and landscaping and building design;
- Explore the concept of offering residential density bonuses in this district in exchange for public benefit features, such as the "Mobility Hub" concept discussed on page 77.

COTTAGE HOUSING

Cottage housing is typically a cluster of 4-12 small detached housing units that surround a common open space. Cottages are typically in the 600-1,200 square feet range and popular with a variety of smaller households who desire a sense of community and limited yard maintenance responsibilities.

Figure B.45. *Cottage housing example*

Update Town of Groton zoning regulations to encourage additional high quality housing development. The Town's 2016 zoning audit identified a number of recommendations that would better encourage the amount, type, and location of new housing to serve Electric Boat employees and SUBASE personnel. These include:

- Follow audit recommendations to simplify the regulations and clarify requirements.
- Eliminate the MX District and create a mixed-use special use permit.
- Conduct a study of the Route 1 corridor to quantify uses, parcel sizes, building types, square footages, rents, etc. in conjunction with the development of a long term plan for the corridor and more immediate zoning updates.
- Update the downtown Design District provisions to encourage the incremental transformation of the area from auto-oriented strip development into a more pedestrian-friendly district with storefronts.
- Simplify the review process for multifamily uses to provide more predictability to prospective developers.
- Update dimensional and design standards for applicable zones allowing multifamily uses to acknowledge existing conditions while promoting more pedestrian-friendly development patterns.
- Consider offering administrative design departures to certain dimensional standards provided the design meets specified intent statements for the development type or district.
- Consider offering density bonuses for desirable forms of development. Example features include structured or enclosed parking and/or integration of a public trail or trail extension.
- Update zoning provisions to offer a greater mix of compatible housing types (such as cottage housing – see inset) in most or all zoning districts.

CITY OF GROTON

Update City of Groton zoning regulations to encourage additional high quality housing development. While the City updated their zoning regulations in 2016, there appear to be some opportunities that could be explored to accommodate more housing development. Also see Community Livability and Economic Development Strategies on page 96 for aligned concepts that support these efforts. These include:

- Allowing accessory dwelling units in all residential zones subject to size, ownership, and design parameters.
- Allowing townhouses and multifamily buildings as a permitted use in RM zone (rather than going through a special use process) provided they meet design standards that address development frontage, building massing and design, internal open space, landscaping, and site edges.
- Applying the same set of design standards as noted above to townhouses and multifamily uses in the FC and GC zones. Consider relaxing the ground level street front commercial requirement on portions of the FC and GC zones where such uses are marginally viable.

Figure B.46. *Accessory dwelling unit example*

Figure B.47. *Multifamily example*

CITY OF NEW LONDON

Update City of New London zoning regulations to encourage additional high quality housing development. Based on review of New London's Zoning Regulations, dated October 18, 2015, suggestions to encourage additional housing development to accommodate the influx of anticipated Electric Boat workers within the coming decade include:

- Increase flexibility for multifamily uses in the C-1 and C-2 districts, which provide some of the better opportunities for infill development in the City. In the C-1 district, eliminate requirement that such uses only be allowed in mixed-use structures, except along key block frontages where the City deems ground level street facing commercial uses to be essential.
- Increase flexibility for ground level multifamily uses in the CBD-2 district.
- Consider reducing the minimum parking requirements for efficiency units (from 1 space to 0.75 space/unit) and 1 bedroom units (from 1.5 spaces to 1 space per unit) to provide greater flexibility for developments and let the marketplace drive parking requirements.
- Craft design standards for the integration of multifamily uses in C-1 and C-2 zones to promote compatibility between sites and enhance the livability of developments for residents. Key design issues to consider include building location and orientation, pedestrian and vehicular circulation, usable open space for residents, and building design standards.
- Consider developing a cottage housing regulations and allowing such developments in most residential districts.

TOWN OF WATERFORD

Update Town of Waterford zoning regulations to encourage additional high quality housing development. Based on review of Waterford's Zoning Regulations, dated October 17, 2017, suggestions to encourage additional housing development to accommodate the influx of anticipated Electric Boat workers within the coming decade include:

- Allow ground-level housing (attached single family and multifamily) in parts or all of the CG (first priority), CR (second priority) and CT (third priority) districts. Current regulations don't allow residential at all, except for one family dwellings and accessory apartments in the CG and CT districts. Allowing greater flexibility for residential uses adds more choices to property owners in these districts, while more housing in these areas increases demand for retail uses within walking distance of shops.
- In addition to the above use updates, adjust the minimum lot width and setback standards in the CG, CR, and CT districts to allow greater flexibility for multifamily uses
- Update regulations in the multifamily residential districts to add greater flexibility. Key changes:
  - Eliminate or reduce the 60,000 square foot lot size minimum.
  - Eliminate or reduce minimum lot width requirements.
  - Allow flexibility to exceed the maximum 8 dwelling units per acre.
  - Reduce front yard setbacks (from 75' to 20-30' depending on roadway classification).
  - Eliminate the 25 percent maximum building coverage standard.
- Craft and adopt design standards for multifamily uses to better ensure that such uses are well integrated into the community. Key design issues to consider include building location and orientation, pedestrian and vehicular circulation, usable open space for residents, and building design standards.
- Reduce minimum parking requirements for studio and one bedroom apartments from 1-1/2 spaces to 1 space.
- Consider developing cottage housing regulations and allowing such developments in most residential districts.

TOWN OF MONTVILLE

Update Town of Montville zoning regulations to encourage additional high quality housing development. Based on review of Montville's Zoning Regulations, dated March 6, 2017, suggestions to encourage additional housing development to accommodate the influx of anticipated Electric Boat workers within the coming decade include:

- Allow ground-level housing (attached single family and multifamily) in parts or all of the C-1 and C-2 districts, which appear to have an extensive amount of vacant and underutilized properties. Current regulations only allow such uses on upper floors via a special use permit. Allowing greater flexibility for residential uses adds more choices to property owners in these districts, while more housing in these areas increases demand for retail uses within walking distance of shops.
- Allow duplexes by right in the R20 district, provided they meet special design standards. Such standards depend on design objectives of the Town and/or the R20 communities, but could address building entry design, garage and parking location, façade materials, and roofline design.
- Craft and adopt design standards for multifamily uses to better ensure that such uses are well integrated into the community. Key design issues to consider include building location and orientation, pedestrian and vehicular circulation, usable open space for residents, and building design standards.
- Reduce parking requirements for multifamily uses by a half-space for each use type.
- Reduce front yard setbacks (currently between 40-50 feet for multifamily in most districts) to no more than 25 feet to create a more pedestrian-friendly environment more consistent with historical residential development patterns in Montville's established villages.
- Reduce the minimum lot size for new development in the commercial zones and R20-M zones to allow greater flexibility in accommodating new development, provided they meet design standards.
- Develop standards for accessory dwelling units and allow them in all residential districts.
- Consider developing cottage housing regulations and allowing such developments in most residential districts.

TOWN OF LEDYARD

Update Town of Ledyard zoning regulations to encourage additional high quality housing development. Based on review of Ledyard's Zoning Regulations, dated August 8, 2016, suggestions to encourage additional housing development to accommodate the influx of anticipated Electric Boat workers within the coming decade include:

- Allow ground level multi-family uses in the LCVD-1 district for portions of sites away from street frontages.
- Allow single purpose ground level multi-family uses in all of the LCVD-2 district (currently, multi-family is allowed on up to 75 percent of the lot or building usage).
- Relax minimum lot size requirements (20,000 square feet) in the LCDV-3 and the MFVD districts provided other applicable village design standards are met.
- Reduce minimum parking requirements for studio and one bedroom apartments from 2 spaces to 1 space.

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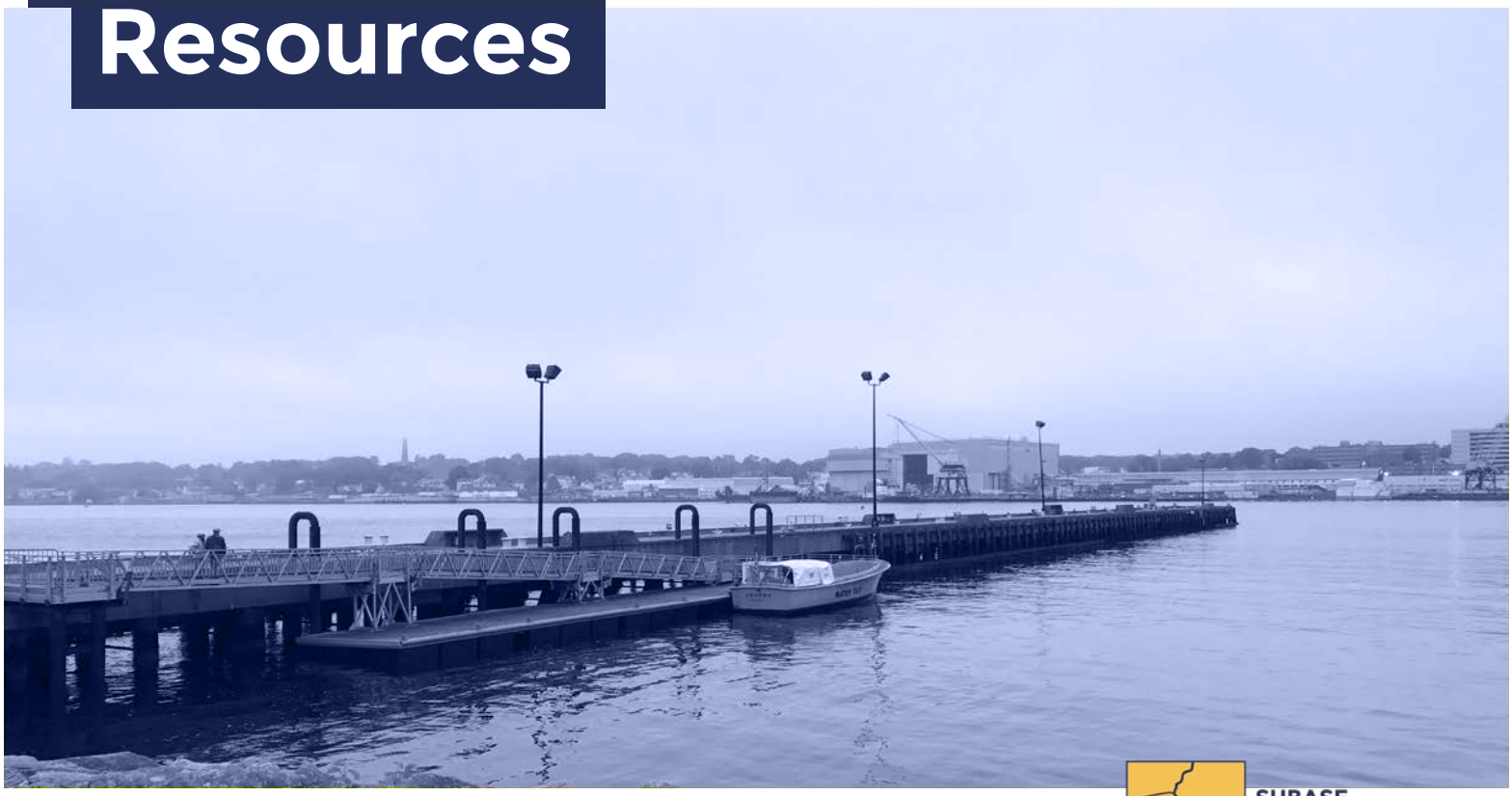
APPENDIX C:
Resources



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The following materials include:

1. An example annotated outline for a memorandum of understanding (MOU) that JLUS parties may use to coordinate implementation (see CC4 on page 111 for more information) and
2. An excerpt from "The Basics of Impact Aid" publication from the National Association of Federally Impacted Schools (NAFIS) discussing impact aid for federally connected children.

SAMPLE MEMORANDUM OF UNDERSTANDING ANNOTATED OUTLINE

Introduction

The following outlines a Memorandum of Understanding (MOU) the SUBASE New London Joint Land Use Study participants may use to implement the strategies described in Chapter 3. An MOU would formalize coordination protocol between the Navy and the community of stakeholders, making ongoing coordination consistent and predictable.

MOUs are negotiated agreements, though they may be non-binding in the legal sense. The parties to an MOU are not obligated to include all the strategies recommended in Chapter 3, and they can select and tailor strategies differently for each participant. They may accept certain ones, or they may add provisions other than those included in the study. This will be up to the JLUS parties (potentially the JLUS Implementation Committee) during the implementation phase.

This annotated outline provides a framework for that discussion consistent with the recommendations of the JLUS between all or some of the parties included in the draft.

Memorandum of Understanding for Navy Coordination

This Memorandum of Understanding ("MOU") is entered into by and between the Navy, Towns, Cities, Councils of Government, Tribes, and Other Stakeholders[1] (collectively referred to as the "Parties")[2] for the purpose of encouraging compatible growth and Party coordination in the vicinity of the properties and training areas associated with SUBASE New London.

RECITALS[3]

PART I: DEFINITIONS

For purposes of implementing the provisions of this MOU, the terms set forth below shall have the following meanings:[4]

Joint Land Use Study means the "Joint Land Use Study for SUBASE New London," dated ***<insert date of final study>***, 2017.

Local Governmental Parties means Southeastern Connecticut Council of Governments, Town of Groton, Town of Ledyard, Town of Montville, Town of Waterford, City of Groton, and City of New London.

Local Tribes means the Mashantucket Pequot Tribal Nation and the Mohegan Tribe.

Off-Base Operational Impacts *<to be Determined by the JLUS Implementation Committee>*[5]

Written Notice means an electronic or hardcopy communication by and between Points of Contact as provided in this MOU.

PART II: POINTS OF CONTACT

<Names of All Parties>

<Official Title>

<Address>

<Phone Number>

<Email Address>

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[1] *Generalized terms for the parties are used for purposes of the outline only. When the MOU is developed, military installations, local municipalities, local tribes, and other stakeholders would be expressly indicated as parties to the MOU.*

Also, the committee or agency overseeing the MOU, such as the Southeast Connecticut Council of Governments, Military Planning and Coordination Committee, or other regional planning/coordinating agency, may have a representative on the MPC, and therefore be a party to the MOU. Alternatively, the MPC may be comprised of the Parties to the MOU.

[2] *Additional parties could join an MOU, of course. For example, the Connecticut Department of Transportation, Office of Military Affairs, or other agencies may have a role. The decision of one party not to participate in an MOU does not preclude remaining parties from entering and successfully effectuating an MOU.*

[3] *Commonly referred to as the "whereas" clauses, recitals would set out the history of the JLUS process and resulting MOU and the basis for its provisions, including, for example, civilian quality of life, citizen and personnel safety, protection of the Navy's mission, specifics of the SUBASE missions, and impacts on the use of affected property.*

[4] *Any terms that are unfamiliar to the general public can be defined to facilitate consistent implementation of the MOU and to avoid confusion after execution.*

[5] *Off-Base Operational Impacts likely would include transportation impacts, water-based training and missions, security, freight routes, among others discussed in the JLUS. However, impacts on and from the Navy's properties and operations may change over time and will ultimately be defined based on the affected Parties joining an MOU.*

PART III: SHORT-TERM COMMITMENTS OF THE PARTIES (FIRST THREE YEARS)[6]

<This section may include the strategies in Chapter 4 and the JLUS Implementation Matrix, indicated by an "S" under the "Anticipated Timeframe" column to occur within the first 3 years following completion of the Joint Land Use Study.>

PART IV: MEDIUM-TERM COMMITMENTS OF THE PARTIES (FOUR TO 10 YEARS)[7]

<This section may include the strategies in the JLUS Implementation Matrix indicated by an "M" under the "Anticipated Timeframe" column to occur between 4-10 years following completion of the Joint Land Use Study.>

PART V: LONG-TERM COMMITMENTS OF THE PARTIES (11 TO 20 YEARS)[8]

<This section may include the strategies in the JLUS Implementation Matrix indicated by an "L" under the "Anticipated Timeframe" column to occur between 11-20 years following completion of the Joint Land Use Study.>

PART VI: THE MILITARY PLANNING COMMITTEE (MPC)[9]

A. MPC MISSION AND PURPOSE

<to be determined by the JLUS Implementation Committee>

B. NATURE AND ORGANIZATIONAL STRUCTURE

<to be determined by the JLUS Implementation Committee >

C. MEMBERSHIP

<to be determined by the JLUS Implementation Committee >

D. TERMS AND VOTING

<to be determined by the JLUS Implementation Committee >

E. OFFICER AND COMMITTEE DUTIES

<to be determined by the JLUS Implementation Committee >

F. MEETINGS

<to be determined by the JLUS Implementation Committee >

G. DISSOLUTION

<to be determined by the JLUS Implementation Committee >

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[6] The prioritization (Low, Medium, High) indicated in the JLUS Strategies Summary in Chapter 4 could be helpful to the JLUS Implementation Committee and/or MOU parties when prioritizing actions within each timeframe.
[7] See footnote 6.
[8] See footnote 6.
[9] MOU participants may choose to designate an MPC for long-term coordination. The MPC's organizational rules could be included in the MOU, as shown here, or in a separate set of bylaws. Inclusion of the rules in the MOU would be advisable in the event that all parties to the MOU are represented on the MPC. On the other hand, if some parties to the MOU would not be on the MPC, then a separate set of bylaws governing the MPC might be more appropriate. This is a decision that the JLUS Implementation Committee would take up during JLUS implementation.

H. RULES

<to be determined by the JLUS Implementation Committee >

PART VII: MISCELLANEOUS

I. NATURE OF THE MOU

Though non-binding, legally speaking, the MOU reflects a commitment of the Parties to move forward in a formal manner.

J. REVIEW

The Parties will review the MOU at least ***<to be determined by the JLUS Implementation Committee>*** and make recommendations for any modifications.

K. MODIFICATION

Modifications to the MOU will be mutually agreed to in writing by the Parties.

L. WITHDRAWAL

Any Party may withdraw from participation in the MOU by giving Written Notice to all other Parties. Withdrawal of one Party does not terminate the MOU.

M. DURATION

The term of the MOU is ***<to be determined by the JLUS Implementation Committee>*** years and may be extended for additional ***<to be determined by the JLUS Implementation Committee>*** year terms.

N. NO AGENCY BETWEEN THE PARTIES

It is understood between the Parties to the MOU that no Party will represent to any other party the existence of any agency relationship.

O. EFFECTIVE DATE

This MOU is effective upon execution by all Parties.

IN WITNESS WHEREOF, the parties have executed this Memorandum of Understanding on the dates below written.

<INSERT ORGANIZATIONAL NAME OF PARTY>

The _____ day of _____, 20____

_____

<INSERT SIGNATORY'S NAME>

THE BASICS OF IMPACT AID

The following is an excerpt (pages 14-21) from "The Basics of Impact Aid," a publication produced by the National Association of Federally Impacted Schools (NAFIS) that discusses the calculation of basic support payments to school districts and some of the factors that determine the Local Contribution Rate (LCR) for a school district.

SECTION 7003 BASIC SUPPORT PAYMENTS FOR FEDERALLY CONNECTED CHILDREN

Basic Support Payments for federally connected children compensate school districts for educating students whose parents or legal guardians reside and/or work on Federal property, including children of members of the uniformed services, and children who reside on Indian Lands. Section 7003 is the largest component of the Impact Aid Program, both in regard to funding and to number of school districts.

A school district can choose one or both of the following two options to count its students:

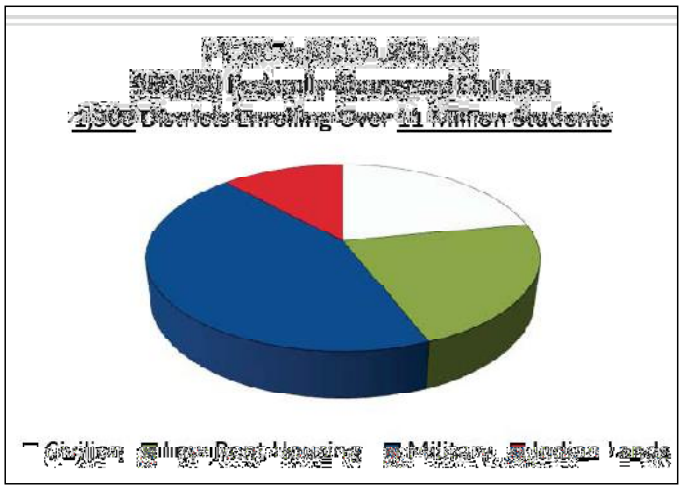
1. *Parent-Pupil Survey: A U.S. Department of Education-approved form for counting the school district's federally connected children. The school district provides a form to parents for each enrolled child. The parent-pupil survey form is a means of authenticating the child's place of residence and the parent's place of employment.*
2. *Source Check: A U.S. Department of Education-approved means of counting the membership of a school district's federally connected children. It is provided to: 1) a parent's employer, who identifies the place of employment of a parent of a pupil claimed; 2) to a housing official, who indicates the residence of each pupil claimed; and 3) to a tribal official, who states each pupil claimed resides on Indian Lands over which that tribal official has jurisdiction.*

Did you know . . .

Some school districts meet the eligibility requirements for both Sections 7002 and 7003. In the cases where school districts are receiving a payment under both Sections, the combined payment cannot be greater than the higher of the two maximum payments.

Eligibility

To be eligible for a Basic Support payment, a school district must educate at least 400 Federal students in average daily attendance (ADA) or at least three-percent of the school district's ADA is Federal students.



Federally Connected Children

Those children whose parent(s) or legal guardian(s) reside and/or work on Federal property are considered federally connected. The law recognizes as eligible:

- **Indian Land** - Children whose parent(s) live on Indian trust, treaty or ANSCA land (1.25 weight).
- **Military on-base** - Children whose parent(s) are members of the uniformed services and reside on a military installation, including children of foreign military officers (1.0 weight).
- **Military off-base** - Children whose parent(s) are members of the uniformed services but who reside off the military installation, including children of foreign military officers (.20 weight).
- **Low rent housing** - Children whose parents reside in Federal low rent housing (not Section 8 housing) (.10 weight).
- **Civilian** - Children whose parent(s) both live AND work on Federal property (1.0 calculation)
- **Civilian whose parent works OR lives on Federal property*** - Children whose parent(s) resides on Federal property, but works on taxable land OR children whose parent(s) resides on taxable land, but works on Federal property (.05 weight).

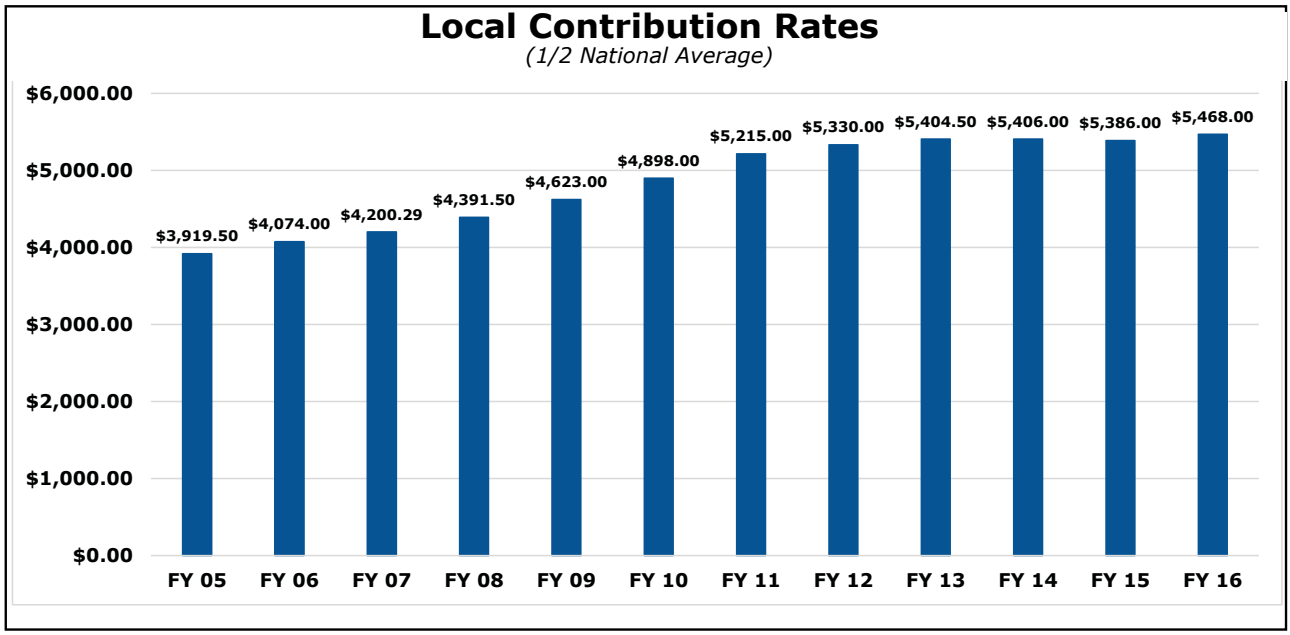
***Civilian students can only be calculated into a school district's payment if there are 1,000 in ADA OR they represent at least 10-percent of the school district's ADA.**

Local Contribution Rate

There are three factors that determine a district's payment:

1. The Local Contribution Rate (LCR)
2. The number of Weighted Federal Student Units (WFSUs)
3. Congressional Appropriations

The Basic Support formula is derived from the premise that 50-percent of the cost of educating a child comes from state funding and 50-percent comes from local revenue. The term used to compute the local loss as measured by per-pupil expenditure is called the Local Contribution Rate or LCR.

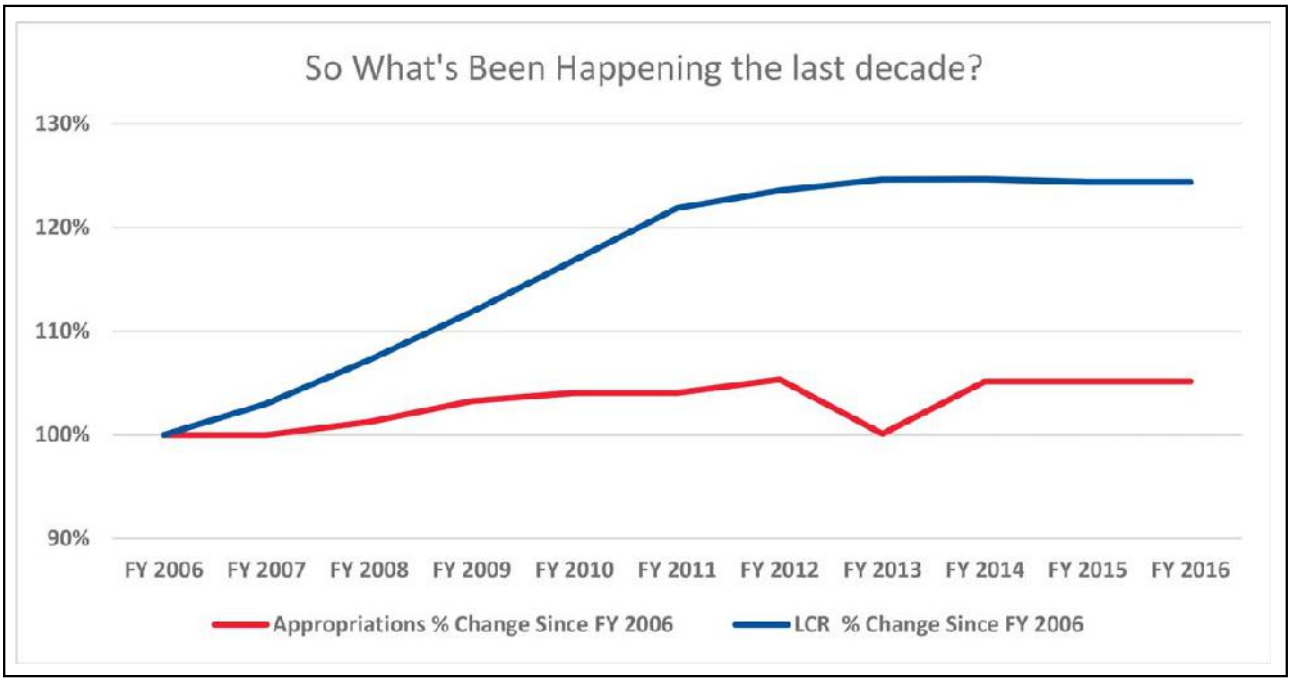


There are four ways a school district can calculate the LCR. A school district may choose the LCR which yields the highest amount.

1. 50-percent of the state average per-pupil expenditure or
2. 50-percent of the national average per-pupil expenditure or
3. The average percentage of local revenue that makes up the average per-pupil expenditure in the state or
4. The use of comparable school district per-pupil expenditures

The data used to compute the LCR is based on data three years prior to the fiscal year for which the payments are calculated. For example, Fiscal Year 2016 (school year 2015-2016) payments will be based on data compiled for Fiscal Year 2013 (school year 2012-2013).

Since per-pupil expenditures change each year, the LCR will change each year as well, reflecting real changes in the costs of education. If the appropriations for Basic Support payments do not keep pace with the percentage change in the LCR, payments to districts will fall behind, widening the margin of the unmet need. The graph below illustrates how stagnant appropriations widen the gap of unmet need.



"Even with Impact Aid and higher tax rates, we receive fewer dollars per student than any district in our region. We stretch each dollar for our students.

For us, Impact Aid is a basic necessity helping cover essential underfunded services like special education, transportation, facilities and operating costs."

Determining a School District's Section 7003 Maximum Payment

There are two steps to determine a school district's maximum payment:
Step 1 - multiply the number of Federal students in (ADA) by their respective weights to determine the total Weighted Federal Student Units (WFSUs); Step 2 - multiply the school district's total WFSUs by the LCR.

Example

TYPE OF STUDENT	# FED. STUDENTS IN ADA	X WEIGHT	= TOTAL WEIGHTED FED. STUDENT UNITS
Indian Land	100	1.25	125
Military on-base	100	1.00	100
Military off-base	100	0.20	20
Low Rent Housing	100	0.10	10
Civilian whose parent works OR lives on federal property only	100	0.05	5
District Total	**500**	**-**	**260**

TOTAL WEIGHTED FED. STUDENT UNITS	X LCR	= MAXIMUM PAYMENT
260	**$5,386**	**$1,400,360**

Did you know . . .

Students living on private property due to military on-base or Indian Lands housing renovation can be included in a school district's count if those students are temporarily displaced due to a federally initiated, certified housing renovation.

Determining a School District's Actual Payment

- The Impact Aid funding calculations are complicated ONLY because the program is **not fully funded (it hasn't been since 1969)**. Currently, the Basic Support program is funded at about 55-percent of need, leaving a 45-percent unmet need and therefore, a formula was developed by Congress to fairly distribute available funds.
- Payments are reduced and distributed on a "needs-based" formula, not simply prorated. School districts more dependent on funds receive a higher proportion of their maximum payment than those not as financially dependent on Impact Aid.
- The **"Learning Opportunity Threshold" (LOT),** is the percentage that indicates how dependent a school district is on Impact Aid funds—the higher the LOT percentage, the closer the LOT payment is to the Maximum Payment.
- To determine a school district's LOT percentage, add:

The percentage of Federal students in ADA	**+**	The percentage the Maximum Payment is of the district's total current expenditures (TCE)

- Each school district has its own LOT percentage, ranging from one-percent to 100-percent. As long as the appropriations are sufficient to fund LOT at 100 percent, a 100-percent LOT district will receive its Maximum Payment.

Over the past decade, appropriations have not kept pace with increasing education costs resulting in districts receiving an increasingly lower percentage of their calculated need-based payment (a percentage of a district's maximum payment). The payout fell below 100-percent in FY 2011 (see chart), meaning even the highest-needs districts - those with a 100-percent LOT - did not receive their Maximum Payment.

	DEPT. OF ED PAYMENT LEVEL
FY 2008	136.930% of LOT
FY 2009	129.870% of LOT
FY 2010	115.524% of LOT
FY 2011	97.066% of LOT
FY 2012	96.109% of LOT
FY 2013	87.0611% of LOT
FY 2014	91.73% of LOT
FY 2015	90%-92% of LOT*
FY 2016	90% -92% of LOT*

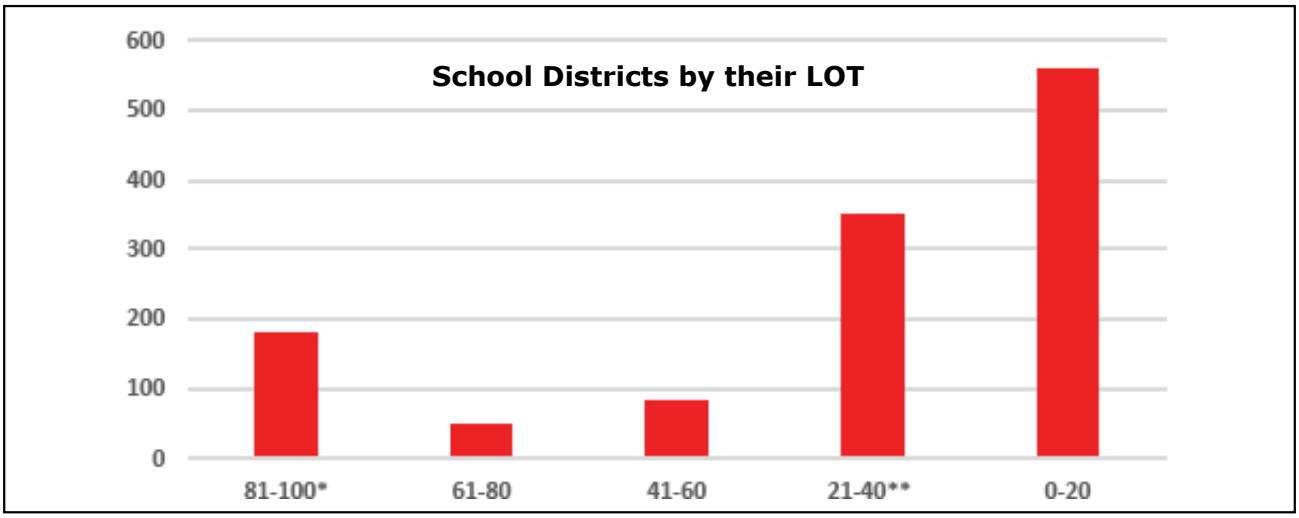
***Represents estimated final rates.**

Example

LOT CALCULATION	SCHOOL DISTRICT "1"	SCHOOL DISTRICT "2"
Total ADA	1,200	1,200
Total Federal Student ADA	650	50
Total Current Expenditure	$6,000,000	$9,000,000
Maximum Payment	$4,376,125	$336,625
Percent Federal Students ADA	54 percent	4.2 percent
Percent Maximum Payment of TCE	73 percent	3.8 percent
LOT Percentage*	100 percent	8 percent
(*LOT Percentage is never higher than 100-percent.)		
LOT PAYMENT	**SCHOOL DISTRICT "1"**	**SCHOOL DISTRICT "2"**
(LOT Percentage X Maximum Payment)	$4,376,125	$26,930

Summary:

- District "1" has a LOT of 100-percent since 54-percent of its students are Federal and 73-percent of its TCE (LOT cannot exceed 100-percent). The maximum payment represents 73-percent of the district's TCE. This is an example of one school district that receives its BSP, as long as the funding level is sufficient to pay districts 100 percent of their LOT payment.
- District "2" has a LOT of eight-percent because Federal students make up only 4.2-percent of its ADA and the maximum payment makes up only 3.8-percent of its TCE.



***146 school districts have a LOT percentage of 100-percent, the highest "need factor."**
****237 school districts have a LOT percentage of 40-percent, including those eligible for the Small School Adjustment.**

Small School Adjustment

School districts with fewer than 1,000 students in ADA and an average per-pupil expenditure less than the state or national average per-pupil expenditure qualify for an automatic 40-percent LOT. The Small School Adjustment was added to the law in 2000, and applies to about 237 school districts nationwide; about 133 of them are in Oklahoma.

> ***"In our remote rural area, Impact Aid is essential to support our entire transportation department.***
>
> ***Without Impact Aid we would not be able to run our buses and without the bus runs, we would have to close down the school."***

SECTION 7003 (B)(2)-HEAVILY IMPACTED DISTRICTS

Districts qualify for additional funding if they meet three criteria related to local tax effort, per pupil expenditures, and percentage of federally connected students. Approximately 30 school districts meet this criteria each year.