

# HANCOCK ASSOCIATES

**Limited Development of Regional Impact Application**  
*for*  
**Springhill Suites by Marriot**  
*556 Main Street*  
*Falmouth, MA*



*Prepared By:*  
**Hancock Associates**  
17791

**Prepared For:**  
**Falmouth Hospitality, LLC**

**July 11, 2014**  
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## 1. Project Description

### **Introduction**

Falmouth Hospitality, LLC proposes the redevelopment of an existing site at 556 Main Street in Falmouth, MA constructing a 110 room Springhill Suites by Marriot Hotel. The project is located in the Falmouth Business Redevelopment District and has been designed in compliance with Chapter 240-240 of the Falmouth Zoning Bylaw.

Hancock Associates and Vanasse & Associates, Inc. (VAI) has completed this report in support of an Application pursuant to Section 5 of the Cape Cod Commission Chapter A, *Enabling Regulations Governing Review of Developments of Regional Impact* (DRI), for a Limited DRI Review of a proposed extended stay hotel to be located at 556 Main Street (Route 28) in Falmouth, Massachusetts (the "Project"). The purpose of this preliminary report is to provide sufficient information to allow the Cape Cod Commission (the "Commission") to make a finding that the Project meets the requirements for Limited DRI review with respect to the required performance standards relative to those issues as identified in the 2009 *Cape Cod Regional Policy Plan* as amended the Commission believes are either satisfied herein or that are not applicable or in need of further study. The Applicant would endeavor to work with Commission to develop a full Developments of Regional Impact application to the Commission focused on the issues the Commission feels warrant further study.

### **Existing Conditions**

The exiting site is comprised of several parcels acquired by the Fay Family starting in the 1940s (Assessor's 47B03-017A-004, 47B-02-005-001, 47B-03-017-002, 47B-02-004-003 and 47B-03-016). The site was bifurcated by Lantern Lane, a 40 foot wide private way created in 1947. The Falmouth Planning Board recently voted favorably to modify the original subdivision plan to eliminate a section of the Lantern Lane Right of Way from Main Street to the northern extent of the Fay property while maintaining an access and utility easement thus making the parcel a single parcel for development. The site is bounded to the south by Main Street, to the west by Pondview Park Commercial Condominiums, to the north by 5 and 6 Lantern Lane, which are single family residential properties and to the west by lands of the Correia Family Trust, which is a retail center containing a Dunkin Donuts, Anytime Fitness, Hair Essentials and Stone's Barber Shop. The property is also bounded to the east by land of Harriet Dugan where Dugan Real Estate resides.

The 2.03 acre site itself is fully developed consisting of commercial and accessory buildings, compacted gravel parking and material storage areas. Additionally, the 7,814 square foot property at 3 Lantern Lane owned by the Fay Family is included in the application for the purposes of meeting local zoning Lot Coverage requirements. However, no work is proposed on this lot that contains a small single family house. It is envisioned the house will continue to be rented on a seasonal basis. A triangular section of the site in the north abutting Lantern Lane and the home at 6 Lantern Lane is vegetated with grass and some trees. Elevations on-site range from elevation 10 at a depression in Lantern Lane to 18 at the northern corner. Four buildings exist on the main commercial site with a total floor area of 19,000 square feet. The main building is a two story gambrel wood framed building built in the 1940s and features storefront windows on the street level with six dormered windows facing Main Street. The building also features a one story showroom building on lantern Lane and a two story "L" wing off the northwest corner of the main structure. This building has been expanded over the years and connected to a one story masonry block building in the back serving as a warehouse with loading dock doors. Additional accessory building include a 400 square foot one story concrete block garage, a 5,000 square foot, one story concrete block building and a 120 square foot shed. The buildings on site are currently being utilized by several commercial entities including;

Fay's Gallery Antique Co-op, Clover Landscaping contractor's yard and Pristine Spring, a self-serve water dispensary that occupies the shed. The buildings are in varied states of disrepair and could be classified as a general blight on the area streetscape. The site is located 1500 to the east of the Falmouth Village Historic District. While not in the district, the area is considered part of Falmouth Center as evidenced by its inclusion in the Business Redevelopment (BR) Zoning District which runs east to 704 Main Street. The area is therefore considered an Economic Center as the Falmouth Zoning Bylaw the purpose of this article is to promote the revitalization of commercial centers. None of the buildings on site are listed on the Massachusetts Historical Commission's inventory or listed by the Town of Falmouth on their list of significant structures per the Town Clerk's Office.

Vehicular access to the site is currently provided via a 40 foot wide access easement (formerly a section of Lantern Lane) which runs from Main Street to the south and continues Lantern Lane to the north to a residential neighborhood abutting the property. The old section of Lantern Lane is in serious disrepair and experiences flooding during major rain events. The roadway drops from an elevation of 15 at Main Street to a catch basin a low point 200 feet from Main Street at an elevation of 10, then rises to an elevation of 17 near the homes at 3 and 6 Lantern Lane. This catch basin as well as one just to the north appear to be leaching basins with no outlet. Other utilities in the area include a 6" water main in Lantern Lane connected to a 10" main in Main Street, sewer services servicing just the commercial buildings on site and overhead electric which do pass through to the northern section of Lantern Lane. Sewer, drainage, water and overhead electric, cable and telephone utilities exist within Main Street and are available to the project.

### **Proposed Conditions**

The proposal calls for the demolition of all structures on site except the dwelling at 3 Lantern Lane and redevelopment of the parcel constructing a Springhill Suites by Marriot hotel with associated parking, on site amenities and necessary infrastructure improvements.

The hotel will be divided into two buildings with upper level connectors on the second and third levels and will have 110 guest rooms and a total of 65,000 square foot floor area. The building has been designed in keeping with the Town Falmouth design principles with regard to redevelopment fostering pedestrian-friendly streetscapes by providing sheltered, rear and side yard parking, and allowing shared parking between businesses and uses. The project also takes advantage of the districts relaxed front and side yard setbacks to encourage sidewalk development and pedestrian-friendly buildings offering street side gathering places in front of redeveloped property, rather than front yard parking fields. The Project meets the Cape Cod Commission's Regional Policy Plan's preference for locating new development and redevelopment in existing village centers, economic centers, or concentrated development areas because of the efficiencies of providing infrastructure in more densely developed areas and because it supports the regional development pattern of dense village centers and outlying rural areas. The Commission's design manual supports this pattern in its opening pages, stating: "Locate new development in or immediately adjacent to town, village, and growth centers to reinforce such centers and to preserve surrounding rural areas."

The architectural design has also kept the town and Cape Cod Commission's directives. The design addresses the street and to maintain established setback patterns, consistent with traditional village design. Although a street-oriented entrance is not possible given the need for vehicle access for check-in, a faux entrance is included on Main Street with principal windows on the street elevation to reinforce the building's primary relationship to the street. Windows, second floor decks and multiple articulated roof lines and architectural detailing on all street-facing elevations as well as pedestrian amenities have been included. The form and scale of the buildings should be consistent with their surroundings and should

incorporate pedestrian-scaled amenities such as porches and stoops and doors and windows that are consistent with the pedestrian nature of the building.

Associated site improvements will include paved parking, driveway, recreation, and pedestrian areas, landscaped areas, utilities, and a stormwater management system. Vehicular access to the project site will be provided via a driveway located in approximately the same location as the abandoned portion of Lantern Lane. The driveway will provide an entrance and exit onto Main Street as well as a connection to the remaining portion of Lantern Lane. Parking areas will be provided on surface lots under the eastern building, along the driveway, in the northern portion of the site partially under the western building; an additional 37 spaces of parking needed for the hotel is provided within surplus parking within a proposed parking lot associated with a small retail building proposed at 587 Main Street approved by the Falmouth Planning Board on October 14, 2014 and located within 300 feet of the hotel lobby entrance as allowed by Falmouth By-laws as a matter of right (no Special Permit required).

New sanitary sewer, gas, and domestic and fire protection water services will be provided for each of the proposed buildings. The services will connect to the existing sewer, gas, and water mains in Main Street. The proposed stormwater management system has been designed in accordance with the Standards described in the Massachusetts Stormwater Handbook. It will include subsurface stormwater storage and treatment systems.

## **2. Limited DRI Review Scoping Checklist**

- Checklist
- Narrative on Responses in Shaded Boxes

**LIMITED DRI REVIEW - SCOPING CHECKLIST  
REDEVELOPMENT/CHANGE OF USE**

Land Use	Question	Required Info	Yes	No
Compact Growth and Resource Protection	Is the project consistent with the land use categories and their characteristics? (check "Yes" if Town has not adopted a Land Use Vision Map)	RPP Regional Land Use Vision Map which shows project site	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Compact Growth and Resource Protection	Is the development clustered on the site?	Preliminary project plans, Local zoning	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Capital Facilities and Infrastructure	Does the project create new infrastructure?	Preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Capital Facilities and Infrastructure	Does the project propose to construct a new wireless facility?	Preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Rural Lands	Is the project site adjacent to rural landscapes or land under active agricultural production?	Staff consultation/Preliminary project plans showing prime agricultural lands	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Rural Lands	Is the land capable of sustained agricultural production as evidenced by recent use, soils, or adjacent land use?	Staff consultation/Preliminary project plans showing prime agricultural lands	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Water Resources	Question	Required Info	Yes	No
Drinking Water Quality and Quantity, Marine Water Embayments and Estuaries, Freshwater Ponds and Lakes	Is the project located in a Wellhead Protection Area, Potential Public Water Supply Area, Marine Water Recharge Area, or Fresh Water Recharge Area?	Site locus map showing watersheds described by Water Resources Classifications Maps I & II	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Public and Private Sewage Treatment Facilities	Is the project's wastewater facility an on-site septic system or private treatment plant?	Preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Water Quality Improvement Areas, General Aquifer Protection	Is there a net increase in nitrogen load from wastewater, stormwater and turf on-site and does the project's nitrogen load from wastewater, stormwater and turf exceed 5 parts per million?	Nitrogen loading calculations (Technical Bulletin 91-001) comparing existing system design / site development and proposed system design / site development	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Stormwater Management	Does the project substantially improve stormwater management by incorporating Low Impact Design to the greatest extent possible?	Engineered grading, drainage, and erosion control plans that show existing and proposed conditions and stormwater design details	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Stormwater Management	Does the project have a comprehensive engineer-certified Operations and Maintenance Plan (Plan) that 1) demonstrates compliance with the Massachusetts Stormwater Policy & Guidelines 2) provides a schedule for inspection, monitoring and maintenance 3) identifies the parties responsible for Plan implementation and 4) includes an inspection and maintenance log	Copy of project's Stormwater Operation and Maintenance Plan	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Coastal Resources	Question	Required Info	Yes	No
Protecting Maritime Industry, Character and Public Access	Does the project involve a conversion or loss of an existing water-dependent use, any marine infrastructure, or an existing legal public access to the coast?	Preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Protecting Maritime Industry, Character and Public Access	Does the project limit views of the ocean and/or shoreline from public ways, waterways, access points, and existing development relative to existing conditions?	Preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Coastal Hazard Mitigation	Does the project involve any expansion or new site disturbance in, or within 100 feet of: land subject to coastal storm flowage, barrier beach, coastal dune, or coastal bank?	Preliminary project plans indicating flood zone boundary, and Resource Area Delineation through local Conservation Commission	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Coastal Hazard Mitigation	Is the project located in land subject to coastal storm flowage, coastal beach, bank, dune or barrier beach?	Resource Area Delineation through local Conservation Commission	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Preserving Coastal Water Quality and Habitat	Does the project involve any alteration of a coastal wetland or its 100 foot buffer zone?	Resource Area Delineation through local Conservation Commission	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Responses in the shaded boxes may be included in the scope of CCC review.  
Consultation with CCC staff recommended.**

**LIMITED DRI REVIEW - SCOPING CHECKLIST  
REDEVELOPMENT/CHANGE OF USE**

Wetlands/Wildlife & Plant Habitat		Question	Required Info	Yes	No
Wetlands	Does the project involve any alteration of a wetland that is greater than 500 square feet in size?	Resource Area Delineation through local Conservation Commission	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Wetlands	Does the project involve any alteration of a 100 foot buffer to a wetland that is greater than 500 square feet in size?	Resource Area Delineation through local Conservation Commission	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Wetlands	Does the project involve any alteration of a 350 foot buffer to a vernal pool?	Resource Area Delineation through local Conservation Commission	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Wetlands	Will the project result in any new or additional direct stormwater discharge into a wetland or waterbody that is greater than 500 square feet in size?	Preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Wildlife & Plant Habitat	Will the project disturb or alter naturally vegetated areas?	Existing conditions plan	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Wildlife & Plant Habitat	Is the project site mapped as Estimated or Priority rare species habitat by the Massachusetts Natural Heritage & Endangered Species Program (NHESP)?	NHESP Atlas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Open Space Protection & Recreation		Question	Required Info	Yes	No
Open Space Protection & Recreation	Will the project disturb or alter a Significant Natural Resource Area (SNRA)?	SNRA map and preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Open Space Protection & Recreation	Will the project disturb or alter more than 2 acres of land outside a Significant Natural Resource Area?	SNRA map and preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Energy		Question	Required Info	Yes	No
Energy	Has the project been designed to meet LEED Certification?	Design information or LEED Certification Checklist	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Energy	Is the project Mixed Use as defined by the Regional Policy Plan?	Project description, RPP definition of Mixed Use	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Energy	Is the project located in an Economic Center? (check "No" if Town has not adopted a Land Use Vision Map)	RPP Regional Land Use Vision Map which shows project site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Economic Development		Question	Required Info	Yes	No
Low Impact and Compatible Development	Is the project located outside an Economic Center or an Industrial Trade Area? (Check "Yes" if Town has not adopted a Land Use Vision Map)	RPP Regional Land Use Vision Map which shows project site	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Low Impact and Compatible Development	If located in an Industrial Trade Area, will this project accommodate non-industrial uses as defined in the Regional Policy Plan? (Check "Yes" if Town has not adopted a Land Use Vision Map)	Statement from Applicant	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Low Impact and Compatible Development	Is the project located in a resource-based economically productive area?	Existing Conditions Plan, Assessors Data	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Balanced Economy	Does the development involve class III gaming?	Preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Infrastructure Capacity	Will the project develop new infrastructure as defined in the Regional Policy Plan?	Preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Affordable Housing		Question	Required Info	Yes	No
Affordable Housing (Residential Projects)	Does the project include 10 or more units/lots in a Town that has an affordable housing bylaw under which this project will be permitted?	Project affordable housing narrative, Local affordable housing bylaw	<input type="checkbox"/>	<input type="checkbox"/>	
Equal Opportunity	Does the project include 10 or more units/lots in a Town that has an affordable housing bylaw under which this project will be permitted?	Project affordable housing narrative, Local affordable housing bylaw	<input type="checkbox"/>	<input type="checkbox"/>	
Community Participation (Commercial Projects)	Does the redevelopment project involve additional commercial development?	Preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Community Participation (Commercial Projects)	Does the change of use project require more mitigation than the credits received for the existing use?	MPS AH3.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

N/A - the project is not a residential project.

**Responses in the shaded boxes may be included in the scope of CCC review.  
Consultation with CCC staff recommended.**

**LIMITED DRI REVIEW - SCOPING CHECKLIST  
REDEVELOPMENT/CHANGE OF USE**

Transportation		Question	Required Info	Yes	No
Congestion Management	Will the project generate more than 250 new daily trips?	ITE Trip Generation manual	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Transportation Balance and Efficiency	Will the project generate more than 250 new daily trips?	ITE Trip Generation manual	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Safety	Does the project have direct access on or does the project directly abut a regional roadway?	Cape Cod Metropolitan Planning Organization functional classification	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Safety	Will the project generate more than 25 new peak hour trips at a high crash location?	State / Local crash data	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Heritage Preservation & Community Character		Question	Required Info	Yes	No
Historic Structures / Cultural and Archaeological Resources	Is the building and/or site listed on the National Register of Historic Places or within a National or Local Historic District?	Historic District map	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Historic Structures / Cultural and Archaeological Resources	Is any part of the site known to be archaeologically significant or archaeologically sensitive, including areas within 100 feet of a wetland or waterbody?	Massachusetts Historical Commission consultation, Resource Area Delineation through local Conservation Commission	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Historic Structures / Cultural and Archaeological Resources	Is there a building or structure on the property, which is more than 75 years old or known to be historically significant?	Local Historical Commission / staff consultation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Site and Building Design	Is the redevelopment proposed within a distinctive area, such as a historic district, along a scenic road, cultural landscape, regional road or shoreline?	Staff consultation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Site and Building Design	Outside of distinctive areas, does the project consist of a single mass greater than 50,000 square feet?	Preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Site and Building Design	Does the project incorporate site design and building design features consistent with the Commission's design manual and design manual addendum guidelines?	Staff consultation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Landscape Design	Is the project subject to habitat restoration requirements resulting from on or off-site disturbance of significant wildlife and plant habitat?	SNRA map, Preliminary project plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Landscape Design	Does the landscape design utilize appropriate, non-invasive plantings to reduce water use and maintenance needs, and is it consistent with existing landscape design features?	Preliminary landscape plans	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exterior Lighting Design	Is the project's exterior lighting design consistent with MPS HPCC2.11 and the Exterior Lighting Technical Bulletin and with the existing exterior lighting design?	Exterior lighting information including fixture cut sheets and foot-candle plans	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Hazardous Materials & Waste		Question	Required Info	Yes	No
Hazardous Materials and Waste Management	Does the project involve a net increase in hazardous materials or hazardous wastes in an existing Wellhead Protection Area or a Potential Public Water Supply Area?	Project inventory, RPP map	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Hazardous Materials and Waste Management	Does the project use, handle, generate, treat or store hazardous waste?	Project inventory	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Solid Waste	Does the project involve a significant amount of land clearing wastes or construction and demolition debris?	Estimate of amounts of land clearing and construction/demo wastes, Plan to address recycling and disposal of wastes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Solid Waste	Does the project involve greater than 25,000 square feet of new development?	Preliminary project plans	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Local Concerns		Question	Required Info	Yes	No
Town Concerns	Has the Town identified issues or concerns that should be addressed through DRI review?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Public Concerns	Has the public identified issues or concerns?		<input type="checkbox"/>	<input checked="" type="checkbox"/>	

**Responses in the shaded boxes may be included in the scope of CCC review.  
Consultation with CCC staff recommended.**

## **Narrative on Responses in Shaded and Key Boxes**

### ***Land Use***

**Compact Growth and Resource Management:** *Is the development clustered on the site?*

**Response:** The proposed project will be a hotel divided into two buildings. The two buildings will be connected on the upper levels. The hotel needs to be separated into two buildings due to the location of the site driveway which will be in the space currently occupied by a portion of Lantern Lane which will be abandoned. The driveway will connect to Main Street and to the remaining portion of Lantern Lane. While the project will include two buildings, a traditional cluster development does not apply since this project will be one lot the buildings are interconnected.

### ***Energy***

**Energy:** *Has the project been designed to meet LEED Certification?*

**Response:** The project intends to be a LEED certifiable project. A full analysis of the LEED credits will be performed as the design advances. This includes significant improvements to the stormwater management system, use of low impact development site techniques such as drought-tolerant native plants and porous pavement material, energy efficient HVAC and appliances, low-flow plumbing fixtures, and locally-sourced, recycled construction materials.

**Energy:** *Is the project Mixed Use as defined by the Regional Policy Plan?*

**Response:** The project is not Mixed Use.

**Energy:** *Is the project located outside an Economic Center? (Check "No" if Town has not adopted a Land Use Vision Map.)*

**Response:** The project is located in Falmouth which has not adopted a Land Use Vision Map. The project is located on Main Street in Falmouth and is in the Business Redevelopment district. The purpose of this district is to promote downtown-type economic development and extend Falmouth's downtown area. This area has the characteristics of an Economic Center and the proposed development is in keeping with the goals of the Business Redevelopment district.

### ***Economic Development***

**Low Impact and Compatible Development:** *Is the project located outside an Economic Center or an Industrial Trade Area? (Check "Yes" if Town has not adopted a Land Use Vision Map.)*

**Response:** The project is located in Falmouth which has not adopted a Land Use Vision Map. The project is located on Main Street in Falmouth and is in the Business Redevelopment district. The purpose of this district is to promote downtown-type economic development and extend Falmouth's downtown area. This area has the characteristics of an Economic Center and the proposed development is in keeping with the goals of the Business Redevelopment district.

*Low Impact and Compatible Development:* *Is the project located in an Industrial Trade Area? (Check "Yes" if Town has not adopted a Land Use Vision Map.)*

*Response:* The project is located in Falmouth which has not adopted a Land Use Vision Map. The project is located on Main Street in Falmouth and is in the Business Redevelopment district as described above. This district, as it currently exists and as it is intended to exist in the future is not an Industrial Trade Area.

### ***Affordable Housing***

*Community Participation (Commercial Projects):* *Does the change of use project require more mitigation than the credits received for the existing use?*

*Response:* See Section 9 of this report for discussion.

### ***Transportation***

The following summarizes the guidance provided in the *Limited DRI Review Scoping Checklist* relative to Transportation as this guidance relates to the Project.

#### ***Congestion Management***

*Guidance:* Will the Project generate more than 250 new daily trips?

*Response:* No. The Project is expected to generate 160 new daily vehicle trips on an average weekday and 202 new vehicle trips on a Saturday when compared to the existing uses that occupy the Project site.

#### ***Transportation Balance and Efficiency***

*Guidance:* Will the Project generate more than 250 new daily trips?

*Response:* No. The Project is expected to generate 160 new daily vehicle trips on an average weekday and 202 new vehicle trips on a Saturday when compared to the existing uses that occupy the Project site.

#### ***Safety***

*Guidance:* Does the Project have direct access on or does the Project directly abut a regional roadway?

*Response:* Yes. The Project site has direct access to and directly abuts Main Street (Route 28), a regional roadway under the jurisdiction of the Town of Falmouth.

#### ***Safety***

*Guidance:* Will the Project generate more than 25 new peak hour trips at a high crash location?

*Response:* No. The Project is predicted to generate 13 new vehicle trips during the Saturday midday peak-hour (traffic volume hour with the highest predicted traffic volume increase).

*See also Section 10 of this report*

***Hazardous Materials and Waste***

*Solid Waste:* *Does the project involve greater than 25,000 square feet of new development?*

*Response:* *Section 12 of this report*

**3. Massachusetts Historical Commission Notification Form**

950 CMR: OFFICE OF THE SECRETARY OF THE COMMONWEALTH

APPENDIX A

MASSACHUSETTS HISTORICAL COMMISSION  
220 MORRISSEY BOULEVARD  
BOSTON, MASS. 02125  
617-727-8470, FAX: 617-727-5128

**PROJECT NOTIFICATION FORM**

Project Name: 556 Main Street

Location / Address: 556 Main Street

City / Town: Falmouth

Project Proponent

Name: Falmouth Hospitality, LLC

Address: 2 Lan Drive

City/Town/Zip/Telephone: Westford, MA 01886, 978-692-9450

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name

Falmouth Planning Board  
Cape Cod Commission

Type of License or funding (specify)

Site Plan Review  
Limited Development of Regional Impact

**Project Description (narrative):**

Falmouth Hospitality, LLC proposes to construct a hotel at 556 Main Street in Falmouth, MA. The hotel will be divided into two buildings with an upper level connector. Associated site improvements will include paved parking, driveway, recreation, and pedestrian areas, a grass paver parking area, landscaped areas, utilities, and a stormwater management system.

**Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.**

The project will include demolition of all existing buildings on the property. This includes wood and concrete commercial buildings and accessory buildings.

**and describe the building(s) which are proposed for rehabilitation.**

**Does the project include new construction? If so, describe (attach plans and elevations if necessary).**

The project site will be redeveloped and will include two new wooden buildings that will be a hotel. They will be connected at the upper levels.

950 CMR: OFFICE OF THE SECRETARY OF THE COMMONWEALTH

APPENDIX A (continued)

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify.

No.

What is the total acreage of the project area?

Woodland _____	acres	Productive Resources:	
Wetland _____	acres	Agriculture _____	acres
Floodplain _____	acres	Forestry _____	acres
Open space _____	acres	Mining/Extraction _____	acres
Developed <u>1.93</u>	acres	Total Project Acreage <u>1.93</u>	acres

What is the acreage of the proposed new construction? 1.93 acres

What is the present land use of the project area?

In the existing conditions, the project area consists of commercial and accessory buildings, a gravel parking area, paved vehicular and pedestrian areas, landscaped and wooded areas, and associated utilities.

Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

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Signature of Person submitting this form: Kathleen Cruz Date: 6/27/2014

Name: Katherine Cruz, Hancock Associates

Address: 185 Centre Street

City/Town/Zip: Danvers, MA 01923

Telephone: 978-777-3050

REGULATORY AUTHORITY

950 CMR 71.00: M.G.L. c. 9, §§ 26-27C as amended by St. 1988, c. 254.

#### **4. Nitrogen Loading Analysis**

Hancock Associates has calculated the existing and proposed nitrogen loading at the site and found the proposal will result in a reduction in the loading from 2.67 ppm to 2.5 ppm. Please refer to the calculations in Appendix 2 of this report, performed in accordance with Cape Cod Commission Technical Bulletin 91-001 dated April 1992.

**The project will maintain or reduce levels of nitrogen loading.**

## **5. Stormwater Management and Landscape Design**

In the existing condition stormwater from the majority of the project area drains to a drainage structure located in the central portion of the site. This structure does not appear to have an outlet and ponding has been observed during major storm events. Stormwater runoff from the remaining portions of the site drain over-land to the property lines. Stormwater runoff from a portion of properties to the north and a portion of Lantern Lane drain onto the property. There is a catch basin in that area that is full of debris and therefore not functioning.

In the proposed condition the drainage system will consist of catch basin filter insert treatment devices and a subsurface stormwater storage system consisting of plastic R-Tanks, both systems are manufactured by ACF Environmental.

Please refer to the Stormwater Management Report for more details. The system meets or exceeds MassDEP Stormwater Standards and the Town Of Falmouth requirements.

Similarly, a full landscape design has been submitted that utilizes appropriate, non-invasive plantings to reduce water use and maintenance needs consistent with existing landscape design features in the downtown Falmouth area.

See Landscape Plan for more detail.

## **6. Open Space Provisions**

*OS1.3 Open Space Requirements: All development, excepting municipal projects serving municipal purposes, that qualifies as a DRI shall provide permanently restricted upland open space in accordance with the proportional calculation described below:*

*Total Development Area to Total Open Space Provided:*

*Proportion Required      Location of Development*

*2:1                              Development in Growth Incentive Zones/Economic Centers*

*1:2                              Development in Significant Natural Resource Areas*

*1:1                              Development in all other areas*

*For towns without designated Economic Centers, a DRI shall comply with the open space requirements based on its location relative to SNRA.*

*Calculation Based on Development Area:*

*A project's open space requirement is calculated in direct proportion to the project's development area. For the purposes of calculating the open space requirement, the development area for new development and redevelopment is any previously undisturbed upland area (including upland areas that are functioning as habitat) affected by "development" as defined in the Definitions section of this document. Additional guidance can be found in Guidelines for Calculation and Provision of Open Space in DRIs, Technical Bulletin 94-001, as amended.*

**Response:**

The project is a redevelopment project that will realize 40% open space. The project is located in Falmouth which has not adopted a Land Use Vision Map and does not have mapped Growth Incentive Zones or Economic Centers. The project is however located on Main Street in Falmouth and is in the Business Redevelopment Zoning district. The purpose of this district is to promote downtown-type economic development and extend Falmouth's downtown area. This area has the characteristics of an Economic Center and the proposed development is in keeping with the goals of the Business Redevelopment district.

The exhibit below depict the existing and proposed disturbed areas within the site. There will be NO INCREASE IN THE DISTURBED AREA ON SITE as a result of the development. The project is a redevelopment project and is therefore exempt from the commission's Open Space requirements.

*OS1.8 Open Space Requirements and Parking Garages: As an incentive toward minimizing impervious areas, protecting open space, and maintaining or improving community character, projects meeting parking requirements under proposed buildings or as a multi-storied parking garage may reduce their open space requirement by an amount equivalent to the square footage of garaged parking. Open space credit as provided by this MPS may not be obtained for parking spaces provided in excess of the minimum number of spaces required by local zoning.*

**Response:** The project does not provide more parking than is required by Falmouth Zoning. 121 parking spaces are required by Falmouth Zoning (1.1 per guest room). 86 spaces are provided on site with 59 spaces provided under the building (garage), 25 provided open air spaces and 37 spaces provided off-site within a

paring lot located within 300 feet of the site as allowed by Falmouth Zoning By-law. The garage spaces total approximately 19,000 SF of the parking areas, representing 20% of the site.



## **7. Energy Use**

Information on the project's energy use in accordance with Technical Bulletin 09-002, *DRI Guidelines for Energy Compliance*, as amended.

The Applicant will cause an energy audit to be performed on the existing conditions and will incorporate recommendations from that audit into the project design in accordance with Minimum Performance Standard E1.1. Furthermore, the project shall be designed to earn Energy Star certification and to comply, where possible, with current ANSI/ASHRAE/IESNA Standard 90.1-2007, Section 5.4 or current prerequisite LEED certified standard. The project will be LEED certifiable to at least base standard. As such, the Project would be seeking a waiver from the Commission requiring redevelopment projects involving net new development providing a minimum of 10 percent of a building's electrical demand through on-site renewable energy generation.

## **8. Economic Impact**

Project, employment, and economic impact information in accordance with Technical Bulletin 04-002, *DRI Economic Development Technical Bulletin*, as amended.

The proposed development will create temporary construction jobs as well as year round traveler accommodation jobs. The new, year round jobs will pay wages consistent with traveler accommodation wages for the area. Health benefits will be provided to the full time employees. It is estimated that the hotel will staff anywhere from 30 to 38 employees, including both full time and part time. The new hotel will directly benefit the area and it is expected that the majority of new employment positions will be filled locally as encouraged under ODRP 3.1.3. In addition, the Applicant will encourage the utilization of local contractors, workers and suppliers as recommended by ODRP 3.3.3. As a result, it is not anticipated that the development will have a meaningful impact on the need for affordable housing in the Falmouth Area. However, the Applicant has evaluated the affordable housing mitigation contribution for the project. More information regarding the same can be found in Section 9.

Although the hotel is not proposed within a certified Growth Activity Center or a Growth Incentive Zone, the project will be located on Main Street in Falmouth within a Business Redevelopment zoning district. The purpose of this zoning district is to promote downtown-type economic development and extend Falmouth's downtown area. Accordingly, this area has the characteristics of an Economic Center and will provide the same benefits to Falmouth as encouraged by the Regional Policy Plan MPS 3.2.1. The Applicant also believes the location meets the intent of ODRP 3.2.5 in that the infrastructure on Main Street in Falmouth is suitable for the project in question.

As referenced in the Existing Conditions narrative, there are currently four buildings located on the proposed project site. These buildings are presently utilized for commercial purposes and are all in a state of disrepair. ODRP 3.2.7 encourages redesign and revitalization of existing strip developments in situations where there is adequate infrastructure. This project will meet the intent of this recommendation by razing the existing, non-historic, buildings which have fallen into disrepair and replacing them with a brand new hotel designed to be in keeping with the character and nature of downtown Falmouth. The construction of a new hotel conveniently located in beautiful downtown Falmouth will also encourage increased tourism as recommended by ODRP 3.1.6. This increase in tourism will have a net economic benefit to local Cape Cod business, and in particular, to businesses located in Falmouth.

## **9. Affordable Housing Requirement**

The proposed use falls into the “Other” category (AH 3.1). The Applicant has reviewed Technical Bulletin 10-001 and has calculated the amount of regional impact/affordable housing mitigation for development in the “Other” category. According to data provided by the Commercial Buildings Energy Consumption Survey from the U.S. Department of Energy, the project will generate one employee for every 2,074 square feet.<sup>1</sup> The Applicant currently estimates that the proposed building will be approximately 65,000 square feet. Therefore the expected number of employees will be 31.

In order to determine the percentage of employees that will earn less than the Average Wage, Technical Bulletin 10-001 requires the Applicant to refer to the U.S. Department of Labor’s Bureau of Labor Statistics (“BLS”), National Industry-Specific Occupational Employment and Wage Estimates.<sup>2</sup> According to the BLS website, the National Average Wage for All Occupations as of May 2013 was \$22.33. Technical Bulletin 10-001 then requires the Applicant to determine the percentage of workers in the proposed industry that will earn less than the National Average Wage for All Occupations. This is done by reviewing the data provided by BLS under their National Industry Specific Occupational Employment and Wage Estimates. The proposed use, hotel, qualifies as a Traveler Accommodation (NAICS 721100). According to the estimates provided, Traveler Accommodations account for a total of 1,771,940 jobs nationwide<sup>3</sup>. Of those, approximately 91% are estimated to pay below \$22.33 per hour. Accordingly, the total percentage of jobs within the Traveler Accommodation industry below the National Average Wage for All Occupations is expected to be 91%.

Per Technical Bulletin 10-001, the total number of jobs expected in connection with the project that will fall below the National Average Wage for All Occupations is 28.<sup>4</sup> The Applicant is then directed to utilize that number to calculate the mitigation per square foot multiplier (“PSF”). As of March 2014, for all DRIs located outside of Economic Centers, the PSF for an “Other” category building is  $\$5.11 \times (\# \text{ of jobs less than the average wage} / (\text{total square feet} / 1000))$ <sup>5</sup>. Using that equation, the PSF for this project would be \$2.20. That number is then used to calculate the total proposed mitigation amount.<sup>6</sup>

$$\$2.20 \times 65,000 = \$143,000.00$$

However, the Applicant’s proposal includes the redevelopment of 19,058 s.f. of existing commercial space. Of that total 19,058 s.f., approximately 11,802 s.f. is existing retail space and approximately 7,256 is existing warehouse space. See attach plan entitled “Building Areas Exhibit.” As of March 1, 2014, for DRIs not located in economic centers, the PSF for retail uses is \$10.75. The PSF for Warehouse Uses is \$2.52. According, the total amount of credit for the existing uses that the Applicant is allowed to utilize to offset the mitigation amount described above is \$145,156.62.<sup>7</sup> Accordingly, there is a net zero mitigation owed for this proposal and we believe this section is appropriate for scoping.

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<sup>1</sup> <http://www.eia.gov/consumption/commercial/data/2003/pdf/b1-b46.pdf> “Lodging” building type.

<sup>2</sup> [www.bls.gov/oes/current/oesrci.htm](http://www.bls.gov/oes/current/oesrci.htm)

<sup>3</sup> [http://www.bls.gov/OES/Current/naics4\\_721100.htm](http://www.bls.gov/OES/Current/naics4_721100.htm)

<sup>4</sup>  $31 \times .91 = 28.2$

<sup>5</sup>  $\$5.11(28/65) = \$2.201$

<sup>6</sup> PSF x total square footage = mitigation amount.

<sup>7</sup>  $(\$10.75 \times 11,802 \text{ s.f.}) + (\$2.52 \times 7,256 \text{ s.f.}) = \$145,156.62$

## **10. Transportation**

See attached report from Vanasse Associates, Inc.

## **11. Exterior Lighting**

Information on exterior lighting in accordance with Technical Bulletin 95-001, *DRI Guidance for Exterior Lighting Design*, as amended.

General Exterior Lighting Design Guidance (“GELDG”) standard 2.1 states that light sources should be either high pressure sodium or metal halide. However, the standard suggests that other sources may be considered by the Commission. The Applicant is proposing to utilize LED lighting. LED lighting has been found to be efficient and extremely versatile. LEDs are “directional” light sources that emit light in a specific direction, unlike incandescent and compact fluorescent bulbs which emit light, and heat, in all directions.<sup>8</sup> Furthermore, LED lights have been demonstrated to be a better alternative than high pressure sodium in many instances for street and security lighting because of their efficiency, effectiveness and long lasting life.<sup>9</sup> The Applicant suggests that LED lighting is a suitable alternative and requests that the Commission allow the use of the same for this project.

The Applicant will ensure that “Pole Mount” or “Wall Pack” luminaires are “Shoe box” type or decorative (with interior directional shields). *See* GELDG standard 2.2. The Applicant is not proposing any flood, area and/or up-lighting and will equip any wall pack luminaires with prismatic lenses. *See* GELDG standard 2.2. Though the Applicant will make all efforts to ensure that all luminaires on site will have a total cutoff of all light at less than 90 degrees from vertical, the Applicant requests a limited waiver for situations where pole or wall mounted fixtures utilize bulbs similar to what would be used in a residential setting and to allow for the use of LED lighting as requested above. *See* GELDG standard 2.3.

The Applicant will select reflectors of IES distribution in an effort to maximize efficiency. *See* GELDG 2.4. No light poles shall be in excess of 20’ (base + pole+head). Light poles for walkway lighting shall not be higher than 12’. Location of wall pack luminaires shall not exceed 20’. Landscape luminaires will not be more than 42’. Safety Accent Luminaires will be mounted not more than 36” from surface. *See* GELDG standard 2.5. In addition, all exterior lights, excepting “Landscape and Safety Accent Luminaires” per the standard, shall have a maximum initial horizontal foot-candle level of 8.0 foot candles. *See* GELDG standard 2.6.

The Applicant will provide the Technical Submittals per Technical Bulletin 95-001.

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<sup>8</sup> See [http://www.energystar.gov/index.cfm?c=lighting.pr\\_what\\_are](http://www.energystar.gov/index.cfm?c=lighting.pr_what_are)

<sup>9</sup> See <http://www.al-e.com/led-vs-sodium-lamps>.

See also [http://www1.eere.energy.gov/buildings/ssl/gatewaydemos\\_results.html](http://www1.eere.energy.gov/buildings/ssl/gatewaydemos_results.html).

## **12. Solid Waste and Hazardous Waste**

Garbage will be routinely disposed of and temporarily stored in waste receptacles and/or outside dumpsters. Dumpsters shall be emptied weekly or more frequently as needed. Recyclables will be stored in approved containers to be located throughout the hotel. Said containers will be marked for the disposal of plastic, glass, cardboard and other waste ban materials and will be transferred to a single stream recycling facility as needed.

### **Construction Period**

Construction & Demolition (C&D) wastes that will be generated during the development or redevelopment will be stored in a single construction dumpster which will be handled and transported by Casella waste Systems under their single stream recycling program.

During construction a full construction recycling program will be required of the contractor. With Casella's process, C & D recycling will optimize the reuse of debris, earning the project points toward LEED® certification while reducing overall environmental impact.

Casella will supply a Construction Specialist, who understands the construction business and project's needs throughout every phase of the construction process – offering up-to-date knowledge of local disposal regulations and requirements.

Construction & Demolition debris including concrete, porcelain, rigid plastics, tile, lumber, metals, masonry, plastic, rock, carpet, insulation and more will be stored and trucked away for recycling in this single stream manner. At the Casella facility, the materials are offloaded onto the tipping floor of a materials recovery facility (MRF), and the larger recyclables are sorted by hand on a conveyor belt. Next, the smaller materials pass through screening machines. Finally, the recyclables are transferred to their appropriate recycling facilities. Any non-recyclable materials are transferred for proper waste disposal.

No hazardous materials other than ordinary household cleaning products will be stored on site. These cleaning products will be stored in closets, accessible only to employees, and away from guests and invitees. Furthermore, the site will be serviced by municipal sewer and water.

### **13. Water and Sewer Infrastructure and Capacity**

The project will be served by municipal sewer and water infrastructure readily available in Main Street.

A 6" water main in Lantern Lane connected to a 10" main in Main Street exist proximate to the site. The proposed building will have domestic and fire connection directly to the 10" pipe in Main Street.

The demand for the project is estimated to be approximately **12,000 gallons per day** with a peak demand of 10-20 gallons per minute. Initial discussions with the Town of Falmouth Public Works indicate there is sufficient capacity in the municipal system. The building will feature a fully compliant fire suppression system with connection to the same water line. Final construction plan will feature the sprinkler design based on pressure and flow tests to be performed proximate to the site.

Projected sewer flows are **12,100 gallons per day** based on 310 CMR 15.203 design flows for a 110 room hotel. A sewer service for the proposed building will be connected to the existing 18" sewer line in the center of Main Street. Initial discussions with the Town of Falmouth Public Works indicate there is sufficient capacity in the municipal system.

**Appendix 1. Required Plans (Full Size Plans Under Separate Cover)**

## **Appendix 2. Nitrogen Loading Calculations**

## **INTRODUCTION**

The purpose of this report is to assess the current levels of Nitrate-Nitrogen (NO<sub>3</sub>-N) concentrations at #556 Main Street in Falmouth, MA as well as estimated levels after redevelopment of the property. Falmouth Hospitality, LLC proposes the redevelopment of the site at 556 Main Street in Falmouth, MA by constructing a 108 room Springhill Suites by Marriot Hotel. Associated site improvements will include paved parking, driveway, recreation, and pedestrian areas, a grass paver seasonal parking area, landscaped areas, utilities, and a stormwater management system.

Cape Cod receives the majority of its drinking water from groundwater and NO<sub>3</sub>-N is one of its primary contaminants of concern. NO<sub>3</sub>-N comes from wastewater, fertilizers, runoff, and other various sources and it can eventually be absorbed into the water system.

"High drinking water nitrate-nitrogen levels have been shown to cause methemoglobinemia (a potentially lethal decreased ability of blood to transport oxygen) in infants and have been correlated with progeny malformations (NRC, 1977; Dorsch, *et al.*, 1984). High NO<sub>3</sub>-N concentrations in groundwater have also been correlated with higher concentrations of regulated drinking water contaminants, such as volatile organic compounds (VOCs) (Eckhardt, *et al.*, 1986). However, the link of high nitrate levels to methemoglobinemia is the most well established and extensive research has led to the calculation of a 10 ppm NO<sub>3</sub>-N concentration as a "no-observed-adverse-effect level" (NOAEL) for most infants (NRC, 1977; Fan, *et al.*, 1987)." - (Eichner, *et al.*, April 1992)

Therefore, it is very important to monitor these levels to keep people and the environment safe. This report will help to justify that the nitrate-nitrogen levels for this site are within the safe values that have been established by the Cape Cod Commission.

## **PROCEDURE**

To conduct this site analysis of NO<sub>3</sub>-N, several different areas of the site needed to be measured since they all contribute different concentration levels. According to the USEPA and MA EOE, the loading values of different areas and the way to calculate the nitrate-nitrogen levels for them are as followed:

**Table 1**  
**SUMMARY OF NITROGEN LOADING VALUES**

TARGET CONCENTRATION:	5 ppm (milligram/liter) NO <sub>3</sub> -N		
<b>WASTEWATER</b>			
Residences			
Concentration:	35 ppm NO <sub>3</sub> -N		
Flow:	Title 5 (310 CMR 15.02)		
Nonresidences			
Concentration:	35 ppm NO <sub>3</sub> -N		
Flow:	Title 5; Frimpter, <i>et al.</i> (1988): Documented flows satisfactory to CCC WRO staff		
OCCUPANCY:	Range (Actual town rate to 2 people per bedroom)		
<b>LAWNS</b>			
Area:	5,000 ft <sup>2</sup>		
Fertilizer:	3 lbs/1,000 ft <sup>2</sup> of lawn		
Leaching:	25%		
<b>RECHARGE</b>			
Off of impervious surfaces:	40 inches per year		
<b>Concentrations</b>			
Road runoff:	1.5 ppm NO <sub>3</sub> -N		
Roof runoff:	0.75 ppm NO <sub>3</sub> -N		
<b>Natural areas</b>			
Barnstable:	18 inches per year	Mashpee:	19 in/yr
Bourne:	21 in/yr	Orleans:	16 in/yr
Brewster:	17 in/yr	Provincetown:	16 in/yr
Chatham:	16 in/yr	Sandwich:	19 in/yr
Dennis:	18 in/yr	Truro:	16 in/yr
Eastham:	16 in/yr	Wellfleet:	16 in/yr
Falmouth:	21 in/yr	Yarmouth:	18 in/yr
Harwich:	17 in/yr		

**Recommended Nitrogen Loading Limits for Coastal Embayments**

<u>EMBAYMENT</u>	<u>WATERS CLASSIFIED SB</u>	<u>WATERS CLASSIFIED SA</u>	<u>OUTSTANDING RESOURCE AREAS</u>
Shallow			
• flushing: 4.5 days or less	350 mg/m <sup>3</sup> /Vr	200 mg/m <sup>3</sup> /Vr	100 mg/m <sup>3</sup> /Vr
• flushing: greater than 4.5 days	30 g/m <sup>2</sup> /yr	15 g/m <sup>2</sup> /yr	5 g/m <sup>2</sup> /yr
Deep			
• select rate resulting in lesser annual loading	500 mg/m <sup>3</sup> /Vr or 45 g/m <sup>2</sup> /yr	260 mg/m <sup>3</sup> /Vr or 20 g/m <sup>2</sup> /yr	130 mg/m <sup>3</sup> /Vr or 10 g/m <sup>2</sup> /yr

Note: Vr = Vollenweider flushing term

$$Vr = \frac{r}{1 + \text{sqrt}(r)}$$

r = flushing time (yrs)

Source: USEPA and MA EOE, 1991

Table 1-A

## EXAMPLE NONRESIDENTIAL LOADING CALCULATIONS

Office Building:

Lot Size: 5 acres (217,800 ft<sup>2</sup>)

Impervious Surfaces: Roof Area: 15,000 ft<sup>2</sup>; Paving Area: 30,000 ft<sup>2</sup>

Natural Area: 172,800 ft<sup>2</sup>; Lawn Area: 10,000 ft<sup>2</sup>

Title V Flow: 75 gallons/day per 1,000 ft<sup>2</sup>

### WASTEWATER

$$15,000 \text{ ft}^2 \left[ \frac{75 \text{ gpd}}{1,000 \text{ ft}^2} \right] \left[ \frac{3.785 \text{ L}}{\text{gal}} \right] = 4,258.1 \text{ L/d} \left[ \frac{35 \text{ mg}}{\text{L}} \right] = 149,034.4 \text{ mg/d}$$

### IMPERVIOUS SURFACES

$$15,000 \text{ ft}^2 \left[ \frac{40 \text{ in}}{\text{yr}} \right] \left[ \frac{\text{ft}}{12 \text{ in}} \right] \left[ \frac{28.32 \text{ L}}{\text{ft}^3} \right] \left[ \frac{1 \text{ yr}}{365 \text{ d}} \right] = 3,879.5 \text{ L/d} \left[ \frac{0.75 \text{ mg}}{\text{L}} \right] = 2,909.6 \text{ mg/d}$$

$$30,000 \text{ ft}^2 \left[ \frac{40 \text{ in}}{\text{yr}} \right] \left[ \frac{\text{ft}}{12 \text{ in}} \right] \left[ \frac{28.32 \text{ L}}{\text{ft}^3} \right] \left[ \frac{1 \text{ yr}}{365 \text{ d}} \right] = 7,758.9 \text{ L/d} \left[ \frac{1.5 \text{ mg}}{\text{L}} \right] = 11,638.4 \text{ mg/d}$$

### LAWN

$$10,000 \text{ ft}^2 \left[ \frac{3 \text{ lbs}}{1,000 \text{ ft}^2 \cdot \text{yr}} \right] \left[ \frac{1 \text{ yr}}{365 \text{ d}} \right] \left[ \frac{454,000 \text{ mg}}{\text{lb}} \right] \left[ 0.25 \right] = 9,328.8 \text{ mg/d}$$

### NATURAL

$$5 \text{ acres} \left[ \frac{43,560 \text{ ft}^2}{\text{acre}} \right] = 217,800 \text{ ft}^2; \quad 217,800 \text{ ft}^2 - 45,000 \text{ ft}^2 = 172,800 \text{ ft}^2$$

$$172,800 \text{ ft}^2 \left[ \frac{1.5 \text{ ft}}{\text{yr}} \right] \left[ \frac{28.32 \text{ L}}{\text{ft}^3} \right] \left[ \frac{1 \text{ yr}}{365 \text{ d}} \right] = 20,111.1 \text{ L/d}$$

### SUMMARY

$$\frac{149,034.4 + 2,909.6 + 11,638.4 + 9,328.8 \text{ mg}}{4,258.1 + 3,879.5 + 7,758.9 + 20,111.1 \text{ liters}} = \frac{172,911.2 \text{ mg}}{36,007.6 \text{ liters}} = \boxed{4.80 \text{ ppm}}$$

Table 1-B

By referring to Table 1-A and Table 1-B, it is possible to see that the areas of interest for this site are the lawn areas, the impervious areas which include the roof of the building and the pavement, and the natural areas. It is also important to take into consideration the recharge from precipitation because it is the *only* way to dilute NO<sub>3</sub>-N loading on an aquifer-wide basis and it provides an important source of dilution for concentrations on smaller scales. (CCC WRO, April 1992) Note that there is no wastewater contributing to the NO<sub>3</sub>-N concentrations, so it was not used in the following calculations. The areas were calculated below in Table 2-A.

Existing Site Areas (ft <sup>2</sup> )		Percentages	
Total Area	88,222	100.00%	4,935 2 story wood, 1,821 1 story wood, 1867 1 story conc block, 408 1 story garage, 4,981 1 story garage, 110 shed)
Building	14,123	16.01%	
Paved	28,655	32.48%	
Natural	20,641	23.40%	Total Area 19,058
Lawn	24,803	28.11%	

**Table 2-A**

By using the equation provided in Table 1-B, the existing NO<sub>3</sub>-N concentration was then calculated for #556 Main Street, Falmouth, MA.

### Existing NO<sub>3</sub>-N Concentrations

#### Roof Areas

$$14,123 \text{ ft}^2 \left[ \frac{40 \text{ in}}{\text{yr}} \right] \left[ \frac{\text{ft}}{12 \text{ in}} \right] \left[ \frac{28.32 \text{ L}}{\text{ft}^3} \right] \left[ \frac{1 \text{ yr}}{365 \text{ d}} \right] = 3,652.6 \text{ L} / \text{d}$$

$$3,652.6 \text{ L} / \text{d} \left[ \frac{0.75 \text{ mg}}{\text{L}} \right] = 2,739.5 \text{ mg} / \text{d}$$

#### Impervious Areas

$$28,655 \text{ ft}^2 \left[ \frac{40 \text{ in}}{\text{yr}} \right] \left[ \frac{\text{ft}}{12 \text{ in}} \right] \left[ \frac{28.32 \text{ L}}{\text{ft}^3} \right] \left[ \frac{1 \text{ yr}}{365 \text{ d}} \right] = 7,411.0 \text{ L} / \text{d}$$

$$7,411.0 \text{ L} / \text{d} \left[ \frac{1.5 \text{ mg}}{\text{L}} \right] = 11,116.6 \text{ mg} / \text{d}$$

#### Lawn

$$24,803 \text{ ft}^2 \left[ \frac{3 \text{ lbs}}{1,000 \text{ ft}^2 * \text{yr}} \right] \left[ \frac{\text{yr}}{365 \text{ d}} \right] \left[ \frac{454,000 \text{ mg}}{\text{lb}} \right] [0.25] = 23,138.1 \text{ mg} / \text{d}$$

#### Natural

$$20,641 \text{ ft}^2 \left[ \frac{1.75 \text{ ft}}{\text{yr}} \right] \left[ \frac{28.32 \text{ L}}{\text{ft}^3} \right] \left[ \frac{\text{yr}}{365 \text{ d}} \right] = 2,802.7 \text{ L} / \text{d}$$

\*Note: 1.75 ft comes from a recharge rate of 21 in/yr in Falmouth, MA\*

### Summary

$$\frac{2,739.5 + 11,116.6 + 23,138.1}{3,652.6 + 7,411.0 + 2,802.7} = \frac{36,994.2mg}{13,866.3L} = \underline{\underline{2.67 \text{ ppm}}}$$

With redevelopment, the areas of interest for the site will change, as shown in Table 3-A. The site will consist only of impervious areas i.e. pavement and sidewalks, roof areas and lawn areas. No areas of natural recharge will remain and have been eliminated from the calculations.

<b>Proposed Site Areas (ft<sup>2</sup>)</b>	<b>Percentages</b>	
Total Area	88,222	100.00%
Building	37,447	42.44%
Paved	21,928	24.86%
Lawn	28,847	32.70%

**Table 3-A**

### **Proposed NO<sub>3</sub>-N Concentrations**

#### Roof Areas

$$37,447 \text{ ft}^2 \left[ \frac{40 \text{ in}}{\text{yr}} \right] \left[ \frac{\text{ft}}{12 \text{ in}} \right] \left[ \frac{28.32 \text{ L}}{\text{ft}^3} \right] \left[ \frac{1 \text{ yr}}{365 \text{ d}} \right] = 9,684.9 \text{ L} / \text{d}$$

$$9,684.9 \text{ L} / \text{d} \left[ \frac{0.75 \text{ mg}}{\text{L}} \right] = 7,263.6 \text{ mg} / \text{d}$$

#### Impervious Areas

$$21,928 \text{ ft}^2 \left[ \frac{40 \text{ in}}{\text{yr}} \right] \left[ \frac{\text{ft}}{12 \text{ in}} \right] \left[ \frac{28.32 \text{ L}}{\text{ft}^3} \right] \left[ \frac{1 \text{ yr}}{365 \text{ d}} \right] = 5,671.2 \text{ L} / \text{d}$$

$$5,671.2 \text{ L} / \text{d} \left[ \frac{1.5 \text{ mg}}{\text{L}} \right] = 4,253.4 \text{ mg} / \text{d}$$

#### Lawn

$$29,181 \text{ ft}^2 \left[ \frac{3 \text{ lbs}}{1,000 \text{ ft}^2 * \text{ yr}} \right] \left[ \frac{\text{ yr}}{365 \text{ d}} \right] \left[ \frac{454,000 \text{ mg}}{\text{ lb}} \right] [0.25] = 26,910.7 \text{ mg} / \text{d}$$

## Summary

$$\frac{7,263.6 + 4,253.4 + 26,910.7}{9,684.9 + 5,671.2} = \frac{38,427.7 \text{ mg}}{15,356.1 \text{ L}} = \underline{\underline{2.50 \text{ ppm}}}$$

## **Conclusion**

It has been shown that the existing concentration of nitrate-nitrogen at #556 Main Street, Falmouth, MA is 2.67 ppm. After redevelopment of the site, this figure will drop to 2.50 ppm due to increased aquifer recharge on site. This value is well below the target concentration of 5 ppm listed in Table 1-A so therefore it is acceptable. A value of 2.50 ppm of NO<sub>3</sub>-N is considered safe and shall not cause harm to either people or the environment.

## **References**

- Dorsch, M.M., R.K.R. Scragg, A.J. McMichael, and P.A. Baghurst. 1984. "Congenital Malformations and Maternal Drinking Water Supply in Reval, South Australia." *Journal of Epidemiology*. 119, 4: 473-485.
- Eckhardt, D.A., W.J. Flipse, Jr., and E.T. Oaksford. 1986. *Relation Between Land Use and Ground Water Quality in the Upper Glacial Aquifer in Nassau and Suffolk Counties, Long Island, New York*. United States Geological Survey Resources Investigations Report 86-4142, Washington, DC.
- Fan, A.M., C.C. Willhite, and S.A. Book. 1987. "Evaluation of the Nitrate Drinking Water Standard with Reference to Infant Methemoglobinemia and Potential Reproductive Toxicity." *Regulatory Toxicology and Pharmacology*. 7: 135-148
- National Research Council. 1977. *Drinking Water and Health*. National Academy of Sciences, Washington, DC.
- Eichner, E.M. and T.C. Cambareri. April 1992. *Nitrogen Loading*. Cape Cod Commission. Water Resources Office Technical Bulletin 91-001 (FINAL), Barnstable, MA.

**Appendix 3. Traffic Site Location Map and CCC Scoping Memo**

#### **Appendix 4: Required Figures**

- USGS Locus Map
- Water Resource Classification Maps 1 and 2
- FEMA Flood Plain Map
- NHESP Map
- SNRA Map
- Historic District Map
- MHC Inventory List

## Land Use

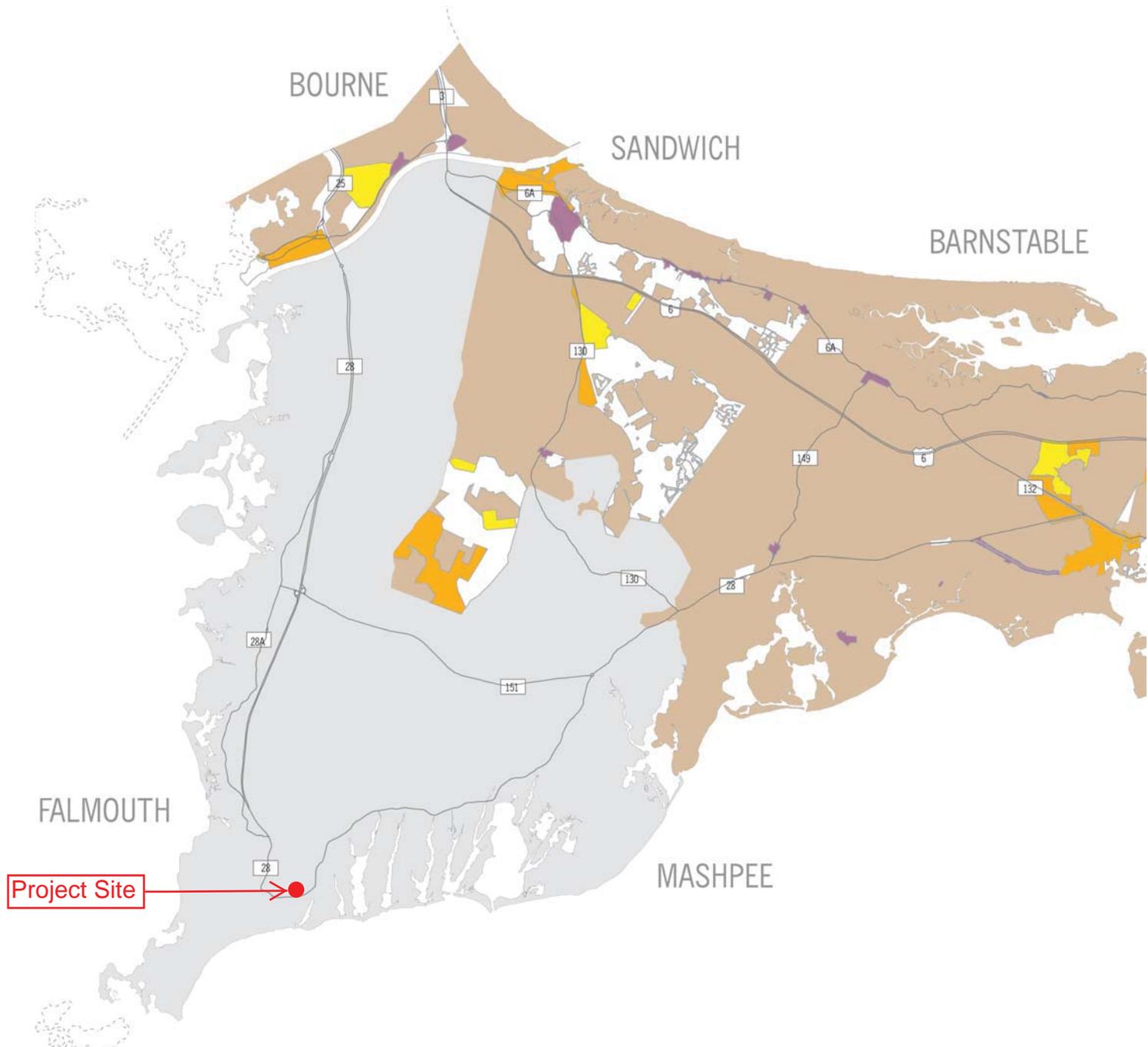
### Map LU1a

#### Upper and Mid Cape: Regional Land Use Vision Map

As of March 4, 2011

The Regional Land Use Vision Map for the Upper and Mid Cape shows target areas for growth. (Some towns have not yet completed the regional land use vision mapping process.) Focusing growth in identified areas and minimizing it in others will help protect Cape Cod's natural resources and traditional character.

-  Economic Center
-  Industrial/Service Trade Area
-  Village
-  Resource Protection Area
-  Areas Yet to Complete Mapping
-  Other



Pilgrim

PROVINCETOWN

TRURO

Pamet

Chequesset

WELLFLEET

Nauset

EASTHAM

ORLEANS

BREWSTER

DENNIS

Monomoy

BARNSTABLE

SANDWICH

BOURNE

Sagamore

HARWICH

CHATHAM

YARMOUTH

MASHPEE

FALMOUTH

Water Table Contour

Groundwater Lenses

This map illustrates the six groundwater lenses (Sagamore, Monomoy, Nauset, Chequesset, Pamet, and Pilgrim) that comprise Cape Cod's sole source aquifer. The underground topography influences groundwater flow direction and speed. The water table contour lines indicate the height of groundwater above sea level.

NOTE: All maps in the Regional Planning section of the Cape Cod Regional Policy Plan are for illustration and planning purposes only. They may be viewed in more detail online: [www.capecodcommission.org/regionalplans/RPP/](http://www.capecodcommission.org/regionalplans/RPP/)

Project Site (Sagamore Groundwater Lens)

# Water Resources

## Map WR2

### Drinking Water Resources

As of June 18, 2010

The Drinking Water Resources map illustrates the location of Cape Cod's existing Wellhead Protection Areas and Potential Public Water Supply Areas. These areas provide the majority of Cape Cod's drinking water. Monitoring and reducing groundwater pollution levels is critical to ensuring their future use.

- Public Water Supply Wellhead Protection Area (Zone II)
- Potential Public Water Supply Area
- Public Supply Well
- Small Volume Well
- Mass. Military Reservation

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Project Site



APPROXIMATE SCALE



NATIONAL FLOOD INSURANCE PROGRAM

**FIRM**  
FLOOD INSURANCE RATE MAP

TOWN OF FALMOUTH,  
MASSACHUSETTS  
BARNSTABLE COUNTY

PANEL 11 OF 13  
(SEE MAP INDEX FOR PANELS NOT PRINTED)

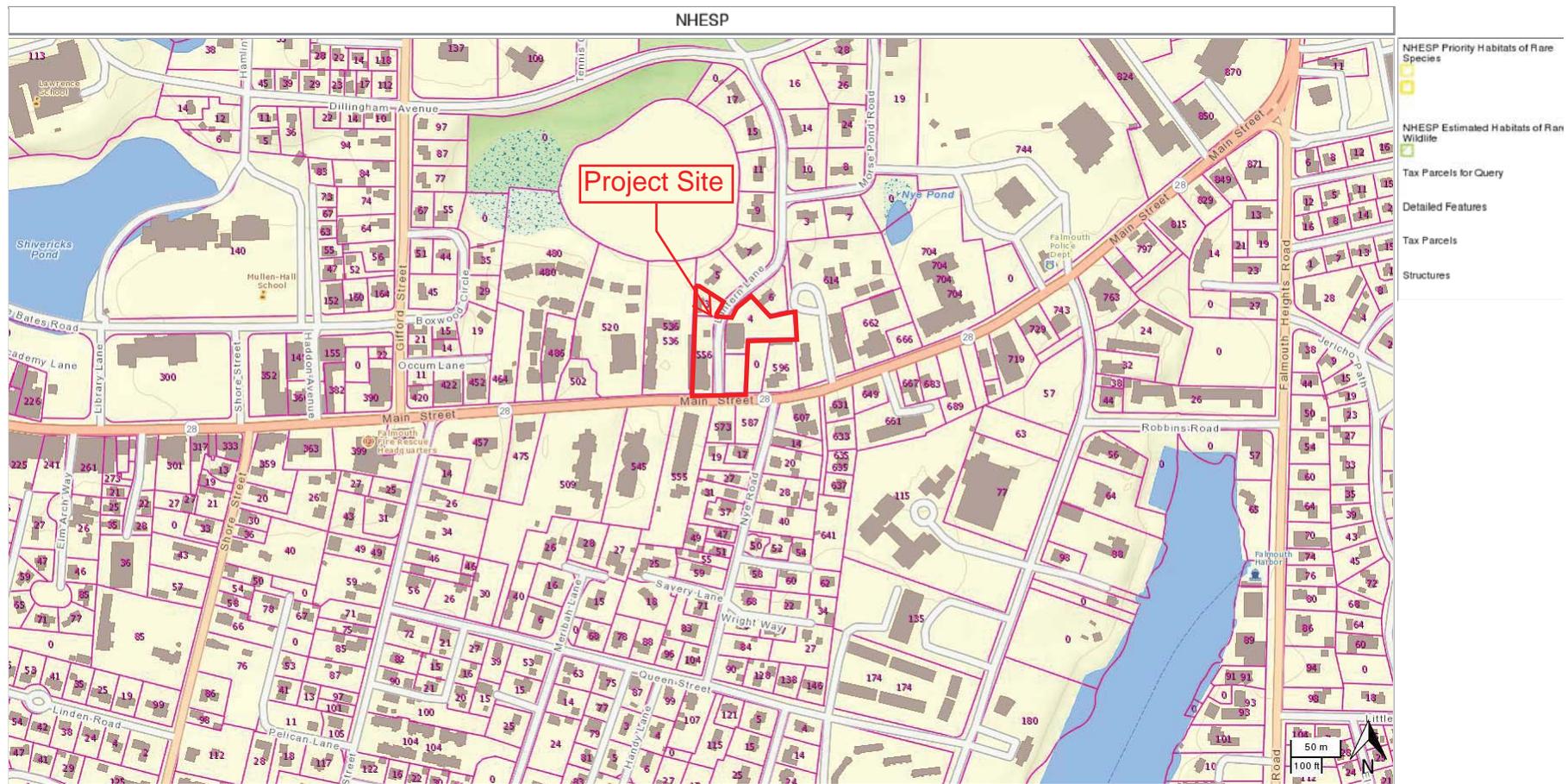
COMMUNITY-PANEL NUMBER  
255211 0011 F

MAP REVISED:  
MAY 15, 1986



Federal Emergency Management Agency

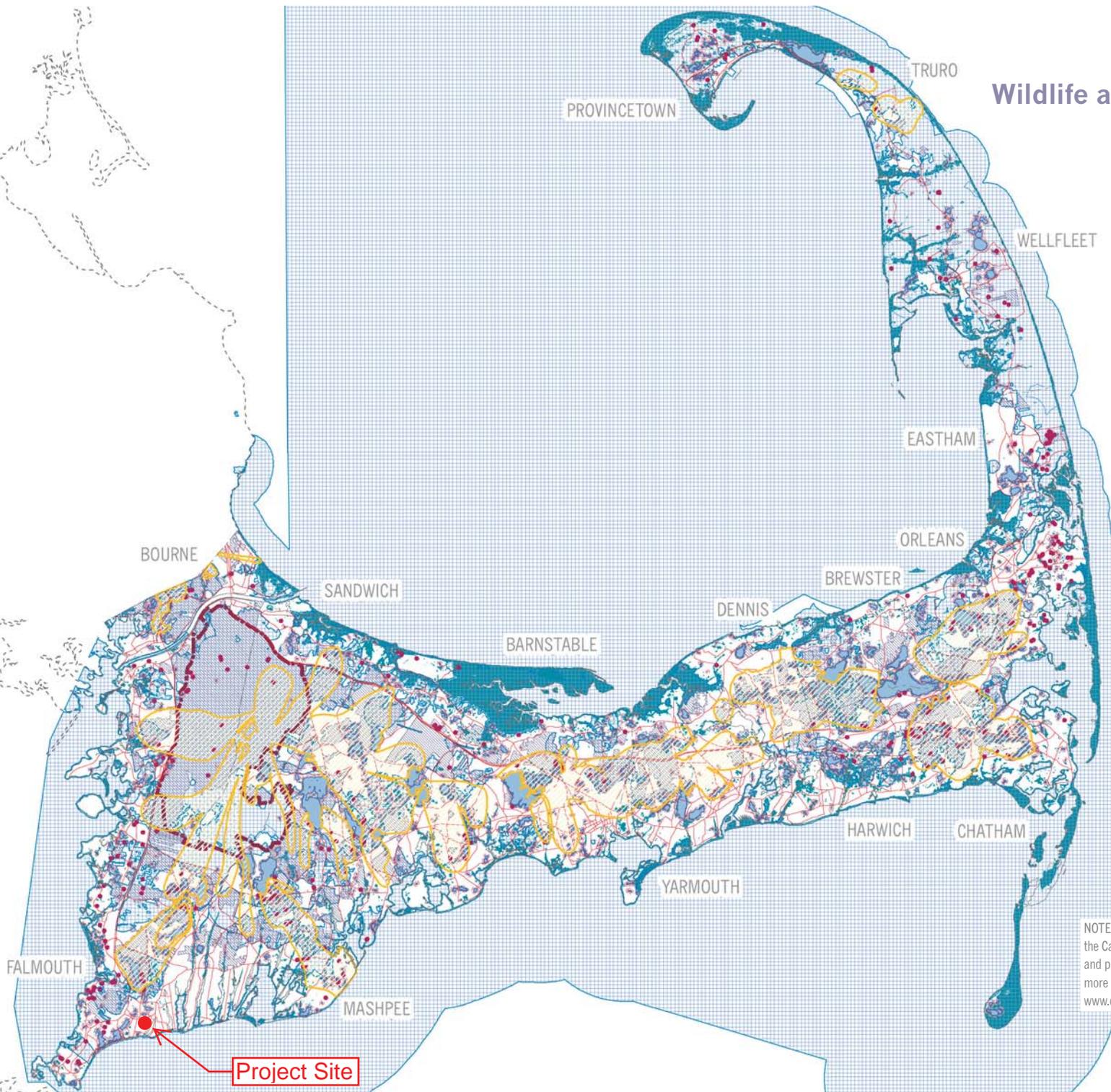
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



# Wildlife and Plant Habitat Map SNRA

**Significant Natural Resource Areas**  
As of June 18, 2010

-  Current DEP Zone II (March 30, 2010)
-  Major Roads
-  350-foot Buffer of Certified Vernal Pool
-  Water Body
-  300-foot Buffer from Pond Shore
-  Massachusetts Military Reservation
-  Potential Public Water Supply Area (PLAAP)
-  Priority Habitats (NHESP 2008)
-  DEP Wetland Area



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[www.capecodcommission.org/regionalplans/RPP/](http://www.capecodcommission.org/regionalplans/RPP/)

# Heritage Preservation and Community Character

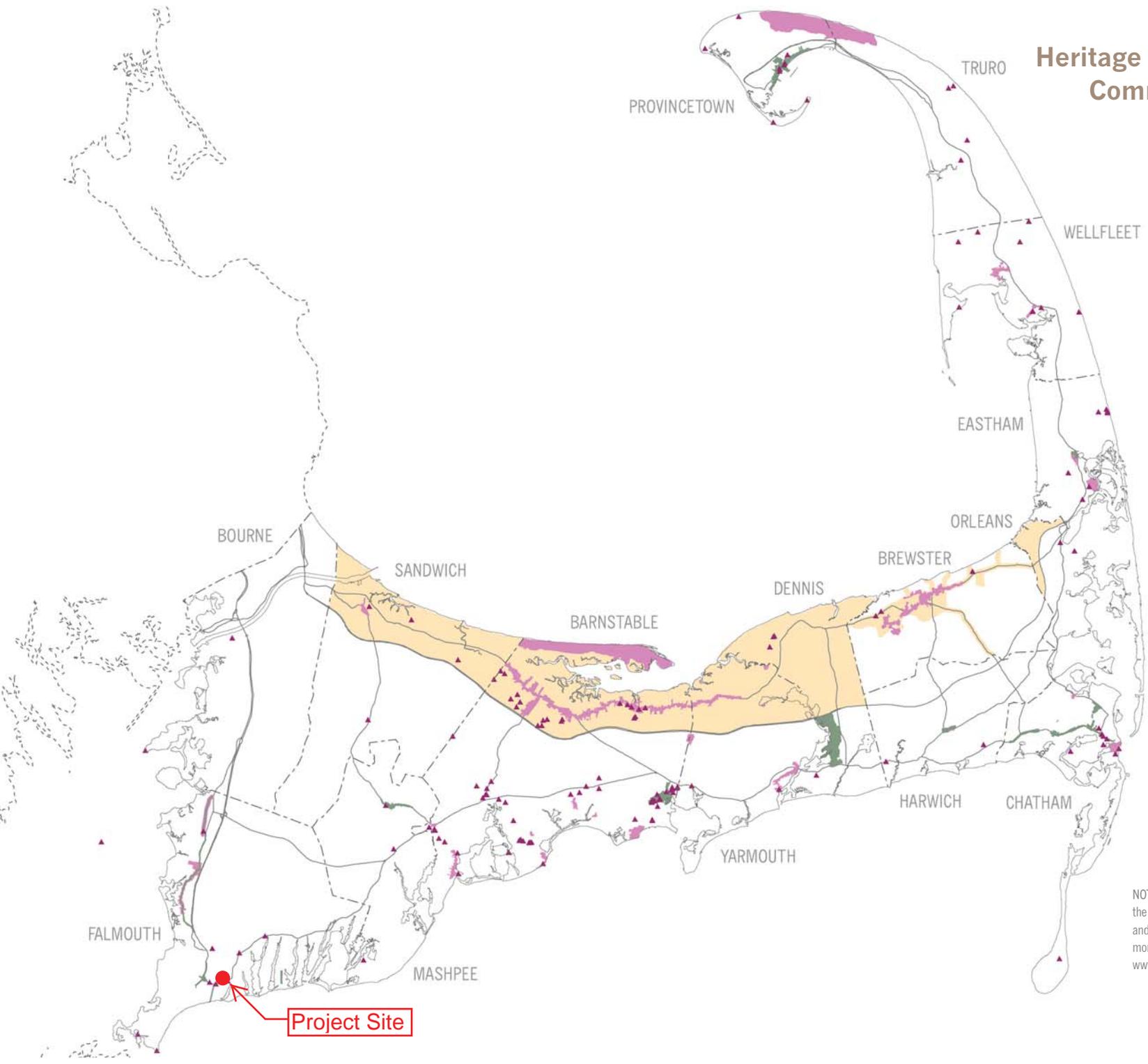
## Map HPCC1

### Historic Resources

Significant historic buildings in areas under high development pressures are in danger of being demolished. This map shows the Cape Cod properties that receive some protection through historic district review at the town or county level. Note: If a Local Historic District is also a National Register Historic District, the Local Historic District alone is visible on this map.

- ▲ National Register Historic Properties
- Local Historic District
- National Register Historic Districts
- Old King's Highway Regional Historic District

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Project Site

# Massachusetts Cultural Resource Information MACRIS

[MHC Home](#) | [MACRIS Home](#)

## Results

[Get Results in Report Format](#)

PDF    Spreadsheet

Below are the results of your search, using the following search criteria:

**Town(s):** Falmouth

**Street No:** 556

**Street Name:** main

**Resource Type(s):** Area, Building, Burial Ground, Object, Structure

For more information about this page and how to use it, [click here](#)

No Results Found.

[New Search](#)

[New Search – Same Town\(s\)](#)

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