

# Reading Woods

Reading, Massachusetts

## ENVIRONMENTAL NOTIFICATION FORM



Prepared for:

**Pulte Homes of New England, LLC**  
115 Flanders Road, Suite 200  
Westborough, Massachusetts 01581

Prepared by:

**Epsilon Associates, Inc.**  
3 Clock Tower Place, Suite 250  
Maynard, Massachusetts 01754

January 3, 2011

# Reading Woods

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### ENVIRONMENTAL NOTIFICATION FORM

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**Commonwealth of Massachusetts**  
**Executive Office of Energy and Environmental Affairs**

■ MEPA Office

**ENF Environmental Notification Form**

*For Office Use Only*  
*Executive Office of Energy & Environmental Affairs*

EEA No.:  
 MEPA Analyst:  
 Phone: 617-626-

The information requested on this form must be completed to begin MEPA Review in accordance with the provisions of the Massachusetts Environmental Policy Act, 301 CMR 11.00.

Project Name: <b>Reading Woods</b>		
Street: <b>Jacob Way</b>		
Municipality: <b>Reading</b>	Watershed: <b>Boston Harbor</b>	
Universal Transverse Mercator Coordinates: <b>UTM 19 326890E 4707830N</b>	Latitude: <b>42° 30' 13" N</b>	Longitude: <b>71° 06' 25" W (NAD83/WGS84)</b>
Estimated commencement date: <b>Spring 2011</b>	Estimated completion date: <b>Winter 2018</b>	
Approximate cost: <b>\$55,000,000</b>	Status of project design: <b>15 %complete</b>	
Proponent: <b>Pulte Homes of New England LLC</b>		
Street: <b>115 Flanders Road, Suite 200</b>		
Municipality: <b>Westborough</b>	State: <b>MA</b>	Zip Code: <b>01581</b>
Name of Contact Person From Whom Copies of this ENF May Be Obtained: <b>Corinne Snowdon</b>		
Firm/Agency: <b>Epsilon Associates, Inc.</b>	Street: <b>3 Clock Tower Place, Suite 250</b>	
Municipality: <b>Maynard</b>	State: <b>MA</b>	Zip Code: <b>01754</b>
Phone: <b>978-897-7100</b>	Fax: <b>978-897-0099</b>	E-mail: <b>csnowdon@epsilonassociates.com</b>

Does this project meet or exceed a mandatory EIR threshold (see 301 CMR 11.03)?  
 Yes  No

Has this project been filed with MEPA before?  
 Yes (EOEA No. \_\_\_\_\_)  No

Has any project on this site been filed with MEPA before?  
 Yes (EOEA No. 12165, 14252)  No

Is this an Expanded ENF (see 301 CMR 11.05(7)) requesting:  
 a Single EIR? (see 301 CMR 11.06(8))  Yes  No  
 a Special Review Procedure? (see 301CMR 11.09)  Yes  No  
 a Waiver of mandatory EIR? (see 301 CMR 11.11)  Yes  No  
 a Phase I Waiver? (see 301 CMR 11.11)  Yes  No

Identify any financial assistance or land transfer from an agency of the Commonwealth, including the agency name and the amount of funding or land area (in acres): **None**

Are you requesting coordinated review with any other federal, state, regional, or local agency?  
 Yes (Specify \_\_\_\_\_)  No

List Local or Federal Permits and Approvals: **Local:** Order of Conditions, Site Plan Approval, 40R Site Plan Approval per Gateway Smart Growth District, Scenic Road Permit; **Federal:** U.S. EPA: Coverage under the NPDES General Permit for Stormwater Discharge from Construction Activities.

Which ENF or EIR review threshold(s) does the project meet or exceed (see 301 CMR 11.03):

- |                                 |                                       |   |
|---------------------------------|---------------------------------------|---|
| <input type="checkbox"/> Land   | <input type="checkbox"/> Rare Species | <input type="checkbox"/> Wetlands, Waterways, & Tidelands                 |
| <input type="checkbox"/> Water  | <input type="checkbox"/> Wastewater   | <input checked="" type="checkbox"/> Transportation                        |
| <input type="checkbox"/> Energy | <input type="checkbox"/> Air          | <input type="checkbox"/> Solid & Hazardous Waste                          |
| <input type="checkbox"/> ACEC   | <input type="checkbox"/> Regulations  | <input checked="" type="checkbox"/> Historical & Archaeological Resources |

Summary of Project Size & Environmental Impacts	Existing	Change	Total	State Permits & Approvals
<b>LAND</b>				<input checked="" type="checkbox"/> Order of Conditions <input type="checkbox"/> Superseding Order of Conditions <input type="checkbox"/> Chapter 91 License <input type="checkbox"/> 401 Water Quality Certification <input checked="" type="checkbox"/> MHD or MDC Access Permit <input type="checkbox"/> Water Management Act Permit <input type="checkbox"/> New Source Approval <input checked="" type="checkbox"/> DEP or MWRA Sewer Connection/ Extension Permit <input type="checkbox"/> Other Permits <i>(including Legislative Approvals) – Specify:</i>
Total site acreage	24.8 ac			
New acres of land altered		0 ac		
Acres of impervious area	11.3 ac	-0.4 ac	10.9 ac	
Square feet of new bordering vegetated wetlands alteration		0 sf		
Square feet of new other wetland alteration		0 sf		
Acres of new non-water dependent use of tidelands or waterways		0 sf		
<b>STRUCTURES</b>				
Gross square footage	208,000	492,000	700,000	
Number of housing units	0	424	424	
Maximum height (in feet)	83	-28	55	
<b>TRANSPORTATION</b>				
Vehicle trips per day	0 <sup>1</sup>	2,260	2,260	
Parking spaces:				
At Grade	669	-214	455	
Below Grade	0	440	440	
Total	669	226	895	
<b>WATER/WASTEWATER</b>				
Gallons/day (GPD) of water use	0 <sup>1</sup>	77,400	77,400	
GPD water withdrawal	0	0	0	
GPD wastewater generation/ treatment	0 <sup>1</sup>	70,360	70,360	
Length of water/sewer mains <sup>2</sup> (in miles)	0	0	0	

<sup>1</sup> The Proponent is not seeking credit for trips generated, water consumed, or wastewater generated by the former land use.

<sup>2</sup> No new off-site water or sewer mains are proposed.

**CONSERVATION LAND:** Will the project involve the conversion of public parkland or other Article 97 public natural resources to any purpose not in accordance with Article 97?

Yes (Specify \_\_\_\_\_ )  No

Will it involve the release of any conservation restriction, preservation restriction, agricultural preservation restriction, or watershed preservation restriction?

Yes (Specify \_\_\_\_\_ )  No

**RARE SPECIES:** Does the project site include Estimated Habitat of Rare Species, Vernal Pools, Priority Sites of Rare Species, or Exemplary Natural Communities?

Yes (Specify \_\_\_\_\_ )  No

**HISTORICAL /ARCHAEOLOGICAL RESOURCES:** Does the project site include any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?

Yes (Specify: Addison-Wesley Publishing Co. Building A (REA.270))  No

If yes, does the project involve any demolition or destruction of any listed or inventoried historic or archaeological resources?

Yes (Specify: Addison-Wesley Publishing Co. Building A (REA.270))  No

**AREAS OF CRITICAL ENVIRONMENTAL CONCERN:** Is the project in or adjacent to an Area of Critical Environmental Concern?

Yes (Specify \_\_\_\_\_ )  No

**PROJECT DESCRIPTION:** The project description should include (a) a description of the project site, (b) a description of both on-site and off-site alternatives and the impacts associated with each alternative, and (c) potential on-site and off-site mitigation measures for each alternative (You may attach one additional page, if necessary.)

**Project Site and Project Description**

The Project, proposed by Pulte Homes of New England LLC, involves redevelopment of the former Addison-Wesley office complex, a 24.8 acre site located in Reading, Massachusetts. Figure 1 in Attachment A is a USGS Locus Map showing the Project's location, and Figure 2 is an aerial photograph of the Project site and surrounding area. As shown on Figure 3, Existing Conditions Plan, the site currently holds vacant, vandalized office buildings totaling approximately 208,000 square feet and associated surface parking. The structures will be demolished to allow construction of 424 for-sale residential units in a mix of townhomes and garden style homes. The project will include 16 townhomes and 408 apartments, of which 208 will be designated as senior independent living units and a minimum of 40 will be designated as affordable units in compliance with the Commonwealth's 40R Smart Growth Zoning. The Project will reduce the amount of surface parking from 669 spaces to 446; the remaining parking will be located beneath the proposed buildings. The proposed site plan is shown on Figure 4A.

Not only will this project provide new housing, but it will also enhance the local tax base and help meet the Town of Reading's goal of having a diverse and affordable housing stock. The Project will also lessen the environmental footprint of the site through the inclusion of new stormwater management facilities, by reducing impervious area, and by minimizing energy use through participation in the construction of Energy Star Rated Homes. Energy Star Rated Homes must meet energy efficiency guidelines set by the U.S. Environmental Protection Agency, typically making them 20 to 30 percent more efficient than standard homes built to the 2009 International Energy Code, so that they use less energy, which reduces air pollution, including greenhouse gas emissions.

## Alternatives

There have been several alternatives considered for the redevelopment of the Addison-Wesley campus.

- In 2000, an Expanded ENF (EOEA No. 12165) was filed with MEPA proposing to replace the existing 208,000 square feet of office building with 600,000 square feet of office space, a 300-room hotel and parking for over 2,000 vehicles. According to the Certificate on the ENF, that project would have generated approximately 7,570 average daily trips, more than three times the number currently proposed. This project was not constructed.
- More recently, in 2008, another developer, submitted an Expanded ENF (EEA No. 14252) for a project consisting of demolishing the existing buildings and parking and replacing them with a mix of residential, senior-living space, and office space. It was estimated in the Single EIR that the project would generate 3,890 average daily trips, more than 150 percent of the trips currently proposed. This project, too, was not built.
- The No-Build Alternative, which would leave in place the existing conditions at the Project site, does not meet the development objectives of the Proponent nor does it address the Town of Reading's economic development goals to resurrect the property into productive use.
- The buildings, dating back to the 1950s and 1960s, contain asbestos, do not meet current building codes, and have no potential to be reused cost-effectively. Therefore, a building-reuse alternative is not practicable.

## Mitigation

Throughout the design of the Project, the Proponent has sought opportunities to avoid or minimize environmental impacts. Although the Project is still being designed, the Proponent has firmly committed to certain mitigation measures and is considering other measures, as outlined below:

- **Site Selection.** The Proponent selected a previously-developed, underutilized site located near the Reading Commuter Rail Station and local businesses and served by municipal water and sewer lines. The Project includes demolition of blighted commercial buildings, including removal and proper disposal of any hazardous materials that may be present. The Project will be constructed within the confines of previously disturbed areas, thereby avoiding the land alteration impacts that would result from building on a "greenfield" site.
- **Impervious Area.** The Project will result in a reduction of 0.4 acres of impervious area on the site, primarily through the construction of below-grade parking garages, which will minimize the area of surface parking.
- **Energy Conservation:** As mentioned above, the Project involves construction of Energy Star Rate Homes. Insulation will be installed to Tier 1 and Tier 2 standards, creating a building envelope that exceeds code by 20 percent. The Project includes Low E energy efficient windows. The Proponent will inspect and seal building envelopes and air ductwork to minimize air leakage. Energy efficient heating, cooling, and ventilation equipment and Energy Star Qualified Appliances will be installed. The Project will incorporate Energy Star Qualified Lighting, which, at a minimum, will be 80 percent compact fluorescent lighting. The units will be equipped with high efficiency tankless water heaters. Third Party Verification by a certified Home Energy Star Rater will verify the installation and operation of energy efficiency measures.
- **Building Materials.** During construction, the Proponent will implement a construction cardboard recycling program. Building materials with recycled content, such as oriented strand board, will be specified. The Project will include resource efficient designs that use engineered wood products with advanced framing techniques, including open web floor trusses, PSL posts, LSL beams, and LPI floor joists. Paints low in volatile organic compounds (VOCs) will be used. Low maintenance exterior building materials, such as vinyl siding and stone, are proposed.

- **Water Conservation:** Low-flow, water conserving faucets will be installed in kitchens and bathrooms, and low-flow shower head and toilets will be installed in bathrooms. Energy efficient dishwashers will also be installed. In addition, to minimize irrigation demand, landscaping plans will specify the use of native North American plant species designated as drought tolerant, and the irrigation system will include rain sensors.
- **Wetlands.** The Project has been designed to avoid wetland impacts entirely, and impacts to the buffer zone to bordering vegetated wetlands have been minimized.
- **Stormwater.** As described below, the site currently is only minimally served by stormwater management facilities. With the proposed Project, stormwater management will meet the requirements of the Massachusetts Department of Environmental Protection (MassDEP), and will improve stormwater quality and infiltration.
- **Transportation.** The proponent will designate an on-site Transportation Coordinator to facilitate a partnership with MassRIDES, which provides programs and services to interested residents to encourage travel demand reduction measures. MassRIDES is a non-profit organization, developed by the Massachusetts Executive Office of Transportation, that provides carpool and vanpool matching services and other travel demand reduction measures. The Project has been designed to accommodate pedestrians and bicycles. Bicycle storage will be provide within each of the below-grade parking garages. In addition, there will be bicycle racks at the Community Center, the Village Green, and the Community Park. There will be pedestrian sidewalks along at least one side of each internal on-site roadway, with internal crosswalks and pedestrian ramps provided, so that pedestrian paths are continuous throughout the site. Additionally, a pedestrian trail is proposed along the northern perimeter, within an open space area, linking with the internal pedestrian sidewalks and the sidewalk along South Street. The Proponent will facilitate a private shuttle van to carry residents to and from the Commuter Rail Station during peak hours, provided that sufficient resident demand for such service is demonstrated. Traffic improvements recommended in the Traffic Study in Appendix C and shown on Figure 4B will further improve traffic flow and minimize vehicle congestion.
- **Wastewater.** The Proponent plans to make a substantial payment to the Town of Reading to mitigate inflow and infiltration in the Town's sewer system.

**LAND SECTION – all proponents must fill out this section**

**I. Thresholds / Permits**

A. Does the project meet or exceed any review thresholds related to **land** (see 301 CMR 11.03(1))  
 Yes  No; if yes, specify each threshold:

**II. Impacts and Permits**

A. Describe, in acres, the current and proposed character of the project site, as follows:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Footprint of buildings	2.8	1.4	4.2
Roadways, parking, and other paved areas	8.5	(1.8)	6.7
Other altered areas – (describe)	9.1	(0.8)	8.3
Undeveloped areas	4.4	1.2	5.6

B. Has any part of the project site been in active agricultural use in the last three years?  
 Yes  No; if yes, how many acres of land in agricultural use (with agricultural soils) will be converted to nonagricultural use?

C. Is any part of the project site currently or proposed to be in active forestry use?  
 Yes  No; if yes, please describe current and proposed forestry activities and indicate whether any part of the site is the subject of a DEM-approved forest management plan:

D. Does any part of the project involve conversion of land held for natural resources purposes in accordance with Article 97 of the Amendments to the Constitution of the Commonwealth to any purpose not in accordance with Article 97?  Yes  No; if yes, describe:

E. Is any part of the project site currently subject to a conservation restriction, preservation restriction, agricultural preservation restriction or watershed preservation restriction?  Yes  No; if yes, does the project involve the release or modification of such restriction?  Yes  No; if yes, describe:

F. Does the project require approval of a new urban redevelopment project or a fundamental change in an existing urban redevelopment project under M.G.L.c.121A?  Yes  No; if yes, describe:

G. Does the project require approval of a new urban renewal plan or a major modification of an existing urban renewal plan under M.G.L.c.121B? Yes  No ; if yes, describe:

H. Describe the project's stormwater impacts and, if applicable, measures that the project will take to comply with the standards found in DEP's Stormwater Management Policy:

The existing site is developed with 11.3 acres of impervious area consisting of 2.8 acres of buildings and 8.5 acres of paved parking, circulation and loading areas. Although some mitigation for peak rate of runoff is provided via an on-site detention basin, no treatment of stormwater containments is currently provided.

Under the proposed project, the total amount of impervious area will be reduced from 11.3 acres to 10.9 acres, a reduction of 0.4 acres. More significant than the reduction in the total amount of impervious area is the reduction of the paved parking, circulation and loading areas from 8.5 to 6.7 acres. This reduction of 1.8 acres of paved surfaces (21% less paved area) is made possible by the proponent's commitment to provide parking under each of the nine mid-rise structures, thereby greatly reducing the need for surface paved parking areas. This reduction in pavement alone represents a vast improvement to runoff water quantity and quality and provides for an increase in recharge to the groundwater table. In

addition to reducing the amount of impervious area, all site runoff will be treated to meet or exceed the MassDEP's stormwater management standards, thereby greatly improving the quality of the stormwater runoff.

A preliminary Drainage Report for the Project is included in Attachment B.

I. Is the project site currently being regulated under M.G.L.c.21E or the Massachusetts Contingency Plan? Yes \_\_\_ No X; if yes, what is the Release Tracking Number (RTN)?

J. If the project site is within the Chicopee or Nashua watershed, is it within the Quabbin, Ware, or Wachusett subwatershed? \_\_\_ Yes \_\_\_ No; if yes, is the project site subject to regulation under the Watershed Protection Act? \_\_\_ Yes \_\_\_ No N/A

K. Describe the project's other impacts on land:

The Project is designed to have a positive impact through the significant reduction in impervious area.

### III. Consistency

A. Identify the current municipal comprehensive land use plan and the open space plan and describe the consistency of the project and its impacts with that plan(s):

The Housing section of the Town of Reading's 2006 Master Plan describes the Town's housing stock as composed predominately of single-family homes, and it identifies the need for both a wider range of housing types and a larger supply of affordable housing. Consistent with the Master Plan, the Project will provide a substantial supply of multi-family housing units, including affordable units and senior independent living units.

Approved by the Massachusetts Division of Conservation Services in 2001, the Reading Open Space and Recreation Plan is designed to preserve the quality of life and the aesthetic character of Reading by making open space for watershed protection, wildlife habitat, and recreation space available to children and adults. By redeveloping a previously developed space, rather than an undeveloped area, the Project is consistent with Reading's Open Space and Recreation Plan.

B. Identify the current Regional Policy Plan of the applicable Regional Planning Agency and describe the consistency of the project and its impacts with that plan:

The Metropolitan Area Planning Commission's 2009 *Metro Future* describes the need to expand access to housing through measures such as providing a diverse housing supply and producing affordable housing. The Project, through the development of a range of unit type and inclusion of affordable units and senior living units, is consistent with the goals described in *Metro Future*.

C. Will the project require any approvals under the local zoning by-law or ordinance (i.e. text or map amendment, special permit, or variance)? Yes X No \_\_\_; if yes, describe:

The Project requires Site Plan Approval, 40R Smart Growth Site Plan Approval, and a Scenic Road Permit, all of which are under the jurisdiction of the Community Planning & Development Commission (CPDC).

D. Will the project require local site plan or project impact review? X Yes \_\_\_ No; if yes, describe:

The Project requires Site Plan Approval, 40R Smart Growth Site Plan Approval, and a Scenic Road Permit, all of which are under the jurisdiction of the Community Planning & Development Commission (CPDC).

## **RARE SPECIES SECTION**

### **I. Thresholds / Permits**

A. Will the project meet or exceed any review thresholds related to **rare species or habitat** (see 301 CMR 11.03(2))? \_\_\_ Yes  No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **rare species or habitat**? \_\_\_ Yes  No

C. If you answered "No" to both questions A and B, proceed to the **Wetlands, Waterways, and Tidelands Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Rare Species section below.

### **II. Impacts and Permits**

A. Does the project site fall within Priority or Estimated Habitat in the current Massachusetts Natural Heritage Atlas (attach relevant page)? \_\_\_ Yes \_\_\_ No. If yes,

1. Which rare species are known to occur within the Priority or Estimated Habitat (contact: Environmental Review, Natural Heritage and Endangered Species Program, Route 135, Westborough, MA 01581, allowing 30 days for receipt of information):

2. Have you surveyed the site for rare species? \_\_\_ Yes \_\_\_ No; if yes, please include the results of your survey.

3. If your project is within Estimated Habitat, have you filed a Notice of Intent or received an Order of Conditions for this project? \_\_\_ Yes \_\_\_ No; if yes, did you send a copy of the Notice of Intent to the Natural Heritage and Endangered Species Program, in accordance with the Wetlands Protection Act regulations? \_\_\_ Yes \_\_\_ No

B. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? \_\_\_ Yes \_\_\_ No; if yes, describe:

C. Will the project alter "significant habitat" as designated by the Massachusetts Division of Fisheries and Wildlife in accordance with M.G.L. c.131A (see also 321 CMR 10.30)? \_\_\_ Yes \_\_\_ No; if yes, describe:

D. Describe the project's other impacts on rare species including indirect impacts (for example, stormwater runoff into a wetland known to contain rare species or lighting impacts on rare moth habitat):

## **WETLANDS, WATERWAYS, AND TIDELANDS SECTION**

### **I. Thresholds / Permits**

A. Will the project meet or exceed any review thresholds related to **wetlands, waterways, and tidelands** (see 301 CMR 11.03(3))? \_\_\_ Yes  No; if yes, specify, in quantitative terms:

B. Does the project require any state permits (or a local Order of Conditions) related to **wetlands, waterways, or tidelands**?  Yes \_\_\_ No; if yes, specify which permit:

Order of Conditions under the Wetland Protection Act

C. If you answered "No" to both questions A and B, proceed to the **Water Supply Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wetlands, Waterways, and Tidelands Section below.

**II. Wetlands Impacts and Permits**

A. Describe any wetland resource areas currently existing on the project site and indicate them on the site plan:

There is an approximately 4,700 square foot bordering vegetated wetland (BVW) and a small isolated wetland located on the site. The bordering vegetated wetland is within a stormwater detention area that was previously installed and regulated as a wetland under the Massachusetts Wetlands Protection Act (310 CMR 10.55). It is described as a detention basin, although it has been characterized as a "surge pond" in previously filed MEPA documents. Currently, untreated stormwater collected in the on-site closed drainage system flows into the wetlands. The Project has been designed to conform to the MassDEP stormwater standards and to avoid impacts to wetland resource areas.

The Order of Resource Area Delineation (ORAD) issued by the Reading Conservation Commission is provided in Attachment C.

C. Estimate the extent and type of impact that the project will have on wetland resources, and indicate whether the impacts are temporary or permanent:

The Project has been designed to avoid impacts to wetland resource areas. In fact, the quality of wetland resource areas will be enhanced by the proposed reduction in impervious area and by implementation of a stormwater management system and associated operation and maintenance practices that comply with the MassDEP stormwater standards.

<u>Coastal Wetlands</u>	<u>Area (in square feet) or Length (in linear feet)</u>
Land Under the Ocean	_____
Designated Port Areas	_____
Coastal Beaches	_____
Coastal Dunes	_____
Barrier Beaches	_____
Coastal Banks	_____
Rocky Intertidal Shores	_____
Salt Marshes	_____
Land Under Salt Ponds	_____
Land Containing Shellfish	_____
Fish Runs	_____
Land Subject to Coastal Storm Flowage	_____
 <u>Inland Wetlands</u>	
Bank	_____
Bordering Vegetated Wetlands	_____
Land under Water	_____
Isolated Land Subject to Flooding	_____
Bordering Land Subject to Flooding	_____
Riverfront Area	_____

C. Is any part of the project

1. a limited project? \_\_\_ Yes  No
2. the construction or alteration of a dam? \_\_\_ Yes  No; if yes, describe:
3. fill or structure in a velocity zone or regulatory floodway? \_\_\_ Yes  No
4. dredging or disposal of dredged material? \_\_\_ Yes  No; if yes, describe the volume of dredged material and the proposed disposal site:
5. a discharge to Outstanding Resource Waters? \_\_\_ Yes  No
6. subject to a wetlands restriction order? \_\_\_ Yes  No; if yes, identify the area (in square feet):

D. Does the project require a new or amended Order of Conditions under the Wetlands Protection Act (M.G.L. c.131A)?  Yes \_\_\_ No; if yes, has a Notice of Intent been filed or a local Order of Conditions issued? \_\_\_ Yes  No; if yes, list the date and DEP file number: \_\_\_\_\_. Was the Order of Conditions appealed? \_\_\_ Yes \_\_\_ No. Will the project require a variance from the Wetlands regulations? \_\_\_ Yes  No.

E. Will the project:

1. be subject to a local wetlands ordinance or bylaw?  Yes \_\_\_ No
2. alter any federally-protected wetlands not regulated under state or local law? \_\_\_ Yes  No; if yes, what is the area (in s.f.)?

F. Describe the project's other impacts on wetlands (including new shading of wetland areas or removal of tree canopy from forested wetlands):

The Project has been designed to avoid impacts to wetland resource areas. The quality of wetland resource areas will be enhanced by the proposed reduction in impervious area and by implementation of a stormwater management system and associated operation and maintenance practices that comply with the MassDEP stormwater standards.

### III. Waterways and Tidelands Impacts and Permits

A. Is any part of the project site waterways or tidelands (including filled former tidelands) that are subject to the Waterways Act, M.G.L.c.91? \_\_\_ Yes  No; if yes, is there a current Chapter 91 license or permit affecting the project site? \_\_\_ Yes  No; if yes, list the date and number:

B. Does the project require a new or modified license under M.G.L.c.91? \_\_\_ Yes  No; if yes, how many acres of the project site subject to M.G.L.c.91 will be for non-water dependent use?

Current \_\_\_ Change \_\_\_ Total \_\_\_

C. Is any part of the project

1. a roadway, bridge, or utility line to or on a barrier beach? \_\_\_ Yes  No; if yes, describe:
2. dredging or disposal of dredged material? \_\_\_ Yes  No; if yes, volume of dredged material \_\_\_\_\_
3. a solid fill, pile-supported, or bottom-anchored structure in flowed tidelands or other waterways? \_\_\_ Yes  No; if yes, what is the base area? \_\_\_\_\_
4. within a Designated Port Area? \_\_\_ Yes  No

D. Describe the project's other impacts on waterways and tidelands:

The Project is not expected to have impacts on waterways or tidelands.

### IV. Consistency:

A. Is the project located within the Coastal Zone? \_\_\_ Yes  No; if yes, describe the project's consistency with policies of the Office of Coastal Zone Management:

B. Is the project located within an area subject to a Municipal Harbor Plan? \_\_\_ Yes  No; if yes, identify the Municipal Harbor Plan and describe the project's consistency with that plan:

## WATER SUPPLY SECTION

### I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **water supply** (see 301 CMR 11.03(4))? \_\_\_ Yes  No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **water supply**? \_\_\_ Yes X No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Wastewater Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Water Supply Section below.

**II. Impacts and Permits**

A. Describe, in gallons/day, the volume and source of water use for existing and proposed activities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Withdrawal from groundwater	_____	_____	_____
Withdrawal from surface water	_____	_____	_____
Interbasin transfer	_____	_____	_____
Municipal or regional water supply	_____	_____	_____

B. If the source is a municipal or regional supply, has the municipality or region indicated that there is adequate capacity in the system to accommodate the project? \_\_\_ Yes \_\_\_ No

C. If the project involves a new or expanded withdrawal from a groundwater or surface water source,

1. have you submitted a permit application? \_\_\_ Yes \_\_\_ No; if yes, attach the application
2. have you conducted a pump test? \_\_\_ Yes \_\_\_ No; if yes, attach the pump test report

D. What is the currently permitted withdrawal at the proposed water supply source (in gallons/day)? \_\_\_\_\_ Will the project require an increase in that withdrawal? \_\_\_ Yes \_\_\_ No

E. Does the project site currently contain a water supply well, a drinking water treatment facility, water main, or other water supply facility, or will the project involve construction of a new facility? \_\_\_ Yes \_\_\_ No. If yes, describe existing and proposed water supply facilities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Water supply well(s) (capacity, in gpd)	_____	_____	_____
Drinking water treatment plant (capacity, in gpd)	_____	_____	_____
Water mains (length, in miles)	_____	_____	_____

F. If the project involves any interbasin transfer of water, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or proposed?

G. Does the project involve

1. new water service by a state agency to a municipality or water district? \_\_\_ Yes \_\_\_ No
2. a Watershed Protection Act variance? \_\_\_ Yes \_\_\_ No; if yes, how many acres of alteration?
3. a non-bridged stream crossing 1,000 or less feet upstream of a public surface drinking water supply for purpose of forest harvesting activities? \_\_\_ Yes \_\_\_ No

H. Describe the project's other impacts (including indirect impacts) on water resources, quality, facilities and services:

**III. Consistency** -- Describe the project's consistency with water conservation plans or other plans to enhance water resources, quality, facilities and services:

**WASTEWATER SECTION**

**I. Thresholds / Permits**

A. Will the project meet or exceed any review thresholds related to **wastewater** (see 301 CMR 11.03(5))? \_\_\_ Yes X No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **wastewater**?  Yes \_\_\_ No; if yes, specify which permit:

Sewer Connection Permit BRP WP 74

C. If you answered "No" to both questions A and B, proceed to the **Transportation -- Traffic Generation Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wastewater Section below.

**II. Impacts and Permits**

A. Describe, in gallons/day, the volume and disposal of wastewater generation for existing and proposed activities at the project site (calculate according to 310 CMR 15.00):

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Discharge to groundwater (Title 5)	_____	_____	_____
Discharge to groundwater (non-Title 5)	_____	_____	_____
Discharge to outstanding resource water	_____	_____	_____
Discharge to surface water	_____	_____	_____
Municipal or regional wastewater facility	0	70,360	70,360
<b>TOTAL</b>	0	70,360	70,360

B. Is there sufficient capacity in the existing collection system to accommodate the project?  Yes \_\_\_ No; if no, describe where capacity will be found:

C. Is there sufficient existing capacity at the proposed wastewater disposal facility?  Yes \_\_\_ No; if no, describe how capacity will be increased:

D. Does the project site currently contain a wastewater treatment facility, sewer main, or other wastewater disposal facility, or will the project involve construction of a new facility? \_\_\_ Yes  No. If yes, describe as follows:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Wastewater treatment plant (capacity, in gpd)	_____	_____	_____
Sewer mains (length, in miles)	_____	_____	_____
Title 5 systems (capacity, in gpd)	_____	_____	_____

E. If the project involves any interbasin transfer of wastewater, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or proposed? **N/A**

F. Does the project involve new sewer service by an Agency of the Commonwealth to a municipality or sewer district? \_\_\_ Yes  No

G. Is there any current or proposed facility at the project site for the storage, treatment, processing, combustion or disposal of sewage sludge, sludge ash, grit, screenings, or other sewage residual materials? \_\_\_ Yes  No; if yes, what is the capacity (in tons per day):

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Storage	_____	_____	_____
Treatment, processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

H. Describe the project's other impacts (including indirect impacts) on wastewater generation and treatment facilities:

The Project is not expected to have other impacts on wastewater generation and treatment facilities.

**III. Consistency** -- Describe measures that the proponent will take to comply with federal, state, regional, and local plans and policies related to wastewater management:

The project is in compliance with the Town of Reading's infiltration/inflow policy therefore no additional measures are required. The Project is also consistent with the federal, state, regional and local plans and policies related to wastewater.

A. If the project requires a sewer extension permit, is that extension included in a comprehensive wastewater management plan? \_\_\_ Yes \_\_\_ No; if yes, indicate the EOEA number for the plan and describe the relationship of the project to the plan. **N/A**

**TRANSPORTATION -- TRAFFIC GENERATION SECTION**

**I. Thresholds / Permits**

A. Will the project meet or exceed any review thresholds related to **traffic generation** (see 301 CMR 11.03(6))?  Yes \_\_\_ No; if yes, specify, in quantitative terms:

The project exceeds the ENF Transportation Thresholds of 2,000 or more New average daily trips (ADT), 1,000 or more New adt plus 150 New parking spaces, and 300 New parking spaces. The project does not exceed any Mandatory EIR Transportation Thresholds.

B. Does the project require any state permits related to **state-controlled roadways**?  Yes \_\_\_ No; if yes, specify which permit:

Indirect Access to State Highway Permit

The Project's Traffic Impact and Access Study is provided in Attachment D.

C. If you answered "No" to both questions A and B, proceed to the **Roadways and Other Transportation Facilities Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Traffic Generation Section below.

**II. Traffic Impacts and Permits**

A. Describe existing and proposed vehicular traffic generated by activities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Number of parking spaces	669	226	895
Number of vehicle trips per day	0	2,260	2,260

Trip Generation, Eighth Edition, Institute of Transportation Engineers, Washington, DC, 2008

ITE Land Use Code(s): 230 Residential Condominiums

B. What is the estimated average daily traffic on roadways serving the site?

<u>Roadway</u>	<u>Existing<sup>a</sup></u>	<u>Change<sup>b</sup></u>	<u>Total</u>
1. Jacob Way west of Site	2,984	316	3,300
2. Jacob Way east of Site	2,984	1,944	4,928

<sup>a</sup>Source: Average Daily Traffic from data collected on Wednesday and Thursday, November 3 and 4, 2010.

<sup>b</sup>The total driveway trips generated to and from east/west split 14/86% on Jacob Way.

- C. Describe how the project will affect transit, pedestrian and bicycle transportation facilities and services:
- D. The Project is not expected to affect transit, pedestrian or bicycle transportation facilities or services.

**III. Consistency** -- Describe measures that the proponent will take to comply with municipal, regional, state, and federal plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services:

The proponent will designate an on-site Transportation Coordinator to facilitate a partnership with MassRIDES, which provides programs and services to interested residents to encourage travel demand reduction measures. MassRIDES is a non-profit organization, developed by the Massachusetts Executive Office of Transportation, that provides carpool and vanpool matching services and other travel demand reduction measures. The Project has been designed to accommodate pedestrians and bicycles. Bicycle storage will be provided in the parking garages. In addition, there will be bicycle racks at the Community Center, the Village Green, and the Community Park. There will be pedestrian sidewalks along at least one side of each internal on-site roadway, with internal crosswalks and pedestrian ramps provided, so that pedestrian paths are continuous throughout the site. Additionally, a pedestrian trail is proposed along the northern perimeter, within an open space area, linking with the internal pedestrian sidewalks and the sidewalk along South Street.

**ROADWAYS AND OTHER TRANSPORTATION FACILITIES SECTION**

**I. Thresholds**

- A. Will the project meet or exceed any review thresholds related to **roadways or other transportation facilities** (see 301 CMR 11.03(6))? \_\_\_ Yes X No; if yes, specify, in quantitative terms:
- B. Does the project require any state permits related to **roadways or other transportation facilities**? \_\_\_ Yes X No; if yes, specify which permit:
- C. If you answered "No" to both questions A and B, proceed to the **Energy Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Roadways Section below.

**II. Transportation Facility Impacts**

A. Describe existing and proposed transportation facilities at the project site:

	Existing	<u>Change</u>	<u>Total</u>
Length (in linear feet) of new or widened roadway	_____	_____	_____
Width (in feet) of new or widened roadway	_____	_____	_____

Other transportation facilities:

- B. Will the project involve any
  - 1. Alteration of bank or terrain (in linear feet)? \_\_\_\_\_
  - 2. Cutting of living public shade trees (number)? \_\_\_\_\_
  - 3. Elimination of stone wall (in linear feet)? \_\_\_\_\_

**III. Consistency** -- Describe the project's consistency with other federal, state, regional, and local plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services, including consistency with the applicable regional transportation plan and the Transportation Improvements Plan (TIP), the State Bicycle Plan, and the State Pedestrian Plan:

**ENERGY SECTION**

**I. Thresholds / Permits**

A. Will the project meet or exceed any review thresholds related to **energy** (see 301 CMR 11.03(7))? \_\_\_ Yes X No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **energy**? \_\_\_ Yes X No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Air Quality Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Energy Section below.

**II. Impacts and Permits**

A. Describe existing and proposed energy generation and transmission facilities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Capacity of electric generating facility (megawatts)	_____	_____	_____
Length of fuel line (in miles)	_____	_____	_____
Length of transmission lines (in miles)	_____	_____	_____
Capacity of transmission lines (in kilovolts)	_____	_____	_____

B. If the project involves construction or expansion of an electric generating facility, what are  
 1. the facility's current and proposed fuel source(s)?  
 2. the facility's current and proposed cooling source(s)?

C. If the project involves construction of an electrical transmission line, will it be located on a new, unused, or abandoned right of way? \_\_\_ Yes \_\_\_ No; if yes, please describe:

D. Describe the project's other impacts on energy facilities and services:

**III. Consistency** -- Describe the project's consistency with state, municipal, regional, and federal plans and policies for enhancing energy facilities and services:

**AIR QUALITY SECTION**

**I. Thresholds**

A. Will the project meet or exceed any review thresholds related to **air quality** (see 301 CMR 11.03(8))? \_\_\_ Yes X No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **air quality**? \_\_\_ Yes X No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Solid and Hazardous Waste Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Air Quality Section below.

**II. Impacts and Permits**

A. Does the project involve construction or modification of a major stationary source (see 310 CMR 7.00, Appendix A)? \_\_\_ Yes \_\_\_ No; if yes, describe existing and proposed emissions (in tons per day) of:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Particulate matter	_____	_____	_____
Carbon monoxide	_____	_____	_____
Sulfur dioxide	_____	_____	_____
Volatile organic compounds	_____	_____	_____
Oxides of nitrogen	_____	_____	_____
Lead	_____	_____	_____
Any hazardous air pollutant	_____	_____	_____
Carbon dioxide	_____	_____	_____

B. Describe the project's other impacts on air resources and air quality, including noise impacts:

**III. Consistency**

A. Describe the project's consistency with the State Implementation Plan:

B. Describe measures that the proponent will take to comply with other federal, state, regional, and local plans and policies related to air resources and air quality:

**SOLID AND HAZARDOUS WASTE SECTION**

**I. Thresholds / Permits**

A. Will the project meet or exceed any review thresholds related to **solid or hazardous waste** (see 301 CMR 11.03(9))? \_\_\_ Yes X No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **solid and hazardous waste**? \_\_\_ Yes X No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Historical and Archaeological Resources Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Solid and Hazardous Waste Section below.

**II. Impacts and Permits**

A. Is there any current or proposed facility at the project site for the storage, treatment, processing, combustion or disposal of solid waste? \_\_\_ Yes \_\_\_ No; if yes, what is the volume (in tons per day) of the capacity:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Storage	_____	_____	_____
Treatment, processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

B. Is there any current or proposed facility at the project site for the storage, recycling, treatment or disposal of hazardous waste? \_\_\_ Yes \_\_\_ No; if yes, what is the volume (in tons or gallons per day) of the capacity:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Storage	_____	_____	_____
Recycling	_____	_____	_____
Treatment	_____	_____	_____
Disposal	_____	_____	_____

C. If the project will generate solid waste (for example, during demolition or construction), describe alternatives considered for re-use, recycling, and disposal:

D. If the project involves demolition, do any buildings to be demolished contain asbestos?  
 Yes  No

E. Describe the project's other solid and hazardous waste impacts (including indirect impacts):

**III. Consistency**--Describe measures that the proponent will take to comply with the State Solid Waste Master Plan:

## **HISTORICAL AND ARCHAEOLOGICAL RESOURCES SECTION**

### **I. Thresholds / Impacts**

A. Is any part of the project site a historic structure, or a structure within a historic district, in either case listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth?  Yes  No; if yes, does the project involve the demolition of all or any exterior part of such historic structure?  Yes  No; if yes, please describe:

The Addison-Wesley Publishing Building, Jacob Way, Reading (REA.270). The building is situated within a large office park that has been developed during the second half of the 20<sup>th</sup> century. The building is vacant and in poor condition, and its setting has been compromised by the construction of later 20<sup>th</sup> century office buildings.

B. Is any part of the project site an archaeological site listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth?  Yes  No; if yes, does the project involve the destruction of all or any part of such archaeological site?  Yes  No; if yes, please describe:

C. If you answered "No" to all parts of both questions A and B, proceed to the **Attachments and Certifications** Sections. If you answered "Yes" to any part of either question A or question B, fill out the remainder of the Historical and Archaeological Resources Section below.

D. Have you consulted with the Massachusetts Historical Commission?  Yes  No; if yes, attach correspondence

E. Describe and assess the project's other impacts, direct and indirect, on listed or inventoried historical and archaeological resources:

The Project includes the demolition of the Addison-Wesley Publishing Co. Building A, a property included in the Inventory. Photographs of the existing conditions, key to a map, of the building are included in Appendix E.

**II. Consistency** -- Describe measures that the proponent will take to comply with federal, state, regional, and local plans and policies related to preserving historical and archaeological resources:

The filing of this ENF initiates review by the Massachusetts Historical Commission in compliance with State Register Review (950 CMR 71). State Register Review is required as the project will need permits from DEP and MHD. It is anticipated that review with the MHC for the Project's potential effects on cultural resources will be completed under State Register Review.

**ATTACHMENTS:**

1. Plan, at an appropriate scale, of existing conditions of the project site and its immediate context, showing all known structures, roadways and parking lots, rail rights-of-way, wetlands and water bodies, wooded areas, farmland, steep slopes, public open spaces, and major utilities. (Figure 2 and Figure 3 in Attachment A)
2. Plan of proposed conditions upon completion of project (if construction of the project is proposed to be phased, there should be a site plan showing conditions upon the completion of each phase). (Figure 4)
3. **Original** U.S.G.S. map or good quality **color** copy (8-½ x 11 inches or larger) indicating the project location and boundaries (Figure 1)
4. List of all agencies and persons to whom the proponent circulated the ENF, in accordance with 301 CMR 11.16(2). (Attachment F)
5. Other:

**CERTIFICATIONS:**

1. The Public Notice of Environmental Review has been/will be published in the following newspapers in accordance with 301 CMR 11.15(1):

Daily Times Chronicle

January 4, 2011

2. This form has been circulated to Agencies and Persons in accordance with 301 CMR 11.16(2).

  
Date 12/10/10  
Signature of Responsible Officer  
of Proponent

12/28/10   
Date Signature of person preparing  
ENF (if different from above)

Name Mark Mastroianni

Name Laura E. Rome

Firm/Agency Pulte Homes

Firm/Agency Epsilon Associates, Inc.

Street 115 Flanders Road, Suite 200

Street 3 Clock Tower Place, Suite 250

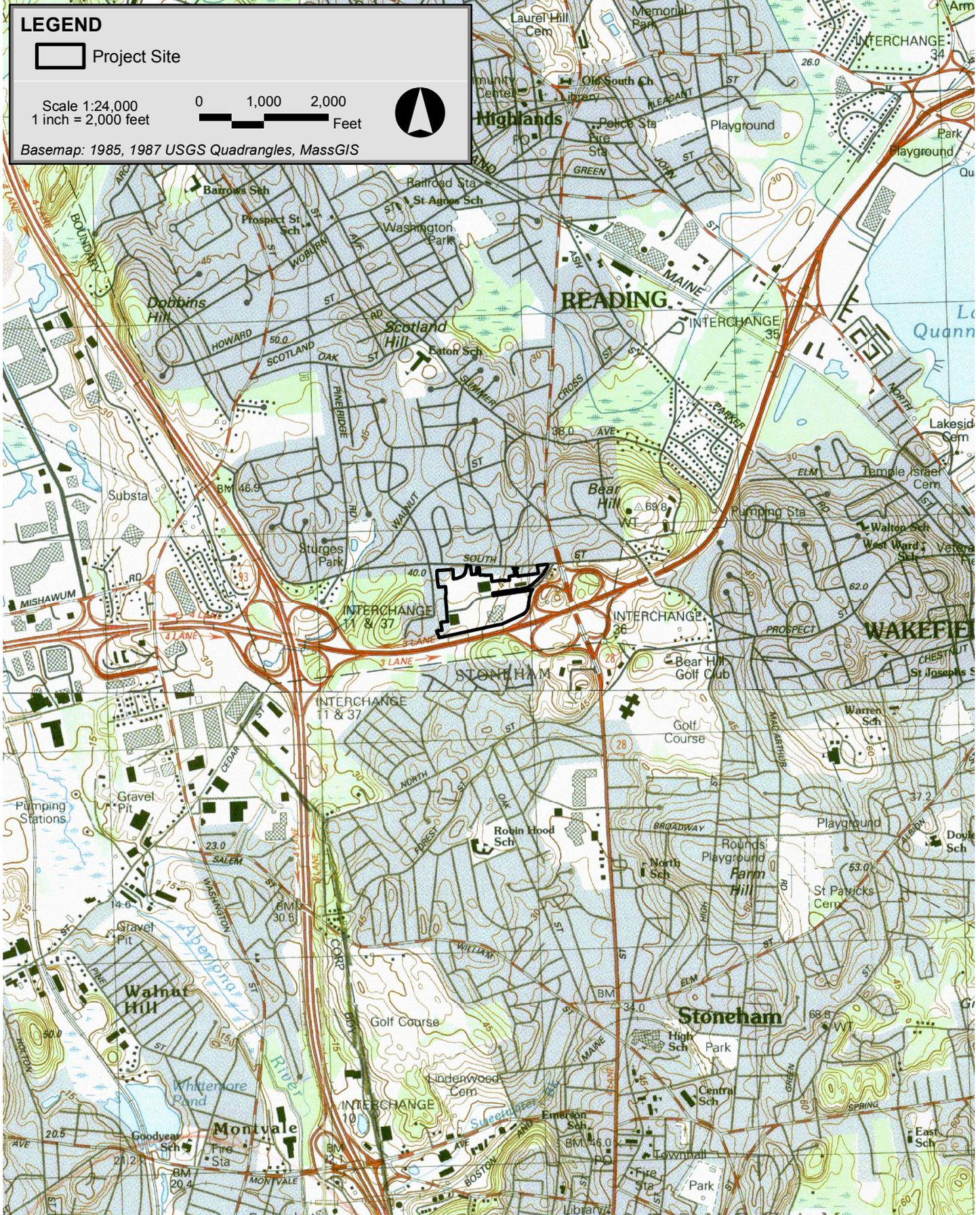
Municipality/State/Zip Westborough, MA 01581

Municipality/State/Zip Maynard, MA 01754

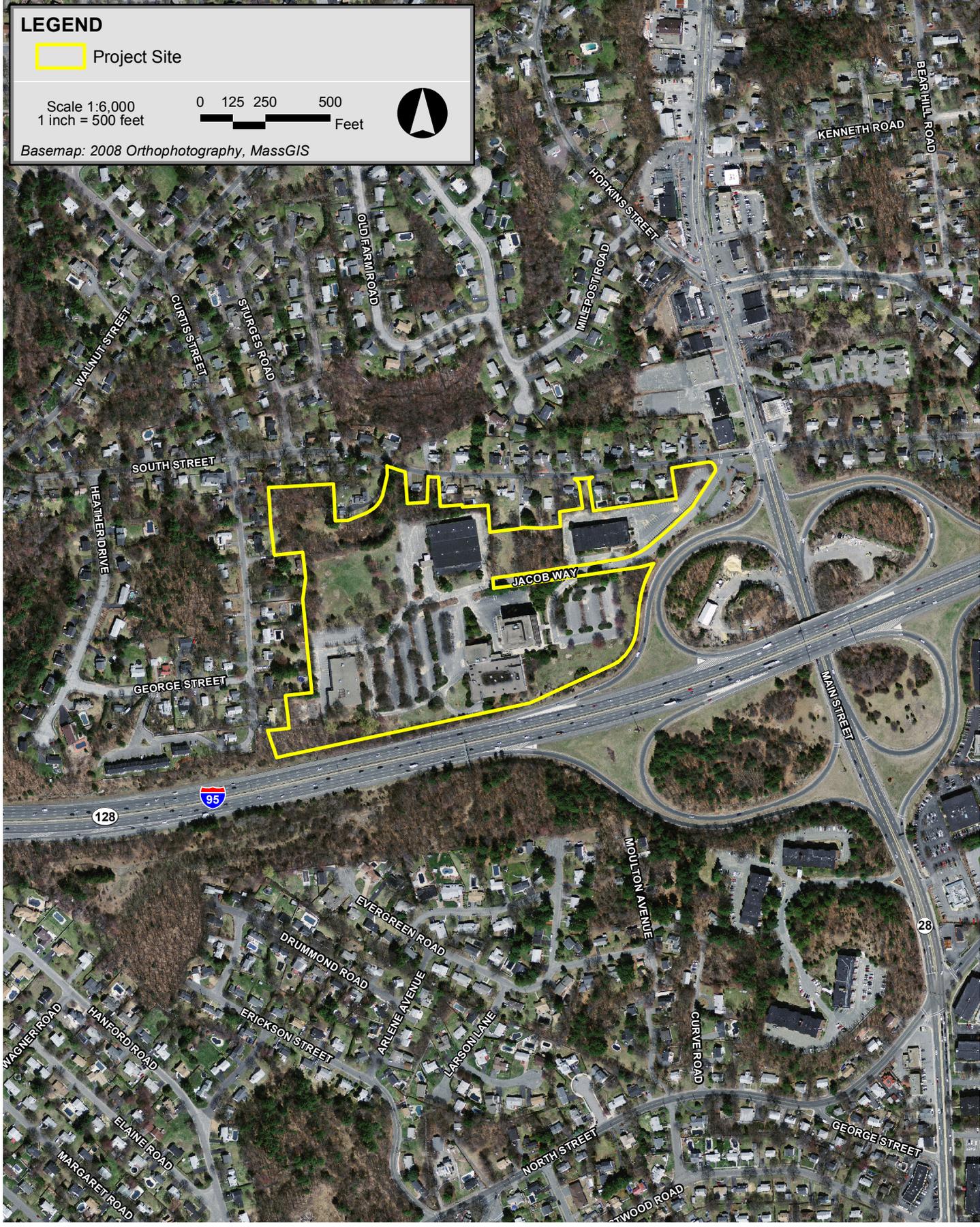
Phone 508-870-9999

Phone 978-897-7100





Reading Woods Reading, MA



Reading Woods Reading, MA

**Plan Notes:**

PROPERTY LINES AND EXISTING CONDITIONS FROM SURVEY PLANS OF THE SITE PREPARED BY NITSCH ENGINEERING, INC. ENTITLED "ALTA/AC" DATED MAY 15, 2001, AND "PLAN OF LAND" DATED MAY 3, 2000.

WETLAND RESOURCE AREAS WERE DELINEATED ON DECEMBER 28, 2006 BY VHB WETLAND SCIENTISTS. FIELD SURVEY AND SETBACK FLAGS WERE CONDUCTED BY NITSCH ENGINEERING INC. IN JANUARY, 2007.

ZONING INFORMATION IS BASED UPON AN ENTITLED "PLAN SHOWING HEIGHT LIMITS AND SETBACK AREAS, BUSINESS C DISTRICT IN READING, MASSACHUSETTS" DATED MARCH 27, 2000.

ENTIRE SITE LIES WITHIN THE BUSINESS C ZONING DISTRICT.

**PLAN REFERENCES**

THE FOLLOWING STATE HIGHWAY LAYOUT PLANS ARE ON FILE AT THE MASSACHUSETTS TRANSPORTATION BUILDING, MASSACHUSETTS HIGHWAY DEPARTMENT OFFICES, PARK SQUARE, ROOM 201, MASSACHUSETTS.

PLAN ENTITLED "PLAN OF ROAD IN READING, MIDDLESEX COUNTY, LOCALLY KNOWN AS MAIN STREET, LAID OUT AS A STATE HIGHWAY BY THE MASSACHUSETTS HIGHWAY COMMISSION", SCALE: 1"=40', DATED SEPT. 14, 1899; BEING A SET OF FOUR (4) SHEETS.

PLAN ENTITLED "THE COMMONWEALTH OF MASSACHUSETTS, PLAN OF ROAD IN THE TOWN OF READING, MIDDLESEX COUNTY, ALTERED AND LAID OUT AS A STATE HIGHWAY BY THE DEPARTMENT OF PUBLIC WORKS", SCALE: 1"=40', DATED MARCH 11, 1930.

PLAN ENTITLED "RELOCATION AND ALTERATION OF A PORTION OF THE SOUTHERLY SIDELINE OF SOUTH ST. AND THE WESTERLY CORNER OF SOUTH ST. AND JACOB WAY, READING, MASS.", SCALE: 1"=40', DATED MARCH, 1957, PREPARED BY BOARD OF PUBLIC WORKS, JAMES T. PUTNAM, SUPT.

PLAN ENTITLED "THE COMMONWEALTH OF MASSACHUSETTS, PLAN OF ROAD IN THE TOWN OF READING, MIDDLESEX COUNTY, ALTERED AND LAID OUT AS A STATE HIGHWAY BY THE DEPARTMENT OF PUBLIC WORKS", SCALE: 1"=40', DATED APRIL 21, 1959.

PLAN ENTITLED "THE COMMONWEALTH OF MASSACHUSETTS, PLAN OF ROAD IN THE TOWN OF READING, MIDDLESEX COUNTY, ALTERED AND LAID OUT AS A STATE HIGHWAY BY THE DEPARTMENT OF PUBLIC WORKS", SCALE: 1"=40', DATED NOVEMBER 24, 1959; BEING A SET OF SIX (6) SHEETS.

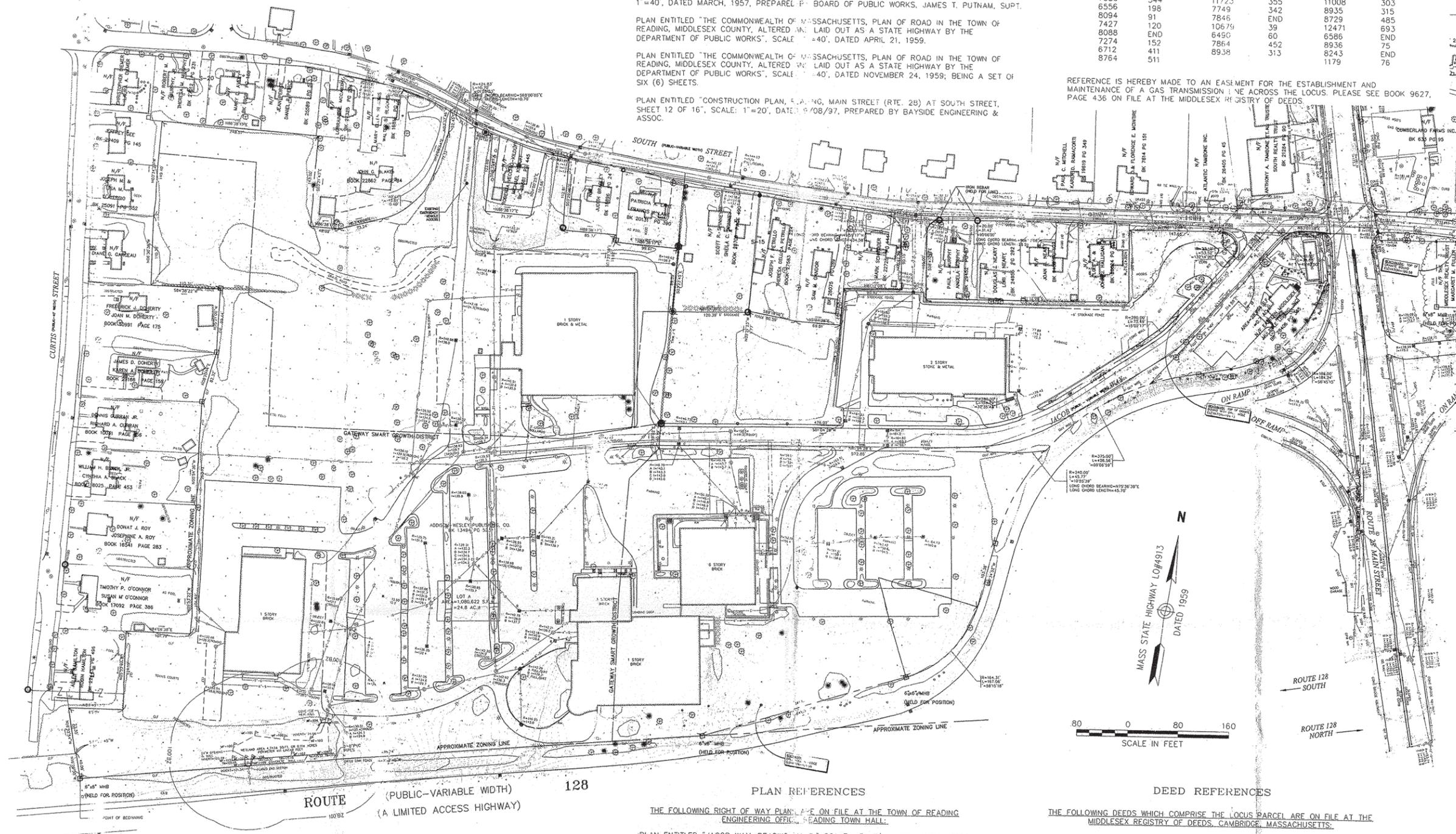
PLAN ENTITLED "CONSTRUCTION PLAN, LAYING MAIN STREET (RTE. 28) AT SOUTH STREET, SHEET 12 OF 16", SCALE: 1"=20', DATED 9/08/97, PREPARED BY BAYSIDE ENGINEERING & ASSOC.

**PLAN REFERENCES**

THE FOLLOWING PLANS ARE ON FILE AT THE MIDDLESEX REGISTRY OF DEEDS, CAMBRIDGE, MASSACHUSETTS.

BOOK	PAGE	BOOK	PAGE	BOOK	PAGE
9708	60	7209	480	7892	526
8876	74	7580	7	7594	13
6862	541	8011	555	7486	239
6529	599	7231	END	6544	185
7784	299	2285	357	12235	215
7309	END	9732	283	12314	150
6964	399	7178	355	7263	555
7486	240	4256	405	7676	52
7427	END	7507	563	7956	304
7383	344	11723	355	11008	303
8056	198	7749	342	8935	315
8094	91	7846	END	8729	485
7427	120	10679	39	12471	693
8088	END	8450	60	6586	END
7274	152	7864	452	8936	75
6712	411	8938	313	8243	END
8764	511			1179	76

REFERENCE IS HEREBY MADE TO AN EASEMENT FOR THE ESTABLISHMENT AND MAINTENANCE OF A GAS TRANSMISSION LINE ACROSS THE LOCUS. PLEASE SEE BOOK 9627, PAGE 436 ON FILE AT THE MIDDLESEX REGISTRY OF DEEDS.



**PLAN REFERENCES**

THE FOLLOWING RIGHT OF WAY PLANS ARE ON FILE AT THE TOWN OF READING ENGINEERING OFFICE, READING TOWN HALL.

PLAN ENTITLED "JACOB WAY, READING, MASS.", SCALE: 1"=40', DATED MARCH, 1956, PREPARED BY BOARD OF PUBLIC WORKS, JAMES T. PUTNAM, SUPT.

PLAN ENTITLED "PORTION OF JACOB WAY, READING, MASS.", SCALE: 1"=40', DATED OCTOBER, 1956, PREPARED BY BOARD OF PUBLIC WORKS, JAMES T. PUTNAM, SUPT.

PLAN ENTITLED "CURTIS ST., READING, MASS.", SCALE: 1"=40', DATED JANUARY 1947, PREPARED BY BOARD OF PUBLIC WORKS, PHILIP WELCH, SUPT.

**DEED REFERENCES**

THE FOLLOWING DEEDS WHICH COMPRISE THE LOCUS PARCEL ARE ON FILE AT THE MIDDLESEX REGISTRY OF DEEDS, CAMBRIDGE, MASSACHUSETTS.

BOOK	PAGE	BOOK	PAGE
8940	166	8962	51
8935	315	8936	80
10613	475	12471	693
9732	283	13494	523
14484	333	13494	527



**Vanasse Hangen Brustlin, Inc.**

Transportation  
Land Development  
Environmental Services

101 Walnut Street, P.O. Box 9151  
Watertown, Massachusetts 02471  
617 924 1770 • FAX 617 924 2286

No.	Revision	Date	Appr.

Designed by MS Drawn by MS Checked by  
CAD checked by Approved by CO  
Scale 1"=80' Date May 15, 2008  
Project No.

**Reading Woods**

One Jacob Way  
Reading, Massachusetts

Issued for  
**Expanded ENF**

Not Approved for Construction  
Drawing Title

**Existing Conditions  
Plan**

Drawing No. ENR  
**Sv-1**  
Sheet of 1  
Project Number  
10016.00





Attachment B    Drainage Report

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PRELIMINARY

**STORMWATER REPORT**

**READING WOODS**

READING, MASSACHUSETTS

Prepared for;

**PULTE HOMES OF NEW ENGLAND, L.L.C.**

Prepared by;

**MARCHIONDA & ASSOCIATES, L.P.**

62i MONTVALE AVE.  
STONEHAM, MA 02180

December 2010

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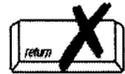
- **STORMWATER REPORT CHECKLIST & ENGINEERS CERTIFICATE**
- **NARRATIVE**
- **STORMWATER MANAGEMENT STANDARDS COMPLIANCE**
- **FIGURES**
- **APPENDIX**



# Checklist for Stormwater Report

## A. Introduction

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.<sup>1</sup> This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8<sup>2</sup>
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the [Massachusetts Stormwater Handbook](#). The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#).

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

<sup>1</sup> The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

<sup>2</sup> For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



# Checklist for Stormwater Report

## B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

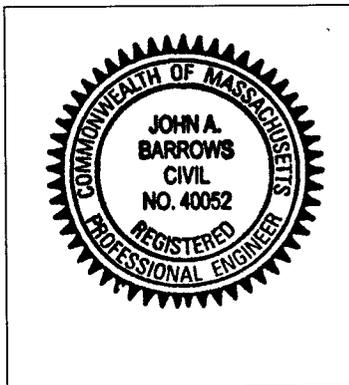
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

### Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



*John A. Barrows* 12/20/10  
Signature and Date

## Checklist

**Project Type:** Is the application for new development, redevelopment, or a mix of new and redevelopment?

- New development
- Redevelopment
- Mix of New Development and Redevelopment



# Checklist for Stormwater Report

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## Checklist (continued)

**LID Measures:** Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- No disturbance to any Wetland Resource Areas
- Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- Reduced Impervious Area (Redevelopment Only)
- Minimizing disturbance to existing trees and shrubs
- LID Site Design Credit Requested:
  - Credit 1
  - Credit 2
  - Credit 3
- Use of "country drainage" versus curb and gutter conveyance and pipe
- Bioretention Cells (includes Rain Gardens)
- Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- Treebox Filter
- Water Quality Swale
- Grass Channel
- Green Roof
- Other (describe): \_\_\_\_\_

### Standard 1: No New Untreated Discharges

- No new untreated discharges
- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth (***Riprap aprons provided to dissipate energy***)
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included. (***TSS calculations provided***)



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

### Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
  - Static
  - Simple Dynamic
  - Dynamic Field<sup>1</sup>
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
  - Site is comprised solely of C and D soils and/or bedrock at the land surface
  - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
  - Solid Waste Landfill pursuant to 310 CMR 19.000
  - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

<sup>1</sup> 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

### Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
  - Provisions for storing materials and waste products inside or under cover;
  - Vehicle washing controls;
  - Requirements for routine inspections and maintenance of stormwater BMPs;
  - Spill prevention and response plans;
  - Provisions for maintenance of lawns, gardens, and other landscaped areas;
  - Requirements for storage and use of fertilizers, herbicides, and pesticides;
  - Pet waste management provisions;
  - Provisions for operation and management of septic systems;
  - Provisions for solid waste management;
  - Snow disposal and plowing plans relative to Wetland Resource Areas;
  - Winter Road Salt and/or Sand Use and Storage restrictions;
  - Street sweeping schedules;
  - Provisions for prevention of illicit discharges to the stormwater management system;
  - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
  - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
  - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent. **(Part of attached O&M Plan)**
  - Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
    - is within the Zone II or Interim Wellhead Protection Area
    - is near or to other critical areas
    - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
    - involves runoff from land uses with higher potential pollutant loads.
  - The Required Water Quality Volume is reduced through use of the LID site Design Credits.
  - Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
  - The ½" or 1" Water Quality Volume or
  - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

### Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does **not** cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

### Standard 6: Critical Areas

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
- Limited Project
  - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
  - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
  - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
  - Bike Path and/or Foot Path
  - Redevelopment Project
  - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
  - Construction Period Operation and Maintenance Plan;
  - Names of Persons or Entity Responsible for Plan Compliance;
  - Construction Period Pollution Prevention Measures;
  - Erosion and Sedimentation Control Plan Drawings;
  - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
  - Vegetation Planning;
  - Site Development Plan;
  - Construction Sequencing Plan;
  - Sequencing of Erosion and Sedimentation Controls;
  - Operation and Maintenance of Erosion and Sedimentation Controls;
  - Inspection Schedule;
  - Maintenance Schedule;
  - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.  
***(some information to be included with SWPPP to be prepared for NPDES permit)***



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- The project is **not** covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins. (**will be covered**)

### Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
  - Name of the stormwater management system owners;
  - Party responsible for operation and maintenance;
  - Schedule for implementation of routine and non-routine maintenance tasks;
  - Plan showing the location of all stormwater BMPs maintenance access areas;
  - Description and delineation of public safety features; (**n/a - underground system**)
  - Estimated operation and maintenance budget; and
  - Operation and Maintenance Log Form.
- The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
  - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
  - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

### Standard 10: Prohibition of Illicit Discharges

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs. (**owner responsible for submitting**)

## **Narrative**

### **Introduction and Background**

The following report provides information regarding the storm water characteristics of a residential housing development proposed on a property located on Jacob Way in Reading, Massachusetts. The property is referred to as 1 Jacob Way and is shown as Lots 57, 69, 74, 77, 84, 86, and 87 on the town assessor's map 4. The report will also provide information on the implementation of storm water mitigation measures, Best Management Practices, and compliance with Town of Reading Wetland Protection Regulations and the Massachusetts Stormwater Management Policy and Standards.

For additional information regarding the site's existing conditions and the project's stormwater management system reference is made to the following plans;

- *Site Plans – Reading Woods*  
*Prepared for; Pulte Homes of New England, LLC*  
*Prepared by; Marchionda & Associates, L.P.*  
*Dated; December 2010*

### **Existing Conditions**

The project site is located at a previously developed and vacated commercial use property. It was last used as an administrative and manufacturing facility by the Addison Wellesley publishing company. The total land area of the property is approximately 24.8 acres with road frontage on public ways Jacob Way, South St. and Massachusetts Highway Rte 128. Vehicle access to the property is through Jacob Way with only limited access to South Street. Jacob Way is a variable width right of way providing frontage to both the north and south areas of the site. The roadway has an average pavement width of 28 feet and runs approximately 1300 feet into the middle of the property. The site also has a gated auxiliary driveway that accesses South Street. This driveway has a bituminous concrete surface with an average width of approximately 17 feet. Almost the entire southern and eastern boundary of the site fronts on the state highway and Jacob Way. The northern and western boundaries of the property abut single family properties located on South and Curtis Street. Elevations on the site drop by approximately 60 feet sloping from the highest elevations at the northeast corner at the intersection of Jacob Way and South Street to the lowest elevations located at the southeast corner of the site. Slopes on the property vary with large flat areas of slopes approximately 1 percent in the west portions of the property to steeper cut and fill slopes created to construct parking areas in the eastern portions of the property.

There are presently five primary buildings located on the property. These buildings vary from a single story plant building to a multi-story office building. The existing total

footprint area of these buildings is approximately 2.8 acres. Supporting these buildings is a series of bituminous concrete access drives and parking areas. The existing drives and parking areas cover approximately 8.6 acres of the site. Stormwater from these access drives and parking areas is managed through traditional catch basin collection drainage systems. These systems convey stormwater in two directions from the site. The larger main system terminates at the southeast corner of the property and a smaller system connects into the municipal drainage system located in South Street.

The remaining areas of the site are made up of mostly overgrown open space landscape and recreational areas which include a baseball field and tennis courts. There is a small amount of undisturbed wooded areas with some mature trees and dense undergrowth on the site. For the most part these areas are located along the perimeter of the property with the largest areas located at the northeast and southeast corners of the site. There is also a small amount of bordering vegetated wetlands (BVW) located at the northwest corner of the property. This BVW is located within an existing stormwater control structure that was constructed as part of the stormwater management system of the previous development. This structure includes a 4 foot high concrete wall approximately 160 feet long with 18" and 24" orifices. Stormwater that flows through these openings enters a 36" culvert located just outside the property within the state highway right of way. After entering the state drainage system stormwater flows west to wetland areas that make up the Aberjona River watershed.

Due to the existing developed urban condition of the site, the Natural Resource Conservation Service (NRCS) soil survey has mapped the site as Udorthents. The mapped areas surrounding the site are for the most part made up of underlying soils typical of the Charlton, Canton, and Hollis soil complexes. These soils are predominately well drained sandy loams and loamy sands formed in areas of hill slopes. These soils are considered to be in the hydrologic soil group "B". An on-site soil evaluation completed in November of 2010 supports the soil survey mapping. Information from the NCRS Soil Survey and the results of the on-site soil evaluation are included in Appendix "A" of this report.

## **Project Description**

The proposed project consists of the construction of a residential housing development. The existing buildings will be demolished and thirteen new multi-family buildings and a community club house will be constructed. Four of these buildings will be town house style buildings housing 4 units per building each with two car parking garages. The other 9 buildings will be garden style buildings containing either 36 or 50 units in each building. Each of the garden style buildings will have parking garages located in their lower levels.

A number of bituminous concrete access drives and parking areas are proposed to support the new development. 895 parking spaces and approximately 4000 feet of drives and access aisles will be created when the project is completed. Of these parking spaces, 426

will be located in parking garages below the garden style buildings. This design will help to reduce the amount of pavement surfaces necessary to meet parking requirements. Access to the site will continue to be from Jacob Way. Jacob Way will be renovated and upgraded with a narrower width of 26 feet while maintaining a similar layout and longitudinal grades. The intersection of Jacob Way with South Street will be re-aligned to improve vehicle access to and from the site. The buildings, drives, and parking areas have been orientated to utilize the existing site grading so to minimize earth work and reduce the limit of work. Work will be limited to areas that have been previously disturbed. No construction will take place within a wetlands resource area however a small portion of the construction will take place within the buffer zone to a Bordering Vegetated Wetland (BVW).

As a result of all the site improvements there will be a net reduction of approximately 1 acre of impervious surfaces. In the post construction condition the project will have approximately 10 ½ acres of impervious surfaces. Of this area approximately 4.2 acres will be building footprints and 6.3 acres will be bituminous drives, parking areas, and walks. This represents a significant reduction from the 9.1 acres of bituminous drives, parking areas, and walks that presently exist on the site. A stormwater management system has been designed to manage and treat the stormwater that will be generated by the proposed bituminous parking areas and drives.

The proposed stormwater management system will mimic the site's existing outfall points and drainage patterns. Stormwater generated from the northeast portion of the site will be conveyed to the municipal stormwater system in South Street through an existing drain line located between homes (# 337 & #343) on South Street. The subcatchment contributing to this point will be limited lawn areas from the development and paved areas of Jacob Way and South Street. This subcatchment will realize a reduction in impervious surfaces with the removal of a large amount of the parking area that previously drained to this system. A small portion of the northeast corner of the site in the area of the emergency access drive will also drain to the municipal system. No changes are proposed to the characteristics of this subcatchment and therefore there will be no changes to stormwater flows to this part of the system.

The remaining northeast portion of the site flows to a topographic depression at the northeast corner of the property. This depression appears to have been formed as the result of previous borrow excavations. The area has been overgrown for some time with brush and some mature trees well established. No changes are proposed to the characteristics of this subcatchment and therefore there will be no changes to stormwater flows to this area.

Stormwater from the southwest portion of the development will be managed through new stormwater management systems. This area represents the majority of the newly developed site areas. Flows from this system will terminate in the southeast corner of the site in the same location as the existing system. By implementing B.M.P.'s such as Deep Sump Catch Basins, Infiltration Chambers, and Water Quality Units, the system will mitigate peak flows, remove suspended solids, and provide ground water recharge.

## **Project Type:**

The project represents a change from the pre-developed commercial use and therefore for purposes of stormwater management standards the project has been considered a “re-development” project.

## **LID Measures:**

A number of environmental sensitive site design and Low Impact Development (LID) techniques have been used in the planning of the project. As previously mentioned the development will reduce the overall amount of existing impervious surfaces, reduce the amount suspended solid generating pavement areas, and limit work to areas previously disturbed. No construction will be required to take place within a wetland resource area.

The project also includes a number of BMP’s to manage stormwater generated from the development. The BMP’s include a number of groundwater recharge systems that have been located throughout the site in effort to decentralize and minimize impacts. These systems have been located under proposed parking areas and areas adjacent to building sites to reduce the overall impact of the construction. The project will also provide construction period erosion and sediment controls and a long term pollution prevention plan.

## **Compliance with Stormwater Management Standards**

The stormwater management system has been designed to meet or exceed the applicable stormwater standards. The following is a brief summary of how the proposed project will meet each standard.

### **1.0 Untreated Stormwater**

The proposed site development will not create untreated stormwater discharges. Proposed point sources will include rip rap aprons to prevent soil erosion and scour.

### **2.0 Post-Development Peak Flow Runoff Rates**

Peak flow runoff rates were studied for the proposed conditions for the 2, 10, 25, and 100 year, 24-hour Type III storm events. Points of comparison (“Study Points”) ( Table 1 and as shown on Figures 3 & 5) were developed and studied in an effort to micro-analyze runoff rates to the abutting properties and wetland areas. The Study Points were consistent with the pre-development condition and post development condition.

**TABLE 1: DESIGN POINTS OF COMPARISON**

<b>Study Points</b>	<b>Description</b>
1	Flows to the wetland located in the existing S.W.M.A. located at the southwest corner of the property.
2	Flows from the northeast corner of the site to areas of South Street that slope toward Main Street.
3	Flows to depression located at the northwest corner of the property.
4	Flows from the northeast corner of the site to the municipal stormwater system in South Street.
5	Flows north to South Street at the intersection with the emergency access drive.

CNs and TCs obtained using TR-55 methodology were input into the *Hydraflow*<sup>®</sup> Hydrographs software package, which utilizes the National Resources Conservation Service (NRCS) (formerly “SCS”) methods to generate and route hydrographs. Information on the CN’s and TC’s has been included in appendix “B”.

Storm water peak flows will be mitigated by the creation of a subsurface detention/infiltration system. Information on the performance of this stormwater structure is included in the hydrologic analysis. The resulting hydrographs and supporting calculations have been included in the hydrologic analysis in the report’s appendix “C”.

The hydrologic analysis determined that the peak runoff rates to the Study Points in the post-development condition do not exceed the pre-development peak runoff rates for the design storms. Table 2 (below) summarizes the attached *Hydraflow*<sup>®</sup> Hydrographs analysis.

TABLE 2: PEAK RUNOFF RATE COMPARISON

Design Point		Peak Flows (CFS)			
		Storm Events			
		<u>2 YR</u>	<u>10 YR</u>	<u>25 YR</u>	<u>100 YR</u>
1	Existing	20.4	41.9	55.1	81.1
	Proposed	20.3	41.6	54.9	80.7
2	Existing	1.1	2.3	3.0	4.3
	Proposed	0.3	0.6	0.7	1.0
3	Existing	0.5	2.0	3.1	5.5
	Proposed	0.5	2.0	3.1	5.5
4	Existing	7.7	12.6	15.4	20.6
	Proposed	1.3	3.3	4.6	7.2
5	Existing	0.4	0.9	1.3	2.1
	Proposed	0.4	0.9	1.3	2.1

### 3.0 Recharge to Groundwater

Due to the fact that the project will reduce the amount of impervious surface that presently exists the annual recharge from the site will be increased without the implementation of recharge BMP's. The proposed storm management system does however include recharge components that will provide volumes to meet the recharge standard as if the project was proposed on undeveloped lands. The recharge volume requirement is based on the amount of impervious surfaces created and criteria outlined in the *Stormwater Management Handbook*. The hydrologic soil groups were determined based on a comparison of published soils data and actual site conditions. The soil evaluation (Appendix "A") determined that the entire site has well drained underlying soils considered to be in the Hydrologic Soil Group "B". All of the proposed impervious surfaces will therefore cover "B" soils. The required groundwater recharge volume will be captured and infiltrated through the use of subsurface recharge systems proposed throughout the site. These systems are connected to both the building's roof drainage systems and the project's storm sewer collection system. Appendix "D" includes calculations and a summary of the recharge volume provided by the stormwater management system. The "static" method was used to determine the infiltration storage volume provided for the project.

#### **4.0 T.S.S. Removal**

The stormwater management system will include BMP treatment trains that will provide at least 80% removal of the Total Suspended Solids (T.S.S.) generated from the proposed development. The BMP's include Street Sweeping, Deep Sump Hooded Catch Basins, and a Proprietary Water Quality Structure (Stormceptor). Appendix "E" includes a removal rate worksheet for the proposed treatment trains.

#### **5.0 Higher Pollutant Loads**

The project does not propose any uses that could potentially generate higher pollutant loads.

#### **6.0 Protection of Critical Areas**

The project does not propose stormwater discharges to critical areas.

#### **7.0 Redevelopment Project**

As previously mentioned the property had been the site of a corporate campus for a large publishing company. Almost the entire site has been previously disturbed or developed and can be considered a "redevelopment" project. As a redevelopment project the storm management system is required to meet certain standards to the extent practical. This report will however demonstrate that the proposed development has been designed to meet all of the applicable stormwater management standards.

#### **8.0 Erosion and Sediment Control**

The project will include appropriate erosion and sediment controls to insure that exposed soils will remain stable and sediment will not be released from the proposed limit of work. An erosion control plan has been prepared for the project and has been included as part of the latest site development plans. The project will require a NPDES General Construction Permit from the EPA prior to construction. A Stormwater Pollution Prevention Plan (SWPPP) will be compiled and kept on site as part of NPDES permit.

## 9.0 Operation & Maintenance Plan

An Operation and Maintenance Plan has been included in Appendix “G” of the report. The O & M Plan states the parties responsible for the operation and maintenance of the proposed BMP’s as well the maintenance requirements and schedule.

## 10.0 Prohibition of Illicit Discharges

DEP does not permit illicit discharges, defined by 310 CMR 10.04 as follows, to the stormwater management system:

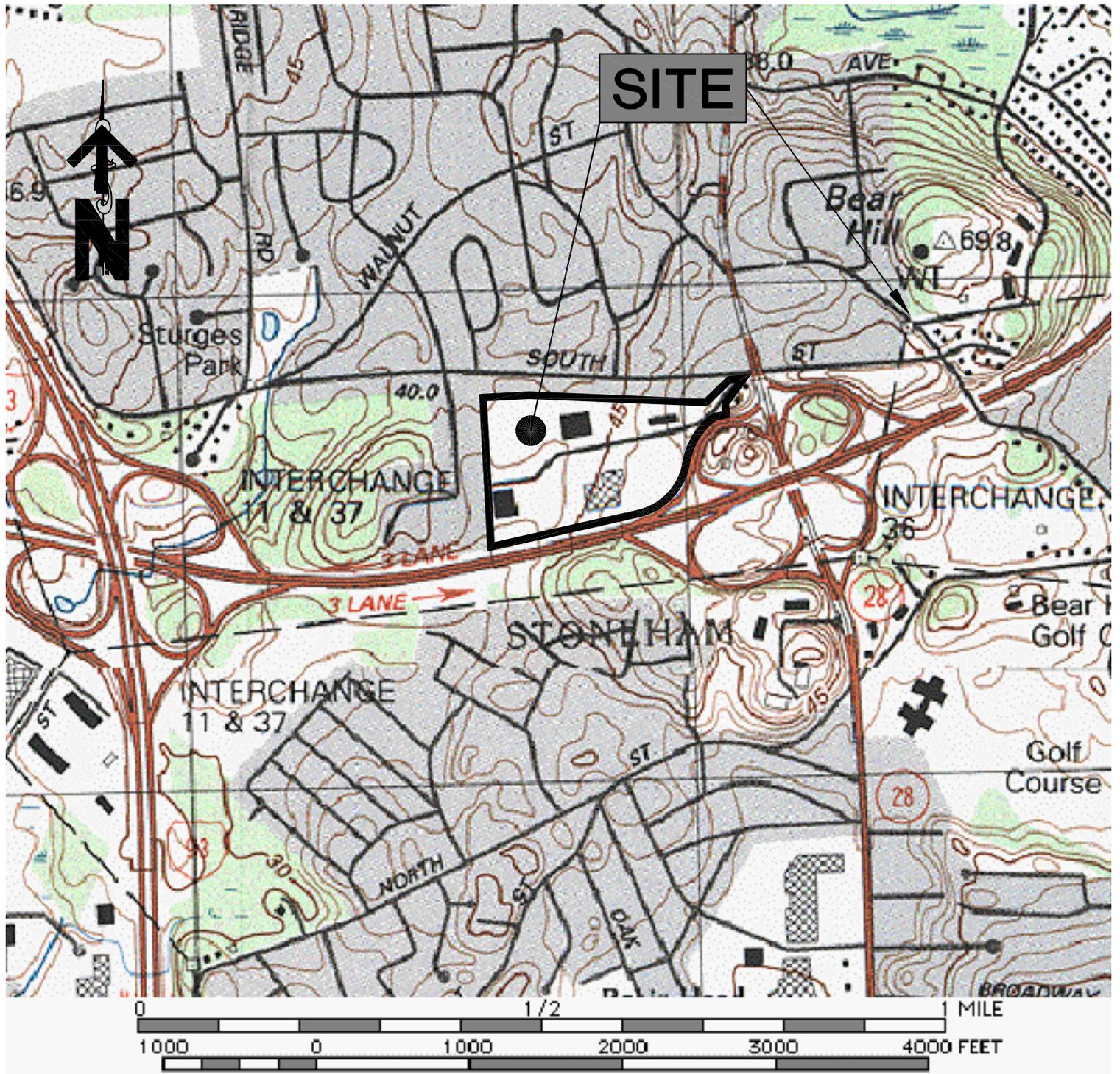
*“Illicit discharge means a discharge that is not entirely comprised of stormwater. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities or facilities: firefighting, water line flushing, landscape irrigation, uncontaminated ground water, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents.”*

Prior to the discharge of stormwater runoff to the post-construction stormwater BMPs, it shall be the project owner’s responsibility to prepare an Illicit Discharge Compliance Statement in accordance with Standard 10 certifying that no illicit discharges exist on the site.

# ***FIGURES***

## **FIGURES**

- 1. U.S.G.S. LOCUS MAP**
- 2. PRE-DEVELOPMENT HYDROLOGIC MODEL FLOW CHART**
- 3. EXISTING CONDITIONS SUBCATCHMENT PLAN**
- 4. POST DEVELOPMENT HYDROLOGIC MODEL FLOW CHART**
- 5. PROPOSED CONDITIONS SUBCATCHMENT PLAN**



**FIGURE 1 - USGS LOCUS MAP**

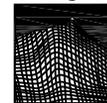
**READING WOODS**  
 READING, MASSACHUSETTS

PREPARED FOR:  
**PULTE HOMES OF NEW ENGLAND, L.L.C.**  
 115 FLANDERS ROAD  
 WESTBOROUGH, MA 01581

DECEMBER 2010

SCALE: 1"=1000±

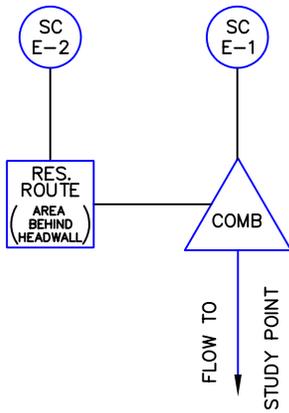
**Marchionda**  
 & Associates, L.P.



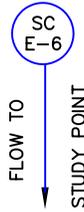
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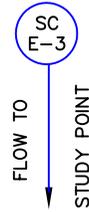
Email: [engineering@marchionda.com](mailto:engineering@marchionda.com)  
 Website: [www.marchionda.com](http://www.marchionda.com)



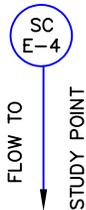
PT #1



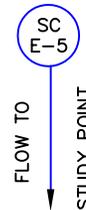
PT #2



PT #3



PT #4



PT #5

PRE-DEVELOPMENT SEQUENCING

MARCHIONDA & ASSOC., L.P.  
ENGINEERING AND PLANNING CONSULTANTS

62 MONTVALE AVE. SUITE 1  
STONEHAM, MA. 02180  
(617) 438-6121

HYDROLOGY SEQUENCING

READING WOODS

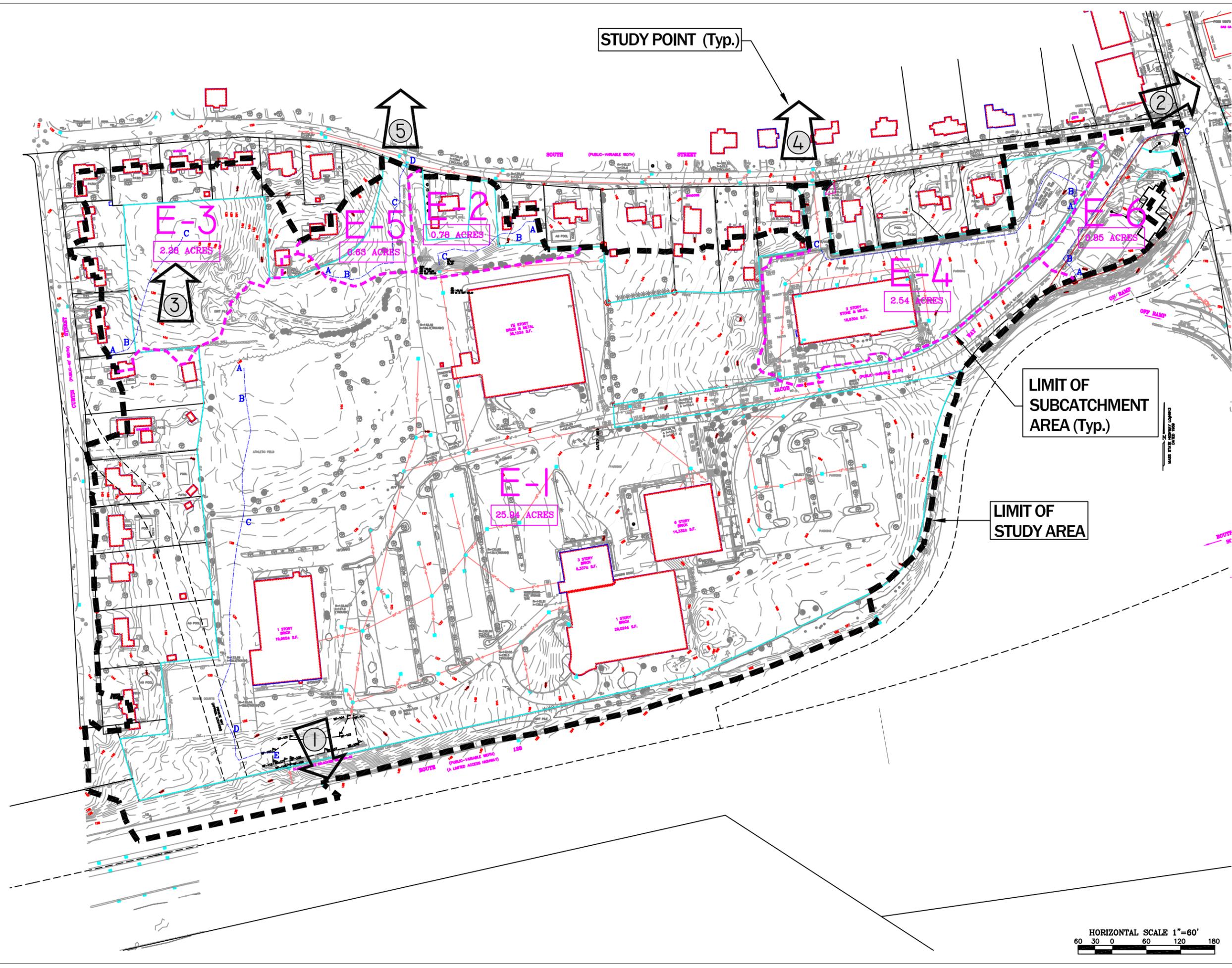
READING, MA

SCALE: NONE

DATE: 12/29/10

FIG. 2

STUDY POINT (Typ.)



PRE-DEVELOPMENT DRAINAGE AREAS

LIMIT OF SUBCATCHMENT AREA (Typ.)

LIMIT OF STUDY AREA

**HYDROLOGY**  
**READING WOODS**  
**JACOB WAY**  
**BRAINTREE, MA**

Prepared For  
**PULTE HOMES OF NEW ENGLAND, LLC**  
 115 FLANDERS ROAD  
 WESTBOROUGH, MA 01581

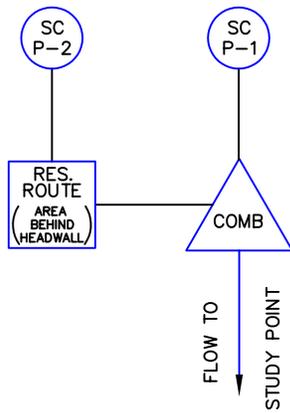
**Marchionda**  
 & Associates, L.P.

Engineering and  
 Planning Consultants  
 62 Montvale Avenue  
 Suite 1  
 Stoneham, MA 02180  
 TEL: (781) 438-6121  
 FAX: (781) 438-9654  
 Email: [engineering@marchionda.com](mailto:engineering@marchionda.com)  
 Website: [www.marchionda.com](http://www.marchionda.com)

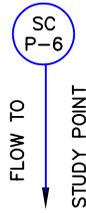
HORIZONTAL SCALE 1"=60'  
 60 30 0 60 120 180

DATE: 12/28/10  
 .487-187 READING DRAINAGE PRE-DEV WATERSHED PLAN/DWG  
 M. & A. NO.: 487-187 SCALE: 1"=60'

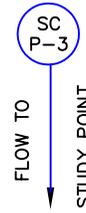
FIGURE 3



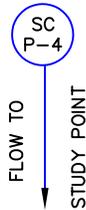
PT #1



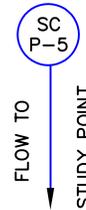
PT #2



PT #3



PT #4



PT #5

POST-DEVELOPMENT SEQUENCING

MARCHIONDA & ASSOC., L.P.  
ENGINEERING AND PLANNING CONSULTANTS

62 MONTVALE AVE. SUITE 1  
STONEHAM, MA. 02180  
(617) 438-6121

HYDROLOGY SEQUENCING

READING WOODS

READING, MA

SCALE: NONE

DATE: 12/29/10

FIG. 4



**POST DEVELOPMENT DRAINAGE AREAS**

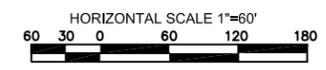
**HYDROLOGY**  
**READING WOODS**  
**JACOB WAY**  
**BRAINTREE, MA**

Prepared For  
**PULTE HOMES OF NEW ENGLAND, LLC**  
 115 FLANDERS ROAD  
 WESTBOROUGH, MA 01581

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 Email: [engineering@marchionda.com](mailto:engineering@marchionda.com)  
 Website: [www.marchionda.com](http://www.marchionda.com)



DATE: 12/28/10  
 .487-187 READING\DRAINAGE\PRE-DEV WATERSHED PLAN.DWG  
 M. & A. NO.: 487-187 SCALE: 1"=60'

**FIGURE 5**

# ***APPENDICES***

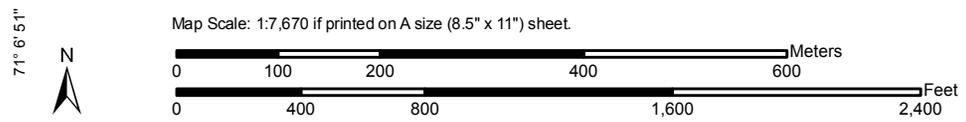
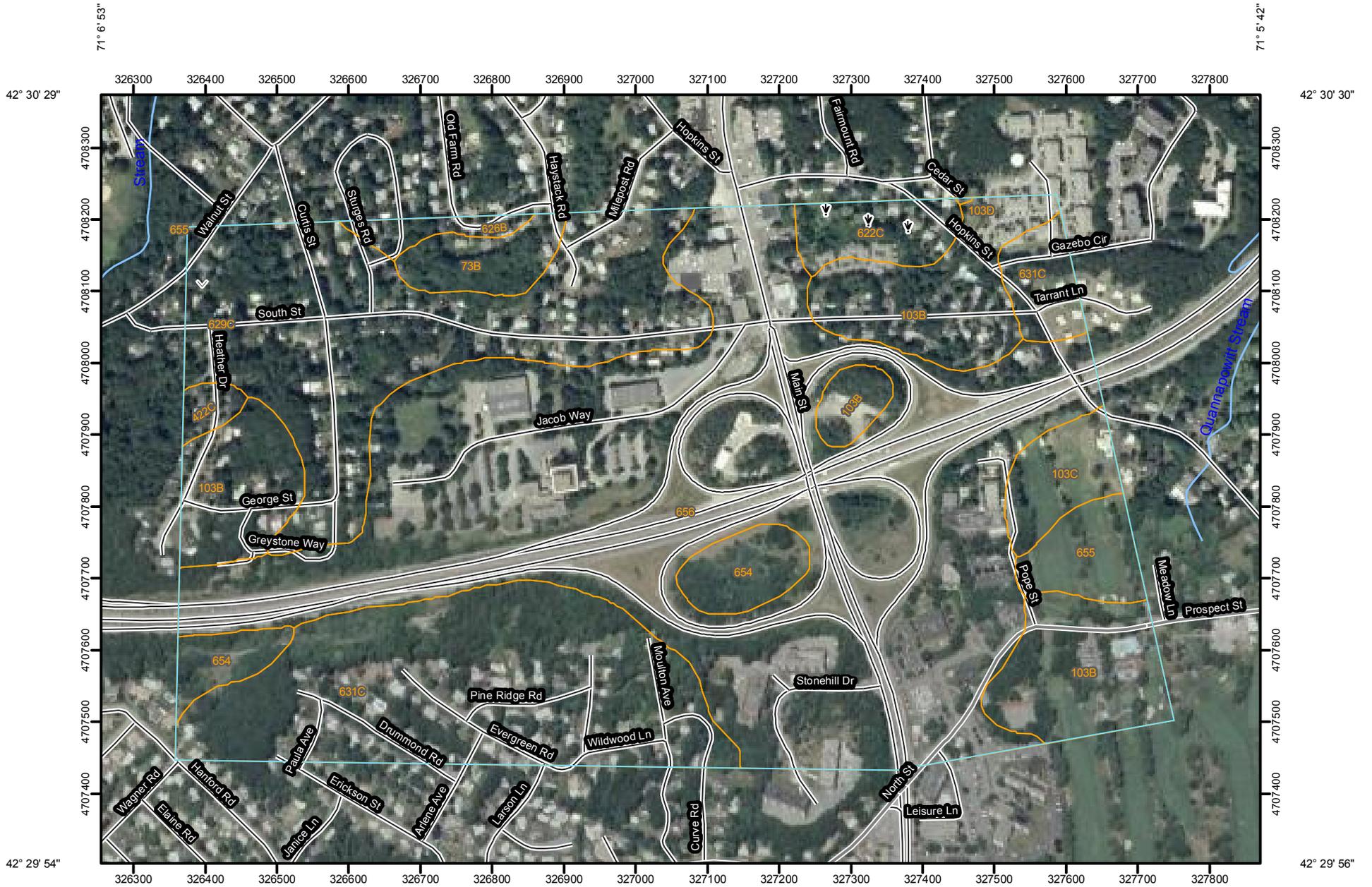
## **APPENDIX**

- A. SITE SOIL INFORMATION**
- B. CURVE NUMBER COMPUTATIONS**
- C. HYDROGRAPH REPORTS**
- D. GROUNDWATER RECHARGE CALCULATIONS (STANDARD 3)**
- E. T.S.S. REMOVAL RATE WORKSHEETS (STANDARD 4)**
- F. LONG TERM POLLUTION PREVENTION PLAN (STANDARD 4-6)**
- G. OPERATION & MAINTANANCE PLAN (STANDARD 9)**

# **APPENDIX A**

## ***Site Soil Information***

Soil Map—Middlesex County, Massachusetts



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Units

### Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot
-  Spoil Area
-  Stony Spot

 Very Stony Spot

 Wet Spot

 Other

### Special Line Features

-  Gully
-  Short Steep Slope
-  Other

### Political Features

 Cities

### Water Features

-  Oceans
-  Streams and Canals

### Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

## MAP INFORMATION

Map Scale: 1:7,670 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:25,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: UTM Zone 19N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts  
 Survey Area Data: Version 12, Feb 26, 2010

Date(s) aerial images were photographed: 7/10/2003; 7/7/2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Middlesex County, Massachusetts (MA017)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
73B	Whitman fine sandy loam, 0 to 5 percent slopes, extremely stony	4.3	1.7%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	30.7	12.4%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	4.8	2.0%
103D	Charlton-Hollis-Rock outcrop complex, 15 to 25 percent slopes	0.0	0.0%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	1.3	0.5%
622C	Paxton-Urban land complex, 3 to 15 percent slopes	4.7	1.9%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	1.9	0.8%
629C	Canton-Charlton-Urban land complex, 3 to 15 percent slopes	37.5	15.1%
631C	Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky	40.0	16.1%
654	Udorthents, loamy	6.8	2.8%
655	Udorthents, wet substratum	4.7	1.9%
656	Udorthents-Urban land complex	111.0	44.8%
<b>Totals for Area of Interest</b>		<b>247.8</b>	<b>100.0%</b>

## Middlesex County, Massachusetts

### 631C—Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky

#### Map Unit Setting

*Elevation:* 0 to 1,000 feet  
*Mean annual precipitation:* 32 to 54 inches  
*Mean annual air temperature:* 43 to 54 degrees F  
*Frost-free period:* 110 to 240 days

#### Map Unit Composition

*Urban land:* 40 percent  
*Charlton and similar soils:* 40 percent  
*Hollis and similar soils:* 10 percent  
*Minor components:* 10 percent

#### Description of Charlton

##### Setting

*Landform:* Drumlins, ground moraines  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Convex  
*Parent material:* Friable loamy eolian deposits over friable loamy basal till derived from granite and gneiss

##### Properties and qualities

*Slope:* 3 to 15 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 6.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Moderate (about 7.3 inches)

##### Interpretive groups

*Land capability (nonirrigated):* 3e

##### Typical profile

*0 to 5 inches:* Fine sandy loam  
*5 to 22 inches:* Sandy loam  
*22 to 65 inches:* Gravelly sandy loam

#### Description of Urban Land

##### Setting

*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear

*Parent material:* Excavated and filled land

## **Description of Hollis**

### **Setting**

*Landform:* Ridges, hillslopes  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Convex  
*Parent material:* Friable, shallow loamy basal till over granite and gneiss

### **Properties and qualities**

*Slope:* 3 to 15 percent  
*Surface area covered with cobbles, stones or boulders:* 9.0 percent  
*Depth to restrictive feature:* 8 to 20 inches to lithic bedrock  
*Drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.14 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 2.0 inches)

### **Interpretive groups**

*Land capability (nonirrigated):* 6s

### **Typical profile**

*0 to 2 inches:* Fine sandy loam  
*2 to 14 inches:* Fine sandy loam  
*14 to 18 inches:* Unweathered bedrock

## **Minor Components**

### **Canton**

*Percent of map unit:* 4 percent  
*Landform:* Hills  
*Landform position (two-dimensional):* Toeslope, backslope  
*Landform position (three-dimensional):* Base slope, side slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Convex

### **Udorthents, loamy**

*Percent of map unit:* 2 percent

### **Rock outcrop**

*Percent of map unit:* 2 percent  
*Landform:* Ledges  
*Landform position (two-dimensional):* Summit  
*Landform position (three-dimensional):* Head slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave

### **Scituate**

*Percent of map unit:* 1 percent

*Landform:* Depressions, hillslopes  
*Landform position (two-dimensional):* Toeslope, summit  
*Landform position (three-dimensional):* Base slope, head slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave

**Montauk**

*Percent of map unit:* 1 percent  
*Landform:* Hillslopes  
*Landform position (two-dimensional):* Shoulder, summit  
*Landform position (three-dimensional):* Nose slope, head slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex

## Data Source Information

Soil Survey Area: Middlesex County, Massachusetts  
Survey Area Data: Version 12, Feb 26, 2010



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Units

### Soil Ratings

 A

 A/D

 B

 B/D

 C

 C/D

 D

 Not rated or not available

### Political Features

 Cities

### Water Features

 Oceans

 Streams and Canals

### Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

## MAP INFORMATION

Map Scale: 1:7,670 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:25,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: UTM Zone 19N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts  
Survey Area Data: Version 12, Feb 26, 2010

Date(s) aerial images were photographed: 7/7/2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Middlesex County, Massachusetts				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
73B	Whitman fine sandy loam, 0 to 5 percent slopes, extremely stony	D	4.3	1.7%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	B	30.7	12.4%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	B	4.8	2.0%
103D	Charlton-Hollis-Rock outcrop complex, 15 to 25 percent slopes	B	0.0	0.0%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	B	1.3	0.5%
622C	Paxton-Urban land complex, 3 to 15 percent slopes	C	4.7	1.9%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	1.9	0.8%
629C	Canton-Charlton-Urban land complex, 3 to 15 percent slopes	B	37.5	15.1%
631C	Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky	B	40.0	16.1%
654	Udorthents, loamy		6.8	2.8%
655	Udorthents, wet substratum		4.7	1.9%
656	Udorthents-Urban land complex		111.0	44.8%
<b>Totals for Area of Interest</b>			<b>247.8</b>	<b>100.0%</b>

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

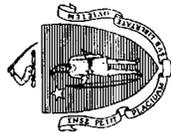
## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Lower





Commonwealth of Massachusetts  
 City/Town of Reading  
**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review (continued)**

Deep Observation Hole Number: 1-1-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color		Percent	Gravel			
8	A	10YR4/3			S.L.	<10	<10	Cr	VF	
18	B	7.5YR5/4			S.L.	<10	<10	Cr	VF	
40	C1	2.5Y6/4	30"		LS	10	<10	SG	Loose	F/M
124	C2	2.5Y6/2			SL	10	<10	BI	VF	F/M

Additional Notes:

*- G. water weeping @ bottom of hole.*



Commonwealth of Massachusetts  
 City/Town of Reading  
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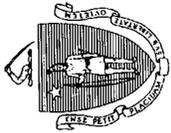
**C. On-Site Review (continued)**

Deep Observation Hole Number: 1-2-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color		Percent	Gravel			
8	A	10YR4/3			S.L.	<10	<10	Cr	VF	
18	B	7.5YR5/4			S.L.	<10	<10	Cr	VF	
40	C1	2.5Y6/4			LS	10	<10	SG	Loose	
108	C2	2.5Y6/2	52"		SL	15	10	SG	Loose	F/M

Additional Notes:

- Bands of gravels located in C2 layer
- Standing water up to 96"



# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

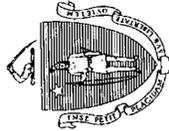
## C. On-Site Review (continued)

Deep Observation Hole Number: 2-1-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
28	FILL									
38	B	7.5YR6/8			SL	<10	<10	VF	Cr	
50	C	2.5Y6/4	30		Gr. S	20	10	Loose	SG	Refusal

Additional Notes:

- Fill layer a mix of sands & gravels
- No obsv. g.w.
- C horizon has some silts present



# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

## C. On-Site Review (continued)

Deep Observation Hole Number: 3-1-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Other
			Depth	Color		Percent	Gravel		
8	FILL								
76	C	2.5Y6/4	46		SL	10	10	Loose	Refusal

Additional Notes:

- Fill layer made up of gravel sub base for parking area
- C layer tight in place
- Refusal / ledge rising @ north end
- No obs. g. water



# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

## C. On-Site Review (continued)

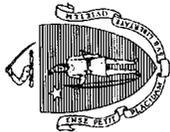
3-2-10

Deep Observation Hole Number:

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
8	FILL									
100	C	2.5Y6/4	50		SL	10	10	Loose	SG	Refusal

Additional Notes:

- Fill made up gravel sub-base of parking area
- No obs H<sub>2</sub>O
- C horizon tight "in-place"



# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

## C. On-Site Review (continued)

Deep Observation Hole Number: 3-3-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
8	FILL									
32	C	2.5Y5/3	N/A		SL	10	10	Loose	SG	Refusal

Additional Notes:

- Fill made up of gravel sub base of parking area  
- No obs. mottling or g. water



# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

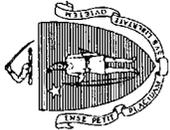
## C. On-Site Review (continued)

Deep Observation Hole Number: 4-1-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color		Percent	Gravel			
4	A	10YR3/2			SL	<10	<10	Cr	VF	
22	B	7.5YR5/8			SL	<10	<10	Cr	VF	
76	C1	2.5Y6/3			Gr.S	20	10	Sg	Loose	M/C
144	C2	2.5Y5/3			Gr.S	20	20	Sg	Loose	Coarse
158	C3	2.5Y6/3	N/A		F/M S	10	<10	Sg	Loose	Stratif.

Additional Notes:

- No obsn. mottling or obsn. G.W.
- C-1 horizon is "firm in the hole."



Commonwealth of Massachusetts  
 City/Town of Reading  
**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review (continued)**

Deep Observation Hole Number: 5-1-10 (date 12/1/10)

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color		Percent	Gravel			
12	FILL									
18	A	10YR4/3			SL	<10	<10	Cr	VF	
24	B	7.5YR5/8			SL	<10	<10	Cr	VF	
124	C1	2.5Y6/3-5/3			Gr.S	25	15	Sg	Loose	
166	C2	2.5Y6/3	154		F/M S	10	<10	Sg	Loose	Stratif.

Additional Notes:

- Coarse sands obs. in C1 horizon, pockets of fine sands on North side
- C1 horizon "firm in hole"
- No obsv. G.W.
- Hole located in parking area. Fills made up of gravel & subbase



**Commonwealth of Massachusetts  
City/Town of Reading  
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

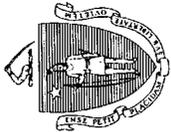
**C. On-Site Review (continued)**

Deep Observation Hole Number: 5-2-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
12	FILL									
16	A	10YR4/3			SL	<10	<10	VF	Cr	
28	B	7.5YR5/8			SL	<10	<10	VF	Cr	
44	C1	2.5Y6/3			Gr.S	20	10	Loose	Sg	
122	C2	2.5Y5/3			Gr.S	20	20	Loose	Sg	
158	C3	2.5Y6/3	N/A		F/M S	10	<10	Loose	Sg	Stratif.

Additional Notes:

- Hole located in bit. conc. parking area
- 4" water line exposed on West side of hole
- No obs mottling or G.W.
- Ct horizon predom. Med f coarse sands
- Fill layer a mix of gravel sub base f some organics.



Commonwealth of Massachusetts  
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**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

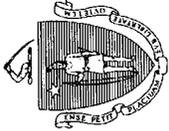
**C. On-Site Review** (continued)

Deep Observation Hole Number: 6-1-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
36	FILL									
60	B	7.5YR5/8			SL	<10	<10	VF	Cr	
132	C	10YR6/4	N/A		LS	<10	<10	Loose	SG	

Additional Notes:

- No obs. mottling or G.W.  
 - Very loose soils. Excavation casing in.



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**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

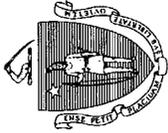
**C. On-Site Review (continued)**

Deep Observation Hole Number: 6-2-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color		Percent	Gravel			
60	FILL									
78	B	7.5YR5/8			SL	<10	<10	Cr	VF	
136	C	10YR6/3	N/A		LS	15	10	SG	Loose	

Additional Notes:

- No obs. Mottling or S.W.
- Hole located in bit. conc. parking area
- Fill layer made up of S.L. soils.



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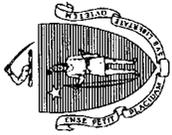
**C. On-Site Review (continued)**

Deep Observation Hole Number: 8-1-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color		Percent	Gravel			
4	A	10YR3/3			S.L.	<10	<10	Cr	VF	
15	B	7.5YR5/6			S.L.	<10	<10	Cr	VF	
66	C	2.5Y6/3	N/A		F.S.	15	20	SG	Loose	Refusal

Additional Notes:

- NO OBSERVED GROUNDWATER
- PERC PERFORMED IN SOUTH SIDE OF PIT
- SOME BOULDERS PRESENT



**Commonwealth of Massachusetts**  
 City/Town of Reading  
**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review (continued)**

Deep Observation Hole Number: 8-2-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
12	FILL									
20	B	7.5YR5/6			L.S.	<10	<10	VF	Cr	
149	C	2.5Y6/3	N/A		F.S.	15	20	Loose	SG	Refusal

Additional Notes:

- Ledge or Boulder @ North side of pit.
- Fill made up of primarily sands & gravels
- No observed ground water
- Test pit in bit. conc. parking area



# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

## C. On-Site Review (continued)

Deep Observation Hole Number: 9-1-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color		Percent	Gravel			
80	FILL									
84	A	10YR3/2			SL			Cr	VF	
92	B	7.5YR6/8			SL			Cr	VF	
110	C	2.5Y6/3			LS	10	10	Sg	Loose	Refusal

Additional Notes:

- Test pit in bit. conc. parking area
- No obs H<sub>2</sub>O or ESHWT.
- Refusal @ bottom of pit.



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**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

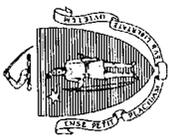
**C. On-Site Review** (continued)

Deep Observation Hole Number: 9-2-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
98	FILL									
106	B	7.5YR6/8			SL	<10	<10	VF	Cr	
118	C	2.5Y6/3	N/A		LS	10	10	Loose	SG	Refusal

Additional Notes:

*-Test pit in bit conc. parking area*  
*-No obs. H<sub>2</sub>O or SHW*



Commonwealth of Massachusetts  
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**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

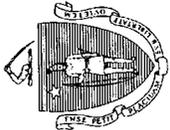
**C. On-Site Review (continued)**

Deep Observation Hole Number: 10-1-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
42	FILL										
54	B	7.5YR5/8				SL	<10	<10	Cr	VF	
64	B/C	10YR5/6				S	<10	<10	Cr	VF	
156	C	2.5Y6/2				Gr. S	20	15	Sg	Loose	

Additional Notes:

- No obs G.W. or Mottling
- Some large boulders obsv.
- Very loose in place. Excavation side walls falling in.
- Test hole dug in bit conc. parking area



**Commonwealth of Massachusetts**  
 City/Town of Reading  
**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review (continued)**

10-2-10

Deep Observation Hole Number:

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
14	FILL									
26	B	10YR6/8			SL	<10	<10	VF	Cr	
36	B/C	7.5YR6/8			S	10	10	Loose	Sg	
59	C	2.5Y6/3			Gr. S	20	15	Loose	Sg	Refusal

Additional Notes:

- No obs G.W. or Mo Hing
- Hole located in dirt conc. parking area.



# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

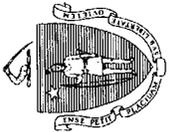
## C. On-Site Review (continued)

Deep Observation Hole Number: 11-1-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color		Percent	Gravel			
50	FILL									
175	C	2.5Y6/3	126		L.S.	10	15	SG	Loose	

Additional Notes:

- Fill: 0-12" sands & gravels, remaining layer made up of a mix topsoil & original soils. Fill depths range from 50" @ east end to 108" @ west end
- Groundwater weeping @ bottom of hole
- Some boulders present



**Commonwealth of Massachusetts**  
 City/Town of Reading  
**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review (continued)**

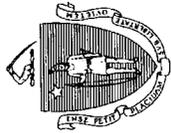
11-2-10

Deep Observation Hole Number: \_\_\_\_\_

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
50	FILL									
64	A	10YR3/2			SL			VF	Cr	
82	B	7.5YR6/8			SL			VF	Cr	
156	C	2.5Y6/3	104		LS	10	15	Loose	Sg	

Additional Notes:

- H<sub>2</sub>O weep @ 140"
- Very loose consistence excavation falling in,
- Pit dug in pavement area, Top 12" of fill gravel and subbase,



# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

## C. On-Site Review (continued)

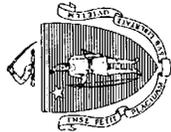
12-1-10

Deep Observation Hole Number:

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
40	A	10YR3/2			S.L.	<10	<10	VF	Cr	
56	B	7.5YR6/6			S.L.	<10	<10	VF	Cr	
88	C	2.5Y5/2	N/A		Gr. S	15	10	Loose	SG	Refusal

Additional Notes:

*- No Obs H<sub>2</sub>O or Mottling*



**Commonwealth of Massachusetts**  
 City/Town of Reading  
**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review** (continued)

Deep Observation Hole Number: 12-2-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
36	A	10YR3/2			S.L.	<10	<10	VF	Cr	
50	B	7.5YR6/6			S.L.	<10	<10	VF	Cr	
96	C	2.5Y6/3	N/A		Gr. S	15	15	Loose	SG	Refusal

Additional Notes:

*No obs. mottling or g. water*



# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

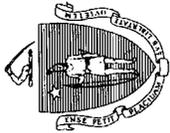
## C. On-Site Review (continued)

Deep Observation Hole Number: 12-3-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
0	A	10YR3/2			S.L.	<10	<10	VF	Cr	
36	B	7.5YR6/6			S.L.	<10	<10	VF	Cr	Refusal

Additional Notes:

- Mix of A & B horizon on top of ledge  
- no "C" horizon observed.



**Commonwealth of Massachusetts**  
 City/Town of Reading  
**Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal**

**C. On-Site Review (continued)**

13-1-10

Deep Observation Hole Number: \_\_\_\_\_

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)		Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color		Percent	Gravel			
12	FILL									
72	C	2.5Y6/2	N/A		LS	15	15	Loose	SG	Refusal

Additional Notes:

- No obs. mottling or g. water
- Fill layer a mix of gravel / sub-base and old "B" horizon
- C horizon samples predom. med & coarse size



# Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

## C. On-Site Review (continued)

13-2-10

Deep Observation Hole Number:

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Consistence (Moist)	Soil Structure	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
24	FILL										
118	C	2.5Y6/2				LS	15	15	Loose	SG	Refusal

Additional Notes:

- No obs mottling or g. water
- Some large stones and boulders present
- faint mottling high in C layer. Not consistent throughout



Commonwealth of Massachusetts  
 City/Town of Reading  
**Percolation Test**  
**Form 12**

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



**A. Site Information**

Pulte Homes of New England LLC  
 Owner Name  
Jacob Way  
 Street Address or Lot #  
Reading MA 01867  
 City/Town State Zip Code  
John Barrows, P.E. , SE#84 781-438-6121  
 Contact Person (if different from Owner) Telephone Number

**B. Test Results**

	<u>12/1/10</u> Date	<u>AM</u> Time	<u>12/1/10</u> Date	<u>AM</u> Time
Observation Hole #	<u>1-1</u>		<u>2-1</u>	
Depth of Perc	<u>48"/18"</u>		<u>30"/18"</u>	
Start Pre-Soak	<u>12:16</u>		<u>10:56</u>	
End Pre-Soak	<u>12:31</u>		<u>10:56</u>	
Time at 12"	<u>12:31</u>		<u>11:11</u>	
Time at 9"	<u>1:00</u>		<u>12:13</u>	
Time at 6"	<u>1:37</u>		<u>(@ 7")12:42</u>	
Time (9"-6")	<u>37 min.</u>		<u>See comments</u>	
Rate (Min./Inch)	<u>13</u>		<u>15</u>	
	Test Passed: <input type="checkbox"/>	Test Failed: <input type="checkbox"/>	Test Passed: <input type="checkbox"/>	Test Failed: <input type="checkbox"/>

John Barrows, P.E. , SE#84  
 Test Performed By:  
Chris Cole, Engineer, Town of Reading  
 Witnessed By:

Comments:  
Perc test #2-1 collapsed and filled in just below the 7" mark.



Commonwealth of Massachusetts  
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**A. Site Information**

Pulte Homes of New England LLC

Owner Name

Jacob Way

Street Address or Lot #

Reading

City/Town

MA

State

01867

Zip Code

John Barrows, P.E. , SE#84

Contact Person (if different from Owner)

781-438-6121

Telephone Number

**B. Test Results**

	<u>12/1/10</u> Date	<u>AM</u> Time	<u>12/1/10</u> Date	<u>AM</u> Time
Observation Hole #	<u>3-1</u>		<u>4-1</u>	
Depth of Perc	<u>42"/18"</u>		<u>44"/18"</u>	
Start Pre-Soak	<u>10:24</u>		<u>8:24</u>	
End Pre-Soak	<u>10:39</u>		<u>8:39</u>	
Time at 12"	<u>10:39</u>		<u>8:39</u>	
Time at 9"	<u>(@ 10")12:42</u>		<u>8:54</u>	
Time at 6"			<u>9:17</u>	
Time (9"-6")	<u>See comments</u>		<u>23</u>	
Rate (Min./Inch)	<u>&gt;50</u>		<u>8</u>	
	Test Passed: <input type="checkbox"/>		Test Passed: <input type="checkbox"/>	
	Test Failed: <input type="checkbox"/>		Test Failed: <input type="checkbox"/>	

John Barrows, P.E. , SE#84

Test Performed By:

Chris Cole, Engineer, Town of Reading

Witnessed By:

Comments:

Unable to finish Perc test #3-1 because of time. Assume Rawl's Loam rate.



Commonwealth of Massachusetts  
 City/Town of Reading  
**Percolation Test**  
 Form 12

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**A. Site Information**

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 Owner Name  
Jacob Way  
 Street Address or Lot #  
Reading MA 01867  
 City/Town State Zip Code  
John Barrows, P.E. , SE#84 781-438-6121  
 Contact Person (if different from Owner) Telephone Number

**B. Test Results**

	<u>12/1/10</u> Date	<u>AM</u> Time	<u>11/30/10</u> Date	<u>PM</u> Time
Observation Hole #	<u>5-1</u>		<u>6-1</u>	
Depth of Perc	<u>46"/18"</u>		<u>36"/18"</u>	
Start Pre-Soak	<u>9:10</u>		<u>12:52</u>	
End Pre-Soak	<u>9:25</u>		<u>1:07</u>	
Time at 12"	<u>9:25</u>		<u>1:07</u>	
Time at 9"	<u>9:28</u>		<u>1:17</u>	
Time at 6"	<u>9:34</u>		<u>1:41</u>	
Time (9"-6")	<u>6</u>		<u>24</u>	
Rate (Min./Inch)	<u>2</u>		<u>8</u>	
	Test Passed:	<input type="checkbox"/>	Test Passed:	<input type="checkbox"/>
	Test Failed:	<input type="checkbox"/>	Test Failed:	<input type="checkbox"/>

John Barrows, P.E. , SE#84

Test Performed By:

Chris Cole, Engineer, Town of Reading

Witnessed By:

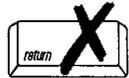
Comments:  
 \_\_\_\_\_  
 \_\_\_\_\_



Commonwealth of Massachusetts  
 City/Town of Reading  
**Percolation Test**  
**Form 12**

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**A. Site Information**

Pulte Homes of New England LLC

Owner Name

Jacob Way

Street Address or Lot #

Reading

City/Town

MA

State

01867

Zip Code

John Barrows, P.E. , SE#84

Contact Person (if different from Owner)

781-438-6121

Telephone Number

**B. Test Results**

	<u>11/30/10</u>	<u>AM</u>	<u>11/30/10</u>	<u>AM</u>
	Date	Time	Date	Time
Observation Hole #	<u>8-1</u>		<u>9-1</u>	
Depth of Perc	<u>32"/18"</u>		<u>40"/18"</u>	
Start Pre-Soak	<u>9:34</u>		<u>10:42</u>	
End Pre-Soak	<u>9:53</u>		<u>10:58</u>	
Time at 12"	<u>9:53</u>		<u>10:58</u>	
Time at 9"	<u>10:12</u>		<u>11:20</u>	
Time at 6"	<u>10:35</u>		<u>11:44</u>	
Time (9"-6")	<u>24</u>		<u>24</u>	
Rate (Min./Inch)	<u>8</u>		<u>8</u>	
	Test Passed:	<input type="checkbox"/>	Test Passed:	<input type="checkbox"/>
	Test Failed:	<input type="checkbox"/>	Test Failed:	<input type="checkbox"/>

John Barrows, P.E. , SE#84

Test Performed By:

Chris Cole, Engineer, Town of Reading

Witnessed By:

Comments:

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Commonwealth of Massachusetts  
 City/Town of Reading  
**Percolation Test**  
**Form 12**

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**A. Site Information**

Pulte Homes of New England LLC

Owner Name

Jacob Way

Street Address or Lot #

Reading

City/Town

MA

State

01867

Zip Code

John Barrows, P.E. , SE#84

Contact Person (if different from Owner)

781-438-6121

Telephone Number

**B. Test Results**

	<u>11/30/10</u>	<u>PM</u>	<u>11/30/10</u>	<u>AM</u>
	Date	Time	Date	Time
Observation Hole #	<u>10-1</u>		<u>11-1</u>	
Depth of Perc	<u>56"/18"</u>		<u>55"/18"</u>	
Start Pre-Soak	<u>12:16</u>		<u>10:40</u>	
End Pre-Soak	<u>12:16</u>		<u>10:40</u>	
Time at 12"	<u>12:31</u>		<u>10:55</u>	
Time at 9"	<u>12:38</u>		<u>11:22</u>	
Time at 6"	<u>12:48</u>		<u>11:59</u>	
Time (9"-6")	<u>10</u>		<u>37</u>	
Rate (Min./Inch)	<u>4</u>		<u>13</u>	
	Test Passed:	<input type="checkbox"/>	Test Passed:	<input type="checkbox"/>
	Test Failed:	<input type="checkbox"/>	Test Failed:	<input type="checkbox"/>

John Barrows, P.E. , SE#84

Test Performed By:

Chris Cole, Engineer, Town of Reading

Witnessed By:

Comments:

---



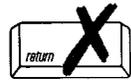
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Commonwealth of Massachusetts  
 City/Town of Reading  
**Percolation Test**  
**Form 12**

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



**A. Site Information**

Pulte Homes of New England LLC  
 Owner Name  
 Jacob Way  
 Street Address or Lot #  
 Reading MA 01867  
 City/Town State Zip Code  
 John Barrows, P.E. , SE#84 781-438-6121  
 Contact Person (if different from Owner) Telephone Number

**B. Test Results**

	11/30/10 Date	AM Time	12/1/10 Date	AM Time
Observation Hole #	12-1		13-1	
Depth of Perc	34"/16"		28"/18"	
Start Pre-Soak	11:06		11:33	
End Pre-Soak	11:06		11:33	
Time at 12"	11:21		11:48	
Time at 9"	11:30		(@8")12:00	
Time at 6"	11:41		12:08	
Time (9"-6")	11			
Rate (Min./Inch)	4		4	
	Test Passed:	<input type="checkbox"/>	Test Passed:	<input type="checkbox"/>
	Test Failed:	<input type="checkbox"/>	Test Failed:	<input type="checkbox"/>

John Barrows, P.E. , SE#84  
 Test Performed By:  
 Chris Cole, Engineer, Town of Reading  
 Witnessed By:

Comments:  
 \_\_\_\_\_  
 \_\_\_\_\_

## **APPENDIX B**

### ***Curve Number & Time of Concentration Computations***

# Worksheet 2: Runoff curve number and runoff

Project <b>READING WOODS</b>	By <b>JTB.</b>	Date <b>12-15-10</b>
Location <b>READING, MA</b>	Checked	Date

Check one:  Present  Developed **"E-1"**

### f. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description  (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN <sup>1/</sup>			Area <input checked="" type="checkbox"/> acres <input type="checkbox"/> mi <sup>2</sup> <input type="checkbox"/> %	Product of CN x area
		Table 2-2	Figure 2-3	Figure 2-4		
	<b>IMPERVIOUS</b>	<b>98</b>			<b>10.93</b>	<b>1071.1</b>
<b>B</b>	<b>WOODS (GOOD)</b>	<b>55</b>			<b>1.99</b>	<b>109.5</b>
<b>B</b>	<b>MEADOW</b>	<b>58</b>			<b>3.66</b>	<b>212.3</b>
<b>B</b>	<b>OPEN SPACE (GOOD)</b>	<b>61</b>			<b>9.36</b>	<b>571.0</b>

<sup>1/</sup> Use only one CN source per line

Totals ➡ **25.94 1963.9**

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{1963.9}{25.94} = 75.7$$
 Use CN ➡ **76**

### 2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency .....			
Rainfall, P (24-hour) .....			
Runoff, Q .....			

(Use P and CN with table 2-1, figure 2-1, or equations 2-3 and 2-4)

# Worksheet 2: Runoff curve number and runoff

Project <b>READING WOODS</b>	By <b>JTB.</b>	Date <b>12-15-10</b>
Location <b>READING, MA</b>	Checked	Date

Check one:  Present  Developed **"E-2"**

## 1. Runoff curve number

Soil name and hydrologic group <small>(appendix A)</small>	Cover description  <small>(cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)</small>	CN <sup>1/</sup>			Area <input checked="" type="checkbox"/> acres <input type="checkbox"/> mi <sup>2</sup> <input type="checkbox"/> %	Product of CN x area
		Table 2-2	Figure 2-3	Figure 2-4		
	<b>IMPERVIOUS</b>	<b>98</b>			<b>0.07</b>	<b>6.9</b>
<b>B</b>	<b>WOODS (GOOD)</b>	<b>55</b>			<b>0.49</b>	<b>27.0</b>
<b>B</b>	<b>OPEN SPACE (GOOD)</b>	<b>61</b>			<b>0.22</b>	<b>13.4</b>

<sup>1/</sup> Use only one CN source per line Totals ➔ **0.78 47.3**

CN (weighted) =  $\frac{\text{total product}}{\text{total area}} = \frac{\mathbf{47.3}}{\mathbf{0.78}} = \mathbf{60.6}$  ; Use CN ➔ **61**

## 2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr			
Rainfall, P (24-hour) ..... in			
Runoff, Q ..... in			

(Use P and CN with table 2-1, figure 2-1, or equations 2-3 and 2-4)

# Worksheet 2: Runoff curve number and runoff

Project: **READING WOODS** By: **JTB.** Date: **12-15-10**

Location: **READING, MA** Checked: \_\_\_\_\_ Date: \_\_\_\_\_

Check one:  Present  Developed **"E-3"**

## 1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description  (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN <sup>1/</sup>			Area <input checked="" type="checkbox"/> acres <input type="checkbox"/> mi <sup>2</sup> <input type="checkbox"/> %	Product of CN x area
		Table 2-2	Figure 2-3	Figure 2-4		
	<b>IMPERVIOUS</b>	<b>98</b>			<b>0.17</b>	<b>16.7</b>
<b>B</b>	<b>WOODS (GOOD)</b>	<b>55</b>			<b>1.28</b>	<b>70.4</b>
<b>B</b>	<b>OPEN SPACE (GOOD)</b>	<b>61</b>			<b>0.83</b>	<b>50.6</b>

<sup>1/</sup> Use only one CN source per line Totals ➔ **2.28** **137.7**

CN (weighted) =  $\frac{\text{total product}}{\text{total area}} = \frac{137.7}{2.28} = 60.4$  ; Use CN ➔ **60**

## 2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr			
Rainfall, P (24-hour) ..... in			
Runoff, Q ..... in			

(Use P and CN with table 2-1, figure 2-1, or equations 2-3 and 2-4)

# Worksheet 2: Runoff curve number and runoff

Project <b>READING WOODS</b>	By <b>JTB.</b>	Date <b>12-15-10</b>
Location <b>READING, MA</b>	Checked	Date
Check one: <input checked="" type="checkbox"/> Present <input type="checkbox"/> Developed <b>"E-4"</b>		

## 1. Runoff curve number

Soil name and hydrologic group <small>(appendix A)</small>	Cover description  <small>(cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)</small>	CN <sup>1/</sup>			Area  <input checked="" type="checkbox"/> acres <input type="checkbox"/> mi <sup>2</sup> <input type="checkbox"/> %	Product of CN x area
		Table 2-2	Figure 2-3	Figure 2-4		
	<b>IMPERVIOUS</b>	<b>98</b>			<b>1.88</b>	<b>184.2</b>
<b>B</b>	<b>WOODS (GOOD)</b>	<b>55</b>			<b>0.15</b>	<b>8.3</b>
<b>B</b>	<b>OPEN SPACE (GOOD)</b>	<b>61</b>			<b>0.51</b>	<b>31.1</b>

<sup>1/</sup> Use only one CN source per line Totals ➔ **2.54** **223.6**

CN (weighted) =  $\frac{\text{total product}}{\text{total area}} = \frac{223.6}{2.54} = 88.0$     Use CN ➔ **88**

## 2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr			
Rainfall, P (24-hour) ..... in			
Runoff, Q ..... in			

(Use P and CN with table 2-1, figure 2-1, or equations 2-3 and 2-4)