

December 23, 2016

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**Town of Richmond  
Richmond, Vermont**

**Environmental Assessment**

**West Street Water and  
Sewer Extension**

**USDA Rural Development Grants  
And Loan Program**

GME Project No. 24-029



*Prepared for:*

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Town of Richmond  
P.O. Box 285  
Richmond, VT 05477

*Prepared by:*

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Green Mountain Engineering, Inc.  
P.O. Box 159, 1438 S. Brownell Road  
Williston, VT 05495  
(802) 862-5590

**TOWN OF RICHMOND  
WEST MAIN STREET WATER AND SEWER EXTENTION  
RICHMONT, VERMONT  
ENVIRONMENTAL ASSESSMENT**

December 23, 2016

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## **SECTION 6 - EXHIBITS**

- 1 Location Map
- 2 Waterline Extension Phase I and II
- 3 Waterline Extension Phase III
- 4 Sewerline Extension Phase I and II
- 5 Sewerline Extension Phase III
- 6 Zoning District Map
- 7 Farmland Soils Map
- 8 Flood Plain Map
- 8 Wetlands Map
- 9 Habitat, Threatened and Endangered Species Map
- 10 Phase IA Archeological Report

## **1.0 PURPOSE AND NEED OF THE PROJECT**

### **1.1 Project Description**

The Town of Richmond is located in Chittenden County, Vermont as shown on the Location Map as Exhibit 1 in Section 6. The Town of Richmond provides water supply and sewer services to areas within the town. This project entails extending the existing water and sewer from the Richmond Elementary School cross country to West Main Street (Route 2) to service the zoned “Gateway” growth area along West Main Street and then West to the River View Commons Mobile Home Park. The project will include 9,000 l.f. of new 8” HDPE waterline by directional drilling and 8,000 l.f. of new 3” HDPE grinder pump low pressure sewer with services to ROW and other appurtenances. Refer to Exhibit 2 in Section 6 for the waterline extension for Phase I and II. Refer to Exhibit 2 in Section 6 for a plan of the project. Refer to Exhibit 2 in Section 6 for the waterline extension for Phase III. Refer to Exhibit 4 in Section 6 for the sewerline extension for Phase I and II. Refer to Exhibit 5 in Section 6 for the sewerline extension for Phase III.

### **1.2 Purpose and Need**

The proposed expansion areas are zone “Gateway Commercial” and “Mobile Home Park”. Gateway Commercial District is designated to allow for commercial uses in an area that has importance as a scenic entrance to the Town of Richmond. There are various allowed and conditional uses as specified in the zoning regulations. Currently water supply and wastewater disposal in the area are both served by on-site individual systems. These on-site systems are limitations for the designated growth center. The zoning regulations allow for 1/3 acres lots for properties served by municipal water and sewer and 1 acre lots for those not served by municipal water and sewer.

The River View Commons Mobile Home Park is within the Mobile Home Park zoning district and has 148 mobile homes. The mobile home park has an aging Indirect Discharge System with major problems with its system due to its age.

The Town's water system has a reserve capacity of 637,559 gpd and the wastewater system has a reserve capacity of 98,273 gpd.

Extending the water and sewer to the Gateway will allow for planned commercial uses within the gateway that are not currently available due to limited soils and area for on-site water and wastewater system. Extending the water and sewer to the mobile home park will replace an aging sewer and water system within the park. The extension will also provide more users to the system and actually lower the entire user costs for the system.

## **2.0 ALTERNATIVES TO THE PROPOSED ACTION**

### **2.1 Water Alternatives**

Water system alternatives include the following:

- Phase I- Extending the water only to the Proposed Commercial Park at Rt 2
- Phase II- Extending the water to the End of the Gateway District
- Phase III- Extending the water all the way to the mobile home park
- Do Nothing

It was determined because of the number of users in each phase that it was only financially feasible to extend the water all the way to the mobile home park. The do nothing alternative would continue lack of wanted controlled growth in the area and continue the use of the aging water system at the mobile home park.

### **2.2 Sewer Alternatives**

Sewer system alternatives include the following:

- Phase I- Extending the sewer only to the Proposed Commercial Park at Rt 2
- Phase II- Extending the sewer to the End of the Gateway District
- Phase III- Extending the sewer all the way to the mobile home park
- Do Nothing

It was determined because of the number of users in each phase that it was only financially feasible to extend the sewer all the way to the mobile home park. The do nothing alternative would continue lack of wanted controlled growth in the area and continue the use of the aging sewer system at the mobile home park.

Other sewer alternatives included the type of collection system including:

- Gravity sewer
- Grinder pump low pressure sewer
- Septic Tank Effluent (STEP) low pressure Sewer

It was determined that grinder pump low pressure sewers were the most economical and feasible approach for this system expansion.

### **3.0 AFFECTED ENVIRONMENTAL RESOURCES**

#### **3.1 Effected Lands/Mitigation**

##### **3.1.1 Land Use/Important Farmland/Formally Classified Lands**

The Gateway Commercial District is designated to allow for commercial uses in an area that has importance as a scenic entrance to the Town of Richmond. There are various allowed and conditional uses as specified in the zoning regulations. Currently water supply and wastewater disposal in the area are both served by on-site individual systems. The zoning regulations allow for 1/3 acres lots for properties served by municipal water and sewer and 1 acre lots for those not served by municipal water and sewer. The proposed project will not change the designated land use, but will allow the area to be developed to the allowed land use.

For the Mobile Home Park District, a lot which is not a mobile home park (MHP) shall not be less than 1 acre. A lot which is used for a MHP shall contain not less than 10 acres and individual lots within the park shall not be less than ¼ acre. The project will not change the designated land use of the mobile home park. It will replace the aged water and sewer systems within the park.

As shown in Figure No. 7 in Section 6, the project is located within prime and statewide agricultural soils. Portions of the proposed alignment would be located in soils designated as prime farmland or farmland of statewide importance. All but the proposed cross country portion would be located within existing roadway or ROWs that have been previously disturbed and converted. When construction is complete, all land will be returned to existing land use and grade. All pipes to

be placed within prime farmland will be buried at sufficient depth to ensure that no land is irreversibly converted to nonagricultural use.

Refer to Section 5 for the farmland conversion form.

There are no formally classified lands within the proposed expanded service area.

### **3.1.2 Floodplains**

See Section 6, Figure 8 for the floodplain mapping. Portions of the project are located within the 100 year floodplain. These portions only include buried piping with the land returned to existing conditions. Most of the project will be performed by directional drilling which does not disturb floodplain, Therefore, floodplains will not be an issue. Section 6.8 of the zoning regulations (effective March 30, 2015) provides the Town's regulations for development and building in the floodplain.

### **3.1.3 Wetlands**

Gilman and Briggs was used to map wetlands along the proposed route. Because the project is within 50 feet of existing wetland, a wetland permit is required from the State of Vermont. Wetlands are mapped along the proposed route. Refer to Appendix A, Exhibit B. Appendix A, Exhibit A is also provided to give an inventory of the site soils characteristics. The State wetlands map is provided as Figure 9 in Section 6.

### **3.1.4 Historic Properties**

Refer to the Archeological Report in Section 6. There are several houses on the historic record in the area. The project area is located away from these structures as the project does not include services on private properties. There are some areas of archeological sensitivity that are recommended for a Phase IB survey.

### **3.1.5 Biological Resources**

There are no Threatened or Endangered species indicated in the area of construction. See Appendix A, Exhibit C.

### **3.1.6 Water Quality Issues**

There are three (3) stream crossings associated with the project. A stream alternation permit is required for the stream crossing. Impact to the streams will be mitigated by installing the waterline and sewerline by directional drilling.

Because of the size of the project, a stormwater construction permit will be needed. The project will adhere to the requirements of the State of Vermont standards for erosion and sedimentation control including, but not limited to silt fence, stone check dams, erosion matting and seeding/mulching within time limits. The fact that most of the project is done by directional drilling, helps protect water quality.

### **3.1.7 Coastal Areas**

Richmond, VT does not lie within a coastal area.

### **3.1.8 Socio-Economic/ Environmental Justice Issues**

The proposed project is expended to not increase or decrease the user rates of the system users.

## **3.2 Environmental Consequences**

None of the proposed work will have any modifications to existing land use.

There will be no permanent disturbances to land with soils designated as prime farmland or farmland of statewide importance.

There will be no permanent disturbances to floodplain and there will be no changes in floodplain elevations.

Where wetlands are present, directional drilling will be used so that there is no disturbances within wetland or their buffers.

In places of archeological sensitivity, Phase IB or greater will be performed to avoid such areas and not impact these areas.



Water quality will be protected through performing stream crossings by directional drilling and performing erosion and sedimentation control measures.

Because the project is supposed to decrease user rates, there are no consequences on socio/environmental justice issues.

#### **4.0 SUMMARY OF MITIGATION**

Following is a summary of the mitigation measures proposed:

- The majority of the project will be performed by directional drilling which mitigates effects on farmland, wetlands, floodplain, and water quality.
- Proper erosion control measures will mitigate effects on wetlands and water quality.
- Historical sensitive areas will be mitigated by performing archeological investigations until each area is written off or is avoided.

#### **5.0 CORRESPONDANCE AND COORDINATION**

Farmland Conversion Form

#### **6.0 EXHIBITS**

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#### **7.0 PREPARERS**

Prepared by:

Kevin J. Camara, P.E.  
Green Mountain Engineering  
P.O. Box 159  
Williston, VT 05495

April, 2016

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Richmond, Vermont**

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April, 2015

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#### **5.0 CORRESPONDANCE AND COORDINATION**

To be included later.

#### **6.0 EXHIBITS**

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#### **7.0 PREPARERS**

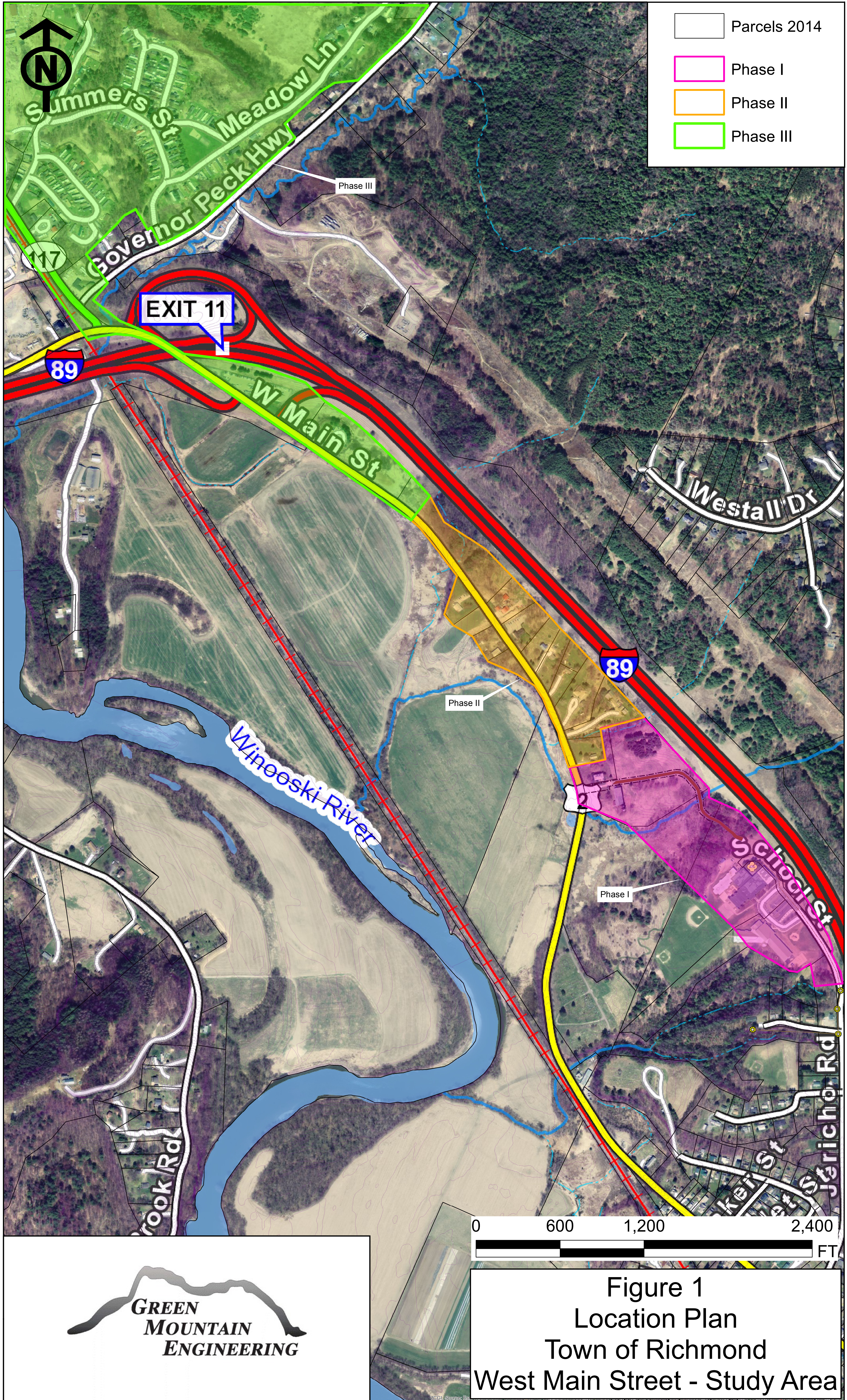
Prepared by:

Kevin J. Camara, P.E.  
Green Mountain Engineering  
P.O. Box 159  
Williston, VT 05495



**APPENDIX A**

**FIGURES**



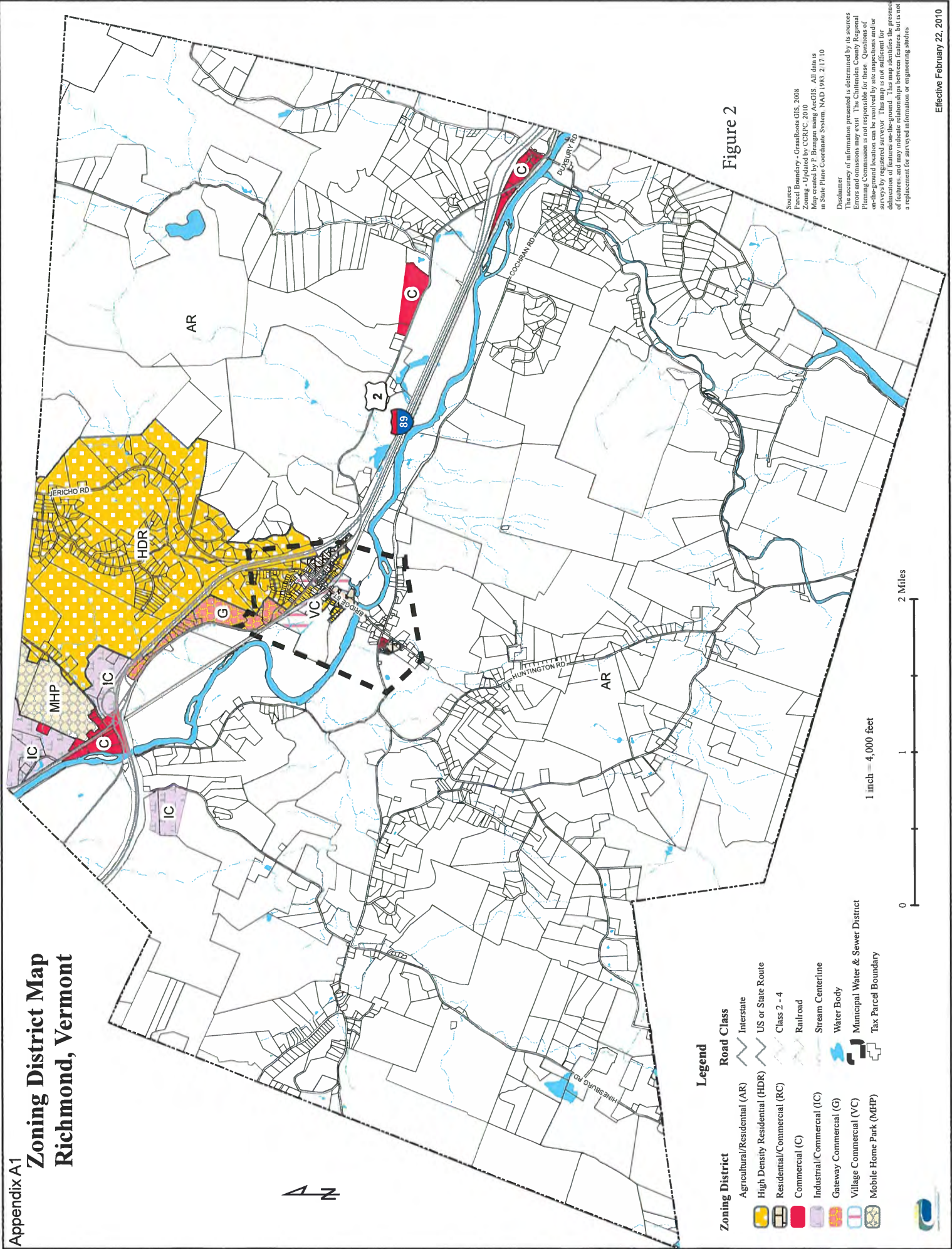
- Parcels 2014
- Phase I
- Phase II
- Phase III

0 600 1,200 2,400  
FT



**Figure 1**  
**Location Plan**  
 Town of Richmond  
 West Main Street - Study Area

# Zoning District Map Richmond, Vermont



- Legend**
- |                                |                                  |
|--------------------------------|----------------------------------|
| <b>Zoning District</b>         | <b>Road Class</b>                |
| Agricultural/Residential (AR)  | Interstate                       |
| High Density Residential (HDR) | US or State Route                |
| Residential/Commercial (RC)    | Class 2 - 4                      |
| Commercial (C)                 | Railroad                         |
| Industrial/Commercial (IC)     | Stream Centerline                |
| Gateway Commercial (G)         | Water Body                       |
| Village Commercial (VC)        | Municipal Water & Sewer District |
| Mobile Home Park (MHP)         | Tax Parcel Boundary              |

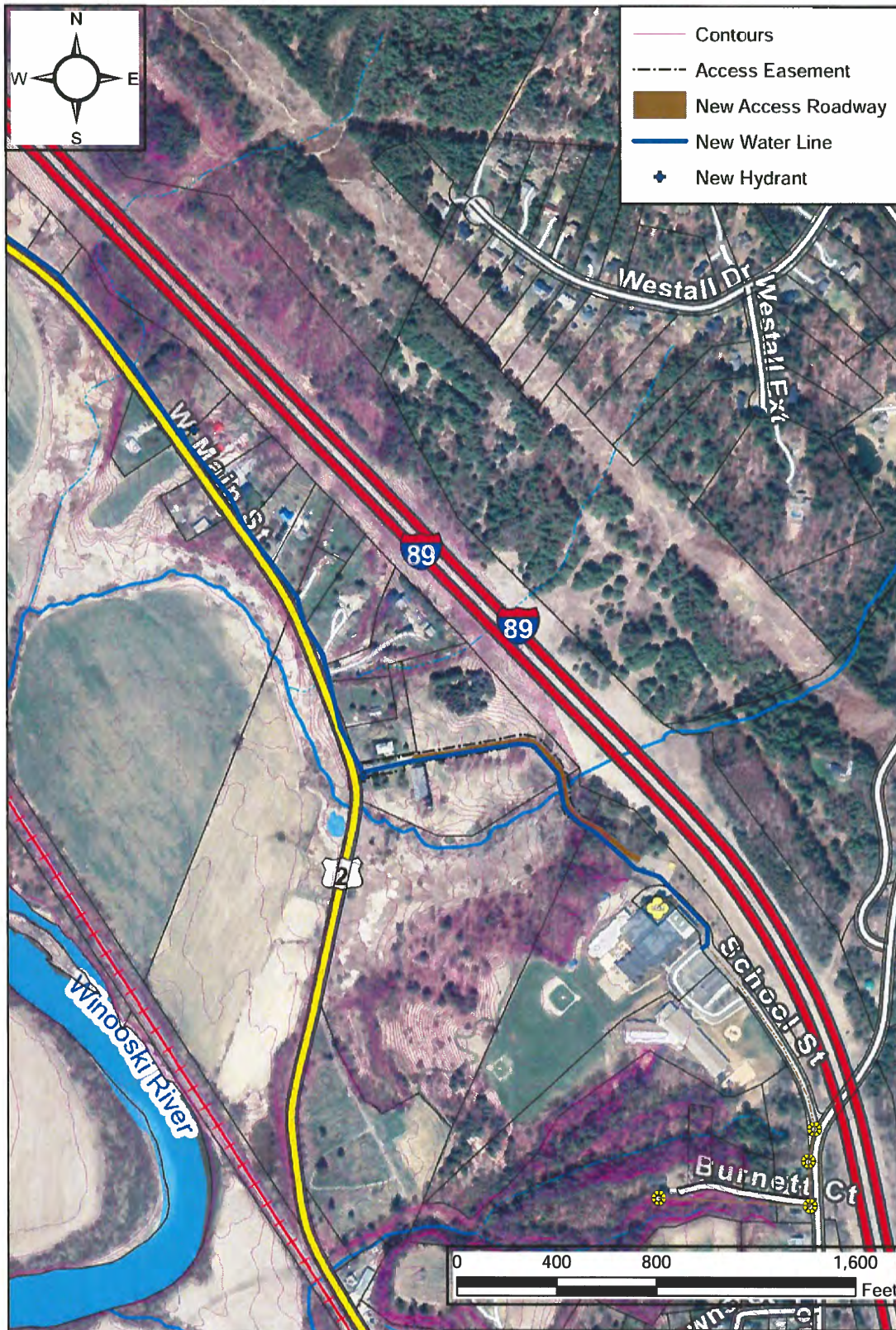
Figure 2

**Sources**  
 Parcel Boundary - Grassroots GIS, 2008  
 Zoning - Updated by CCRPC, 2010  
 Stream Centerline - Updated by CCRPC, 2010  
 All data is in State Plane Coordinate System - NAD 1983, 211710

**Disclaimer**  
 The accuracy of information presented is determined by its sources. Errors and omissions may exist. The Chittenden County Regional Planning Commission and the Vermont Department of Public Safety do not warrant the accuracy of the information presented. This map is not a replacement for a survey by a registered surveyor. This map is not sufficient for the delineation of features on-the-ground. This map identifies the presence of features, and may indicate relationships between features, but is not a replacement for surveyed information or engineering studies.



**Figure 3**  
**Proposed School Emergency Access Road**  
**Town of Richmond**  
**Access Road With Water and Sewer**  
**Extensions for West Main Street**

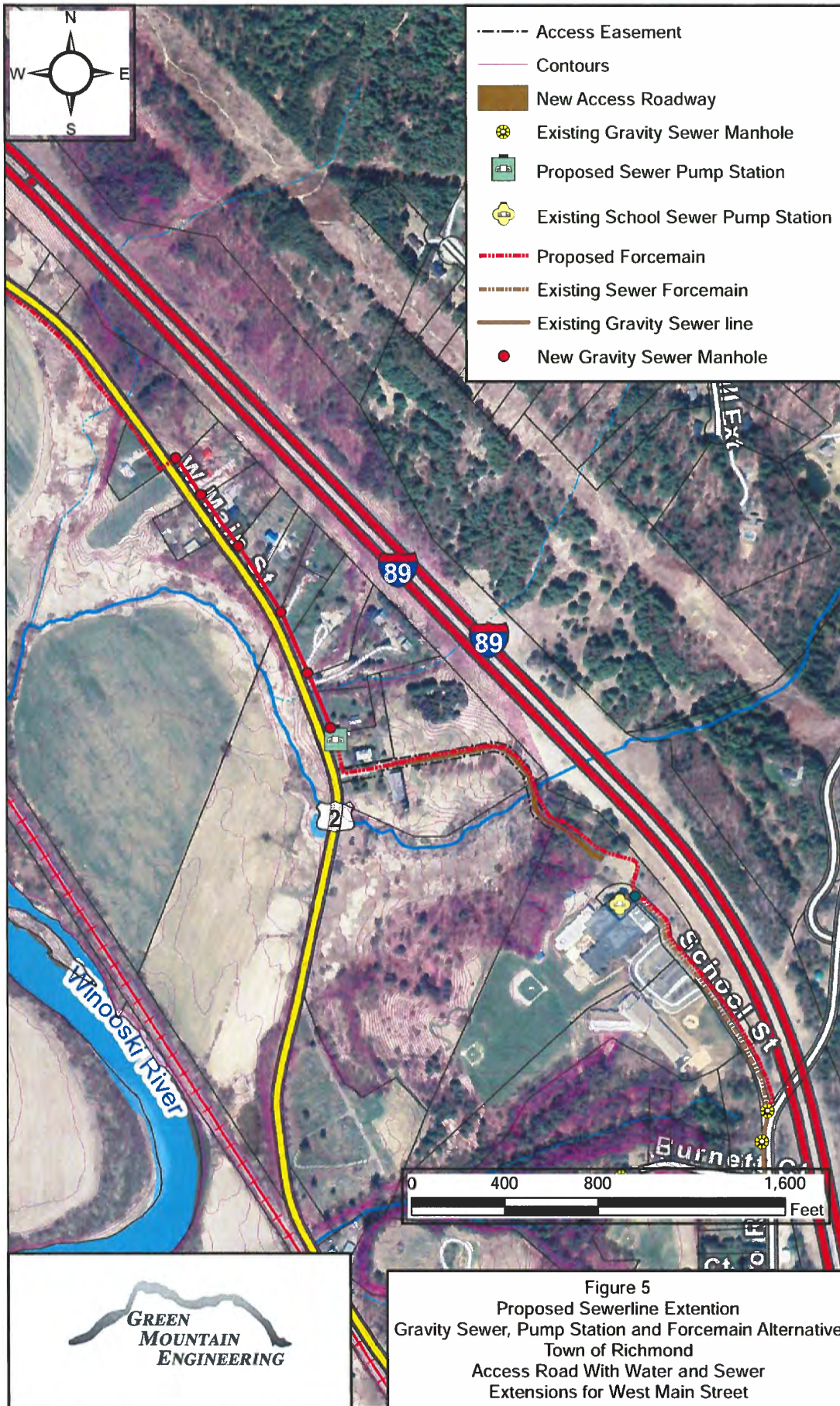


**Figure 4**  
**Proposed Waterline Extension**  
**Town of Richmond**  
**Access Road With Water and Sewer**  
**Extensions for West Main Street**



Figure 4A  
 Proposed Waterline Extension - Phase III  
 Town of Richmond  
 Access Road With Water and Sewer  
 Extensions for West Main Street





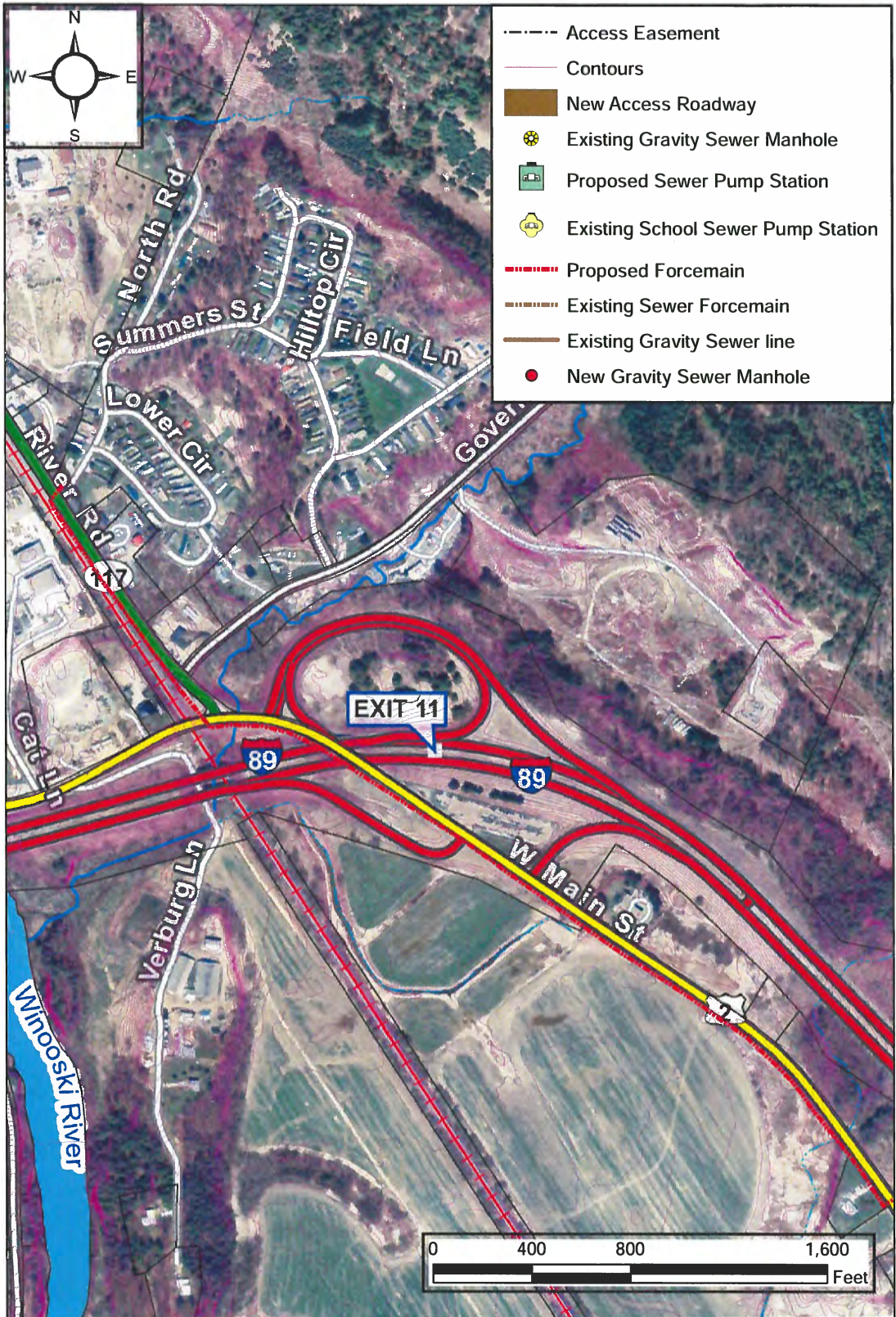
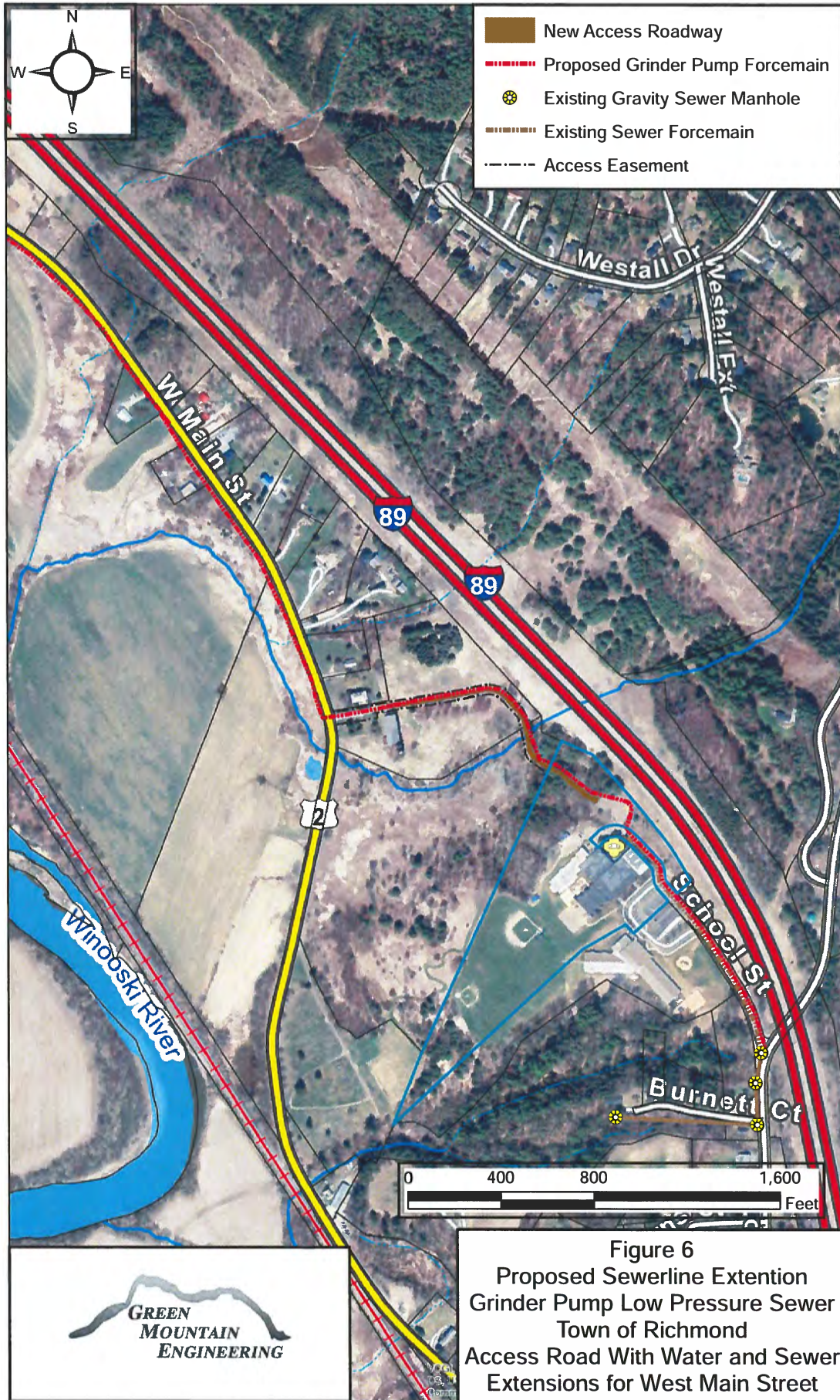
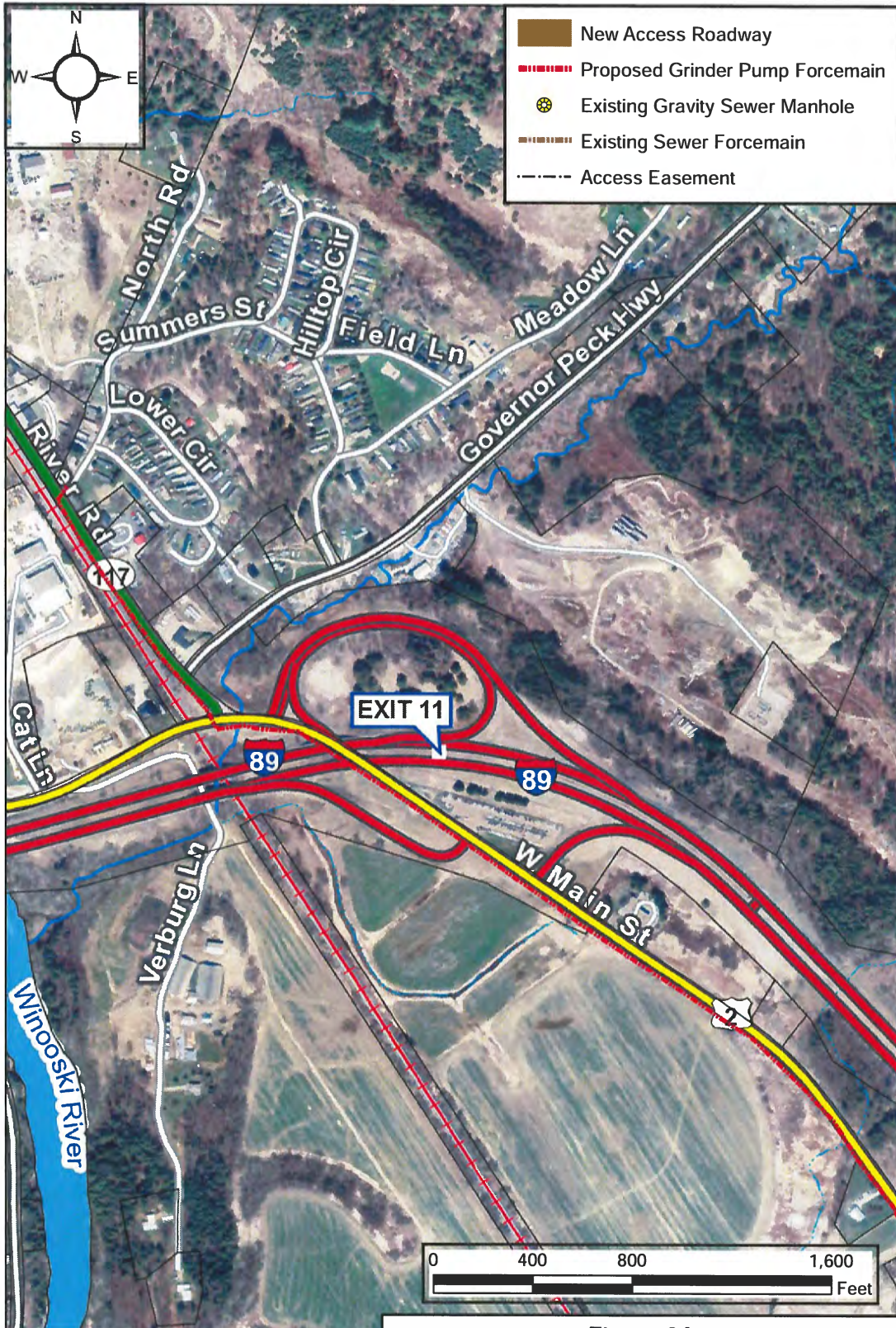


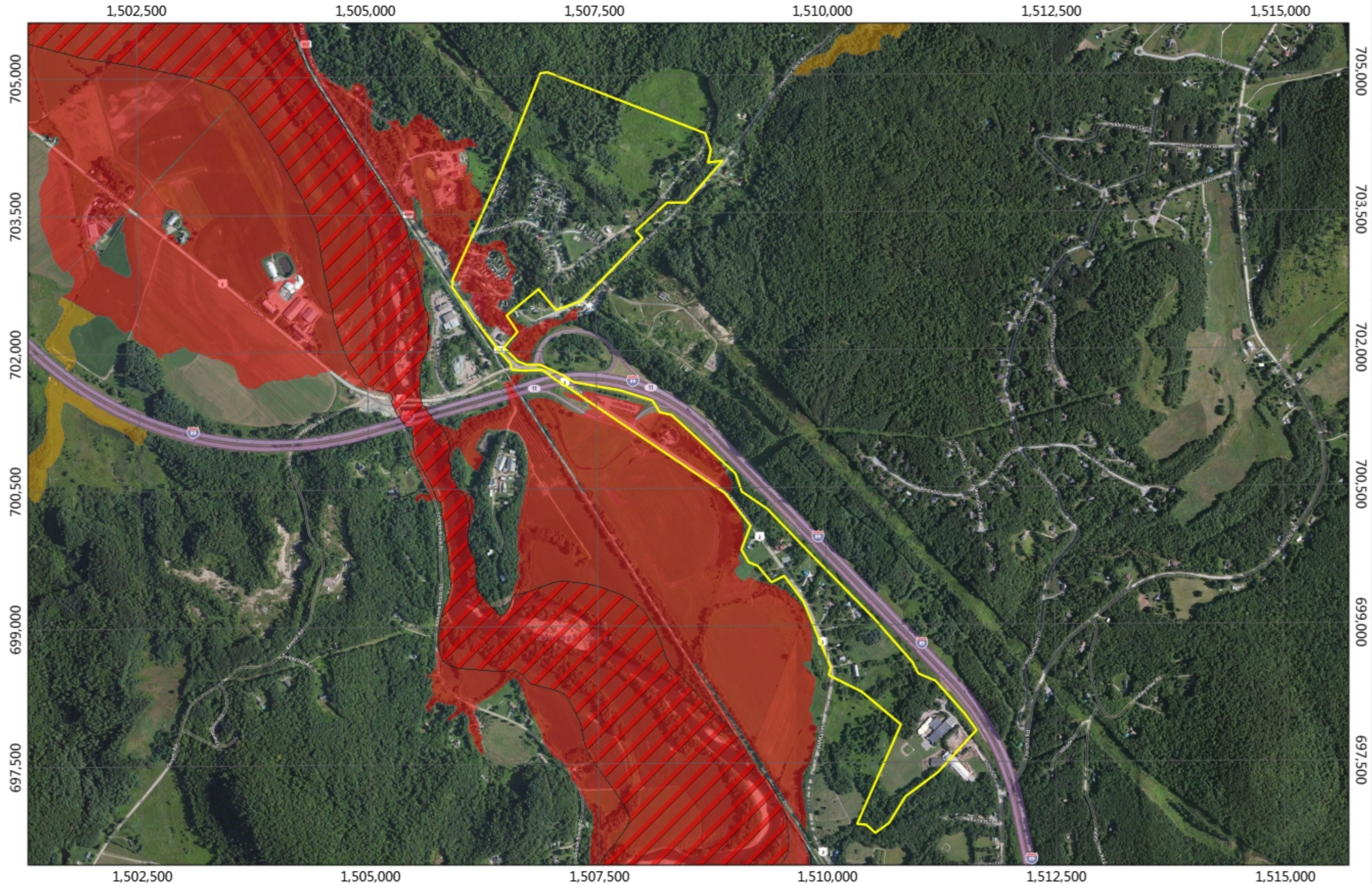
Figure 5A  
 Proposed Sewerline Extension  
 Gravity Sewer, Pump Station and Forcemain Alternative  
 Phase III  
 Town of Richmond  
 Access Road With Water and Sewer  
 Extensions for West Main Street







**Figure 6A**  
 Proposed Sewerline Extension  
 Grinder Pump Low Pressure Sewer- Phase III  
 Town of Richmond  
 Access Road With Water and Sewer  
 Extensions for West Main Street



**LEGEND**

- DFIRM Floodways
- DFIRM Preliminary Floodways

Special Flood Hazard Areas (All Availal Counties)

- AE (1-percent annual chance floodplains with e
- A (1-percent annual chance floodplains without
- AO (1-percent annual chance zone of shallow f feet)
- 0.2-percent annual chance flood hazard zone

Special Flood Hazard Areas (Prelimina DFIRM)

- AE (1-percent annual chance floodplains with e
- A (1-percent annual chance floodplains without
- AO (1-percent annual chance zone of shallow f feet)
- 0.2-percent annual chance flood hazard zone

**1: 12,600**

1in = 1050 ft.  
1cm = 126 meters

640.0 0 320.0 640.0 Meters

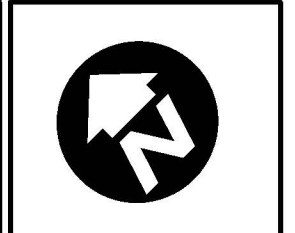
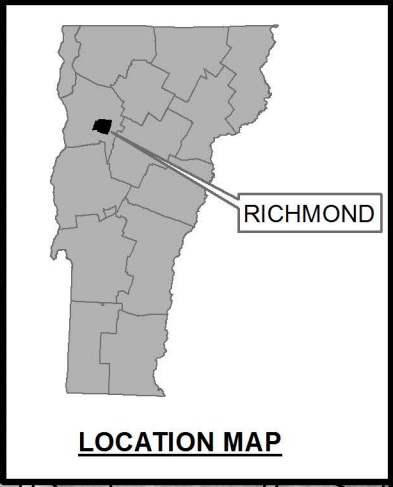
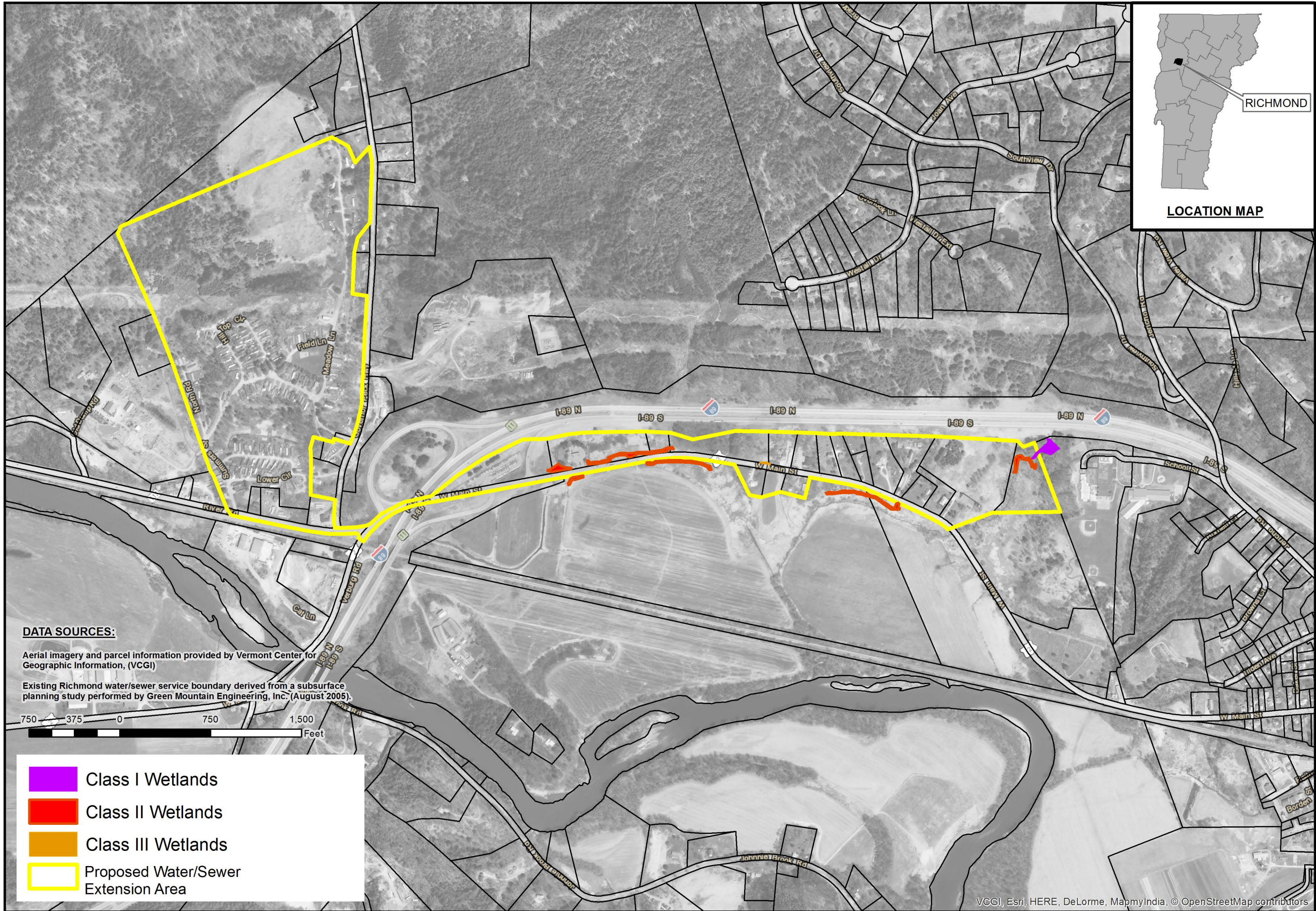
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DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

**NOTES**

Map created using ANR's Natural Resources Atlas



WETLANDS MAP  
 WEST MAIN STREET UTILITIES EXTENSION  
 TOWN OF RICHMOND, VERMONT

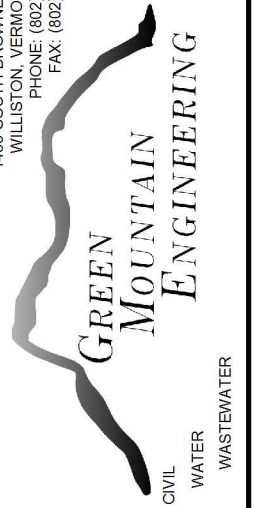
**DATA SOURCES:**

Aerial imagery and parcel information provided by Vermont Center for Geographic Information, (VCGI)  
 Existing Richmond water/sewer service boundary derived from a subsurface planning study performed by Green Mountain Engineering, Inc. (August 2005).

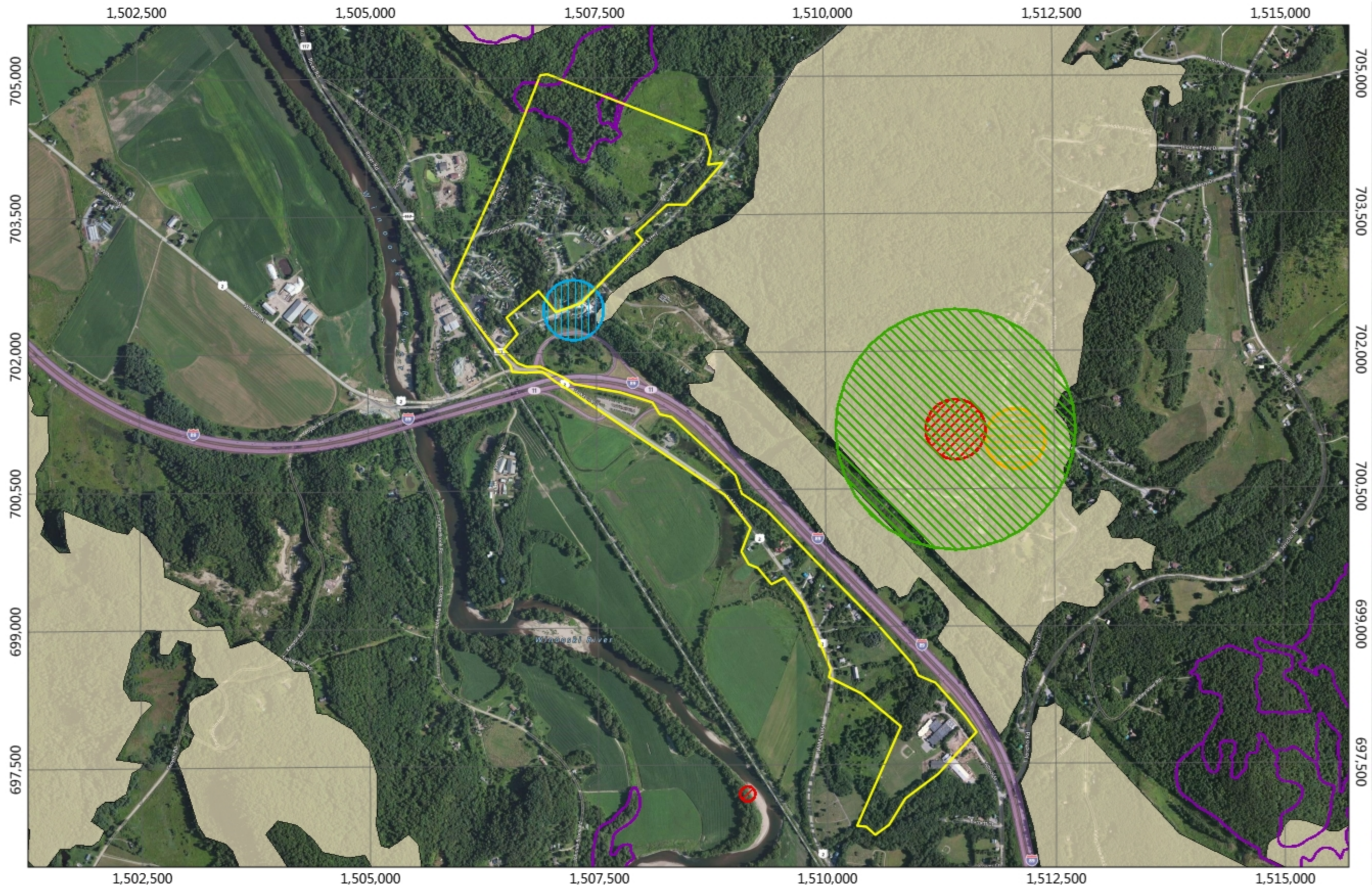


- Class I Wetlands
- Class II Wetlands
- Class III Wetlands
- Proposed Water/Sewer Extension Area

1438 SOUTH BROWNELL ROAD  
 WILLISTON, VERMONT 05495  
 PHONE: (802)862-5590  
 FAX: (802)862-7598



DESIGNED	PROJECT NO.
DRAWN RSO	24-029
CHECKED BY KJC	DRAWING NO.
PLOT DATE 04/15/16	1
SCALE 1" = 750'	
DATE APR 2016	



### LEGEND

- Rare Threatened Endangered Species
  - Threatened or Endangered
  - Rare
- Significant Natural Community
  - Natural Community
- Uncommon Species and Other Feature
  - Animal
  - Plant
- Deer Wintering Areas
  - Deer Wintering Areas
- State Game Refuges
  - State Game Refuges

**1: 12,600**

1in = 1050 ft.  
1cm = 126 meters



### NOTES

Map created using ANR's Natural Resources Atlas

640.0 0 320.0 640.0 Meters



**HARTGEN**

archeological associates inc

## ARCHEOLOGICAL RESOURCE ASSESSMENT

### Richmond West Main Street Sewer and Water Extension

Town of Richmond  
Chittenden County, Vermont

HAA # 4868-11

**Submitted to:**

Green Mountain Engineering, Inc.  
PO Box 159  
Williston, Vermont 05495

**Prepared by:**

Hartgen Archeological Associates, Inc.

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An ACRA Member Firm  
[www.acra-crm.org](http://www.acra-crm.org)

July 2015

## **MANAGEMENT SUMMARY**

SHPO Project Review Number:

Involved State and Federal Agencies: *Vermont Water Supply Division, USDA Rural Development*

Phase of Survey: *Archeological Resource Assessment*

## **LOCATION INFORMATION**

Municipality: *Town of Richmond*

County: *Chittenden*

State: *Vermont*

## **SURVEY AREA**

Length

Water: *1.43 miles (2.3 km)*

Sewer: *1.65 miles (2.65 km)*

Access Road: *0.21 mile (0.34 km)*

Width: *6.1 meters (20 ft)*

Acres: *7.98 acres (3.23 ha)*

## **RESULTS OF RESEARCH**

Archeological sites within one mile: *4*

Surveys in or adjacent: *4*

NR/NRE sites in or adjacent: *2*

Precontact Sensitivity: *Moderate*

Historic Sensitivity: *Moderate*

## **RECOMMENDATIONS**

*Avoid areas of archeological potential. Phase IB archeological reconnaissance survey recommended for areas that cannot be avoided.*

Report Authors: *Thomas R. Jamison*

Date of Report: *July 2015*

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## **ARCHEOLOGICAL RESOURCE ASSESSMENT**

### **1 Introduction**

Hartgen Archeological Associates, Inc. (Hartgen) conducted an Archeological Resource Assessment for the proposed Richmond West Main Street Sewer and Water Extension project (Project) located in the Town of Richmond, Chittenden County, Vermont (Map 1). The Project requires approvals by Vermont Water Supply Division. This investigation was conducted to comply with Section 106 of the National Historic Preservation Act of 1966, as amended and will be reviewed by the Vermont Division for Historic Preservation (VDHP). This investigation adheres to the Vermont State Historic Preservation Office's (SHPO) *Guidelines for Conducting Archeology in Vermont* (2002).

### **2 Project Information**

A site visit was conducted by Thomas R. Jamison on June 17, 2015 to observe and photograph existing conditions within the Project Area. The information gathered during the site visit is included in the relevant sections of the report.

#### **2.1 Project Location**

The project is located in the northwest corner of the Town of Richmond. It extends from the Camel's Hump Middle School, running northwest cross country to Route 2 and northwest along Route 2 to Route 117 where it ends at Summers Street, the entrance to Riverside Mobile Home Park (Map 2, Map 3 and Map 4).

#### **2.2 Description of the Project**

The project includes the following components (Map 2, Map 3 and Map 4):

- Extension of the town water system from the Camel's Hump Middle School to Riverside Mobile Home Park
- Installation of five fire hydrants
- Extension of the town sewer system from Jericho Road to Riverside Mobile Home Park
- Construction of a new access road along the cross country part of the proposed alignment.

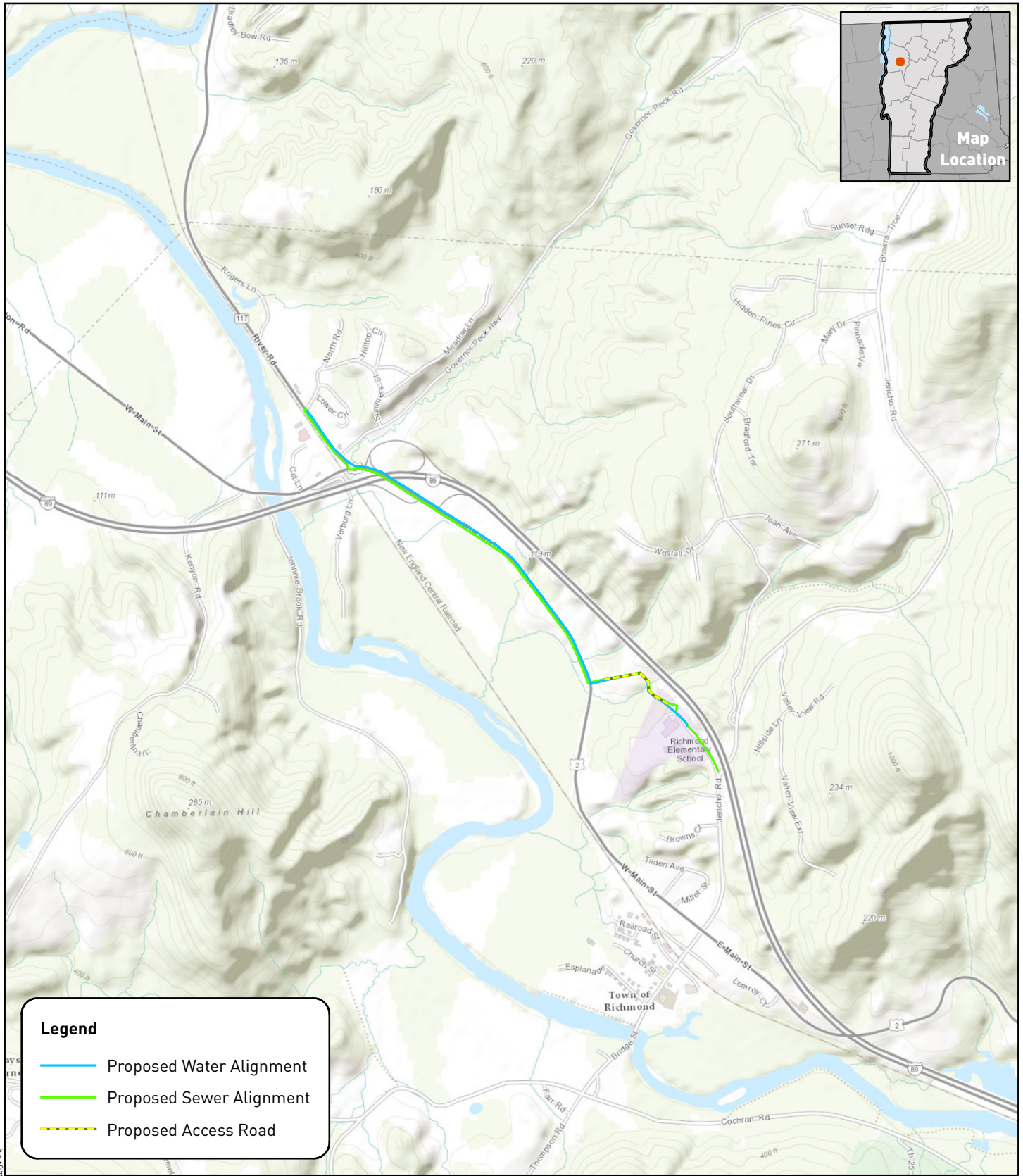
#### **2.3 Description of the Area of Potential Effects (APE)**

The area of potential effects (APE) includes all portions of the property that will be directly or indirectly altered by the proposed undertaking. The alignment of the water line is proposed to be on the north side of Route 2 and 117 while the wastewater alignment is on the south side. For the cross-country route, the two lines will be on either side of a new access road. The project alignment is approximately 1.43 miles (2.3 km) for the water line, 1.65 miles (2.65 km) for the sewer alignment and 0.21 miles (0.34 km) of new access road. The width of the APE is estimated at 20 feet (6.1 m). Based on these proposed effects, the APE includes approximately 7.98 acres (3.23 ha).

### **3 Environmental Background**

The environment of an area is significant for determining the sensitivity of the Project Area for archeological resources. Precontact and historic groups often favored level, well-drained areas near wetlands and waterways. Therefore, topography, proximity to wetlands, and soils are examined to determine if there are landforms in the Project Area that are more likely to contain archeological resources. In addition, bedrock formations may contain chert or other resources that may have been quarried by precontact groups. Soil conditions can provide a clue to past climatic conditions, as well as changes in local hydrology.

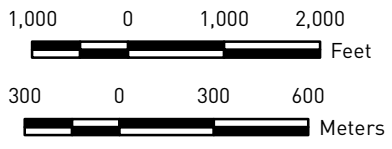
Richmond West Main Street Sewer and Water Extension, Town of Richmond, Chittenden County, Vermont  
 Archeological Resource Assessment



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**Legend**

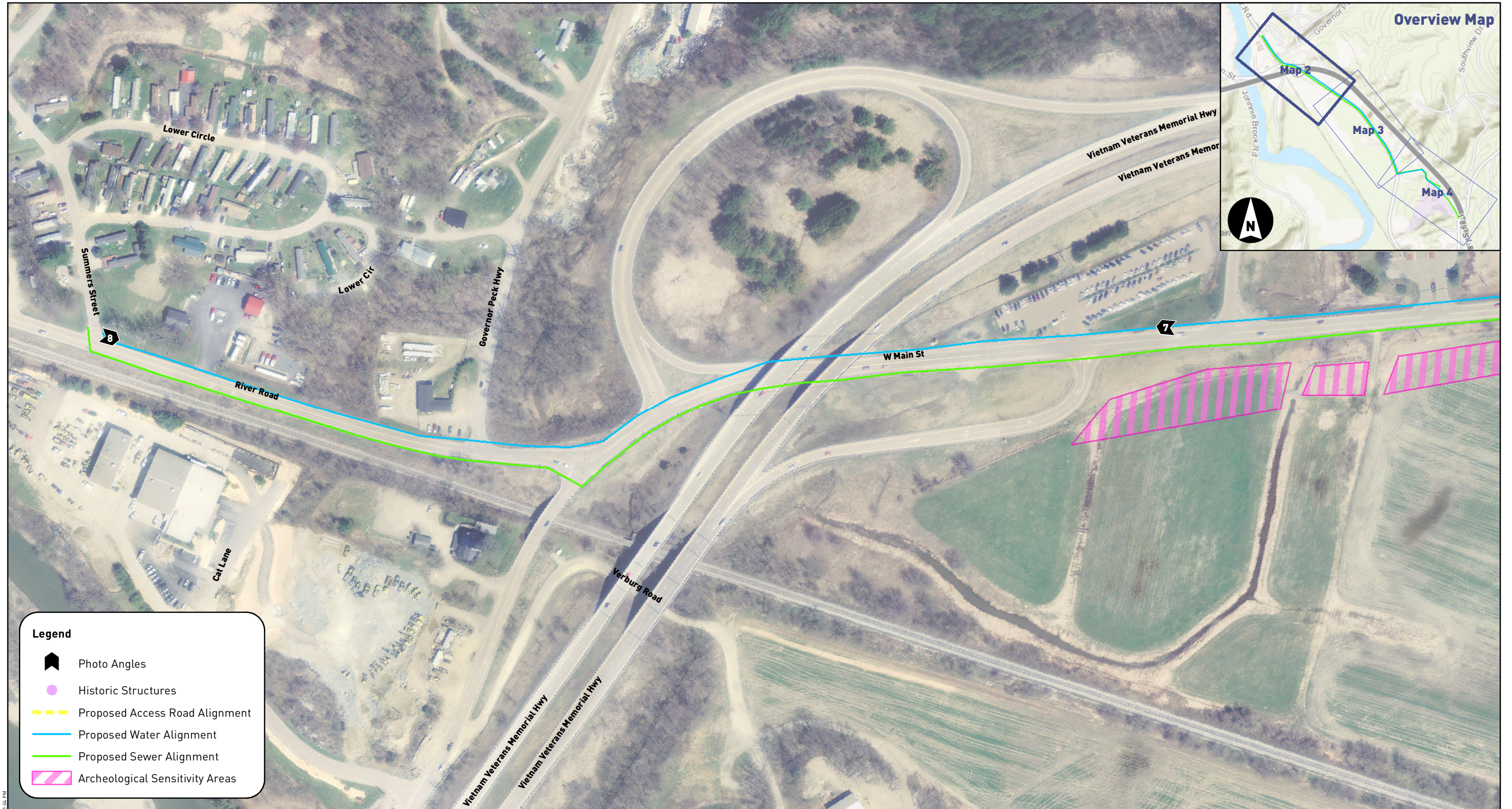
- Proposed Water Alignment
- Proposed Sewer Alignment
- Proposed Access Road





Project Location  
 (Esri Inc. 2015)

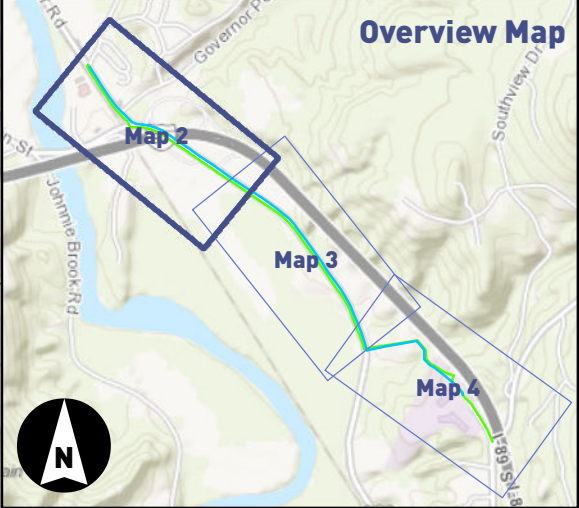
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**Map 1**



**Legend**


-  Photo Angles
-  Historic Structures
-  Proposed Access Road Alignment
-  Proposed Water Alignment
-  Proposed Sewer Alignment
-  Archeological Sensitivity Areas



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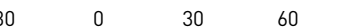


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Feet

30 0 30 60



Meters

Project Map  
 (Green Mountain Engineering, Inc. 2015;  
 VCGI 2015)









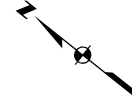
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**Map 2**



**Legend**

-  Photo Angles
-  Historic Structures
-  Proposed Access Road Alignment
-  Proposed Water Alignment
-  Proposed Sewer Alignment
-  Archeological Sensitivity Areas



100 0 100 200  
 Feet

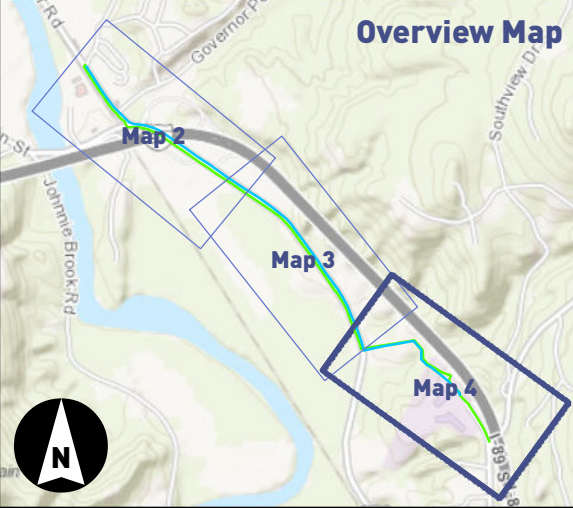
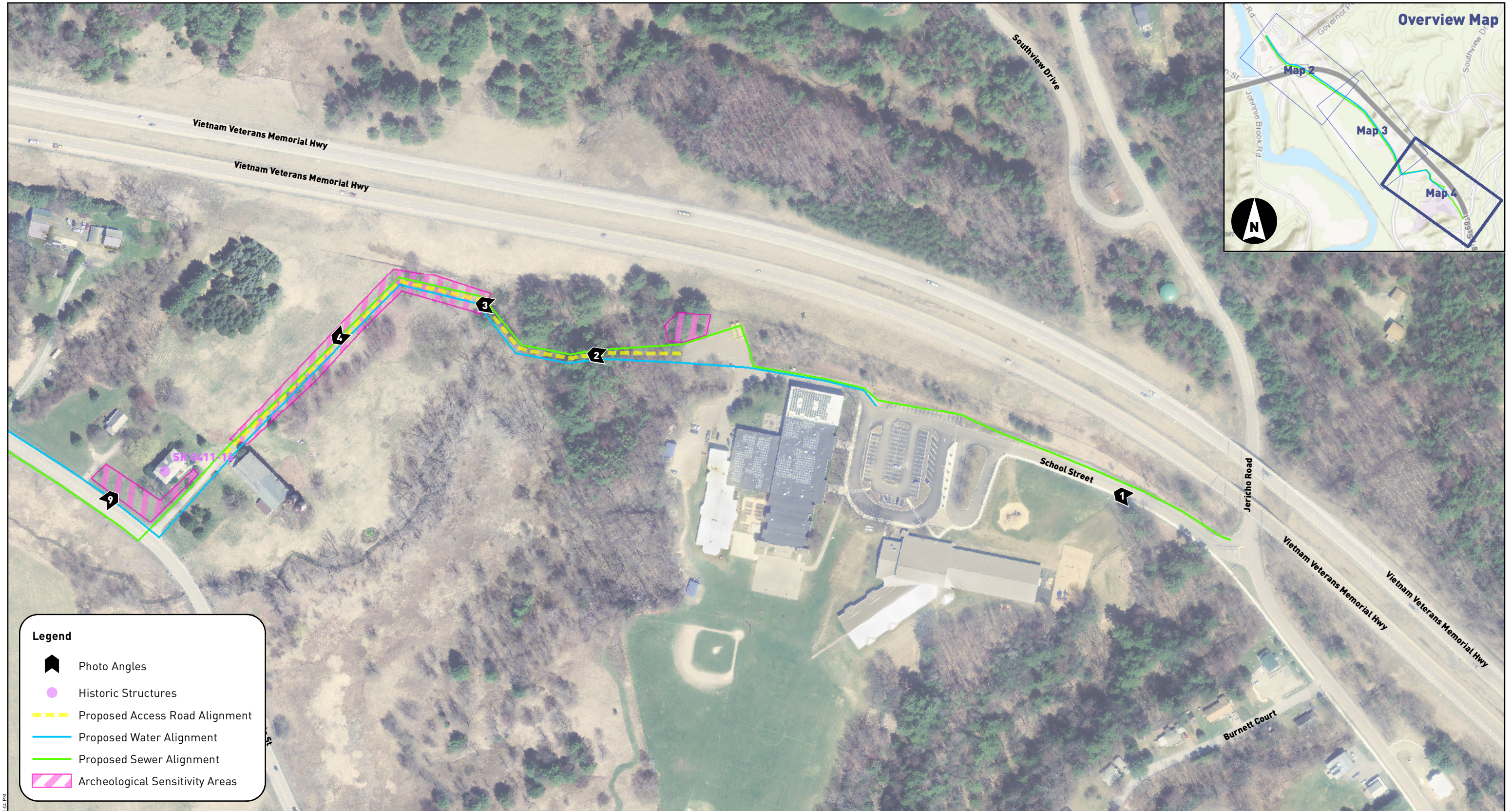
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Project Map  
 (Green Mountain Engineering, Inc. 2015;  
 VCGI 2015)


**HARTGEN**  
 archeological associates inc

**Map 3**

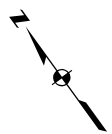
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**Legend**

-  Photo Angles
-  Historic Structures
-  Proposed Access Road Alignment
-  Proposed Water Alignment
-  Proposed Sewer Alignment
-  Archeological Sensitivity Areas

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Project Map  
 (Green Mountain Engineering, Inc. 2015;  
 VCGI 2015)



**HARTGEN**  
 archeological associates inc

**Map 4**

### 3.1 Present Land Use and Current Conditions

The project alignment crosses several different landforms as it passes from the Camel's Hump Middle School to the Riverview Mobile Home Park (Photo 1 to Photo 8). Most of the project alignment is located along the busy Route 2 corridor. The existing conditions along that section and along Route 117 are characterized as the edge of lawns, agricultural fields and highly disturbed areas where Route 2 passes near and under I-89. Much of the alignments on either side of the corridor have embankments, cut slopes and ditches along the roadside. Embankments and ditches generally extend a short distance from the road and beyond those features .the adjacent areas are often undisturbed. The cross-country alignment extending from the middle school parking lot is wooded and generally sloped with a great deal of surface water present, although there is a small terrace on the alignment between a small school parking lot and I-89. Once the alignment crosses a small brook it is a gradual slope down to Route 2 that is mostly open field.

Utilities along the alignment include a gas line and underground telephone/cable lines. Most of these disturbances are along the north side of Route 2 and the north side of Route 117.



Photo 1. Entrance to Camel's Hump Middle School. Note cut bank on the right and sidewalk with embankment on the left. View to the northwest.



Photo 2. Steeply sloped and wet area at east end of cross country route. View to the northwest.

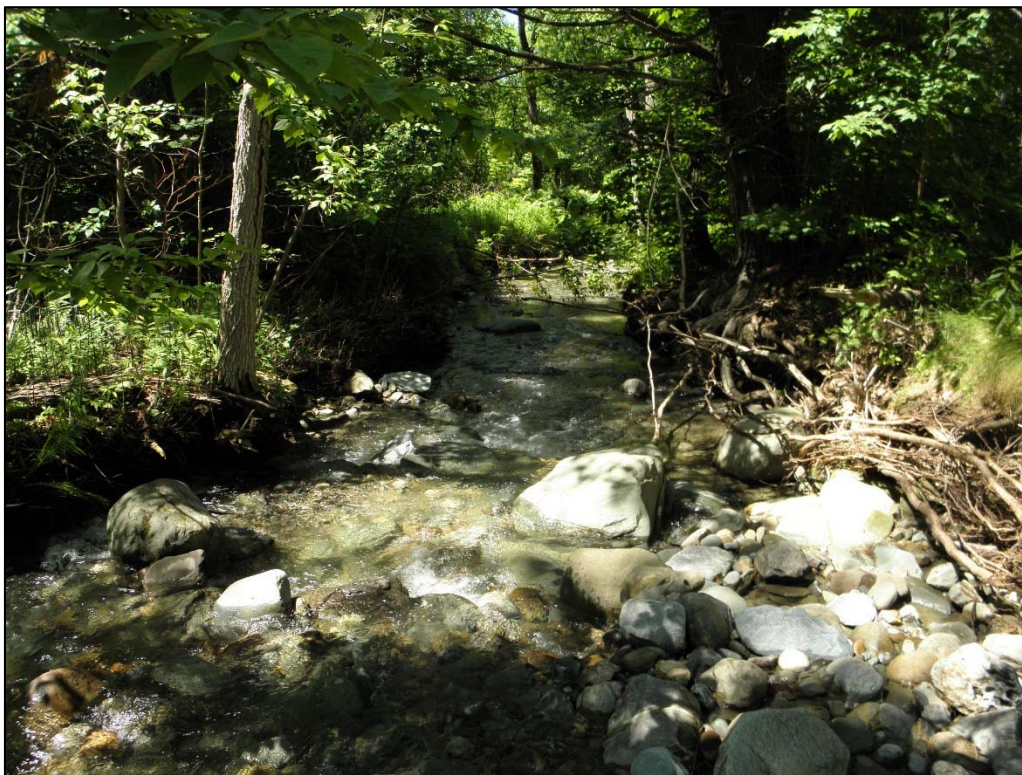


Photo 3. Brook crossed by cross-country route. View to the southwest.





Photo 4. Field behind Westall Farm (SR 0411-16). Note house and barn in the background and gradual slope up to the foreground. View to the west/southwest.



Photo 5. Terrace area adjacent to the Winooski flood plain on both sides of Route 2. Note low embankment in the foreground that increases in height in the background. View to the southeast.



Photo 6. Field on Winooski River flood plain. Note embankment of Route 2 to the left and overpass of I-89 in the background. View to the northwest.



Photo 7. Disturbance of I-89 and associated park and ride lot. View to the northwest.



Photo 8. Embankment along Route 117 at entrance to Riverside Mobile Home Park. Note buried telephone/cable marker. View to the southeast.

### 3.2 Soils

Soil surveys provide a general characterization of the types and depths of soils that are found in an area. This information is an important factor in determining the appropriate methodology if and when a field study is recommended. The soil type also informs the degree of artifact visibility and likely recovery rates. For example, artifacts are more visible and more easily recovered in sand than in stiff glacial clay, which will not pass through a screen easily.

The soils extending from the school to Route 2 are generally moderately well drained silt loam deposits on glacial till or lacustrine/marine deposits terraces. At Route 2 and extending to the mobile home park, the alignment crosses onto a segment of lake plain and then onto alluvial soils associated with the Winooski River (USDA 2015). The alluvial deposits have the potential for deeply buried and stratified archeological deposits.

Table 1. Soils in Project Area (east to west)

Symbol	Name	Textures	Slope	Drainage	Landform
<i>School to Route 2:</i>					
MuD	Munson and Belgrade	Silt loam	12-25%	Moderately well drained	Glacio-lacustrine terraces
PsC	Peru	Extremely stony loam	0-20%	Moderately well drained	Glacial till on uplands
MyB	Munson and Raynham	Silt loam	2-6%	Somewhat poorly drained	Lacustrine and marine silt over clay on lake plains
TeE	Terrace escarpments	Silty and clayey	12-25%	Moderately well drained	Terrace slopes
An	Alluvial land	Silt loam	0-3%	Well drained	Alluvial deposits
<i>Route 2 to Route 117</i>					
MyB	Munson and Raynham	Silt loam	2-6%	Somewhat poorly drained	Lacustrine and marine silt over clay on lake plains

Symbol	Name	Textures	Slope	Drainage	Landform
Le	Limerick	Silt loam	0-3%	Poorly drained	Flood plain
TeE	Terrace escarpments	Silty and clayey	12-25%	Moderately well drained	Terrace slopes
Lf	Limerick	Silt loam, very wet	0-3%	Poorly drained	Flood plain
Hf	Hadley	Very fine sandy loam	0-3%	Well drained	Flood plain
<i>Route 117 to Mobile Home Park</i>					
Hf	Hadley	Very fine sandy loam	0-3%	Well drained	Flood plain

### 3.3 Bedrock Geology

The bedrock in the Project Area is primarily of the Pinnacle formation consisting of muscovite-chlorite-biotite-feldspar-quartz schist phyllite and metagraywacke. The APE crosses a band of the Pinnacle formation that consists of metabasalt and volcanics. The western limit of the APE crosses onto the Fairfield Pond formation of quartz-sericite-chlorite phyllite and foliated quartzite (Ratcliffe 2011).

These formations were not typically used by Native American groups for stone tool manufacture. However, they could have been utilized on an expedient basis.

### 3.4 Physiography and Hydrology

The Project Area begins at the Camel’s Hump Middle School, which is located on a high terrace along I-89. From that point, the alignment drops about 23 meters (75 ft), from 123 meters (405 ft) to 101 meters (330 ft) to a small brook that crosses the alignment. From there, the APE gradually drops down to Route 2 at about 95 meters (313 ft). Route 2 varies slightly, with a high point of 101 meters (330 ft) and dropping down to about 91 meters (300 ft) at the park and ride lot before rising at Route 117 and ending at about 94 meters (309 ft) at the entrance to the Riverview Mobile Home Park.

Several small drainages cross the APE. The primary one is the small brook below the school (Photo 3). Another small drainage, which flows into the first, is located at the start of the APE at the school parking lot. Further to the west, three small drainages cross the APE. However, each of them are somewhat or extensively channelized, suggesting significant disturbance.

## 4 Documentary Research

Hartgen conducted research at the Vermont Division for Historic Preservation (VDHP) to identify previously reported archeological sites, State and National Register (NR) properties, properties determined eligible for the NR (NRE), and previous cultural resource surveys.

### 4.1 Archeological Sites

The archeological site files at VDHP contained four reported sites within one mile (1.6 km) of the Project Area (Table 2). Previously reported archeological sites provide an overview of both the types of sites that may be present in the APE and the relationship of sites throughout the surrounding region. The presence of few reported sites, however, may result from a lack of previous systematic survey and does not necessarily indicate a decreased archeological sensitivity within the APE.

In the case of the Richmond project area, the lack of reported sites is probably due to the limited amount of survey conducted in the area, judging by the high number of sites known to exist further to the west and east. The known sites in the project vicinity include the Conant Site (VT-CH-639) across the river from the mobile home park. At that site, 61 precontact features were identified during Phase I, II and III investigations. The radiocarbon samples dated the site to 3600 years before present, or the Late Archaic (Skins 2012). In the village of Richmond, the Esplanade Site (VT-CH-1098) consisted of an isolated find of a Levanna projectile point under levels of historic fill. Historic sites identified in the village consist of the 1908 Fire Site (VT-CH-

1108) that consists of large amounts of fill in the foundations of structures that burned during the 1908 fire that devastated most of the business district.

Over a mile from the APE there are several clusters of precontact sites located to the west and several important sites to the east along the Winooski River and its tributaries. The presence of those sites indicates the lack of sites in the project vicinity is likely due to the limited investigation in the area, rather than a true lack of sites.

Table 2. Vermont Archeological Inventory (VAI) sites within one mile (1.6 km) of the Project Area

VAI Site No.	Site Identifier	Description	Proximity to Project Area
VT-CH-639	Conant Site	Late Archaic, many features, stone tools, botanical remains	0.4 mile to SW
VT-CH-1098	Esplanade Site	Late Woodland, isolated find of Levanna projectile point	0.6 mile to S
VT-CH-1108	1908 Fire Site	Early 20 <sup>th</sup> -century deposits associated with 1908 fire	0.6 mile to S
VT-CH-1109	Pump Station Site	19 <sup>th</sup> -century house and blacksmith shop	1 mile to S

#### 4.2 Historic Properties

An examination of the files at VDHP identified no NR properties and two NRE properties adjacent to the APE (Table 3). The two NRE properties include one early 19<sup>th</sup>-century structure and one early 20<sup>th</sup>-century structure. The project APE passes through the property of the Westhall Farm (SR 0411-16), while the APE passes along the edge of the property.

Table 3. Inventoried properties within or adjacent to the APE

VHSSS #	Name	Address	Status	Description of Building
0411-16	Willis Residence/former Westhall Farm	840 West Main Street	SRL 4/9/1980	c. 1910 "Tourist Home" large frame hipped roof house with associated barn and silos
0144-17	Thompson House	1070 West Main Street	SRL 4/9/1980	c. 1815 Federal style house

#### 4.3 Previous Surveys

On file at VDHP are four previous surveys within the immediate vicinity of the Project (Table 4). These surveys include one at the eastern end of the APE that examined the archeological potential of utility improvements along Jericho Road and in the village of Richmond (Hartgen 2012). This survey extended to the intersection of Jericho Road and School Street, where the current APE begins. This location was determined to be disturbed. One survey has been conducted along the south side of Route 2 adjacent to the APE approximately half way between the two ends of the project alignment. This survey on a small terrace overlooking the Winooski River floodplain identified disturbance in that APE but indicated other parts of the landform could retain intact deposits (Skinas 1999) Two surveys have been conducted adjacent to the west end of the APE. These surveys include an expansion of the Milton CAT facility located slightly to the southwest of the mobile home park where no archeological deposits were encountered (Hartgen 2010) and a Phase IA assessment for J. Hutchins excavation contractors immediately to the northwest of the mobile home park (Frink and Hathaway 2001) that determined no archeological potential for the property.

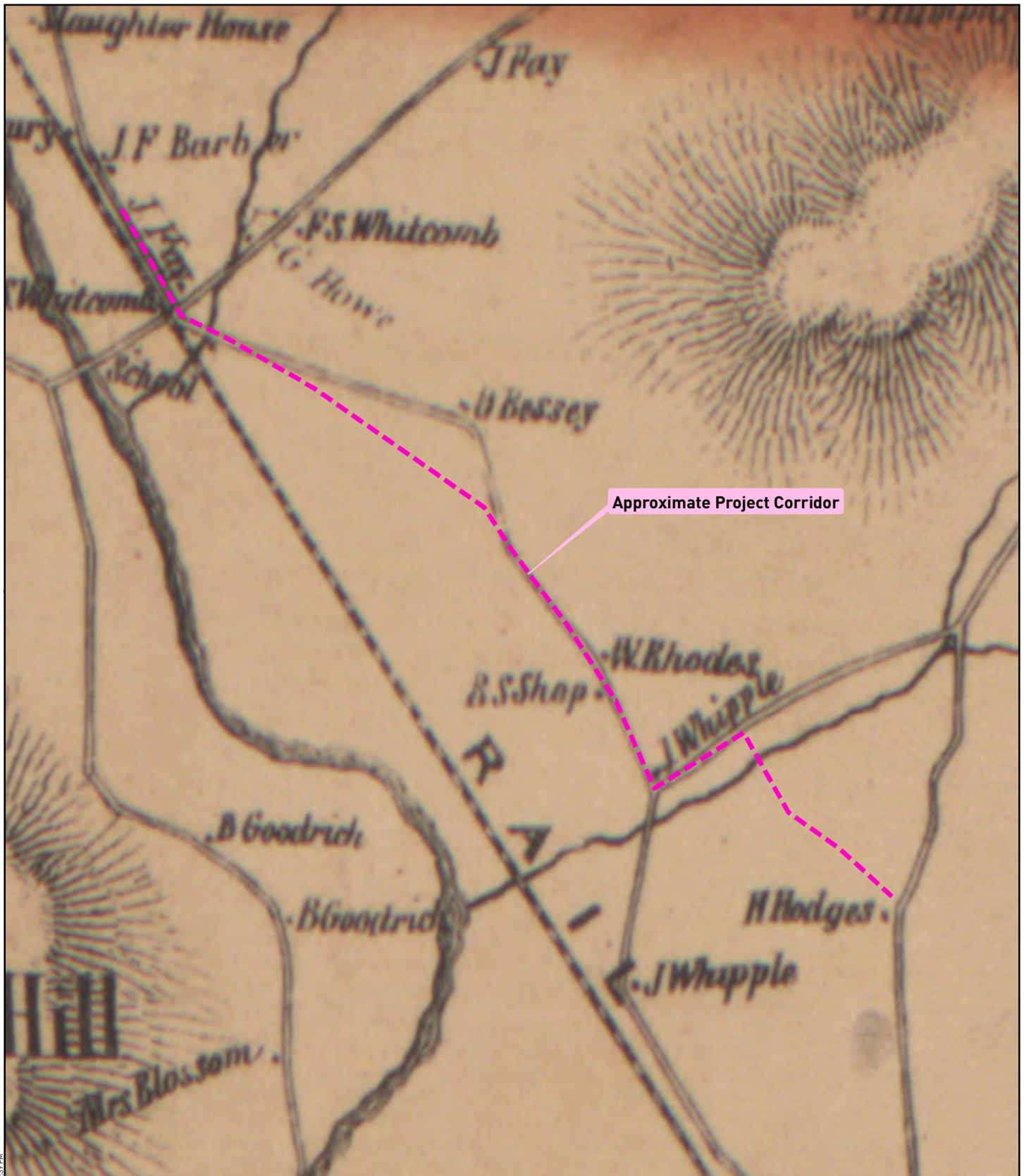
Table 4. Relevant previous surveys within or adjacent to the Project

Year	Investigator	Methodology	Results	Notes
1999	David Skinas-USDA NRCS	Surface survey and stps	Identified disturbance in APE	Vergurg borrow area
2010	Frink and Hathaway	Phase IA archeological and geomorphological assessment	Determined to be not sensitive	J. Hutchins
2012	David Skinas-USDA NRCS	Phase I to III surface survey, stp	Identification of 61	Conant Site

		and unit excavation, plowzone stripping and feature excavation	precontact features, Late Archaic occupation	
2012	Hartgen Archeological Associates, Inc.	Phase I survey for municipal infrastructure improvements	Disturbance in vicinity of current APE	Richmond Infrastructure

## 5 Historical Map Review

Review of the historic maps of the project area identifies several structures that were located along the APE. These structures are mostly along Route 2 and the intersection with Route 117, although one structure is located on the cross country route. The 1856 Walling map of Richmond (Map 5) depicts five residences along the north side of Route 2 and one blacksmith shop on the south side (Walling 1857). The 1869 Beers atlas (Map 6) depicts most of the same structures, although one residence has been removed and another added in a different location and the blacksmith shop is not shown (Beers 1869). The 1906 and 1924 USGS quadrangles depict the same structures as the Beers map (USGS 1906, 1924). The 1948 USGS quad shows the presence of the barns across Route 2 from the Thompson House (SR 0411-17), the vicinity of the blacksmith shop shown on the 1857 map (USGS 1948). The structure on the cross country route first appears on the 1869 Beers map labeled B. Lincoln (Map 6). It continues to be present on the USGS maps until at least 1980 (USGS 1980). At the west end of the APE, the intersection of Routes 2 and 117 was heavily disturbed by a quarry that is shown on the 1948 and 1980 USGS quads. This disturbance extends slightly into the Riverview Mobile Home Park. However, it appears to not extend to the edge of Route 117, potentially leaving a sliver of undisturbed land along the northeast side of Route 117. None of the Sanborn maps cover any of the APE (Sanborn 1939).



Approximate Project Corridor



500 0 500 1,000  
Feet

150 0 150 300  
Meters

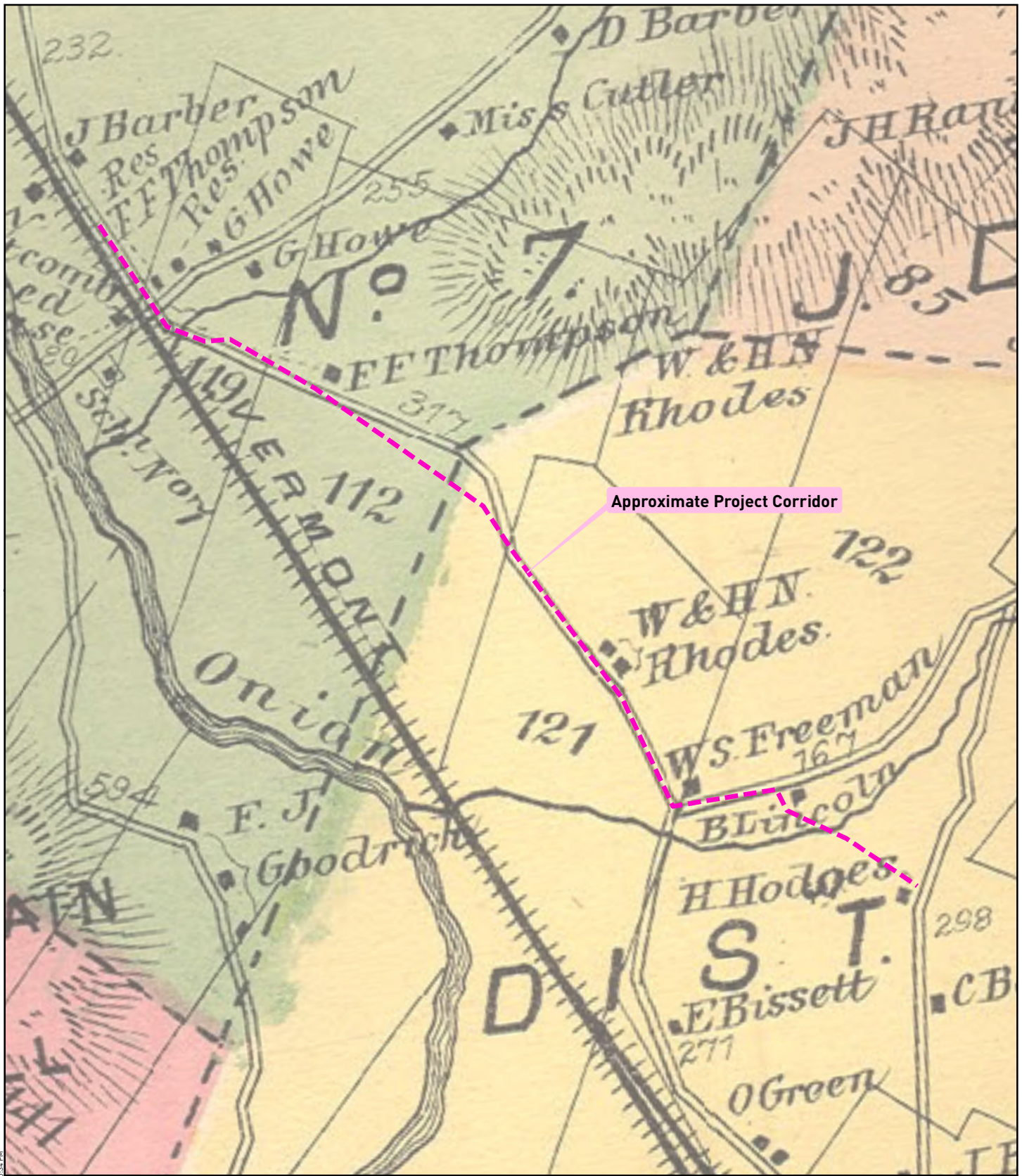
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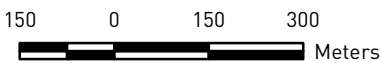
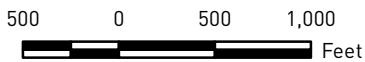
Walling 1857

Map 5

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Approximate Project Corridor



**HARTGEN**  
archeological associates inc

Beers 1869

Map 6

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## **6 Archeological Discussion**

### **6.1 Precontact Archeological Sensitivity Assessment**

Completion of the VDHP Environmental Predictive Model provides a measure of the precontact archeological sensitivity of the project area (Appendix 1). The Project Area is sensitive for proximity to permanent stream, seasonal stream, floodplain, wetlands, high elevated landform, valley edge features, Champlain Sea/glacial lake shoreline and natural travel corridor. Points were reduced for the Project Area having significant disturbance related to road, highway and utility construction. The Project Area has a score of 60. A score of 32 and above is considered to indicate precontact sensitivity. This sensitivity is supported by a number of sites in similar locations as the APE, including the Conant Site across the river from the mobile home park and the Esplanade Site in the Village of Richmond.

### **6.2 Historic Archeological Sensitivity Assessment**

The historic sensitivity of an area is based primarily on proximity to previously documented historic archeological sites, map-documented structures, or other documented historical activities (e.g. battlefields).

As demonstrated by the historic maps of the area, historic occupation of the project APE has always been at a fairly low density, translating into a relatively low sensitivity for early historic archeological sites. The only standing historic structures adjacent to the APE that appear on the historic maps are the two State Register listed structures (SR 0411-16 and 0411-17; Table 3). SR 0411-16, the Westhall Farm, dates to c. 1910 (Photo 9). However, the 1857 Walling and 1869 Beers maps depict a structure in that location labeled J. Whipple and W. S. Freeman, respectively. Therefore, there may be archeological remains on the property related to earlier structures, perhaps closer to the edge of Route 2. Similarly, the Beers map shows a structure labeled B. Lincoln on a road that no longer exists, but that appears to be the alignment of the cross country route east of the Westhall Farm. A structure also appears in this location on the USGS quads from 1921 to 1980. No evidence of structural remains were noted along the alignment in this area during the site visit. However, very high vegetation prevented thorough examination. The c. 1815 Thompson House (SR 0411-17) appears on both the 1857 and 1869 maps, labeled W. Rhodes (Photo 10). The 1869 map shows two structures in that location, suggesting there may be the remains of other structures on the property. A structure labeled O. Bessey appears on the 1857 Walling map about 288 meters (945 ft) east of the current Mobil gas station near the I-89 South entrance ramp. This area is currently bounded by a cut bank along Route 2. A structure labeled F. F. Thompson on the 1869 Beers map is located within what is now the heavily disturbed park and ride lot. Another structure labeled F. F. Thompson is shown on the 1869 map in the northeast quadrant of the intersection of Routes 2 and 117. This area, however, was later heavily disturbed by quarrying as shown on several late 20<sup>th</sup>-century USGS quads.

### **6.3 Archeological Potential**

Archeological potential is the likelihood of locating intact archeological remains within an area. The consideration of archeological potential takes into account subsequent uses of an area and the disturbance those uses would likely have on archeological remains.

The archeological potential of the APE varies considerably along the route. Map 2 depicts areas of archeological potential derived from the information presented above. Some of these locations are set off from the edge of Route 2 due to the presence of cut or fill or buried utilities directly adjacent to the road. However, if project disturbance is proposed to extend beyond such existing disturbance, areas of archeological potential should be expected to be present. In some locations the precise location of buried utilities is unclear, so they may intersect areas of archeological potential. Areas of archeological potential within or adjacent to the APE are listed in Table 5 and illustrated on Map 2, Map 3 and Map 4.

Table 5. Summary of archeological potential

Area	Archeological Potential	Length	Location
1	Precontact	27 m/90 ft	Adjacent to school parking lot
2	Precontact and historic	205 m/674 ft	On alignment east of SR 0411-16
3	Precontact and historic	82 m/268 ft	South and west of SR 0411-16
4	Precontact	61 m/156 ft	N side Rte 2, offset from road
5	Precontact	44 m/144 ft	N side Rte 2, offset from road
6	Precontact and historic	73 m/239 ft	N side Rte 2, in front of SR 0411-17
7	Precontact and historic	17 m/56 ft	N side Rte 2, adjacent to SR 0411-17
8	Precontact and historic	98 m/321 ft	S side Rte 2, site of barns assoc. with SR 0411-17
9	Precontact and historic	73 m/239 ft	S side Rte 2, raised terrace vicinity of SR 0411-17
10	Precontact	51 m/169 ft	S side Rte 2, raised terrace
11	Precontact and historic	162 m/534 ft	N side Rte 2, vicinity of O. Bessey on 1857 map, offset from road
12	Precontact	214 m/701 ft	S side Rte 2, offset from road
13	Precontact	165 m/542 ft	S side Rte 2, offset from road
14	Precontact	37 m/120 ft	S side Rte 2, offset from road
15	Precontact	123 m/404 ft	S side Rte 2, offset from road



Photo 9. Westhall Farm (SR 0411-16). Note lawn in foreground that extends to the side of Route 2. View to the east.



Photo 10. Thompson House (SR 0411-17). Note lawn in front of house and Route 2 in the foreground. View to the east.

#### 6.4 Archeological Recommendations

Since the project is in the scoping phase, the exact location of the proposed lines is uncertain. The areas of archeological potential outlined above provide some guidance as to where project disturbance could intersect archeological deposits. It is recommended that project disturbance stay as close to the edge of the roadways as possible, to minimize affecting areas of archeological potential. If areas of archeological potential cannot be avoided, Phase IB archeological reconnaissance survey is recommended.

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## **Appendix 1: VDHP Environmental Predictive Model**

**Vermont Division for Historic Preservation  
Archeological Resources Assessment Form**

DHP# \_\_\_\_\_

Organization & Recorder: Hartgen Archeological Associates, Inc./T. Jamison

Date: \_\_\_\_\_

Environmental Predictive Model				ArcheoMapTool GIS Model	Field Inspection Comments
Variable	Proximity	Value	Assigned Score	Variable	
<i>A. Rivers and Streams (Existing or relict)</i>					
1) Proximity to Rivers and Permanent Streams*	0-90 m	12	12	Layer 1: Proximity to Rivers and Permanent Streams (0-180 m)	
	90-180 m	6			
2) Proximity to Intermittent Streams	0-90 m	12	12	-	
	90-180 m	6			
3) Proximity to Permanent River/Stream Confluences	0-90 m	8		Layer 6: Proximity to River/Stream Confluences (0-180 m)	
	90-180 m	4			
4) Proximity to Intermittent Stream Confluences	0-90 m	12		-	
	90-180 m	6			
5) Proximity to Waterfalls	0-90 m	8		Layer 7: Proximity to Waterfalls (0-180 m)	
	90-180 m	4			
6) Proximity to Heads of Drainages	0-90 m	8		Layer 5: Proximity to Heads of Permanent Drainages (0-300 m)	
	90-180 m	4			
7) Major Floodplain - Alluvial Terrace	0-90 m	8	8	Layer 10: Floodplain Soils Presence	
	90-180 m	4			
8) Knoll or Swamp Island		32		Layer 1: Proximity to Rivers and Permanent Streams (0-180 m)	
9) Stable Riverine Island		32		Layer 2: Proximity to Waterbodies (0-180 m)	
<i>B. Lakes and Ponds</i>					
10) Proximity to Pond or Lake	0-90 m	12		Layer 2: Proximity to Waterbodies (0-180 m)	
	90-180 m	6			
11) Proximity to Stream-Waterbody Confluences	0-90 m	12		Layer 4: Proximity to Stream-Waterbody Confluences (0-180 m)	
	90-180 m	6			
12) Lake Coves, Peninsulas, and Bayheads	0-90 m	12		Layer 2: Proximity to Waterbodies (0-180 m)	
	90-180 m	6			
<i>C. Wetlands</i>					
13) Proximity to Wetlands*	0-90 m	12	12	Layer 3: Proximity to Wetlands (0-180 m)	
	90-180 m	6			

Environmental Predictive Model				ArcheoMapTool GIS Model	Field Inspection Comments
Variable	Proximity	Value	Assigned Score	Variable	
14) Knoll or Swamp Island		32		Layer 3: Proximity to Wetlands (0-180 m)	
<i>D) Valley edge and Glacial Landforms</i>					
15) High Elevated Landform (e.g. Knoll Top, Ridge Crest, Promontory)		12	12	See Landmarks (Info Layers) and Catchment layers (Water-related Layers)	
16) Valley Edge Features (e.g. Kame Outwash Terrace)		12	12	Layer 9 Glacial Outwash and Kame Terrace Soils	
17) Marine/Lake Delta Complexes		12		Layer 9 Glacial Outwash and Kame Terrace Soils Presence	
18) Champlain Sea or Glacial Lake Shore Line**		12	12	Layer 8: Paleo Lake Soils Proximity (0-180 m)	
<i>E. Other Environmental Factors</i>					
19) Caves and Rockshelters		32		-	
20) Natural Travel Corridors (e.g. Drainage Divides)		12	12	See Landmarks (Info Layers) and catchment layers (Water-related Layers)	
21) Existing or Relict Springs	0-90 m	8		-	
	90-180 m	4			
22) Potential or Apparent Prehistoric Quarry for Lithic Material Procurement	0-90 m	8		See Soils with "M" parent material (Under Construction)	
	90-180 m	4			
23) Special Environmental or Natural Area~	0-180 m	32		-	
<i>F. Other High Sensitivity Layers</i>					
24) High Likelihood of Burials		32		See VAI layer (Under Construction)	
25) High Recorded Archeological Site Density		32		See VAI layer (Under Construction)	
26) High likelihood of containing significant site based on recorded or archival data or oral tradition		32		See VAI layer (Under Construction)	



Environmental Predictive Model				ArcheoMapTool GIS Model	Field Inspection Comments
Variable	Proximity	Value	Assigned Score	Variable	
<i>G. Negative Factors</i>					
27) Excessive (>15%) or Steep Erosional (>20%) Slopes		-32		See Slope Layer (Info Layers folder)	
28) Previously Disturbed Land***		-32	-32	See Land Use ND Building Footprint Layers (Info Layers folder)	
<b>Total Score:</b>			60		

\*measured from top of bank

\*\* remains incompletely mapped; digital layer includes paleo lakes and wetlands based on soils data

\*\*\* as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence (such as a gravel pit)

~such as Milton aquifer, mountain top, etc. (historic or prehistoric sacred or traditional site locations, other prehistoric site types)

\*Environmental predictive model limits wetlands to those > one acre in size; ArchSensMap