

# **FEMA Region 1 Supplemental Environmental Assessment**

**Related to the Addition of a Bedrock Well and Caretaker Residence– DRAFT**

## **ROXBURY FISH CULTURE STATION, ROXBURY, WASHINGTON COUNTY, VT**

DR 4022 VT, Public Assistance Grant Program  
June 4, 2018



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ROXBURY FISH CULTURE STATION  
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## **Acronyms and Abbreviations**

A.P.E.	Area of Potential Effect
B.G.S.	Vermont Department of Buildings and General Services
B.M.P.	Best Management Practice
C.A.A.	Clean Air Act
C.E.Q.	Council on Environmental Quality
C.F.R.	Code of Federal Regulations
C.W.A.	Clean Water Act
D.E.M.H.S.	Vermont Division of Emergency Management and Homeland Security
D.H.P.	Vermont Division for Historic Preservation
E.A.	Environmental Assessment
E.I.S.	Environmental Impact Statement
E.O.	Executive Order
E.P.S.C.	Erosion Prevention and Sediment Control
E.S.A.	Endangered Species Act
F.E.M.A.	Federal Emergency Management Agency
F.I.R.M.	Flood Insurance Rate Map
F.O.N.S.I.	Finding of No Significant Impact
G.I.S.	Geographic Information System
G.P.M.	Gallons Per Minute
H.H.S.	Hydrologic and Hydraulic Study
I.E.A.	Initial Environmental Assessment
L.A.G.	Lincoln Applied Geology, Inc.
N.E.P.A.	National Environmental Policy Act
N.F.I.P.	National Flood Insurance Program
N.H.P.A.	National Historic Preservation Act
N.P.D.E.S.	National Pollutant Discharge Elimination System
N.R.A.	Natural Resources Atlas
N.R.C.S.	Natural Resources Conservation Service
P.A.	Public Assistance
P.N.P.	Private Non-Profit
S.E.A.	Supplemental Environmental Assessment
U.S.A.C.E.	United States Army Corps of Engineers
U.S.E.P.A.	United States Environmental Protection Agency
U.S.D.A.	United States Department of Agriculture
U.S.F.W.S.	United States Fish and Wildlife Service
U.S.G.S.	United States Geological Survey
V.A.N.R.	Vermont Agency of Natural Resources
V.D.E.C.	Vermont Department of Environmental Conservation
V.D.F.S.	Vermont Division of Fire Safety
V.D.G.P.D.	Vermont Drinking and Groundwater Protection Division
V.E.M.H.S.	Vermont Division of Emergency Management and Homeland Security
V.F.W.D.	Vermont Fish and Wildlife Department
V.W.M.D.	Vermont Waste Management Division

## **1.0 INTRODUCTION**

Between August 27 and September 2, 2011, Tropical Storm Irene (Irene) damaged much of the infrastructure throughout Vermont, including the Roxbury Fish Culture Station (R.F.C.S.), the oldest fish culture station in the State. Shortly thereafter, President Obama signed a disaster declaration for Vermont, referenced as FEMA-4022-DR-VT. The State of Vermont Fish and Wildlife Department (V.F.W.D./Sub-Grantee) applied for assistance under the public assistance (P.A.) program to rebuild the R.F.C.S. to modern standards of operation and with increased flood resiliency. An environmental assessment referenced in this document as the Initial Environmental Assessment (I.E.A.) was prepared to evaluate the potential effects of this undertaking on environmental and cultural resources. F.E.M.A. issued a Finding of No Significant Impact (F.O.N.S.I.) on March 15, 2017 for the rebuild of the R.F.C.S. as documented in the I.E.A. dated March 20, 2017. The proposed rebuild of the Roxbury Fish Culture Station (R.F.C.S.) includes an aboveground, tank-based fish rearing facility on the existing site.

This Supplemental Environmental Assessment (S.E.A.) specifically addresses the potential environmental effects of the installation of a supplemental groundwater supply well and construction of a caretaker residence. Neither of these new elements require modifications to other elements of the rebuilt R.F.C.S. as proposed in the I.E.A. and F.O.N.S.I.

This S.E.A. has been prepared in accordance with F.E.M.A. Directive 108-1 and F.E.M.A. Instruction 108-1-1, and pursuant to Section 102 of the National Environmental Policy Act (N.E.P.A.) of 1969, as implemented by the regulations promulgated by the President's Council on Environmental Quality (C.E.Q.); 40 C.F.R. Parts 1500-1508. This S.E.A. was prepared to determine whether to prepare an Environmental Impact Statement (E.I.S.) or alter or replace the existing F.O.N.S.I. issued in March 2017.

### **1.1 Disaster Background and Overview**

Tropical Storm Irene struck on August 27, 2011 causing the most severe flooding in Vermont since the record flood of November 1927. Flint Brook, located approximately 1,200 feet north of the R.F.C.S. Site, overtopped a retaining wall and, flowing along the ridge created by VT Route 12A, swept through the 1,100 foot-long R.F.C.S. before entering the Third Branch of the White River to the south (Appendix A-1). The floodwaters carried a portion of a nearby residence into the Springhouse, destroying both structures. Tropical Storm Irene functionally destroyed the R.F.C.S. by filling in the fish rearing ponds with sediment. Flood waters reached an estimated height of 3 feet above the ground surface at the R.F.C.S. The ponds and raceways were damaged to an extent that the R.F.C.S. was rendered inoperable for an extended period of time, and incapable of rearing production trout.

### **1.2 Restored Facility as Initially Proposed and Reviewed in the I.E.A.**

As documented in the I.E.A., V.F.W.D. will restore Ponds #1 and #2 to pre-disaster (though not functional) condition, and stock it with fish so that visitors can learn and understand the Hatchery's historic use. In addition, all existing historic buildings will remain. Two

enclosed pavilions with raised tanks will replace the function of the ponds, which offers better flood protection and will also allow the complex to meet permit requirements under the Clean Water Act (C.W.A.). An Upper Tank Pavilion and Lower Tank Pavilion will be built on the former locations of Ponds #3, #4 and #5. Each pavilion will consist of six, 20-foot diameter tanks with concrete bottoms and stainless steel walls. Each of these pavilions measure approximately 25 feet high, 75 feet wide, and 80 feet long. To match the existing structures, the new Pavilions will be clad in white siding panels and have green roofs, trim, doors and wire mesh windows to promote viewing by the public. For a fuller discussion, see the I.E.A.

The F.O.N.S.I. for the I.E.A. issued on March 15, 2017 contained a total of nine conditions that V.F.W.D. would need to comply with to mitigate and protect the environment and resources within the area affected from rebuilding the R.F.C.S. These conditions are summarized in Table 1-1 (See Appendix A-2).

### **1.3 Supplemental Elements Not Addressed in the I.E.A.**

The R.F.C.S. encompasses approximately 8.3 acres (Appendix A-3). The S.E.A. addresses two elements located within this area: 1) a groundwater well which would be located next to an existing barn at the south end of the hatchery complex, and 2) a two-story residential structure set within a roughly 80 x 100-foot house site, along with a small wastewater pump, mound leach field and connecting pipe. Far less than an acre of the hatchery property will be disturbed by the proposed supplemental elements presented in the S.E.A. These elements will not expand the area of disturbance identified in the I.E.A. The remaining portion of the property is occupied by buildings used by V.F.W.D. for operations not related to fish culture.

### **1.4 Purpose and Need**

As a consequence of constructing the facility proposed in the I.E.A., a significant flow of water, which historically was supplied by Flint Brook, is needed to effectively maintain fish cultural operations at the facility. V.F.W.D. in consultation with the Vermont Department of Environmental Conservation (V.D.E.C.) conducted an alternative analysis to identify other sources of water for the hatchery operations needed to obtain a Section 401 water quality certification. The alternative analysis investigated the feasibility of withdrawing water from another large surface water, the feasibility of implementing a water storage system, the feasibility of a recirculation system in the hatchery operations, and the use of supplemental wells and groundwater yield at the site to supplement withdrawals from Flint Brook.

For various reasons, all alternatives were eliminated except the use of a supplementary well. A test for groundwater availability indicated feasibility to supplement surface water withdrawals from Flint Brook with groundwater for hatchery operations once a site-specific conservation flow is established. Failure to install a supplemental well within the facility would prevent the issuance of a Section 401 water quality certification. This would likely preclude F.E.M.A. funding for the proposed undertaking, forcing the hatchery to operate only at its present capacity. This would not meet the goals of expanded capacity

identified by V.F.W.D. in the Initial EA. It should be noted that the R.F.C.S. is not currently withdrawing water from Flint Brook and is not violating water withdrawal standards.

The increased dependence on pumping water from a supplementary groundwater well accentuated the need for quality assurance and control measures to avoid catastrophic loss of fish in emergency situations. In this S.E.A. two alternative approaches involving off-site and on-site monitoring to increase oversight will be evaluated. The preferred alternative consists of constructing an on-site residence for a caretaker who will provide crucial oversight of quality assurance and control for the hatchery.

### **1.5 Clean Water Act Permitting for Flint Brook Intake Structure and the Supplementary Water Source**

The United States Army Corp of Engineers (U.S.A.C.E.) has jurisdiction over permitting Section 404 of the C.W.A. There are two 404 permits needed for the proposed rebuild of the R.F.C.S.—1) permitting the Flint Brook Intake Structure and 2) reviewing the current U.S.A.C.E. category 2 Vermont General Permit for impacts to wetlands from the supplementary well and caretaker residence. A flow chart is attached in Appendix A-4 to show how these two permits are interconnected and to help better explain the various needs, actions, and resolution with regards to these permits. These permits are also discussed in more detail in Section 3.2.1 Wetlands and Section 3.2.3 Surface Water.

## **2.0 ALTERNATIVES CONSIDERED**

C.E.Q. regulations (40 CFR 1502.14) require federal agencies to consider a reasonable range of alternatives that meet the purpose and need of proposed actions in their N.E.P.A. review. Under N.E.P.A. guidelines, a No Action alternative is also required, in large measure to set a baseline by which to judge the other practicable alternatives. The following section describes various alternatives analyzed to supply the R.F.C.S. an additional water source and provide necessary oversight of quality assurance and control for the hatchery.

### **2.1 Alternative 1 – The No Action Alternative**

Under the No Action Alternative, a failure to provide a supplemental source of ground water for use during low flow periods would result in a failure to secure a Section 401 water quality certificate, would not meet the expectations of F.E.M.A.'s F.O.N.S.I, and prevent the hatchery from proceeding with the conceptual plan proposed in the I.E.A. As expressed in the I.E.A., V.F.W.D. would continue to operate in a reduced capacity, as it has since Tropical Storm Irene flooded the facility in 2011. Under the present operating conditions, the R.F.C.S. is unable to fulfill its primary purpose of producing yearling Brook Trout and Rainbow Trout for stocking the waters of the State. Since 2011 V.F.W.D. has been unable to meet its fish culture goals due to the damages sustained at the R.F.C.S. with trout production shortfalls of at least 30% per year since 2011.

### **2.2 Alternative 2 - Proposed Alternative – Connect to a Bedrock Well to Provide Additional Water, with Oversight of Quality Assurance and Control through Off-Site Management**

Under this Proposed Alternative, V.F.W.D. would rebuild the R.F.C.S. as previously reviewed in the I.E.A. with the addition of a bedrock well (Appendix A-5) capable of producing approximately 400 gallons per minute (G.P.M.) of groundwater adequate for rearing fish. The connection to the current bedrock test well would address water quality standards and allow for continuous operation and supplementation during low flow periods in Flint Brook, the surface water source for the R.F.C.S. With the pre-existing groundwater sources (two spring water sources and pre-existing well near hatchery), the additional flow from the bedrock test well will be able to provide all of the water necessary to operate the hatchery. This would mean that during times of need, the hatchery would be able to sustain production without withdrawing any water from Flint Brook.

As proposed in this S.E.A, the operational well would be roughly eight inches in diameter and located within approximately five (5) feet of the existing red storage barn at the southern end of the hatchery complex (Appendix A-5). Based on test results, this well would have a 576,000 gallon per day capacity. Water would be conveyed 805 feet through a 6-inch pipe to a well-water degassing system. This system consists of a precast concrete structure measuring approximately 8 feet long, 4 feet wide and 12.5 feet high, recessed 6 feet into the ground. All control points for the well would be located in the existing red barn directly next to the well and would not require any additional buildings. This well is not intended to provide potable water to any residence or the public.

Under this Proposed Alternative, V.F.W.D. would provide oversight to insure the integrity of facility operations through off-site management. Due to the increased dependence on pumping water facilitated through the connection to a supplementary groundwater well, increased quality assurance and control measures to avoid catastrophic loss of fish in emergency situations are necessitated. The installation and connection of more sophisticated critical control point monitoring and alarming to a remote alarm notification system would alert designated off-site, on-call staff during non-working hours of an emergency if an alarm were triggered.

Although this option provides resiliency in operations to the R.F.C.S. during critical events that would occur if an alarm were triggered, there are a number of emergency situations that have the potential to bypass or render an alarm system ineffective, such as an overall loss of power at the facility, malfunction of the remote alarm notification system, emergencies in critical areas that are not easily fitted with alarms, etc.

### **2.3 Alternative 3 – Preferred Alternative – Connect to a Bedrock Well to Provide Additional Water, with Oversight of Quality Assurance and Control Using a Resident Caretaker**

Under this Preferred Alternative, V.F.W.D. would rebuild the R.F.C.S. as previously reviewed in the I.E.A and connect to a bedrock well (Appendix A-5) capable of producing approximately 400 G.P.M. of groundwater adequate for rearing fish. The connection to the bedrock well would meet water quality standards and allow for continuous operation and supplementation during low flow periods in Flint Brook, the R.F.C.S. surface water source . With the pre-existing groundwater sources (two spring water sources and pre-existing well near hatchery) the additional flow from the bedrock test well will be able to provide all of the water necessary to operate the hatchery. This would mean that during times of need, the hatchery would be able to sustain production without withdrawing any water from Flint Brook.

Although V.F.W.D. believes that Alternative 2 discussed above is a viable option, the Department does not view this alternative as the most effective solution for providing necessary quality assurance and control to the facility.

Under the Preferred Alternative, V.F.W.D. would construct and maintain an on-site caretaker residence at the R.F.C.S. (Appendix A-5). This residential structure would be built in a manner that conforms with environmental and historic preservation codes and standards and house a resident caretaker who would be available to ensure proper operation of the R.F.C.S. during non-working hours. By providing constant on-site oversight of the facility during emergency situations that would not be communicated through normal alarming (i.e., overall site power loss, flooding of tanks, water line restrictions that would not trigger a critical alarm point) the R.F.C.S. would be most effectively protected from a quality assurance and control perspective.

As conceptualized in this S.E.A, the caretaker residence would be a two-story house of approximately 2,760 square feet built on a slab with a crawlspace. The proposed design of the house is provided in Appendix A-6. An ADA handicap ramp would access the



residence at the side. No garage is planned. A 1,000-gallon septic tank would collect wastewater from the caretaker residence, and, via a small pump station, would deliver it to an 84 x 5-foot, mound-style leach field. Water for the residence would be delivered via a 2-inch diameter pipe originating at the existing domestic water source for the hatchery.

### **3.0 AFFECTED ENVIRONMENTS AND POTENTIAL EFFECTS OF THE ALTERNATIVES CONSIDERED**

C.E.Q. regulations at 40 C.F.R. 1508.9 require federal agencies to evaluate potential effects on the environment from the implementation of the considered alternatives, including the preferred alternative. In the following section, the *No Action Alternative* consists of operating R.F.C.S. at its current capacity, thus failing to meet the goals expressed by V.F.W.D. in the I.E.A. The No Action Alternative would have no foreseeable effect on the current natural and historical environment within the R.F.C.S.

Each of the following alternatives might have direct effects on natural and/or historic resources within the R.F.C.S. Site:

- *Alternative 2 – Connect to a Bedrock Well with Oversight of Quality Assurance and Control Through Off-Site Management, and*
- *Alternative 3 [preferred] - Connect to a Bedrock Well with Oversight of Quality Assurance and Control Using a Resident Caretaker.*

Such potential effects are addressed below.

Environmental reviews conducted for F.E.M.A.-funded projects consider a wide variety of federal environmental laws to determine if they are triggered by a proposed action. The following laws were considered but were determined not to apply to actions related to any of the alternatives: Coastal Barrier Resources Act; Coastal Zone Management Act; Fish and Wildlife Coordination Act; Migratory Bird Treaty Act; and the Wild and Scenic Rivers Act.

The I.E.A. defined the Area of Potential Effect (A.P.E.) as the existing 8.3-acre hatchery facility (Appendix A-3). Both the proposed residential site and future groundwater well would be located within this A.P.E. For this reason, all determinations of effect made in the I.E.A. that apply to this A.P.E. as a whole also apply to the proposed house and well sites addressed in this S.E.A. These environmental and cultural variables include: geology, vegetation, wildlife, threatened and endangered species, floodplains, archaeological resources, land use and zoning, traffic and parking, air quality, noise, disposal of asbestos, structural debris and fuel tanks, hazardous waste, seismic safety and environmental justice. These environmental resources are summarized in Table 3-1 in Appendix A-7 and will not be repeated in this S.E.A.

The following section addresses those environmental and historical resources that might be affected by installation and operation of the groundwater well and construction of a caretaker residence and related utilities.

Table 3-2 summarizes the effects described and analyzed in this chapter. Levels of potential effect are defined as follows:

- \* Negligible: The resource area would not be affected, or changes would be non-detectable or if detected, effects would be slight and local. Effects would be well below regulatory limits.
- \* Minor: Changes to the resource would be measurable, although the changes would be small and localized. Effects would be within or below regulatory limits. Mitigation measures may be necessary to reduce potential effects.
- \* Moderate: Changes to the resource would be measurable and have localized and potentially regional scale effects. Effects would be within or below regulatory limits, but historical conditions would be altered on a short-term basis. Mitigation measures may be necessary to reduce potential effects.
- \* Major: Changes would be readily measurable and would have substantial consequences on a local and potentially regional level. Effects would exceed regulatory limits. Mitigation measures to offset the effects would be required to reduce effects, although long-term changes to the resource would be possible.

Detailed discussions of the three alternatives continue on page 20.

**Table 3-2.**  
**ALTERNATIVES ANALYSIS: SUMMARY OF POTENTIAL EFFECT**  
**AND MITIGATION APPLIED**

Affected Environment/ Resource Area	Alternative 1: No Action	Alternative 2: Addition of Supplemental Groundwater Well and Off-site Management	Alternative 3: Addition of Supplemental Groundwater Well and Caretaker Residence (Preferred Alternative)	B.M.P.s/Mitigation Measures to Be Applied
<b>Soils</b>	<b>Minor</b>	<b>Minor</b>	<b>Minor</b>	<p>Risk Evaluation section of the Stormwater Construction Permit will be resubmitted to the V.D.E.C. prior to connecting the well. Also, the original permitted project disturbance limits will reach final stabilization before disturbing the area around the bedrock test well.</p> <p>A minor amendment record will be attached to the Erosion Prevention and Sediment Control Plan for the residence area.</p>

<b>Wetlands</b>	<b>Negligible</b>	<b>Minor</b>	<b>Minor</b>	<p>The bedrock test well is outside the boundaries of delineated wetlands. The water line connection will be installed in areas outside of a wetland or in areas already included in the ordinary high water and wetland impacts in Permit #NAE-2013-00656.</p> <p>The bedrock test well will not impact wetlands with regard to groundwater drawdown and recharge during use of this well (Appendix A-11).</p> <p>The proposed location of the caretaker residence is on a rock ledge outside of the delineated wetland. The water and sewer for the proposed caretaker residence will be installed in areas outside of a wetland or in areas already included in the ordinary high water and wetland impacts in Permit #NAE-2013-00656.</p>
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Affected Environment/ Resource Area	Alternative 1: No Action	Alternative 2: Addition of Supplemental Groundwater Well and Off-site Management	Alternative 3: Addition of Supplemental Groundwater Well and Caretaker Residence (Preferred Alternative)	B.M.P.s/Mitigation Measures to Be Applied
<b>Groundwater</b>	<b>Minor:</b> Effluent from fish culture operations will not meet C.W.A. requirements for nutrient pollution.	<b>Minor</b>	<b>Minor</b>	<p>A pump will be installed in the bedrock test well to provide supplementary groundwater during conservation flow periods in Flint Brook.</p> <p>Once connected to the hatchery for production pumping, the bedrock test well should be re-sampled for turbidity, microbiological and iron analyses after pumping for several days.</p> <p>Existing drinking water well will be used for caretaker residence.</p>
<b>Surface Water</b>	<b>Moderate</b>	<b>Minor to Moderate</b>	<b>Minor</b>	<p>A site-specific conservation flow will be established for downstream of the Flint Brook intake structure to meet Vermont Water Quality Standards for the Section 401 Water Quality Certification.</p>

Affected Environment/ Resource Area	Alternative 1: No Action	Alternative 2: Addition of Supplemental Groundwater Well and Off-site Management	Alternative 3: Addition of Supplemental Groundwater Well and Caretaker Residence (Preferred Alternative)	B.M.P.s/Mitigation Measures to Be Applied
<b>Historic Buildings</b>	<b>Negligible</b>	<b>Negligible</b>	<b>Minor</b>	<p>Finding of Adverse Effect as determined by F.E.M.A. A second Treatment Proposal prepared by F.E.M.A. in lieu of a formal Memorandum of Agreement was submitted to S.H.P.O. Concurrence was received on March 22, 2018. Treatment measures include:</p> <ul style="list-style-type: none"> <li>• Design Review by S.H.P.O.</li> </ul> <p>See Section 3.3.1 and attached supporting documents for more detail</p>
<b>Utilities</b>	<b>Negligible</b>	<b>Negligible</b>	<b>Minor</b>	<p>An agreement was made between the V.F.W.D. and G.M.P. on January 19, 2018 that the mound septic system installation will not exceed a ten-foot change in grade to the existing line.</p>

Affected Environment/ Resource Area	Alternative 1: No Action	Alternative 2: Addition of Supplemental Groundwater Well and Off-site Management	Alternative 3: Addition of Supplemental Groundwater Well and Caretaker Residence (Preferred Alternative)	B.M.P.s/Mitigation Measures to Be Applied
<b>Potable Water, Wastewater, Stormwater</b>	<b>Moderate:</b> Stormwater management not addressed; effluent from fish culture operations will not meet C.W.A. requirements.	<b>Minor</b>	<b>Minor</b>	<p>Wastewater and Potable Water Supply Permit #WW-5-6093-2 was issued on January 4, 2018 for the proposed caretaker residence.</p> <p>The proposed caretaker residence impervious area will be disconnected from the approved rebuild of the R.F.C.S. via engineered leveler and vegetated filter strip. Stormwater discharge post-construction will be managed under the amended Stormwater Discharge General Permit issued by V.D.E.C.</p> <p>Discharge limits established by V.D.E.C.; a N.P.D.E.S. permit for discharge to a receiving water (Third Branch White River) will be obtained under the C.W.A. as a mitigation measure.</p>



Affected Environment/ Resource Area	Alternative 1: No Action	Alternative 2: Addition of Supplemental Groundwater Well and Off-site Management	Alternative 3: Addition of Supplemental Groundwater Well and Caretaker Residence (Preferred Alternative)	B.M.P.s/Mitigation Measures to Be Applied
Climate Change	Negligible	Minor	Minor	Under both Proposed Actions energy use at the Site will increase. The proposed design is undergoing review by Efficiency Vermont, with the goal of achieving efficiency targets under the 2016 Vermont State Agency Energy Plan.

### **3.1 Terrestrial and Biological Resources**

Terrestrial resources combine to form a mosaic landscape. Factors related to soils are considered during project development to determine if one or more actions could adversely affect these resources.

#### **3.1.2 Soils**

##### *3.1.2.1 Affected Environment*

Mapping of National Resource Conservation Service (N.R.C.S.) soils units in the vicinity of the project is provided as Appendix A-10. The soils classifications at the site according to the N.R.C.S. on-line soil database include:

- Rumney fine sandy loam, 0-3% slope, frequently flooded [groundwater well]; and
- Tunbridge-Lyman complex, 35-65% slope, very rocky [house site].

Considerations of this variable are generally concerned with good construction practices that are implemented to insure soil stability and long-term preservation.

##### *3.1.2.2 Environmental Consequences*

#### **ALTERNATIVE 1: NO ACTION –**

Under the No Action Alternative, the R.F.C.S would continue to operate at its present capacity and no construction activity would occur. Storm and flooding events are anticipated to continue to erode soils at the Site and based on this potential for further soil erosion, minor effects can be expected under the No Action Alternative.

#### **ALTERNATIVE 2: PROPOSED ACTION WITH OFFSITE QUALITY ASSURANCE AND CONTROL –**

The bedrock test well disturbance area is outside the authorized project disturbance limit of 4.0 acres. There will be earth disturbance including excavation and trenching to supply power to the bedrock test well and to connect the water line from the bedrock test well to a water distribution system. The V.D.E.C. determined that the bedrock test well connection and subsequent addition of earth disturbance is a minor amendment to authorization Permit # 7799-9020. The requirements for this minor amendment include updating and resubmitting the Risk Evaluation portion of the Stormwater Construction Permit Application. This is due to the proximity of the bedrock test well connection to the nearby stream. This earth disturbance is within 50 feet (horizontal) upslope of the unnamed stream and is considered an additional risk to stormwater runoff and soil erosion.

To mitigate the additional risk, earthwork for the well connection will be addressed after earthwork for the rest of the Site is completed and stabilized. This will limit the amount of earth disturbed at one time as a means to avoid sediment from entering the unnamed stream near the well. Through compliance with this required permit, minor effects to soil are

anticipated for this Proposed Action. The addition of a groundwater well does not alter any requirements stipulated in Vermont Construction General Permit 3-9020 for Moderate Risk Projects, Permit # 7799-9020, including a site-specific Erosion Prevention and Sediment Control (E.P.S.C.) Plan.

### ALTERNATIVE 3: PREFERRED ACTION WITH ON-SITE QUALITY ASSURANCE AND CONTROL –

The preferred action takes into consideration potentially affected resources related to the groundwater well as described above in Alternative 2.

The proposed caretaker residence lies within the authorized project disturbance limit of 4.0 acres. A minor amendment record for moderate risk projects will be completed by the On-Site Plan Coordinator and will document any change to the E.P.S.C. Plan. This documentation will be retained onsite with the E.P.S.C. plan. This proposed change is a minor change that increases the size of disturbed land that is open at any one time and will require the addition of E.P.S.C. practice. Through compliance with this required permit, minor effects to soil are anticipated from Alternative 3.

## **3.2 Aquatic Resources**

The Site is located in an alluvial plain between Flint Brook and the Third Branch of the White River. The Site is located approximately 120 feet west of and 10 feet higher in elevation than the Third Branch of the White River, and approximately 1,100 feet southeast and 40 feet lower in elevation than Flint Brook.

Although the Site is not located within the mapped 100-year floodplain, recent flooding events and the 2014 Hydrologic and Hydraulic Study (H.H.S.) (Ahearn and Lombard, 2014) have demonstrated that the Site is located within the 500-year floodplain under scenarios where Flint Brook diverges from its channel upstream of the Site. In fact, flood events in 1998 and 2006, prior to Tropical Storm Irene, caused significant damage to the Site. The damage caused by recent flood events clearly demonstrates the need to increase the resiliency of the R.F.C.S. to flood events between the 100-year and 500-year level. Review of the location of the bedrock test well and the proposed caretaker residence concluded that these areas are outside of the H.H.S. 500-year flood plain.

### 3.2.1 Wetlands

#### *3.2.1.1 Affected Environment*

E.O. 11990 requires federal agencies to avoid adverse effects to wetlands to the extent possible. Section 404 of the C.W.A. establishes a wetland permit program administered by the U.S.A.C.E. The Vermont Wetland Rules identify significant wetlands and regulate activities in and near these wetlands. F.E.M.A.'s implementing regulations (44 C.F.R. Part 9) include an eight-step decision-making process. The 8-Step review was performed for the I.E.A. and, since the proposed well and caretaker residence fall within the previously defined project limits, this 8-Step review was not performed a second time.

The Vermont Wetland Rules identify three classes of wetland. Class I wetlands have been determined to be exceptional or irreplaceable and therefore merit the highest level of protection. Class III wetlands are not mapped or protected under the Vermont Wetland Rules, and do not require a permit to disturb. Class II wetlands fall in between Class I and Class III wetlands, and require a permit issued by V.D.E.C. to disturb. The V.D.E.C. determined that all constructed features (man-made waterways) on the Site are exempt from the Vermont Wetland Regulations, and all the natural wetland features were reclassified from Class II to Class III.

U.S.F.W.S. National Wetland Inventory mapping depicts a linear feature identified as “freshwater ponds,” which roughly correspond to the man-made ponds and raceways located at the R.F.C.S. As part of the I.E.A., V.F.W.D. contracted with a wetlands specialist, Mark Bannon of Bannon Engineering<sup>1</sup> to perform on-Site wetlands delineation. The delineation confirmed the presence of wetlands at the Site. Boundaries of the delineated wetlands were added to the proposed construction plan for the Site. It was determined that a total area of both open water, as calculated from the ordinary high-water mark, and wetland to be affected by rebuilding the R.F.C.S. is 36,190 square feet (0.83 acres).

### *3.2.1.2 Environmental Consequences*

#### ALTERNATIVE 1: NO ACTION –

Under the No Action Alternative, the R.F.C.S. would continue to operate at its present capacity and no new construction activity would occur resulting in negligible effects on wetlands.

#### ALTERNATIVE 2: PROPOSED ACTION WITH OFFSITE QUALITY ASSURANCE AND CONTROL –

Mark Bannon of Bannon Engineering performed a site visit on April 4, 2018 to evaluate the location of the bedrock test well. At the time, the ground was covered in snow and a determination of the presence or absence of a wetland in this area was not feasible. As a consequence, Angela Repella with the U.S.A.C.E., as documented in an email dated April 5, 2018<sup>2</sup>, indicated that additional information pertaining to the Vermont General Permit would be required if additional wetlands were discovered.

Mr. Bannon revisited the site on April 30, 2018 once the snow melted and vegetation began to grow to determine if the area around the bedrock test well is a wetland and to identify wetland boundaries near the well. Mr. Bannon mapped the wetland boundaries near the well at the location of the unnamed stream using visible surface water boundaries, the presence of saturated soils, the presence of wetland vegetation and/or evidence indicating the area was topographically below the seasonal high-water table, such as the presence of

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<sup>1</sup> Bannon Engineering, 2018a, *VANR F&W Roxbury Fish Hatchery Project – NAE-2013-00656, Wetlands Supplemental to Residential Structure and Bedrock Test Well*, March 8. & Bannon Engineering, 2018b, *Wetland Determination Data Form - Northcentral and Northeast Region*, April 30.

<sup>2</sup> U.S.A.C.E., 2018, *Roxbury SEA/Scope of work status 3/15/18*, email dated April 05.

hydric soils or oxidation-reduction (redox) features. The wetland delineation and wetland determination data forms were submitted to Ms. Repella in an email dated May 9, 2018 to indicate that no additional wetlands will be impacted during the connection of the bedrock test well.

It should be noted, the overall hatchery rebuild project was reviewed and verified under the former Vermont General Permit which expired on Dec. 6, 2017. However, an additional year is provided to complete this work (until December 6, 2018). If construction activities extend beyond December 6, 2018 then the overall hatchery rebuild project will need to be reviewed under the new Vermont General Permit, thereby continuing the permit period until 2022.

The bedrock test well was also evaluated to determine if there would be impacts to wetlands from groundwater drawdown and recharge during use of this permanent well. The V.D.E.C. issued a letter on February 28, 2018 (Appendix A-11) stating that the Lincoln Applied Geology, Inc. (L.A.G., 2017) report on the construction, yield and interference testing of the bedrock test well was reviewed by both Scott Stewart, Hydrogeologist with the V.D.E.C. and Shannon Morrison, Wetland Ecologist with the V.D.E.C. The review concluded that the test well characteristics, the distance between the wetland and the bedrock test well, and lack of response in nearby pre-existing wells indicates there would be no significant impact to the wetland from the commission and operation of this bedrock test well up to the tested yield of 400 G.P.M. Ms. Repella concurred with the letter dated February 28, 2018 from the V.D.E.C. indicating that there will be no secondary effects to the hydrology of wetlands as a result of the new well (Appendix A-11).

In a letter dated May 18, 2018, U.S.A.C.E. (Appendix A-12) determined that the additional work proposed at the R.F.C.S. including a caretaker residence, septic mound, well and water/wastewater connections does not require additional permitting.

Based on the references cited, coordination with V.D.E.C. and U.S.A.C.E., and the resulting mitigation measures to be implemented under a C.W.A. Section 404 Vermont General Permit, the installation and operation of a groundwater well with Offsite Quality Assurance and Control will have a negligible effect on wetlands.

### ALTERNATIVE 3: PREFERRED ACTION WITH ON-SITE QUALITY ASSURANCE AND CONTROL –

The preferred action takes into consideration the affected resources related to the groundwater well as described above in Alternative 2.

Mark Bannon of Bannon Engineering performed a second site visit on January 31, 2018 to evaluate the location of the proposed caretaker residence and determine if the site would have any impacts on wetlands. Following verbal confirmation from Shannon Morrison, Wetland Ecologist with the V.D.E.C., Mark Bannon issued a letter on March 8, 2018 to Angela Repella, with the U.S.A.C.E. stating the proposed caretaker residence will be located on a rock ledge outside of delineated wetlands. The residence will be served by the existing water supply well and new wastewater disposal field. Water and sewer lines will

be installed in areas outside of wetlands or in areas already included in the ordinary high water and wetland impacts in Permit NAE-2013-00656. A revised Wetland and Ordinary High-Water Map is provided as an attachment to this letter. Mark Bannon returned to the Site on April 30, 2018 as described in the section above to perform wetland delineation around the area of the bedrock test well.

As referenced above, a letter dated May 18, 2018, U.S.A.C.E. (Appendix A-12) determined that the additional work proposed at the R.F.C.S. including a caretaker residence, septic mound, well and water/wastewater connections does not require additional permitting.

Based on the references cited, coordination with V.D.E.C. and U.S.A.C.E., and the resulting mitigation measures to be implemented under a C.W.A. Section 404 Vermont General Permit, the Preferred Action with Onsite Quality Assurance and Control will have a minor effect on wetlands.

### 3.2.2 Groundwater

#### *3.2.2.1 Affected Environment*

V.D.E.C. has adopted a Groundwater Protection Rule and Strategy to protect Vermont's groundwater resource (V.D.E.C., 2005). This rule provides for the establishment of Groundwater Source Protection Areas to protect public water supplies obtained from groundwater. The Vermont Drinking and Groundwater Protection Division (V.D.G.P.D.) identifies no Groundwater Source Protection Areas within 1.0 mile of the Site.

The R.F.C.S. Site was originally chosen in part for the abundance of groundwater. Groundwater is combined with surface water from Flint Brook to support fish hatchery operations, and then directly discharged to the Third Branch of the White River with minimal or no treatment. Potable water for the R.F.C.S. is provided by a drilled bedrock well located near the northeast corner of the Site.

#### *3.2.2.2 Environmental Consequences*

##### ALTERNATIVE 1: NO ACTION –

Under the No Action Alternative, the R.F.C.S. would continue to operate at its present capacity and no new construction activity would occur. Water for the R.F.C.S. would continue to be sourced primarily from two natural groundwater springs (combined flow of 95 G.P.M.) and surface water diverted from Flint Brook through a supply line (flow rate 350 G.P.M.). In addition, the facility would continue to function at a level incapable of meeting N.P.D.E.S. requirements. Therefore, minor effects on groundwater quality are anticipated to continue. Specifically, water leaving the Site will continue to exceed nutrients limits under the C.W.A. in the absence of treatment measures.

##### ALTERNATIVE 2: PROPOSED ACTION WITH OFFSITE QUALITY ASSURANCE AND CONTROL –

The bedrock test well was located using fracture trace analysis method. It was drilled between July 10, 2017 and July 22, 2017 to a depth of 400 feet and has a yield of 400 G.P.M. as documented in the L.A.G. Well Site 1/Well 001-Pump Test Analysis and Report (Appendix A-13). High yield zones were intercepted at 70 feet, 165 feet, 245 feet and 300 feet. Bedrock type was grey to black phyllite and schist. A 550 G.P.M. pump was set at the depth of 340 feet to perform a step drawdown and a constant rate test. The appropriate well yield was established so that extended drawdown would not exceed recharge and over-pump the well.

Well interference was monitored during the constant rate test in the lower and upper wells located at the R.F.C.S. and in nearby Baker and Potwin wells. The only well to show interference was the lower well located 50 feet to the south from the bedrock test well. The impact to the lower well was not significant enough to prevent its use to supply the demands of the lower hatchery building. The water quality was tested during the constant rate test and was high quality and generally pristine, not needing treatment.

The connection to the bedrock test well would allow for continuous operation and supplementation during low flow periods of the surface water that the R.F.C.S. withdraws from Flint Brook. The bedrock test well will supply groundwater adequate for rearing fish and will be used only for farming purposes.

The V.D.E.C. requires groundwater withdrawal reporting and permitting through the Drinking Water and Groundwater Protection Division. Because the proposed well is to be used as a water supply well for farming purposes, it is exempt from regulatory review under Act 199. Thus, the bedrock well need not be reported the V.D.E.C. Drinking Water and Groundwater Protection division.

Based on the L.A.G. report and the intended use of the bedrock test well, the Proposed Action with Offsite Quality Assurance and Control will have a minor effect on groundwater supply. No additional mitigation measures related to groundwater as outlined in the I.E.A. are required.

### ALTERNATIVE 3: PREFERRED ACTION WITH ONSITE QUALITY ASSURANCE AND CONTROL –

The preferred action takes into consideration the affected resources related to the groundwater well as described above in Alternative 2.

The proposed residence will utilize the existing on-site water supply well. Since there will not be an additional source of groundwater used for the proposed caretaker residence, the Preferred Action with Onsite Quality Assurance and Control will have a minor effect on groundwater. No additional mitigation measures related to groundwater as outlined in the I.E.A are required.

#### 3.2.3 Surface Water

##### *3.2.3.1 Affected Environment*

The Flint Brook watershed is part of the eastern slope of the Northfield Range located in the Roxbury State Forest. Flint Brook flows southeast toward the confluence of the Third Branch of the White River. Before the river junction there is a wing wall to the Oxbow Road Bridge that channels the brook off at a sharp right angle. The Flint Brook intake structure that currently delivers surface water to the R.F.C.S. is located at this wing wall approximately 1,500 feet north of the site. In September 2014 and June and July 2015, the Flint Brook intake structure was improved with the addition of a screen box on the face of this wing wall.

For the proposed rebuild of the R.F.C.S. surface water will be diverted from Flint Brook through a supply line as discussed above. On May 16, 2016 an application was submitted to U.S.A.C.E. from the V.F.W.D. for an after-the-fact Section 404 Permit for the modification to the intake structure on Flint Brook<sup>3</sup>. The V.D.E.C. Watershed Management Division reviewed the application and determined that a conservation flow downstream of the intake structure should be established to meet Vermont Water Quality Standards (Appendix A-14). The V.D.E.C. requested that the V.F.W.D. apply for an individual Section 401 Water Quality Certification. Without this additional flow, the ability of the brook to support aquatic biota and aquatic habitat is threatened.

The V.F.W.D. conducted a flow monitoring study at Flint Brook in the summer and fall 2017. The spring flow study is pending for spring 2018 following the snow melt. The Flint Brook site specific flow analysis began in July 2017 and is anticipated to end in September 2018. The purpose of the study is to develop a site-specific conservation flow to meet Vermont Water Quality Standards below the intake for the Section 401 Water Quality Certification. The V.F.W.D. is currently analyzing data from the flow monitoring study with the aim to submit a report to the V.D.E.C. in early summer 2018. This process was summarized in a memorandum from the V.D.E.C. Watershed Management Division dated January 4, 2018 (Appendix A-15).

### *3.2.3.2 Environmental Consequences*

#### **ALTERNATIVE 1: NO ACTION –**

Under the No Action Alternative, the R.F.C.S. would continue to operate at its present capacity and no new construction activity would occur. Under the No Action Alternative, the facility would not meet the requirements of a Section 401 Water Quality Certification. Water for the R.F.C.S. would continue to be sourced primarily from two natural groundwater springs and surface water diverted from Flint Brook through a supply line. During low flow periods of Flint Brook, the intake structure would continue to withdrawal 350 G.P.M. and downstream of the intake would not meet Vermont Water Quality Standards. Therefore, the No Action Alternative would have a moderate effect on surface water and would be in violation of the C.W.A.

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<sup>3</sup> V.F.W.D., 2016, *Determination of Eligibility Checklist for Roxbury Fish Hatchery Intake Structure*, NAE-2016-00788, May 17.



## ALTERNATIVE 2: PROPOSED ACTION WITH OFFSITE QUALITY ASSURANCE AND CONTROL –

The bedrock test well has adequate flow (400 G.P.M) to supplement the Flint Brook Intake water source during conservation flow periods. A stage-discharge relationship will be established for Flint Brook following the completion of the flow monitoring study. The bedrock test well will be used during low flow periods that are identified by low water level based on the stage-discharge relationship. These low flow periods will be monitored by the current staffing plan during normal work day operations of the R.F.C.S. Since there will not be continuous monitoring of the water level in Flint Brook, Alternative 2 will have a minor to periodic moderate effect on surface water.

It is important to note that the new well, in conjunction with other currently-operating well sources on site, can provide 100% of the needed water for hatchery operations during any low flow periods. Thus, regardless of the specific results of the stream flow study related to Flint Brook, a change in the water volumes that can be withdrawn from Flint Brook will not be an impediment to hatchery operations.

## ALTERNATIVE 3: PREFERRED ACTION WITH ONSITE QUALITY ASSURANCE AND CONTROL –

The preferred action takes into consideration the affected resources related to the groundwater well as described above in Alternative 2.

The caretaker residence would allow for continuous monitoring of the low flow periods in Flint Brook. This would ensure that the bedrock well pump is activated as necessary and as soon as possible during low flow periods. A resident caretaker would provide immediate, available, on-site oversight of quality assurance and control for the facility. The presence of a caretaker living in an on-site residence would ensure that surface water is available and any adverse effect would be minor.

### **3.3 Cultural Resources**

The National Historic Preservation Act (N.H.P.A.) of 1966 defines a historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register". Criteria for listing a property on the National Register of Historic Places can be found in 36 C.F.R. Part 60.

#### 3.3.1 Historic Buildings

##### *3.3.1.1 Affected Environment*

As defined in the Advisory Council on Historic Preservation's (A.C.H.P.) regulations, the A.P.E. for a project is defined as, the "geographic area or area within which an undertaking may directly or indirectly cause changes in the character of or use of historical properties, if any such properties exist" (36 CFR 800.16[d]). Aside from physical alteration of an historic structure or complex, factors with potential to cause adverse effects include but are

not limited to; noise, vibration, visual (setting), traffic, atmosphere, construction, indirect and cumulative.

The R.F.C.S. is listed on the National Register of Historic Places (N.R.H.P.). The A.P.E. for this undertaking is the entire R.F.C.S. property. The State of Vermont established the R.F.C.S. with construction of the Hatchery Building (Hatch House) and four ponds in 1891. By 1894, the Hatchery had eight ponds and an Ice House Building (for cold storage and transport uses). A Superintendent's House (demolished in 1970 and replaced with a temporary mobile home) and a Carriage Barn followed in 1897. The modern configuration of the five ponds likely appeared after 1912. In the 1930s the Civilian Conservation Corp (C.C.C.) built a number of structures at the Hatchery: Storage Barn (1935), new raceways (1937), and two stone barbecues (1937). They also renovated the Hatch House in 1938. The pond system was continuously upgraded over the years, until its destruction during Irene in 2011. Maintaining the historic character of this historic hatchery complex is an important consideration.

In September 2016, the installation of a roadside historical marker was completed for public interpretation as shown in Appendix B-2. This roadside historical marker indicates the fish hatchery was established in 1891 and was funded by the State and donated land from Hon. E.N. Spaulding. It details how the Site was selected for the abundant spring water and location to the Central Vermont Railroad line and that the fish hatchery operated with earthen ponds until 2011 when it was heavily damaged by Tropical Storm Irene.

#### *3.3.2.2 Environmental Consequences*

##### ALTERNATIVE 1: NO ACTION –

Under the No Action Alternative, the R.F.C.S. would continue to operate at its present capacity and no new construction activity would occur. The No Action Alternative would have a negligible effect to historic structures.

##### ALTERNATIVE 2: PROPOSED ACTION WITH OFFSITE QUALITY ASSURANCE AND CONTROL –

F.E.M.A. made a determination of no historic properties affected with respect to potential archaeological resources that might occur as a result of conversion and utilization of the bedrock test well as the source for supplemental groundwater. S.H.P.O. concurred with this determination on March 22, 2018. Alternative 2 with Offsite Quality Assurance and Control would have a negligible effect on historic properties.

##### ALTERNATIVE 3: PREFERRED ACTION WITH ONSITE QUALITY ASSURANCE AND CONTROL –

This preferred alternative involves construction of a caretaker residence. F.E.M.A. concluded that construction of the caretaker residence and installation of associated utilities would have no adverse effect to historic properties with respect to potential archaeological resources and recommended treatment measures for the project with respect to historic

buildings. A second treatment proposal was prepared by F.E.M.A. and submitted to S.H.P.O. where concurrence was received on March 22, 2018 (Appendix A-16).

F.E.M.A. determined that the caretaker residence would have a limited adverse effect on the integrity of the setting, feeling and association of hatchery-related elements in the historic core by introducing a new visual element into the view scape. Therefore, F.E.M.A. held an on-site review with V.F.W.D. at the R.F.C.S. on March 7, 2018. Subsequently, F.E.M.A., V.F.W.D. and the D.H.P. Historic Preservation Review Coordinator, Jamie Duggan, held a conference call on March 8, 2018 to refine design parameters for the caretaker residence. The results of consultation are as follows:

- It was mutually agreed that the proposed site for the caretaker's residence was sufficiently removed from the core of historic buildings that significant visual impacts would not occur.
- Remaining visual impacts will be further reduced by:
  - Limiting all but essential removal of vegetation on the house site during site preparation, and
  - Installing vegetative plantings to provide a visual break between the hatchery complex and residence.
- So that visitors to the site do not associate the new residence with the historic 100-year-old hatchery, design elements used on the new structure will not identically mirror those of the historic structures.
  - A standing-seam metal roof will not mirror the asphalt roofs of the closest hatchery buildings.
  - Vinyl siding will not replicate the wooden clapboard siding.
  - Further differentiation can be achieved by using similar coordinated colors to the white and green motif in use today, or if the white with green trim motif is also used for the residence, a small plaque or sign indicating that the residence was constructed in 2018 will be used to indicate that the residence is not contemporaneous with the hatchery buildings.
  - Windows other than the 6-over-6-pane design used in the hatchery will be used in the residence.

By following the established treatment measures that all parties agreed upon, the installation of the well and construction of a caretaker residence will have a minor effect on the historic character of this National Register property.

### **3.4 Infrastructure**

#### **3.4.1 Utilities**

##### ***3.4.1.1 Affected Environment***

The waterline for the bedrock well will run north to the low head oxygenator box next to the currently-designed upper tank pavilion. The caretaker residence utilities will include water, sewer and power. The water supply will be from an existing water supply well located on the northern portion of the property that currently provides water to the existing

hatchery building and potable water system. The sewer will include a new septic system with a septic mound located west of the currently-designed Upper and Lower Tank Pavilion.

Electricity will continue to be provided through overhead power lines along Vermont Route 12A, maintained by the Central Vermont Public Service Corporation. Power supply to the bedrock well pump will be extended from the influent treatment building. A separate metered service is proposed for the caretaker residence and Green Mountain Power (G.M.P.) will extend a primary line along Route 12A to a new transformer pole located on the east side of the road. G.M.P. will cross the highway and set a new pole on the east side of the proposed caretaker residence. An underground service entrance feeder is proposed to be installed from the pole to a meter mounted on the residence.

Effluent from the fish culture operations will be treated prior to being discharged to the Third Branch of the White River. The proposed bedrock well connection will not increase the treated effluent volume and contaminant concentration to be discharged into the Third Branch White River.

Solid waste (trash) removal will continue to be provided by Casella Resource Solutions, a private company. Fire protection and emergency rescue is provided by the Roxbury Volunteer Fire Department. The Town of Roxbury maintains an automatic response agreement with the larger, neighboring Town of Northfield, and is part of the Capitol Fire Municipal Aid System, comprised of 27 towns in the central Vermont region.

#### *3.4.1.2 Environmental Consequences*

##### **ALTERNATIVE 1: NO ACTION –**

Under the No Action Alternative, the R.F.C.S. would continue to operate at its present capacity and no new construction activity would occur. The effects to utilities will be negligible under the No Action Alternative.

##### **ALTERNATIVE 2: PROPOSED ACTION WITH OFFSITE QUALITY ASSURANCE AND CONTROL –**

The proposed water line and electrical utilities are readily accessible to connect the bedrock well and hence this alternative will have a negligible effect on the environment.

##### **ALTERNATIVE 3: PREFERRED ACTION WITH ONSITE QUALITY ASSURANCE AND CONTROL –**

The potable water and solid waste utilities are readily accessible. With minor alterations to the existing overhead power lines the proposed caretaker residence electrical utility will be readily accessible. The planned location of the mound septic for the proposed caretaker residence is under existing overhead electrical lines maintained and operated by G.M.P. An agreement was made between the V.F.W.D. and G.M.P. on January 19, 2018 that the mound septic system installation will not exceed a ten-foot change in grade to the existing

line<sup>4</sup>. The septic system will have a minor effect on the environment. Minor effects on storm water discharge from the proposed caretaker residence will be mitigated through the addition of storm water B.M.P.s.

### 3.4.2 Potable Water, Wastewater, Stormwater

#### *3.4.2.1 Affected Environment*

The proposed caretaker residence will be serviced by the existing on-Site drinking water well. This well is located at the north end of the R.F.C.S. property and will run artesian when not pumping. The percentage contribution that this well has on an overall water use at the R.F.C.S. is approximately 17% (90 g.p.m. of 530 g.p.m. needed). Sanitary wastewater treated through soil-based systems, such as the proposed mound septic system for the caretaker residence, are subject to a Wastewater and Potable Water Supply Permit issued by V.D.G.P.D. Under Permit WW-5-6093-2, the proposed caretaker residence at R.F.C.S. is permitted to discharge up to 420 gallons per day into the mounded septic system. The design flow of the mound septic system is based on stamped engineering plans dated December 21, 2017 and revised January 2, 2018.

Regarding storm water and wastewater directly discharged to a receiving waterbody, the State of Vermont administers the federal C.W.A. and the Vermont Water Quality Regulations. Stormwater Construction Permits address stormwater runoff from earth disturbance activity of one or more acres of land during construction; Stormwater Discharge permits regulate storm water post-construction. Both types of stormwater permits are issued by V.D.E.C.

Under the C.W.A., all municipal, industrial, and commercial facilities that discharge wastewater directly from a point source (such as the water discharged from fish culture operations at the R.F.C.S.) into a receiving water body are issued a permit under the National Pollutant Discharge Elimination System (N.P.D.E.S.). The State of Vermont, through the V.D.G.P.D., issues individual N.P.D.E.S. discharge permits under authorization from U.S.E.P.A. Under this authority, V.D.G.P.D. determines the volume of effluent that can be discharged from the facility and sets limits to ensure the environmental quality of the receiving water body is not compromised.

#### *3.4.2.2 Environmental Consequences*

##### ALTERNATIVE 1: NO ACTION –

Under the No Action Alternative, the R.F.C.S. would continue to operate at its present capacity and no new construction activity would occur. Moderate effects to wastewater and stormwater runoff are anticipated to continue under the No Action Alternative. Specifically, water leaving the Site will continue to exceed nutrient limits under the C.W.A. in the absence of treatment measures. Stormwater will continue to leave the Site and enter the Third Branch of the White River without treatment.

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<sup>4</sup> Green Mountain Power, 2018, *Septic Permit to Encroach on Existing Easement*, January 19.

## ALTERNATIVE 2: PROPOSED ACTION WITH OFFSITE QUALITY ASSURANCE AND CONTROL –

The bedrock well will not have new impervious areas associated with the connection to this well and is not subject to compliance with a Stormwater Discharge General Permit 3-9015. The following permits were obtained or are being sought for the Proposed Action in connection with wastewater and stormwater:

- Stormwater Construction General Permit 3-9020 (Moderate Risk Project, issued July 24, 2017, Permit #7799-9020, Risk Evaluation portion of permit will be updated as a minor amendment to this permit);
- N.P.D.E.S. Discharge Permit (application submitted to V.D.E.C. and a renewed discharge permit is currently being drafted by V.D.E.C. Watershed Management Division, Wastewater Program as stated in email correspondence dated November 15, 2017.)

Discharge of treated fish culture water (treated effluent) will be subject to volumes and contaminant concentrations specified in an individual permit to be issued by V.D.E.C. under the N.P.D.E.S. program (“N.P.D.E.S. Discharge Permit”). The proposed connection to the bedrock test well will not increase the treated effluent volume and contaminant concentration to be discharged into the Third Branch of the White River specified in the individual permit. The Proposed Action with Offsite Quality Assurance and Control will have a minor effect on storm water and negligible effect on wastewater.

## ALTERNATIVE 3: PREFERRED ACTION WITH ONSITE QUALITY ASSURANCE AND CONTROL –

The preferred action takes into consideration the affected resources related to the groundwater well as described above in Alternative 2.

The following permits were obtained or are being sought for the residential structure in connection with potable water, wastewater; and storm water:

- Wastewater and Potable Water Supply (Permit #WW-5-6093-2 issued January 4, 2018);
- Stormwater Construction General Permit 3-9020 (Moderate Risk Project, issued July 24, 2017, Permit #7799-9020, a minor amendment record will be included with the E.P.S.C. plan on-site);
- Stormwater Discharge General Permit 3-9015 (General Permit 3-9015, Permit #7799-9015.A issued April 12, 2018).

The R.F.C.S. is subject to Vermont Wastewater and Potable Water Supply Permit #WW-5-6093-2, issued by V.D.G.P.D. on January 4, 2018. This permit allows sanitary discharge of up to 420 gallons per day into the proposed septic system. This permit also authorizes

the proposed caretaker residence to utilize the existing on-site water supply system for 420 gallons per day.

Surface water runoff will increase beyond current levels due to construction of the caretaker residence. Water quality will be protected from undue adverse effects due to stormwater runoff through B.M.P.s. The existing Discharge General Permit 3-9015 #7799-9015 was amended to incorporate the proposed changes including the new (0.02 acres) impervious area associated with the proposed caretaker residence in accordance with the updated Vermont Stormwater Management Rule and Design Guidance, effective July 1, 2017.

The caretaker residence will be disconnected from the approved rebuild of the R.F.C.S. via engineered leveler and vegetated filter strip. The access walk to the residence will be constructed with pervious materials. The storm water runoff from new pavement, 0.02 acres of new gravel drive areas, existing gravel drive area and new building roofs will flow via sheet flow to two grass treatment channels that are both routed to a wet pond pre-treatment forebay, then flow through an aquatic bench before entering a wet pool, then finally discharging by an overflow-controlled outfall before entering the Third Branch of the White River.

Based on all the factors considered during coordination with regulatory agencies and compliance with required permits, this undertaking will only result in minor effects on potable water, wastewater and stormwater.

### **3.5 Climate Change**

#### **3.5.1 Affected Environment**

E.O. 13653, “Preparing the United States for the Impacts of Climate Change”, sets standards to prepare the United States for the impacts of climate change and supporting climate-resilient investment. According to draft C.E.Q. guidance for considering climate change in environmental reviews, agencies should consider the following when addressing climate change: (1) the potential effects of a proposed action on climate change as indicated by its greenhouse gas emissions; and (2) the implications of climate change for the environmental effects of a proposed action. E.O. 13693 promotes federal leadership in sustainability and greenhouse gas reductions.

The 2016 Vermont State Agency Energy Plan (B.G.S., 2016) establishes a goal of meeting 35% of the state government’s energy needs—following the reduction of total energy consumption goals outlined in the plan—from renewable sources by 2025. The plan also recommends that state agencies increase the use of modern wood heating with biomass. Solar panels were installed at the Salisbury Fish Culture Station and went online and began producing power on December 1, 2017. The Salisbury project will be used to offset carbon emissions generated by the increase in grid electricity use at the R.F.C.S.

#### **3.5.2 Environmental Consequences**

ALTERNATIVE 1: NO ACTION –

Under the No Action Alternative, the R.F.C.S. would continue to operate at its present capacity and no new construction activity would result. The No Action Alternative is anticipated to have a negligible effect on climate change.

#### **ALTERNATIVE 2: PROPOSED ACTION WITH OFFSITE QUALITY ASSURANCE AND CONTROL –**

The power supply for the bedrock well is currently under review by Efficiency Vermont, Vermont's statewide energy efficiency utility. This review is part of the typical process that B.G.S. utilizes to meet their goals under the 2016 Vermont State Agency Energy Plan. The objective of the review is to identify potential energy savings and implement those changes to the project design where feasible. Based on the projected slight increase of energy use, the Proposed Action with Offsite Quality Assurance and Control will likely have a negligible effect on climate change.

#### **ALTERNATIVE 3: PREFERRED ACTION WITH ONSITE QUALITY ASSURANCE AND CONTROL –**

Efficiency Vermont is reviewing the design associated with the proposed caretaker residence and will identify potential energy savings and implement those changes to the project design where feasible. Based on the projected slight increase to energy use, the Proposed Action with Onsite Quality Assurance and Control will likely have a negligible effect on climate change.

### **3.6 Cumulative Effects**

Cumulative effects are defined by the C.E.Q. in 40 C.F.R. 1508.7 as:

“Cumulative effects are those that result from incremental effects of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.”

No other federal or federally-funded projects are planned or envisioned in proximity to the R.F.C.S. within the next 5 years. No cumulative effects related to non-R.F.C.S. development have been identified.

### **3.7 Summary of Effects on Natural and Historic Resources**

Most of the effects associated with the groundwater well and caretaker's residence are negligible to minor and can be virtually eliminated by implementing minor mitigation measures. No factors were identified in this S.E.A that would alter the conclusions reached in the F.O.N.S.I. issued for the I.E.A. in March 2017.



#### **4.0 AGENCY COORDINATION AND PERMITS**

During completion of the draft I.E.A, coordination was completed with the N.R.C.S., U.S.F.W.S., V.F.W.D., V.W.M.D., V.D.F.S., D.H.P. Vermont G.I.S. data layers for prime agricultural soils, hazardous waste, mapped wetlands, floodplains and river corridors, waterways, rare, threatened and endangered species and wildlife habitat were reviewed.

All required state and local permits will be obtained for the project. A list of all the required permits identified to date is included in Appendix A-17. Those related to the S.E.A. are summarized in Table 4-1. The new facility must also meet all applicable state fire safety and occupational health and safety standards or requirements.

**Table 4-1.**  
**LIST OF PERMITS REQUIRED FOR THE PROPOSED ACTIONS IN THE S.E.A.**

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Permit	Permitting Agency	Status
Stormwater Construction General Permit 3-9020	V.D.E.C	Moderate Risk Project, issued July 24, 2017, Permit #7799-9020. Risk Evaluation portion of permit will be updated as a minor amendment for bedrock test well. A minor amendment record for the E.P.S.C. Plan will be prepared for the caretaker residence.
Stormwater Discharge General Permit 3-9015	V.D.E.C.	General Permit 3-9015, Permit #7799-9015.A issued April 12, 2018 for the caretaker residence. This permit was not needed for bedrock test well.
Wastewater System and Potable Water Supply Permit	V.D.E.C.	Wastewater and Potable Water Supply Permit #WW-5-6093-2 was issued on January 4, 2018 for the caretaker residence.
N.P.D.E.S. Discharge Permit	V.D.E.C.	Application submitted to V.D.E.C. and a renewed discharge permit is currently being drafted by V.D.E.C. Watershed Management Division, Wastewater Program as stated in email correspondence dated November 15, 2017.

## **5.0 PUBLIC INVOLVEMENT**

### **5.1 Public Meetings**

A public meeting was held on January 21, 2014 at the Roxbury Town Hall to review proposed rebuild of the R.F.C.S. prior to drafting the I.E.A. The meeting was attended by the Roxbury Selectboard, staff from V.F.W.D. and Vermont Division of Emergency Management and Homeland Security (V.E.M.H.S.) and by members of the public. V.F.W.D. staff gave a presentation on the Proposed Alternative followed by a question and answer session with the meeting attendees. According to V.F.W.D. staff present at the meeting, the public and Roxbury Selectboard were generally enthusiastic about the return of the R.F.C.S. that is a key amenity to local residents and an asset to the local economy.

The draft I.E.A. was available for public review and comment beginning on February 24, 2017. The public comment period lasted for 15 days, ending on March 12, 2017. No public comments were received.

### **5.2 FEMA Publication of Draft Supplemental Environmental Assessment Notice and Request for Comment**

The Federal Emergency Management Agency (FEMA) proposes to assist the Vermont Fish and Wildlife Department, Roxbury VT, with upgrades to the Roxbury Fish Culture Station including the connection of a supplementary groundwater supply well and quality assurance and control. Vermont Fish and Wildlife Department would like to supplement the surface water source to comply with state and federal water quality standards and feels that a caretaker residence is needed to provide continuous oversight.

To meet the requirements of the National Environmental Policy Act (NEPA), FEMA has prepared a Draft Supplemental Environmental Assessment (SEA) to identify and evaluate human, historic, and environmental resources that might be affected by the proposed reconstruction of the Roxbury Fish Culture Station. FEMA invites the public to review and comment on the Draft SEA and to provide FEMA with information it may not have considered in its review. If FEMA finds that the Preferred Alternative, as defined in the SEA, will have no significant impact on the natural or human environment after the public comment period, a Finding of No Significant Impact (FONSI) will be issued by FEMA's Regional Environmental Officer, David Robbins. However, if a change in the scope of work occurs FEMA must be notified to evaluate if the proposed change would alter the potential impacts on the environment.

This document will be available for viewing online at <http://bgs.vermont.gov/facilities/forms> and in person at the Roxbury Town Clerk's Office, 1664 Roxbury Road, Roxbury, VT 05669, (802) 485-7840. The document will also be posted on FEMA's website: <http://www.fema.gov/resource-document-library>.

The public comment period will last for 15 days from the date of publication in this newspaper ending at 5:00 pm.

Written comments on the Draft SEA can be submitted by mailing David Robbins, Regional Environmental Officer at, FEMA Region 1, 99 High Street 6th Floor, Boston, Massachusetts 02110, by emailing [David.Robbins@fema.dhs.gov](mailto:David.Robbins@fema.dhs.gov), or by sending a fax to 617-956-7574.

## **6.0 CONCLUSIONS**

F.E.M.A will document its conclusions in this section when it publishes the final S.E.A. and reviews any comments received.

## **7.0 LIST OF PREPARERS**

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Federal Emergency Management Agency (F.E.M.A.)  
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## 8.0 REFERENCES

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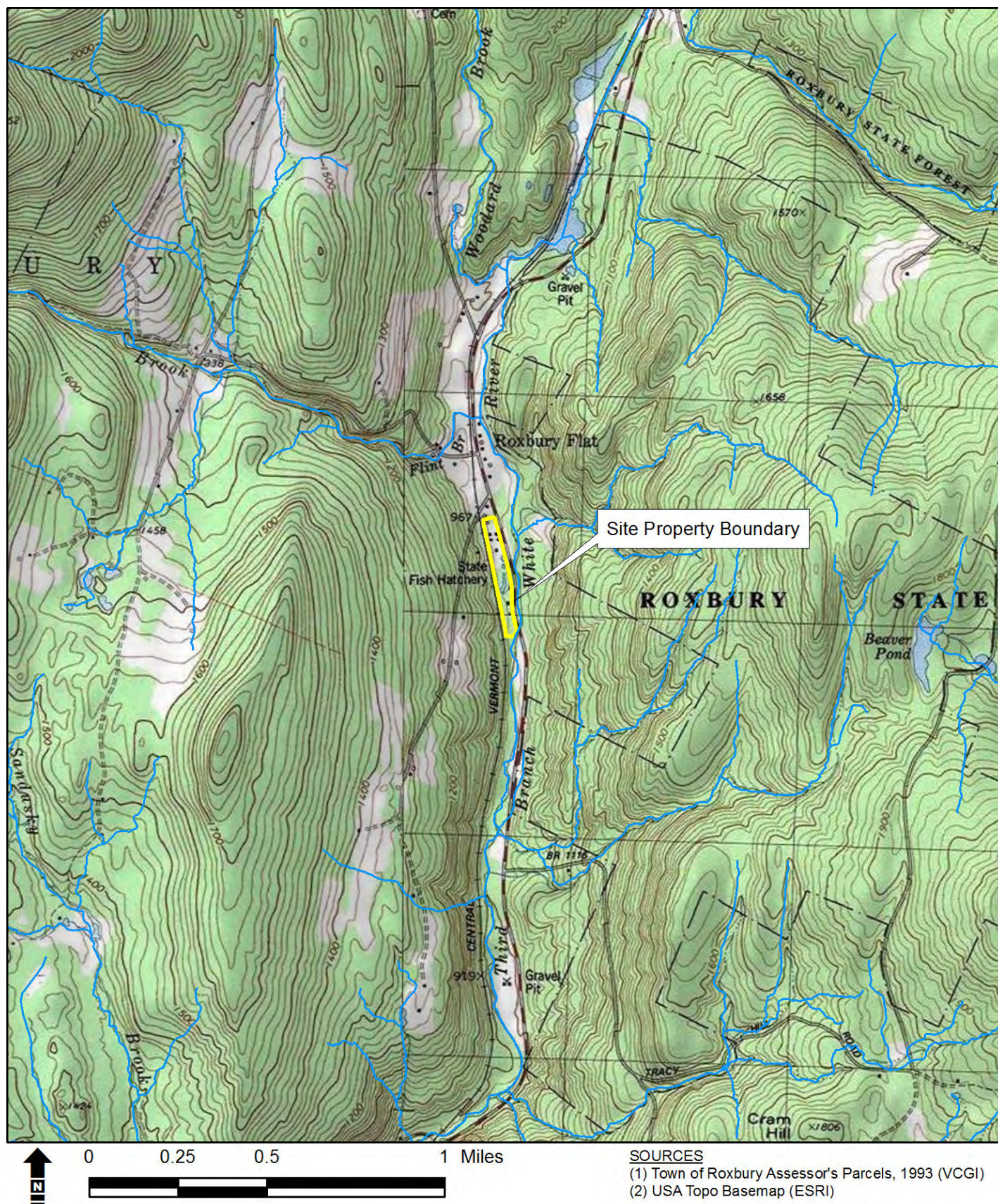
FEMA Region 1 Supplemental Environmental Assessment

Roxbury Fish Culture Station

## **Appendix A: Supporting Documents**



# Appendix A-1: Site Location Map





**Appendix A-2****Table 1-1. Permits and Conditions Required by the F.O.N.S.I. for the Initial E.A.**

<b>Affected Environment/ Resource Area</b>	<b>B.M.P.s/Mitigation Measures to Be Applied in Final E.A.</b>	<b>Status of Mitigation Measures</b>
<b>Soils</b>	<p>Erosion Prevention and Sediment Control Plan submitted to V.D.E.C.</p> <p>Stormwater Plan BMPs include check dams to promote infiltration and a detention pond with sediment forebay and outlet to a stabilized drainage outfall.</p>	<p>Notice of Authorization Under Vermont Construction General Permit 3-9020 for Moderate Risk Projects issued July 24, 2017, Permit #7799-9020</p> <p>Notice of Authorization Under Vermont Discharge General Permit 3-9015 issued August 28, 2017, Permit #7799-9015</p>
<b>Threatened and Endangered Species</b>	<p>V.F.W.D. may voluntarily restrict tree cutting during the period from June 1 to July 31. This is a voluntary measure and is not a required mitigation measure in order to ensure compliance with the U.S. Fish and Wildlife Service's (U.S.F.W.S.) January 5, 2016, intra-Service Programmatic Biological Opinion (B.O.) on the final 4(d) rule for the Northern Long Eared Bat for section 7(a)(2) compliance.</p>	<p>Northern Long Eared Bat will be protected through B.M.P.s.</p>
<b>Floodplains</b>	<p>Floor slabs of Tank Pavilions will be 3-5 feet above existing grade. Aboveground tanks are less likely to be damaged by flooding.</p>	<p>The planned design incorporated flood resiliency.</p>

Appendix A-2 Table 1-1. Permits and Conditions Required by the F.O.N.S.I. for the Initial E.A.

Affected Environment/ Resource Area	B.M.P.s/Mitigation Measures to Be Applied in Final E.A.	Status of Mitigation Measures
<b>Wetlands</b>	<p>On-Site Class II wetlands have been reclassified to Class III by V.A.N.R.</p> <p>Design changes to minimize wetland impacts were developed and agreed to by V.F.W.D., U.S.A.C.E., and U.S.E.P.A., and have been incorporated into the Proposed Project design. An approval letter is under preparation by U.S.A.C.E. to authorize the project under Category 2 Vermont General Permit. The work will comply with all terms of the Vermont General Permit. These conditions are summarized in Section 3.2.2.</p>	<p>U.S.A.C.E. C.W.A. Section 404 Category 2 Vermont General Permit issued on February 6, 2017, Permit #NAE-2013-00656</p>
<b>Groundwater</b>	<p>Nutrients (primarily phosphorus and nitrogen) and fishery chemicals will be reduced in waters leaving the Site.</p> <p>Thermal pollution (increase in water temperature leaving the Site) will be reduced under the Proposed Action by removing open water in favor of covered fish-rearing tanks and underground piping.</p> <p>Fish wastes to be separated for off-Site beneficial use.</p> <p>Existing septic systems to remain in place.</p>	<p>Groundwater quality will be protected through B.M.P.s.</p>

Affected Environment/ Resource Area	B.M.P.s/Mitigation Measures to Be Applied in Final E.A.	Status of Mitigation Measures
<b>Archaeological Resources</b>	Inadvertent discovery conditions to apply to all construction activities.	In the event of the discovery of archaeological deposits or human remains V.F.W.D. and their contractor will immediately stop all work near the discovery and take the appropriate measures outlined in the I.E.A to avoid or minimize harm to the finds. V.F.W.D. and their contractor will follow the provisions of applicable state law and report the finds accordingly.
<b>Historic Buildings</b>	<p>Finding of Adverse Effect as determined by F.E.M.A. Treatment Proposal prepared by F.E.M.A. in lieu of formal Memorandum of Agreement submitted to S.H.P.O., D.E.M.H.S., and V.F.W.D. Concurrences from all parties were received by December 16, 2016. Treatment measures include:</p> <ul style="list-style-type: none"> <li>• Design Review by S.H.P.O.</li> <li>• Public Interpretation</li> <li>• National Register nomination amendment.</li> </ul>	<ul style="list-style-type: none"> <li>• S.H.P.O. reviewed design and stamped concurrence on June 22, 2017.</li> <li>• The concept for public interpretation was reviewed and approved verbally by S.H.P.O. Further development of the educational interpretive plan is pending.</li> <li>• National Register draft nomination amendment was approved by S.H.P.O. The final amendment will include photographs of new buildings post construction activities.</li> <li>• A National Historic Registry sign has been erected at the entrance of the hatchery. An image of</li> </ul>

Affected Environment/ Resource Area	B.M.P.s/Mitigation Measures to Be Applied in Final E.A.	Status of Mitigation Measures
		the sign is included in Appendix B-2.
<b>Utilities</b>	<p>Stormwater Plan B.M.P.s include check dams to promote infiltration and a detention pond with sediment forebay outlet to a stabilized drainage outfall.</p> <p>Waters leaving the R.F.C.S. will be treated to meet C.W.A. discharge requirements.</p>	<p>Stormwater utility will be installed using B.M.P.s.</p> <p>N.P.D.E.S. discharge permit #3-0362 for the R.F.C.S. was issued in October 2006. A renewed discharge permit is currently being drafted by V.D.E.C. Watershed Management Division, Wastewater Program as stated in email correspondence dated November 15, 2017.</p>
<b>Potable Water, Wastewater, Stormwater</b>	<p>Modification to Wastewater and Potable Water Supply Permit #WW-5-6093 will be sought for addition of an outdoor A.D.A.-compliant restroom.</p> <p>Erosion Prevention and Sediment Control Plan submitted to V.D.E.C. Stormwater Plan B.M.P.s include check dams to promote infiltration and a detention pond with sediment forebay outlet to a stabilized drainage outfall. Stormwater discharge post-construction will be managed under the Stormwater Discharge</p>	<p>Modified Wastewater and Potable Water Supply Permit #WW-5-6093-1 issued July 5, 2017.</p> <p>Notice of Authorization Under Vermont Construction General Permit 3-9020 for Moderate Risk Projects issued July 24, 2017, Permit #7799-9020.</p> <p>Notice of Authorization Under Vermont Discharge General Permit 3-9015 issued August 28, 2017, Permit #7799-9015.</p> <p>N.P.D.E.S. discharge permit #3-0362 for the R.F.C.S. was</p>

Appendix A-2 Table 1-1. Permits and Conditions Required by the F.O.N.S.I. for the Initial E.A.

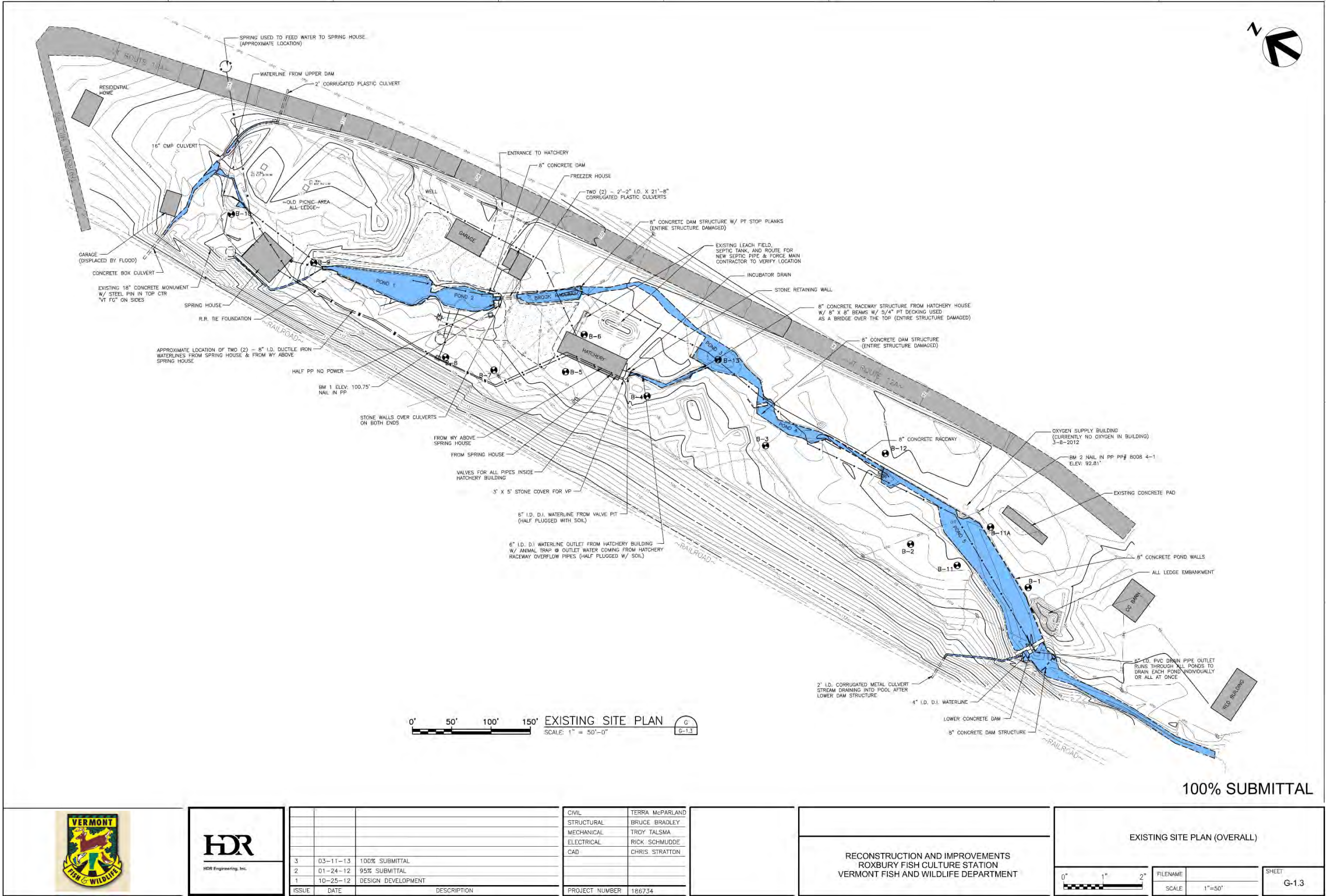
Affected Environment/ Resource Area	B.M.P.s/Mitigation Measures to Be Applied in Final E.A.	Status of Mitigation Measures
	<p>General Permit issued by V.D.E.C.</p> <p>Discharge limits established by V.D.E.C.; a N.P.D.E.S. permit for discharge to a receiving water (Third Branch White River) will be obtained under the C.W.A. as a mitigation measure.</p>	<p>issued in October 2006. A renewed discharge permit is currently being drafted by V.D.E.C. Watershed Management Division, Wastewater Program as stated in email correspondence dated November 15, 2017.</p>
<b>Air Quality</b>	<p>Standard dust control measures to be implemented during construction in accordance with Vermont Stormwater Construction General Permit, and under an Erosion Prevention and Sediment Control Plan which was submitted to V.D.E.C.</p> <p>Dust control will also be included in the construction bid specification by V.B.G.S.</p>	<p>Notice of Authorization Under Vermont Construction General Permit 3-9020 for Moderate Risk Projects issued July 24, 2017, Permit #7799-9020.</p> <p>Notice of Authorization Under Vermont Discharge General Permit 3-9015 issued August 28, 2017, Permit #7799-9015.</p>
<b>Noise</b>	<p>Construction equipment will meet local, state and federal noise regulations. Construction equipment will be fitted with mufflers.</p> <p>HVAC and water pump noise levels expected to be within typical noise levels for such systems.</p> <p>Minimal increase in noise levels at neighbor property lines.</p>	<p>Construction will take place only during normal business hours and all equipment will meet local, state, and federal noise regulations. Idling time shall be limited on site.</p>

Affected Environment/ Resource Area	B.M.P.s/Mitigation Measures to Be Applied in Final E.A.	Status of Mitigation Measures
<b>Asbestos, Structural Debris, and Fuel Tanks</b>	Diesel- fuel aboveground storage tank (belly tank) for the electrical generator will conform to V.D.F.S. and V.W.M.D. regulations. A diesel-fuel storage and use plan will be filed with and approved by V.D.F.S.	Construction Permit issued by V.D.F.S. July 19, 2017, Permit #1782219. This Construction Permit is for the installation of a 200-gallon diesel aboveground storage tank. This facility is not subject to the Spill Prevention Control and Countermeasure rule because the total capacity of the aboveground storage tank is less than 1,320-gallons.  A Final Construction Valuation will be submitted to V.D.F.S. and a final inspection is required before using the electrical generator.
<b>Hazardous Waste</b>	Oil and hazardous materials to be stored within secondary containment.  Low volumes of fishery chemicals (Formalin and Chloramine-T) to be used on-Site and will be removed from waters leaving the Site.	V.F.W.D. and its designees will manage and dispose of excavated soils and waste materials in accordance with applicable local, state, and federal regulations. If hazardous/contaminated materials are discovered during construction, the work shall cease until the V.F.W.D. and its designees can implement appropriate procedures and secure additional permits if needed.

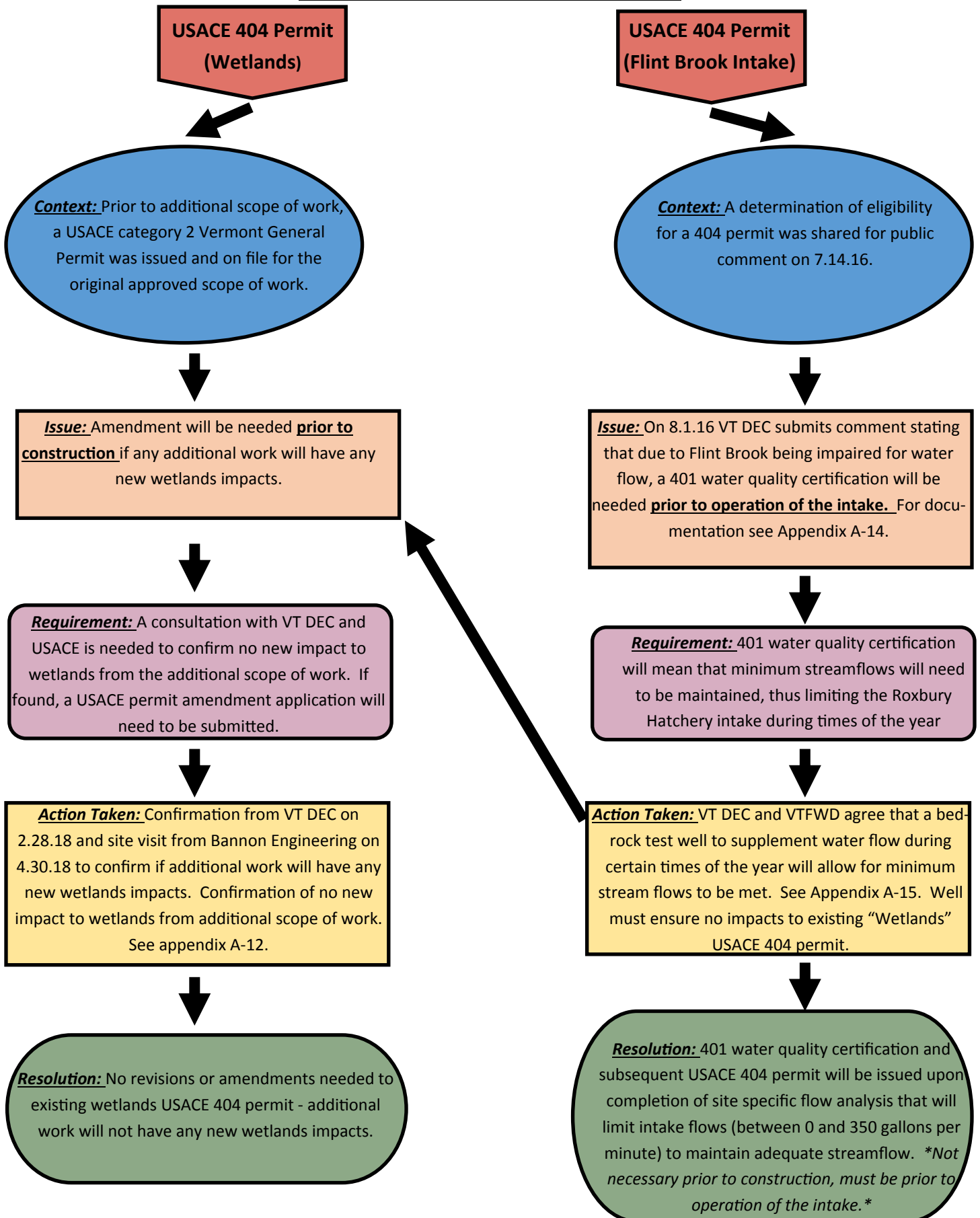


Affected Environment/ Resource Area	B.M.P.s/Mitigation Measures to Be Applied in Final E.A.	Status of Mitigation Measures
<b>Climate Change</b>	<p>Under the Proposed Action energy use at the Site will increase. The proposed design is undergoing review by Efficiency Vermont, with the goal of achieving efficiency targets under the 2016 Vermont State Agency Energy Plan.</p> <p>Salisbury Fish Culture Station will receive solar photovoltaic panels. Energy from these solar panels will be used to partially offset additional carbon emissions generated by increased energy use at the R.F.C.S.</p>	<p>Review completed by Efficiency Vermont on June 28, 2017.</p> <p>Solar panels were installed at the Salisbury Fish Culture Station and went online and began producing power on December 1, 2017.</p>

Appendix A-3: Existing Plan Depicted in Initial E.A.



**Appendix A-4 Flow Chart Proposed Alternative USACE Permitting concerning Flint Brook Intake Structure and Bedrock Test Well**










Appendix A-6 Proposed Caretaker Residence Site Plan





STATE OF VERMONT  
Department of Buildings  
and General Services  
Agency of Administration  
Montpelier, Vermont



PROPOSED RESIDENCE  
ROXBURY FISH CULTURE STATION  
ROXBURY, VERMONT

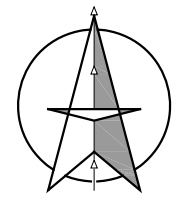
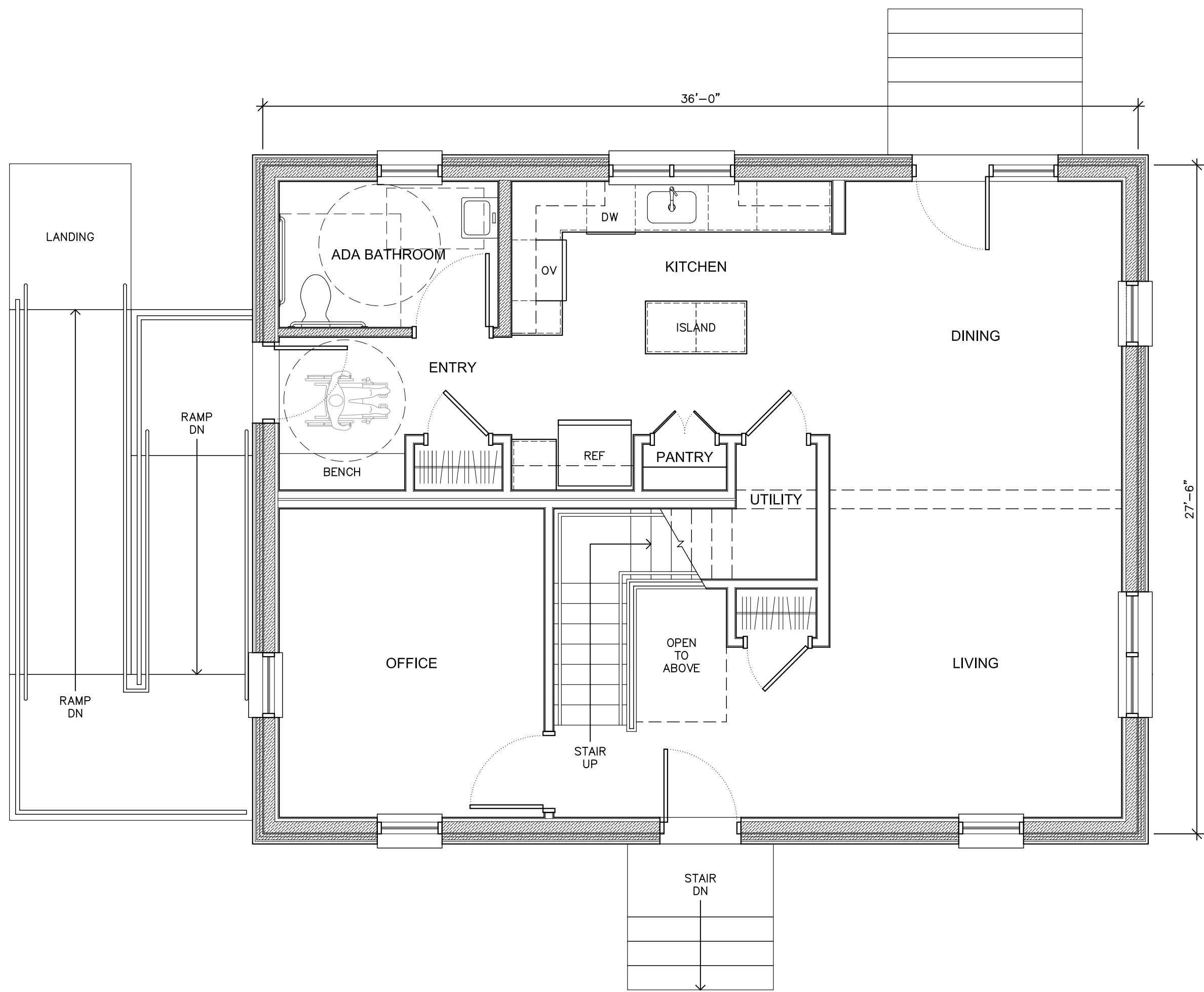
REVISIONS	

SITE PLAN

ENG JOB NO:	160007
BLDG NO:	-----
DATE:	FEBRUARY 2018
SCALE:	AS NOTED
DRAWN BY:	MDB
APPR. BY:	PH
SHEET NUMBER	

SK1

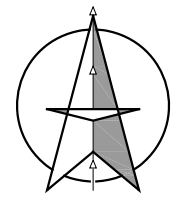
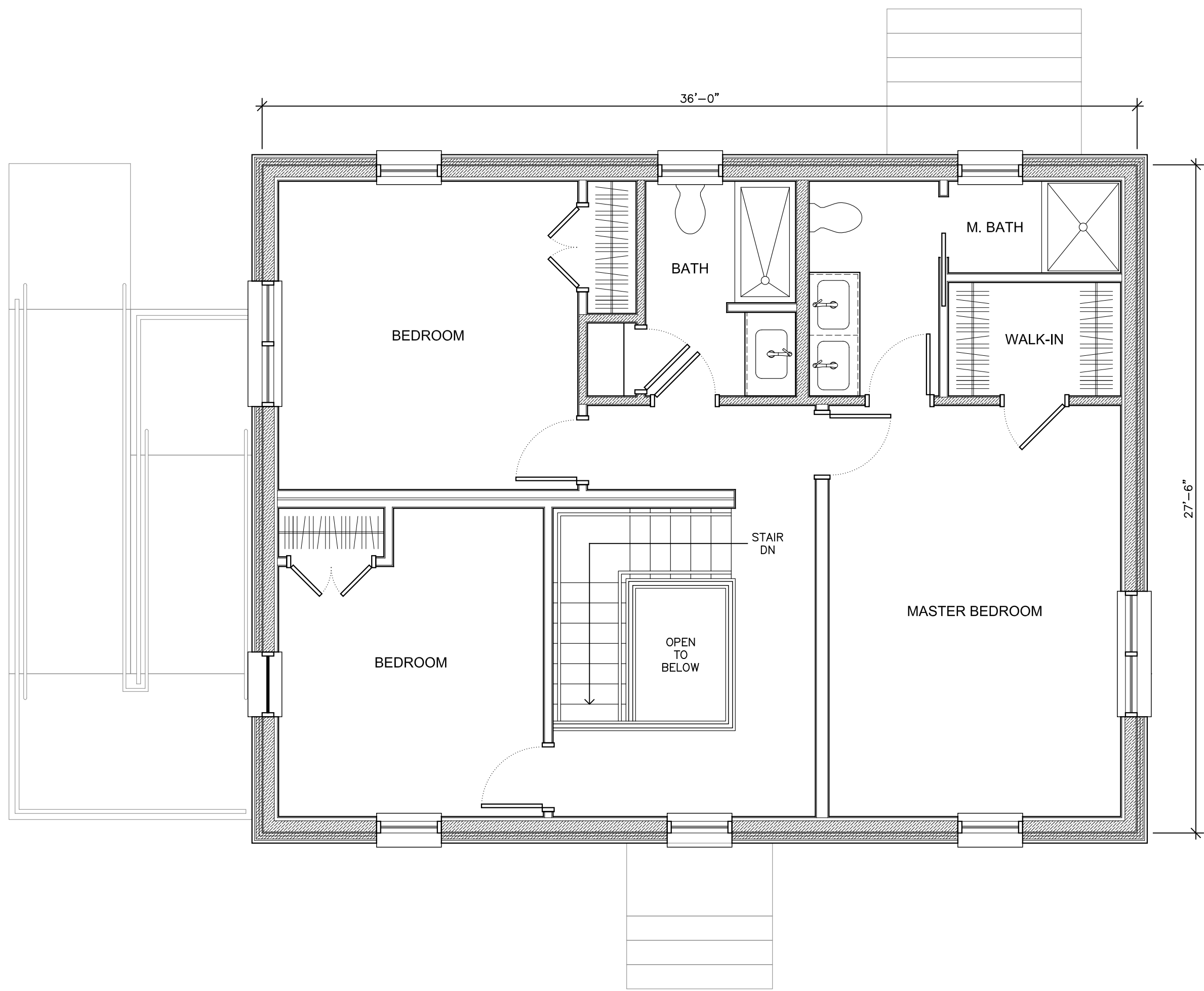
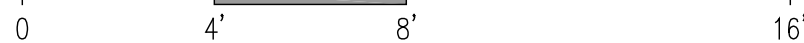




FIRST FLOOR PLAN

SCALE: 1/4"=1'-0" (22x34)

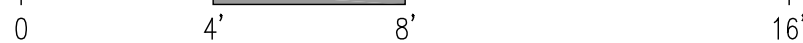
SQUARE FOOTAGE: 905 SF (GROSS INTERIOR)



SECOND FLOOR PLAN

SCALE: 1/4"=1'-0" (22x34)

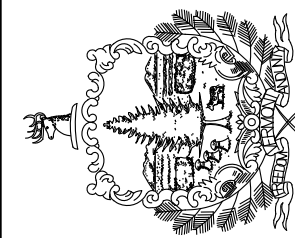
SQUARE FOOTAGE: 905 SF (GROSS INTERIOR)



preliminary



STATE OF VERMONT  
Department of Buildings  
and General Services  
Agency of Administration  
Montpelier, Vermont



PROPOSED RESIDENCE  
ROXBURY FISH CULTURE STATION  
ROXBURY, VERMONT

REVISIONS


FLOOR PLANS

ENG JOB NO: 160007

BLDG NO: -----

DATE: FEBRUARY 2018

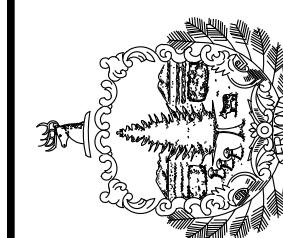
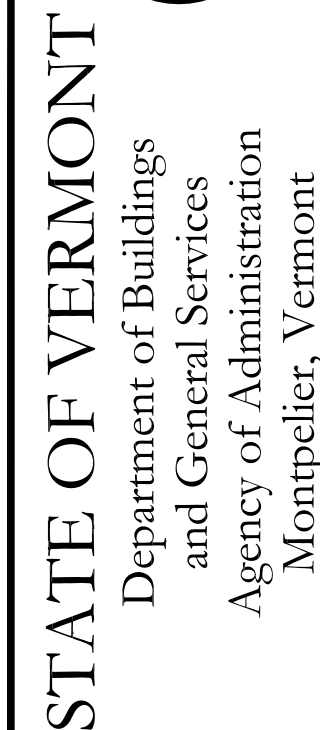
SCALE: AS NOTED

DRAWN BY: MDB

APPR. BY: PH

SHEET NUMBER

SK2



PROPOSED RESIDENCE  
ROXBURY FISH CULTURE STATION  
ROXBURY, VERMONT

REVISIONS	

## ELEVATIONS & CROSS SECTIONS

ENG JOB NO: 160001

BLDG NO: ----

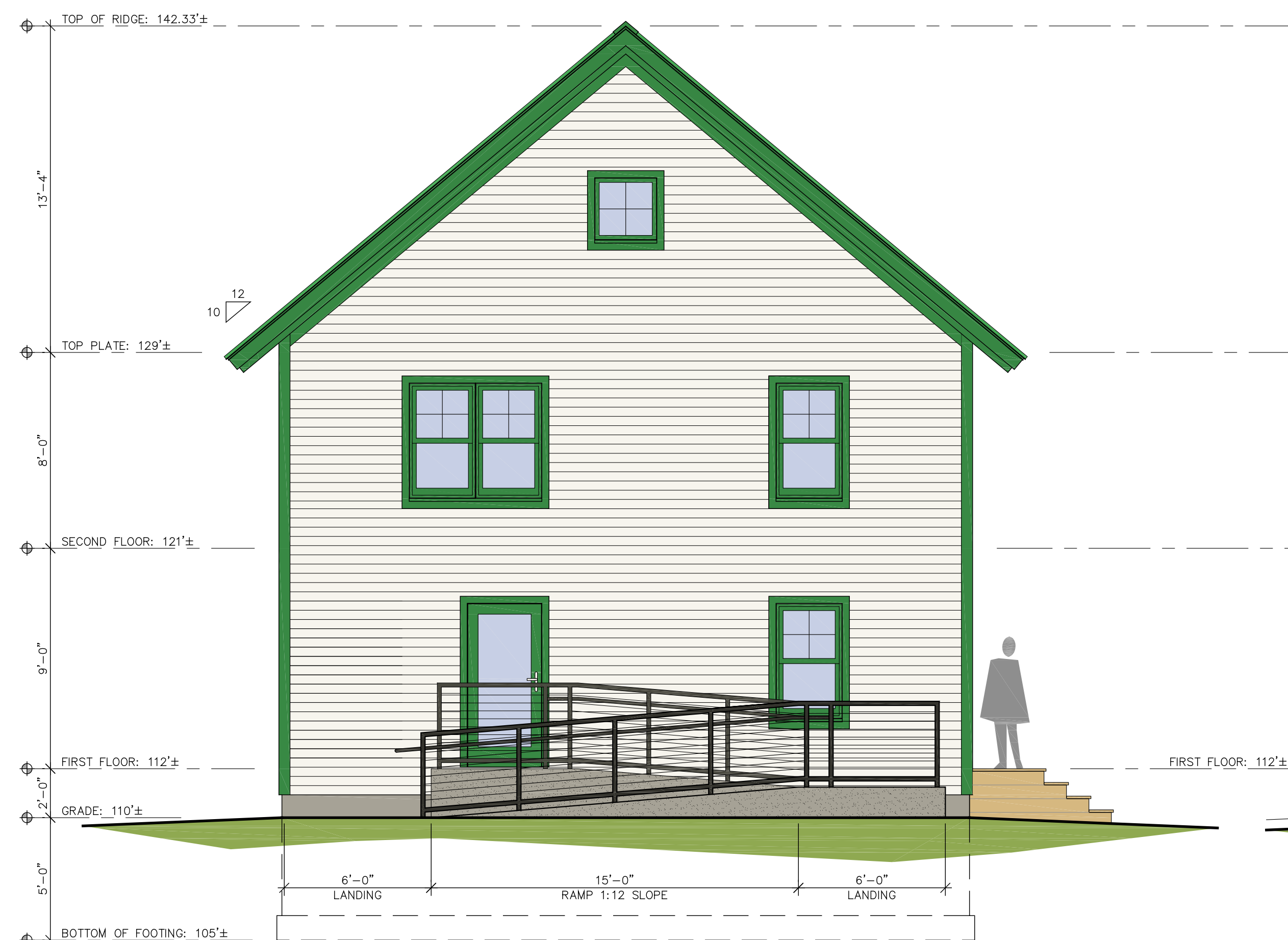
DATE: FEBRUARY 2018

SCALE: AS NOTED

DRAWN BY: MDI

APPR. BY:	PR
-----------	----

SK3



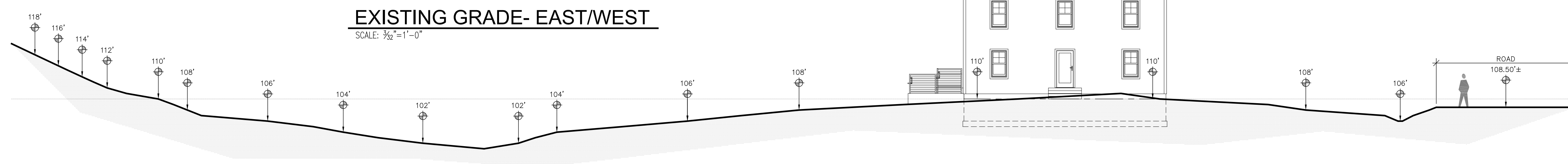
WEST ELEVATION

SCALE:  $\frac{1}{4}'' = 1' - 0''$



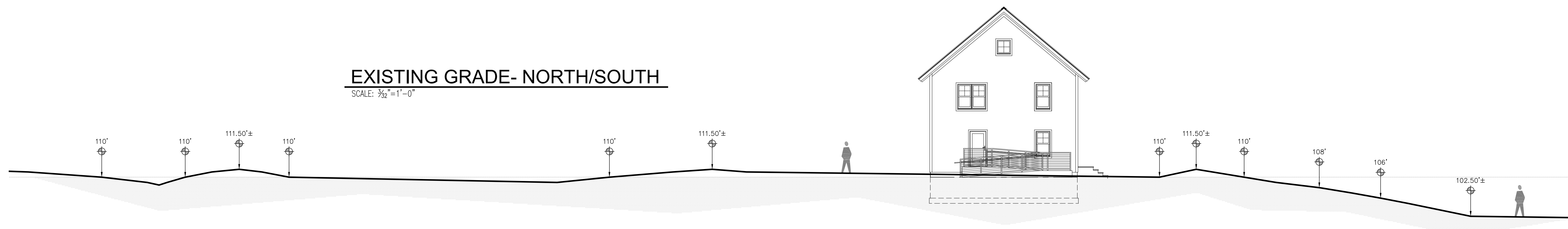
SOUTH ELEVATION

SCALE:  $\frac{1}{4}"=1'-0"$



### EXISTING GRADE- EAST/WEST

SCALE:  $\frac{3}{32}" = 1' - 0"$



## EXISTING GRADE- NORTH/SOUTH

SCALE:  $\frac{3}{32}'' = 1' - 0''$

preliminary

**Appendix A-7****Table 3-1.****ENVIRONMENTAL VARIABLES NOT SUBJECT TO FURTHER EVALUATION  
DUE TO ADDITION OF WELL AND RESIDENCE**

Affected Environment/ Resource Area	No Action Alternative in both Initial and Supplemental EA	Environmental Variables Not Subject to Further Evaluation under Alternative 2 and Alternative 3
<b>Geology</b>	<b>Negligible</b>	The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.
<b>Vegetation</b>	<b>Negligible</b>	The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.
<b>Wildlife</b>	<b>Negligible</b>	The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.
<b>Threatened and Endangered Species</b>	<b>Negligible</b>	<p>The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.</p> <p>In addition, the Northern Long Eared Bat will be protected through B.M.P.s by restricting tree cutting during the period from June 1 to July 31.</p>

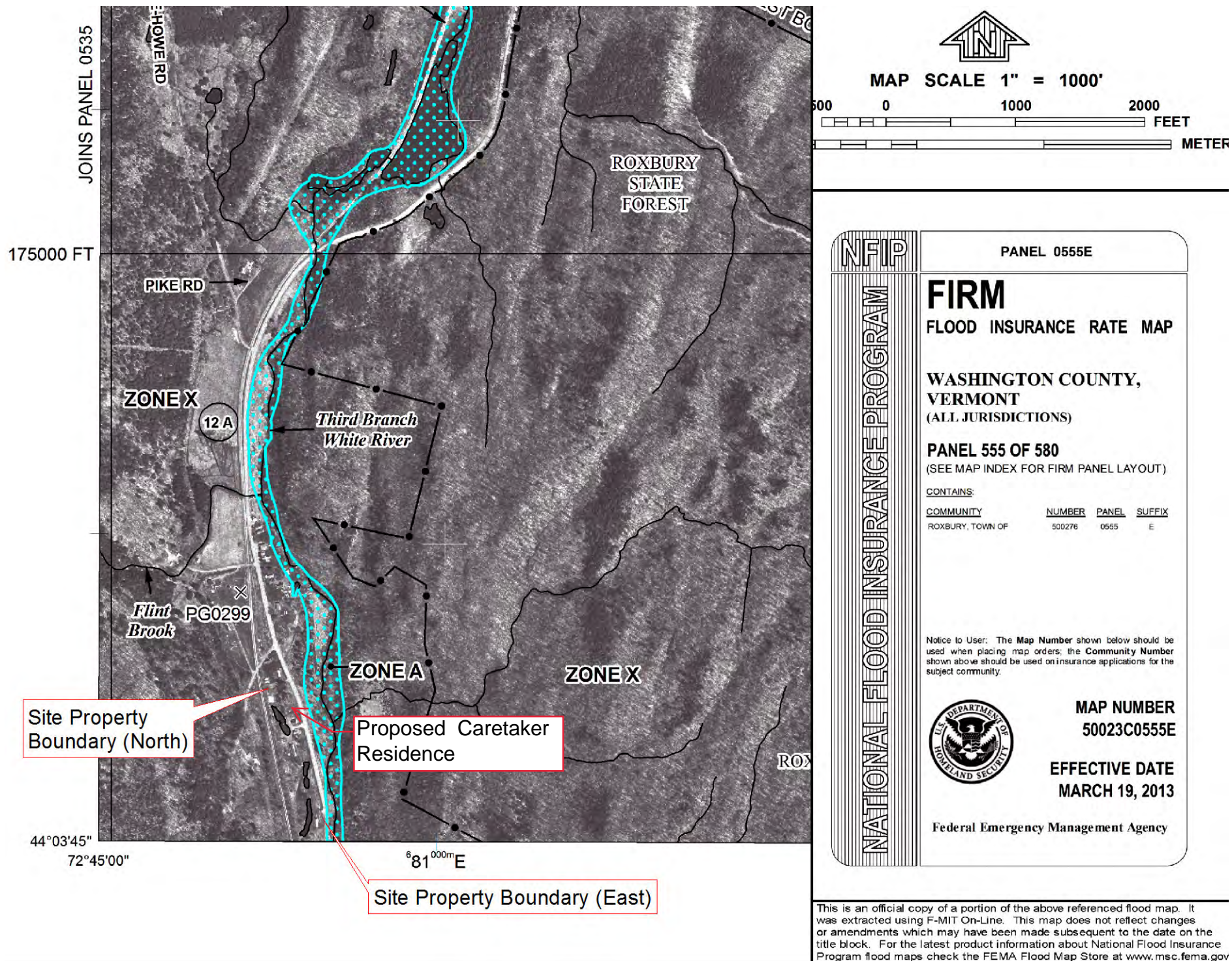


Affected Environment/ Resource Area	No Action Alternative in both Initial and Supplemental EA	Environmental Variables Not Subject to Further Evaluation under Alternative 2 and Alternative 3
<b>Floodplains</b>	<b>Moderate</b>	<p>The bedrock test well and caretaker residence are not located in a F.E.M.A. 100 or 500-year floodplain (Appendix A-8). In addition, the bedrock test well and caretaker residence are located above the level of flooding experienced during tropical storm Irene (Appendix A-9).</p> <p>Further evaluation of this environmental resource is not required in this supplemental review.</p>
<b>Archaeological Resources</b>	<b>Negligible</b>	<p>The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.</p> <p>In addition, inadvertent discovery conditions to apply to all construction activities.</p>
<b>Land Use and Zoning</b>	<b>Negligible</b>	<p>The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.</p>
<b>Traffic and Parking</b>	<b>Negligible</b>	<p>The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.</p>

Affected Environment/ Resource Area	No Action Alternative in both Initial and Supplemental EA	Environmental Variables Not Subject to Further Evaluation under Alternative 2 and Alternative 3
		In addition, traffic during construction will be temporary.
<b>Air Quality</b>	<b>Negligible</b>	<p>The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.</p> <p>In addition, standard dust control measures to be implemented during construction in accordance with Vermont Stormwater Construction General Permit, and under an Erosion Prevention and Sediment Control Plan which was submitted to V.D.E.C.</p> <p>Dust control will also be included in the construction bid specification by V.B.G.S.</p>
<b>Noise</b>	<b>Negligible</b>	<p>The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.</p> <p>In addition, construction will take place only during normal business hours and all equipment will meet local, state, and federal noise regulations. Idling time shall be limited on site.</p>

Affected Environment/ Resource Area	No Action Alternative in both Initial and Supplemental EA	Environmental Variables Not Subject to Further Evaluation under Alternative 2 and Alternative 3
<b>Asbestos, Structural Debris, and Fuel Tanks</b>	<b>Negligible</b>	The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.
<b>Hazardous Waste</b>	<b>Negligible</b>	The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.
<b>Seismic Safety</b>	<b>Negligible</b>	The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.
<b>Environmental Justice</b>	<b>Negligible</b>	The bedrock test well and residence fall within the A.P.E. reviewed in the initial E.A. Further review would not alter previous findings of effect. Further evaluation of this environmental resource is not required in this supplemental review.





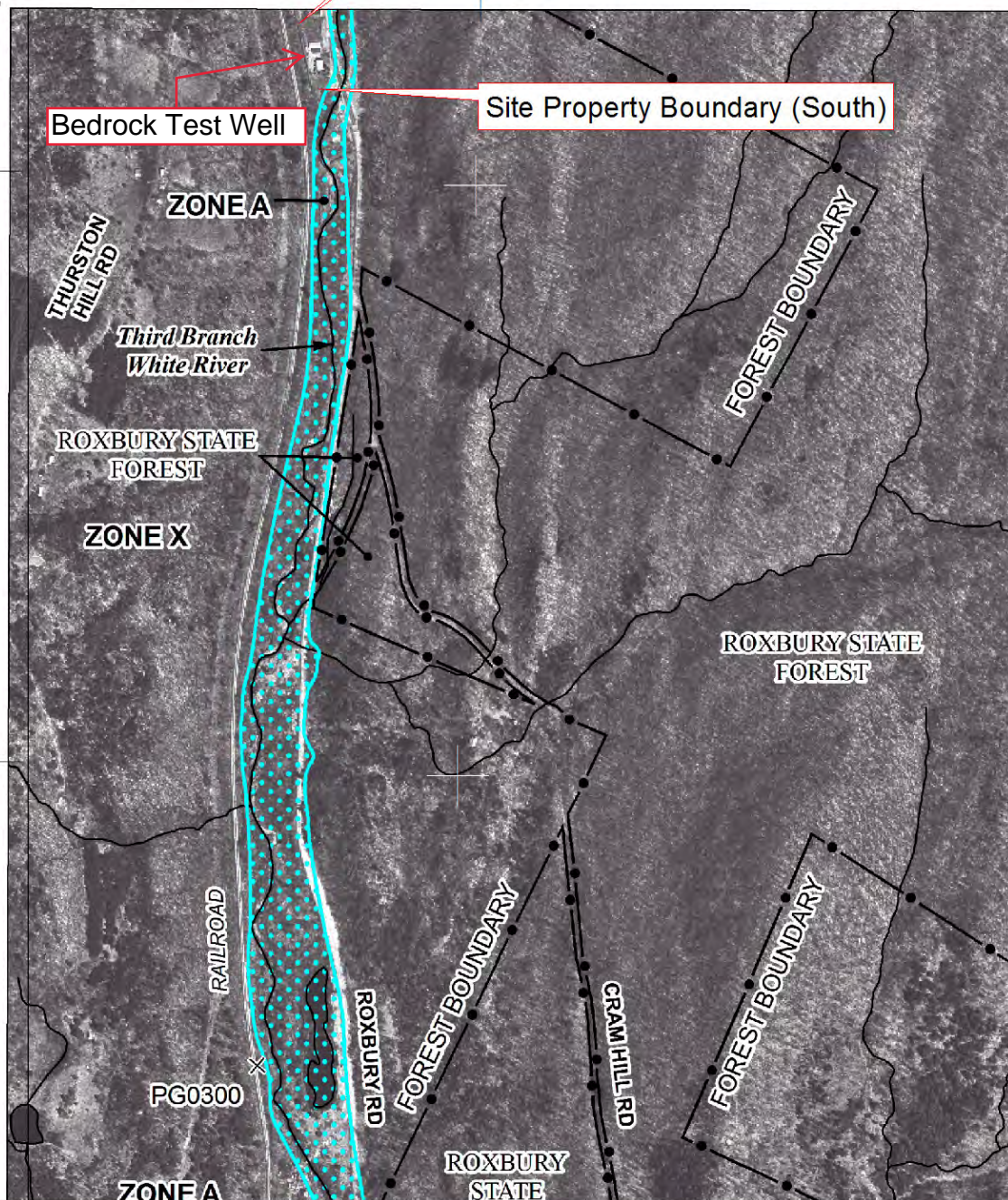


72°45'00"  
480000 FT  
44°03'45"

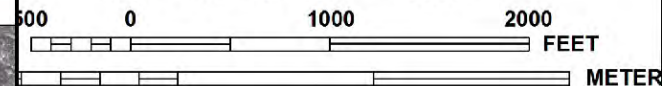
South End of Proposed Construction

Bedrock Test Well

Site Property Boundary (South)



MAP SCALE 1" = 1000'



NFIP

PANEL 0565E

**FIRM**

FLOOD INSURANCE RATE MAP

WASHINGTON COUNTY,  
VERMONT  
(ALL JURISDICTIONS)

PANEL 565 OF 580

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ROXBURY, TOWN OF	500276	0565	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER  
50023C0565E

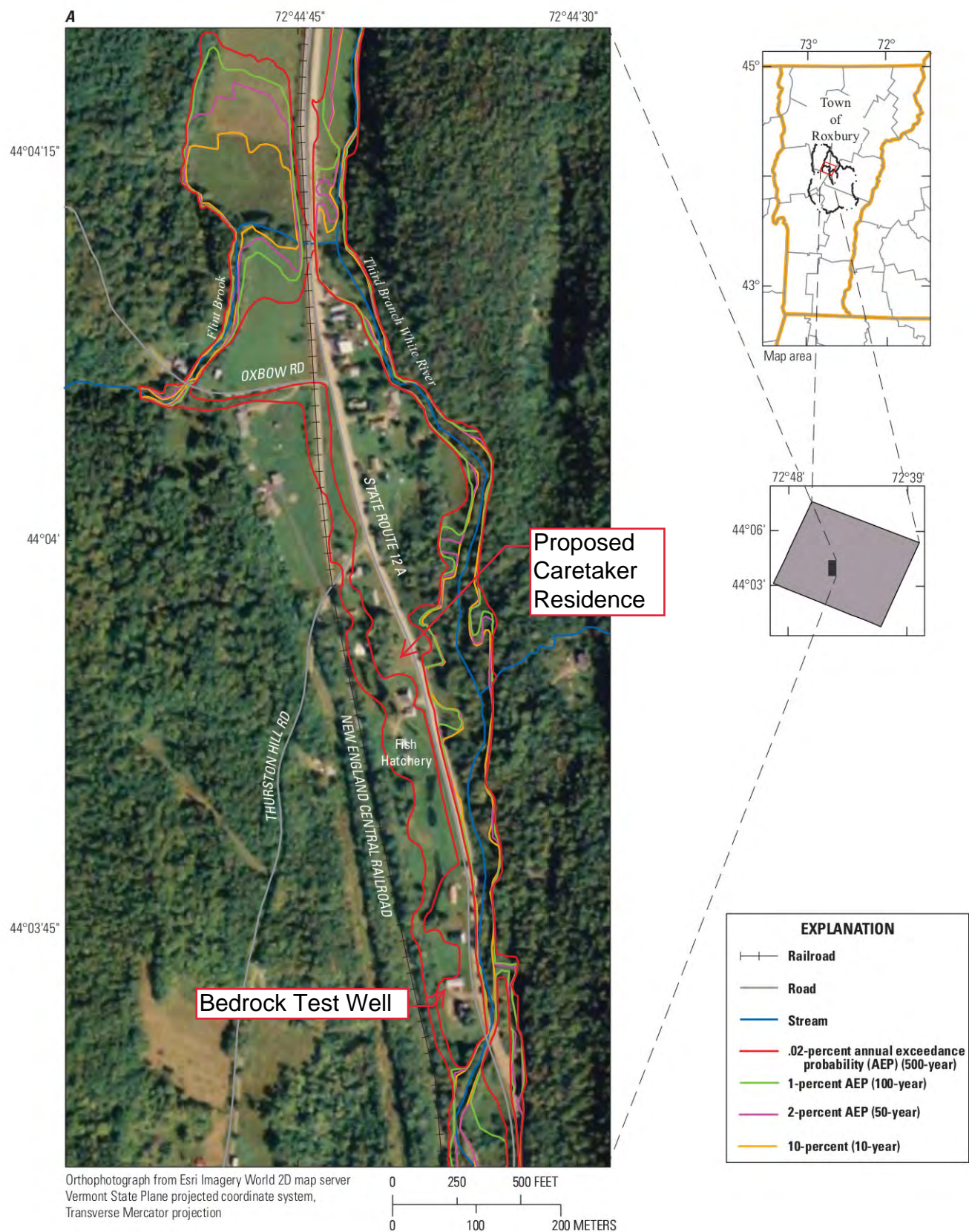
EFFECTIVE DATE  
MARCH 19, 2013

Federal Emergency Management Agency

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



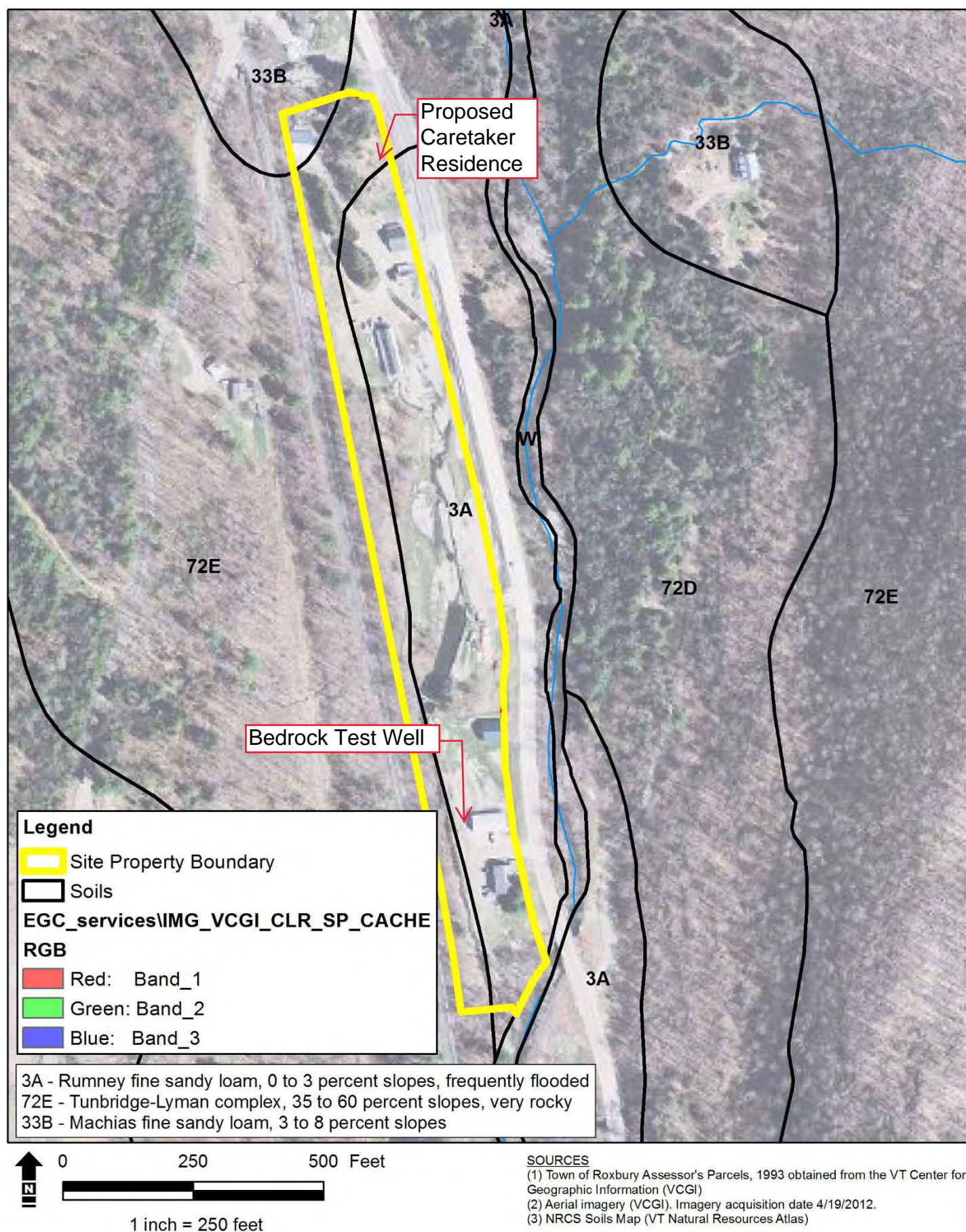
Appendix A-9: H.H.S. Figure 6-1A



**Figure 6–1:** Annual exceedance probabilities for the area near and around the Roxbury Fish Culture Station in Roxbury, Vermont, under existing conditions in 2014.



# Appendix A-10: N.R.C.S. Soils Map





Vermont Department of Environmental Conservation  
Drinking Water and Groundwater Protection Division  
One National Life Drive - Main 2 [phone] 802-828-1535  
Montpelier, VT 05620-3521 [fax] 802-828-1541  
<http://dec.vermont.gov/water>

Agency of Natural Resources

February 28, 2018

Louis Porter, Commissioner  
Fish and Wildlife Department  
Vermont Agency of Natural Resources  
1 National Life Drive, Davis 2

Re: Assessment of Wetlands impact from bedrock test well to serve Roxbury Fish Culture Station,  
Roxbury, Vermont

Dear Mr. Porter:

This letter follows our review of the Lincoln Applied Geology report on the construction, yield and interference testing of the bedrock test well for the Roxbury Fish Culture Station. The potential high yield well has a significant upward gradient as evidenced by the fast well recovery time with the major fracture system at 300 + feet deep. The wetland in the vicinity of the RFCS is delineated as a Class III and is part of a perched water table. The test well characteristics, the distance between the wetland and the test well, and lack of response in nearby pre-existing wells indicates there would be no significant impact to the wetland from the commissioning and operation of this test well up to the tested yield of 400 gpm.

If there are any questions, please contact me in writing or by phone at (802) 585-4910.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Stewart".

Scott Stewart  
Hydrogeologist

A handwritten signature in black ink, appearing to read "Shannon Morrison".

Shannon Morrison  
District Wetlands Ecologist



## Appendix A-11 V.D.E.C. Well Impact to Wetland Determination, February 28, 2018



On Apr 4, 2018, at 10:16 AM, Repella, Angela C CIV USARMY CENAE (US) <[Angela.C.Repella@usace.army.mil](mailto:Angela.C.Repella@usace.army.mil)> wrote:

CLASSIFICATION: UNCLASSIFIED

Hi Mark,

Apologies for the delayed response to your emails, I was out of the office for a couple of weeks. If the location of the new bedrock test well and the disturbance areas associated with the installation of the waterline have been confirmed to be upland/non-wetland, then a Corps permit would not be required for this component of the project. However, I mentioned in my last email that I suspect an additional wetland may exist in the vicinity of the new well and likely correlates with the unmowed area depicted in the attached googleearth image. However, the presence/absence of a wetland in this area cannot be confirmed based solely on aerial photography. Was this potential wetland area checked in the field?

Note, the additional installation of waterlines within the footprint of previously authorized wetland/waterway fill, as depicted in the attached plan, does not require a change to the original permit verification. Also, I concur with the attached letter dated February 28, 2018 from the VTDEC hydrologist concluding there will be no secondary effects to the hydrology of wetlands as a result of the new well.

If you have any questions on this, please don't hesitate to let me know.

Angela C. Repella  
U.S. Army Corps of Engineers  
New England District  
11 Lincoln Street  
Essex Junction, VT 05452  
p:(802)872-2893  
f:(802)879-7638

In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at [http://corpsmap.usace.army.mil/cm\\_apex/73-regulatory\\_survey](http://corpsmap.usace.army.mil/cm_apex/73-regulatory_survey)

-----Original Message-----

From: Mark Bannon ([markbannon@bannonengineering.com](mailto:markbannon@bannonengineering.com))  
Sent: Wednesday, April 04, 2018 8:40 AM  
To: Repella, Angela C CIV USARMY CENAE (US) <[Angela.C.Repella@usace.army.mil](mailto:Angela.C.Repella@usace.army.mil)>  
Cc: Peter Hack <[Peter.Hack@vermont.gov](mailto:Peter.Hack@vermont.gov)>  
Subject: [Non-DoD Source] Fwd: Roxbury SEA/Scope of work status 3/15/18

Hello Angela

Following up on Roxbury Hatchery. Are you able to provide a statement of concurrence that there are no impacts for the proposed house site and bedrock test well? Thank you.

Mark

Mark Bannon  
Bannon Engineering  
802-279-6500

From: Katrina Mattice  
Sent: Wednesday, March 28, 2018 1:50 PM  
To: 'Hack, Peter' <[Peter.Hack@vermont.gov](mailto:Peter.Hack@vermont.gov)> <<mailto:Peter.Hack@vermont.gov>> >; Mark Bannon <[mark@bannonengineering.com](mailto:mark@bannonengineering.com)> <<mailto:mark@bannonengineering.com>> >; Miller, Adam <[Adam.Miller@vermont.gov](mailto:Adam.Miller@vermont.gov)> <<mailto:Adam.Miller@vermont.gov>> >; Whalen, Jeremy <[Jeremy.Whalen@vermont.gov](mailto:Jeremy.Whalen@vermont.gov)> <<mailto:Jeremy.Whalen@vermont.gov>> >  
<<mailto:Joe.Aja@vermont.gov>> <<mailto:Joe.Aja@vermont.gov>> >  
Cc: Aja, Joe <[Joe.Aja@vermont.gov](mailto:Joe.Aja@vermont.gov)> <<mailto:Joe.Aja@vermont.gov>> >  
Subject: RE: Roxbury SEA/Scope of work status 3/15/18

Pete,

Thanks for all this information. With anticipation to hear back from Angela tomorrow and then working with Adam to complete the proposed alternatives it is looking like I can submit the SEA for BGS/FWD review on April 3. This would give me time to have an internal review at Stone.

Peter Thomas checked in with me and I told him the same scenario.



**DEPARTMENT OF THE ARMY**  
US ARMY CORPS OF ENGINEERS  
NEW ENGLAND DISTRICT  
696 VIRGINIA ROAD  
CONCORD MA 01742-2751

May 18, 2018

Regulatory Division  
CENAE-RDC-63  
File Number: NAE-2013-00656

Vermont Fish and Wildlife Department  
Attn: Mr. Louis Porter  
1 National Life Drive, Davis 2  
Montpelier, Vermont 05620

Dear Mr. Porter:

We have determined that the additional work proposed at the Roxbury Fish Culture Station located at 3696 Roxbury Road in Roxbury, Vermont does not require additional permitting from the Department of Army. The additional work includes a residence, septic mound, well, and water/wastewater connections and is shown on the attached plans, in two sheets, entitled "VICINITY MAP" (dated "17 MAY 2018") and "WETLAND & OHW IMPACTS MAP" (dated "1.6.17", last revised "4.30.18"). The proposed wetland and waterway impacts associated with this additional work is located within the previously approved areas verified on February 6, 2017 under Category 2 of Department of the Army permit no. NAE-2012-01167.

Our regulatory jurisdiction encompasses all work in or affecting navigable waters of the United States under Section 10 of the Rivers and Harbors Act of 1899 and the discharge of dredged or fill material into all waters of the United States, including adjacent wetlands, as well as discharges associated with excavation and grading within those waters, under Section 404 of the Clean Water Act. Since your proposal does not include additional impacts within Corps jurisdiction beyond what is currently authorized under Department of the Army permit no. NAE-2012-01167, no further action is required.

As you know, Department of the Army permit no. NAE-2012-01167 expired on December 6, 2017. Since this project was under contract before the permit expiration date, you are allotted an additional year (until December 6, 2018) to complete the work. If impacts within Corps jurisdiction are not completed by December 6, 2018, the project will need to be re-verified under the new Vermont General Permits (NAE-2017-02232). There has been no other change in circumstances since the issuance of the original verification letter and the conditions of the original permit remain in full force and effect.



The Corps of Engineers permit process does not supersede any other agency's jurisdiction. Therefore, if other Federal, State, and/or local agencies have jurisdiction over your proposed activity, you must receive all other applicable permits before you can begin work.

If you have any questions regarding this letter, please contact Angela C. Repella at (802) 872-2893.

Sincerely,

A handwritten signature in black ink that reads "Michael J. Adams". The signature is written in a cursive style with a horizontal line at the end.

*for* Frank J. Delgiudice  
Chief, Permits & Enforcement Branch  
Regulatory Division

Attachments

Copies furnished:

Ms. Shannon Morrison  
Vermont Department of Environmental Conservation  
[Shannon.morrison@vermont.gov](mailto:Shannon.morrison@vermont.gov)

Mr. Mark Bannon  
Bannon Engineering  
[Mark@bannonengineering.com](mailto:Mark@bannonengineering.com)

Vermont Fish and Wildlife Department  
Mr. Louis Porter  
[Louis.Porter@vermont.gov](mailto:Louis.Porter@vermont.gov)

Mr. Jeremy Whalen  
Vermont Fish and Wildlife Department  
[Jeremy.Whalen@vermont.gov](mailto:Jeremy.Whalen@vermont.gov)

Mr. Adam Miller  
Vermont Fish and Wildlife Department  
[Adam.Miller@vermont.gov](mailto:Adam.Miller@vermont.gov)

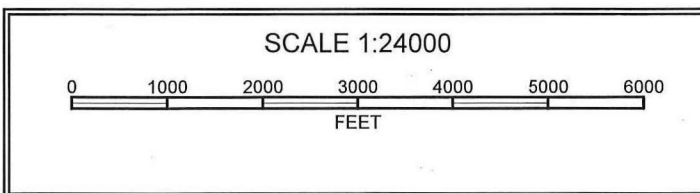
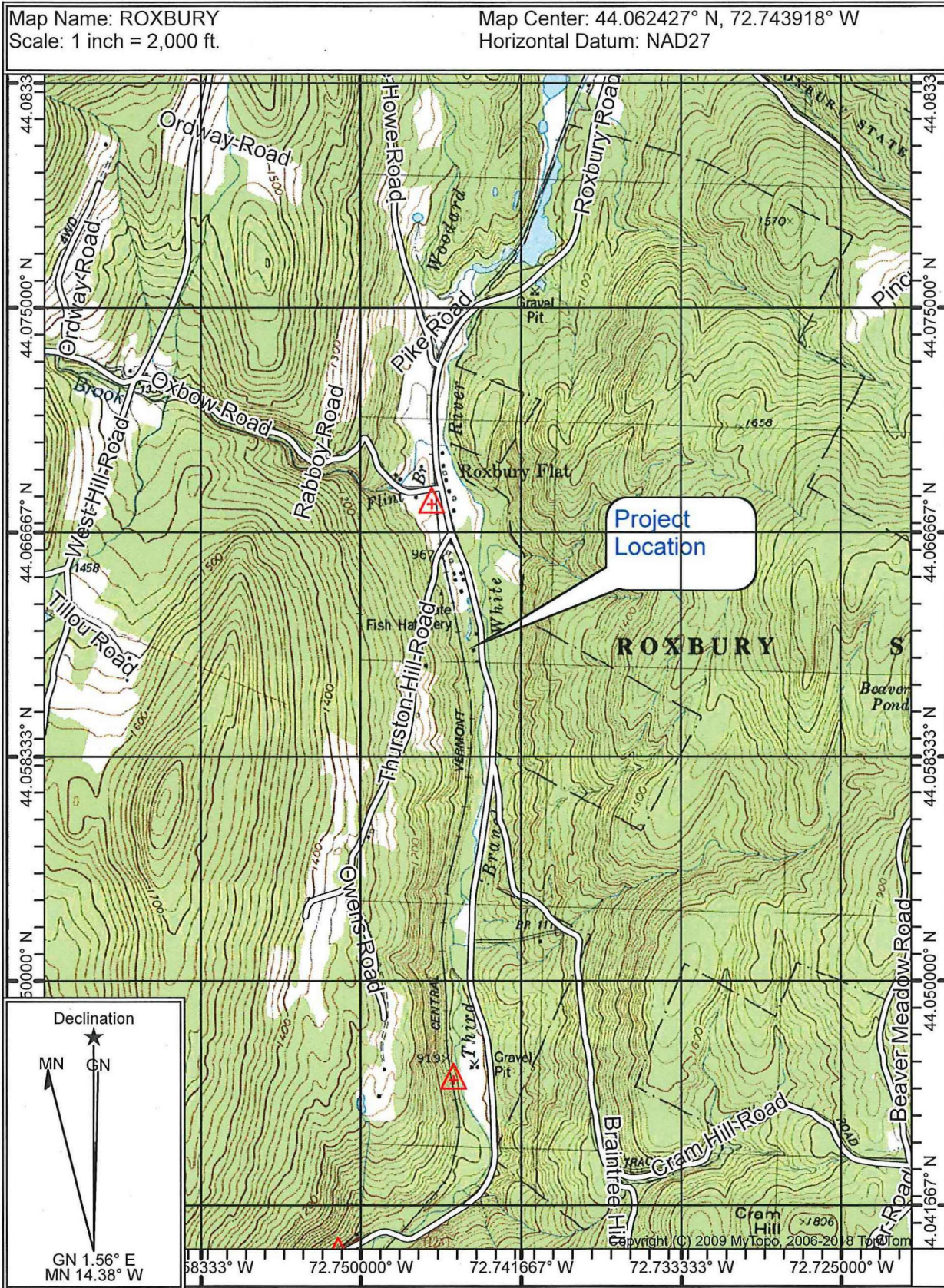
Mr. Peter Hack  
State of Vermont  
Department of Buildings and General Services  
[Peter.Hack@vermont.gov](mailto:Peter.Hack@vermont.gov)

Mr. Marcus Tate  
Federal Emergency Management Agency  
[Marcus.Tate@fema.dhs.gov](mailto:Marcus.Tate@fema.dhs.gov)

Mr. Dave Robbins  
Federal Emergency Management Agency  
[David.robbins@fema.dhs.gov](mailto:David.robbins@fema.dhs.gov)

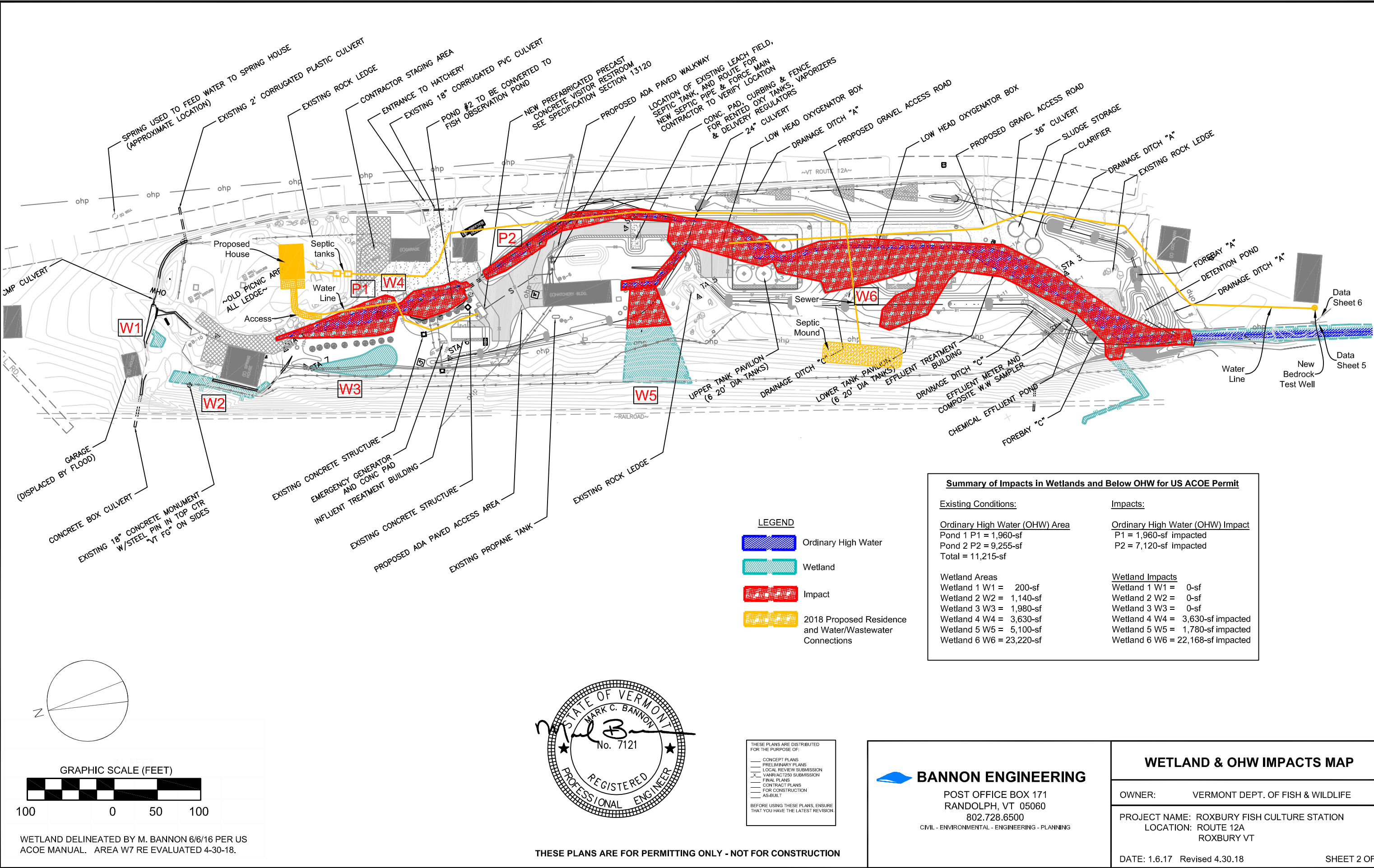


# Appendix A-12 5.18.18 USACE Additional Scope Determination Letter



VICINITY MAP  
ROXBURY FISH CULTURE STATION  
RT 12A, ROXBURY, VT  
17 MAY 2018







**Jeremy Whalen, Fish Culture Specialist**  
**VT Dept of Fish & Wildlife**  
**Roxbury Fish Culture Station**  
**3696 Roxbury Rd**  
**Roxbury, VT 05669**

**RE: Roxbury Fish Culture Station, Well Site 1/Well 001-Pump Test Analysis & Report**

Dear Jeremy,

Well Site Well 001 was located using fracture trace analysis methods. It was drilled between July 10, 2017 and July 22, 2017 resulting in an impressive yield of +400 gpm. This letter report serves to summarize the results of drilling and pump testing with recommendations regarding the long term use of the well.

**1) Well Drilling**

As noted above, the well was drilled to a depth of 400' with an approximate yield of +400 gpm. A 14" top hole was drilled to a depth of 40' where 10" casing was set. Grey to black phyllite and schist was encountered at 16' with rotten/broken rock encountered at 30' with a top hole yield of 80-90 gpm which was sealed out. An 8" borehole was drilled to 400' with high yield zones intercepted at 70', 165', 245', and 300'. The grey to black phyllite and schist continued to the bottom of the hole. Because of an approximate yield of +400gpm, the borehole was reamed out to 10" in order to accommodate a pump capable of pumping up to 550 gpm. During pump setting, the pump encountered a blockage in the well due to fractured rock collapse which necessitated resetting the drill rig on the well and cleaning/redeveloping it. The lower hatchery well was monitored with a pressure transducer during the drilling. A record of the water level is presented on Chart 1 which shows approximately 35' of interference caused by drilling.

**2) Pump Testing**

A 550 gpm Goulds pump Model VIS-WF 7TLC 7Stage vertical turbine with a 100 h.p motor was set at the depth of 340' on August 24, 2017 and outfitted with a 6" gate valve, 6" flow meter and 6" discharge pipe. The pump was set at 340' because a soft bottom was encountered possibly related to sediment infilling from a large water bearing fracture at +/- 300'.

A step drawdown test was conducted on August 29, 2017 with 8 steps run for a one hour period each at 150, 250, 300, 350, 400, 450, 500 and 600 gpm. The step test data is included as Table 1 with the data plotted on Chart 2. The drawdown for each step was extended out to 180 days to simulate long term pumping and the long term test pumping rate was determined from that. The graphed data suggested that at rates from 150 gpm to 450 gpm the well would be under pumped, so a target rate of 500gpm was chosen for the 120 hour pump test.

The 120 hour pump test was initiated on September 5, 2017 at a rate of 500 gpm and the test was ended on September 10, 2017. The pump test data is included on Table 2 and consists of a record of the clock time, the elapsed time (t), elapsed recovery time (t'), t/t' for recovery, depth to water, drawdown (s), residual drawdown (s') and the calculated discharge rate (Q) in gpm. The elapsed time in minutes, drawdown in feet and discharge rate in gpm are plotted on Chart 3. As Chart 3 indicates the pumping rate had to be cut back at 1440 minutes to 450 gpm and then to 400 gpm at 4320 minutes due to excessive drawdown at 500 and 450 gpm. A pumping rate of 400 gpm was maintained to the end of the test at 7200 minutes. The 400 gpm drawdown was projected at the end of the test to 180 days to anticipate long term pumping. At 180 days the projected drawdown would reach 62.87' which effectively defines a long term production pumping rate of 400 gpm. The 400 gpm and the drawdown data per log cycle from the projected drawdown were used to calculate a transmissivity (T) value of 11,700 gpd per foot of drawdown. Aquifer transmissivity is defined as the amount of water that can be transmitted horizontally through a unit width by the full saturated thickness of the aquifer under a hydraulic gradient of 1. Needless to say, this well has a high transmissivity.

At the end of 120 hours (7200 minutes), the pump test was ended and well recovery was monitored until the static water level (measured at the start of the test) was reached. The static water level was reached 210 minutes after pumping ceased which is incredibly fast. The recovery water level data and elapsed time (t) is also shown on Table 2 which is translated in elapsed recovery time (t'), t/t' and residual drawdown (s') for chart plotting purposes. In this regard, an arithmetic plot of residual drawdown versus recovery time is shown on Chart 4 with full recovery reached in 210 minutes. Residual drawdown (s') is plotted versus t/t' (elapsed time/recovery time) on Chart 5 in order to help define the effects of pumping and to calculate transmissivity. Full recovery was reached at 35.04 minutes which is way to the right of the origin of the graph. This is a true indication that the well was not over pumped at a rate of 400 gpm. The calculated transmissivity from the recovery plot using 400 gpm and a residual drawdown/log cycle of 4.018' is a very high 26,283 gpd/foot of residual drawdown.

### 3) Well Interference

Well interference was monitored before, during and after the 120 hour pump test in the lower well, the upper well, the Baker well and the Potwin well. Permission to monitor letters were sent to 14 property owners with wells located within 3000' of the pumping well but only the Bakers and the Potwins responded with permission. The letter sent to them and their permission to monitor sheets are attached. The Baker & Potwin wells are located +/- 2200' and +/- 1650' from the pumping well, respectively. The lower and upper hatchery wells are located +/- 50' and +/- 1080' from the pumping well, respectively. Water level data from the 4 wells shown on Chart 6 through Chart 9. With the exception of the lower well which showed 50' of interference from pumping well 001 at 400gpm, none of the others showed any interference at all. The upper well continued to flow throughout the test and the water level in the Baker and Potwin wells rose throughout the test. In short the only well impacted by the 400 gpm pump test was the lower well located +/- 50' away to the south. The impact to the lower well is not significant enough to prevent its use to supply the demands of the lower hatchery building.

### 4) Water Quality

The water quality results are attached. Because of time sensitivity related to several analyses, the water was sampled on September 7, 2017 in the middle of the 120 hour pump test. Samples were collected for microbiological, turbidity, primary and secondary inorganic contaminants, volatile organic chemicals, cyanide, synthetic organic chemicals, carbamate pesticides, radionuclides and uranium. The water quality is very acceptable in most regards. There is total coliform but no e.coli and the turbidity is



somewhat elevated. This is not a surprise given the well was still in the development phase which is the reason for the elevated turbidity and the total coliform related to it. The total coliform and turbidity should drop to absent and very low levels with pumping. The water should be considered on the soft end of moderately hard (50-150 mg/l) at 68 mg/l. It has a neutral pH, is very slightly corrosive at -1.506 and has low nitrates at 0.27 mg/l (the MCL or maximum contaminant level) is 10mg/l. Iron which is an aesthetic parameter (causing staining) is very slightly elevated at 0.35 mg/l above the MCL of 0.30 mg/l. The remaining primary & secondary inorganic contaminants are at low levels or less than detection levels which are below any applicable MCL. The volatile organics, cyanide, synthetic organics, carbamate pesticides, radionuclides and uranium are non detect or at levels below their MCL. The water can be considered to be high quality and generally pristine, not needing treatment.

## **5) Conclusions and Recommendations**

**A)** A successful fractured bedrock well 001 was drilled to a depth of 400' with a well yield in excess of 400 gpm with water bearing fractures encountered at 70', 165', 245', and 300'. The largest water bearing fracture was encountered at 300'.

**B)** A step drawdown test was conducted with 8 steps run for a one hour period each at 150, 250, 300, 350, 400, 450, 500 and 600 gpm. Highly turbid water was generated from a depth of 300' during the 600 gpm step indicating well development was occurring from the major water bearing fracture located at 300'. A long term pumping rate of 500 gpm was proposed based on the step test.

**C)** A 120 hour long term pump test was conducted at a starting rate of 500 gpm but due to abrupt excessive drawdown to 300' the test was cut back to 450 gpm and then to 400 gpm (for the remainder of the test).

**D)** At 400 gpm, 53.6' of drawdown to a depth of 63' was achieved at the end of 120 hour test with a 180 day drawdown projection of 62.87' to a depth of 72.27'. The aquifer transmissivity was calculated to be a high value of 11,700 gpd/ft.

**E)** Following the 120 hour test, water level recovery was monitored. Full recovery was rapidly achieved in 210 minutes suggesting that the well had not been over pumped at 400 gpm. Subsequent analysis of the recovery data indicated that the well had not been over pumped and that the aquifer transmissivity was a high value of 26,283 gpd/ft.

**F)** Four wells were monitored throughout the pump test period including the lower hatchery well, the upper hatchery well, the Baker well and the Potwin well with only the lower well showing well interference.

**G)** Although the lower well was drawn down to a depth of 59', the interference was not enough to prevent the lower well for supplying the demands of the lower hatchery building.

**H)** The well was sampled during the pump test for full spectrum microbiological, inorganic chemicals, organic chemicals, radionuclides, uranium, cyanide and turbidity analyses and found to have outstanding water quality with minor deviations related to total coliform, turbidity and iron. Once connected to the hatchery for production pumping, the well should be re-sampled for turbidity, microbiological and iron analyses after pumping for several days.

I) A vertical turbine pump capable of pumping 400 gpm from a pumping level of 75' should be set at 340' and outfitted with a 1 ¼" monitoring tube set just above the pump for short term monitoring using an electric tape or long term monitoring using a pressure transducer.

This completes a successful pump testing program at a safe yield pumping rate of 400 gpm which includes the pump test analysis and this letter report. If you have any questions, please do not hesitate to call me at: 802-453-4384 or email me at [srevell@lagvt.com](mailto:srevell@lagvt.com).

Very Truly Yours,  
Lincoln Applied Geology Inc



Stephen Revell, CPG  
Senior Hydrogeologist

encl

cc: Peter Hack  
Adam Miller



Project: Roxbury Fish Hatchery  
 Location: Roxbury, Vermont  
 LAG Project #16116

**August 29, 2017**  
**Step Drawdown Test Data**

Table 1  
 Page 1 of 3

Elapsed Pumping Time, t (min.)	Depth to Water (ft)	Drawdown, s (ft)	Discharge, Q (gpm)	Step #
0.01	9.55	0.00	150	1
5	15	5.45	150	
10	15.5	5.95	150	
15	15.55	6.00	150	
20	15.6	6.05	150	
25	15.65	6.10	150	
30	15.65	6.10	150	
35	15.7	6.15	150	
40	15.75	6.20	150	
45	15.75	6.20	150	
50	15.75	6.20	150	
55	15.75	6.20	150	
60	15.75	6.20	150	
65	22.2	12.65	250	2
70	22.15	12.60	250	
75	22.15	12.60	250	
80	22.1	12.55	250	
85	21.8	12.25	250	
90	21.75	12.20	250	
95	21.75	12.20	250	
100	21.75	12.20	250	
105	21.8	12.25	250	
110	21.75	12.20	250	
115	21.8	12.25	250	
120	26.25	16.70	250	3
125	26.50	16.95	300	
130	26.25	16.70	300	
135	26.75	17.20	300	
140	26.80	17.25	300	
145	26.84	17.29	300	
150	26.95	17.40	300	
155	26.90	17.35	300	
160	27.00	17.45	300	
165	27.00	17.45	300	
170	27.00	17.45	300	
175	27.05	17.50	300	
180	27.05	17.50	300	

Project: Roxbury Fish Hatchery  
 Location: Roxbury, Vermont  
 LAG Project #16116

**August 29, 2017**  
**Step Drawdown Test Data**

Table 1  
 Page 2 of 3

Elapsed Pumping Time, t (min.)	Depth to Water (ft)	Drawdown, s (ft)	Discharge, Q (gpm)	Step #
185	30.55	21.00	350	4
190	30.95	21.40	350	
195	31.20	21.65	350	
200	31.35	21.80	350	
210	31.50	21.95	350	
215	31.60	22.05	350	
220	31.80	22.25	350	
225	31.80	22.25	350	
230	31.80	22.25	350	
235	31.90	22.35	350	
240	31.90	22.35	350	
245	36.70	27.15	400	5
250	37.50	27.95	400	
255	37.85	28.30	400	
260	38.20	28.65	400	
265	38.40	28.85	400	
270	38.45	28.90	400	
275	38.50	28.95	400	
280	38.60	29.05	400	
285	38.65	29.10	400	
290	39.35	29.80	400	
295	39.90	30.35	400	
300	40.30	30.75	400	6
305	42.15	32.60	450	
310	42.50	32.95	450	
315	42.80	33.25	450	
320	42.87	33.32	450	
325	43.00	33.45	450	
330	43.20	33.65	450	
335	43.30	33.75	450	
340	43.30	33.75	450	
345	43.30	33.75	450	
350	43.30	33.75	450	
355	43.31	33.76	450	
360	43.32	33.77	450	

Project: Roxbury Fish Hatchery  
 Location: Roxbury, Vermont  
 LAG Project #16116

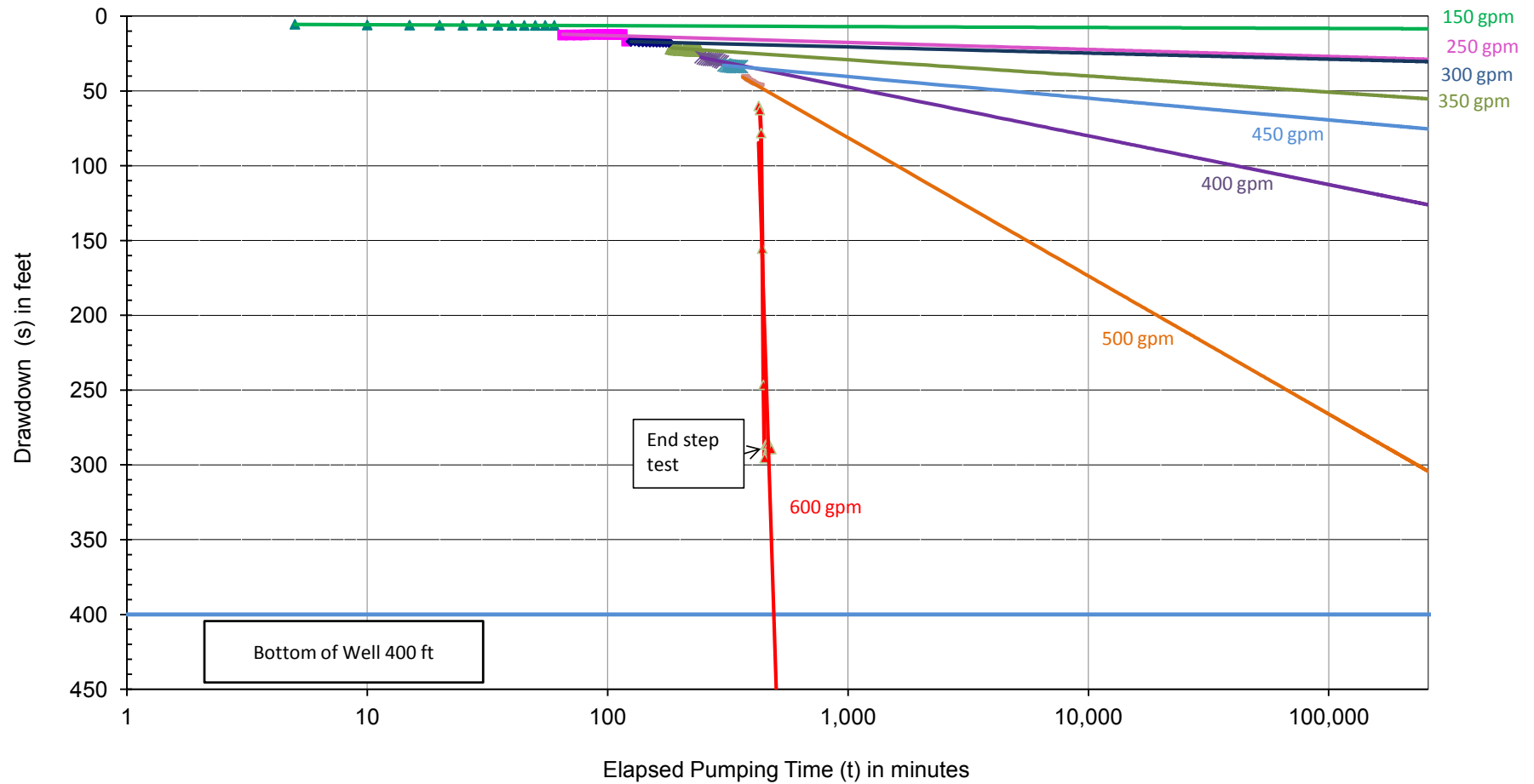
**August 29, 2017**  
**Step Drawdown Test Data**

Table 1  
 Page 3 of 3

Elapsed Pumping Time, t (min.)	Depth to Water (ft)	Drawdown, s (ft)	Discharge, Q (gpm)	Step #
365	49.60	40.05	500	7
370	50.70	41.15	500	
375	51.75	42.20	500	
380	52.40	42.85	500	
385	52.70	43.15	500	
390	53.30	43.75	500	
395	53.90	44.35	500	
400	54.40	44.85	500	
405	54.80	45.25	500	
410	55.08	45.53	500	
415	55.25	45.70	500	
420	55.40	45.85	500	
425	69.60	60.05	600	8
430	72.35	62.80	600	
435	87.70	78.15	600	
440	165	155.45	600	
445	256	246.45	600	
450	305	295.45	600	
455	296	286.45	600	
460	296	286.45	600	
465	299	289.45	600	
470	296	286.45	600	
475	298	288.45	600	
480	299	289.45	600	

Chart 2

Roxbury Fish Hatchery  
Roxbury, Vermont  
August 29, 2017 Step Test  
**Elapsed Time vs. Drawdown with 180-Day Extrapolation**



Project: Roxbury Fish Hatchery  
Location: Roxbury, Vermont  
LAG Project #16116

**WL001**  
**September 5-10, 2017**  
**120-Hour Pump Test Data**

Clock Time	Elapsed Time, t (minutes)	Elapsed Recovery Time, t' (minutes)	t/t'	Depth to Water (feet)	Drawdown, s (feet)	Residual Drawdown, s' (feet)	Calculated Discharge, Q (gpm)	Remarks
9/5/2017 8:30	0.01	-	-	9.40	0.00	-	--	Manual measurement
9/5/2017 8:31	1	-	-	27.60	18.20	-	500.00	Manual measurement
9/5/2017 8:32	2	-	-	33.00	23.60	-	500.00	Manual measurement
9/5/2017 8:33	3	-	-	36.20	26.80	-	500.00	Manual measurement
9/5/2017 8:34	4	-	-	38.50	29.10	-	500.00	Manual measurement
9/5/2017 8:35	5	-	-	40.00	30.60	-	500.00	Manual measurement
9/5/2017 8:36	6	-	-	41.15	31.75	-	500.00	Manual measurement
9/5/2017 8:37	7	-	-	42.00	32.60	-	500.00	Manual measurement
9/5/2017 8:38	8	-	-	42.70	33.30	-	500.00	Manual measurement
9/5/2017 8:39	9	-	-	43.20	33.80	-	500.00	Manual measurement
9/5/2017 8:40	10	-	-	43.60	34.20	-	500.00	Manual measurement
9/5/2017 8:42	12	-	-	44.30	34.90	-	500.00	Manual measurement
9/5/2017 8:44	14	-	-	44.60	35.20	-	500.00	Manual measurement
9/5/2017 8:46	16	-	-	44.60	35.20	-	500.00	Manual measurement
9/5/2017 8:48	18	-	-	44.60	35.20	-	500.00	Manual measurement
9/5/2017 8:50	20	-	-	44.60	35.20	-	500.00	Manual measurement
9/5/2017 8:52	22	-	-	44.60	35.20	-	500.00	Manual measurement
9/5/2017 8:54	24	-	-	45.00	35.60	-	500.00	Manual measurement
9/5/2017 8:56	26	-	-	45.30	35.90	-	500.00	Manual measurement
9/5/2017 8:58	28	-	-	45.60	36.20	-	500.00	Manual measurement
9/5/2017 9:00	30	-	-	45.90	36.50	-	500.00	Manual measurement
9/5/2017 9:05	35	-	-	46.90	37.50	-	500.00	Manual measurement
9/5/2017 9:10	40	-	-	47.50	38.10	-	500.00	Manual measurement
9/5/2017 9:15	45	-	-	48.05	38.65	-	500.00	Manual measurement
9/5/2017 9:20	50	-	-	48.40	39.00	-	500.00	Manual measurement
9/5/2017 9:25	55	-	-	48.80	39.40	-	500.00	Manual measurement
9/5/2017 9:30	60	-	-	49.20	39.80	-	500.00	Manual measurement
9/5/2017 9:35	65	-	-	49.35	39.95	-	500.00	Manual measurement
9/5/2017 9:40	70	-	-	49.70	40.30	-	500.00	Manual measurement
9/5/2017 9:45	75	-	-	49.90	40.50	-	500.00	Manual measurement
9/5/2017 9:50	80	-	-	50.40	41.00	-	500.00	Manual measurement
9/5/2017 9:55	85	-	-	50.60	41.20	-	490.00	Manual measurement
9/5/2017 10:00	90	-	-	51.00	41.60	-	495.00	Manual measurement
9/5/2017 10:10	100	-	-	51.80	42.40	-	500.00	Manual measurement
9/5/2017 10:20	110	-	-	52.20	42.80	-	500.00	Manual measurement
9/5/2017 10:30	120	-	-	52.90	43.50	-	500.00	Manual measurement
9/5/2017 10:40	130	-	-	53.40	44.00	-	490.00	Manual measurement
9/5/2017 10:50	140	-	-	53.90	44.50	-	490.00	Manual measurement
9/5/2017 11:00	150	-	-	54.40	45.00	-	510.00	Manual measurement
9/5/2017 11:10	160	-	-	54.70	45.30	-	495.00	Manual measurement
9/5/2017 11:20	170	-	-	55.00	45.60	-	505.00	Manual measurement
9/5/2017 11:30	180	-	-	55.15	45.75	-	485.00	Manual measurement
9/5/2017 12:00	210	-	-	55.90	46.50	-	495.00	Manual measurement
9/5/2017 12:30	240	-	-	56.60	47.20	-	495.00	Manual measurement
9/5/2017 13:00	270	-	-	57.80	48.40	-	501.67	Manual measurement
9/5/2017 13:30	300	-	-	58.75	49.35	-	495.00	Manual measurement
9/5/2017 14:00	330	-	-	59.70	50.30	-	490.00	Manual measurement
9/5/2017 14:30	360	-	-	60.80	51.40	-	500.00	Manual measurement
9/5/2017 15:00	390	-	-	61.50	52.10	-	490.00	Manual measurement
9/5/2017 15:30	420	-	-	62.20	52.80	-	493.33	Manual measurement
9/5/2017 16:30	480	-	-	63.80	54.40	-	496.67	Manual measurement
9/5/2017 17:30	540	-	-	65.20	55.80	-	495.00	Manual measurement
9/5/2017 18:30	600	-	-	66.90	57.50	-	495.00	Manual measurement
9/5/2017 19:30	660	-	-	68.10	58.70	-	505.00	Manual measurement
9/5/2017 20:30	720	-	-	68.95	59.55	-	490.00	Manual measurement
9/5/2017 21:30	780	-	-	70.75	61.35	-	496.67	Manual measurement
9/5/2017 22:30	840	-	-	92.10	82.70	-	485.00	Manual measurement
9/5/2017 23:30	900	-	-	111.95	102.55	-	496.67	Manual measurement
9/6/2017 0:30	960	-	-	124.85	115.45	-	485.00	Manual measurement
9/6/2017 1:30	1020	-	-	153.50	144.10	-	491.67	Manual measurement
9/6/2017 2:30	1080	-	-	187.00	177.60	-	490.00	Manual measurement
9/6/2017 3:30	1140	-	-	235.90	226.50	-	486.67	Manual measurement
9/6/2017 4:30	1200	-	-	275.30	265.90	-	501.67	Manual measurement
9/6/2017 5:30	1260	-	-	281.50	272.10	-	471.67	Manual measurement
9/6/2017 6:30	1320	-	-	287.90	278.50	-	478.33	Manual measurement
9/6/2017 7:30	1380	-	-	294.00	284.60	-	480.00	Manual measurement
9/6/2017 8:30	1440	-	-	301.00	291.60	-	480.00	Manual measurement
9/6/2017 11:30	1620	-	-	65.00	55.60	-	450.00	Manual measurement
9/6/2017 14:30	1800	-	-	63.00	53.60	-	445.56	Manual measurement
9/6/2017 17:30	1980	-	-	63.00	53.60	-	455.00	Manual measurement



Project: Roxbury Fish Hatchery  
Location: Roxbury, Vermont  
LAG Project #16116

**WL001**  
**September 5-10, 2017**  
**120-Hour Pump Test Data**

Clock Time	Elapsed Time, t (minutes)	Elapsed Recovery Time, t' (minutes)	t/t'	Depth to Water (feet)	Drawdown, s (feet)	Residual Drawdown, s' (feet)	Calculated Discharge, Q (gpm)	Remarks
9/6/2017 20:30	2160	-	-	65.00	55.60	-	455.56	Manual measurement
9/6/2017 23:30	2340	-	-	66.00	56.60	-	438.89	Manual measurement
9/7/2017 2:30	2520	-	-	69.00	59.60	-	438.89	Manual measurement
9/7/2017 5:30	2700	-	-	68.00	58.60	-	444.44	Manual measurement
9/7/2017 8:30	2880	-	-	68.20	58.80	-	445.00	Manual measurement
9/7/2017 11:30	3060	-	-	87.20	77.80	-	444.44	Manual measurement
9/7/2017 14:30	3240	-	-	108.90	99.50	-	443.33	Manual measurement
9/7/2017 17:30	3420	-	-	110.40	101.00	-	443.33	Manual measurement
9/7/2017 20:30	3600	-	-	111.90	102.50	-	443.33	Manual measurement
9/7/2017 23:30	3780	-	-	132.00	122.60	-	443.33	Manual measurement
9/8/2017 2:30	3960	-	-	151.00	141.60	-	443.33	Manual measurement
9/8/2017 5:30	4140	-	-	218.90	209.50	-	441.67	Manual measurement
9/8/2017 8:30	4320	-	-	295.00	285.60	-	442.22	Manual measurement
9/8/2017 11:30	4500	-	-	61.00	51.60	-	405.00	Manual measurement
9/8/2017 14:30	4680	-	-	59.00	49.60	-	405.00	Manual measurement
9/8/2017 17:30	4860	-	-	56.00	46.60	-	398.33	Manual measurement
9/8/2017 20:30	5040	-	-	55.00	45.60	-	396.67	Manual measurement
9/8/2017 23:30	5220	-	-	55.00	45.60	-	396.67	Manual measurement
9/9/2017 2:30	5400	-	-	55.00	45.60	-	402.78	Manual measurement
9/9/2017 5:30	5580	-	-	55.00	45.60	-	390.56	Manual measurement
9/9/2017 8:30	5760	-	-	55.00	45.60	-	397.22	Manual measurement
9/9/2017 11:30	5940	-	-	58.00	48.60	-	410.00	Manual measurement
9/9/2017 14:30	6120	-	-	59.00	49.60	-	409.44	Manual measurement
9/9/2017 17:30	6300	-	-	58.00	48.60	-	415.00	Manual measurement
9/9/2017 20:30	6480	-	-	55.30	45.90	-	412.00	Manual measurement
9/9/2017 23:30	6660	-	-	56.00	46.60	-	415.00	Manual measurement
9/10/2017 2:30	6840	-	-	58.60	49.20	-	410.00	Manual measurement
9/10/2017 5:30	7020	-	-	59.00	49.60	-	405.00	Manual measurement
9/10/2017 8:30	7200	0	-	63.00	53.60	53.60	410.00	Manual measurement
9/10/2017 8:31	7201	1	7201.0	51.00	-	41.60	-	
9/10/2017 8:32	7202	2	3601.0	49.00	-	39.60	-	
9/10/2017 8:33	7203	3	2401.0	46.00	-	36.60	-	
9/10/2017 8:34	7204	4	1801.0	45.00	-	35.60	-	
9/10/2017 8:35	7205	5	1441.0	42.00	-	32.60	-	
9/10/2017 8:36	7206	6	1201.0	40.00	-	30.60	-	
9/10/2017 8:37	7207	7	1029.6	38.00	-	28.60	-	
9/10/2017 8:38	7208	8	901.0	36.00	-	26.60	-	
9/10/2017 8:39	7209	9	801.0	33.00	-	23.60	-	
9/10/2017 8:40	7210	10	721.0	31.50	-	22.10	-	
9/10/2017 8:42	7212	12	601.0	27.00	-	17.60	-	
9/10/2017 8:44	7214	14	515.3	23.50	-	14.10	-	
9/10/2017 8:46	7216	16	451.0	21.00	-	11.60	-	
9/10/2017 8:48	7218	18	401.0	19.30	-	9.90	-	
9/10/2017 8:50	7220	20	361.0	18.00	-	8.60	-	
9/10/2017 8:52	7222	22	328.3	17.00	-	7.60	-	
9/10/2017 8:54	7224	24	301.0	16.30	-	6.90	-	
9/10/2017 8:56	7226	26	277.9	15.50	-	6.10	-	
9/10/2017 8:58	7228	28	258.1	15.00	-	5.60	-	
9/10/2017 9:00	7230	30	241.0	14.50	-	5.10	-	
9/10/2017 9:10	7240	40	181.0	13.00	-	3.60	-	
9/10/2017 9:20	7250	50	145.0	12.00	-	2.60	-	
9/10/2017 9:30	7260	60	121.0	11.50	-	2.10	-	
9/10/2017 9:40	7270	70	103.9	11.25	-	1.85	-	
9/10/2017 9:50	7280	80	91.0	11.00	-	1.60	-	
9/10/2017 10:00	7290	90	81.0	10.90	-	1.50	-	
9/10/2017 10:30	7320	120	61.0	10.50	-	1.10	-	
9/10/2017 11:00	7350	150	49.0	10.10	-	0.70	-	
9/10/2017 11:30	7380	180	41.0	9.75	-	0.35	-	
9/10/2017 12:00	7410	210	35.3	9.40	-	0.00	-	
9/10/2017 12:30	7440	240	31.0	9.10	-	-0.30	-	

Chart 3

Roxbury Fish Hatchery  
Roxbury, Vermont  
WL001 120-Hour Pumping Test  
**Drawdown vs. Elapsed Time**

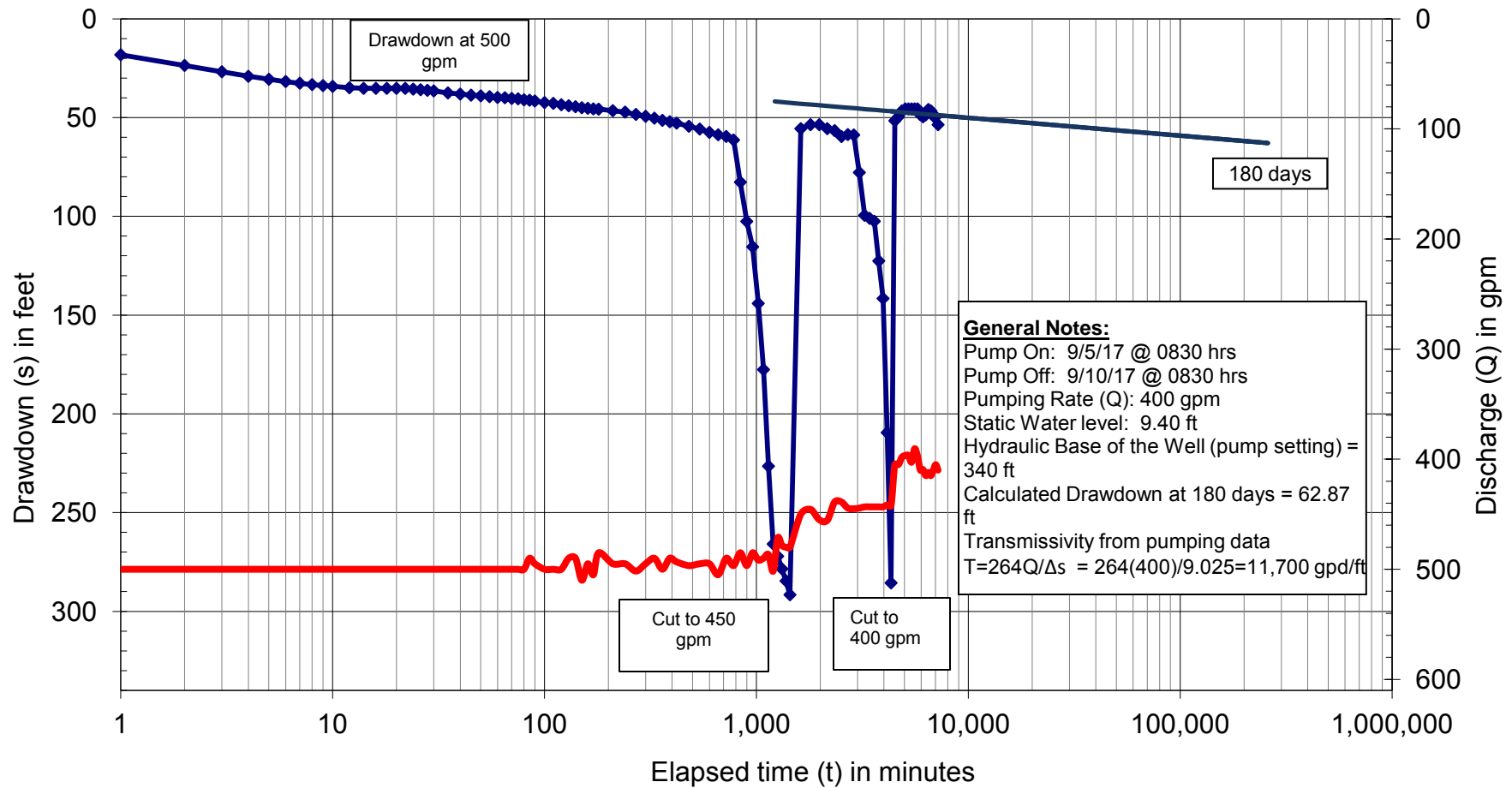


Chart 4

Roxbury Fish Hatchery  
Roxbury, Vermont  
**WL001 Residual Recovery (s') vs. Time (t')**

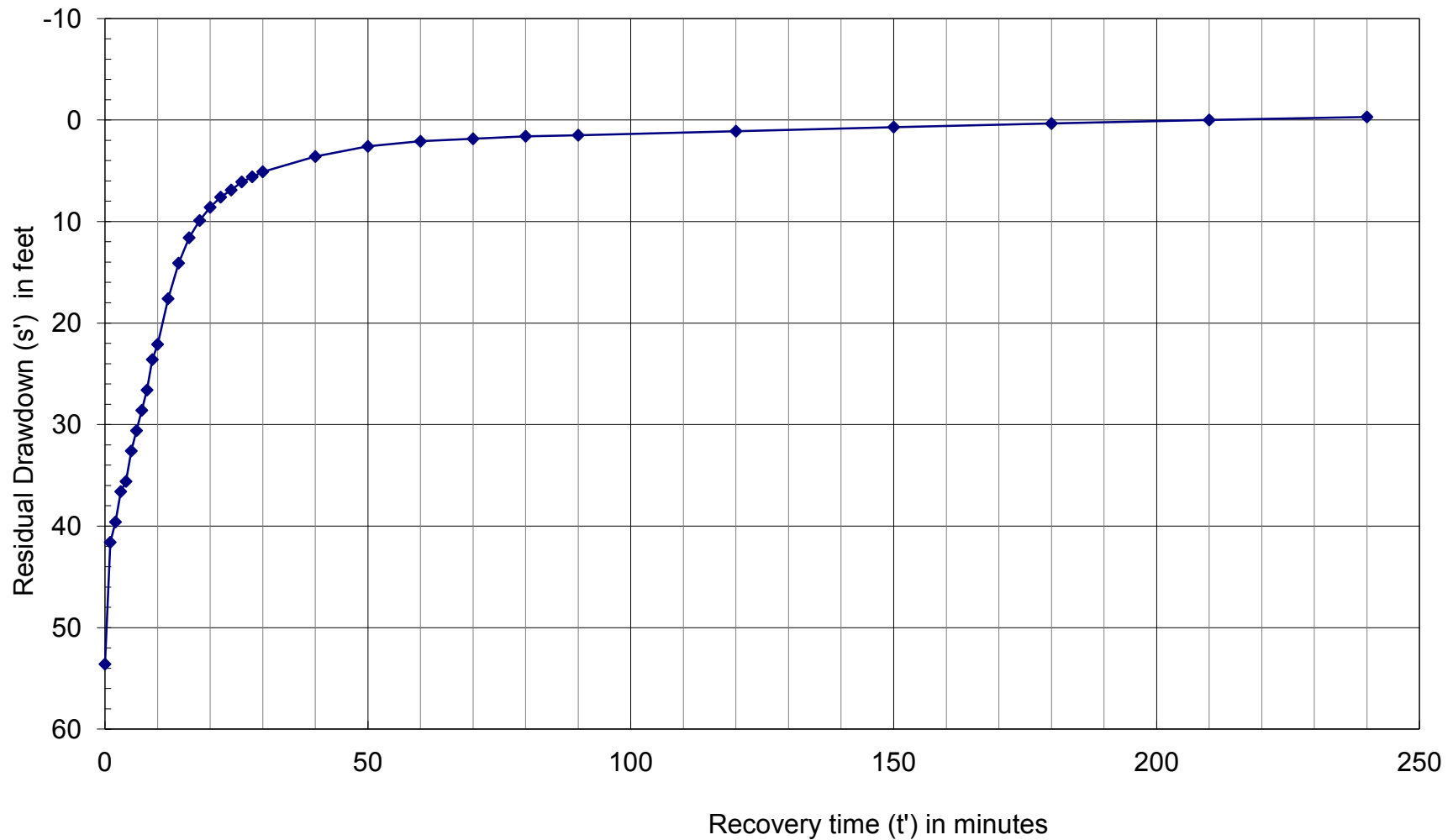
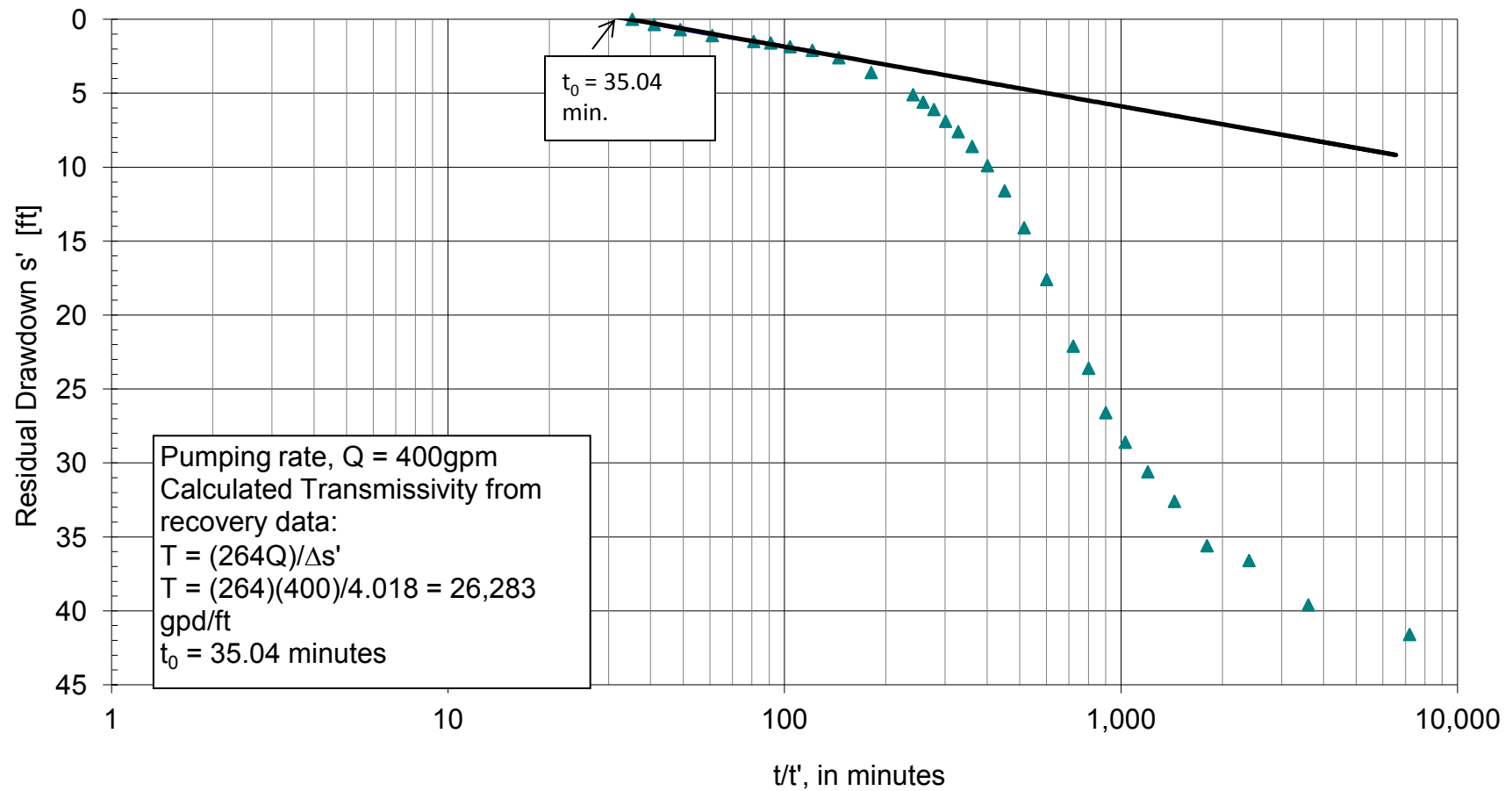


Chart 5

Roxbury Fish Hatchery  
Roxbury, Vermont  
**WL001 t/t' vs. Residual Drawdown (s')**





August 1, 2017

Clarence & Violet Baker  
3453 Roxbury Rd  
Roxbury, Vermont 05669

RE: Request for Permission to Monitor Water Supply  
Parcel ID #090029-000  
3453 Roxbury Rd  
Roxbury, Vermont

Dear Mr. & Mrs. Baker:

The State of Vermont Roxbury Fish Culture Station, located at 3696 Roxbury Rd in Roxbury Vermont is currently developing a new water supply well with the State of Vermont for fish culturing. Lincoln Applied Geology, Inc. (LAG) will be conducting a pump test on this well sometime in August or September. The pump test will be 120 hours in duration, and will be performed in order to determine the long-term yield of the well, its water quality, and the influence that pumping has on existing water supplies within a 3,000-foot radius surrounding the well.

We are contacting you because your property is within 3,000 feet of this well. LAG would like permission to monitor the water level in your well during the pumping test. We are doing this monitoring at no cost to you, as it is a required part of developing a well for the Roxbury Fish Culture Station.

In order for us to monitor the water supply, we will need to access the well by removing the cover. Once the cover is removed, we will install a 1" diameter PVC probe tube in your well. All well work will be performed by a licensed water well company. The probe tube will allow us to monitor water levels in your well without getting our equipment stuck on your pump or associated wiring. The majority of the water level monitoring conducted during the pumping test will be performed by using an automated data logger called a transducer. The data logger will automatically collect readings on your well during the pump test period, but we will have to manually measure the water level readings several times during the test to serve as reference for the transducer data. All collected data will be downloaded after the test and examined to determine if pumping the test well influences the water level in your well. This data is then used in conjunction with water level data collected from the new well and other wells to determine the long-term yield that the test well can be safely operated without adversely impacting existing water supply wells within the 3,000-foot investigation radius.

Baker, Clarence & Violet

August 1, 2017

Page 2 of 2

Installation of the probe tube will very likely create mild turbidity in your well which may persist for 24 to 48 hours. The turbidity is due to the rust that accumulates on the inside of the steel well casing that will settle out of the water column. Your patience is appreciated with this unavoidable consequence of monitoring.

When the monitoring period is completed, we will remove the equipment and disinfect your water supply with chlorine at your request. The well will then be properly covered.

My contact information and phone numbers during the pump test are below:

**Stephen Revell, Lincoln Applied Geology, Inc. : (802) 453-4384 or (802) 349-8542**

Please fill out and sign the enclosed form and return it to me in the self-addressed stamped envelope (SASE) by **August 15, 2017**. The more information you can provide concerning your water supply the better.

LAG appreciates your permission to monitor your well and the time you have taken to assist us in this process which is aimed at protecting the water supply. If you have any questions or comments, please don't hesitate to call me.

Sincerely,  
**Lincoln Applied Geology, Inc.**



Stephen Revell, CPG  
Senior Hydrogeologist

DN/SR:mh

Enclosure

F:\CLIENTS\2016\16116\Letters\Baker\_Request for Permission to Monitor Water Supply.docx

### PERMISSION TO MONITOR WATER SUPPLY WELL

I grant permission to Lincoln Applied Geology, Inc. (LAG), hydrogeological consultant to the Roxbury Fish Culture Station, to access to my water supply well or spring to perform periodic monitoring of the water levels during a long-term pumping test scheduled for August or September 2017.

Signed: Clarence Baker Date: 8/3/17  
 Name: Clarence Baker Telephone: 802-485-6707  
 Address: 3453 Roxbury Rd Roxbury VT 05669  
 Property Address with Water Supply: \_\_\_\_\_

Water Supply Type: (circle) ☐ No Well on Property ☒ Drilled Well ☐ Dug Well ☐ Spring

Well Type (circle) ☒ GRAVEL ☒ BEDROCK Well is above Ground? YES ☐ NO ☐

Depth to bedrock: \_\_\_\_\_ feet Well Tag/Year (on well): \_\_\_\_\_

Name of Well Driller: \_\_\_\_\_ Well Cover (circle): ☒ ABOVE GRADE or ☐ BURIED

Well Casing: Length \_\_\_\_\_ feet; Well Diameter: \_\_\_\_\_ inches

Well Depth: \_\_\_\_\_ feet Well Yield: \_\_\_\_\_ gallons per minute (gpm)

Depth to Water: \_\_\_\_\_ feet Depth of Well (feet) \_\_\_\_\_ Depth of Pump: \_\_\_\_\_ (feet)

Number of bedrooms served by your water supply: \_\_\_\_\_

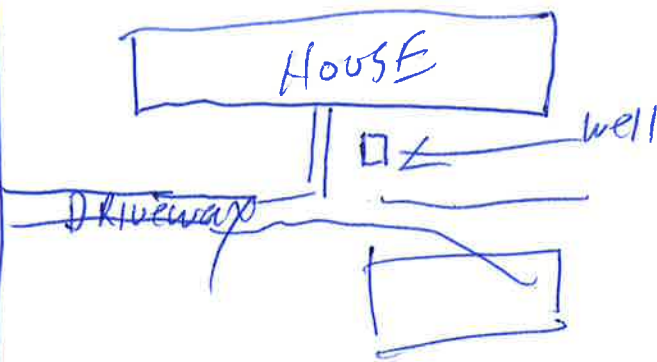
Do you want us to disinfect well with bleach at the end of our work? (Circle) ☒ YES ☐ NO

Describe Well Location: In front of house to the right of walkway  
covered by a 2x2 concrete box

If possible, sketch the well location with respect to the house and/or other structures:

**NOTES:** Buried Wells will not be monitored unless they are exposed prior to scheduled work. Please return the self addressed stamped envelope by August 15, 2017 or we cannot guarantee that you will be included in the interference monitoring program. Please return form even if you do not have a well or don't wish to have us monitor your well. Please write "DO NOT MONITOR MY WELL" across the top and fill in the rest of the information except the signature.

F:\CLIENTS\2016\16116\Letters\Interference Well Survey and Permission Form.doc



LINCOLN APPLIED

AUG 7 2017

GEOLOGY, INC.



August 1, 2017

Ralph & Linda Potwin  
PO Box 44  
Roxbury, Vermont 05669

RE: Request for Permission to Monitor Water Supply  
Parcel ID #090036-002  
18 Thurston Hill Rd  
Roxbury, Vermont

Dear Mr. & Ms. Potwin:

The State of Vermont Roxbury Fish Culture Station, located at 3696 Roxbury Rd in Roxbury Vermont is currently developing a new water supply well with the State of Vermont for fish culturing. Lincoln Applied Geology, Inc. (LAG) will be conducting a pump test on this well sometime in August or September. The pump test will be 120 hours in duration, and will be performed in order to determine the long-term yield of the well, its water quality, and the influence that pumping has on existing water supplies within a 3,000-foot radius surrounding the well.

We are contacting you because your property is within 3,000 feet of this well. LAG would like permission to monitor the water level in your well during the pumping test. We are doing this monitoring at no cost to you, as it is a required part of developing a well for the Roxbury Fish Culture Station.

In order for us to monitor the water supply, we will need to access the well by removing the cover. Once the cover is removed, we will install a 1" diameter PVC probe tube in your well. All well work will be performed by a licensed water well company. The probe tube will allow us to monitor water levels in your well without getting our equipment stuck on your pump or associated wiring. The majority of the water level monitoring conducted during the pumping test will be performed by using an automated data logger called a transducer. The data logger will automatically collect readings on your well during the pump test period, but we will have to manually measure the water level readings several times during the test to serve as reference for the transducer data. All collected data will be downloaded after the test and examined to determine if pumping the test well influences the water level in your well. This data is then used in conjunction with water level data collected from the new well and other wells to determine the long-term yield that the test well can be safely operated without adversely impacting existing water supply wells within the 3,000-foot investigation radius.



Potwin, Ralph & Linda

August 1, 2017

Page 2 of 2

Installation of the probe tube will very likely create mild turbidity in your well which may persist for 24 to 48 hours. The turbidity is due to the rust that accumulates on the inside of the steel well casing that will settle out of the water column. Your patience is appreciated with this unavoidable consequence of monitoring.

When the monitoring period is completed, we will remove the equipment and disinfect your water supply with chlorine at your request. The well will then be properly covered.

My contact information and phone numbers during the pump test are below:

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LAG appreciates your permission to monitor your well and the time you have taken to assist us in this process which is aimed at protecting the water supply. If you have any questions or comments, please don't hesitate to call me.

Sincerely,  
**Lincoln Applied Geology, Inc.**



Stephen Revell, CPG  
Senior Hydrogeologist

DN/SR:mh

Enclosure

F:\CLIENTS\2016\16116\Letters\Potwin\_Request for Permission to Monitor Water Supply.docx

**PERMISSION TO MONITOR WATER SUPPLY WELL**

I grant permission to Lincoln Applied Geology, Inc. (LAG), hydrogeological consultant to the Roxbury Fish Culture Station, to access to my water supply well or spring to perform periodic monitoring of the water levels during a long-term pumping test scheduled for August or September 2017.

Signed: Ralph E. Potvin Date: Aug. 3, 2017  
 Name: Ralph E. Linck Potvin Telephone: 802-485-7204  
 Address: Roxbury, Vermont 05669

Property Address with Water Supply: 18 Thurston Hill Rd

Water Supply Type: (circle) ☐ No Well on Property ☒ Drilled Well ☐ Dug Well ☐ Spring

Well Type (circle) GRAVEL or ☒ BEDROCK Well is above Ground? YES ☒ NO

Depth to bedrock: 20' feet Well Tag/Year (on well): 1377/165/4-96

Name of Well Driller: Johnson Artesian Well Co. Well Cover (circle): ABOVE GRADE or BURIED

Well Casing: Length 20' feet; Well Diameter: 6" inches

Well Depth: 85' feet Well Yield: 30 gallons per minute (gpm)

Depth to Water: \_\_\_\_\_ feet Depth of Well (feet) 85' Depth of Pump: \_\_\_\_\_ (feet)

Number of bedrooms served by your water supply: 2 Bedrooms & 2 Full Bathroom

Do you want us to disinfect well with bleach at the end of our work? (Circle) ☒ YES ☐ NO

Describe Well Location:

cut BACK & Between Main House & Garen Sheed,

If possible, sketch the well location with respect to the house and/or other structures:

**NOTES: Buried Wells will not be monitored unless they are exposed prior to scheduled work.**

**Please return the self addressed stamped envelope by August 15, 2017 or we cannot guarantee that you will be included in the interference monitoring program. Please return form even if you do not have a well or don't wish to have us monitor your well. Please write "DO NOT MONITOR MY WELL" across the top and fill in the rest of the information except the signature.**

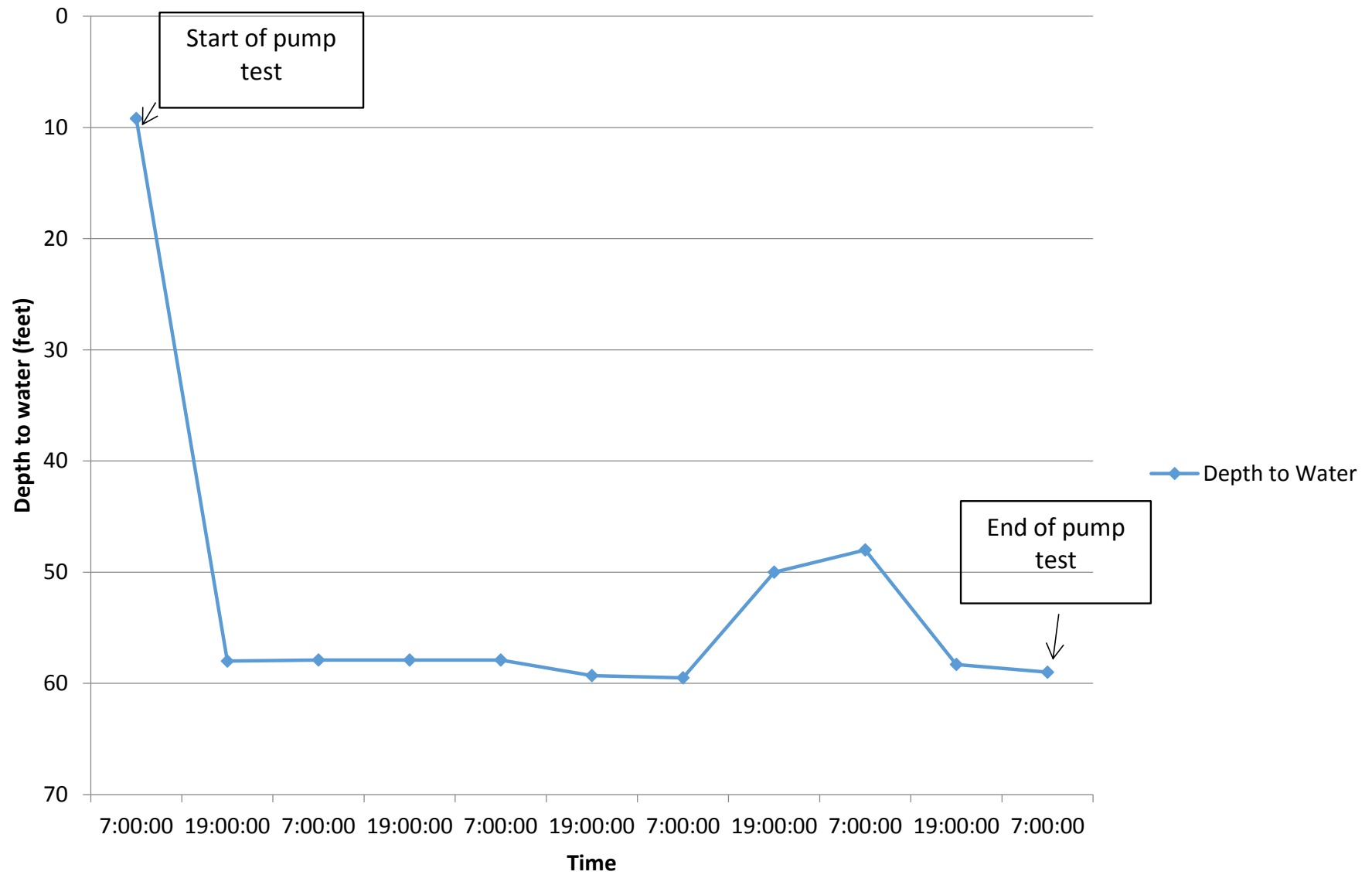
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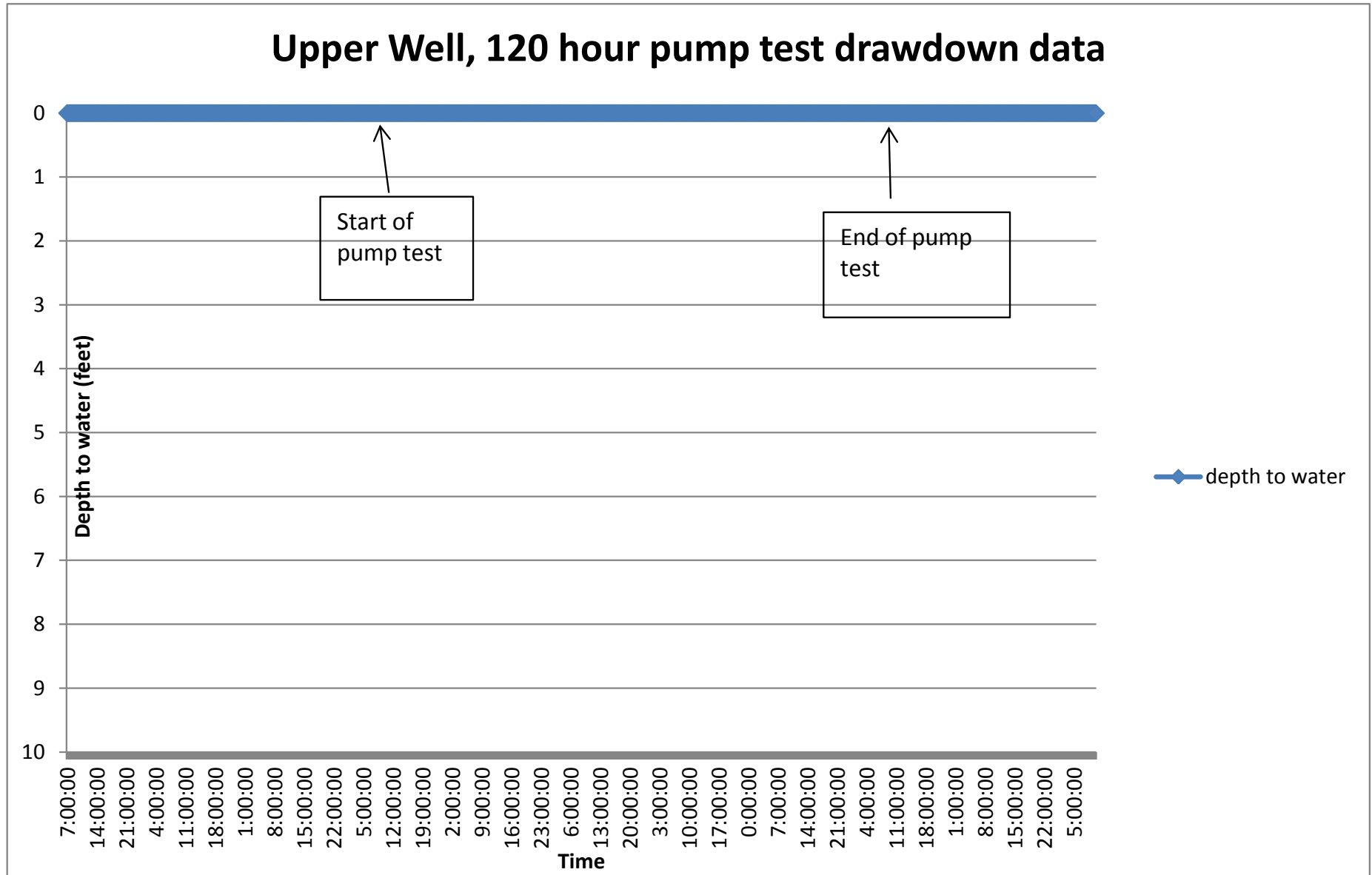
**LINCOLN APPLIED**

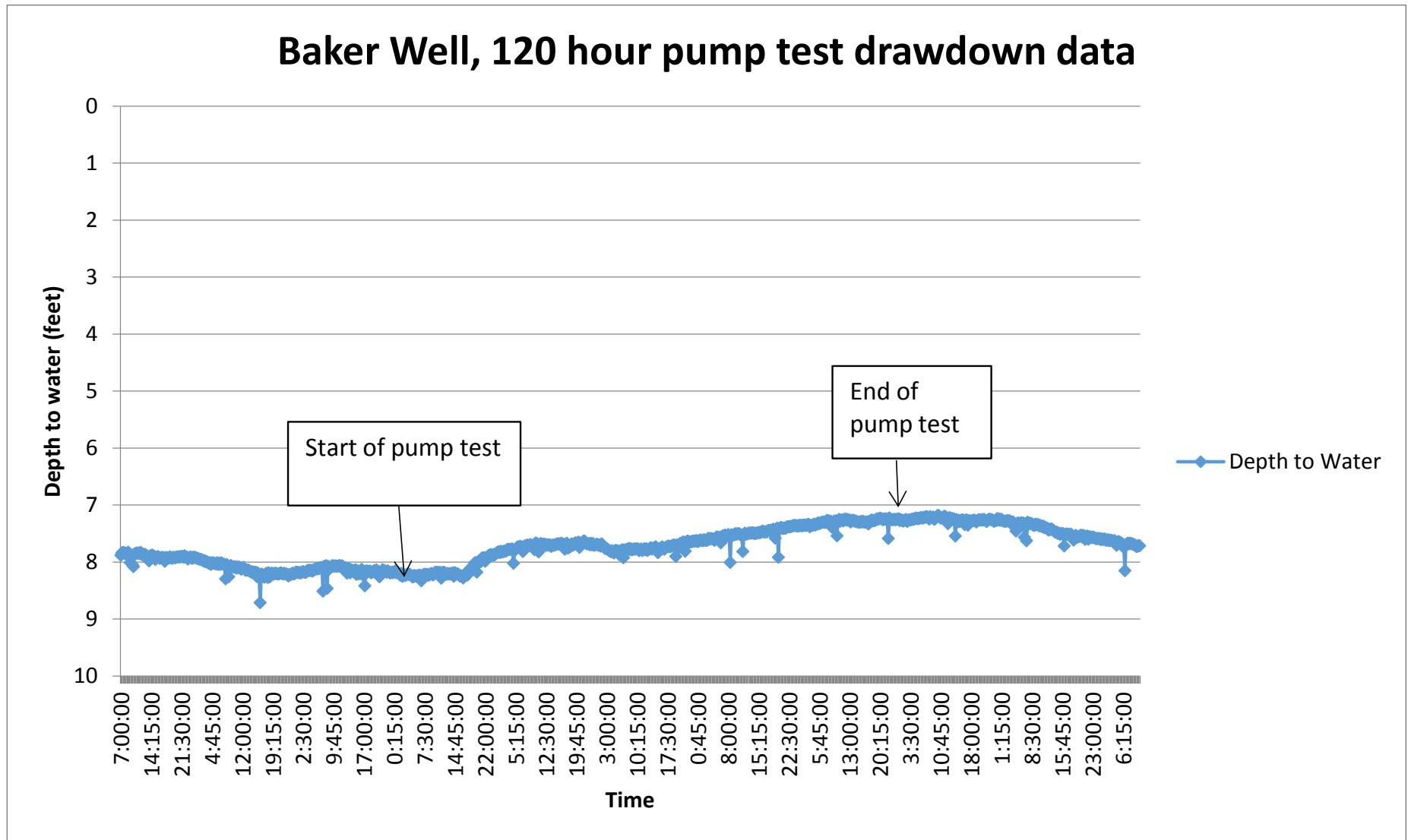
AUG 7 2017

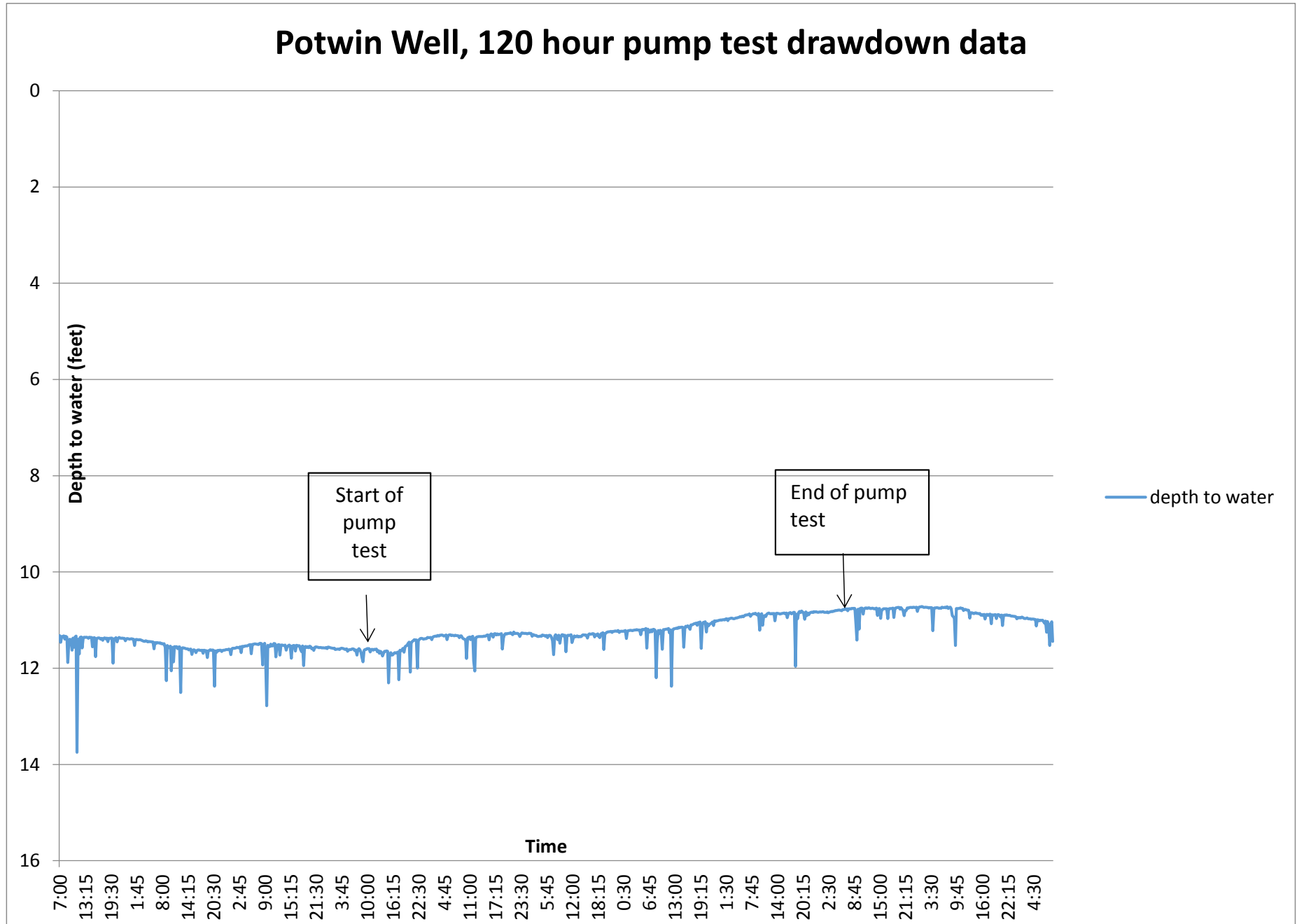
**GEOLOGY, INC.**

## Lower Well, 120 hour pump test drawdown data











Lincoln Applied Geology

163 Revell Drive

100332

Lincoln, VT 05443

Atten: Jeremy Revell

PROJECT: Roxbury Fish Hatchery

WORK ORDER: **1709-21253**

DATE RECEIVED: September 07, 2017

DATE REPORTED: October 05, 2017

SAMPLER: Jeremy Revell

### Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

A handwritten signature in black ink, appearing to read "H. Locker", written over a horizontal line.

Harry B. Locker, Ph.D.  
Laboratory Director

[www.endynelabs.com](http://www.endynelabs.com)



160 James Brown Dr., Williston, VT 05495  
Ph 802-879-4333 Fax 802-879-7103

56 Etna Road, Lebanon, NH 03766  
Ph 603-678-4891 Fax 603-678-4893



**Laboratory Report**

DATE REPORTED: 10/05/2017

CLIENT: Lincoln Applied Geology

WORK ORDER: 1709-21253

PROJECT: Roxbury Fish Hatchery

DATE RECEIVED 09/07/2017

001	Site: Pumping Well Microbiological				Date Sampled: 9/7/17		Time: 9:00	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>		<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Total Coliform	Present	/100 mL	SM20 9223B(97)	9/7/17	16:50	W RJL	A	
e. coli	Absent	/100 mL	SM20 9223B(97)	9/7/17	16:50	W RJL	A	

002	Site: Pumping Well Turbidity				Date Sampled: 9/7/17		Time: 9:00	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>		<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Turbidity	6.71	NTU	EPA 180.1	9/8/17	16:39	W SJM	A	

003	Site: Pumping Well Primary & Secondary Inorganic Contaminants			Date Sampled: 9/7/17		Time: 9:00		
Parameter	Result	Units	Method	Analysis Date/Time		Lab/Tech	NELAC	Qual.
Alkalinity, as CaCO3, to pH 4.5	46	mg/L	SM20 2320B(97)	9/10/17		W JSS	N	
Chloride	15	mg/L	EPA 300.0	9/8/17		W CM	A	
Color, Apparent	5	CoPt Units	SM 2120 B. (01)	9/8/17	16:26	W SJM	A	
pH of color measurement	7.35	SU at 24.1C	SM20 4500-H B.	9/8/17	17:18	W SJM	U	
Fluoride	< 0.10	mg/L	EPA 300.0	9/8/17		W CM	A	
Hardness, Total as CaCO3	68	mg/L	EPA 200.7	9/27/17		W SJM	U	
Langelier's Corrosivity	-1.506		SM18 2330B	9/27/17		W SJM	A	
Nitrate as N	0.27	mg/L	EPA 300.0	9/8/17	11:17	W CM	A	
Nitrite as N	< 0.020	mg/L	EPA 300.0	9/8/17	11:17	W CM	A	
Odor	< 1	TON @ 60C	SM20 2150B (97)	9/8/17	16:58	W MLF	A	
pH	7.00	SU at 23.0C	SM 4500-H B.(97)	9/7/17	19:05	W MLF	U	
Solids, Total Dissolved	97	mg/L	SM 2540C(97)	9/11/17		W JSS	A	
Temperature for Calc.	20	C	EPA 170.1	9/7/17	9:00	W ECT	U	
Metals Digestion HNO3-HCl	Digested		EPA 200.7/200.9	9/18/17		W FAA	A	
Mercury Digestion	Digested		EPA 245.1	9/11/17		W CM	A	
Antimony, Total	< 0.0020	mg/L	EPA 200.9	9/20/17		W FAA	A	
Arsenic, Total	< 0.0010	mg/L	EPA 200.9	9/19/17		W FAA	A	
Barium, Total	< 0.020	mg/L	EPA 200.7	9/27/17		W SJM	A	
Beryllium, Total	< 0.0010	mg/L	EPA 200.7	9/27/17		W SJM	A	
Cadmium, Total	< 0.0020	mg/L	EPA 200.7	9/27/17		W SJM	A	
Calcium, Total	20	mg/L	EPA 200.7	9/27/17		W SJM	A	
Chromium, Total	< 0.0050	mg/L	EPA 200.7	9/27/17		W SJM	A	
Copper, Total	< 0.020	mg/L	EPA 200.7	9/27/17		W SJM	A	
Iron, Total	0.35	mg/L	EPA 200.7	9/27/17		W SJM	A	
Lead, Total	< 0.0010	mg/L	EPA 200.9	9/19/17		W FAA	A	
Magnesium, Total	4.4	mg/L	EPA 200.7	9/27/17		W SJM	A	
Manganese, Total	0.029	mg/L	EPA 200.7	9/27/17		W SJM	A	
Mercury, Total	< 0.0002	mg/L	EPA 245.1	9/12/17		W CM	A	
Nickel, Total	< 0.0050	mg/L	EPA 200.7	9/27/17		W SJM	A	
Selenium, Total	< 0.0020	mg/L	EPA 200.9	9/20/17		W FAA	A	
Sodium, Total	7.1	mg/L	EPA 200.7	9/27/17		W SJM	A	
Thallium, Total	< 0.0010	mg/L	EPA 200.9	9/20/17		W FAA	A	

004	Site: Pumping Well Volatile Organic Chemicals				Date Sampled: 9/7/17	Time: 9:00	
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.

**ENDYNE Inc.**

www.endynelabs.com



**Laboratory Report**

DATE REPORTED: 10/05/2017

CLIENT: Lincoln Applied Geology

WORK ORDER: 1709-21253

PROJECT: Roxbury Fish Hatchery

DATE RECEIVED 09/07/2017

004	Site: Pumping Well Volatile Organic Chemicals			Date Sampled: 9/7/17	Time: 9:00		
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
VOC Potable Water							
Dichlorodifluoromethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Chloromethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Vinyl chloride	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Bromomethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Chloroethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Trichlorofluoromethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
1,1-Dichloroethene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Methylene chloride	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Methyl-t-butyl ether (MTBE)	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
trans-1,2-Dichloroethene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
1,1-Dichloroethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
2,2-Dichloropropane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
cis-1,2-Dichloroethene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Bromochloromethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Chloroform	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
1,1,1-Trichloroethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Carbon tetrachloride	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
1,1-Dichloropropene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Benzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
1,2-Dichloroethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Trichloroethene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
1,2-Dichloropropane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Dibromomethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Bromodichloromethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
cis-1,3-Dichloropropene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Toluene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
trans-1,3-Dichloropropene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
1,1,2-Trichloroethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Tetrachloroethene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
1,3-Dichloropropane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Dibromochloromethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Chlorobenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Ethylbenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
1,1,1,2-Tetrachloroethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Xylenes, Total	< 1.0	ug/L	EPA 524.2	9/8/17	W EEP	A	
Styrene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	RPD
Bromoform	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Isopropylbenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
1,1,2,2-Tetrachloroethane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
Bromobenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
n-Propylbenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
1,2,3-Trichloropropane	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
2-Chlorotoluene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	
1,3,5-Trimethylbenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	RPD
4-Chlorotoluene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A	

**Laboratory Report**

DATE REPORTED: 10/05/2017

CLIENT: Lincoln Applied Geology

WORK ORDER: 1709-21253

PROJECT: Roxbury Fish Hatchery

DATE RECEIVED 09/07/2017

004 Site: Pumping Well Volatile Organic Chemicals							Date Sampled: 9/7/17	Time: 9:00
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.	
t-Butylbenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A		
1,2,4-Trimethylbenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A		RPD
s-Butylbenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A		
4-Isopropyltoluene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A		
1,3-Dichlorobenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A		
1,4-Dichlorobenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A		
n-Butylbenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A		
1,2-Dichlorobenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A		
1,2,4-Trichlorobenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A		
Hexachlorobutadiene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A		
Naphthalene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A		
1,2,3-Trichlorobenzene	< 0.5	ug/L	EPA 524.2	9/8/17	W EEP	A		
Surr. 1 (4-Bromofluorobenzene)	99	%	EPA 524.2	9/8/17	W EEP	A		
Surr. 2 (1,2-Dichlorobenzene d4)	95	%	EPA 524.2	9/8/17	W EEP	A		

005 Site: Pumping Well Cyanide Testing							Date Sampled: 9/7/17	Time: 9:00
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.	
Cyanide	< 0.005	mg/L	EPA 335.4, R.1	9/19/17	N JGM	A		

006 Site: Pumping Well Synthetic Organic Chemicals							Date Sampled: 9/7/17	Time: 9:00
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.	
MICRO-EXTRACTABLES								
504 Extraction	Completed		EPA 504.1	9/20/17	W DPD	A		
Ethylene Dibromide	< 0.03	ug/L	EPA 504.1	9/20/17	W DPD	A		
1,2-Dibromo-3-chloropropane	< 0.05	ug/L	EPA 504.1	9/20/17	W DPD	A		
CHLORINATED PESTICIDES								
505 Extraction	Completed		EPA 505	9/13/17	17:00	W ITR	A	
gamma-BHC (Lindane)	< 0.1	ug/L	EPA 505	9/18/17	W DPD	A		
Heptachlor	< 0.1	ug/L	EPA 505	9/18/17	W DPD	A		
Aldrin	< 0.5	ug/L	EPA 505	9/18/17	W DPD	A		
Heptachlor Epoxide	< 0.1	ug/L	EPA 505	9/18/17	W DPD	A		
Dieldrin	< 0.5	ug/L	EPA 505	9/18/17	W DPD	A		
Endrin	< 0.5	ug/L	EPA 505	9/18/17	W DPD	A		
Methoxychlor	< 1.0	ug/L	EPA 505	9/18/17	W DPD	A		
Chlordane	< 0.2	ug/L	EPA 505	9/18/17	W DPD	A		
Toxaphene	< 2.0	ug/L	EPA 505	9/18/17	W DPD	A		
Aroclor 1016	< 0.5	ug/L	EPA 505	9/18/17	W DPD	A		
Aroclor 1221	< 0.5	ug/L	EPA 505	9/18/17	W DPD	A		
Aroclor 1232	< 0.5	ug/L	EPA 505	9/18/17	W DPD	A		
Aroclor 1242	< 0.5	ug/L	EPA 505	9/18/17	W DPD	A		
Aroclor 1248	< 0.5	ug/L	EPA 505	9/18/17	W DPD	A		
Aroclor 1254	< 0.5	ug/L	EPA 505	9/18/17	W DPD	A		
Aroclor 1260	< 0.5	ug/L	EPA 505	9/18/17	W DPD	A		
PHENOXY-ACID HERBICIDES								
515 Extraction	Completed		EPA 515.4	9/13/17	W AKJ	A		

**Laboratory Report**

DATE REPORTED: 10/05/2017

CLIENT: Lincoln Applied Geology

WORK ORDER: 1709-21253

PROJECT: Roxbury Fish Hatchery

DATE RECEIVED 09/07/2017

006	Site: Pumping Well Synthetic Organic Chemicals				Date Sampled: 9/7/17	Time: 9:00	
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Dalapon	< 15.0	ug/L	EPA 515.4	9/16/17	W DPD	A	
Dicamba	< 10.0	ug/L	EPA 515.4	9/16/17	W DPD	A	
2,4-D	< 5.0	ug/L	EPA 515.4	9/16/17	W DPD	A	
Pentachlorophenol	< 0.5	ug/L	EPA 515.4	9/16/17	W DPD	A	AN1
2,4,5-TP (Silvex)	< 2.0	ug/L	EPA 515.4	9/16/17	W DPD	A	
2,4,5-T	< 3.0	ug/L	EPA 515.4	9/16/17	W DPD	U	
Picloram	< 5.0	ug/L	EPA 515.4	9/16/17	W DPD	A	
Dinoseb	< 3.0	ug/L	EPA 515.4	9/16/17	W DPD	A	
Surrogate-DCAA	86	%	EPA 515.4	9/16/17	W DPD	A	
SEMI-VOLATILE ORGANICS							
525.2 Extraction	Completed		EPA 525.2	9/20/17	W AKJ	A	
Hexachlorocyclopentadiene	< 5.0	ug/L	EPA 525.2	9/20/17	W EEP	A	
Propachlor	< 1.0	ug/L	EPA 525.2	9/20/17	W EEP	A	
Hexachlorobenzene	< 0.5	ug/L	EPA 525.2	9/20/17	W EEP	A	
Simazine	< 1.0	ug/L	EPA 525.2	9/20/17	W EEP	A	
Atrazine	< 1.0	ug/L	EPA 525.2	9/20/17	W EEP	A	
Metribuzin	< 2.0	ug/L	EPA 525.2	9/20/17	W EEP	A	
Alachlor	< 1.0	ug/L	EPA 525.2	9/20/17	W EEP	A	
Metolachlor	< 1.0	ug/L	EPA 525.2	9/20/17	W EEP	A	
Butachlor	< 1.0	ug/L	EPA 525.2	9/20/17	W EEP	A	
Bis(2-ethylhexyl)adipate	< 5.0	ug/L	EPA 525.2	9/20/17	W EEP	A	
Bis(2-ethylhexyl)phthalate	< 3.0	ug/L	EPA 525.2	9/20/17	W EEP	A	
Benzo(a)pyrene	< 0.1	ug/L	EPA 525.2	9/20/17	W EEP	A	
Surrogate 1	114	%	EPA 525.2	9/20/17	W EEP	A	
Surrogate 2	116	%	EPA 525.2	9/20/17	W EEP	A	
Surrogate 3	73	%	EPA 525.2	9/20/17	W EEP	A	
007	Site: Pumping Well Carbamates Testing				Date Sampled: 9/7/17	Time: 9:00	
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
CARBAMATE PESTICIDES							
3-Hydroxycarbofuran	< 1.0	ug/L	EPA 531.2	9/15/17	SWSUB	A	SPG
Aldicarb	< 1.0	ug/L	EPA 531.2	9/15/17	SWSUB	A	SPG
Aldicarb Sulfone	< 1.0	ug/L	EPA 531.2	9/15/17	SWSUB	A	SPG
Aldicarb Sulfoxide	< 1.0	ug/L	EPA 531.2	9/15/17	SWSUB	A	SPG
Carbaryl	< 1.0	ug/L	EPA 531.2	9/15/17	SWSUB	A	SPG
Methomyl	< 1.0	ug/L	EPA 531.2	9/15/17	SWSUB	A	SPG
Carbofuran	< 1.0	ug/L	EPA 531.2	9/15/17	SWSUB	A	SPG
Oxamyl (Vydate)	< 1.0	ug/L	EPA 531.2	9/15/17	SWSUB	A	SPG
008	Site: Pumping Well Radionuclides				Date Sampled: 9/7/17	Time: 9:00	
Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Radium-226	0.0717 +/-0.372	pCi/L	EPA 903.1	9/21/17	SWSUB	A	SPA
Radium-228	0.430 +/- 0.385	pCi/L	EPA 904.0	9/25/17	SWSUB	A	SPA
Gross Alpha	1.69 +/- 1.52	pCi/L	EPA 900.0	9/26/17	SWSUB	A	SPA

**Laboratory Report**

DATE REPORTED: 10/05/2017

CLIENT: Lincoln Applied Geology

WORK ORDER: 1709-21253

PROJECT: Roxbury Fish Hatchery

DATE RECEIVED 09/07/2017

009	Site: Pumping Well Uranium				Date Sampled: 9/7/17	Time: 9:00	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
Uranium	< 1	ug/L	EPA 200.8	9/13/17	SWSUB	A	SPG

010	Site: Method 524 Trip Blank Not Needed				Date Sampled: 9/7/17	Time: 9:00	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
No analysis							

011	Site: Method 504 Trip Blank Not Needed				Date Sampled: 9/7/17	Time: 9:00	
<u>Parameter</u>	<u>Result</u>	<u>Units</u>	<u>Method</u>	<u>Analysis Date/Time</u>	<u>Lab/Tech</u>	<u>NELAC</u>	<u>Qual.</u>
No analysis							

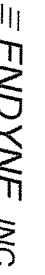
**Report Summary of Qualifiers and Notes**

RPD: The Relative Percent Difference of the Matrix Spike Duplicate was above method acceptance limits.

SPG: Analysis performed by subcontracted laboratory, Granite State. Results are presented here for your convenience. Refer to the complete subcontracted report, which has been appended to this report, for detailed information regarding this result.

AN1: The Laboratory Fortified Blank (LFB/LCS) and matrix spike recovery for this parameter was 69% of the expected target, the sample result may be biased low.

SPA: Analysis performed by subcontracted laboratory, Pace Analytical, with the following state assigned laboratory ID numbers; VT0282, NY10888, NH2974. Refer to the complete subcontracted report appended to this report, for detailed information regarding this result.



160 James Brown Drive  
Williston, Vermont 05495  
(802) 879-4333

Special Reporting Instructions/PO#: N/A  
W/STO

76811

Project Name: <b>Roxbury Fish Hatchery</b>		Client/Contact Name: <b>2AG</b>		Sampler Name: <b>Steve Revell</b>	
State of Origin: VT ___ NY ___ NH ___ Other ___		Phone #: <b>Steve Revell</b>		Phone #: <b>802 245 32384</b>	
Endyme WO #		Mailing Address: <b>2AG</b>		Billing Address: <b>2AG</b>	

[illegible]

1709-21253



1709-21253

Lincoln Applied Geology  
Roxbury Fish Hatchery

Relinquished by:

Date/Time

Received by:

Date/Time

Received by:

Date/Time: \_\_\_\_\_

9/7/17 15:30												9/7/17 15:30		9/7/17 15:30	
1	pH	6	TKN	11	Total Solids "	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only	LAB USE ONLY			
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest				
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB	Temp: 13			
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals				
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8	Comment:			
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn														
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other								
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other								
38	Other														



**Vermont Department of Environmental Conservation**

Watershed Management Division  
1 National Life Drive, Main 2  
Montpelier, VT 05620-3522  
www.watershedmanagement.vt.gov

*Agency of Natural Resources*

[phone] 802.490.6151

DISTRIBUTED ELECTRONICALLY

August 1, 2016

Angela C. Repella  
U.S. Army Corps of Engineers  
New England District  
11 Lincoln Street  
Essex Junction, VT 05452

RE: Determination of Eligibility – Roxbury Intake Structure on Flint Brook (NAE-2016-00788)  
Section 401 Water Quality Certification

Dear Ms. Repella:

The Vermont Department of Environmental Conservation (Department) has reviewed the Determination of Eligibility (DOE) (File No. NAE-2016-00788) for an after-the-fact Section 404 permit for the modification to an intake structure on Flint Brook to supply water to the Roxbury Fish Culture Station. The permit will allow the Vermont Fish and Wildlife to retain and maintain fill in Flint Brook in conjunction with modifications to an existing dam and modified intake structure for the fish hatchery that was damaged during Tropical Storm Irene. The DOE does not contain information on operation of the intake, the amount of water that will be diverted from Flint Brook, nor proposes a conservation flow downstream of the intake structure to support aquatic habitat and protect water quality.

The Department lists Flint Brook below the fish hatchery intake in Part F of its List of Priority Surface Waters Outside the Scope of the Clean Water Act Section 303(d). Part F lists surface waters where flow alteration has resulted in aquatic habitat and/or other designated uses in the Vermont Water Quality Standards (Standards) not being supported. The listing for Flint Brook describes the surface water quality problem as artificial flow regulation and a possible lack of conservation flow downstream of the fish hatchery withdrawal, which threatens the ability of the brook to support aquatic biota and aquatic habitat.

The Department's review of the DOE indicates that operations of the intake structure has the potential to violate Standards without specific conditions to address intake operations and require a conservation flow downstream of the intake. Therefore, the Department requests that the Vermont Fish and Wildlife Department to apply for an individual Section 401 water quality certification for operation of the intake on Flint Brook.

Thank you for the opportunity to review and comment.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeffrey B. Crocker'.

Jeffrey B. Crocker  
Supervising River Ecologist





**Vermont Department of Environmental Conservation**

Watershed Management Division

1 National Life Drive, Main 2

Montpelier, VT 05620-3522

[www.watershedmanagement.vt.gov](http://www.watershedmanagement.vt.gov)

*Agency of Natural Resources*

[phone] 802.490.6151

DISTRIBUTED ELECTRONICALLY

January 4, 2018

Louis Porter, Commissioner  
Vermont Department of Fish and Wildlife  
One National Drive, Davis 2  
Montpelier, VT 05620-3702

RE: Section 401 Water Quality Certification for Roxbury Intake Structure on Flint Brook  
Alternatives analysis and aquatic habitat flow study

Dear Commissioner Porter:

This memorandum is being provided to the Vermont Fish and Wildlife Department (VTFWD) from the Vermont Department of Environmental Conservation (Department) to serve as documentation outlining criteria which will be established to meet the requirements of a Section 401 water quality certification for the Roxbury Fish Culture Station Intake Structure on Flint Brook. The Department has reviewed the memorandum from the VTFWD providing an update on the flow monitoring study conducted at Flint Brook in the summer and fall of 2017. The purpose of this study was to develop a site-specific conservation flow to meet Vermont water quality standards below the intake for the Section 401 Water Quality Certification using the methodology specified in the Agency Procedure for Determining Acceptable Minimum Stream flows.

Through communications with the VTFWD, it is understood that a significant flow of water, which historically was supplied by Flint Brook, is needed in order to effectively maintain fish culture operations at the facility. Prior to the VTFWD conducting the 2017 flow monitoring study, VTFWD in consultation with the Department conducted an alternative analysis to find another source of water for the hatchery operations as part of the Section 401 application process. The alternative analysis investigated the feasibility of withdrawing water from another large surface water, the feasibility of implementing a water storage system, the feasibility of a recirculation system in the hatchery operations, and the use of supplemental wells and groundwater yield at the site to supplement withdrawals from Flint Brook. For various reasons, all alternatives were eliminated except the use of a supplementary well, as a test for groundwater availability indicated feasibility to supplement surface water withdrawals from Flint Brook with ground water for hatchery operations once a site-specific conservation flow is established.

As summarized in the memorandum, VTFWD staff conducted streamflow monitoring at Flint Brook during the summer/fall 2017 to establish a stage-discharge relationship. Streamflow monitoring equipment was deployed for 149 days at Flint Brook to measure the natural flows. VTFWD staff are working on the analysis of the data with the aim to submit a report as part of the Section 401 water quality certification application process to the Department for review in early 2018. In summary, it is the Department's understanding that conservation flow criteria will be instituted which will only permit water withdrawal from Flint Brook during times when adequate flow is available to maintain conservation flows. During times when adequate flow is not available, water withdrawal will be limited, and shortfalls will be supplemented through other water conservation measures with a primary focus on the use of the on-site groundwater source.

Appendix A-15 V.D.E.C. Section 401 Water Quality Certification for R.F.C.S. January 4, 2018

The Department appreciates the efforts made by VTFWD in the Section 401 application process. If you have any questions please contact Jeff Crocker, Supervising River Ecologist ([Jeff.Crocker@vermont.gov](mailto:Jeff.Crocker@vermont.gov) or 802-490-6151).

Sincerely,

Peter LaFlamme, Director  
Watershed Management Division

Cc. Adam Miller, VTFWD  
Eric Palmer, VTFWD  
Jeff Crocker, VTDEC

**CONCUR**  
**Vermont Division for Historic Preservation**

e-Signed by Laura Trieschmann  
on 2018-03-22 13:03:54 GMT

**State Historic Preservation Office**

U.S. Department of Homeland Security  
FEMA Region I, Mitigation Division  
Environmental & Historic Preservation Program  
99 High Street, 6th Floor  
Boston, MA 02110



**FEMA**

March 13, 2018

Mr. James Duggan  
Historic Preservation Review Coordinator  
Vermont Division for Historic Preservation  
National Life Building, 6<sup>th</sup> Floor  
Montpelier, VT 05620-1201

**RE: Request for Concurrence with FEMA's Determination of Adverse Effect and Treatment Measures to Reduce Such Effects Relative to Construction of a Caretaker Residence and Associated Utilities, as well as Concurrence with FEMA's Determination of No Effect for Conversion and Utilization of a Test Well as the Source for Supplemental Ground Water.**

Undertaking: This consultation is being conducted as part of a Supplemental Environmental Assessment related to a completed Environmental Assessment and FONSI for repairs and new construction at the Roxbury Fish Culture Station, Roxbury Vermont, issued on March 15, 2017.

Recipient: Vermont Division of Emergency Management and Homeland Security (VT DEMHS)

Sub-recipient: Vermont Fish and Wildlife Department (VFWD)

FEMA Grant Program: Public Assistance

Dear Mr. Duggan,

FEMA, through its Public Assistance Program, proposes to fund both repairs and new construction at the Roxbury Fish Culture Station that was substantially damaged during Tropical Storm Irene. The disaster declaration is referenced as DR-4022-VT.

Based on the results of a lengthy, agency-wide and public review conducted between the fall of 2014 and early 2017, a final EA (environmental assessment) and FONSI (finding of no significant impact) were issued on March 15, 2017 for the project as then envisioned. In late 2017, after consultation between FEMA and the Vermont Division for Historic Preservation (VDHP) had been concluded, the applicant proposed to enhance the oversight of quality control and operational security at the hatchery, which would be facilitated by constructing an on-site residence for a caretaker.

Based on agency review of water quality standards related to operation of the hatchery, it was determined that a source of supplemental ground water was required to ensure adequate stream flow in Flint Brook. A test boring drilled to a depth of 400 feet indicates that such a source of groundwater does exist within the previously defined project area. This letter addresses the potential effect of both supplemental undertakings within the hatchery complex – a site listed on the National Register of

Page 2 of 10  
March 12, 2018  
Supplement EA for Roxbury Fish Culture Station

**Historic Places.** Documentation in this letter is consistent with the requirements in 36 CFR §800.11(e).

FEMA seeks consultation and concurrence with its determinations of effect and proposed treatment measures relative to the addition of a caretaker residence and activation of a supplemental groundwater well.

### **Project Location**

The Roxbury Fish Culture Station, commonly referred to as the Fish Hatchery, is located at 3696 Roxbury Road, Roxbury, VT (N 44.06552, W -72.74488) or expressed in UTM coordinates, Zone 18: Easting: 0680605; Northing: 4881623, about two and a half miles south of the village on Route 12A. The property consists of a narrow and oblong parcel of approximately ten (10) acres. It is bordered by the Central Vermont Railway line and a steep hill to the immediate west and by Route 12A along its eastern border. The Third Branch of the White River channel is situated several hundred feet farther east.

Both the caretaker residence and groundwater well are located within the parcel as originally defined and reviewed in the EA and FONSI.

### **Scope of Work**

VFWD proposes to construct a 2,760 ft<sup>2</sup>, two story caretaker residence on a slab with a crawlspace. Proposed elevations for the residence are provided in Site Plans SK-1 to SK-3, which were delivered to your office on March 9, 2018. (See attached maps and aerial photographs.) An ADA handicap ramp will access the residence at the side. No garage is planned. A 1,000-gallon septic tank will collect wastewater from the caretaker residence, and, via a small pump station, will deliver it to an 84 x 5-foot, mound-style leach field. Water for the residence will be delivered via a 2-inch diameter pipe originating at the existing domestic water source for the hatchery.

The residence will be located on a small rise north of the “Carriage Barn” – a 1-1/2 story, three-bay-wide, 28 x 30-foot structure with lean-tos on each side constructed in 1896-98. This vernacular building sits on a concrete foundation and faces west. It has clapboard siding and an asphalt shingle roof. Other elements of this historic hatchery, including the ice-meat-cook house (1894), hatch house (1891), ponds (upgraded over the years), CCC constructed storage barn (1934-1935) and research lab (1950) lie farther south of the carriage barn.

The test well, which can be modified to produce sufficient ground water, is roughly eight inches in diameter and located within approximately five (5) feet of the existing red storage barn at the southern end of the hatchery complex (see attached maps and aerial photographs.) This well has a 576,000 gallon per day capacity. Water will be conveyed 805 feet through a 6-inch pipe to a well water degassing system. This degassing system consists of a precast concrete structure measuring approximately 8 feet long, 4 feet wide and 12.5 feet high, recessed 6 feet into the ground. All control points for the well will be located in the existing red barn directly next to the well and will not require any additional buildings. This well is not intended to provide potable water to any residence or the public.

Page 3 of 10  
March 12, 2018  
Supplement EA for Roxbury Fish Culture Station

### **Area of Potential Effect (APE)**

As defined in the Advisory Council on Historic Preservation's (ACHP) regulations, the APE for a project is defined as, the "geographic area or area within which an undertaking may directly or indirectly cause changes in the character of or use of historical properties, if any such properties exist" (36 CFR 800.16[d]). The APE was defined in the original project scope of study. The proposed caretaker residence and associated utilities, as well as the well and distribution system fall within this APE.

### **Steps Taken to Identify Historic Properties**

#### **Archaeological Considerations/Criterion D**

As indicated in FEMA's consultation letter with VDHP related to the larger project dated December 15, 2016, since the project would involve a moderate amount of ground disturbance from grading and excavation within the APE, its potential archaeological sensitivity was reviewed. On September 18, 2014 Scott Dillon, Archaeologist for the VDHP, conducted a site visit, accompanied by Adam Miller and Jeremy Whalen (VFWD). Based on his observations and sub-surface core sampling, he concluded that the near-surface environment had been heavily disturbed during Tropical Storm Irene, by two earlier flood events, and through general construction and maintenance activities carried out during the past hundred years. Dillon wrote: "The purpose of the site visit was to review the entire Area of Potential Effect (APE) for the proposed reconstruction project with regard to archaeological resources. The site visit confirmed that there are no archaeologically sensitive areas with the proposed project footprint. Accordingly, the Division concludes that the Roxbury Fish Culture Station reconstruction project will have no effect on any archaeological historic sites."

Due to the slight altering of the original scope of the reconstruction project by adding a caretaker residence, VDHP conducted a second site visit on October 2, 2017 for the specific purpose of evaluating and reviewing the area of the proposed residence and associated utilities. VDHP concluded that no further archaeological investigation was warranted and conveyed this information to the sub-applicant in an e-mail dated October 23, 2017. VDHP proposed to review the final design in accordance with FEMA's previous Treatment Proposal with which it concurred on December 15, 2016.

### **Assessing the Effect on Potential Archaeological Properties**

Based on the findings noted above, FEMA concludes that construction of the caretaker residence and installation of associated utilities will have **No Effect** on significant archaeological resources. Based on the results of the original field survey and the small area involved, FEMA further concludes that installation and operation of the groundwater well will also have **No Effect** on significant archaeological resources.

## **Steps Taken to Identify Historic Properties**

### ***Standing Structures/ National Register Criteria A and C***

The Roxbury Fish Culture Station is listed on the National Register of Historic Places. Its original nomination will be updated as one of the agreed-to Treatment Measures.

The State of Vermont established the Roxbury Fish Hatchery in 1891, following the lead of nearby states and the federal government at a time when fish conservation and recreational fishing were rising in popularity. The first items built at the site were the Hatchery Building in 1891 and four ponds. By 1894, the Hatchery had eight ponds and an Ice House. A Superintendent's House followed in 1897 (demolished in 1970 and replaced with a mobile home), with a Carriage Barn in 1897. During the 1930s, the Civilian Conservation Corps (CCC) built additional structures – Storage Barn (1935), new raceways (1937), and two stone barbecues (1937). These structures form a complex of buildings that record the evolution of state-sponsored fish culture in Vermont from its beginnings.

## **Assessing Adverse Effects on Standing Historic Properties**

Consultation between FEMA and VDHP was undertaken and eventually concluded while plans for repair, reconstruction, deconstruction and construction of new facilities to replace the older ponds were being developed. A series of Treatment Measures were proposed to reduce associated adverse effects.

Construction of the new caretaker residence and groundwater well will have no adverse effect with respect to the physical integrity of any of the hatchery structures that contribute to the historic hatchery complex. However, construction of the caretaker's residence just north of the building complex will have a limited **"adverse effect"** on the integrity of the setting, feeling and association of hatchery-related elements in the historic core by introducing a new visual element into the view scape.

## **Resolution of Adverse Effects**

As proposed in the Mitigation Proposal of 2016, VFWD has been consulting with the VDHP during its project development process. Through these efforts, good planning and judicious design have resolved several potential adverse effects. To avoid and/or further minimize any visual adverse effects that might result from construction of the caretaker residence, FEMA held an on-site review with VFWD and other state personnel at the hatchery on March 7, 2018. Attendees then held a conference call on March 8 with VDHP's Historic Preservation Review Coordinator, Jamie Duggan, to refine design parameters.



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March 12, 2018  
Supplement EA for Roxbury Fish Culture Station

- It was mutually agreed that the proposed site for the caretaker's residence was sufficiently removed from the core of historic buildings that significant visual impacts will not occur.
- Remaining visual impacts will be further reduced by:
  - Limiting all but essential removal of vegetation on the house site during site preparation, and
  - Installing vegetative plantings to provide a visual break or buffer between the hatchery complex and residence.
- So that visitors to the site do not associate the new residence with the historic 100-year-old hatchery, design elements used on the new structure will not identically mirror those of the historic structures.
  - A standing-seam metal roof will not mirror the asphalt roofs of the closest hatchery buildings.
  - Vinyl siding will not replicate the wooden clapboard siding.
  - Further differentiation can be achieved by using similar coordinated colors to the white and green motif in use today, or if the white with green trim motif is also used for the residence, a small plaque or sign indicating that the residence was constructed in 2018 will be used to indicate that the residence is not contemporaneous with the hatchery buildings.
  - Windows other than the 6-over-6-pane design used in the hatchery will not be used in the residence.

As indicated in the current Treatment Measures, VFWD and VDHP staff will continue to consult as needed as final plans come together.

### **Request for Concurrence**

Pursuant to Stipulation III.C.5.a.ii and Appendix E of the FEMA-SHPO-VEM-ACHP Programmatic Agreement for Vermont, FEMA proposes to add the measures listed above to the Treatment Measures currently in place for the FEMA grant to repair and reconstruct the hatchery after Tropical Storm Irene.

Based on the heavy disturbance throughout the project area and the fact that the well site is located far to the south of all major hatchery buildings, hence having no archaeological or adverse visual effect on the historic core, FEMA concludes that installation and operation of the well will have **no effect** on historic properties, either archaeological or standing.

Based on project review and the mitigation measures to be implemented, FEMA concludes that construction of the caretaker residence will have a limited **adverse** visual **effect** on the setting, feeling and association of the hatchery complex. Placement of the residence on the periphery of the historic core and the strategies to reduce a clear view of the structure and prevent confusion about the association of the new residence with the historic hatchery substantially minimize this adverse effect.

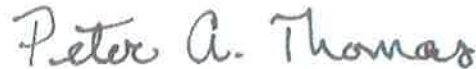
We look forward to your concurrence with these determination of effect and the proposed treatment measures. Should you have any questions or need additional information regarding this review,



Page 6 of 10  
March 12, 2018  
Supplement EA for Roxbury Fish Culture Station

please contact me at [Peter.Thomas@fema.dhs.gov](mailto:Peter.Thomas@fema.dhs.gov) or 802-309-0190,  
[David.Robbins@fema.dhs.gov](mailto:David.Robbins@fema.dhs.gov) or 978-914-0378, or one of our Historic Preservation Specialists  
Kathryn Emmitt at [Kathryn.Emmitt@fema.dhs.gov](mailto:Kathryn.Emmitt@fema.dhs.gov) or 202-704-4633 or Mary Shanks at  
[Mary.Shanks@fema.dhs.gov](mailto:Mary.Shanks@fema.dhs.gov) or 617-901-2204..

Sincerely,

A handwritten signature in dark ink that reads "Peter A. Thomas". The script is cursive and fluid.

Peter A. Thomas for  
David Robbins  
Regional Environmental Officer  
FEMA Region 1  
Environmental and Historic Preservation

Attachments:

Maps and Aerial Photographs of the Project Area  
Elevation and Plan View of Proposed Caretaker Residence

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**SITE OF  
PROPOSED  
CARETAKER  
RESIDENCE**

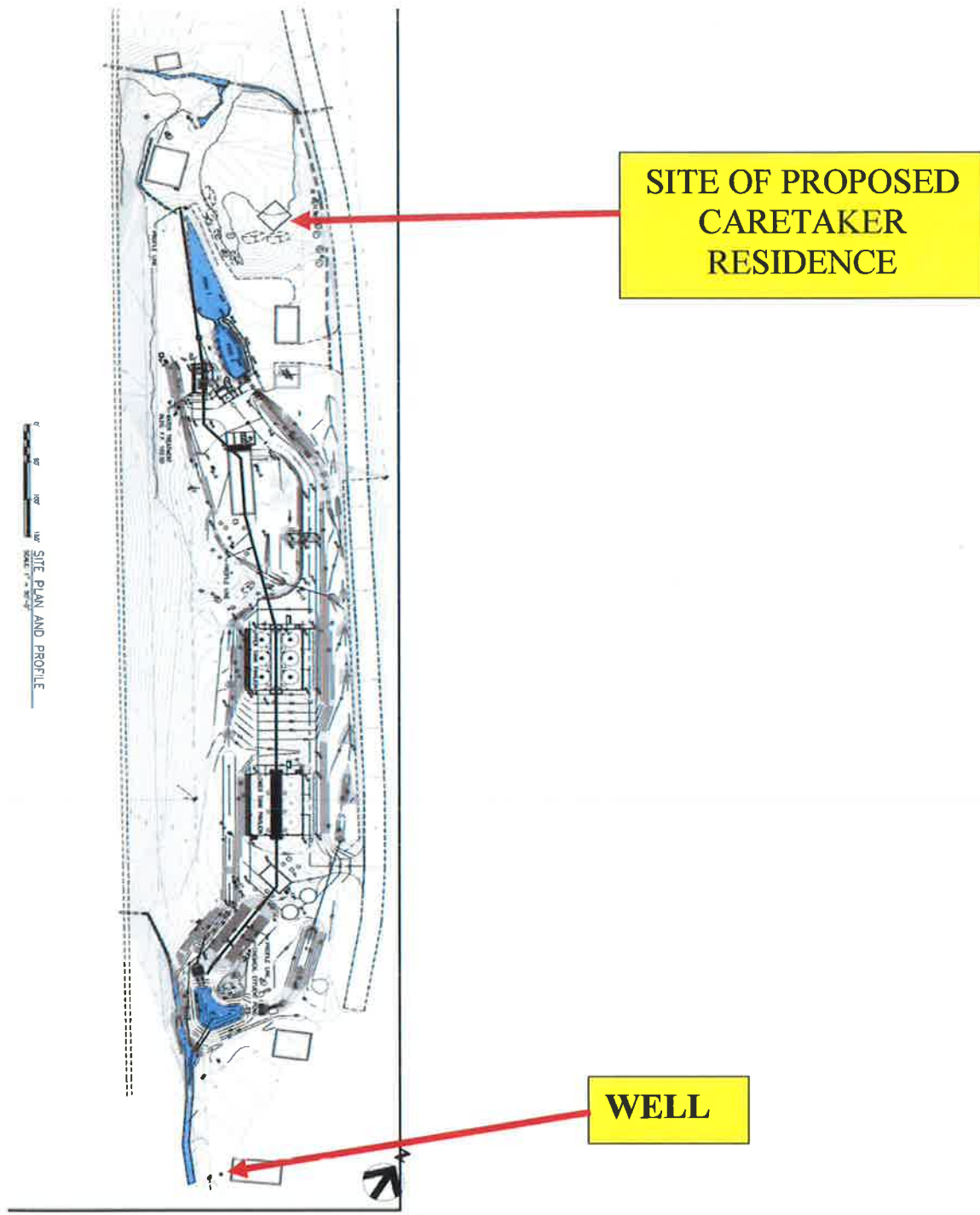
**PROJECT  
ELEMENTS  
UNDER  
CONSIDERATION**

**GROUNDWATER  
WELL**

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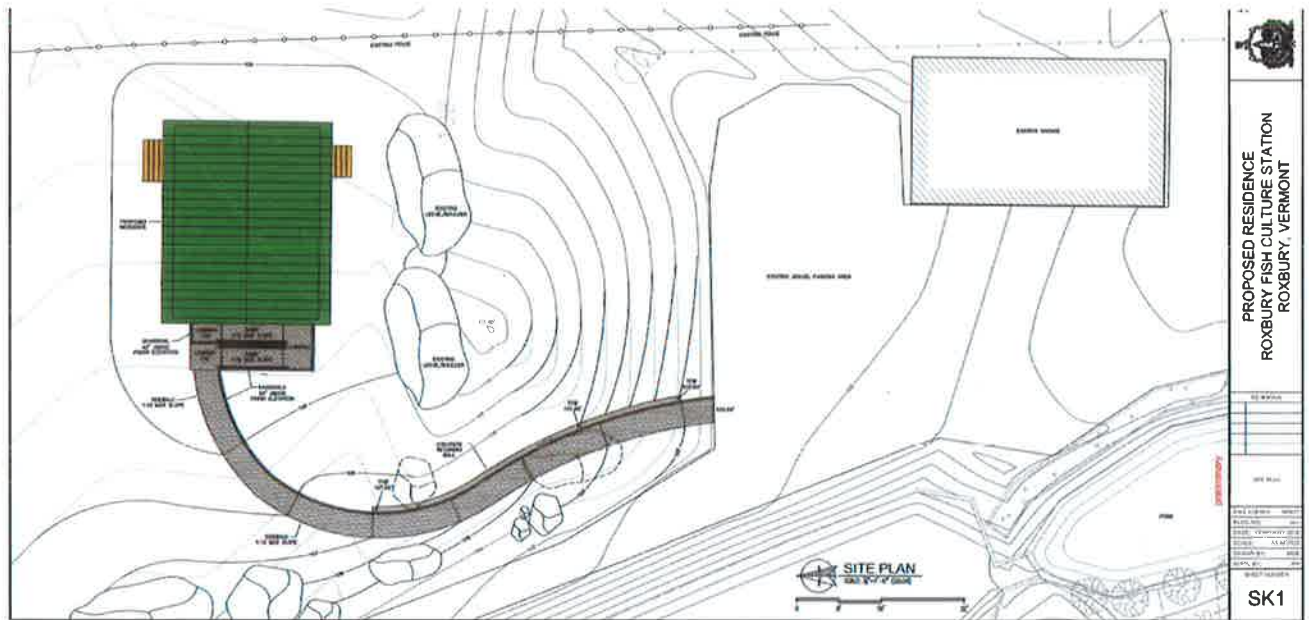
**SITE OF  
PROPOSED  
CARETAKER  
RESIDENCE**



**WELL**



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**Horizontal Plan View**



**Elevations**

## Appendix A-17: List of Permits Required for the Proposed Action in Initial E.A.

The following permits will be obtained as part of the Proposed Action. Each permit will be obtained from the primary permitting agency indicated in parentheses after each permit.

1. Stormwater Construction General Permit 3-9020 (V.D.E.C.).
2. Stormwater Discharge General Permit 3-9015 (V.D.E.C.)
3. Wastewater System and Potable Water Supply Permit (V.D.E.C.)
4. N.P.D.E.S. Discharge Permit (V.D.E.C.)
5. Department of Public Safety Construction Permit (D.P.S.)
6. Division of Fire Safety Tank Permit (D.P.S.)
7. Fire Safety Storage and Use Plan for generator diesel tank (D.P.S.)
8. Programmatic General Permit for Vermont (U.S.A.C.E.)

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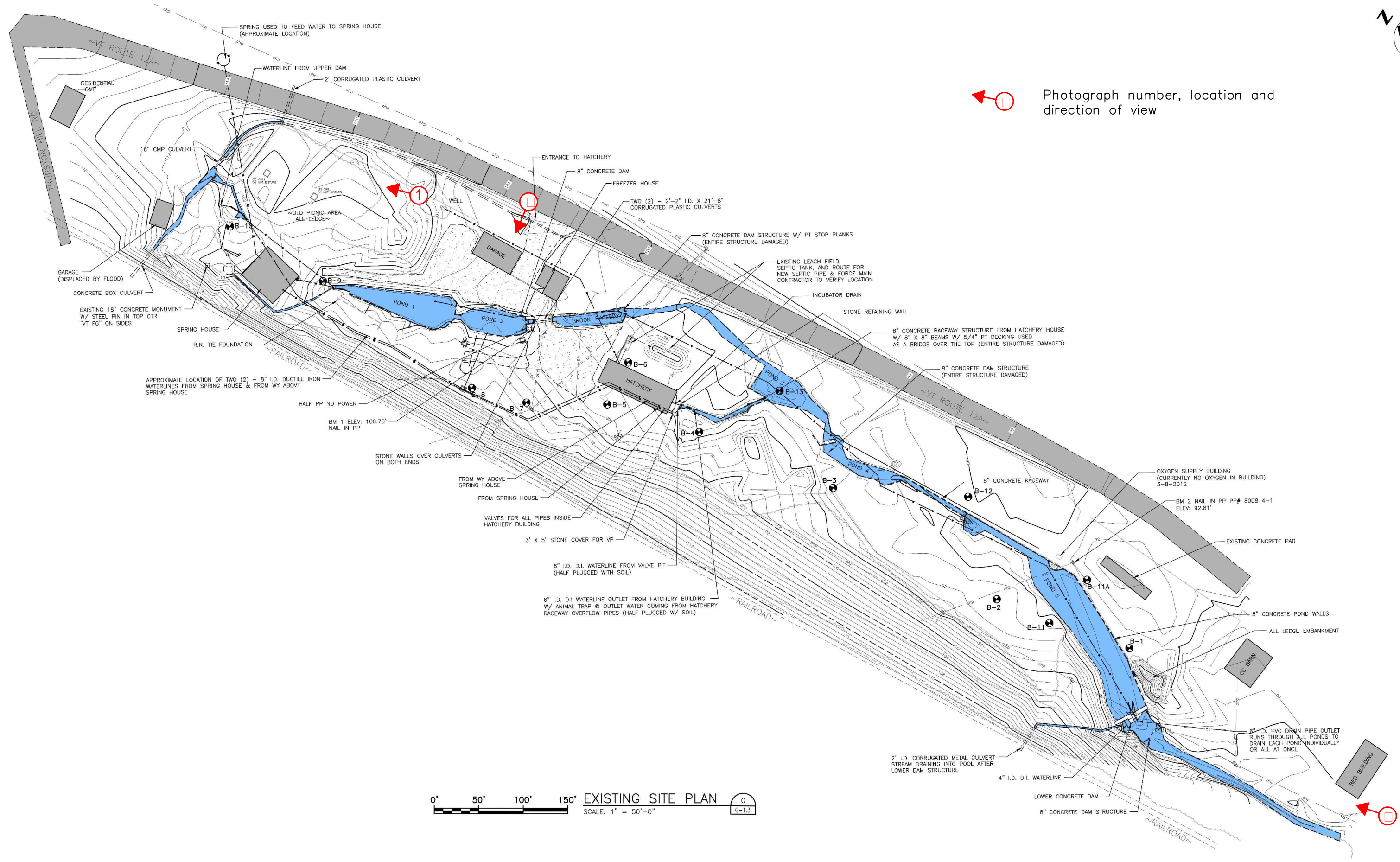
Roxbury Fish Culture Station

## **Appendix B: Photographs**





Photograph number, location and direction of view



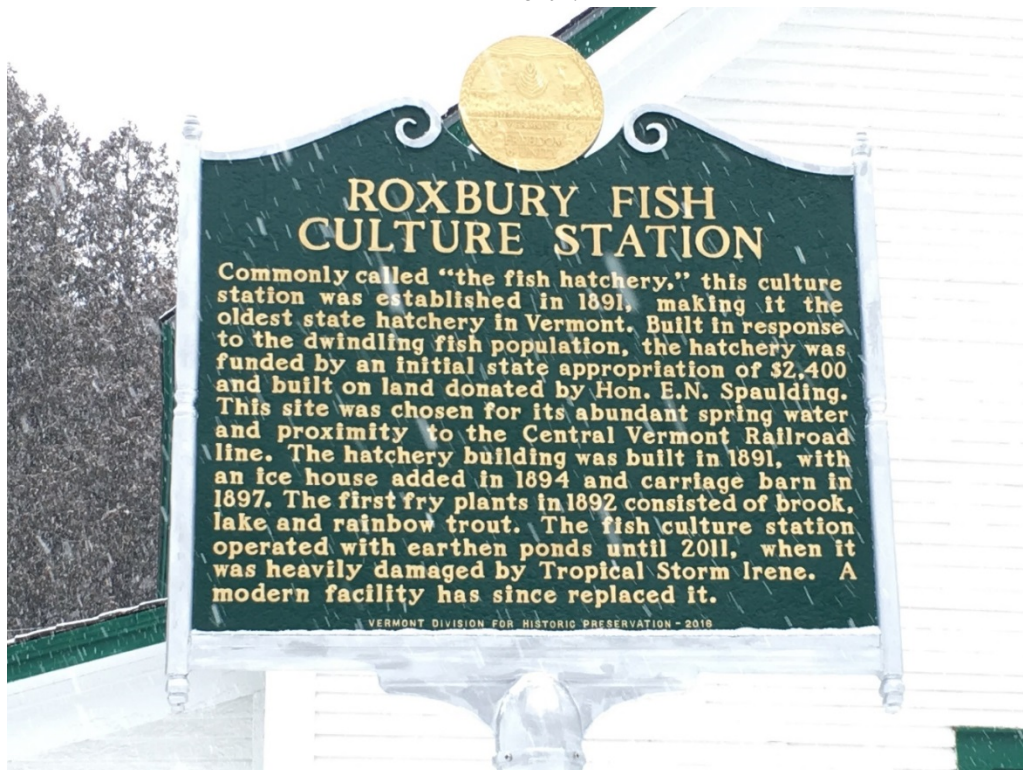


## Appendix B-2: Site Photographs

Photographs are arranged from north to south. Refer to Appendix B-1 for location key.



Photograph 1: View of the proposed caretaker residence location at R.F.C.S., looking north.



Photograph 2: Roadside historical marker installed in September 2016 looking west.





Photograph 3: Bedrock test well location next to red building looking north.

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## **Appendix C: Public Notice**

## FEMA INITIAL PUBLIC NOTICE - ROXBURY FISH CULTURE STATION SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

The Federal Emergency Management Agency (FEMA) proposes to assist the Vermont Fish and Wildlife Department, Roxbury VT, with upgrades to the Roxbury Fish Culture Station including the connection of a supplementary groundwater supply well and quality assurance and control. Vermont Fish and Wildlife Department would like to supplement the surface water source to comply with state and federal water quality standards and feels that a caretaker residence is needed to provide continuous oversight.

To meet the requirements of the National Environmental Policy Act (NEPA), FEMA has prepared a Draft Supplemental Environmental Assessment (SEA) to identify and evaluate human, historic, and environmental resources that might be affected by the proposed reconstruction of the Roxbury Fish Culture Station. FEMA invites the public to review and comment on the Draft SEA and to provide FEMA with information it may not have considered in its review. If FEMA finds that the Preferred Alternative, as defined in the SEA, will have no significant impact on the natural or human environment after the public comment period, a Finding of No Significant Impact (FONSI) will be issued by FEMA's Regional Environmental Officer, David Robbins. However, if a change in the scope of work occurs FEMA must be notified to evaluate if the proposed change would alter the potential impacts on the environment.

This document will be available for viewing online at <http://bgs.vermont.gov/facilities/forms> and in person at the Roxbury Town Clerk's Office, 1664 Roxbury Road, Roxbury, VT 05669, (802) 485-7840. The document will also be posted on FEMA's website: <http://www.fema.gov/resource-document-library>.

The public comment period will last for 15 days from the date of publication in this newspaper ending at 5:00 pm.

Written comments on the Draft SEA can be submitted by mailing David Robbins, Regional Environmental Officer at, FEMA Region 1, 99 High Street 6th Floor, Boston, Massachusetts 02110, by emailing [David.Robbins@fema.dhs.gov](mailto:David.Robbins@fema.dhs.gov), or by sending a fax to 617-956-7574.

FEMA Region 1 Supplemental Environmental Assessment

Roxbury Fish Culture Station

## **Appendix D: FONSI**