

Town of Norwich, Vermont



CHARTERED 1761

Neil R. Fulton  
Town Manager

January 14, 2016

Ms. Mary Andes  
Special Project Analyst  
Division of Emergency Management and Homeland Security  
Department of Public Safety  
45 State Drive  
Waterbury, VT 05671-1300

Re: Alternate Project: Culvert Replacement - \$126,700

Dear Ms. Andes:

The Town of Norwich Selectboard, after denial of a permit to restore the damaged Pool Dam received on October 20, 2015, has decided to pursue three Alternate Projects for use of the FEMA funds. The Selectboard has carefully reviewed the attached request for an Alternate Project and on January 13, 2015 unanimously voted to support the submission of a request that the project be funded as an Alternate Project.

If you have questions or need additional information please contact Town Manager Neil Fulton.

Sincerely,

A handwritten signature in blue ink, which appears to read "Linda Cook". The signature is written in a cursive style and is positioned above the typed name of the signatory.

Linda Cook, Chair  
Norwich Selectboard

/ndk

**Request for Alternate Project  
Town of Norwich**

FEMA Declaration PA01VT4022	PW 02334(0)	Date January 14, 2016
FIPS 027-52900-00	Category G Recreational or Other	
Applicant Town of Norwich	County Windsor	Damaged Facility Recreation Pool Dam

**Alternate Project: Culvert Replacement  
Location: VT Route 132 North of Bowen Road  
(Approximately 335 VT Route 132)  
N 43° 45.967; W 072° 14.707  
Estimated cost of this project is; \$126,700**

The Town of Norwich (Town) has determined that the public interest would not be best served by restoring the Norwich Pool Dam because restoring the damaged facility would require a permit from the Agency of Natural Resources (ANR) and after unexpected delays from the ANR the needed permit was denied on October 20, 2015.

**Proposed Project**

A request for proposals is attached that details the scope of the proposed project. The current structure is a small slab bridge that was constructed in 1927 that is in poor condition and hydraulically inadequate. The Project includes the following elements.

- Demolish and remove existing concrete box culvert.
- Replace existing concrete culvert with a 30' concrete box with a 10' wide by 5' high inside opening and 6" high bed retention sills (baffles) in the bottom.
- The box invert should be buried 12", so the top of the sills will be buried 6" and not be visible. That will result in a 10' wide by 4' high waterway opening above streambed, providing 40 sq. ft. of waterway area.
- Sills should be spaced no more than 8'-0" apart throughout the structure with one sill placed at the inlet and one at the outlet.
- This structure will result in a headwater depth at Q50= 3.7' and at Q100= 4.2', with no roadway overtopping at Q100. The current structure has a Q50 =6.8' and Q100=8.0'.
- Full headwalls will be constructed at the inlet and outlet.
- Wingwalls will match into the channel banks.
- Structure will be properly aligned with the channel, and constructed on a grade that matches the channel.
- Repair of road pavement after the installation of the new structure.
- Installation of 75 linear feet of used SBGR Guard Rail State of Vermont-type.

A request for bids for the project was issued and bids were received on January 6, 2016. The following is a summary of the bids received.

<b>Route 132 Culvert</b>	
<b>Bidder</b>	<b>Proposal</b>
Griffin and Griffin	126,700
Conkey Enterprises	136,292
Daniels Construction	138,250
Winterset	143,651
G & N	148,700
Willey Earth Moving	149,000
Thomson Excavating	151,345
Hook	183,265
Northwoods Excavating	219,328
L&M	234,500
Beard	295,800

The low bid from Griffin and Griffin was determined to be compliant with the bid specifications and they will be awarded the contract if the Alternate Project is approved.

The estimated start date for the project will be no sooner than June 1, 2016 and completion date no later than October 1, 2016.

#### **Approvals**

- A stream alteration permit has been obtained from the VT Agency of Natural Resources for this project: Project Number: SA-05-044-2015 Norwich Route 132 Culvert.
- The Project Delivery Bureau, Environmental Section of the VT Agency of Transportation has confirmed that no clearances or permits are needed from the State of Vermont for the project.

#### **EHP compliance:**

- The proposed project is EHP compliant. The project does not involve any construction work or disturbance outside of the site other than what has been approved in the Vermont Stream Alteration Permit issued on December 23, 2015 (SA-05-044-2015 Norwich Route 132 Culvert attached).
- The project has been reviewed and approved by the Division for Historic Preservation.
- No additional permits are required.

#### **Attachments (Phil check list)**

- A. Alternate and Improved Project Request Checklist
- B. Special Consideration Questions
- C. Vicinity Maps
- D. Typical Box Culvert
- E. Stream Alteration Permit SA-05-044-2015 which shows existing and proposed conditions and Hydraulic Analysis
- F. Request for Bids (RFB) for the proposed project.
- G. Bid from low bidder
- H. Color pictures of the site
- I. ANR Resource Map

The Town confirms by signature below that: 1) approval is based on the information provided with this request; 2) any changed conditions are to be immediately brought to the attention of the Public Assistance Officer; and, 3) approved alternate projects remain subject to all previous requirements for accountability, completion, and closure.

A handwritten signature in black ink, appearing to read "Neil Fulton". The signature is written in a cursive style with a horizontal line extending from the end of the name.

---

Neil R. Fulton, Authorize Representative  
Town Manager

**Alternate & Improved Project Request Checklist  
DR 4022 VT**

(Items in the package should follow the order of the checklist)

Project type: **0 Alternate Project** 0 Improved Project Disaster Number: **PA01VT4022**

**PROJECT CONSTRUCTION DATA:**

Applicant Name: **Town of Norwich**

Proposed Project Address: **VT Route 132 North of Bowen Road**

Proposed Project Latitude/Longitude: **N 43° 45.967; W 072° 14.707**

0 List Referenced Project Worksheets and Attach Copies: **02334(0)**

0 Vicinity map showing proposed location, disturbed areas, waterways, and wetlands.

**See Attachment C**

0 Map showing existing footprint and proposed footprint.

**See Attachment E (Stream Alteration Permit)**

0 Special Considerations 9-Question Form as it pertains to the proposed project.

**See Attachment B**

0 New Scope of Work for the proposed project.

**See Attachment F (RFB)**

0 Anticipated start date and completion date of proposed project (regulatory timeframes apply).

**Start after June 1, 2016. Complete before October 1, 2016**

0 Estimated cost to complete the proposed project along with any specifications, contracts, etc.

**\$126,700 – See Attachment G (Low Bid)**

0 Disposition of original facility (if applicable).

**Removed by Contractor to authorized disposal site**

0 Explanation of general disturbing activities (digging, structure removal, site work, access roads, etc.) **See Attachments F (RFB) & E (Stream Alteration Permit)**

SUPPORTING DOCUMENTATION: (if required)

0 Copy of requesting documentation from the applicant. **First Document in Application**

0 Copies of all available Federal and State environmental and regulatory permits and approvals and any other relevant documentation (i.e. environmental site assessments, surveys, or reports). **See Attachment E (Stream Alteration Permit)**

0 Copies of documentation or correspondence with the State Historical Preservation Office.

**See Attachment J**

## Special Consideration Questions

0 Copies of insurance settlements, statement of loss, insurance adjuster estimate of losses, etc.

N/A

0 Alternate Projects Only: Identification of the source of funding when the cost estimate for the alternate project is greater than the eligible alternate project funding. **Town Funds**

## Special Consideration Questions

### Route 132 Culvert Project

1. Does the damaged facility or item of work have insurance coverage and/or is it an insurable risk (e.g., buildings, equipment, vehicles, etc.)?

Yes No Unsure Comments:

2. Is the damaged facility located within a floodplain or coastal high hazard area and/or does it have an impact on a floodplain or wetland?

Yes No Unsure Comments: **This is a “Water Dependent Structure” authorized by a Vermont Stream Alteration Permit**

3. Is the damaged facility or item of work located within or adjacent to a Coastal Barrier Resource System Unit or an Otherwise Protected Area?

Yes No Unsure Comments:

4. Will the proposed facility repairs/reconstruction change the pre-disaster conditions (e.g., footprint, material, location, capacity, use, or function)?

Yes No Unsure Comments:

5. Does the applicant have a hazard mitigation proposal or would the applicant like technical assistance for a hazard mitigation proposal?

Yes No Unsure Comments:

6. Is the damaged facility on the National Register of Historic Places or the state historic listing? Is it older than 50 years? Are there more, similar buildings near the site?

Yes No Unsure Comments:

7. Are there any pristine or undisturbed areas on, or near, the project site? Are there large tracts of forestland?

Yes No Unsure Comments:

8. Are there any hazardous materials at or adjacent to the damaged facility and/or item of work?

Yes No Unsure Comments:

9. Are there any other environmental or controversial issues associated with the damaged facility and/or item of work?

Yes No Unsure Comments:

- U. S. NUMBERED ROUTE
- STATE NUMBERED ROUTE
- INTERCHANGE NUMBER
- CLASS 1 TOWN HIGHWAY
- CLASS 2 TOWN HIGHWAY
- CLASS 3 TOWN HIGHWAY
- CLASS 4 TOWN HIGHWAY
- NATIONAL FOREST ROAD
- STATE FOREST HIGHWAY

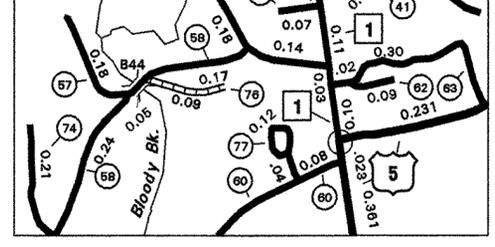
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- STATE PAVED
  - OTHER PAVED
  - STATE GRAVEL
  - OTHER GRAVEL
  - GRADED AND DRAINED
  - UNIMPROVED/PRIMITIVE

- NATURAL FEATURES**
- SINGLE LINE STREAM
  - OPEN WATER
  - SWAMP

- OTHER TRANSPORTATION**
- RAILROAD
  - AIRPORT TERMINAL

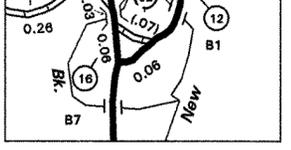
- POLITICAL SUBDIVISIONS**
- STATE BOUNDARY
  - COUNTY BOUNDARY
  - TOWN BOUNDARY
  - CITY BOUNDARY
  - VILLAGE BOUNDARY
  - URBAN COMPACT BOUNDARY

- SCHEMATIC**
- DAM

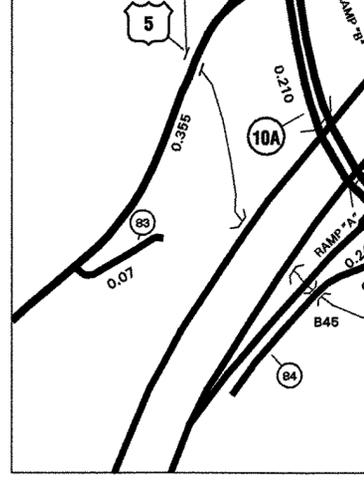


NORWICH INSET 2

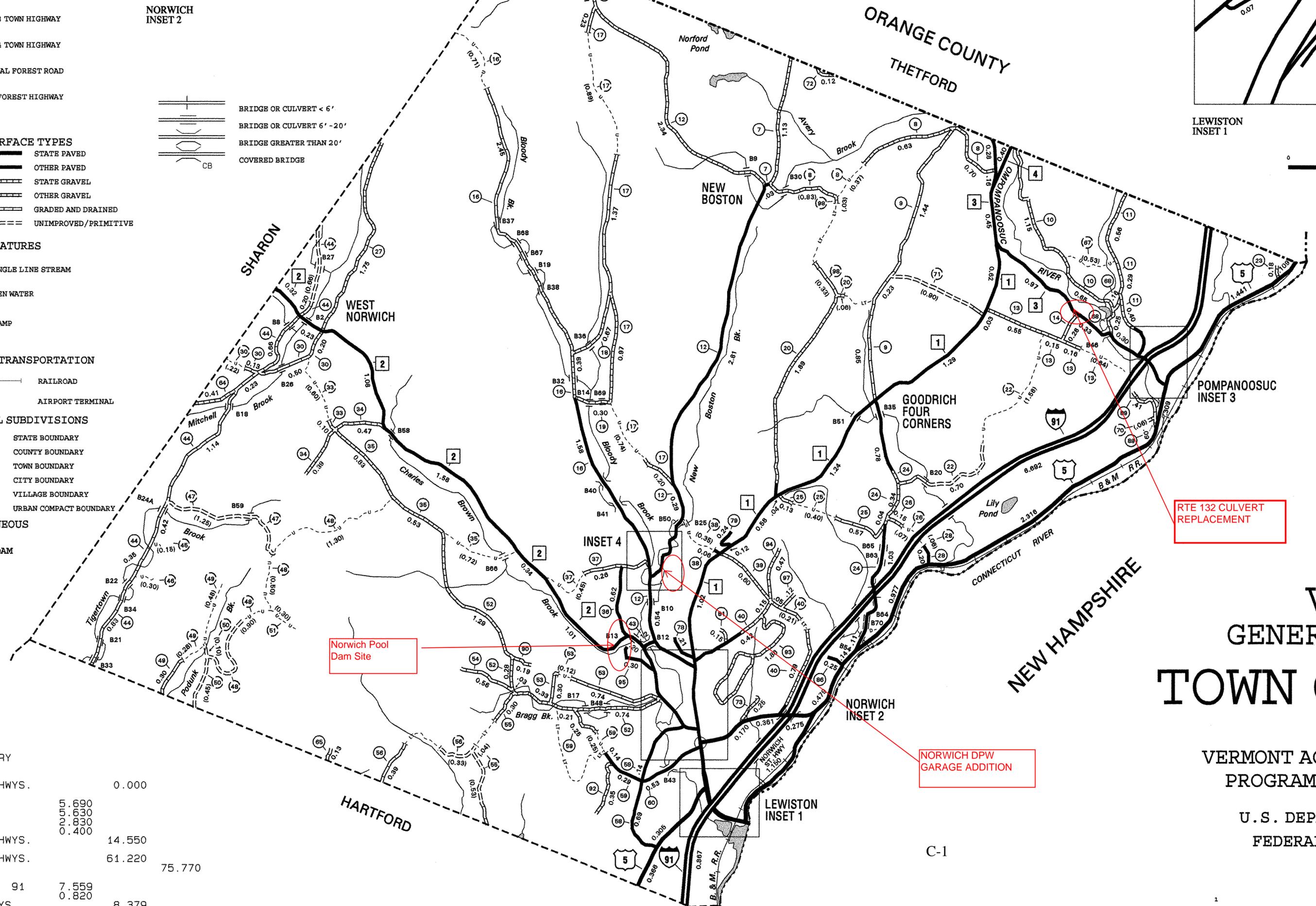
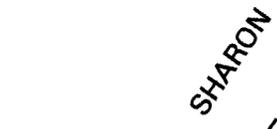
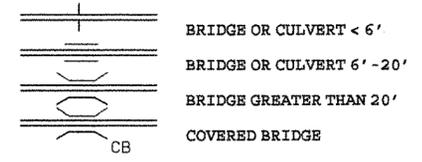
POMPANOSUC INSET 3



INSET 4



LEWISTON INSET 1

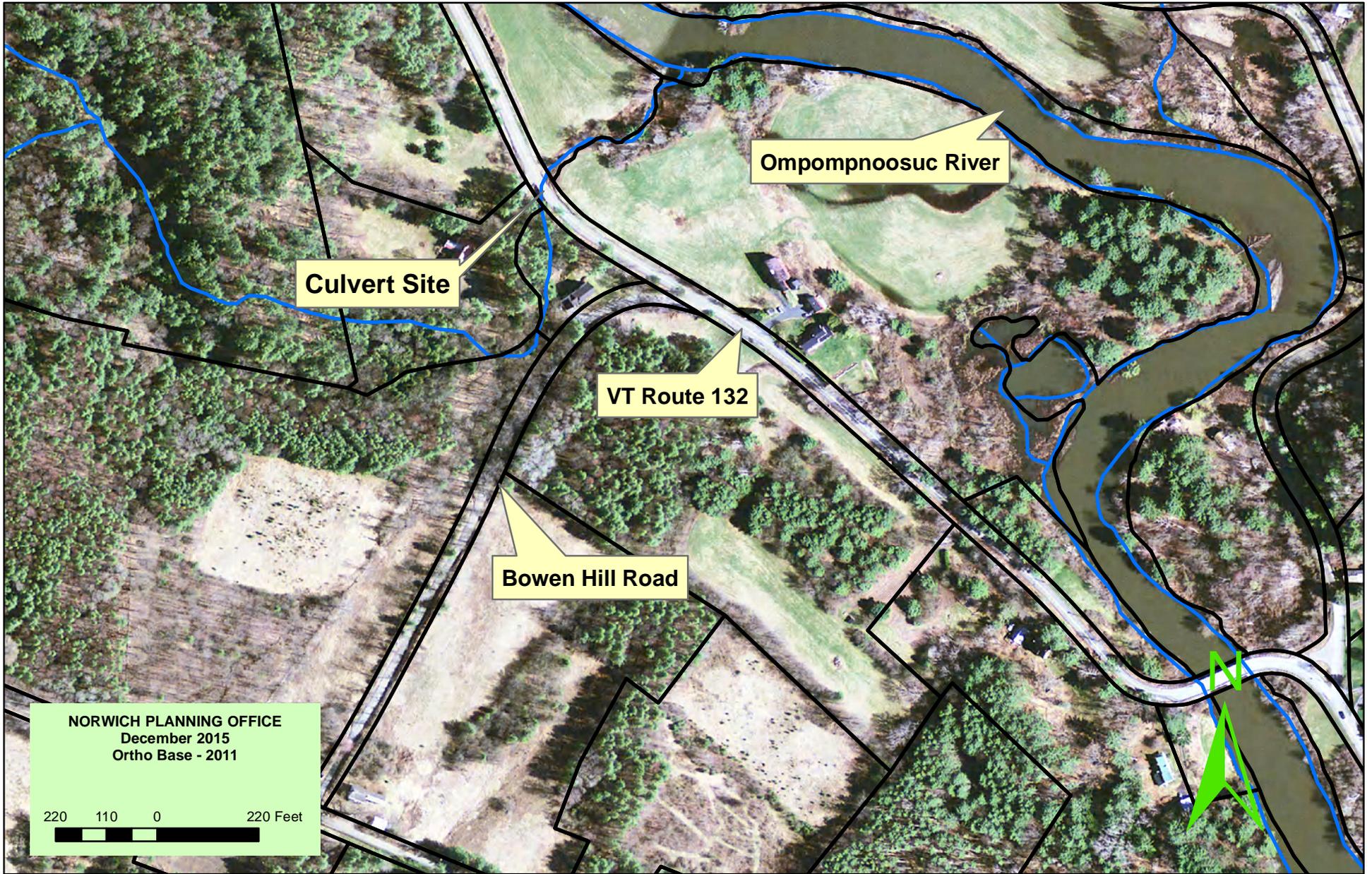


**PERFORMANCE SUMMARY**

ROADS:		
1 TOWN HWYS.	0.000	
2 TOWN HWYS.	14.550	
3 TOWN HWYS.	61.220	75.770
Y. NO. 91	7.559	
MPS	0.820	
STATE HWYS.	8.290	8.379
5		

VERMONT GENERAL TOWN OF  
 VERMONT AGENCY  
 PROGRAM DEVELOPMENT  
 IN COOPERATION WITH  
 U. S. DEPARTMENT OF TRANSPORTATION  
 FEDERAL HIGHWAY ADMINISTRATION





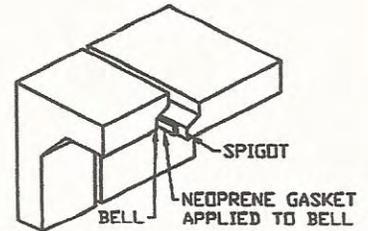
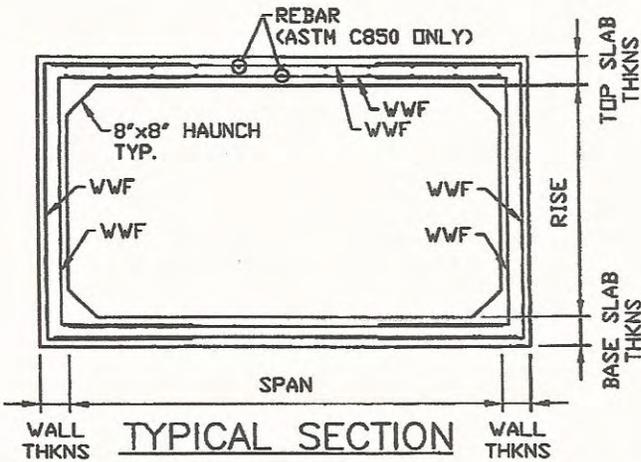
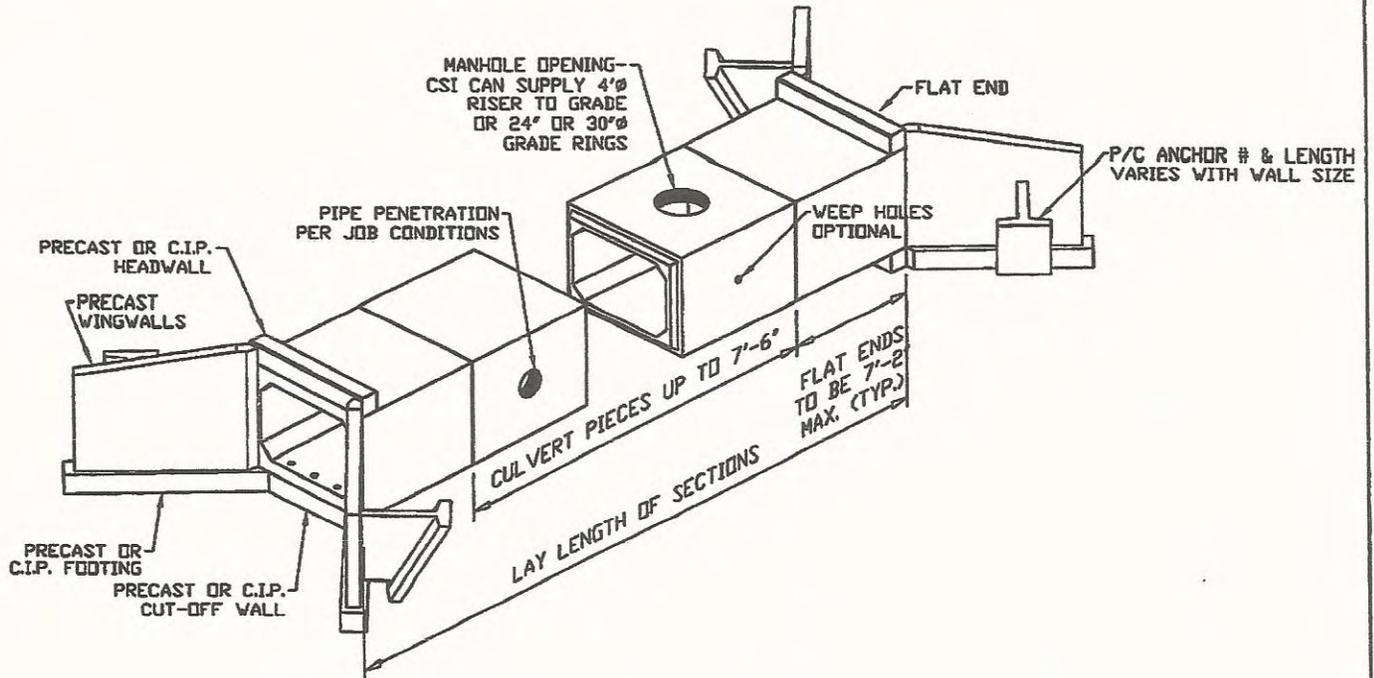
NORWICH PLANNING OFFICE  
December 2015  
Ortho Base - 2011

220 110 0 220 Feet

Date Printed: 12/22/2015

# TYPICAL BOX CULVERT

## Precast Box Culvert with Wing Walls Single Cell



JOINT DETAIL

**GENERAL NOTES:**

1. Structure designed and built in accordance with ACI 318-99 "Building Code Requirements for Structural Concrete" and ASTM C789 or C850. Other design codes: AASHTO, AREA, FAA Airport Loading & BOCA as required.
2. Design Parameters:
  - Live load: As specified
  - Earth Cover: Per job condition
  - Concrete: Design strength  $f_c = 5000$  psi
  - Unit weight = 150 pcf
  - Reinforcing: ASTM A615 (Rebar) Grade 60
  - ASTM A185 (Welded Wire Fabric) Grade 70

**Vermont Department of Environmental Conservation**

Watershed Management Division  
Springfield Regional Office  
100 Mineral Street, Suite 303  
Springfield, VT 05156  
www.watershedmanagement.vt.gov

*Agency of Natural Resources*

[phone] 802-885-8855  
[fax] 802-885-8890  
[cell] 802-345-3510

**AUTHORIZATION TO CONDUCT STREAM ALTERATION ACTIVITIES**

Pursuant to Section C.2.2.5 of the VT Stream Alteration General Permit (replacement to improve existing culverts)

Project Number: **SA-05-044-2015 Norwich Route 132 Culvert**

Applicant Name: Selectboard, Town of Norwich, Vermont

Contact: Neil Fulton or Andy Hodgdon

Mailing Address: Town of Norwich, PO Box 376, Norwich, Vermont 05055

Phone: (802) 649-1419 or (802) 649-2209

Project Location: Rte 132 Replacement Culvert over un-named tributary

Email: [manager@norwich.vt.us](mailto:manager@norwich.vt.us) or

[ahodgdon@norwich.vt.us](mailto:ahodgdon@norwich.vt.us)

The Secretary of the Vermont Agency of Natural Resources (VT ANR) has determined that:

1. This project authorizes the replacement of a structurally deficient 4' wide X 6' tall bridge with a 10' wide X 5' tall concrete box culvert on an un-named tributary to the Ompompanossuc River to preclude emergency repairs.
2. The proposed activity is eligible for coverage under the VT ANR Stream Alteration General Permit.
3. The proposed activity will meet the terms and conditions of the General Permit provided:
  - a) The project will be completed and approved as shown on the attached plans undated, prepared by the town of Norwich as reviewed and approved by the VT ANR herein. Shop drawings shall be approved prior to construction.
  - b) The project will not adversely affect the public safety by increasing flood hazards. See VTrans Hydraulic Report.
  - c) The project will not significantly damage fish life or wildlife. Provide 12" sills buried 24" below stream bed.
  - d) The project will not significantly damage the rights of riparian owners. See attached VTrans Hydraulic Report.
  - e) The project will not obstruct the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction. Use Type E1 Stone Fill in retention sills as per attached SRMPP Appendix M Stone Fill.
  - f) The project is conducted in a manner which minimizes or avoids any discharge of sediment or other pollutants to surface waters in violation of the VT Water Quality Standards.
  - g) The ANR River Management Engineer is notified by phone or email when construction begins and when the project is complete.
  - h) In-stream working dates for all GP activities are from June 1<sup>st</sup> through October 1<sup>st</sup>; any in-stream work outside these dates will require an Individual Stream Alteration Permit authorization by the River Management Engineer.
  - i) This authorization has been posted for three days public comment. This authorization constitutes final approval.

If there are any changes in the project plan or deviation in construction from the plan, the Permittee must notify the River Management Engineer immediately.

If the project is constructed as you have described, as shown on the above referenced approved plans and according to the above conditions, there is no reason to expect any violation of Vermont Water Quality Standards.

Signed this 23<sup>rd</sup> day of December, 2015

This permit expires October 1, 2016.

Alyssa B. Schuren, Commissioner

Department of Environmental Conservation

by   
\_\_\_\_\_

Todd Menees, P.E., P.H., River Management Engineer

E-1

### **Streambed Stone Fill Design Guidance**

<b>Type</b>	<b>Velocity Range (fps)*</b>	<b>Embeddedness (in)</b>
E1	$V \leq 9$	18
E2	$9 < V \leq 11$	24
E3	$11 < V \leq 13$	36
E4	$13 < V \leq 15$	48

\*Maximum velocity should be based on a minimum 50-year design flow rate and calculated at the structure outlet.

### **Item xxx.xxx CY Streambed Stone Fill Specification**

Type E1. The longest dimension of the stone shall be at least 18 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 12 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E2. The longest dimension of the stone shall be at least 24 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 18 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E3. The longest dimension of the stone shall be at least 36 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 24 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E4. The longest dimension of the stone shall be at least 48 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 36 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

#### Notes

- The streambed stone fill shall be hard, blasted, angular rock other than serpentine rock containing the fibrous variety chrysotile (asbestos). Similar sized river sediment is an acceptable alternative as is a mixture of angular material and river sediment.
- Stone placed inside of a closed structure shall be placed such that the structure is not damaged.
- Care shall be taken to limit segregation of the materials.
- Add sand borrow item as needed to seal the bed and prevent subsurface flow.
- There shall be no subsurface flow upon final inspection.

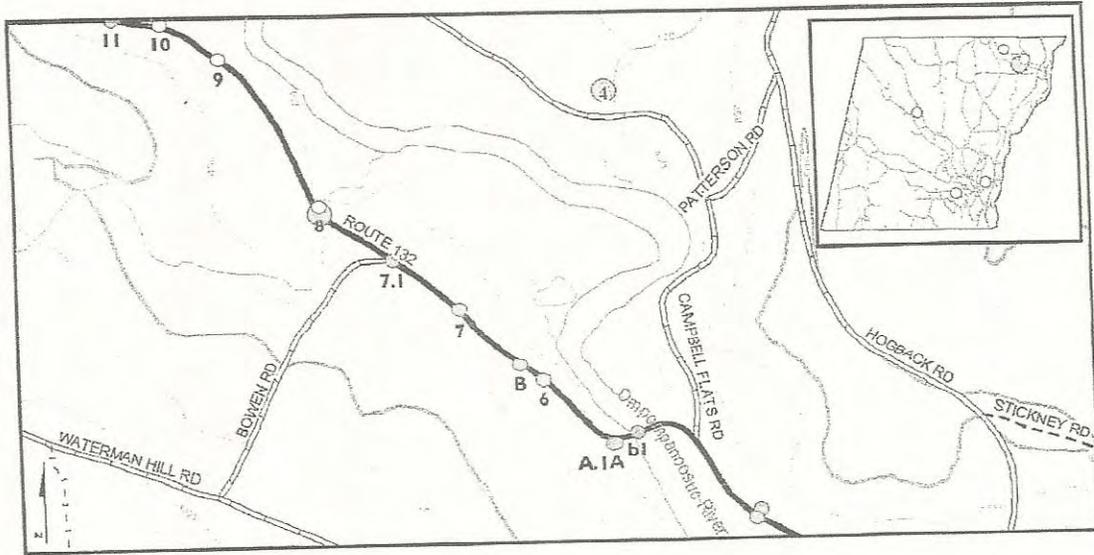


Figure 1: Cracked wingwalls

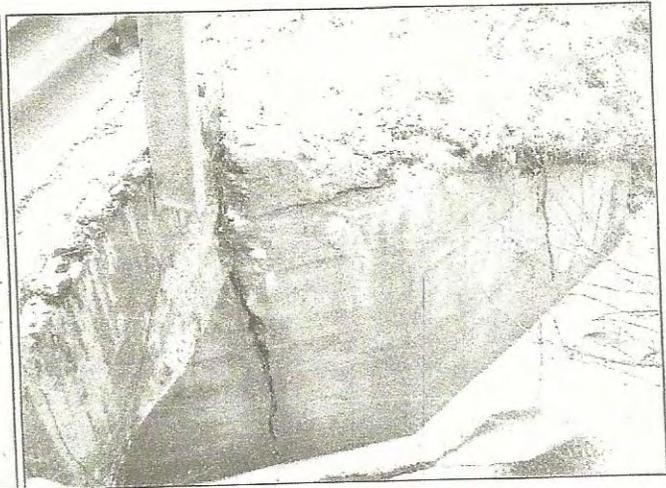


Figure 2: Cracked wingwalls



Figure 3: Poor condition box culvert



## Site Description

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At the first stream crossing below the intersection of Bowen Hill, a concrete box culvert that was built in 1927 and is in very poor condition.

## Recommended Treatment

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Scope of work:

- Demolish and remove existing concrete box culvert.
- Replace existing concrete culvert with a metal pipe arch with a 117" minimum clear span and 79" minimum clear height.
- Install 12" high bed retention sills in the bottom of the structure, buried 24", so the top of the sills and invert are buried below the streambed.
- Sills will be spaced no more than 8' - 0" apart throughout the structure with one sill placed at the inlet and one at the outlet.
- Sills will be cast in a V shape with a 10:1 lateral slope, to create a low flow channel in the center if the bed material in the structure is washed out.
- This will result in a structure with an approximate waterway opening of 37.7 square ft. This structure will result in approximate headwater depths at Q50=4.1' and at Q100-4.8'.
- Concrete headwalls will be constructed at the inlet and outlet. The headwalls will extend at least four feet below the channel bottom or to the ledge, to prevent undermining of the structure.
- The new structure will have flared wing walls at the inlet and outlet, to smooth transition flow through the structure, and to protect the structure and roadway approaches from erosion.
- Stone fill-Type II will be used to protect any disturbed channel banks or roadway slopes at the structure's inlet and outlet, up to a height of at least one foot above the top of the opening.
- Repair of road pavement after the installation of the metal pipe arch.
- Installation of 150 linear feet of used SBGR State of Vermont-type w-rail with radius panels and buffers.

**Permit Requirements** - A VT DEC Stream Alteration Permit will be required for this project. Contact Pat Ross at (802) 279-1143.

## Construction Notes:

- Construction Specifications-See specifications in Vermont Better Backroads Manual, 2009.
- Buried Cable/Utilities-Buried cable/utilities may be on site. Call Dig Safe 1-888-DIG-SAFE to locate buried utilities prior to construction
- Crown roads ½ to ¾ inch per linear foot after project installation and maintain thereafter.
- Stabilize all disturbed soils with seed and mulch.
- Appropriate erosion control measures shall be utilized throughout the duration of the project in accordance with the ANR stream engineer.
- All cost of installing, maintaining, and removing the signs and barricades, and traffic control are to be borne by the successful bidder.
- All traffic signs shall conform to the Manual of Uniform Traffic Control Devices (MUTCD), 2009 Edition.
- All orange signs shall be fabricated using reflectorized fluorescent orange-colored sheeting.
- It is estimated that this project will take approximately two weeks to complete, during which time an acceptable detour will need to be established for Route 132 traffic.

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## Cost Estimates for Treatment

The total cost of removal and disposal of the existing cement box culvert, purchasing and installing the new metal pipe and culvert with concrete work as described above, clearing and grubbing, channel relocating, stone-filled slope stabilizing, repairing pavement, traffic control, erosion control, guardrail installation, turf establishment, and mobilization will be \$115,000.

### Cost Benefit Analysis:

This culvert is in such poor shape that it will eventually cave in; causing an emergency repair that would put the burden of the entire replacement cost to the town.

This project is located in a highly visible area on Route 132, which is one of the main arteries going to the towns of Thetford, Strafford, and Sharon. It would demonstrate the benefits of being proactive in the maintenance of stream crossings and proper drainage on this important connecting route.

VT AGENCY OF TRANSPORTATION      PROGRAM DEVELOPMENT DIVISION  
**HYDRAULICS UNIT**

**TO:** Trevor Starr, District Project Manager, District 4  
**FROM:** Leslie Russell, P.E., Hydraulics Project Engineer  
**DATE:** 16 March 2012  
**SUBJECT:** Norwich VT 132 – 300' west of TH 14 – over unnamed brook

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We have completed our preliminary hydraulic study for the above referenced site, and offer the following information for your use:

**Hydrology**

This site has a hilly drainage basin. It is mostly forested. The total contributing drainage area is about 0.8 sq. mi. There is an overall length of 9855 feet from the divide to the site, with a 630 foot drop in elevation, giving an average overall channel slope of 6.4 %. The stream slope at the site was estimated to be about 1%. Using several hydrologic methods, we came up with the following design flow rates:

<u>Recurrence Interval in Years</u>	<u>Flow Rate in Cubic Feet per Second (CFS)</u>
Q2.33	45
Q10	110
Q25	145
Q50	180 - State Highway Design Flow
Q100	220 - Check flow

**Existing Conditions**

The existing structure is a small slab bridge. It has a clear span length of 4', with a clear height of about 6', providing a waterway opening of 24 sq. ft. The bridge has concrete abutments. The southeast wingwall on the outlet is separating from the eastern abutment.

The bridge is on a skew to the roadway and constricts the channel. The top of the footings can be seen indicating that there is scour through the bridge. There is potential for debris and ice to block this narrow structure.

The downstream channel is incised and during high water, it may be possible for this structure to see backwater from the Ompompanoosuc River because the confluence is a couple hundred feet downstream of the structure.

This structure results in a headwater depth of 6.8' at Q50 and 8.0' at Q100.

**Recommendations**

In sizing a new structure we attempted to select structures that meet the hydraulic standards, fit the natural channel width, the roadway grade and other site conditions. Though there was ice and snow on the day of the site visit, we measured the channel width to be approximately 10'. ANR regression

equation calculates bankfull width as 12'. However, the equation does not take into account any other factor besides drainage area. We recommend any of the following structures as a replacement at this site:

1. A concrete box with a 10' wide by 5' high inside opening, with 6" high bed retention sills (baffles) in the bottom. The box invert should be buried 12", so the top of the sills will be buried 6" and not be visible. That will result in a 10' wide by 4' high waterway opening above streambed, providing 40-sq. ft. of waterway area. Sills should be spaced no more than 8'-0" apart throughout the structure with one sill placed at the inlet and one at the outlet. Sills should be cast in a V shape with a 10:1 lateral slope, to create a low flow channel in the center if the bed material in the structure is washed out. The spaces between sills should be filled with stone graded to match the natural stream bed material. This structure will result in a headwater depth at  $Q_{50} = 3.7'$  and at  $Q_{100} = 4.2'$ , with no roadway overtopping at  $Q_{100}$ .
2. A metal pipe arch with a 117" minimum clear span and 79" minimum clear height. There should be 12" high bed retention sills in the bottom of the structure that are buried 24", so the top of the sills and invert are buried below the streambed. Sills should be built as for the box above. This will result in a structure with an approximate waterway opening of 37.7 sq. ft. This structure will result in approximate headwater depths at  $Q_{50} = 4.1'$  and at  $Q_{100} = 4.8'$ .
3. Any similar structure with a minimum clear span of 10' and at least 40 sq. ft. of waterway area, that fits the site conditions, could be considered.

#### **General comments**

If a new box is installed, we recommend it have full headwalls at the inlet and outlet. The headwalls should extend at least four feet below the channel bottom, or to ledge, to act as cutoff walls and prevent undermining.

If the pipe arch option is installed, concrete headwalls should be constructed at the inlet and outlet. The headwalls may be either half height or full height. The headwalls should extend at least four feet below the channel bottom or to ledge, to prevent undermining of the structure. We recommend a minimum cover of 3' over all pipe structures. Obtaining the minimum cover of 3' should be no problem at this site. Pipe manufactures can provide specific recommendations for minimum and maximum fill heights and required pipe thickness.

It is always desirable for a new structure of this size to have flared wingwalls at the inlet and outlet, to smoothly transition flow through the structure, and to protect the structure and roadway approaches from erosion. The wingwalls should match into the channel banks. Any new structure should be properly aligned with the channel, and constructed on a grade that matches the channel.

Stone Fill, Type II should be used to protect any disturbed channel banks or roadway slopes at the structure's inlet and outlet, up to a height of at least one-foot above the top of the opening. The stone fill should not constrict the channel or structure opening.

**The Agency of Natural Resources (ANR), Corps of Engineers, or other permitting agency may have additional concerns regarding replacement of this structure, or any channel work. The River Management Engineer should be contacted with respect to those concerns, before a replacement structure is ordered. If ANR requires the invert of the structure to be buried**

deeper than specified above, the size of the structure will have to be larger to provide the required waterway area.

Please keep in mind that while a site visit was made, these recommendations were made without the benefit of a survey and are based on limited information. The final decision regarding the replacement of this structure should take into consideration matching the natural channel conditions, the roadway grade, environmental concerns, safety, and other requirements of the site.

Please contact us if you have any questions or if we may be of further assistance.

LGR

cc: Barry Cahoon, A.N.R. River Management Engineer  
Hydraulics Project File via NJW  
Hydraulics Chrono File

Non\_PMS\_Projects\Hydraulics\ProjectFiles\_NonCADD\Norwich\VT 132\Norwich VT 132 prel hyd  
memo.docx



**TOWN OF NORWICH**  
**DEPARTMENT OF PUBLIC WORKS**  
26 New Boston Road  
Norwich, VT 05055  
802-649-2209 Fax: 802-296-0060  
[Ahodgdon@norwich.vt.us](mailto:Ahodgdon@norwich.vt.us)

**Request for Bids**  
**Town of Norwich-VT Route 132**  
**Replacement of Concrete Box Culvert**

**1. PURPOSE**

- 1.1 The Town of Norwich is seeking bids for the replacement of a dilapidated concrete box culvert on VT Route 132, at the first stream crossing below the intersection of Bowen Hill.
- 1.2 Location: N 43° 45.967; W 072° 14,707; West to 002

**2. EXISTING STRUCTURE**

- 2.1 The existing structure is a concrete box culvert with a clear span length of 4' and clear height of about 6', providing a waterway opening of 24 sq. ft.

**3. SCOPE OF WORK**

- 3.1 Demolish and remove existing concrete box culvert.
- 3.2 Replace existing concrete culvert with a concrete box with a 10' wide by 5' high inside opening and 6" high bed retention sills (baffles) in the bottom.
- 3.3 The box invert should be buried 12", so the top of the sills will be buried 6" and not be visible. That will result in a 10' wide by 4' high waterway opening above streambed, providing 40 sq. ft. of waterway area.
- 3.4 Sills should be spaced no more than 8'-0" apart throughout the structure with one sill placed at the inlet and one at the outlet.
- 3.5 Sills should be cast in a V-shape with a 10:1 lateral slope, to create a low flow channel in the center of the bed material in the structure is washed out.
- 3.6 The spaces between sills should be filled with stone graded to match the natural stream bed material.
- 3.7 This structure will result in a headwater depth at Q50= 3.7' and at Q100= 4.2', with no roadway overtopping at Q100.
- 3.8 Full headwalls should be constructed at the inlet and outlet.
  - 3.8.1 The headwalls should extend at least four feet below the channel bottom, or to ledge, to act as cutoff walls and prevent undermining.
- 3.9 Structure should have flared wingwalls at the inlet and outlet, to smoothly transition flow through the structure, and to protect the structure and roadway approaches from erosion.
  - 3.9.1 Wingwalls should match into the channel banks.

- 3.10 Structure should be properly aligned with the channel, and constructed on a grade that matches the channel.
- 3.11 Stone fill-Type II should be used to protect any disturbed channel banks or roadway slopes at the structure's inlet and outlet, up to a height of at least one foot above the top of the opening. The stone fill should not constrict the channel or structure opening.
- 3.12 Repair of road pavement after the installation of the new structure.
- 3.13 Installation of 75 linear feet of used SBGR State of Vermont-type.

#### 4. QUANTITIES

##### 4.1

Item #	Description	Quantity	Unit
201.11	Clearing and grubbing	0.1	acre
203.15	Common excavation	300	cy
203.32	Granular borrow	200	cy
301.15	Subbase of gravel	150	cy
402.1	Aggregate shoulders	10	cy
406	Marshall bituminous pavement	50	tons
507.15	Reinforcing steel	500	lbs.
529.15	Removal of existing structure	1	unit
540.1	Precast concrete box	1	unit
541.25	Concrete class B footings	20	cy
606.14	Beam guardrail	75	ft
615.16	Type II stone fill	40	cy
621.5	Man. Term. Section (G1-D)	4	ea
621.8	Removal of guardrail	75	ft
635.11	Mobilization	1	unit
641.1	Traffic control	1	unit
649.31	Geotextile under stone fill	100	sy
649.51	Geotextile for silt fence	100	sy
651.15	Seed	50	lb
651.18	Fertilizer	100	lb
651.25	Hay mulch	200	sy
651.35	Topsoil	50	cy
900.651	Testing allowance	\$5,000	NABI

##### 4.2 Notes

4.2.1 The quantities above were developed as a base for cost of the project and may not include all items necessary to complete the work.

4.2.2 These quantities are provided for information only.

4.2.3 This project is to be bid and paid for as a lump sum project.

4.2.4 It is not anticipated that ledge will be encountered. However, if ledge is encountered, the contractor will be asked to pin the footings to ledge. This will be paid for as a change order adding the drilling and grouting item.

**5. OTHER CONDITIONS**

- 5.1 A stream alteration permit has been obtained from the VT Agency of Natural Resources for this project: Project Number SA-05-044-2015 Norwich Route 132 Culvert.
- 5.2 The Vermont ANR will not approve the installation of a metal arch pipe at this location.
- 5.3 The Project Delivery Bureau, Environmental Section of the VT Agency of Transportation has confirmed that no clearances or permits are needed from the State of Vermont for this project.

**6. INDEMNIFICATION AND INSURANCE**

- 6.1 The chosen contractor shall comply with the following requirements.
  - 6.1.1 The contractor agrees to defend and save harmless the Town of Norwich, its officers, agents and employees against all claims, demands, payments, suits, actions, recovery, and judgments of every kind and description arising out of the performance of the Agreement, including a personal injury or property damage brought or recovered against it by reason of any negligent action or omission of the consultant, its agents, or employees and with respect to the degree to which the Town is free from negligence on the part of itself, its employees and agents.
  - 6.1.2 The contractor shall carry Comprehensive Broad Form General Liability Insurance in the amount shown below including protection for bodily injury and property damage.
  - 6.1.3 The contractor shall also maintain Automobile Liability Insurance providing limits prescribed by the Town and Umbrella or Excess Liability Insurance in the amount shown below. The Workers' Compensation Insurance shall provide coverage pursuant to V. S. A. Title 21, Section 600 et seq.
  - 6.1.4 Prior to the commencement of work, Certificates of Insurance shall be supplied to the Town by the contractor detailing the required coverage. These Certificates shall be issued by a carrier authorized to do business within the State of Vermont. The Town shall also be named as an additional insured.
  - 6.1.5 The contractor shall have and require all sub-consultants to have and maintain insurance coverage and list the Town as an additional insured in accordance with the minimum amounts listed below. Prior to the start of any work, the Town shall be furnished with an insurance certificate as proof that coverage is in place.

General Liability-\$1,000,000 per occurrence  
Product Liability-\$1,000,000 per occurrence  
Property Damage-\$1,000,000 per occurrence  
Personal Injury- \$1,000,000 per occurrence  
Automotive Liability-\$500,000 per occurrence  
Workers' Compensation-Statutory Requirement

**7. INSTRUCTIONS TO BIDDER**

- 7.1 Proposals shall be typewritten or written in ink. Officials of corporations shall designate their official title; partners or sole owners shall so state giving the names of all interested parties. The person signing the bid shall initial all corrections or erasures.
- 7.2 Requested descriptive material shall be submitted with the bid.
- 7.3 In submitting the bids the contractor agrees that acceptance of any bid by the Town of Norwich within 90 calendar days constitute a contract. No work shall be started until a purchase order has been approved by the Town Manager and a Notice to Proceed in writing from the Director of Public Works.
- 7.4 Discounts for immediate payment or credit terms where offered will not be a factor in the determination of the lowest responsible bidder. Payment terms by the Town will be cash, less any applicable discounts, to be paid within 30 days of the completion of the work by the contractor and formal acceptance by the Town.
- 7.5 The successful bidder shall indemnify and hold harmless the Town of Norwich against all claims for royalties, for patents, or suit for infringement thereon which may be involved in the manufacture or use of the material to be furnished.
- 7.6 All materials shall remain the property of the contractor until delivered to and accepted by the Town.
- 7.7 Deviations from these specifications are permitted only as separate bids provided they are submitted as alternate proposals accompanying a conforming bid.
- 7.8 Selection criteria: This bid shall be awarded to the contractor whose bid represents the best value to the Town of Norwich.
- 7.9 All traffic control and signage will be the responsibility of the successful bidder. All traffic control and signage shall be in compliance with the Manual of Uniform Traffic Control, 2009 Edition.
- 7.10 All bids shall include the following:
  - 7.10.1 Project cost
  - 7.10.2 Project schedule
- 7.11 The Town of Norwich reserves the right to accept and reject any and all bids for due cause to negotiate with any party, to waive informalities or defects in bids, to require test proving or to accept such bids or parts thereof as it shall deem in the best interests of the Town.
- 7.12 Questions relating to these specifications may be directed to R. Andrew Hodgdon, Public Works Director, Town of Norwich, at 802-649-2209.
- 7.13 Interested firms shall submit an original and 2 copies of their bid in a sealed envelope, marked "Route 132 Box Culvert" to

Town Manager  
Town of Norwich  
300 Main Street  
P.O. Box 376  
Norwich, VT 05055

## **8. CALENDAR**

- 8.1 Request for Bids posted:
- 8.2 Proposals due: By noon on Wednesday, January 6, 2016

## Andy Hodgdon

---

**From:** Menees, Todd <Todd.Menees@vermont.gov>  
**Sent:** Wednesday, December 23, 2015 1:29 PM  
**To:** Andy Hodgdon; Neil Fulton; Roberta Robinson; White, Jasmine  
**Cc:** Kirn, Rich; Mason, Dan; 'Kevin Geiger'; 'Mike Adams'; Kline, Mike; Andes, Mary; 'Mary Andes'; Pentkowski, Ron; Phil Dechert  
**Subject:** SA-05-044-2015 Norwich Route 132 Culvert  
**Attachments:** SA-05-044-2015 Norwich Route 132 Culvert.pdf

Andy and Neil –

I have attached authorization for replacement of the structurally deficient structure crossing over an un-named tributary to preclude emergency repairs in Norwich, VT. I will not be mailing a hard copy unless requested. You should print off a copy for your files and a copy for the selected contractor to keep on-site during implementation.

I have copied Jasmine White who will post the permit on the Agency web site for a 3-day public comment period, after which she will notify you of the permit status. I have also copied other folks who should be aware in the event they receive a complaint. I have also copied Mike Adams in the Army Corps regarding federal jurisdiction.

Mike –

You may not yet be aware of this the project. You can reach Andy at 802-649-2209 and Neil is on vacation until after the New Year.

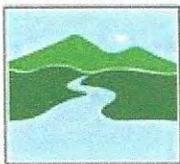
Thanks –

**Please note that my e:mail address has changed below:**

**Todd Menees, P.E., P.H., River Management Engineer**  
**Watershed Management Division, Rivers Program**  
**Vermont Department of Environmental Conservation**  
**100 Mineral Street, State Office Suite 303**  
**Springfield, VT 05156**

**802-345-3510 / [todd.menees@vermont.gov](mailto:todd.menees@vermont.gov)**

**On the Web @ [www.watershedmanagement.vermont.gov/rivers.htm](http://www.watershedmanagement.vermont.gov/rivers.htm)**



VERMONT DEPARTMENT OF  
ENVIRONMENTAL CONSERVATION  
**WATERSHED**  
MANAGEMENT DIVISION

**Vermont Department of Environmental Conservation**

Watershed Management Division  
Springfield Regional Office  
100 Mineral Street, Suite 303  
Springfield, VT 05156  
www.watershedmanagement.vt.gov

*Agency of Natural Resources*

[phone] 802-885-8855  
[fax] 802-885-8890  
[cell] 802-345-3510

**AUTHORIZATION TO CONDUCT STREAM ALTERATION ACTIVITIES**

Pursuant to Section C.2.2.5 of the VT Stream Alteration General Permit (replacement to improve existing culverts)

Project Number: **SA-05-044-2015 Norwich Route 132 Culvert**

Applicant Name: Selectboard, Town of Norwich, Vermont

Contact: Neil Fulton or Andy Hodgdon

Mailing Address: Town of Norwich, PO Box 376, Norwich, Vermont 05055

Phone: (802) 649-1419 or (802) 649-2209

Project Location: Rte 132 Replacement Culvert over un-named tributary

Email: [manager@norwich.vt.us](mailto:manager@norwich.vt.us) or

[ahodgdon@norwich.vt.us](mailto:ahodgdon@norwich.vt.us)

The Secretary of the Vermont Agency of Natural Resources (VT ANR) has determined that:

1. This project authorizes the replacement of a structurally deficient 4' wide X 6' tall bridge with a 10' wide X 5' tall concrete box culvert on an un-named tributary to the Ompompanossuc River to preclude emergency repairs.
2. The proposed activity is eligible for coverage under the VT ANR Stream Alteration General Permit.
3. The proposed activity will meet the terms and conditions of the General Permit provided:
  - a) The project will be completed and approved as shown on the attached plans undated, prepared by the town of Norwich as reviewed and approved by the VT ANR herein. Shop drawings shall be approved prior to construction.
  - b) The project will not adversely affect the public safety by increasing flood hazards. See VTrans Hydraulic Report.
  - c) The project will not significantly damage fish life or wildlife. Provide 12" sills buried 24" below stream bed.
  - d) The project will not significantly damage the rights of riparian owners. See attached VTrans Hydraulic Report.
  - e) The project will not obstruct the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction. Use Type E1 Stone Fill in retention sills as per attached SRMPP Appendix M Stone Fill.
  - f) The project is conducted in a manner which minimizes or avoids any discharge of sediment or other pollutants to surface waters in violation of the VT Water Quality Standards.
  - g) The ANR River Management Engineer is notified by phone or email when construction begins and when the project is complete.
  - h) In-stream working dates for all GP activities are from June 1<sup>st</sup> through October 1<sup>st</sup>; any in-stream work outside these dates will require an Individual Stream Alteration Permit authorization by the River Management Engineer.
  - i) This authorization has been posted for three days public comment. This authorization constitutes final approval.

If there are any changes in the project plan or deviation in construction from the plan, the Permittee must notify the River Management Engineer immediately.

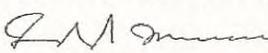
If the project is constructed as you have described, as shown on the above referenced approved plans and according to the above conditions, there is no reason to expect any violation of Vermont Water Quality Standards.

Signed this 23<sup>rd</sup> day of December, 2015

This permit expires October 1, 2016.

Alyssa B. Schuren, Commissioner

Department of Environmental Conservation

by 

Todd Menees, P.E., P.H., River Management Engineer

F-6

## Streambed Stone Fill Design Guidance

Type	Velocity Range (fps)*	Embeddedness (in)
E1	$V \leq 9$	18
E2	$9 < V \leq 11$	24
E3	$11 < V \leq 13$	36
E4	$13 < V \leq 15$	48

\*Maximum velocity should be based on a minimum 50-year design flow rate and calculated at the structure outlet.

### Item xxx.xxx CY Streambed Stone Fill Specification

Type E1. The longest dimension of the stone shall be at least 18 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 12 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

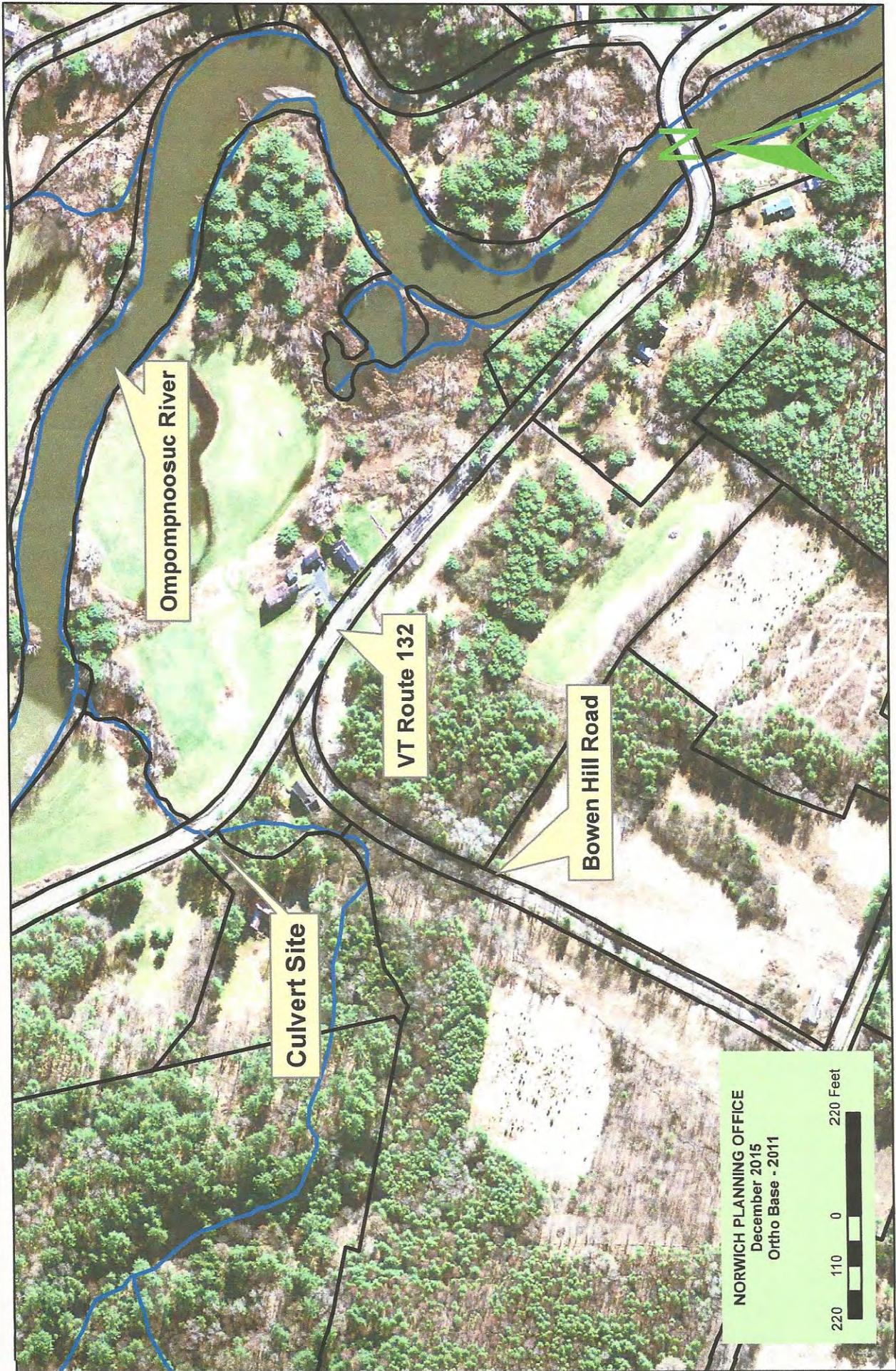
Type E2. The longest dimension of the stone shall be at least 24 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 18 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E3. The longest dimension of the stone shall be at least 36 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 24 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E4. The longest dimension of the stone shall be at least 48 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 36 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

### Notes

- The streambed stone fill shall be hard, blasted, angular rock other than serpentine rock containing the fibrous variety chrysotile (asbestos). Similar sized river sediment is an acceptable alternative as is a mixture of angular material and river sediment.
- Stone placed inside of a closed structure shall be placed such that the structure is not damaged.
- Care shall be taken to limit segregation of the materials.
- Add sand borrow item as needed to seal the bed and prevent subsurface flow.
- There shall be no subsurface flow upon final inspection.



Date Printed: 12/22/2015

VT AGENCY OF TRANSPORTATION      PROGRAM DEVELOPMENT DIVISION  
**HYDRAULICS UNIT**

**TO:** Trevor Starr, District Project Manager, District 4  
**FROM:** Leslie Russell, P.E., Hydraulics Project Engineer  
**DATE:** 16 March 2012  
**SUBJECT:** Norwich VT 132 – 300' west of TH 14 – over unnamed brook

---

We have completed our preliminary hydraulic study for the above referenced site, and offer the following information for your use:

**Hydrology**

This site has a hilly drainage basin. It is mostly forested. The total contributing drainage area is about 0.8 sq. mi. There is an overall length of 9855 feet from the divide to the site, with a 630 foot drop in elevation, giving an average overall channel slope of 6.4 %. The stream slope at the site was estimated to be about 1%. Using several hydrologic methods, we came up with the following design flow rates:

<u>Recurrence Interval in Years</u>	<u>Flow Rate in Cubic Feet per Second (CFS)</u>
Q2.33	45
Q10	110
Q25	145
Q50	180 - State Highway Design Flow
Q100	220 - Check flow

**Existing Conditions**

The existing structure is a small slab bridge. It has a clear span length of 4', with a clear height of about 6', providing a waterway opening of 24 sq. ft. The bridge has concrete abutments. The southeast wingwall on the outlet is separating from the eastern abutment.

The bridge is on a skew to the roadway and constricts the channel. The top of the footings can be seen indicating that there is scour through the bridge. There is potential for debris and ice to block this narrow structure.

The downstream channel is incised and during high water, it may be possible for this structure to see backwater from the Ompompanoosuc River because the confluence is a couple hundred feet downstream of the structure.

This structure results in a headwater depth of 6.8' at Q50 and 8.0' at Q100.

**Recommendations**

In sizing a new structure we attempted to select structures that meet the hydraulic standards, fit the natural channel width, the roadway grade and other site conditions. Though there was ice and snow on the day of the site visit, we measured the channel width to be approximately 10'. ANR regression

equation calculates bankfull width as 12'. However, the equation does not take into account any other factor besides drainage area. We recommend any of the following structures as a replacement at this site:

1. A concrete box with a 10' wide by 5' high inside opening, with 6" high bed retention sills (baffles) in the bottom. The box invert should be buried 12", so the top of the sills will be buried 6" and not be visible. That will result in a 10' wide by 4' high waterway opening above streambed, providing 40-sq. ft. of waterway area. Sills should be spaced no more than 8'-0" apart throughout the structure with one sill placed at the inlet and one at the outlet. Sills should be cast in a V shape with a 10:1 lateral slope, to create a low flow channel in the center if the bed material in the structure is washed out. The spaces between sills should be filled with stone graded to match the natural stream bed material. This structure will result in a headwater depth at  $Q_{50} = 3.7'$  and at  $Q_{100} = 4.2'$ , with no roadway overtopping at  $Q_{100}$ .
2. A metal pipe arch with a 117" minimum clear span and 79" minimum clear height. There should be 12" high bed retention sills in the bottom of the structure that are buried 24", so the top of the sills and invert are buried below the streambed. Sills should be built as for the box above. This will result in a structure with an approximate waterway opening of 37.7 sq. ft. This structure will result in approximate headwater depths at  $Q_{50} = 4.1'$  and at  $Q_{100} = 4.8'$ .
3. Any similar structure with a minimum clear span of 10' and at least 40 sq. ft. of waterway area, that fits the site conditions, could be considered.

#### General comments

If a new box is installed, we recommend it have full headwalls at the inlet and outlet. The headwalls should extend at least four feet below the channel bottom, or to ledge, to act as cutoff walls and prevent undermining.

If the pipe arch option is installed, concrete headwalls should be constructed at the inlet and outlet. The headwalls may be either half height or full height. The headwalls should extend at least four feet below the channel bottom or to ledge, to prevent undermining of the structure. We recommend a minimum cover of 3' over all pipe structures. Obtaining the minimum cover of 3' should be no problem at this site. Pipe manufactures can provide specific recommendations for minimum and maximum fill heights and required pipe thickness.

— It is always desirable for a new structure of this size to have flared wingwalls at the inlet and outlet, to smoothly transition flow through the structure, and to protect the structure and roadway approaches from erosion. The wingwalls should match into the channel banks. Any new structure should be properly aligned with the channel, and constructed on a grade that matches the channel.

— Stone Fill, Type II should be used to protect any disturbed channel banks or roadway slopes at the structure's inlet and outlet, up to a height of at least one-foot above the top of the opening. The stone fill should not constrict the channel or structure opening.

**The Agency of Natural Resources (ANR), Corps of Engineers, or other permitting agency may have additional concerns regarding replacement of this structure, or any channel work. The River Management Engineer should be contacted with respect to those concerns, before a replacement structure is ordered. If ANR requires the invert of the structure to be buried**

deeper than specified above, the size of the structure will have to be larger to provide the required waterway area.

Please keep in mind that while a site visit was made, these recommendations were made without the benefit of a survey and are based on limited information. The final decision regarding the replacement of this structure should take into consideration matching the natural channel conditions, the roadway grade, environmental concerns, safety, and other requirements of the site.

Please contact us if you have any questions or if we may be of further assistance.

LGR

cc: Barry Cahoon, A.N.R. River Management Engineer  
Hydraulics Project File via NJW  
Hydraulics Chrono File

Non\_PMS\_Projects\Hydraulics\ProjectFiles\_NonCADD\Norwich\VT 132\Norwich VT 132 prel hyd  
memo.docx

**Griffin & Griffin Excavating, Inc.**

1909 Airport Road  
N. Fayston, VT 05660

**Estimate**

Date	Estimate #
1/5/2016	911

Name / Address
Town of Norwich Dept. Public works 26 Boston Road Norwich, VT 05055

Project	Terms

Description	Qty	Cost	Total
Remove & Replace Box Culvert on Rt 132 in Norwich, VT, by house # 533 Pricing included on sheet # 2	1	\$ 126,700.00	\$ 126,700.00

One Hundred Twenty Six Thousand Seven <sup>Hundred 00/100</sup> Total \$ 126,700.00

Signature owner / president  
*Robert D Griffin*

Phone #	Fax #
802-583-2500	802-496-5478

Project manager  
*Michael Allen*  
802 - 371 - 8918

# Griffin & Griffin Excavating, Inc.

1909 Airport Road  
North Fayston, VT 05660

## COST ANALYSIS SHEET

Project No: Box culvert  
Location: Norwich, VT  
Priced By: mike Avery

Prepared By: mike  
Checked By: mike  
Sheet 2 of 2

DIVISION NO.	SECTION NO.	DESCRIPTION	QUANTITY	UNIT	MANHOURS		LABOR		MATERIAL		EQUIPMENT		SUB TRADES	TOTAL COST	
					UNIT	TOTAL	UNIT	TOTAL	UNIT	TOTAL	UNIT	TOTAL		UNIT	TOTAL
		Clearing	L/S												1000.00
		Common Exc	300 cy												3600.00
		Granular borrow	200 cy												4400.00
		Subbase Gravel	150 cy												3300.00
		Aggregate Shoulder	10 cy												1000.00
		Pavement	50 ton												7500.00
		Remove Existing Culvert	L/S												5000.00
		Precast Culvert (New)	L/S												68,500.00
		Steel Beam guardrail	L/S												6,000.00
		Type II Stone fill	40 cy												1400.00
		Remove Existing guard rail	L/S												700.00
		mobilization	L/S												5000.00
		Traffic Control	L/S												1500.00
		Silk fence	L/S												300.00
		Road fabric	L/S												300.00
		Seed, Fertilizer, Hay	L/S												700.00
		Topsoil	L/S												1500.00
		Testing Soil	L/S												5000.00
		Supervision Foreman													10,000.00
		SUB TOTAL													
		TOTAL													\$ 126,700.00

36" CPP  
Culvert

Sand bags  
concrete blocks with plastic

pump if  
needed

**GRIFFIN & GRIFFIN EXCAVATING, INC.**

1909 AIRPORT RD  
NORTH FAYSTON VT 05660

802-583-2500 Fax 802-496-5478 E-mail [northfayston@gmavt.net](mailto:northfayston@gmavt.net)

BY Pass

INSTALL 36" pipe  
concrete blocks  
plastic over blocks  
sand bag on plastic  
temp pipe will be  
4' off outside of  
new box culvert

Remove temp 36"  
after box culvert  
is installed  
backfill box culvert

Put temp 36" inside  
inlet box culvert  
up river sand bags  
dig wing walls  
set wing walls  
backfill  
same on outlet



- week 1
- set up signs & Road Closure
  - lay out of new culvert
  - install temp 36" pipe for by pass,
  - Remove old culvert
  - grade for new culvert
  - set new culvert
  - Remove temp. pipe
  - backfill box culvert

- week 2
- Put in 36" pipe inlet & outlet
  - grade & set wing walls
  - backfill
  - Place type II rip rap
  - topsoil slope
  - box cut for gravel
  - Open road
  - allow traffic for
  - 3 weeks
  - PAVE Road



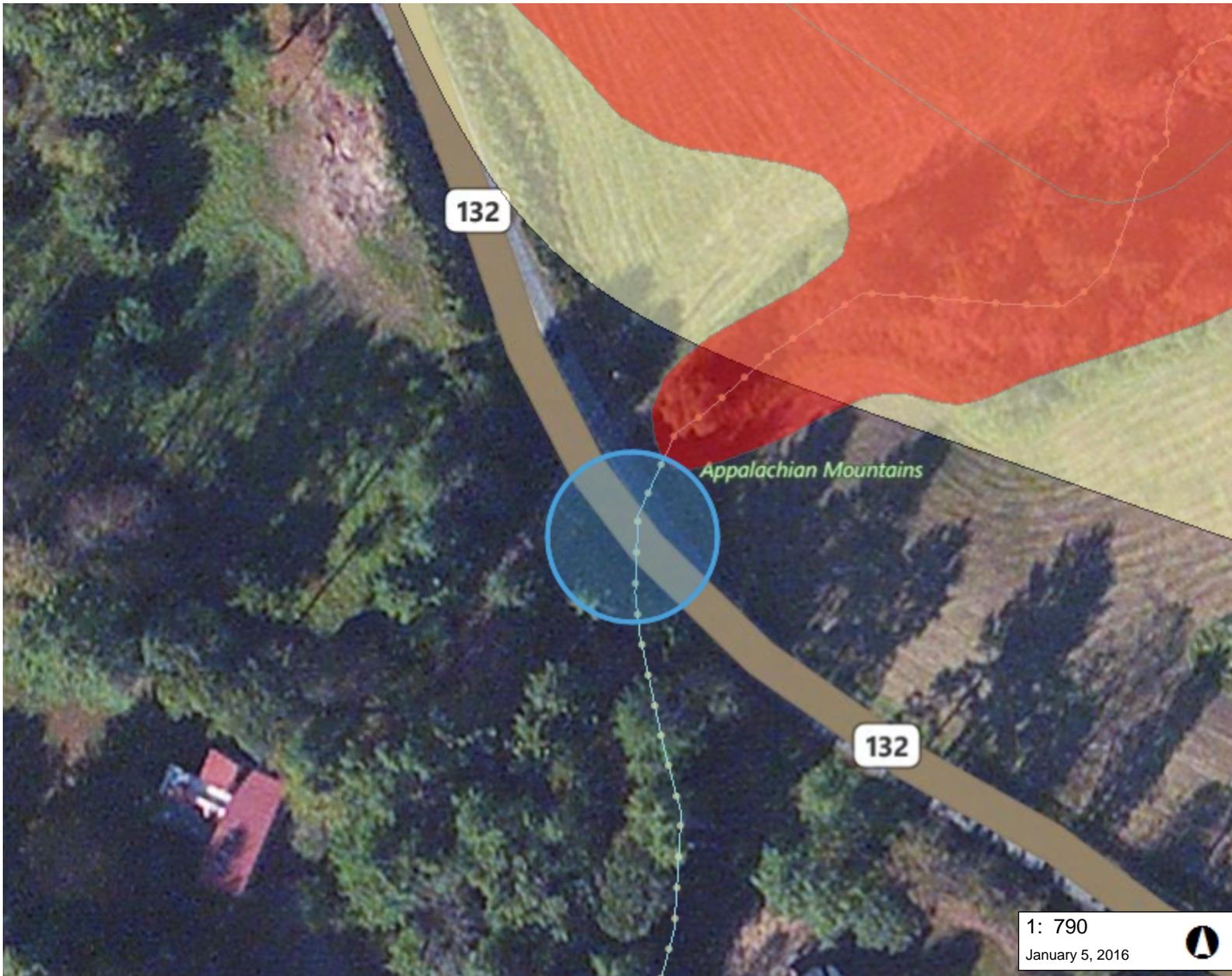
H-1



H-2



H-3



### LEGEND

- Wetlands - VSWI**
  - Class 1 Wetland
  - Class 2 Wetland
- Special Flood Hazard Areas (A Counties)**
  - AE (1-percent annual chance flood)
  - A (1-percent annual chance floodpl)
  - AO (1-percent annual chance zone feet)
  - 0.2-percent annual chance flood ha
- River Corridors (Jan 2, 2015)
- Small Streams - 50ft Setback
- Stream
- Town Boundary

1: 790  
January 5, 2016

### NOTES

Map created using ANR's Natural Resources Atlas

40.0 0 20.00 40.0 Meters

WGS\_1984\_Web\_Mercator\_Auxiliary\_Sphere 1" = 66 Ft. 1cm = 8 Meters

© Vermont Agency of Natural Resources THIS MAP IS NOT TO BE USED FOR NAVIGATION

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

## Phil Dechert

---

**From:** Duggan, James <James.Duggan@vermont.gov>  
**Sent:** Tuesday, January 12, 2016 4:20 PM  
**To:** Phil Dechert  
**Cc:** ACCD - Project Review  
**Subject:** RE: Norwich HP review for 3 Alternative Projects

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Hi Phil,

Our team had a chance to review the materials and here is the summary at present.

- 
1. We have no concerns with the box culvert project as it will occur in the previously disturbed area and the structure is not considered historic.
  2. We have no concerns for the addition at the highway garage - existing developed area and not archaeologically sensitive - also not a historic building
  3. We do have some concerns related to the Dam removal and will need a formal submittal of required information to provide comments. (\*\*see below)
    - a. There is considerable ground disturbance planned along the streambank and therefore an Archaeological Resource Assessment (ARA) will be needed, at minimum, to identify the potential for archaeological sensitivity. We would anticipate that due to previous ground disturbance an ARA will likely clear the area of potential effect for sensitivity, but we will need the potential for this to be reviewed to ensure additional testing is not required.
    - b. The dam itself was potentially historic, but has been compromised so there is a question with its integrity. We do not have issues with the proposed demolition, but the removal and loss of the dam could be considered a direct, adverse effect. Due to the compromised integrity, we suggest that if a few photographs of existing conditions and a few photographs showing the dam prior to TS Irene are included in the above-mentioned ARA would be sufficient mitigation to resolve any potential adverse effect created by demolition.

\*\* The materials you have provided are sufficient for the required items needed for project review submittal, however, to formally initiate the review we would need you to complete a Project Review Cover Form found here:

<http://accd.vermont.gov/sites/accd/files/Documents/strongcommunities/historic/ProjectReviewCoverForm2.pdf>

We will need to review the ARA before we can provide formal comments VTDEMHS.

A list of consultants who could complete the ARA can be found here:

[http://accd.vermont.gov/sites/accd/files/Documents/strongcommunities/historic/Environmental\\_Project\\_Review\\_Consultants.pdf](http://accd.vermont.gov/sites/accd/files/Documents/strongcommunities/historic/Environmental_Project_Review_Consultants.pdf)

I hope this will give you enough information for your meeting tonight, feel free to call me with any additional questions or to talk about next steps.

Best  
Jamie



**James P. Duggan** | Senior Historic Preservation Review Coordinator

Division for Historic Preservation

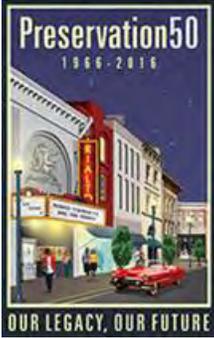
Department of Housing & Community Development

1 National Life Dr, Davis Bldg, 6th Floor | Montpelier, VT 05620-0501

802-477-2288 direct | [accd.vermont.gov/strong\\_communities/preservation](http://accd.vermont.gov/strong_communities/preservation)

**PLEASE NOTE: The suffix on all state email has changed; all emails now end in vermont.gov.**

**My email address is [james.duggan@vermont.gov](mailto:james.duggan@vermont.gov)**



**From:** Phil Dechert [mailto:PDechert@norwich.vt.us]

**Sent:** Friday, January 08, 2016 3:40 PM

**To:** Duggan, James <James.Duggan@vermont.gov>

**Subject:** Norwich HP review for 3 Alternative Projects

Jamie,

I was unable to go to my meeting in Montpelier today, so I have created a Dropbox folder with the DRAFT application materials for the three Alternative Projects Norwich is submitting to DEMHS. DEMHS is looking for some letter or document from your office to comply with the EHP review.

<https://www.dropbox.com/sh/j2jd5souhx23lbl/AAApNaXt6jMW7xQVIOBZT8YOa?dl=0>

The projects:

**Restoration of the Norwich Pool Dam Area** – This is cleanup, and removal of debris from the former pool area behind a dam that was taken out by TS Irene. The Dam and pool were created in 1944. There is some restoration to the stream bed as outlined in the Stream Alteration Permit. There is no construction but there may be some limited bank restoration.

**Addition to highway garage at the Public works facility** – 40’ x 70’ Addition to an existing steel building (1972) in a paved area adjacent to the existing building. Excavation will be for footings and frost walls under a slab. Prior to 1972 there was a Quonset Hut building for highway trucks in the same general area. That building is gone but the slab is still there.

There is a new 200’ communication tower about 800’ north of the building. Lyssa Papasian did a Section 106 review for CPG application which I have included in the Dropbox folder.

**Replace a box culvert on Route 132** – Remove and replace a structurally deficient box culvert. The details are in the Stream Alteration permit in the file.

I would appreciate any status report by early next week. We have a Selectboard meeting on Wednesday.

Thanks,  
Phil

Phil Dechert  
Director of Planning & Zoning  
Town of Norwich  
PO Box 376  
Norwich VT 05055  
802 649-1419 Ext. 4

Please note that any response or reply to this electronic message may be subject to disclosure as a public record under the Vermont Public Records Act.