VERMONT

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AUTHORIZATION TO CONDUCT STREAM ALTERATION ACTIVITIES

Pursuant to Section C.2.2.5 of the VT Stream Alteration General Permit (Reporting activities not requiring an application)

Project Number: SA-05-024-2015 Jamaica W Jamaica Rd Culvert 48 FEMA HMGP# WJR-O Twin Culverts Jamaica
Applicant Name: Town of Jamaica Contact: Paul Fraser
Mailing Address: P.O. Box 173, 28 Town Office Rd, Jamaica, VT 0534 Phone: 802-874-4681
Project Location: West Jamaica Rd TH 30 Culv 48 trib to Ball Mtn Brk Email: frasercrew@aol.com

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

1. This project authorizes replacement of dual culverts damaged by T.S. Irene with a new structure with 14' clear span and min. 56 s.f. opening and associated wing walls and rip-rap stabilization over Ball Mountain Brook tributary as per VTrans Hydraulic report. The culvert invert to be stabilized with Type E1 stone fill as per Appendix M Stone Sizing.
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 schematic dated 4/29/15, prepared by Holden Engineering, and final project design plans shall be submitted for review and final approval by the VT ANR.
   b) The project will not adversely affect the public safety by increasing flood hazards.
   c) The project will not significantly damage fish life or wildlife.
   d) The project will not significantly damage the rights of riparian owners.
   e) The project will not obstruct the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction.
   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 July 1st through October 1st; 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.

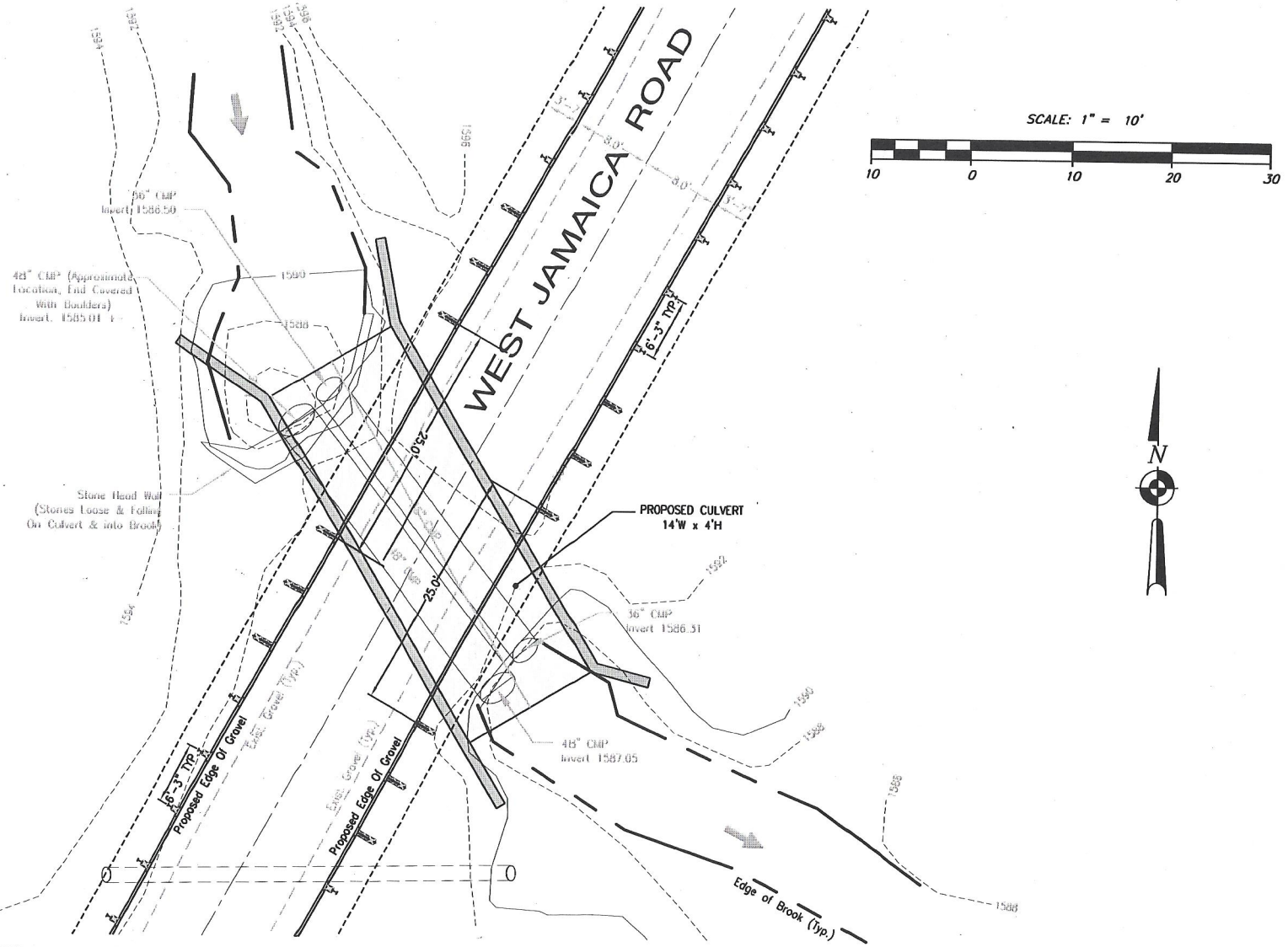
If there are any changes in the project plan or deviation in construction from the plan, the Permittee must notify the River Management Engineer immediately.

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 6th day of August, 2015
David K. Mears, Commissioner
Department of Environmental Conservation

This permit expires October 1, 2016.

by: _____
Todd Menees, P.E., P.H., River Management Engineer



HOLDEN TRANSPORTATION ENGINEERING

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CULVERT REPLACEMENT SCHEMATIC PLAN
CULVERT #48 – WEST JAMAICA
JAMAICA, VT

Date:	Revisions Description	Dr. By	Chk. By

Book	Page

Date: 04.29.2015
Scale: 1" = 10'
Drawn By: TD
Checked By:
Job No: 1570019
Sheet No. 1 of 1

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VT AGENCY OF TRANSPORTATION **PROGRAM DEVELOPMENT DIVISION**

HYDRAULICS UNIT

TO: John Alexander, District Project Manager, District 2

FROM: Mike Tuttle, Hydraulics Project Engineer

DATE: November 30, 2011

SUBJECT: Jamaica, TH30 – West Jamaica Rd, 0.34mi South of TH28
(FEMA #WJR-0, Twin Culverts) #48 CULVERT

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 mountainous drainage basin. It is mostly forested. The total contributing drainage area is about 1.25 sq. mi. There is an overall length of 13,560 feet from the divide to the site, with a 1238 ft drop in elevation, giving an average overall channel slope of 9.1 %. Slope at the site was estimated to be from 6 – 8%. Using several hydrologic methods, we came up with the following design flow rates:

Recurrence Interval in Years	Flow Rate in Cubic Feet per Second (CFS)
Q2.33	90
Q10	220
Q25	280 - Town Highway Design Flow
Q50	340
Q100	400 - Check flow

Existing Conditions

The existing crossing is through 2 CMP's, 1-36in and 1-48in diameter. That combination of pipes provides 19.6 square feet of waterway area and is inadequate hydraulically. Flow would be over the road at less than the design Q25.

Recommendations

In sizing a new structure we attempt to select structures that meet the hydraulic standards, fit the natural channel width, the roadway grade and other site conditions. At this time we recommend any of the following structures as possible replacements:

1. A concrete box with a 14ft wide by 5ft high inside opening, with 6in high bed retention sills (baffles) in the bottom. The box invert should be buried 12in, so the top of the sills will be buried 6in and not be visible. That will result in a 14ft wide by 4ft high waterway opening above streambed, providing 56 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 Q25 = 3.9ft (HW/D = 1.0), and at Q100 = 5.1ft (HW/D = 1.3).

2. Any similar structure with a minimum clear span of 14ft and at least 56 sq. ft. of waterway area, that fits the site conditions, could be considered. Any closed bottom structure should have bed retention sills and a buried invert as described above.

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.

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 III 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 more than indicated above, the size of the structure will have to be larger to provide the required waterway area.

Please keep in mind that although 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.

MJT

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

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.