NH Department of Environmental Services (NHDES)
Response to Comments and List of Substantive Changes
for
Section 401 Water Quality Certification
WQC # 2017-404I-001

October 24, 2017

On September 27, 2017 the New Hampshire Department of Environmental Services (NHDES) issued a draft of the following Section 401 Water Quality Certification (WQC or Certification) for public review and comment:

WQC # 2017-404I-001

Activity Name: Reconstruction of NH Route 12, Walpole-Charlestown X-A000(487), 14747

Activity Location: Walpole and Charlestown, New Hampshire

Owner/ Applicant: New Hampshire Department of Transportation (NHDOT)

The public comment period ended on October 18, 2017. During the public comment period for the draft WQC, comments were received from the following:

- Peter Powers
- Connecticut River Joint Commissions (CRJC – James McClammer)
- Connecticut River Conservancy (CRC – Kathy Urffer)

The U.S. Army Corps of Engineers (Corps) also received comments from the following stakeholders in response to their public notice of NHDOT's application for an individual section 404 permit for this Activity. Although not required, this document includes responses to these comments as many concerned water quality.

- John Bruno, P.E.
- U.S. Environmental Protection Agency (EPA – Mark Kern)

Copies of the comment letters are provided at the end of this document in Appendix A. Response to comments are provided below (in bold, italics) followed by a summary of other substantive changes made to the final WQC. In some cases comments were paraphrased. Each response begins with "Changes made to the WQC" or "No changes made to the WQC". If changes were made to the final WQC as a result of the comment, a description of the revisions is provided. NHDES consulted with NHDOT for many of the responses.

RESPONSE TO COMMENTS

A. Comments from Peter Powers

Comment A.1: In my review of the material I noted that the water quality cert requires a review of "hydrologic" impacts. It is my concern that any so called "rip-rap" or bank stabilization work

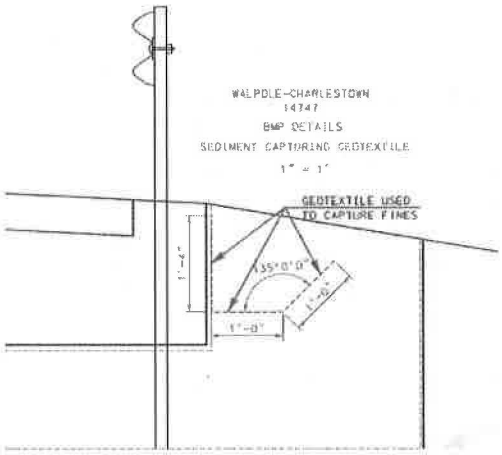
done by the state will have an impact on the erosion happening downstream. It is a known fact that changing the river bank will affect the banks downstream. I saw no mention that this issue was addressed. I am requesting that the State review the hydrologic impact and review the Corp of Engineers Study as to the impact and issue a report to the Town of Walpole, Village of North Walpole as well as myself.

Response A.1: No changes made to the WQC:
NHDOT ran the U.S. Army Corps of Engineers HEC RAS river hydraulic model to compare pre and post construction characteristics (velocity and flood elevation) of the river. Results indicated the proposed bank between the road and the river is not expected to result in any significant change in river characteristics in the vicinity or downstream of the project.

B. Comments from Connecticut Rivers Joint Commission (CRJC- James McClammer)

Comment B.1: The design relies on untested engineering measures to treat storm water runoff before it enters the river. It incorporates treatment measures (i.e., infiltration basins/trenches under the road surface) which are not designed in accordance with current Alteration of Terrain regulations (Env-Wq 1500). They have no pretreatment and lack access for periodic maintenance. Consequently, they may not be effective over the long term. Thus, it may be prudent not only to ensure the catch basins and tops of the infiltration trenches are maintained, especially during the winter months, but to include long-term monitoring of the effectiveness of this BMP in pollutant reduction.

Response B.1: No changes made to the WQC.
The infiltration system is designed and engineered to be substantially equivalent with the NHDES Alteration of Terrain regulations (Env-Wq 1500). With regards to maintenance, Condition E-12 of the WQC requires development and implementation of a comprehensive inspection and maintenance plan for all permanent stormwater best management practices (BMPs). Filter fabric has been added to the design in the upper layer of the infiltration stone on both sides of the road to provide pretreatment (see the detail below). The fabric will retain winter sand and other debris and help prevent clogging of the infiltration BMP.



With regards to long-term monitoring, infiltration is a common stormwater practice in New Hampshire and forms the cornerstone of Low Impact Development standards. Its effectiveness has been well studied throughout the engineering and academic communities. Consequently,

long-term monitoring to determine the effectiveness of the infiltration BMPs is not considered necessary for this project.

Comment B.2: As you acknowledged, there is currently little to no stormwater treatment of roadway runoff. The infiltration trenches are intended to treat stormwater runoff from approximately 7.3 acres of impervious surfaces which, as stated in the draft water quality certification, "exceeds the increase in impervious area of approximately 2.3 acres". However, this does not consider the concomitant loss of roadside vegetation which may function in treatment nor does it appear to address the standard that "Existing discharges containing phosphorus or nitrogen, or both, which encourage cultural eutrophication shall be treated to remove the nutrient(s) to ensure attainment and maintenance of water quality standards" [Env-Wq 1703.14 (c)].

Response B.2: No changes made to the WQC.
It is true that the pre-construction pollutant loading analysis (PLA) does not account for any stormwater treatment BMPs under existing conditions. This is because no well-defined permanent stormwater BMPs currently exist. However, the post-construction PLA does account for loss of roadside vegetation where it is replaced by impervious pavement. Increasing the impervious area, increases the pollutant loading and drives the need to include permanent stormwater BMPs with appropriate pollutant removal efficiencies to prevent post-construction pollutant loadings from exceeding pre-construction pollutant loadings. Results of the PLA indicate that the proposed infiltration BMPs will reduce the pollutant loading after the Activity is constructed (see Response D.3 below).

With regards to Env-Wq 1703.14(c), none of the receiving surface waters in the vicinity of the Activity are considered culturally eutrophied because none are listed as impaired for nutrients (i.e., phosphorus or nitrogen) or nutrient related causes (such as excessive algal growth). Although nutrients are not currently causing cultural eutrophication, nutrient loadings to the receiving waters are, nevertheless, being reduced by the proposed infiltration BMPs, based on the results of the PLA.

Comment B.3: Although road salt and other deicers improve safety, it poses risks to water quality, roadside vegetation, and aquatic life. We applaud the proposed requirement that the applicant prepare and implement a salt minimization plan, which will address measures to reduce chloride to the maximum extent practicable. However, we think this plan should also address the use of toxic deicers, other than chlorides, that may be contemplated.

Response B.3: Changes made to the WQC.
NHDOT currently does not plan to utilize non-chloride deicers within the project area. If they are proposed, a description of the product and use would be included in the Salt Minimization Plan, which must be approved by NHDES. The requirement to include information regarding any non-chloride deicers in the Road Salt Minimization Plan was added to Condition E-11 of the WQC.

C. Comments from Connecticut River Conservancy (CRC – Kathy Urffer)

Comment C.1: This road salt minimization plan should include other deicers that might be used in addition to or in place of chloride.

Response C.1: See Response B.3 above.

Comment C.2: Because the BMP treatment measures have no pretreatment and lack access for periodic maintenance we agree that development and implementation of a permanent stormwater BMP inspection and maintenance plan should be required.

Response C.2: See Response B.1 above.

Comment C.3: Given this deviation from the Env-Wq 1500 design criteria we also agree with comments provided by the Connecticut River Joint Commission that the inspection and maintenance plan should include "long-term monitoring of the effectiveness of this BMP in pollutant reduction."

Response C. See Response B.1. above.

D. Comments from John Bruno

Comment D.1: The Jacob's study refers to infiltration trenches when in fact they are infiltration beds. Trenches traditionally are four feet wide whereas beds are defined as systems greater than four feet in width. Does calling the system a trench rather than a bed have any effect on the results of the Jacob's analysis?

Response D.1: No changes made to the WQC.
The plans depict an infiltration system. The nomenclature of the components has no effect on the functional analysis of the system. The trenches are the means of getting the water to the infiltration beds.

Comment D.2: It is the intent of the infiltration system to retain the water quality volume for infiltration? This will be accomplished by installing 6-inch dams at the ends of the infiltration beds.

Response D.2: No changes made to the WQC.
The system was designed to retain and infiltrate the water quality volume based on a dynamic hydraulic analysis which assumes infiltration. The height of the dams has since been raised to one foot to provide more assurance that the system will be constructed and function as designed.

Comment D.3. One statement in the study states that the bottom of the infiltration system is flat whereas another statement indicates they follow the roadway profile. Although the roadway profile is relatively flat, even a road grade of 1 % would result in an elevation difference of I foot for each 100 feet of infiltration bed, which means there will likely be insufficient volume in the beds to store the water quality volume. I have not reviewed the details of the analysis to determine if it assumes the proposed beds will have flat bottoms.

Response D.3: No changes made to the WQC.
The subgrade of the infiltration system will be transversely flat and will follow the profile grade. The profile grade varies from 0.3% to 1.8% and the dams were placed at calculated distances so the water quality volume would be retained and infiltrated. Initially, the system was designed to accommodate a dynamic water quality volume (WQV), retention and infiltration occurring simultaneously. NHDOT recently modified the design to accommodate a higher static water quality volume which assumes no infiltration during the event. The dams were increased to one foot in height to accommodate this modified analysis. This resulted in some static WQVs that

were higher and some which were lower than 1-inch WQV[1]. The pollutant removal efficiencies provided in guidance for the pollutant loading analysis assume that the static WQV is equivalent to the 1-inch WQV. If the WQV is higher, higher removal efficiencies should be used, and if lower, lower removal efficiencies should be used. Using EPA performance curves[2] to adjust the removal efficiencies, and conservatively assuming a 0.17 inch/hour infiltration rate for the infiltration trenches[3], results of the pollutant loading analysis still resulted in post development loads being less than pre development loads.

Comment D.4: Also, does using a trench in the analysis rather than a bed result in different results?

Response D.4: No changes made to the WQC.
No, individual components of the infiltration BMP were modeled as a system.

Comment D.5: This detail should be clarified by the Jacob's Engineering Group.

Response D.5: No changes made to the WQC.
According to NHDOT, the plans and addendums to the proposal provide sufficient detail to construct the BMPs.

Comment D.6: The Jacob's Group states the infiltration "trenches" will extend vertically to the road surface for a width of three feet outside the roadway shoulder to receive storm water runoff. The plans show the trenches slope away from the road surface and have geotextile fabric on top of stone. Depending on the porosity of the geotextile fabric, the storm water runoff will run across the top of the fabric without entering the infiltration cell. What happens when the entrances to the infiltration beds become plugged with winter sand and other debris that will prevent stormwater from entering the infiltration system?

Below grade infiltration systems require fore bays or other structures to remove sand and other debris from entering the infiltration system. These structures allow for cleaning and maintenance. I did not see these structures in the design plans.

Response D.6: No changes made to the WQC.
Filter fabric has been added to the design to retain winter sand and other debris and prevent clogging of the infiltration BMP. See Response B.1 above.

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[1] *According to the Alteration of Terrain regulations (Env-Wq 1500), the 1-inch WQV is the volume of water equivalent to the volume of runoff attributable to the first one inch of rainfall.*

[2] *Performance curves show removal efficiencies for BMPs sized for different WQVs. For infiltration BMPs, removal efficiencies increase with increasing infiltration rate. For phosphorus and nitrogen, performance curves from Appendix F of EPA's 2017 MS4 General Stormwater Permit for New Hampshire were used (see https://www3.epa.gov/region1/npdes/stormwater/nh/2017-appendix-f-sms4-nh.pdf). For total suspended solids, performance curves from "Stormwater Best Management Practices (BMP) Performance Analysis" prepared for EPA by Tetra-Tech (March 2010) were used (see https://www3.epa.gov/region1/npdes/stormwater/assets/pdfs/BMP-Performance-Analysis-Report.pdf).*

[3] *Expected infiltration rates for the Activity based on the geotechnical report for the proposed infiltration BMPs varied with a minimum of 1 inch / hour (which is approximately five times greater than the infiltration rate used in the pollutant loading analysis with removal efficiencies adjusted based on the static WQV).*

Comment D.7: How will the system entrances be cleaned and maintained to allow continued inflow to the infiltration system?

Response D.7: No changes made to the WQC.
As specified in Condition E-12 of the WQC, a Permanent Stormwater BMP Inspection and Maintenance Plan will be developed and submitted to NHDES for approval prior to construction.

Comment D.8: The bottoms of the infiltration cells are four feet below the roadway surface, which is well within the frost and freeze zone for plowed surfaces. That is why water pipes are buried a minimum of 5 to 6 feet to prevent freezing. I have concern that water in the cells will freeze.

Response D.8: No changes made to the WQC.
According to the NHDOT, the University of New Hampshire Stormwater Center has studied infiltration systems as well as many other structural stormwater treatment systems and concluded that water quality treatment remains strong in all seasons especially in underground infiltration systems, and rarely freeze due to the introduction of melt water and rain in the winter months.

Comment D.9: Infiltration rates are based on NRCS soil maps and properties. There is no indication in the report that NRCS soils data were actually confirmed by field tests. Typically, NRCS soil data only go to a depth of five feet, therefore in cut areas the bottom of the infiltrating systems will be in soils below the limits of the NRCS soils data. It has been my 50-year experience that NRCS soils mapping units are general in nature and only good for general planning purposes; however, for site specific designs actual field tests that include sufficient borings, test pits and permeability tests are necessary to ensure the soils are adequate. Even the NRCS states that "Map units rarely are 100% composed of any particular soil type." It is my opinion that using the NRCS data as a basis of design and analysis does not meet an appropriate engineering standard of care.

Response D-9: No changes made to the WQC.
Correct, NRCS mapping would be insufficient. NHDOT provided a full geotechnical report, including borings, soils analysis and expected infiltration rates within the footprint of the proposed infiltration system. NHDOT is confident the proposed design meets acceptable practices. Expected infiltration rates based on the geotechnical report for the proposed infiltration BMPs varied with a minimum of 1 inch per hour. With regards to the Alteration of Terrain (AoT) regulations (Env-Wq 1500), the infiltration determines how long it will take to infiltrate the WQV. According to the AoT regulations the infiltration practice must completely drain the WQV within 72 hours [Env-Wq 1508.06(f)]. Even if an infiltration rate of 0.1 inches/hour was selected, which is 10 times lower than the minimum expected infiltration rate, the WQV at each location would still drain within 72 hours as required by the Alteration of Terrain regulations. Consequently, even if the selected infiltration rates vary somewhat from design assumptions, they should still comply with the 72 hour drain time requirements required by the AoT regulations.

Comment D-10: Is this the first attempt to implement this water quality best management practice (BMP)? Has this BMP been implemented anywhere else in New Hampshire? Anywhere else with similar winter conditions? If there are other similar installations, how long have they been in place and have there been any testing to determine if they are functioning as intended? I know infiltration systems have been installed beneath parking lots but this is a major infrastructure project for a major north-south public highway?

Response D-10: No changes made to the WQC.
Infiltration is a common stormwater practice in New Hampshire and forms the cornerstone of Low Impact Development standards. The proposed design incorporates the needs of the traveling public by providing a modern engineered highway and protects the environment by treating and infiltrating stormwater thus preventing direct discharges to the Connecticut River.

Comment D.11: What happens if they do not work as intended or if they ultimately have an adverse effect on the structural integrity of the highway?

Response D.11: No changes made to the WQC.
According to the NHDOT, the proposed design has incorporated modern engineering practices and will be inspected and maintained as needed into the future.

Comment D.12: As stated above, the design also incorporates 11-foot travel lanes rather than standard 12-foot lanes. I have expressed my professional opinion publicly and in a letter to the NHDOT Commissioner that 11-foot lanes are an unsafe. This is a negligent design for the volume of traffic, high percentage of trucks, and high speeds. The response I received was that the lane width was a compromise between the pavement width and environmental impacts. Has there been a detailed analysis of the environmental impacts of an alternative with 12-foot lanes?

Response D.12: No changes made to the WQC.
According to the NHDOT, this issue was addressed at a public informational meeting held at the North Walpole School on June 28, 2017 and in correspondence from Commissioner Sheehan on June 27, 2017.
https://www.nh.gov/dot/projects/walpole14747/documents/14747_pim_06282017.pdf
It was determined that 11 foot travel lanes with 5 foot paved shoulders were appropriate for this area. The proposed design strikes a balance between public safety, economic feasibility and environmental impacts.

Comment D.13: Throughout my experience and training the key component in highway design is drainage, drainage and drainage. Design concepts are to remove water away from under the highway not to direct water under the highway. I understand that there is a need to treat stormwater, however, I am not in favor of a design that potentially sacrifices the integrity of the highway.

Response D.13: No changes made to the WQC.
Drainage is an important consideration in providing a durable roadway. There is water at some level under essentially every highway. What NHDOT strives for in its proposed designs is to keep the pavement and structural materials (sand, gravels) underlying the pavements out of the water table, which has been accomplished in the proposed design.

E. Comments from EPA (Mark Kern)

Comment E.1: Share the draft 401 W.Q. Cert. with the Corps, EPA and other interested groups such as the CRJC before it is final.

Response E.1: No changes made to the WQC.

The draft WQC was issued for public comment on September 27, 2017. The notice and draft certification was posted on the NHDES website and an email was sent directly to the Corps, EPA, the Connecticut River Joint Commission (CRJC) and other interested groups.

Comment E.2: Ask NHDOT to fund a part-time NHDES position to keep track of all the construction work and BMPs until the project is complete.

Response E.2: No changes made to the WQC.
NHDOT and the Contractor will have personnel on site to ensure compliance with the relevant conditions in the NHDES Wetland Permit, US ACOE 404 Permit, NPDES Construction General Permit, and the 401 Water Quality Certification conditions. Staff from the NHDES Wetlands Bureau will also inspect the site on occasion. Consequently, NHDES does not believe that it is necessary for NHDOT to fund a part-time position for a project.

Comment E.3: Support a comprehensive monitoring plan to check the results of the new BMPs.

Response E.3: See Response B.1 above.

Comment E.4: Be sure that FEMA and other key agencies are supportive of the loss and mitigation of 100-year floodplain impacts.

Response E.4: No changes made to the WQC.
NHDOT has coordinated with the Federal Highway Administration (FHWA), the Federal Emergency Management Agency (FEMA), the New Hampshire Office of Energy and Planning (NHOEP) and the local governments. FHWA, as the lead federal agency, has issued a Floodplain Finding that there will be no practicable alternative to the proposed construction in floodplains, and the proposed project will include all practicable measures to minimize harm to the involved floodplains which may result from such use. FEMA has reviewed the proposed action and has not requested a Conditional Letter of Map Revision (CLOMR) to be filed with FEMA. In addition, since FEMA is in the process or re-evaluating this reach of the Connecticut River, they have not requested a Letter of Map Revision (LOMR). NHDOT also did not receive any objections to the proposed Activity from the NHOEP or the local governments.

OTHER SUBSTANTIVE CHANGES MADE TO THE FINAL WQC

The following includes a list of other substantive changes made to the final WQC which are in addition to the revisions mentioned above and minor editorial and formatting changes.

1. The following was added to Finding D-1: "Filter fabric has been added to the design in the upper layer of the infiltration stone on both sides of the road to provide pretreatment. The fabric will retain winter sand and other debris and help prevent clogging of the of the infiltration BMP."

APPENDIX A
COMMENTS RECEIVED ON DRAFT WQC #2017-404I-001

401 Certification Program (Attn: Gregg Comstock) October 8, 2017

NHDES Watershed Management Bureau

P.O. Box 95

Concord, NH 03301-0095

Dear Sir,

I have reviewed the information contained on the States Websites as referenced on your e.mail. (The first site ((ends with coe ind.htm))) does not work but allowed me to search within the broader web page.)

In my review of the material I noted that the water quality cert requires a review of "hydrologic" impacts. It is my concern that any so called "rip-rap" or bank stabilization work done by the state will have an impact on the erosion happening downstream. It is a known fact that changing the river bank will affect the banks downstream. I saw no mention that this issue was addressed.

I have notified the Corp of Engineers who are supposed to be reviewing the impact on water flows and quality, as to my concerns and have yet to receive a response.

I am therefore requesting that the State review the hydrologic impact and review the Corp. Of Engineers

Study as to the impact and issue a report to the Town of Walpole, Village of North Walpole as well as myself.

Thank you,

Peter Powers

6 Duffy Street

North Walpole, NH 03609

Ppowers920@gmail.com

Connecticut River Joint Commissions
10 Water Street, Suite 225
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(603) 727-9484
http://www.crjc.org

October 17, 2017

Gregg Comstock, P.E.
401 Certification Program
NHDES Watershed Management Bureau
P.O. Box 95
Concord, NH 03301-0095

Re: Comments on Draft Water Quality Certification #2017-404I-001
Reconstruction of NH Route 12, Walpole-Charlestown

E-mail: gregg.comstock@des.nh.gov

Dear Gregg:

The Connecticut River Joint Commissions (CRJC) is pleased to comment on the draft 401 Water Quality Certification. Our overarching concern is that the project meets current engineering and environmental standards, does not degrade riparian and riverine ecology, and maintains and improves the recreational and aesthetic values of the river. The design should not be a short-term solution, which compromises either the safety of the travelling public or the river's ecosystem.

We know this is a difficult project due to the limited space between the railroad and river bank to implement water quality treatment measures, and we appreciate the applicant's efforts to implement an innovative infiltration BMP to treat stormwater runoff. However, we are concerned that the effectiveness of this BMP has not been adequately tested, and the proposed periodic inspection and maintenance plan is not intended to assess the effectiveness of this BMP. Thus, we share the NHDES' concern in the draft water quality certification that the "removal efficiencies used in the pollutant loading analysis and the predicted pollutant reductions may be too high." Furthermore, if this design proves ineffective in treating runoff, there is no backup plan as space is apparently unavailable to construct alternative treatment measures.

Some of our specific concerns are as follows:

(a) The design relies on untested engineering measures to treat storm water runoff before it enters the river. It incorporates treatment measures (i.e., infiltration basins/trenches under the road surface) which are not designed in accordance with current Alteration of Terrain regulations (Env-Wq 1500). They have no pretreatment and lack access for periodic maintenance. Consequently, they may not be effective over the long term. Thus, it may be prudent not only to

ensure the catch basins and tops of the infiltration trenches are maintained, especially during the winter months, but to include long-term monitoring of the effectiveness of this BMP in pollutant reduction.

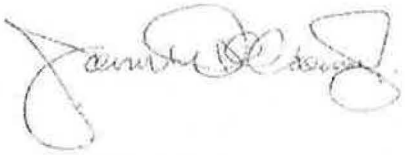
(b) As you acknowledged, there is currently little to no stormwater treatment of roadway runoff. The infiltration trenches are intended to treat stormwater runoff from approximately 7.3 acres of impervious surfaces which, as stated in the draft water quality certification, "exceeds the increase in impervious area of approximately 2.3 acres". However, this does not consider the concomitant loss of roadside vegetation which may function in treatment nor does it appear to address the standard that "Existing discharges containing phosphorus or nitrogen, or both, which encourage cultural eutrophication shall be treated to remove the nutrient(s) to ensure attainment and maintenance of water quality standards" (Env-Wq 1703.14 (c)).

(c) Although road salt and other deicers improve safety, it poses risks to water quality, roadside vegetation, and aquatic life. We applaud the proposed requirement that the applicant prepare and implement a salt minimization plan, which will address measures to reduce chloride to the maximum extent practicable. However, we think this plan should also address the use of toxic deicers, other than chlorides, that may be contemplated.

The Connecticut River Joint Commissions sincerely appreciate the thoroughness of your review and for your consideration of our comments on the draft water quality certification. By working in cooperation with our state and federal resource agencies, we are committed to ensuring local public interests are considered, our shared public trust resource (the Connecticut River) is protected, and the best possible design is crafted.

If you have any questions regarding the contents of this letter, please feel free to contact Jim McClammer (McClammer@aol.com) or Jason Rasmussen (jrasmussen@swcrpc.org).

Sincerely,



James U. McClammer, Jr.
Chair, New Hampshire Connecticut River Valley Resource Commission

Jason Rasmussen
Chair, Vermont Connecticut River Watershed Advisory Commission

Connecticut River Conservancy

Clean water. Healthy habitat. Thriving communities.

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October 17, 2017

Gregg Comstock, P.E.
401 Certification Program
NHDES Watershed Management Bureau
P.O. Box 95
Concord, NH 03301-0095

Re: Comments on Draft Water Quality Certification #2017-404I-001
Reconstruction of NH Route 12, Walpole-Charlestown

Via e-mail: gregg.comstock@des.nh.gov

Mr. Comstock:

The Connecticut River Conservancy (CRC) submits the following comments on the evaluation of the Draft Water Quality Certification for the Reconstruction of NH Route 12. Since 1952, CRC has been the principal nonprofit environmental advocate for protection, restoration, and sustainable use of the Connecticut River watershed. As you know, Route 12 runs between Walpole and Charlestown, often running parallel to the CT River, and crosses several small tributaries of the Connecticut River.

We understand that limited space between the river and railroad provides an additional measure of complication in the redevelopment of this roadway. Our main concern is focused on maximizing any proactive actions that will protect the river. As the NH DES state in the draft 401 Certification for this project:

> "Chlorides cannot be treated by structural BMPs because they are conservative and relatively untreatable substances that persist in the environment. De-icing chemicals containing chloride (i.e., road salt) are typically the primary source of chlorides in fresh surface waters. Because they cannot be treated by structural BMPs, chlorides cannot be addressed by typical loading analyses. Submittal and implementation of a road salt minimization plan to reduce chloride to the maximum extent practicable can be required to address concerns associated with chloride."

CRC agrees that a road salt minimization plan should be required for this project in order to reduce chloride. This road salt minimization plan should include other deicers that might be used in addition to or in place of chloride.

Additionally, as stated in the draft 401 Certification:

> "The Applicant has indicated, however, that the design of the infiltration trenches deviated somewhat from the design criteria in Env-Wq 1500 and guidelines provided in the NHDES Stormwater Manual (see C-52)."

Because the BMP treatment measures have no pretreatment and lack access for periodic maintenance we agree that development and implementation of a permanent stormwater BMP inspection and maintenance plan should be required. Given this deviation from the Env-Wq 1500 design criteria, we also agree with comments provided by the Connecticut River Joint Commission that the inspection and maintenance plan should include "long-term monitoring of the effectiveness of this BMP in pollutant reduction." There are multiple roadways in New Hampshire that are located directly next to the river and are actively being undermined due to erosion issues. For future reference it would be helpful to understand the efficacy of this application.

CRC also supports the compensatory mitigation of a one-time payment of $1,287,621.45 to the Aquatics Resource Mitigation Fund.

Thank you for considering our comments as this project moves forward. If you have any questions about these comments don't hesitate to contact me at 802-258-0413 or kurffer@ctriver.org.

Sincerely,

Kathy Urffer

Kathy Urffer
River Steward

JOHN BRUNO
ENGINEER & LAND CONSULTANT

P.O. Box 1273 Charlestown, New Hampshire 03603
603 445 2307

September 19, 2017

Christopher R. Marron
US Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742-2751

Re: Comments on Reconstruction of NH Route 12, Walpole/Charlestown
ACOE File Number: NAE-2017-01513; NHDOT Project #14747

E-mail: christopher.r.marron@usace.army.mil

Dear Mr. Marron,

As background, I am a registered professional engineer in New Hampshire and Vermont with over 50 years of design experience, a member of the Charlestown Planning Board, live on Route 12, and represent Charlestown on the CRJC Mt. Ascutney Subcommittee.

Having reviewed the design plans for the NH Route 12 reconstruction, I have the following concerns, comments and questions regarding the proposed stormwater infiltration cells to be placed under the highway and the proposed substandard 11-foot wide travel lanes. I was informed by NHDOT Commissioner Sheehan that the proposed 11-foot lane width, rather than standard 12-foot lane width, is necessary to reduce environmental impacts.

My concerns, comments and questions are based on attendance at several public meetings, and review of NHDOT design plans and NHDES Wetland Permit and Water Quality Certification applications. I also reviewed the Pollutant Loading Analysis Report prepared by Jacob's Engineering Group.

The following relates to the proposed under-highway infiltration systems and 11-foot travel lanes.

- The design plans and descriptions in the applications indicate stormwater runoff will enter treatment cells located under the highway via stone lined roadside ditches.
- The Jacob's study refers to infiltration trenches when in fact they are infiltration beds. Trenches traditionally are four feet wide whereas beds are defined as systems greater than four feet in width. Does calling the system a trench rather than a bed have any effect on the results of the Jacob's analysis?

- It is the intent of the infiltration system to retain the water quality volume for infiltration. This will be accomplished by installing 6-inch dams at the ends of the infiltration beds.
- One statement in the study states that the bottom of the infiltration system is flat whereas another statement indicates they follow the roadway profile. Although the roadway profile is relatively flat, even a road grade of 1% would result in an elevation difference of 1 foot for each 100 feet of infiltration bed, which means there will likely be insufficient volume in the beds to store the water quality volume. I have not reviewed the details of the analysis to determine if it assumes the proposed beds will have flat bottoms. Also, does using a trench in the analysis rather than a bed result in different results? This detail should be clarified by the Jacob's Engineering Group.
- The Jacob's Group states the infiltration "trenches" will extend vertically to the road surface for a width of three feet outside the roadway shoulder to receive stormwater runoff. The plans show the trenches slope away from the road surface and have geotextile fabric on top of stone. Depending on the porosity of the geotextile fabric, the stormwater runoff will run across the top of the fabric without entering the infiltration cell. What happens when the entrances to the infiltration beds become plugged with winter sand and other debris that will prevent stormwater from entering the infiltration system? How will the system entrances be cleaned and maintained to allow continued inflow to the infiltration system?
- Below grade infiltration systems require fore bays or other structures to remove sand and other debris from entering the infiltration system. These structures allow for cleaning and maintenance. I did not see these structures in the design plans.
- The bottoms of the infiltration cells are four feet below the roadway surface, which is well within the frost and freeze zone for plowed surfaces. That is why water pipes are buried a minimum of 5 to 6 feet to prevent freezing. I have concern that water in the cells will freeze.
- Infiltration rates are based on NRCS soil maps and properties. There is no indication in the report that NRCS soils data were actually confirmed by field tests. Typically, NRCS soil data only go to a depth of five feet, therefore in cut areas the bottom of the infiltrating systems will be in soils below the limits of the NRCS soils data. It has been my 50-year experience that NRCS soils mapping units are general in nature and only good for general planning purposes; however, for site specific designs actual field tests that include sufficient borings, test pits and permeability tests are necessary to ensure the soils are adequate. Even the NRCS states that "Map units rarely are 100% composed of any particular soil type." It is my opinion that using the NRCS data as a basis of design and analysis **does not meet an appropriate engineering standard of care.**
- Is this the first attempt to implement this water quality best management practice (BMP)? Has this BMP been implemented anywhere else in New Hampshire? Anywhere else with similar winter conditions? If there are other similar installations, how long have they been in place and have there been any testing to determine if they are functioning as intended? I know infiltration systems have been installed beneath parking lots but this is a major infrastructure project for a major north-south public highway.

- What happens if they do not work as intended or if they ultimately have an adverse effect on the structural integrity of the highway?
- As stated above, the design also incorporates 11-foot travel lanes rather than standard 12-foot lanes. I have expressed my professional opinion publicly and in a letter to the NHDOT Commissioner that 11-foot lanes are an unsafe. This is a negligent design for the volume of traffic, high percentage of trucks, and high speeds. The response I received was that the lane width was a compromise between the pavement width and environmental impacts. Has there been a detailed analysis of the environmental impacts of an alternative with 12-foot lanes?

Throughout my experience and training the key component in highway design is drainage, drainage and drainage. Design concepts are to remove water away from under the highway not to direct water under the highway. I understand that there is a need to treat stormwater, however, I am not in favor of a design that potentially sacrifices the integrity of the highway. The other major component of highway design is safety, and I find the proposed travel lane width goes against all acceptable standards, and is therefore unacceptable.

Thank you for the opportunity to express my concerns and ask questions regarding the proposed Route 12 design.

Respectively submitted,

John Bruno P.E.

Hicks, Michael C CIV USARMY CENAE (US)

From: Kern, Mark <kern.mark@epa.gov>
Sent: Tuesday, September 19, 2017 1:47 PM
To: Hicks, Michael C CIV USARMY CENAE (US); Marron, Christopher R CIV USARMY CENAE (US)
Cc: Teracino, Laura; LeClair, Jacqueline; Sommer, Lori; Collis Adams; Infascelli, Gino; Gregg Comstock
Subject: [EXTERNAL] NH Route 12 improvements 2017-01513

Hi Mike and Chris, and NHDES folks,

I have worked on this project, with NHDOT and others, for 10+ years now. The project is clearly needed and I think NHDOT has done a solid job trying to find a solution to a site with really messy constraints. I have no objections to the overall approach and the mitigation plan.

However, a lot of work will take place next to or within a portion of the CT River, so extra care and attention is needed. A large portion of the proposed water quality treatment areas are innovative, but we are not quite sure how it will all work out. I would recommend the following:

1. Share the draft 401 W.Q. Cert. with the Corps, EPA and other interested groups such as the CRJC before it is final.
2. Ask NHDOT to fund a part-time NHDES position to keep track of all the construction work and BMPs until the project is complete.
3. Support a comprehensive monitoring plan to check the results of the new BMPs.
4. Be sure that FEMA and other key agencies are supportive of the loss and mitigation of 100-year floodplain impacts.

Thank you, Mark