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June 24, 2011

Mr. Wayne Ives, P.G.
NHDES – Watershed Management Bureau
P.O. Box 95
Concord, NH 03302-0095

**RE: Comments from UNH/Durham Water System on the
Draft Lamprey River Water Management Plan**

Dear Mr. Ives:

The University of New Hampshire/Durham Water System (UDWS) is pleased to provide the below comments relative to the Draft Lamprey River Water Management Plan provided by NHDES in PDF form and dated April 11, 2011, and earlier versions in MS Word format of specific sections pertaining to the UDWS which are attached. The UDWS has been in discussion with NHDES regarding specific language in the proposed UDWS Water Use Plan, the Wiswall Dam Management Plan, and the UDWS Water Conservation Plan. A public meeting between representatives of the UDWS, NHDES, and NHDES's contractors was held on April 6, 2011 to discuss this specific language and the operational realities of complying with the draft plans. It is understood that at least one more meeting will be held to revise and finalize the language.

The following are general comments:

1. Originally, drafts of the proposed UDWS Water Use Plan, the Wiswall Dam Management Plan, and the UDWS Water Conservation Plan were provided in MS Word format for UNH's and the Town of Durham's comments and as mentioned above we have been in discussion with NHDES for some time now regarding specific language. In April 2011, the bulk of the three draft plans were then incorporated into the body of the Draft Lamprey River Water Management Plan, which was provided in PDF format only, and the individual draft Plans were included in separate appendices in the PDF. This has unnecessarily complicated the comment process since now the same information exists in essentially three places with potentially three different versions making proofing of the final information very difficult. Hence, the reason most of the below comments contain three references. Does NHDES plan to maintain the format of having the bulk of the information from the three plans in the body of the Water Management Plan and entirety of the individual plans included in separate appendices? The UDWS does not feel this makes practical sense since

it will make revising the information moving forward even more complicated than it already is. It is our recommendation that the body of the Water Management Plan not contain so much redundant information and instead refer to the individual plans which would be contained entirely in their own appendices.

2. The title of Table 3 on page 19 is “Affected Dam Owners”, however it is a list dams not the actual owners. A column should be added that list the owner of the respective dams.
3. The discussion about manageability of instream flows and the need for it is based on a comparison of statistical analyses that were used developed the flow duration curve of the Lamprey River, projections of population increase, and assumptions about water demand. It is important to bear in mind that neither regional population projections nor per capita water use can be expected to follow current trends with a great deal of confidence. Per capita water use has been in decline since the 1970s, which is why the UDWS’s water demand is only at 25% of what was projected in 1970.
4. Page 25, first paragraph in the PDF. This paragraph exaggerates the per capita use of users in the watershed (150 gallons per person per day is about 50-100% greater than the per capita use in most area Towns) and therefore exaggerates its impact on the Lamprey River. There is lack of source references to support this discussion. In addition, the last sentence states: “So on average, there is plenty of water, however often demand exceeds supply”. The use of the word “often” in this statement is contrary to the lengthy preceding discussion which makes the case that demand exceeds supply infrequently.
5. Page 26, 2nd paragraph in the PDF incorrectly refers to a Newmarket gage. There is no stream gage in Newmarket. The Packers Falls gage is located in the Town of Durham, however for some reason the USGS refers to it as “near” Newmarket.
6. Page 39, 3rd paragraph in the PDF states “prior to obtaining approval for the proposed new source, but no later than June 1, 2012, UDWS will finalize it proposed Water Conservation Plan in accordance with Env-Wq 2101”. A deadline of June 1, 2012 may be unrealistic; however, UDWS will commit to making a reasonable effort to finalize the proposed Water Conservation Plan prior to this deadline.

The following comments are provided primarily to prevent an unreasonable burden from being placed on the operations of the UDWS, and to ensure that basic operational constraints do not result in an accidental violation of the **UDWS Water Use Plan**. The first page reference refers to the MS Word document of UDWS Water Use Plan (see attachment) followed by the page reference(s) in the complete PDF Water Management Plan document.

7. Page 6, paragraph following bullet list (pages 54 and 224 in the PDF): The ability to base the 1 inch per day drawdown on a weekly average is needed in order to manage the reservoir outflow by removing 1 stop log at a time which would result in a release of “slugs” of water much like a relief pulse. This is also essential if for some reason outflow is managed with a

low level gate in which case it is extremely tricky to maintain a steady drop in pool elevations.

8. Page 6, last paragraph (Page 55, 2nd paragraph and page 225, 3rd paragraph in the PDF): The notification requiring the UDWS to acknowledge within 24 hours is workable, unless the notification is received on a Friday or a weekend in which case acknowledgment will be provide on the following Monday.
9. Page 7, 1st paragraph (page 55, 2nd paragraph and page 225, 3rd paragraph in the PDF): All the language regarding DES plan to create relief flows, the estimated timing of the pulse arrive, and the estimated volume of the flow expected to arrive at the Wiswall Dam are only estimates since the operation of creating a relief flow on the Lamprey River is completely untested the UDWS is extremely uncomfortable with the prescriptive requirements prior to actual trials being conducted. The language suggests that the owner of the Wiswall Dam could create a relief flow “equal to the current bioperiod’s 90th percentile event volume, but without the volume of the 20% buffer released to compensate for losses” has great potential failing and cause the UDWS to violate the conditions if the volume that arrives at the Wiswall Reservoir is inadequate. Because the concept of creating a relief flow is untested, the UDWS has little confidence that the 20% buffer released from the upstream sources will provide enough of a buffer to allow the UDWS to maintain compliance without losing a significant amount of stored water that would otherwise be available to meet public drinking water requirements. It may also require the Wiswall Reservoir be drawn down more than 18 inches total. The following language should be inserted: “Provided that an adequate volume of water is released from upstream sources arrives at the Wiswall Dam, UDWS will make a reasonable effort to create a relief flow that is equal to the current bioperiod’s 90th percentile event volume, but without the volume of the 20 percent buffer released to compensate for losses”.
10. Page 7, 2nd paragraph (page 55, 3rd paragraph and page 225, 4th paragraph in the PDF): The text currently states: “When stream flows in the Lamprey are below 18 cfs, the system’s water sources will comprise the Lee Well, the Oyster River surface water withdrawal and the remaining storage within the drawdown limits of Wiswall Reservoir”. This apparently implies UDWS will be required to maintain inflow equal to outflow at Wiswall, however the designated critical flow of 18 cfs has an associated allowable duration of 15 day. UDWS proposes to use this 15 day allowable duration to begin scaling down the operations at the UNH Water Treatment Plant, and requests the ability to withdraw 0.8 cfs from the Lamprey River instream flow when flows fall below 18 cfs for a period of plus 7 days, and the ability to withdraw 0.4 cfs from 7 days to 15 days. This is necessary for the UNH Water Treatment Plant to more reasonably transition from a high to lower operational level, and to preserve the capacity in the Lee Well until absolutely necessary as prescribed on page 9, 4th paragraph (page 57, 5th paragraph and 227, 6th paragraph of the PDF).

11. Page 9, 1st paragraph (page 57, 2nd paragraph and 227, 3rd paragraph in the PDF): In order for the UDWS to impose mandatory water use restrictions, the Durham Town Council would need to adopt an ordinance to require such actions and impose penalties. UDWS shall work with the Town and UNH to establish procedures to implement mandatory water use restrictions and water conservation measures consistent with this water use plan. Discuss procedure and schedule for adopting water use restrictions as part of a new or updated Town Water Ordinance.
12. Page 9: Cost considerations (page 57 and 228 of the PDF): The following language more accurately reflect the UDWS's true costs and should be inserted: "The management activities would be performed by UNH and Town staff and/or a consultant and the annual costs to implement and maintain the water use plan is expected to range from \$10,000 to \$30,000. The reduced water withdrawal capacity imposed by the protected instream flow program may trigger the permitting, engineering, and installation of associated infrastructure for a new water source and ranges from \$4 million to \$6 million".

The following comments are provided primarily to prevent an unreasonable burden from being placed on the operations of the UDWS and the Town of Durham, and to ensure that basic operational constraints do not result in an accidental violation of the **Wiswall Dam Management Plan**. The first page reference refers to the MS Word document of Wiswall Dam Management Plan (see attachment) followed by the page reference(s) in the complete PDF Water Management Plan document.

13. Page 2, 3rd paragraph (page 46, introductory paragraph and page 191 of the PDF): Chapter 332 from 1965 referenced both the Town of Durham and UNH.
14. Page 3, 3rd paragraph (page 192 in the PDF) – The estimated volume of the impoundment of the top 12" is 12,142,211 gal or 1,623,290 CF or, 37.3 ac-ft per 8-25-10 email correspondence with Wayne Ives.
15. Page 3, 5th paragraph (page 193 in the PDF) – The primary purpose for reservoir is clearly for water supply storage and recreation is secondary. This was the conclusion of the 2003 Dufresne-Henry study. The NH Dams Data Sheet 071.04 referenced in the paragraph needs to indicate "water supply storage" as the primary purpose. The UDWS requests that NHDES revise NH Dams Data Sheet 071.04 accordingly.
16. Page 3, 3rd to last paragraph (page 193 in the PDF) – The last sentence of this paragraph is confusing.
17. Page 3, 2nd to last paragraph (page 193 in the PDF) – There may be approximately 3 miles of river downstream of Wiswall Dam, but the vast majority of this stretch of river is impounded. This should be acknowledged here.
18. Page 3, last Paragraph – (page 46 last paragraph and page 194, 1st paragraph in the PDF): As evident in Table 6, the volume of the Wiswall Reservoir is not "large" as stated in this paragraph, and for this reason it does not provide a significant potential to attenuate the

relief flow. The soon to be installed outflow notch/weir will be self regulating which will help to reduce the potential for attenuation. In addition, for the reason stated in the previous paragraph it does not provide a great potential to provide significant relief flow for the mostly impounded downstream reach. DES is imposing requirements based on assumed behavior the system. They also have practical problems in that no one knows or can measure how much attenuation occurs between the Pawtuckaway dams and our reservoir since the upstream gage is on a side branch of the Lamprey. It is reasonable to assume that some degree of attenuation will occur upstream of the Wiswall Reservoir, but how much? The statewide drawdown in 2009, which was used to assess the relief flow volume needed, was conducted in mid October. The antecedent moisture conditions during this time would typically have been very different from what would be expected during a drought when an actual relief flow would be considered.

19. Page 4, starting with the 3rd Paragraph (pages 47 and 194 in the PDF) – Regarding relief flows: Without conducting some actual relief flow tests that would provide NHDES and the UDWS with some real data of what flows to expect and when, and to what degree the new notch/weir of the dam might actually have on flow attenuation, it is unreasonable to insist that the UDWS come up with a plan to “ensure the relief flows are conveyed” without some amount of attenuation. Pulling stop logs in anticipation of an untested relief flow increases the UDWS’s liability of loosing drinking water storage during a potentially critical period of demand. Depending on when it happens, it could result in prematurely declaring Stage 4 (Water Emergency). What is a “controlled release”? The UDWS has proposed the accuracy as being what can be obtained by pulling a 4” stop log. What degree of control is expected? This is a natural system with natural variability. The degree of precision implied is inconsistent with the system being controlled, and this is all based on untested hypothetical information. The high degree precision of dam outflow controls will not exist to manage small changes in pool elevation. There needs to be a reasonable range of pool elevation variability by which the UDWs will be required to operate the dam.
20. Page 4 (Page 194 in the PDF): Delete the first bullet list. It is redundant with the following bullet list.
21. Page 4, bullet Item #1 (page 47 and 194, 1st bullet item in the PDF): This paragraph is confusing and it is not clear what the final phrase “whichever is less” is referring to.
22. Page 4, bullet Item #2 (page 47 and 194, 2nd bullet item in the PDF): The requirement to confirm receipt of DES’s notification within 24 hours is unrealistic for a municipality where the responsible staff may not be available, particularly if the notification arrives on a Friday or weekend . The planning involved in a relief flow release would happen at least a week before the actual release, and as such it seems reasonable that an “Affected” dam owner could be given more than 48 to 72 hrs notice.

23. Page 4, bullet Item #3 (pages 47 and 194, 3rd bullet item in the PDF): Maintaining inflow equal to inflow on an “instantaneous” basis would require a staff person to continually reside at the dam and is simply unrealistic. The alternative approach proposed in the Water Use plan, and as suggested above, the following language should be considered here: “Provided that an adequate volume of water is released from upstream sources arrives at the Wiswall Dam, UDWS will make a reasonable effort to create a relief flow that is equal to the current bioperiod’s 90th percentile event volume, but without the volume of the 20 percent buffer released to compensate for losses”. However, UDWS would prefer to simply agree to cooperate with NHDES to develop reasonable relief flow protocols based on experience from actual relief flow trials.
24. Page 5, bullet Item #4 (pages 47 and 195, 4th bullet item in the PDF): The outflow weir will be self-regulating, and if the UDWS is not withdrawing then we do not plan to pull additional stop logs.
25. Page 5, bullet Item #5 (pages 47 and 195, 4th bullet item in the PDF): The water level drop is proposed to be based on a 7 day average of 1 inch per day.
26. Page 6, bullet Item #6 (pages 47 and 195, 5th bullet item in the PDF): Again, this level of monitoring will require a staff person to reside continuously at the dam. Automated measurements will consist of pool elevation at the Pump Station and flow at the Packers Fall USGS gage.
27. Page 6, 2nd paragraph (page 48 and 196 in the PDF): The paragraph regarding cost needs to be revised to more accurately reflect the Town of Durham’s true cost with the following language “The estimated annual costs associated with this work will be dependent upon the number of personnel involved, and either the degree of automation of the system or the number of site visits required to perform the necessary flow management actions and the travel time and mileage, and is expected to range from \$200,000 to \$400,000 in infrastructure improvements (dam outflow controls) and \$10,000 to \$100,000 for operation and maintenance”.

NHDES recently informed the UDWS that they have changed its plan to nullify or supersede Durham’s §401 Water Quality Certificate upon adoption of the Lamprey River Water Management Plan, and instead has suggested that they would prefer to modify to the Certificate’s language to simply refer to the Lamprey River Water Management Plan. As recently as October 2010, the Administrator of the Watershed Bureau, Paul Currier, informed the Durham Town Council that the §401 Water Quality Certificate would become null and void upon adoption of the Lamprey River Water Management Plan. The basis of nullifying the Certificate is because ALL the conditions included in the current Certificate will be updated and incorporated into the Water Management Plan. Once the Water Management Plan is adopted, the Certificate will serve no practical purpose and would only perpetuate unnecessary bureaucracy and redundancy regulatory oversight if maintained in some modified form. The UDWS insists that NHDES proceed with nullifying

Durham's §401 Water Quality Certificate upon adoption of the Lamprey River Water Management Plan as was promised to the Durham Town Council.

We look forward to receiving NHDES's responses to the above comments, and working through the final language of the Lamprey River Water Management Plan in the near future. Please contact us with question and/or to schedule a follow-up meeting.

Sincerely,



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Durham Town Engineer



Paul Chamberlin, P.E.
UNH Assistant Vice President of Energy and
Campus Development

cc: Todd Selig, Town Administrator
Michael Lynch, Director of Public Works
James Dombrosk, UNH Director of Energy & Utilities
Michael Metcalf, P.E., Underwood Engineers
Dana Bisbee, Esq., Devine, Millimet & Branch