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PUBLIC UTILITIES COMMISSION

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March 24, 2021

Debra A. Howland, Executive Director
New Hampshire Public Utilities Commission
21 South Fruit Street, Suite 10
Concord, NH 03301

Re: DW 18-101, Pennichuck East Utility, Inc.
Supplemental Petition for Approval of Special Contract with Pillsbury for service to
Woodmont Commons in Londonderry, NH
Staff Recommendation for Approval

Dear Ms. Howland:

On March 9, 2020, Pennichuck East Utility, Inc. (PEU or the Company) filed a Verified Supplemental Petition for Approval of Special Contract for Woodmont Commons in Londonderry (Petition). In its Petition, the Company requested the Commission to affirm its approval of a prior special contract between PEU and Pillsbury [Realty Development, LLC] (Pillsbury), the primary developer of Woodmont Commons. *See Pennichuck East Utility, Inc.*, Order No. 26,285 (August 9, 2019) (order describing the parties and approving special contract). PEU and Pillsbury describe Woodmont Commons as a \$1 billion planned, mixed-use real estate development. Attachments of John Boisvert, JJB-C at 2, March 9, 2020.

Along with its Petition, the Company filed the supplemental direct testimony and attachments of John J. Boisvert, Chief Engineer of Pennichuck Water Works, Inc.¹ Mr. Boisvert's attachments included a revised special contract between PEU and Pillsbury (2020 Special Contract). The Company also filed letters of support from the NH Department of Environmental Services (NHDES) and Pillsbury on April 16, 2020 and June 15, 2020, respectively. In addition, PEU filed status update reports on June 2, August 31, and December 3, 2020.

After review of the record, Commission Staff (Staff) supports approval of the 2020 Special Contract, per RSA 378:18. In doing so, Staff relies upon the reasoning that the 2020 Special Contract is identical in purpose to the previously approved special contract – to allow the Company to collect funds from Pillsbury for construction of a water storage tank that will provide service to Woodmont Commons and supplement PEU's Londonderry Core Distribution system (LCS). Staff believes that

¹ Pennichuck Water Works, Inc., is a sister-utility of PEU that performs Operations and Maintenance work for the Company on a work order basis.

the public interest to provide water service to both Woodmont Commons and the LCS still exists, thus providing justification for approval.

Staff maintains, however, that this recommendation does not extend to any proposed financing or recovery of PEU's share of the costs it expects to incur during the construction of the facilities described in the 2020 Special Contract, including the required prudency review of the final expenses.

I. Background

On June 29, 2018, PEU filed its original request, pursuant to RSA 378:18, to depart from its general schedules and approved tariff for entry into a special contract with Pillsbury. The purpose of the special contract was to accept funds from Pillsbury for the construction of the facilities necessary to provide water service to Woodmont Commons, and supplement the LCS. Those plans included an elevated water tank. Supplemental Direct Testimony of John J. Boisvert at 3, March 9, 2020. Staff submitted a recommendation in support of approval on November 28, 2018.

PEU filed a revised special contract on April 2, 2019, which added language concerning the cost sharing arrangement regarding the Company's new tax liability with the receipt of contributions in aid of construction (CIAC). Order No. 26,285 at 1-2. PEU's new tax liability stemmed from the passage of the federal 2017 Tax Cuts and Jobs Act (effective January 1, 2018), which removed the exclusion of CIAC from gross income for tax purposes for water companies. *Id.* at 1. Staff filed a revised recommendation recommending approval of the revised contract on June 28, 2019.

On August 9, 2019, the Commission found "that special circumstances exist that render a departure from PEU's tariff just and consistent with the public interest" and approved that special contract between PEU and Pillsbury. Order No. 26,285 at 5.

Subsequent to Commission approval, the Town of Londonderry Zoning Board of Adjustment (ZBA), after hearing, denied the variance requested by PEU for the elevated storage tank, largely due to its height. Petition at 2. PEU indicated the denial was followed by a request for re-hearing which was also denied. *Id.* The Company also stated that an appeal was filed in the [New Hampshire] Superior Court, and that PEU will stay that appeal pending a Commission decision. *Id.*

On March 9, 2020, PEU filed its Petition, which includes the 2020 Special Contract. Staff followed with an additional set of discovery requests.

II. Staff Analysis

As a threshold matter, Staff recognizes that the Company requests the Commission affirm its approval of the special contract between PEU and Pillsbury. Petition at 3. PEU, however, in its request for Commission affirmation of the previously approved special contract, submitted its 2020 Special Contract, which contained revisions from its previous special contract. As such, Staff's position is that, as the 2020 Special Contract contains revisions from the previously approved contract, the 2020 Special Contract requires separate examination and Commission approval, per RSA 378:18. *See also* Order No. 26,285 at 5 ("[e]ach special contract must meet the standards of RSA 378:18 on an individual basis in order for approval").

During its review, Staff focused on three revised areas: (1) reference to the additional construction in the statement of special circumstances; (2) a change from an elevated tank to a ground-level tank; and (3) an increase in PEU's projected income tax liability.

Despite the revisions, as described below, Staff contends that the purpose and existence of special circumstances encompassed in the 2020 Special Contract are essentially the same as the special contract approved by Order No. 26,285. Staff further states that, as it believes no material difference between the contracts exist, circumstances relied upon by the Commission in its decision to approve the prior special contract also continue to exist. In doing so, Staff stresses the continued need and public interest in addressing the water service needs for both the LCS and Woodmont Commons, as discussed in Section B below. As such, Staff recommends Commission approval of the 2020 Special Contract.

A. Statement of Special Circumstances

PEU updated its Statement of Special Circumstances (Updated Statement) in its response to Staff 4-12, as required by N. H. Admin. R., Puc 1606.02(b) (“[a] utility shall include as part of any proposed special contract filing, a statement describing the special circumstances that justify the departure from its existing tariff”). Compared to PEU's prior statement, Staff notes that only Section 3 of the Updated Statement is substantially different. Attachment A, Staff 4-12; *see also* Revised Staff Recommendation at 23, June 28, 2019 (attaching prior statement).

Section 3 of the Updated Statement now includes additional language of “associated mains, and a water booster pumping station.” Attachment A, Staff 4-12. While Section 3 enlarges the scope of the proposed work, Staff does not believe that it materially alters the justification for finding that special circumstances exist to depart from PEU's current tariff as the Commission has previously found. The additional work still pertains to providing the projected growth of its LCS and providing water service to Woodmont Commons.

B. Revision from an Elevated Tank to a Ground-Level Tank

The previously approved special contract authorized PEU to accept funds from Pillsbury to construct an elevated water storage tank. Order No. 26,285. Specifically, the Order recognized that the ultimate goal of PEU and Pillsbury was to construct a 1.1 million gallon water tank thus providing the required flows for Woodmont Commons and supplementing the LCS. *Id.* at 5. PEU's Petition again makes the request to approve a special contract which allows the collection of funds from Pillsbury for construction work.

The difference in the 2020 Special Contract is that the scope of construction has changed, from a 1.1 million gallon elevated water storage tank to a 1.25 million gallon ground-level water storage tank. Attachments of John Boisvert, JJB-C, March 9, 2020. The proposed work also includes a water booster station and connecting distribution main. *Id.* Specifically, the 2020 Special Contract states that PEU “is constructing a 1.25 million gallon level (less than 35 feet high) precast prestressed concrete water storage tank, approximately 6,300 linear feet of 16-inch diameter water transmission

main, and a 3,500 gallon per minute water booster pumping station.” *Id.* 2 (Staff notes that the reference to “less than 35 feet high” is included only in the non-redlined version).

The Company argued that the need remains for a solution to meet the requirements of Woodmont Commons. When fully built, Woodmont Commons’ water service requirements will be significant, at an estimated 405,488 gallons per day (GPD). Staff 4-12. The significance of such demand is further highlighted when compared to the projected 10-year needs of the existing LCS, which Staff calculated at approximately 472,018 GPD. *See* Attachments of John Boisvert, Schedule A-Attachment 1 (noting LCS existing demand at 382,402 GPD and LCS future demand at 89,616 (382,402 + 89,616 = 472,018). Mr. Boisvert further stated that the cost sharing apportionment remained unchanged from the one examined in the prior special contract. Testimony of John J. Boisvert at 15, March 9, 2020. As a result, PEU’s estimated cost of the new project, (water storage tank, booster and main) excluding the proposed tax sharing arrangement, is \$1,549,404 of an estimated \$3,152,000 total project cost. Attachments of John Boisvert, Schedule A-Attachment 2, March 9, 2020.

Mr. Boisvert stated that the change from an elevated to a ground-level water tank would “eliminate the need for a variance and avoid litigation” but that other approvals would still be required. Testimony of John J. Boisvert at 7-8, March 9, 2020. The Company confirmed that the ground-level tank provided many of the same benefits as the elevated tank, including: reduced wholesale water rates from MWW as a result of the elimination of fire flow capacity from the contracted rates between MWW and PEU (Attachment A, Staff 4-8); and would supply peak demand and fire flow, taking pressure off of the current Mount Homes pump station to supply both (Attachment A, Staff 4-18; Staff Revised Recommendation at 8, June 28, 2019).

PEU also provided a memorandum from Underwood Engineers, Inc., who, subsequent to the Londonerry ZBA denial, was contracted by PEU to assess alternative water supply storage and distribution options, and associated costs, that would achieve the same objectives as the original elevated storage tank project. Mr. Boisvert’s testimony summarized the key finding from the Underwood report which concluded that the LCS could not currently meet both domestic water demand and fire flow requirements for its existing customers, and that a water tank is necessary. Attachments of John Boisvert, JJB-E, March 9, 2020 and Testimony of John J. Boisvert at 4-6, March 9, 2020.

The Company, lastly, filed a letter from the NHDES in support of the concept of the ground level water tank project now proposed by the Company. Pennichuck East Utility, Inc., Letter of Support from DES at 2, April 16, 2020.

Staff’s engineering consultant, Douglas W. Brogan, P.E., reviewed the Company’s filing, including the alternative plans considered by the Company, and its current plans to construct a ground level tank and a booster station. Mr. Brogan issued a report of his findings on September 8, 2020. Attachment B. In his report, Mr. Brogan, concluded that the current plan to construct a ground level water storage tank with a booster station appears reasonable. *Id.* at 10.

After review, Staff agrees with PEU that the purpose of the 2020 Special Contract is the same as the previously approved special contract. While the identified water infrastructure to be constructed

has been revised in the 2020 Special Contract, Staff highlights that prior Commission approval merely allowed PEU to collect funds from Pillsbury for construction of a non-water-main project, which is not provided for or permitted per its current tariff. Prior Commission approval, furthermore, did not specifically extend to the water infrastructure construction itself, as the Commission reserved its prudence determination. Order No. 26,285 at 5. As such, Staff agrees that the purpose of the contracts are materially similar.

C. Projected Increase in PEU's Income Tax Liability

The originally approved special contract authorized PEU and Pillsbury to share responsibility for the additional income taxes resulting from Pillsbury's contributions. Order No. 26,285 at 1, 5. Specifically, the Commission authorized PEU to collect 51%, of the resulting tax liability from Pillsbury, effectively mirroring the cost-sharing agreement for the water tank. *Id.* 3, 5. According to the Petition, the Company proposes continuation of the 49% / 51% tax sharing arrangement between PEU and Pillsbury. Petition at 3.

The Company indicated, however, that PEU's estimated income tax liability increased as a result of the increase in the estimated project cost, from \$242,922 (Order No. 26,285 at 3) to \$270,056 (Attachments of John Boisvert, Schedule A: Anticipated Project Phases and Fee Schedule).

The Company reiterated that they plan to continue to offset their income tax responsibility by use of prior years' net operating losses (NOL). Attachment A, Staff 4-9 & Attachment A, Staff 4-10. NOLs are tax losses from previous years that can be applied against current years' income thereby reducing a Company's income tax liability. Revised Staff Recommendation at 4, June 28, 2019. According to the Company, it had approximately \$3.4 million in NOLs at the end of 2018. *Id.* at 19. As the 51 % liability to Pillsbury is the same allocation approved previously by the Commission, the Company concludes that the cost-sharing proposal in the 2020 Special Contract continues to be in the public's interest. Supplemental Direct Testimony of John J. Boisvert at 16-17, March 9, 2020

After review, Staff agrees that the cost-sharing percentages previously authorized by the Commission are the same within the 2020 Special Contract. Staff notes that only the projected amount of the income tax liability is expected to change which is understandable as the first tax estimate noted in Order No. 26,285 was based upon a 2017 cost estimate. Petition at 3.

In addition, Staff notes that the Company continues to anticipate meeting all of their portion of the tax costs with NOLs, thereby mitigating any cash flow impact to the Company. Attachment A, Staff 4-9. As such, Staff continues to support the Company's position, and contends that despite a possible increase in income tax liability, the tax cost-sharing agreement is unchanged, and thus not materially different from the previously approved special contract.

III. Financing and Recovery

As the Petition concerns requested approval of a special contract to collect funds from Pillsbury for water infrastructure construction, Staff did not review any proposals or statements from the Company regarding the financing of PEU's cost to construct the tank or the proposed recovery of that cost. At the appropriate time, Staff anticipates a formal filing from the Company to address those

matters. Staff reiterates that its recommendation, as previously stated, does not extend to any proposed financing or recovery, but merely to support the Special Contract proposed by PEU. Revised Staff Recommendation at 5, June 28, 2019.

IV. Conclusion

After review of the entire record, Staff supports the Company's position that special circumstances exist which render a departure from PEU's general schedules and approved tariff, and that such departure is just and consistent within the public interest. RSA 378:18 (a utility may contract for service at rates outside its tariff if "special circumstances exist which render such departure...just and consistent with the public interest").

Staff notes that the 2020 Special Contract is not materially different from the prior special contract approved by Order No. 26,285, as detailed above. Staff, furthermore, agrees with PEU that special circumstances still exist to justify departure from its tariff (to collect construction funds from Pillsbury). As supported by Mr. Brogan's memo, the construction of the water tank appears reasonable, and in order to do so, the Company must collect funds from Pillsbury, which it cannot do under its current tariff.

Staff further offers that the Company has provided support for the argument that the 2020 Special Contract continues to be just and consistent with the public interest. The Company detailed the continued need and benefits of the tank construction, as detailed in Part II, Section B above. As such, Staff agrees that its approval of the 2020 Special Contract would be just and consistent with the public interest.

Staff contends, however, that this recommendation does not extend to any proposed financing of or recovery of PEU's share of the costs it expects to incur during the construction of the facilities described in the Special Contract, including the required prudency review of the final expenses. As such, Staff recommends that the Commission note its reservation of the required prudency review as it did previously. Order No. 26,285 at 5.

If you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

/s/ Anthony J. Leone

Anthony J. Leone
Utility Analyst, Gas & Water Division

cc: Service list (electronically)

Attachments: A) Set 4 Discovery Responses
B) Engineering Report, Douglas W. Brogan, P.E.

Docket No. DW 18-101

Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-1

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Please list all additional authorizations the Company needs to obtain before it can begin to construct the project. (ie. Town of Londonderry ZBA, Town of Londonderry Planning Board, NHDES, Conservation Commission, etc...)

RESPONSE:

Town of Londonderry:

ZBA: No approvals required as the tank will be 35 feet or less in height.

Planning Board: Site Plan Approval for the storage tank (likely three meetings).
Site Plan Approval for the booster station. This will be a modification to an existing site plan for Woodmont Commons since the booster station will be on Woodmont Commons property (likely two meeting coinciding with the storage tank.

Conservation Commission: Conservation Overlay District Conditional Use Permit as the transmission main and the booster station will fall within wetland buffer zones.

NHDES:

Drinking Water and Groundwater Bureau: Design Review for all projects

Wetlands: Possible Wetland Permit associated with the transmission main crossing wetland areas. Confirmation of the presence of wetlands will be upon the completion of the topographic survey and wetlands mapping. Wetland avoidance will be considered during the design phase of the project.

Alteration of Terrain: Possible. To be determined based on final project scope and land disturbance.

Docket No. DW 18-101**Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4**

Date Request Received: 5/2/20
Request No. Staff 4-2

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:**Referencing Data Requests from the previously approved special contract**

Please update the following Data Responses to reflect any and all changes proposed in the March 9, 2020 updated filing and April 16, 2020 DES Letter of Support:

- a. Staff 1-1
- b. Staff 1-2
- c. Staff 3-4
- d. Staff 3-5
- e. Staff Tech 2-6
- f. Staff Tech 2-7
- g. Staff Tech 2-8
- h. Staff Tech 2-9

RESPONSE:

- a. No changes are needed other than adjusting capital cost estimates for inflation.
- b. No changes are necessary.
- c. No changes are necessary other than adjusting cost estimates for inflation. We anticipate the relative values of the options to remain the same.
- d. No changes are necessary other than adjusting cost estimates for inflation. We anticipate the relative values of the options to remain the same.
- e. No changes are necessary.
- f. No changes are necessary except that the interconnection to Springwood Hills is discussed below in the response to 4-26 below.
- g. The ground level tank will still require annual inspections.
- h. The water main discussed in 2-9 is not required in the current project. The remainder of 2-9 is accurate.

Docket No. DW 18-101**Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4**

Date Request Received: 5/2/20
Request No. Staff 4-3

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Reference Page 16, Lines 11-14 of Mr. Boisvert's Testimony: The previous estimated cost of the elevated tank was \$2,835,000. The Company's supplemental filing appears to indicate that the cost of the previously proposed elevated tank, adjusting for 2020 dollars, is now \$3,400,000. Please provide a detailed itemization, in 2020 dollars, of the previously proposed elevated tank project resulting in a total of \$3.4 million.

RESPONSE:

The 2020 estimated value of \$3.4 million in the testimony for the elevated tank is incorrect. The original testimony JJB-A Schedule 2 had a 2017 estimated elevated tank cost of \$2,853,000. One of the three potential elevated tank constructors, Landmark Structures, suggested a ten percent increase in construction costs based on market changes since the elevated budgeted in 2017. The 2020 estimated construction cost for the elevated tank, using that formula, would be \$3,118,500. Because of the overall percent adder, there would be no itemized detail.

Docket No. DW 18-101

Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-4

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Referencing Schedule A- Attachment 2: Anticipated Project Phases and Fee Schedule

Please compare the estimated costs of newly proposed ground level water tank, main and required booster station in this schedule to each corresponding and applicable item of the previously proposed elevated water tank and the anticipated main. Specifically listing the difference in cost per element and total overall cost.

RESPONSE:

Even though the elevated tank option and the proposed Project accomplish the goal of addressing the current water supply needs of the existing Londonderry Core System (LCS) and the future demands of the Woodmont Commons development, the elements of each option do not align for comparison. Please see the attachment, Attachment Staff 4-4, with current budget estimates for both options.

Docket No. DW 18-101Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4Date Request Received: 5/2/20
Request No. Staff 4-5Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Reference Data Response to Staff Tech 2-9: The Company's data response contemplated a future water main project, the construction of which would be subject to the same cost sharing arrangement as the previously proposed elevated tank. Please clarify whether this previously contemplated water main project is the same as that contemplated in the Company's updated proposal at an estimated cost of \$787,500. Please elaborate.

RESPONSE:

No, the updated proposed project is not the same as the water main discussed in response to Staff 2-9. The previously contemplated water main would have directly served the Woodmont development. It would have had new Woodmont Commons customers connected to it and was needed to deliver the necessary fire flow in the commercial areas of the Woodmont Commons development that were in the 620 pressure zone.

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Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-6

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Referencing the June 29, 2018 Testimony of John J Boisvert, page 15:

Will the newly proposed ground level water storage tank allow PEU to receive the same decreased purchased water rate from Manchester Water Works as PEU anticipated receiving from the elevated storage tank outlined in the previous special contract? Please Explain.

RESPONSE:

Yes, this benefit of the project is retained in the new design. The tank will buffer instantaneous peak demand and provide fire flow as with the prior elevated tank option. Therefore, because the tank eliminates the need for MWW to provide fire protection purchased water rate will reflect the lower volumetric pricing from the MWW-Pennichuck purchased water agreement.

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Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-7

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:**Referencing the April 16, 2020 NHDES Letter of Support**

On April 16, 2020, subsequent to the filing of the March 9, 2020 updated petition, testimony, and attachments, the NHDES Drinking Water and Groundwater Bureau (DWGB) provided a letter supporting the concepts laid out in the updated petition. In light of this and the Underwood Engineers Report, will the Company again be applying for State Revolving Fund (SRF) monies to finance the Company's portion of the project? Please explain.

RESPONSE:

Yes. Pre-Applications for SRF and the Drinking Water and Groundwater Trust Fund (DWGTF) loans are due in June 2020. The Company will be submitting pre-applications to both of these sources of financing. In addition, the NHDES surveyed water and wastewater utilities in New Hampshire for projects that may qualify for future Federal funding associated with impacts from Covid-19. The Company submitted the Project in response to this survey.

Docket No. DW 18-101

Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-8

Date of Response: 5/15/20
Witness: Larry Goodhue

REQUEST:

Regarding the anticipated subsequent financing for PEU's portion of the cost of the project, please provide an update of the anticipated terms of such financing.

RESPONSE:

This project will initially be financed with PEU's CoBank Fixed Asset Line of Credit, at a monthly floating rate of interest until it becomes used and useful. The project, once used and useful, qualifies for QCPAC treatment. The QCP's for the year the project is used and useful will be financed with a 25-year term loan with CoBank, at the then current available interest rate, approximately 6 months after the completion of the calendar year in which the project went used and useful.

Docket No. DW 18-101

Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-9

Date of Response: 5/15/20
Witness: Larry Goodhue

REQUEST:

Please explain the benefit(s) existing PEU ratepayers will derive from subsidizing a portion of the CIAC tax liability that is associated with Pillsbury's contributions.

RESPONSE:

The PEU Ratepayers will benefit from the fact that the subsidy of the taxes will pay for the NOLs used in conjunction with the taxable income from the CIAC contribution. And, the cash being held in a separate bank account for the Company will be the first cash used to pay for income taxes due for cash payment to the IRS or State, when NOLs are exhausted, or their full impact to shelter taxable income is reduced under the TCJA rules and regulations. This preserves overall cash balances in the Company's RSF funds, which if depleted, are recovered from rate payers in the three years following the next rate case. As such, this cash would defer or eliminate that event from occurring, thus translating directly into the reduction of rate increases included in that next rate case, or future rate cases.

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Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-10

Date of Response: 5/15/20
Witness: Larry Goodhue

REQUEST:

Please explain how the Company intends to meet and account for its portion of the income tax liability derived from Pillsbury's contributions. If short-term funds are used, please detail the source of those funds and how, and if, those funds will be converted to long-term financing.

RESPONSE:

The income tax derived from Pillsbury's contribution of CIAC will be included in the taxable income of PEU. This inclusion will result in higher taxes on the overall income, or reduction of overall net taxable losses for the Company. As such, it will translate into either the usage of current NOL balances, and/or a reduction in new NOLs being generated in the year. If the overall impact of this, is to cause taxable income to be less than fully sheltered by NOLs in a year, the cash collected on the CIAC will be the first cash used (FIFO) to pay the resulting tax liability. This does not translate into a long-term financing implication, but is a component of short term working capital needs and funding.

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Petition for Approval of Special Contract for Woodmont Commons in Londonderry
 Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
 Request No. Staff 4-11

Date of Response: 5/15/20
 Witness: John Boisvert

REQUEST:**Referencing Schedule A- Attachment 6: Net Present Value Analysis of Annual Expenses**

Please provide a live copy of the two spreadsheets (pages 1 and 2) and explain further the following:

- a. The absence of a tank recoating cost in the analysis of the expenses of the elevated storage tank on page 2 of 2.
- b. The decision to use a discount rate of 5% on page 2 of 2.
- c. Please explain how the \$325,000 recoating cost in the response to Staff Tech 2-8 relates to the \$600,000 recoating cost highlighted in green at the bottom of p. 1.
- d. In the bottom center of p. 1, should “Added head at Mountain Homes to achieve Londonderry HGL” be 155, not 145? Please confirm or explain.
- e. Please explain the annotation highlighted in yellow, “50% less with 498 connection”.
- f. Please explain how the \$ 32,675.19 (orange highlight) was calculated.
- g. On p. 2, please explain what “Tank Inspection Checks” are, and why they are not needed on the ground-level tank.

RESPONSE:

Please see the attached live spreadsheet, Attachment Staff 4-11.

- a. It is listed in year 20 at \$874,086.74.
- b. The 5% is a value that the Company has use in prior filings with the Commission for similar capital projects.
- c. The \$325,000 only included the external surface of the tank. Value was adjusted to include both the exterior surface and the internal surface at an estimated cost of \$600,000.
- d. 155 feet is correct. Attachment 6 is revised.
- e. The “498 connection” refers to the 498 pressure zone. The “50% less with 498 connection” Please ignore this reference. It was a note referring to if water were to be purchased from Derry the electrical cost would be approximately 50% less because not all the demand would need to be raised to the 620 pressure zone.
- f. The \$32,675.19 represents an estimate of the electric cost to re-pressurize water from the 498 pressure zone to the 620 pressure zone. This equates to the volume of water needed to be pumped into the 620 pressure zone by the new booster station when the Mountain Homes station (MHS) is off and the tank is not in a fill cycle. Initially the Company considered a tank fill time (MHS run time) of 8 hours. During the time

- when the MHS is running there would be no double-pumping of LCS demand into the 620 pressure zone. When the tank is built and the MHS station is off, both the 498 and 620 pressure zones will receive water from the tank. The water to the 490 pressure zone will flow by gravity out of the tank. The water to the 620 pressure zone will be provided by the new booster station drawing from the tank and lifting the water into the 620 pressure zone. This water is essentially double-pump into the 620 pressure zone, once by the MHS to fill the tank and once by the new booster station. Further analysis of the LCS distribution system demonstrated that an 8 hour tank fill time is not feasible due to the flow limitations of the suction line to the Mountain Homes station. The fill time should be extended to 11 hours at a Mountain Homes station flow rate of 750 gpm. This results in approximately 21% of the LCS demand being double pumped into the 620 pressure zone. The resulting electrical cost to re-pump is reduced to \$8,152.57 and is reflected in the revised NPV spreadsheet.
- g. They are included in the lower left portion of the sheet in the section "Ground Level Tank and Booster Labor". A total of 3 hours per week of labor which includes 0.5 hours for the tank and 2.5 hours for the booster station is accounted for the ground level tank and the new booster station.

Docket No. DW 18-101

Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-12

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Referencing the March 9, 2020 Testimony of John J Boisvert, page 17:
The testimony appears to refer to the original Statement of Special Circumstances. However, Data Request 3-13 includes an updated Statement. In light of the March 9, 2020 filing, please update the Statement of Special Circumstances.

RESPONSE:

An updated Statement of Special Circumstances reflecting the larger storage tank, mains, and water booster station is attached as Attachment Staff 4-12.

STATEMENT OF THE SPECIAL CIRCUMSTANCES

1. Pursuant to N.H. Code Admin. R. Puc 1606.02(b), Pennichuck East Utility, Inc. (“PEU”) submits this statement that special circumstances exist that warrant a departure from its general tariff schedules.
2. Woodmont Commons Planned Unit Development (“Woodmont Commons”) in Londonderry has asked PEU to provide water service to the development. Demand from the development is anticipated to be approximately 405,488 GPD which is much larger than the projected growth in the Londonderry core system.
3. PEU anticipated building a water storage tank to meet the projected growth needs of the core system, however, a larger storage tank, associated mains, and a water booster pumping station will be needed to serve Woodmont Commons.
4. PEU’s tariff does not directly address the costs to provide service to Woodmont Commons. Although PEU’s tariff (Original Page 35 and First Revised Page 36) enables PEU to collect from customers, in advance, for the cost of constructing main extensions necessary to serve the new customer and PEU has a System Upgrade Fees (Second Revised Page 37) that may be charged to customers for the construction of new water facilities, neither of these provisions directly fit the circumstance at hand. Pursuant to paragraph 5 on First Revised Page 36, “[s]pecial contracts will be negotiated whenever in the opinion of the Company this regular extension tariff should not be used or is not feasible or economical. Each special contract shall be submitted to the Commission for approval.”
5. Because a larger storage tank is necessary to serve Woodmont Commons, it is of considerable expense, it does not benefit the entire water system, and it is not a main extension project under PEU’s tariff, PEU believes the situation fits paragraph 5 of First Revised Page 36 and the extension tariff should not be used. For these reasons, special circumstances exist.

< End of Document >

Docket No. DW 18-101**Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4**

Date Request Received: 5/2/20
Request No. Staff 4-13

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Prior to the March 2020 filing, analyses of future demands and tank size requirements relied on a 10 year planning horizon (see, for example, Mr. Boisvert's 2018 testimony p. 6, lines 9 and 16-17). In a limited respect, the March 2020 filing also contemplates a 20 year horizon (Boisvert 2020 testimony p. 11, line 22). In this regard please comment on:

- a. What the company believes is an appropriate horizon for evaluating future supply, storage and facility upgrade needs in the Londonderry core system, particularly in regard to Woodmont Commons.
- b. Why a 20-year horizon was used for cost comparison of alternative improvements options in the 2020 filing.

RESPONSE:

- a. 10 years for demand assessment is appropriate as that corresponds to the planned build out of the Woodmont commons system. The project is based on this planning horizon. Additional growth in Londonderry is difficult to predict and the factors that drive growth of the Londonderry water system even less. Londonderry has the potential for customer growth in both the 620 and 498 pressure zones. It would be beneficial for the Company to engage with the Town of Londonderry to identify areas of potential growth and to plan for what a water system may consist of outside of the current Project designed to serve existing customers and accommodate Woodmont Commons.
- b. 20 years is an appropriate engineering estimate for the size pumps, the associated electrical equipment, and other mechanical equipment in the new booster station. 20 years also corresponds to the design life of the steel coatings on the elevated tank. Thus, the 20-year cycle corresponds to the period when major repairs and/or replacements would first occur for each alternative.

Docket No. DW 18-101**Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4**

Date Request Received: 5/2/20
Request No. Staff 4-14

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:**Referencing response to Staff 1-1**

While the response is intended as only a high level estimate:

- a. The additional 2,000 gpm of needed Mountain Homes pumping capacity appears to meet anticipated maximum day plus fire flows, but neither a) peak hour flows nor b) increased flow requirements beyond the initial 10 year period. Please confirm or explain, including whether these impacts would have increased the cost of Option 1.
- b. The distance from the Cohas meter pit to the Mountain Homes pump station appears to be closer to 9400 feet than the 8400 feet indicated. Please clarify or explain, including any impact on the Option 1 cost estimate.

RESPONSE:

- a. Increasing demand would require larger infrastructure under Option 1 (larger capacity pumping station and water main larger than 24 inch diameter). The cost would rise significantly to meet instantaneous peak demand making Option 1 more costly and less feasible than an option with a storage tank.
- b. Based on the Company's GIS mapping the full distance is approximately 8,800 feet. Not all of the existing 16 inch watermain would need to be replaced with 24 inch diameter main in order to maintain minimum suction pressures at the Mountain Homes Station.

Docket No. DW 18-101**Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4**

Date Request Received: 5/2/20
Request No. Staff 4-15

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:**Referencing Mr. Boisvert's 2018 testimony p. 11, lines 6-8**

Please comment on the decision to reduce required storage by 405,000 gallons (based on supply pumping capacity during 180 minute fire flow), including:

- a. The rationale behind choice of that value.
- b. The derivation of the number, which assumes a pumping capacity of 2,250 gpm.
- c. Whether the number relies on Mountain Homes pump station in its current capacity as limited by suction pressures, on installed capacity, or on some other value.
- d. Whether the number relies on contribution of the South Road pump station, including why or why not.

RESPONSE:

- a. The NHDES regulations follow what are known as “Ten States Standards” for water systems the size of the LCS. The standards generally break the storage volume in a tank into three components, working storage, fire (emergency) storage, and dead (residual) storage. Working storage is associated with average day demand, the fire flow volume, and dead storage is the volume in the bottom allowed for sediment accumulation or the level that the tank cannot be drawn lower than such that pressure to the nearest customer drops below 20 psi in an emergency. The Standards also allow storage volume to be reduced based on source pumping capacity and other considerations such as minimizing tanks size as not to increase water age in a system causing water stagnation that may resulting in unacceptable water quality. In the case of the LCS the fire flow volume is 630,000 gallons. The domestic demand daily volume at full build out is estimated at 877,506. Because of the proposed location, the nearest customer served directly by the tank is at an elevation of approximately 400 feet above mean sea level (AMSL). The tank bottom is at approximately 470 feet AMSL. When the tank is empty the nearest customer will have an adequate residual pressure of approximately 30 psi during an emergency condition. The theoretical tank volume should be 1,507,506 gallons (630,000 gallons + 877,506 gallons). The Standards allow a reduction in tank capacity for source pumping capacity. Based on the findings of UEI the source pumping capacity over the duration of the fire flow (180 minutes) is 2,100 gpm (1,400 gpm from Mountain Homes station and 700 gpm from South Londonderry station). The volume provided by the sources over 180 minutes is 378,000 gallons. This value was adjusted down based on the UEI report. The minimum tank size may be reduced to 1,129,506 gallons (1,507,506 gallons less

- 378,000 gallons). The proposed tank is 1,250,000 gallons leaving approximately 120,494 gallons of dead storage or roughly 2.5 feet of water in the bottom of the tank for sediment accumulation.
- b. The actual number is 2,100 gpm as provided in the UEI report and as presented in response “a” above.
 - c. The number factors in both suction pressures, installed capacity as well as system domestic demand.
 - d. As stated above, it does because the tank can receive water from both the Mountain Homes and the South Road stations.

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Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-16

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:**Referencing Attachment Staff Tech 2-2 Exhibit B**

Regarding the attachment:

- a. Why is the size of a smaller tank (without Woodmont Commons) not reduced by some figure comparable to the 405,000 gallons in Attachment JJB-A Schedule 1 of Mr. Boisvert's original testimony?
- b. Please explain why the 227,286 gpd number (third number down under "With Woodmont Commons") is not instead 405,488 gpd as indicated in the same earlier attachment.
- c. Please explain why the total tank size with Woodmont Commons is not reduced by 405,000 gallons as indicated in the same earlier attachment.

RESPONSE:

- a. The Company is reasonably confident in the demand projections without Woodmont Commons. Although there is a development plan for Woodmont Commons, the demand projects may be subject to much greater variability. Therefore, the Company elected to reduce the tank size for the scenario with Woodmont commons due to source pumping capacity. The Company did not want to be in a situation of having a tank too large (potentially creating issues with water stagnation) if the flows from the Woodmont Commons did not materialize.
- b. 405,288 gpd is the correct value. A corrected exhibit is attached as Attachment Staff 4-16. The sizing of the tank is in accordance with the response to 4-15 above.
- c. It has been. Please see response to 4-15 above.

Docket No. DW 18-101

Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-17

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Referencing Mr. Boisvert's 2018 testimony Attachment JJB-A, Schedule 1

Please indicate generally the source of the various fire flow and duration requirements.

RESPONSE:

The required fire flow for the current conditions is defined by the requirements needed by the Home Depot located off of Route 102 in the 498 pressure zone. The developer of the Home Depot invested in system improvements to ensure a fire flow capacity of 2,400 gpm at this facility. The need for a fire flow of 3,500 gpm in the Woodmont Commons development was provided by Pillsbury to the Company by their consultants based on the type of structures and occupancy they were anticipating. Hence why the Woodmont Commons share of the fire protection capacity of the system is greater than that of the existing system and existing customers.

Docket No. DW 18-101**Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4**

Date Request Received: 5/2/20
Request No. Staff 4-18

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:**Referencing Response to Staff 3-1**

The language in part a) regarding peak hour flows exceeding the “allotted domestic capacity” of the Mountain Homes pump station is unclear. Present-day peak hour flows do not appear to exceed domestic flow limits in the Manchester Water Works contract, but do appear to exceed the current suction-limited capacity of the Mountain Homes station with the largest pump out of service (per Ten State Standards, see Underwood Engineers report, 2020 Att. JJB-E, p. 8). In this regard:

- a. Please clarify or explain what was intended by flows exceeding the “allotted domestic capacity” of the station.
- b. Given Underwood’s apparent indication that current pumping capacity is inadequate for even present day domestic and fire requirements, would a smaller (non-Woodmont) tank have been built sooner than the “more than five years out” time frame anticipated in the same response (see also Mr. Boisvert’s 2020 testimony p. 13 at top)? Please explain.
- c. Would the size of a smaller tank have been impacted by the Underwood findings? Please explain.

RESPONSE:

- a. The Mountain Homes station can only deliver a maximum amount of water into the Londonderry Core system. That capacity includes both domestic flow and fire flow. Fire flow capacity needs to be reserved. In the case of the Mountain Homes station the fire flow capacity is 1,400 gpm. 1,100 gpm of this capacity is reserved for fire flow to support a total fire flow required in the 498 pressure zone of 2,400 gpm (1,300 gpm is contributed by the South Londonderry station for a total of 2,400 gpm). Subtracting 1,100 gpm from the Mountain Homes station capacity of 1,500 gpm leaves 400 gpm available for domestic supply. 400 gpm over the course of 24 hours results in a domestic capacity of 576,000 gallons per day. Hourly data recorded at the Cohas Meter show that flows regularly exceed 400 gpm thus drawing capacity away from the required fire flow capacity.
- b. Yes, a smaller tank would have been evaluated as a possible consideration for implementation in a shorter time period. The five year time frame would allow the Company to balance annual capital expenditures across all of PEU in consideration of project priority and criticality.

- c. No, at least not in a significant manner. The Underwood findings identified deficiency in the ability to supply (pump) water into the Londonderry system to meet both domestic and fire flow at the same time. The tank would supply/buffer peak hourly demand and provide fire flow taking the pressure off of the Mountain Homes station having to supply both.

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Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-19

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

How seriously does the company view the 750 gpm fire flow limitation in paragraph 201.3.1 of the Manchester Water Works contract in light of the much greater (current and anticipated) fire flow needs of the Londonderry core system? Please explain.

RESPONSE:

The contract with Manchester Water requires MWW to provide a minimum of 750 gpm where the Company does not have its own fire protection facilities. In the case of the Londonderry core system MWW can deliver about 1,400 gpm to the MWW/PEU meter pit on Mammoth Road. PEU can use all of that capacity as long as it exists. If a large user were to connect to the MWW system upstream of the MWW/PEU meter pit and drew enough water to limit the capacity to PEU in Londonderry to less than the current available 1,400 gpm but more than 750 gpm and PEU required 1,400 gpm MWW would be in compliance with its contract with PEU to deliver at least 750 gpm. If the depletion in available fire flows impacted PEU's customers than PEU would be obligated to improve MWW's system to deliver the desired fire flows from MWW to PEU or PEU would need to build storage within the Londonderry core system to insure the availability of the required fire flows as the contract with MWW does not insure flows over 750 gpm.

Docket No. DW 18-101**Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4**

Date Request Received: 5/2/20
Request No. Staff 4-20

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Given that the proposed ground-level tank rides on the 498 pressure zone, has the company considered moving the tank itself closer to the proposed booster station and 620/498 zone boundary to eliminate some or all of the cost of the 16-inch main? Please explain.

RESPONSE:

The overall height of the tank to remain under 35 feet which avoids the requirement of a Zoning Board variance, and to serve the 498 pressure zone by gravity, the ground elevation where the tank needs to be located has to be at an elevation of 468 feet above mean sea level (AMSL). The proposed site meets this criterion and is owned by the Company. Any other parcel in Londonderry at 468 feet AMSL would require the Company to acquire an easement or purchase the property at that elevation adding additional cost to the project. A tank sited any lower in elevation would require depressurization (pumping) of the water to feed the 498 pressure zone as opposed to flowing by gravity from the tank. The ground elevation at the Gilcreast Road pressure reducing valve (PRV) where the 620 pressure zone and the 489 pressure zone is approximately 366 feet AMSL while elevation at the location of the proposed booster station on Michel's Way is approximately 376 feet AMSL. At tank sited at any other elevation below a ground elevation of 468 feet AMSL would require that tank to be taller than 35 feet, require a zoning variance, and require pumping to deliver water to the 498 pressure zone. For a tank located at either the Gilcreast Road PRV or the location of the proposed booster station on Michel's way, it would need to have a heave a minimum height of either 132 feet or 122 feet respectively. The proposed booster station to serve the 620 pressure zone would still be required. The tank cost now resembles that of the original proposal (\$3.4 million) with the added cost of a booster station and some piping. This concept would drive the cost well above that of the proposed Project.

Docket No. DW 18-101Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4Date Request Received: 5/2/20
Request No. Staff 4-21Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Regarding the Gilcreast Road pressure reducing valve (PRV):

- a. Will a new PRV inside the proposed booster station fill the ground-level tank from the 620 pressure zone? Please explain.
- b. Would the Gilcreast Road PRV be eliminated under the new proposal? Please explain.
- c. Will the location of the 620/498 pressure boundary be adjusted under the new proposal? Please explain.
- d. Would the Gilcreast Road PRV have been eliminated under the elevated tank proposal? Please explain.

RESPONSE:

- a. Yes. The PRV inside the station will also serve as a flow regulating valve to limit the flow into the 498 pressure zone while the tank is filling as to cause greater than normal pressure fluctuations in the 620 pressure zone.
- b. Yes. The pressure in the 498 pressure zone will float of the tank level.
- c. No. The intent is to deliver the same pressure to existing customers as they are experiencing now.
- d. No. The 498 pressure zone would be served in the same way from the elevated storage tank as it currently is from the Mountain Homes Station that runs to maintain a constant pressure.

Docket No. DW 18-101

Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-22

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Referencing Mr. Boisvert's 2020 testimony, p. 10, lines 18-22

Is the proposed booster station anticipated to pump only into the 620 pressure zone, or also, for example, boost fire flows into the 498 zone beyond what the gravity tank would provide? Please explain.

RESPONSE:

It will pump only into the 620 zone. Existing fire flow requirements will be achieved by water flowing directly from the tank into the 498 pressure zone. If for some reason an unlikely extreme fire flow event were to occur, and the storage tank were to call for water based on tank level. It would likely be the South Londonderry Booster Station that would turn on to supplement flow into the 498 pressure zone.

Docket No. DW 18-101

Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-23

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Please indicate generally how the two pump stations (Mountain Homes and proposed booster station) would function in relation to one another, in both pumping water into the 620 pressure zone and keeping the 498 zone ground-level tank filled, to the extent known at this time.

RESPONSE:

The following is the anticipated sequencing of the Mountain Homes and new booster station:

Start:

- Storage tank is full
- Mountain Homes station is off
- Proposed booster station is on drawing water from the tank via the new transmission main to maintain flow and pressure in the 620 Pressure zone.
- Water from the tank is flowing through the new transmission main by gravity directly into the 498 pressure zone.
- The flow control valve in the new station that connects the 620 pressure zone to the 498 pressure zone is closed.

Tank calls for water:

- The Mountain Homes station turns on and reaches the pressure setting to maintain the 620 pressure zone pressure.
- The flow control valve in the new station opens to allow water to flow from the 620 pressure zone into the 498 pressure zone.
- The pumps in the new station shut down. The demand and pressure in the 620 pressure zone is maintained by the Mountain Homes station along with water to fill the tank.

Tank reaches capacity:

- The flow control valve closes to stop the flow of water from the 620 pressure zone into the 498 pressure zone.

- The pumps in the new booster station turn on to provide water to the 620 pressure zone. At this point both the Mountain Homes station and the new booster station are providing water to the 620 pressure zone.
- Once the pumps in the new booster station are running, the Mountain Homes station pump are turned off and the 620 pressure zone demand is maintained by the new booster station drawing water from the storage tank.

This cycling will continuously repeat as needed all controlled automatically by the operators through the Company's SCADA system.

Docket No. DW 18-101Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4Date Request Received: 5/2/20
Request No. Staff 4-24Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:**Referencing Mr. Boisvert's 2020 testimony, p. 10, lines 5-7**

Mr. Boisvert's testimony indicates an interconnecting main would be required between the ground-level tank and 620 pressure zone, if the booster station were instead located adjacent to the tank. This would appear to be the same main anticipated in relation to the elevated tank option, required to connect the tank site to larger distribution mains in the 620 zone. (This main is delineated in Attachment Staff Tech 2-2 Exhibit A as 3,800 feet and costing \$444,600, as distinct from the longer main in the ground-level tank option as currently proposed, which would run the full distance - 6,300 feet per Boisvert 2020 testimony p. 13, line 13 - to the 620/498 pressure zone boundary and cost \$787,500).

In previous filings, however, the shorter main appeared as a future, v. current, need (response to Staff Tech 2-9, third paragraph, "this one and future need"). In this regard please indicate:

- a. The time frame in which this main was viewed as being required under the elevated tank option.
- b. Whether the main was included in the cost of the elevated tank option prior to the March 9, 2020 update filing and, if not, why not.
- c. Whether the main is included in the cost of the elevated tank option in the March 9, 2020 update filing and, if not, why not.

RESPONSE:

- a. Under the elevated tank option, the main referenced would have to be constructed right away in order to connect the tank to the LCS and achieve the fire flow in the Woodmont Commons development.
- b. The cost of the main was to be that of Pillsbury.
- c. It is not included in the cost because it is no longer required to achieve fire flow in Woodmont Commons as that is accomplished by the proposed booster station and transmission main.

Docket No. DW 18-101**Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4**

Date Request Received: 5/2/20
Request No. Staff 4-25

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

The connection to Derry is described as an emergency connection, yet is repeatedly referred to in relation to the ability to provide water to at least the 498 pressure zone. In this regard:

- a. To what extent does the company anticipate Derry water will continue to be relied on to meet Londonderry core system fire flow requirements?
- b. To what extent will Derry water be relied on to meet future Londonderry domestic demands?
- c. How do Derry rates compare to those of Manchester Water Works?

RESPONSE:

- a. Very little if any. As discussed in response to 4-22 above, it would only be needed in an extreme unlikely event or if the storage tank was down for maintenance or temporarily isolated due to an emergency such as a water main break.
- b. The benefit of the proposed Project is that water from the 498 pressure zone can be supplied into the 620 pressure zone by activating the South Londonderry Booster Station which feeds water to the new tank and the use of the proposed booster station. This would be in the event that the flow of water from MWW to the Mountain Homes Booster Station is interrupted or the Mountain Homes Station needs to be taken out of service for maintenance, repair, or upgrades. Under the present operating scenario the water from Derry can only serve the 498 zone. If the flow from MWW is interrupted or the Mountain Homes Booster Station were to fail the 620 zone in Londonderry would be without water.
- c. The water rates are as follows: From MWW current Londonderry Core without storage is \$1.5310 per CCF, with the proposed storage tank the MWW would be \$1.2108 per CCF. The Derry rate is \$2.9826 per CCF.

Docket No. DW 18-101**Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4**

Date Request Received: 5/2/20
Request No. Staff 4-26

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:**Referencing Response to Staff Tech 2-7**

Regarding Springwood Hills:

- a. In what time frame does the company anticipate connection of Springwood Hills to the Londonderry Core System (LCS)?
- b. Would Springwood Hills bring significant additional supply to the LCS?
- c. Has the future contribution of Springwood Hills been considered in sizing of proposed facilities in the docket? Please explain.

RESPONSE:

- a. The current project does not anticipate the need to interconnect the Springwood Hills system into the Londonderry Core. The interconnection would occur at such a time that the interconnection would be a better alternative than replacing or upgrading the existing Springwood Hills booster station as well as being justified by the savings in purchased water cost from MWW. The time to consider interconnecting to Springwood Hills would be when the Mountain Homes station needs to pump at a rate of 750 gpm for more than 12 hours per day to meet the domestic demand of the LCS and after water main connecting the LCS on the west of I-93 to the west of I-93 is in place.
- b. Approximately 500 GPM based on the size of the Springwood Hills pumps.
- c. Springwood Hills recorded a recent peak month usage in 2016 of 1,726 CCF (approximately 23,000 gallons). This demand is relatively small compared to the capacity of the proposed project. The proposed project would have enough capacity to absorb the demand of Springwood Hills if required in the future.

Docket No. DW 18-101

Petition for Approval of Special Contract for Woodmont Commons in Londonderry
Responses to Staff Data Requests – Set 4

Date Request Received: 5/2/20
Request No. Staff 4-27

Date of Response: 5/15/20
Witness: John Boisvert

REQUEST:

Referencing April 16, 2020 letter of Richard Skarinka (NHDES) to John Boisvert re Londonderry system

In regard to the above:

- a. Please provide copies of the Underwood Engineers reports referenced in the letter.
- b. Are future Underwood Engineering studies related to the Londonderry/Woodmont Commons project anticipated? Please explain.

RESPONSE:

- a. A copy of the Underwood Technical Memorandum dated March 30, 2020 is attached at Attachment Staff 4-27.
- b. Not at this time unless the local permitting process requires/requests material changes to the proposed Project.



99 North State Street
Concord, New Hampshire 03301
Tel: 603-230-9898 Fax: 603-230-9899

Technical Memorandum

To: John J. Boisvert, PE, Chief Engineer File: 2421.08
Pennichuck East Utility, Inc.

From: Devon W. Smith, PE DS

cc: Keith A. Pratt, PE, Tom Page, PE & Josh Teixeira

Date: 3/30/2020

Subject: **Londonderry Proposed Distribution System Analysis**

The following Technical Memorandum summarizes the analysis by Underwood Engineers (UE) of the Londonderry Core Distribution System in accordance with Engineering Service Request #1 and Amendment #1. This memorandum shall supplement UE's letter titled "Preliminary Evaluation of PEU's Distribution System Londonderry, NH" dated October 18th, 2019 and technical memorandum titled "Londonderry Distribution System Analysis" dated February 6th, 2020.

1. INTRODUCTION

The Londonderry Core Distribution System (hereinafter the "System" or "Londonderry System") is owned and operated by the regulated public utility, Pennichuck East Utility, Inc (PEU). A background on the existing System was provided in the February 2020 technical memorandum. A significant expansion is anticipated to serve the proposed Woodmont Commons development. PEU has proposed improvements to maintain the desired level of service including pressure and fire flow in Londonderry

PEU has engaged Underwood Engineers to perform hydraulic modeling to evaluate the System's capacity with proposed improvements. This memo summarizes the modeling results based on certain improvements, but it does not evaluate when/who should conduct the improvements.

2. PROPOSED IMPROVEMENTS

The proposed improvements evaluated in this analysis consist of a new ground level water storage tank, a new pump station, and new water mains. Figure 1 provides an overview of the existing System and identifies the location of the proposed improvements in yellow. The baseline improvements needed for the System to function properly are as follows: Water



storage tank, Michels Way pump station, and 16" water main (connecting the pump station to the water storage tank and the 498 ft AMSL pressure zone). Pending regulatory approval, PEU would construct the baseline improvements. Woodmont Commons would assume responsibility for constructing the distribution network improvements to serve their development. At this time, the hydraulic improvements to the system are hypothetical, and no party has assumed responsibility of construction at this time. Below is a description of the proposed improvements:

Ground Level Water Storage Tank - Baseline Improvement

- Floats on the 498 ft AMSL pressure zone
- Volume = 1.25 Million Gallons
- Tank High Water Level = 497.5 ft AMSL (assumed)
- Tank Low Water Level = 492.5 ft AMSL (assumed)

Michels Way Pump Station (MWS) - Baseline Improvement

- Serves the 620 ft AMSL pressure zone only
- Finished Floor Elevation = 372 ft (assumed)
- Control Strategy
 - Variable Speed Control by Discharge Pressure = 620 ft HGL
 - Under normal operations the existing Mountain Homes Pump Station will serve the 620 ft Zone and fill the proposed ground storage tank. When the MHS is not running, the Michels Way Pump Station will draw from the tank and maintain system pressure in the 620 ft AMSL pressure zone. The pump stations will communicate and alternate operation to promote storage turnover. If pressure falls below a minimum setpoint, both pump stations will run to maintain pressure in the 620 ft AMSL pressure zone.
 - The proposed Michels Way pump station will house a control valve and a pressure reducing valve. These valves will be used to regulate the flow to fill the proposed ground level storage tank in the 498 ft AMSL pressure zone from the 620 ft AMSL pressure zone. The existing pressure reducing valve (PRV) on Gilcreast Road will be taken out of service.

Tank Inlet/Outlet Water Main - Baseline Improvement

- 5,800 ft of proposed 16" ductile iron water main to extend between the proposed Michels Way pump station and the ground storage tank. This section of main will serve the suction side of the Michels Way pump station. This main will also connect to the



498-pressure zone, enabling the 498 ft AMSL pressure zone to “float” off of the storage tank. See Figures 1 and 2

Woodmont Commons Distribution Network

- A proposed distribution network of 12” ductile iron pipe was added based on an assumed future buildout for Woodmont Commons. The layout for this distribution network was provided to UE from PEU. See Figures 1 and 2.

East Woodmont Water Main Extension

- 4,500 ft of proposed 16” ductile iron water main will extend from the existing 620 ft AMSL pressure zone off of Spring Road to the east across Interstate 93 to serve the future East Woodmont development.

Water Main Loops - Potential Hydraulic Improvements

- 4,700 ft of proposed 16” ductile iron water main will extend from the existing 620 ft AMSL pressure zone off of Pillsbury Road to the north to connect with the proposed water main running to east to serve East Woodmont commons. See Figures 1 and 2.
- 1,250 ft of proposed 12” ductile iron water main will extend from the Gilcrest Road south to Orchard View Drive. This will provide additional looping near the Home Depot in the 498 ft AMSL pressure zone. See Figures 1 and 2.
- 750 ft of proposed 12” ductile iron water main will connect the two dead ends on Buttrick Road. This will provide looping in the southern end of the 498 ft AMSL pressure zone. See Figures 1 and 2.

3. FUTURE SYSTEM DEMANDS & LEVEL OF SERVICE

Appendix A contains monthly flow data provided by PEU, which UE used to determine the maximum day flow (MDF) in each pressure zone. PEU also provided UE with the Woodmont demand projections and the level of service to meet fire flows. The existing and future system MDF demands are summarized in Table 1 below.

Table 1: Londonderry Core System Future Demands and Level of Service

Demand or Level of Service	620 ft AMSL Pressure Zone	498 ft AMSL Pressure Zone
MDF - Existing (gpm)	129	210
Woodmont Future Demand (gpm)	382	0
MDF - Future (gpm)	511	210
Level of Service – Future (gpm)	3,500	2,500

Notes:



1. MDF was calculated based on the highest monthly flow divided by the number of days in that month, see Appendix A.
 - Data Period: January 2018 to September 2019
 - The maximum monthly demand for both the 620 ft AMSL and 498 ft AMSL pressure zones occurred on August of 2019.
 - Because the calculated MDF is an average day flow of the month with the highest monthly demand, the calculated MDF is slightly less than the actual MDF.
2. With the exception of the future Woodmont Commons development, future customer growth in Londonderry was considered to be insignificant and within the margin of error of the model.
 - The future MDF in the 498 zone is equal to the existing MDF because all proposed development is in the 620 ft AMSL pressure zone.

4. HYDRAULIC MODELING

PEU provided UE with an Innovyze water model of the Londonderry distribution system. Where possible, UE validated the model's hydraulic assumptions and then incorporated the proposed system improvements. UE ran various modeling scenarios to evaluate the additional capacity that the proposed improvements would provide. All scenarios were analyzed under steady-state conditions. Friction and minor losses in the pump stations were neglected.

The New Hampshire Department of Environmental Services (NHDES) follows the Recommended Standards for Water Works, commonly referred to as the "Ten State Standards." Here, two specific standards were accounted for as described below.

First, Section 8.2 (System Design) requires that the System be able to meet both the maximum domestic demand and fire flows simultaneously. In order to evaluate this standard, UE simulated fire flows while constant MDF demands were applied. Fire flows were simulated at the same locations as the flow test locations defined in the prior technical memorandum titled "Londonderry Distribution System Analysis." See Figure 1

Second, Section 8.2.1 (Pressure) requires that a minimum pressure of 20 psi be maintained throughout the entire distribution system under all conditions of flow. UE set all nodes within the pressure zone of investigation to a minimum residual pressure of 20 psi to ensure compliance with this standard. This constraint controlled the available fire flow. The limiting node locations are identified in Appendix B and shown on Figure 1.

The goal of each hydraulic modeling scenario is summarized below. Appendix B contains additional detail related to the modeling scenarios and results.



Scenario #1 - Existing MDF

- Calculate the available fire flow in the 620 ft AMSL pressure zone demands at the High School (flow test location #1) and Gilcreast Road (flow test location #2) with the proposed baseline improvements under existing MDF.

Scenario #2 - Future MDF, East Woodmont Extension & 16" Loop

- Calculate the available fire flow in the 620 ft AMSL pressure zone at East Woodmont with the proposed baseline improvements under future MDF. This scenario also includes 16" east Woodmont extension and the 16" water main loop, north of the MWS.

Scenario #3 - Existing MDF

- Calculate the available fire flow in the 498 ft AMSL at the Home Depot (flow test location #3) from the proposed baseline improvements under existing MDFs.

Scenario #4 - Future MDF, East Woodmont Extension, Woodmont Network & 16" Loop

- Calculate the available fire flow in the 620 ft AMSL pressure zone at the High School (flow test location #1), Gilcreast Road (flow test location #2) and East Woodmont with the proposed baseline improvements under future MDF. This scenario also includes the 16" east Woodmont extension, 12" Woodmont distribution network and the 16" water main loop, north of the MWS.

Scenario #5 - Future MDF, East Woodmont Extension, Woodmont Network, 16" Loop & MWS On and MHS On

- Calculate the available fire flow in the 620 ft AMSL pressure zone demands at the High School (flow test location #1), Gilcreast Road (flow test location #2) and East Woodmont with the proposed baseline improvements under future MDFs. This scenario also includes the existing Mountain Homes pump station operating at 800 gpm, the 16" east Woodmont extension, the 12" Woodmont distribution network and the 16" water main loop, north of the MWS.

Scenario #6 - Future MDF & 12" Loops

- Calculate the available fire flow in the 498 ft AMSL at the Home Depot (flow test location #3) from the proposed baseline improvements. This scenario also includes the two 12" water main loops.

Tables 2 and 3 below summarize the existing capacity based on the prior flow testing; the simulated available fire flow after system improvements; and the level of service for each pressure zone.



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Table 2: Available Fire Flows in 620 ft AMSL Pressure Zone

Location	Existing - Flow Test Field Data (gpm)	Scenario #1 - Existing MDF (gpm)	Scenario #2 - Future MDF + East Woodmont Extension & 16" Loop (gpm)	Scenario #4 - Future MDF, East Woodmont Extension, Woodmont Network & 16" Loop (gpm)	Scenario #5 - Future MDF, East Woodmont Extension, Woodmont Network, 16" Loop & MWS On and MHS On (gpm)	Level of Service (gpm)
High School	1678	2,186	(note 1)	2,422	3,222	n/a
Gilcreast Road	1577	2,873	(note 1)	2,717	3,517	n/a
East Woodmont	n/a	n/a	3,100	3,100	3,900	3,500

Table 3: Available Fire Flows in 498 ft AMSL Pressure Zone

Location	Existing - Flow Test Field Data (gpm)	Scenario #3 - Existing MDF (gpm)	Scenario #6 - Future MDF & 12" Loops (gpm)	Level of Service (gpm)
Home Depot	2,100	2,450	2,450	2,500

Notes:

- The available fire flow simulations were not performed under the Scenario 2 conditions at Gilcreast Road or the High School, but the available fire flows are expected to be similar to the Scenario 4 results. This is because flow is not expected to go through the Woodmont network or the 16" loop.
- Field flow test data is not based on a 20 psi minimum residual everywhere in the zone but is provided for reference.



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5. DISCUSSION

The model results show the proposed baseline improvements will improve the level of service for fire flows at currently served locations (Scenario 1). The improved level of service at these locations remain even when future Woodmont flows are added (Scenarios 2 and 4).

The baseline improvements provide close to the target level of service for fire flow at East Woodmont with just the MWS running (Scenario 2). Adding the proposed Woodmont network had a negligible impact on fire flows at East Woodmont (Scenario 4). East Woodmont was the most conservative location to simulate the fire flow due to its distance from the Michels Way pump station and the Mountain Homes pump station. It can be assumed that any other location in the Woodmont Development west of Interstate 93 will have higher available fire flows.

When both the Michels Way pump station and the Mountain Homes pump station were pumping together into the 620 ft AMSL pressure zone (Scenario 5) this mode of operation provided a substantial increase to the available fire flow in all simulated hydrant locations. The results of Scenario 5 indicate that the proposed improvements meet and exceed the target fire flows for Woodmont.

The available fire flow for Home Depot from the proposed tank is slightly less than the target fire flow (Scenario 3). Adding the proposed 12" loops did not increase fire flows at this location (Scenario 6). Neither modeling scenarios included the South Road booster pump station, which was constructed to provide additional emergency flow in the 498 ft AMSL pressure zone. If the South Road booster pump station was also running to support the tank, it can be assumed that the additional 50 gpm shortfall could be achieved and the required fire flows met.

Although the 12" loops did not improve the available fire flow at the Home Depot, the southern main extension will likely improve the available fire flow in the south end of the 498 ft AMSL pressure zone. Further study is necessary to determine the most beneficial location for water main extensions.

Please note that Scenarios 3 and 6 assume that the Michels Way pump station is off. When this pump station is running the available fire flow at the Home depot would likely be reduced. This mode was not evaluated in this report.



6. CONCLUSIONS AND RECOMMENDATIONS

Based on this analysis,

- Improvements are needed to provide the current and future max day demands and fire flow requirements simultaneously.
- The proposed improvements appear capable of meeting the level of service with the proposed Woodmont Commons expansion under certain scenarios evaluated.
- The proposed improvements also increase the level of service in other areas such as the High School and Gilcreast Road.
- This analysis was limited to a hydraulic assessment and did not evaluate the control strategy or water quality. Water quality and control strategies can be evaluated in final design at PEU's request.
- Further evaluation of looping improvements is recommended, including the possible southernmost 12" section of water main in the 498 ft AMSL pressure zone, to improve available fire flow and water quality.

FIGURES

Figure 1 – Londonderry Proposed Water System Improvements

Figure 2 – Woodmont Buildout

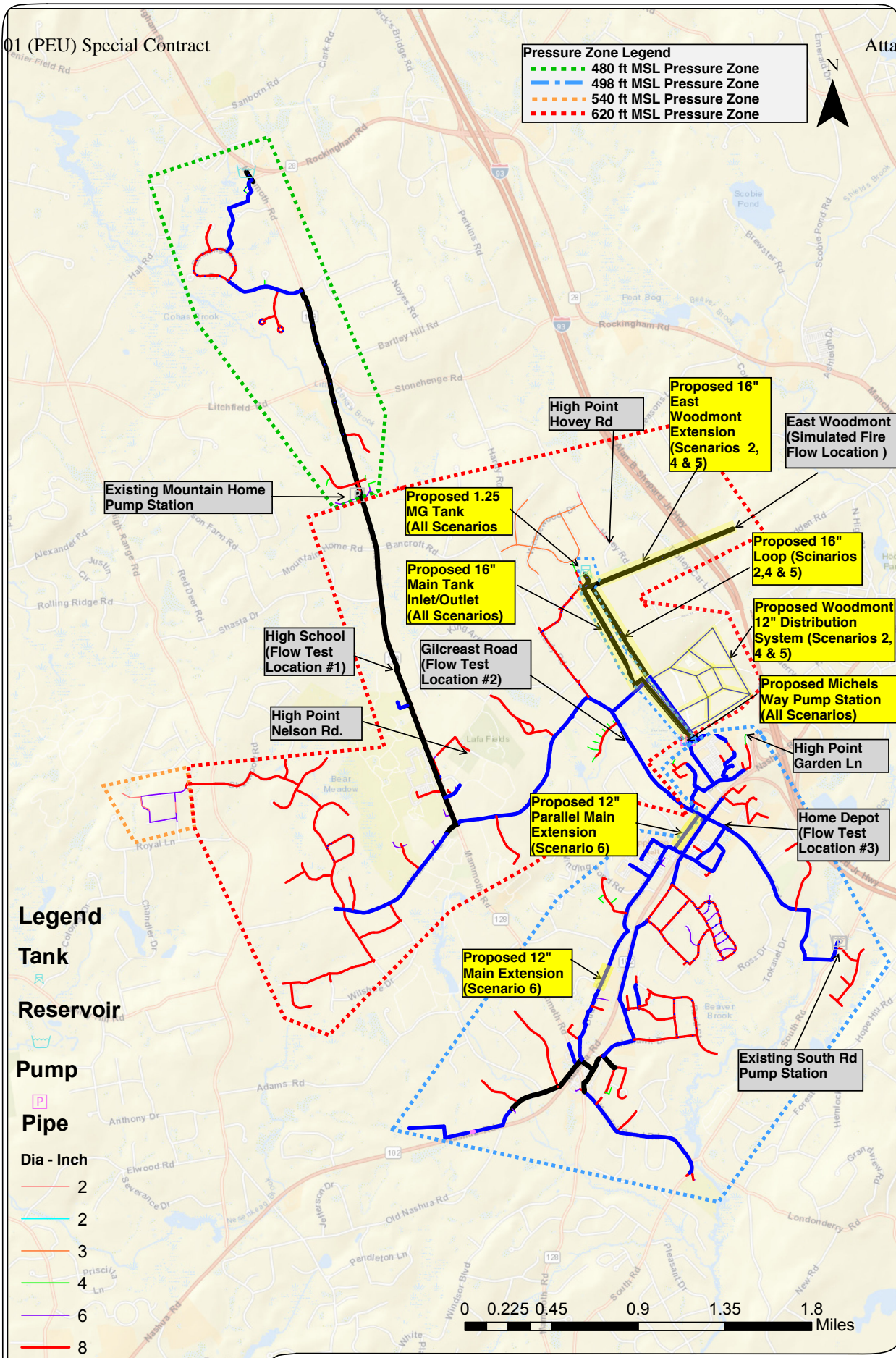
Figure 3 – Proposed Improvements HGL Profile

APPENDICES

APPENDIX A - Londonderry Core Percent Demand by Zone

APPENDIX B - Proposed System Improvements Modeling Data

FIGURES



Pressure Zone Legend

- 480 ft MSL Pressure Zone
- 498 ft MSL Pressure Zone
- 540 ft MSL Pressure Zone
- 620 ft MSL Pressure Zone

Legend

Tank

Reservoir

Pump

Pipe

Dia - Inch

- 2
- 2
- 3
- 4
- 6
- 8
- 12
- 14
- 16

Please Note:
Highlighted pipes
are proposed
improvements

DATE
3/20

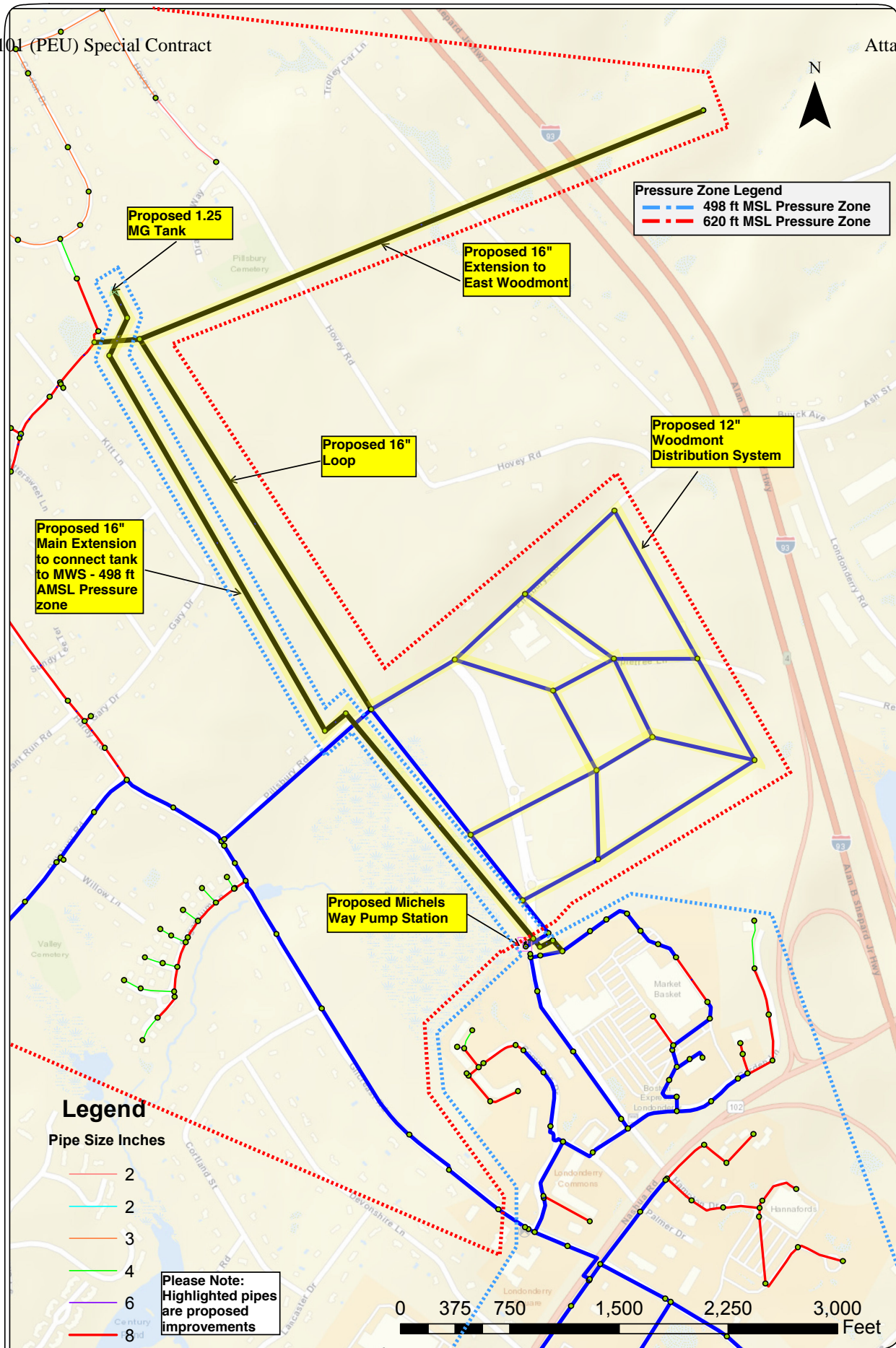
PROJECT
2421

UNDERWOOD
engineers

25 Vaughan Mall, Portsmouth, N.H. 03801
Tel. 603-436-6192 Fax. 603-431-4733

**LONDONDERRY PROPOSED
WATER SYSTEM
IMPROVEMENTS
LONDONDERRY, NH**

FIG.
1



Legend

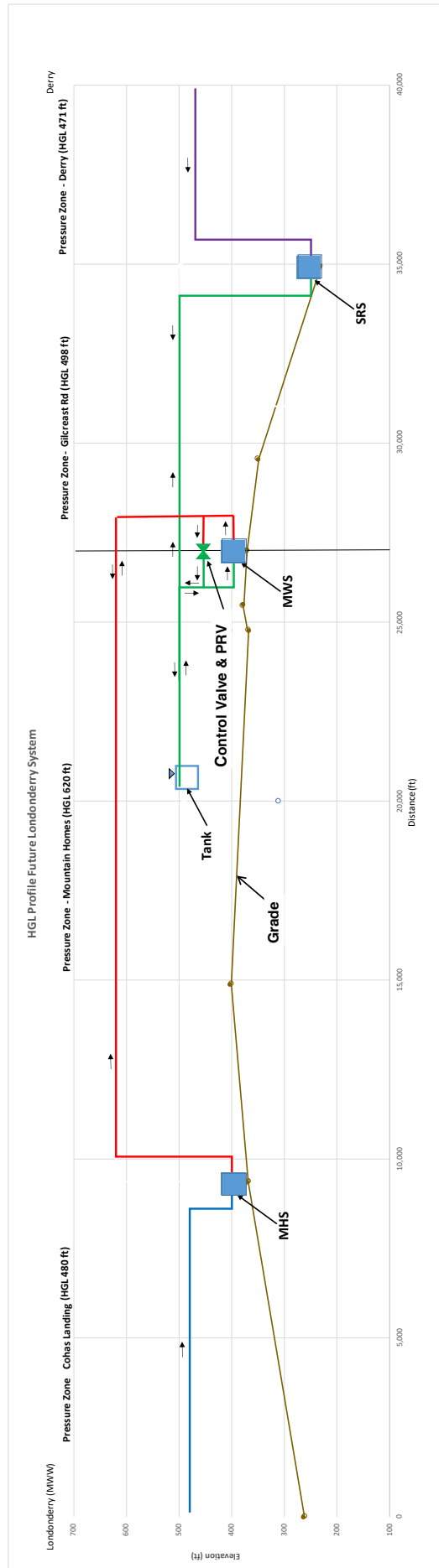
Pipe Size Inches

- 2
- 2
- 3
- 4
- 6
- 8
- 12
- 14
- 16

Please Note:
Highlighted pipes
are proposed
improvements



DATE 3 / 20 PROJECT 2421	 UNDERWOOD engineers	LONDONDERRY PROPOSED WATER SYSTEM IMPROVEMENTS WOODMONT AREA LONDONDERRY, NH	FIG. 2
25 Vaughan Mall, Portsmouth, N.H. 03801 Tel. 603-436-6192 Fax. 603-431-4733			



DATE
3/20

PROJECT
2421



Proposed Improvements
HGL Profile
Londonderry, NH

FIG.

3

APPENDICIES

Appendix A

Londonderry Core Percent Demand by Zone

Demand in CCF	01/2018	02/2018	03/2018	04/2018	05/2018	06/2018	07/2018
Cohas Landing	866	796	1,020	789	825	1,427	2,684
Gilcrest	6,218	5,887	7,546	5,928	6,247	9,375	10,078
Mountain Home Estates	3,961	3,446	4,691	3,502	3,935	5,627	7,026

Demand in Gallons

	01/2018	02/2018	03/2018	04/2018	05/2018	06/2018	07/2018
Cohas Landing	647,855	595,488	763,062	590,251	617,183	1,067,539	2,007,900
Gilcrest	4,651,686	4,404,065	5,645,163	4,434,737	4,673,381	7,013,438	7,539,352
Mountain Home Estates	2,963,224	2,577,953	3,509,337	2,619,846	2,943,774	4,209,559	5,256,151
Total	8,262,765	7,577,505	9,917,562	7,644,834	8,234,337	12,290,535	14,803,403
	275,425.48						

By Percent of Total

	01/2018	02/2018	03/2018	04/2018	05/2018	06/2018	07/2018
Cohas Landing	7.8%	7.9%	7.7%	7.7%	7.5%	8.7%	13.6%
Gilcrest	56.3%	58.1%	56.9%	58.0%	56.8%	57.1%	50.9%
Mountain Home Estates	35.9%	34.0%	35.4%	34.3%	35.7%	34.3%	35.5%
Total	100%	100%	100%	100%	100%	100%	100%

MDF

	Mountain Home Estates	Gilcrest
Gal/month	5,765,607	9,381,922
Gal/Day	185,987.31	302,642.65
MGD	0.19	0.30
Gal/Min	129.16	210.17

08/2018	09/2018	10/2018	11/2018	12/2018	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019
2,850	2,452	1,958	1,415	998	1,017	1,246	998	1,030	1,039	1,727
10,382	11,608	8,904	8,603	6,129	6,290	7,343	6,503	6,355	6,376	8,775
6,955	6,399	5,564	5,029	3,711	4,071	4,678	3,875	3,791	3,817	5,309
<u>08/2018</u>	<u>09/2018</u>	<u>10/2018</u>	<u>11/2018</u>	<u>12/2018</u>	<u>01/2019</u>	<u>02/2019</u>	<u>03/2019</u>	<u>04/2019</u>	<u>05/2019</u>	<u>06/2019</u>
2,132,085	1,834,341	1,464,780	1,058,562	746,604	760,818	932,133	746,604	770,543	777,276	1,291,969
7,766,774	8,683,945	6,661,082	6,435,904	4,585,105	4,705,549	5,493,298	4,864,894	4,754,176	4,769,886	6,564,578
5,203,036	4,787,092	4,162,428	3,762,195	2,776,199	3,045,515	3,499,612	2,898,888	2,836,047	2,855,498	3,971,663
15,101,895	15,305,378	12,288,291	11,256,661	8,107,908	8,511,882	9,925,043	8,510,386	8,360,766	8,402,659	11,828,209
<u>08/2018</u>	<u>09/2018</u>	<u>10/2018</u>	<u>11/2018</u>	<u>12/2018</u>	<u>01/2019</u>	<u>02/2019</u>	<u>03/2019</u>	<u>04/2019</u>	<u>05/2019</u>	<u>06/2019</u>
14.1%	12.0%	11.9%	9.4%	9.2%	8.9%	9.4%	8.8%	9.2%	9.3%	10.9%
51.4%	56.7%	54.2%	57.2%	56.6%	55.3%	55.3%	57.2%	56.9%	56.8%	55.5%
34.5%	31.3%	33.9%	33.4%	34.2%	35.8%	35.3%	34.1%	33.9%	34.0%	33.6%
100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	<u>07/2019</u>	<u>08/2019</u>	<u>09/2019</u>
	2,002	3,819	3,022
	8,595	12,541	9,228
	5,221	7,707	6,045
	<u>07/2019</u>	<u>08/2019</u>	<u>09/2019</u>
	1,497,696	2,856,994	2,260,758
	6,429,920	9,381,922	6,903,467
	3,905,830	5,765,607	4,522,265
	11,833,446	18,004,523	13,686,490
	<u>07/2019</u>	<u>08/2019</u>	<u>09/2019</u>
	12.7%	15.9%	16.5%
	54.3%	52.1%	50.4%
	33.0%	32.0%	33.0%
	100%	100%	100%

Appendix B - Proposed Improvements Modeling Data

Location: Londonderry, NH

Client: PEU

Job No: 2421

Date: 3/30/2020

Pressure Zones

- Cochas Landing (480 HGL)
- Mountain Homes (620 HGL)
- Gilcrest Road (498 HGL)
- Core Mountain Homes (HGL = 540) – Feed from 620 Zone through PRV)

Base Demands – Existing

- Average Day Demands
 - 620 zone = 86 gpm
 - 498 zone = 139 gpm
- Maximum Day Demands
 - 620 zone = 129 gpm
 - 498 zone = 210 gpm
- Demand Pattern = Constant Demand per Existing Model

Base Demands – Projected Future Woodmont Buildout

- Average Day Demands
 - 620 zone = 282 gpm
 - 498 zone = 139 gpm
- Maximum Day Demands
 - 620 zone = 511 gpm
 - 498 zone = 210 gpm
- Fire Flow Demands =
 - 620 zone = 3,500 gpm
 - 498 zone = 2,500 gpm
- Demand Pattern = Constant Demand per Existing Model

MWW Supply: Fixed Head Reservoir

- Elevation = 476.5 ft (Londonderry Tank Overflow = 480.8 ft.)

Derry Supply (Alternate Emergency): Fixed Head Reservoir

- Elevation = 466 (Derry Tank Overflow = 471 ft.)

Proposed Ground Level Tank: Reservoir Style Tank (Complete Mix)

- Base Elevation = 467.00 ft.
- Overflow = 498.00 ft.
- Diameter = 82 ft – 10-inch
- Tank Height = 35 ft.
- Tank Volume = 1.25 MG
- Water main from tank to MWS =
 - Size = 16-inch DI
- High Water Level = 497.5 ft.
- Operating Band = 5 ft (assumed)

Mountain Homes Station (MHS) (four Pumps)

- 2 Low Flow Pumps
 - Elevation = 370 ft
 - Multiple point curve
 - Design Flow = 300 gpm
 - Design Head = 215 ft.
 - Variable Speed Control by Discharge Pressure = (620 HGL)
- 2 High Flow Pumps
 - Multiple point curve
 - Design Flow = 900 gpm
 - Design Head = 235 ft
 - Variable Speed Control by Discharge Pressure = (620 HGL)

South Road Station (SRS) (Two Pumps)

- 2 Flow Pumps
 - Elevation = 232 ft
 - Multiple point curve
 - Design Flow = 650 gpm
 - Design Head = 200 ft.
 - Variable Speed Control by Discharge Pressure = (513 HGL Observed)

Proposed Michaels Way Station (MWS)

- Elevation = 372 ft
 - Variable Speed Control by Discharge Pressure = (620 HGL Observed)
 - Serves the 620 Zone only

Control Valves

- Gilcrest Rd PRV (498 HGL) (Removed from Service and replaced with a closed isolation valve)
- Michaels Way Control Valve: Open to fill tank from MHS, shut when not filling tank
 - PRV Pressure setting = 60 psi

General

- C-values from the Town’s existing model C = 110 for existing pipes and 130 for new pipes
- Pipe material = DIP, PVC, UNK, COP
- Pipe size range 2,3,4,6,8,12 and-16-inch

Scenario #1

- **Pressure Zone** = 620 ft AMSL
- **Pump Stations**
 - MHS = Off
 - MWS = On
- **Demands**
 - Existing MDF = 129 gpm
- **Proposed Improvements in Model**
 - Baseline Improvements

MWS on at 620 HGL	Available Fire Flow at 20 psi min in Zone	Pump Flow	Pump TDH
Scenario 1 (Existing)	gpm	gpm	ft.
MDF	-	129	127
MDF + FF at High School	2,186	2,315	149
MDF +FF at Gilcrest	2,873	3,002	162

Limiting Node = High Point on Nelson Rd (EL = 438 ft)

Limiting Node = High Point on Hovey Rd (EL = 490 ft)

Scenario #2

- **Pressure Zone** = 620 ft AMSL
- **Pump Stations**
 - MHS = Off
 - MWS = On
- **Demands**
 - Future MDF = 511 gpm
- **Proposed Improvements in Model**

- Baseline Improvements
- 16” East Woodmont Extension
- 16” Loop

MWS on at 620 HGL	Available Fire Flow at 20 psi min in Zone	Pump Flow	Pump TDH
Scenario 2 (Woodmont)	gpm	gpm	ft.
MDF	-	511	128
MDF + FF at Woodmont	3,100	3,611	174

Limiting Node = High Point at end of Garden Ln near Park and Ride (EL = 408)

Scenario #3

- **Pressure Zone** = 498 ft AMSL
- **Pump Stations**
 - SRS = Off
- **Demands**
 - **Future MDF** = 210 gpm
- **Proposed Improvements in Model**
 - Baseline Improvements

MWS off	Available Fire Flow at 20 psi min in Zone
Scenario 3 (Tank Serves 498 Zone)	gpm
MDF + FF at Home Depot	2,450

Limiting Node = High Point at end of Garden Ln near Park and Ride (EL = 408)

Scenario #4

- **Pressure Zone** = 620 ft AMSL
- **Pump Stations**
 - MHS = Off
 - MWS = On
- **Demands**
 - **Future MDF** = 511 gpm
- **Proposed Improvements in Model**
 - Baseline Improvements
 - 16” East Woodmont Extension
 - 12” Woodmont Distribution Network

o 16" Loop

MWS on at 620 HGL	Available Fire Flow at 20 psi min in Zone	Pump Flow	Pump TDH
Scenario 4 Woodmont Loop	gpm	gpm	ft.
MDF + FF at High School	2,422	2,933	159
MDF +FF at Gilcreast	2,717	3,228	165
MDF + FF at Woodmont	3,100	3,611	174

Limiting Node = High Point on Nelson Rd (EL = 438 ft)

Limiting Node = High Point at end of Garden Ln near Park and Ride (EL = 408)

Limiting Node = High Point at end of Garden Ln near Park and Ride (EL = 408)

Scenario #5

- **Pressure Zone** = 620 ft AMSL
- **Pump Stations**
 - o **MHS** = On at 800 gpm
 - o **MWS** = On
- **Demands**
 - o **Future MDF** = 511 gpm
- **Proposed Improvements in Model**
 - o Baseline Improvements
 - o 16" East Woodmont Extension
 - o 12" Woodmont Distribution Network
 - o 16" Loop

MWS on at 620 HGL	Available Fire Flow at 20 psi min in Zone	Micheals Way Station		Mountain Homes Station	
		Pump Flow	Pump TDH	Pump Flow	Pump Discharge HGL
Scenario 5 Mountain Homes Back Up	gpm	gpm	ft.	gpm	ft.
MDF + FF at High School	3,222	2,933	159	800	485
MDF +FF at Gilcreast	3,517	3,228	165	800	590
MDF + FF at Woodmont	3,900	3,611	174	800	604

Limiting Node = High Point on Nelson Rd (EL = 438 ft)

Limiting Node = High Point at end of Garden Ln near Park and Ride (EL = 408)

Limiting Node = High Point at end of Garden Ln near Park and Ride (EL = 408)

Scenario #6

- **Pressure Zone** = 498 ft AMSL
- **Pump Stations**
 - **SRS** = Off
- **Demands**
 - **Future MDF** = 210 gpm
- **Proposed Improvements in Model**
 - Baseline Improvements
 - 12” Main Loops

MWS off	Available Fire Flow at 20 psi min in Zone	
Scenario 6 (Tank Serves 498 Zone + Minor Looping Added)	gpm	
MDF + FF at Home Depot	2,450	Limiting Node = High Point at end of Garden Ln near Park and Ride (EL = 408)

MEMO REPORT

Date: September 8, 2020

From: Douglas W. Brogan, P.E.**To:** Jayson Laflamme, Asst. Director, Gas & Water Division, NHPUC**Re:** DW 18-101 Pennichuck East Utility, Inc.
Petition for Approval of Special Contract Regarding Woodmont Commons

I am writing this memo report as an engineering consultant to the Gas-Water Division to summarize my findings in the above-referenced docket, which is a request by Pennichuck East Utility, Inc. (Pennichuck, PEU or company) for approval of a special contract with Pillsbury Realty Development, LLC (Pillsbury) to allow cost sharing for the construction of water facilities to serve Pennichuck's Londonderry core system (LCS), including Pillsbury's proposed Woodmont Commons development (Woodmont) in that town. Woodmont Commons is a 600-plus acre mixed-use development to be constructed over the next ten or more years.

Three options have now been presented by Pennichuck to address anticipated needs in the LCS. Those options, and a brief procedural background, are described later in this memo. My review is limited primarily to the engineering and operational aspects of the three alternatives, although I will also touch briefly on a few aspects of their respective costs. My review is based on material filed, and discovery in, the docket, but also includes limited material in related dockets, minutes of the Londonderry Zoning Board of Adjustment, newspaper articles, and information available from the Department of Environmental Services (NHDES) website.

A. System Description

The LCS includes four separate pressure zones, as identified by their respective pressure head elevations (in feet MSL) below.

480 Zone

This zone serves a mixed customer base along Rte 128/Mammoth Rd from Rte 28/Rockingham Rd southerly to the Mountain Home Estates (MHE) pump station. It receives water directly from Manchester Water Works (MWW) at MWW pressures, via a meter pit near Rte 28.

620 Zone

This zone serves a largely residential customer base from the MHE pump station southerly, both east and west of Mammoth Road; but also includes four Londonderry public schools, the Londonderry town hall and other municipal facilities, and all proposed Woodmont development. Its sole current source of supply is the MHE pump station.

540 Zone

This zone serves a small residential development to the west of Mammoth Road, receiving its water from the 620 Zone, and is considered incidental for the purposes of this report.

498 Zone

This zone serves the area southwest of I-93 exit 4, including the largely commercial development along Rte 102. It receives its water primarily from the 620 Zone, but also has emergency/backup capability from the town of Derry.

The 480 Zone rides directly off MWW storage and acts as the primary source for the two main elevated pressure zones (620 and 498). Apart from the Derry emergency connection (Derry rates are roughly double those of MWW, Staff 4-25 c), the entire system of pressure zones is linear, with each zone supplied solely by the previous one. There is no storage anywhere within the LCS itself. Given this overall situation, the 620 and 498 zones are the ones of chief significance in the analysis of alternatives for the LCS.

B. Need for Improvements

Looking at LCS demands over the next ten years, Pennichuck's original June 2018 filing indicated the following average day demands in gallons per day (testimony of John J. Boisvert, Attachment JJB-A, p. 1):

Existing LCS demand:	382,402
Additional Future (non-Woodmont) LCS demand:	89,616
Anticipated Woodmont demand:	<u>405,488</u>
Total	877,506

Although some of the numbers are slightly dated, the relative impacts of Woodmont are clear. As a result, a January 9, 2018 letter from Richard Skarinka of NHDES (Attachment JJB-B to the same testimony) imposed a limitation on Woodmont development, stating that "New development cannot be approved until an agreement is reached and PEU can confirm sufficient flow and pressure is available." (p. 3)

Pennichuck subsequently engaged Underwood Engineers, Inc. (UEI) to study certain aspects of the LCS in more detail to better assess current and future demands and system capacity. A study dated

January 29, 2020 (Boisvert March 2020 Attachment JJB-E) indicated the system is somewhat more deficient than previously understood in terms of its ability to meet even current domestic demands and fire flows, further supporting the need for improvements. See Boisvert 2020 testimony p. 5, lines 15-23; Staff 3-1 a; Staff 4-18 a.

As alluded to above, Pennichuck's analysis of the physical impact of alternatives is based on a 10 year planning period - relatively short for such facilities. However, given the relative impact of Woodmont, which will account for nearly half of all demand in the LCS at time of completion, aligning the review period with the time frame of anticipated buildout of that development is reasonable. See Staff 4-13 a.

C. Improvements Options

As noted above, Pennichuck has presented three options to address present and future needs in the LCS. The first two (Options 1 and 2) were described in the original filing in June 2018. A third, which I will call Option 2A, was introduced in a March 2020 filing, as further described below. The three options are:

- Option 1: Upgrade MHE Pump Station and Upstream Mains
- Option 2: Elevated Tank (Original Tank Option)
- Option 2A: Ground-Level Tank, Transmission Main, Booster Station (New Tank Option)

Commission Order 26,285 (August 9, 2019) approved a special contract anticipating construction of Option 2 over Option 1. However, the elevated tank proposal was denied by the Londonderry Zoning Board of Adjustment in September 2019, and Pennichuck is now proposing a different tank option (2A) with a lower tank to meet zoning requirements.

The original tank option would have served the higher 620 Zone directly (and 498 Zone indirectly via a pressure reducing valve). Option 2A would reverse that service, with the ground-level tank connected to and supplying the 498 Zone directly via the proposed 16-inch transmission main, and supplying the 620 Zone indirectly via pumping by the proposed booster station. A comparison of various facets of the respective projects are presented in the table at the end of this section.

It should be noted that a transmission main was associated with the original tank option as well, which was the source of some potential confusion. The main in Option 2 would have remained solely within the 620 Zone. Although not introduced until later in the case (April 2019 testimony of Larry D. Goodhue p. 7, line 16 through p. 8, line 3), its various facets were defined over time:

- Diameter: 16" (Goodhue testimony p. 7, line 19)
- Length: 3,800' (Attachment to Staff Tech 2-2, Exhibit A)

- Location: “from the Water Storage Tank through the area of Woodmont Commons north of Pillsbury Road (or an alternate route as may be mutually agreeable) to PEU’s existing water main at the intersection of Pillsbury Road and Michels Way.” (Goodhue Attachment LDG-A, pp. 3-4, para. 4. d.) (The response to Staff 3-12 a. described the cost benefits of routing the main directly through Woodmont property.)
- Purpose: Initially, a “necessary” (Staff 3-1 b. iii.) “primary interconnection main” (Staff Tech 2-9) “to allow the tank to fully meet and supply water to PEU’s existing and future customers, as well as Pillsbury...” (Staff Tech 2-9, May 2019). Perhaps as a result of continuing review by UEI and others, the focus of the primary function of the main later shifted somewhat such that the main “would have directly served the Woodmont development. It would have had new Woodmont Commons customers connected to it and was needed to deliver the necessary fire flow in the commercial areas of the Woodmont Commons development that were in the 620 pressure zone.” (Staff 4-5, May 2020)
- Cost: \$444,600 (Attachment to Staff Tech 2-2, Exhibit A).

There also appeared to be some evolution in the company’s thinking regarding the timing of this main, had the elevated tank option been pursued. It was initially introduced as the subject of a separate, future special contract to “be filed for Commission approval before the water main is constructed. PEU and Pillsbury do not yet have an estimated date for that filing” (Goodhue testimony p. 8, lines 2-3, April 2019); and was described as a “one and future need” (Staff Tech 2-9, May 2019). However, the company later indicated the main would have been an immediate need (“Under the elevated tank option, the main referenced would have to be constructed right away in order to connect the tank to the LCS and achieve the fire flow in the Woodmont Commons development.” Staff 4-24 a, May 2020). This main and evolution in thinking is discussed further in the cost section below.

The issue of pressure reducing valves (PRV’s) merits brief comment as well. Currently a single PRV on Gilcreast Road provides the sole feed from the 620 Zone to the 498 Zone, apart from the Derry emergency connection. That PRV is in deteriorated condition and, in an effort related to but independent of Options 1 and 2, was slated for replacement. Addition of a second PRV on Michels Way was also contemplated (opportunistically as part of a developer main extension) for redundancy purposes. Option 2A will include a new PRV inside the new booster station and, due to the redundancy provided by the new ground-level tank, will allow the Gilcreast Road PRV to be abandoned. (See Boisvert testimony p. 45 in PEU QCPAC docket DW 19-035, and responses to Staff 4-4 and 4-5 in that docket; Boisvert testimony pp. 13-15 in PEU QCPAC docket DW 20-019; and response to Staff 4-21 in the instant docket.)

The following is a table of some of the various components of the three improvements options (indicated costs are discussed in the next section):

	<u>Option 1</u> Upgrade MHE Pump Station & Upstream Mains	<u>Option 2</u> Elevated Tank, 16" Main	<u>Option 2A</u> Ground-Level Tank, 16" Main, Booster Station
Date Initially Filed	Jun 2018	Jun 2018	Mar 2020
Tank Volume		1.1 MG	1.25 MG
Usable Tank Volume		1.1 MG	1.1 MG
Tank Type		Steel w/ Concrete Pedestal	Precast Prestressed Concrete
Tank Height		156	35
Pressure Zone Directly Served by Tank		620	498
Length of 16" Main		3800	6300
Length of 24" Main	8400		
Water Main Cost 2017	\$2,100,000	\$444,600	
Water Main Cost 2020			\$787,500
Water Main Included in Capital Cost?	Yes	No	Yes
Feeds to 620 Zone	1	1 + Tank	2
Feeds to 498 Zone	1 + B/U*	1 + B/U*	1 + Tank + B/U
Cost of Tank Itself 2017		\$2,500,000	
Cost of Tank Itself 2020			\$1,000,000
Overall Capital Cost 2017	\$3,100,000	\$2,835,000	
Overall Capital Cost 2020 Before Discovery		\$3,400,000	\$3,152,000
NPV Before Discovery (PEU Costs Only)		\$2,377,182	\$2,425,677
Overall Capital Cost 2020 After Discovery		\$3,118,500	\$3,152,000
NPV After Discovery (PEU Costs Only)		\$2,239,247	\$2,065,765

* Adding a second feed (Michels Way PRV) was contemplated by PEU; B/U = Derry emergency back-up connection.

D. Costs

As noted above, Pennichuck originally advocated for, and Staff and the Commission ultimately supported, Option 2 over Option 1; and the company now proposes Option 2A over Option 2. The company has provided cost and other comparisons within each pair of options. However, the cost of the 16-inch main associated with Option 2 was not included in either set of comparisons.

It is clear from company testimony and discovery that PEU originally anticipated the main to be a shared cost with Pillsbury (referring to this main, the company indicated “We are just putting the Commission on notice of this known and anticipated activity that will require Commission approval, and will be requested in a similar cost sharing arrangement as this Special Contract, with regards to all estimated construction costs, inclusive of the CIAC tax.” Staff Tech 2-10, May 2019). Similar to the evolution in thinking regarding the purpose and timing of the main noted earlier, the company’s view of cost responsibility appears to have evolved as well, with the company stating in May 2020 that “The cost of the new main was to be that of Pillsbury” (Staff 4-24 b). Assuming the latter to be the case as the result of the continuing review and negotiations between PEU and Pillsbury, the cost of the main would not have impacted PEU.

Regarding Option 1, it is worth noting that, if anything, the high-level cost estimates for that option may have been underestimated due in part to the need for the upgraded MHE pump station to meet all instantaneous flows in the absence of any storage in the system (Staff 4-14 a). If a comparison were made today, those estimates would also have increased due to inflation, similar to those of Option 2 (see table above).

In the above regards, previous Staff and/or Commission conclusions regarding the cost advantages of Option 2 over Option 1 are unaffected.

As noted above, the company’s March 2020 filing provided cost comparisons between new and old tank options (2A and 2, respectively). Although the cost of the Option 2A ground-level tank itself is significantly less than that of the elevated tank, the associated Option 2A booster station and transmission main offset that savings. The company also provided a 20-year net present value (NPV) analysis that additionally factored in ongoing maintenance and replacement costs to PEU of each option (PEU proposes to pay 49% of initial capital costs, but will be responsible for all maintenance and replacement costs once the facilities are constructed). The filing indicated the Option 2A capital cost was less, but its overall NPV or lifecycle cost slightly more, than Option 2 (actual dollar amounts are presented in the table above). However, Staff discovery resulted in two substantive changes:

- 1) The updated capital cost (from 2017 to 2020) of Option 2 was corrected downward from \$3,400,000 to \$3,118,500 (Staff 4-3).

- 2) After further review, the additional annual pumping costs (electricity) of Option 2A over Option 2 were revised downward from \$32,675 to \$8,153 (Staff 4-11 f). This is an estimate of the amount of water that would have to be double-pumped under Option 2A (pumped once by the MHE station up into and through the 620 Zone to the new tank in the 498 Zone, then re-pumped back up into the 620 Zone by the new booster station at certain times of the day).

Incorporation of the above changes yields an Option 2A capital cost that is marginally more, but an overall NPV result that is slightly less, than that of Option 2.

Although an attempt was made by PEU at a very detailed analysis, the numbers are of necessity approximations based on a number of assumptions, including even things such as the actual time frame of Woodmont buildout and the extent of distribution upgrades upstream of the MHE station over time. It is probably safe to say the analyses indicate the costs of Options 2 and 2A are comparable.

It should be noted that eliminating the need for the Gilcreast Road PRV upgrade, although the upgrade was not technically part of Option 2, is in essence a cost savings under Option 2A. The most recent cost estimate for that work was \$140,000 (Staff 4-4 in DW 19-035).

E. Operational Comparison of Options

Many of the operational and other issues related to Options 1 and 2, such as demand projections, analysis of fire flow requirements, resulting cost allocations between PEU and Pillsbury, comparison of improvements with and without Woodmont, and the respective advantages of each option, were addressed prior to or in Order 26,285 and will not be revisited here. My primary focus will be on a comparison of the more recent Option 2A to the previous Option 2. I will also offer a few summary comments on Option 1.

The following table, taken primarily from a March 30, 2020 UEI report (Attachment Staff 4-27, p. 3 at bottom; future non-Woodmont flows are extrapolated from information provided in a January 29, 2020 UEI report, Boisvert 2020 Attachment JJB-E, p. 4 at bottom), gives a sense of the relative size of the two main pressure zones involved. Current domestic (non-fire) demand is split approximately 38% / 62% between the 620 and 498 zones, respectively. However, as all future Woodmont development will occur within the 620 Zone, the relative proportions would be reversed, to about 67% / 33%. Required fire flows will be higher in the 620 Zone as well.

**Maximum Daily Flows & Fire Flows
(Gallons per Minute)**

	620 <u>Zone</u>	498 <u>Zone</u>	<u>Total</u>
Existing LCS	129	210	339
Future LCS (non-Woodmont)	32	52	84
Total	161	262	423
Percent by Zone	38%	62%	
Future Woodmont	382	0	382
Total Future LCS	543	262	805
Percent by Zone	67%	33%	
Future fire flow requirement	3500	2500	

A system lacking storage (such as the LCS) is not only atypical but misses out on certain key advantages: storage buffers peak demands, provides fire flows, provides a degree of backup when something else fails, involves no moving parts, and generally offers the highest degree of reliability.

Storage in the highest pressure zone (620 in this case), where water can flow by gravity to the rest of the system - and where the highest demands will also occur in this instance - is preferable. The January UEI report affirms this, ranking Option 2A behind Option 2 conceptually by noting that:

Ground level storage and pumping provides similar benefits to elevated storage but at a higher capital and operation and maintenance costs [sic], and with less system reliability because there are more single points of failure. (p. 8 at bottom)

PEU's analyses have indicated, however, that capital and O&M costs will be comparable between the two tank options (the higher O&M costs associated with Option 2A are countered by the cost of needing to periodically recoat the elevated steel tank, both internally and externally; the ground-level tank does not need recoating). Option 2A does, however, have more components (pumps and other equipment) that can fail, essentially by adding a booster station to the mix. Several factors outlined below help ameliorate this deficiency.

The new booster station will:

- 1) Provide a second feed into the 620 Zone (doubling the number of existing feeds). That second feed will be from a separate facility located at the opposite end of the 620 Zone from the MHE station, creating significant redundancy.
- 2) Be located at the 620/498 boundary but able to draw directly from the ground-level tank, thereby providing almost all the benefits to the 620 Zone that direct system storage in that zone would offer.
- 3) Be “in close proximity to where maximum emergency fire flows are required” in the Woodmont development (Boisvert 2020 testimony p. 10, lines 18-22).
- 4) Be located where necessary 3-phase power can readily be obtained (Boisvert 2020 testimony p. 10, lines 15-17).

The proposed tank site (the same as in Option 2, on a lot owned by PEU) is nearly perfectly situated elevation-wise for Option 2A (Staff 4-20). The terrain drops off nearly 100' from the tank site to the booster station site. The fact that the ground-level tank will serve the 498 Zone directly is an ideal situation for that zone.

However, Option 2A offers one significant advantage that Option 2 does not: the ability to provide water from a second source (Derry) to the 620 Zone in an emergency. This is important because there is currently no means to pump water from the 498 Zone up into 620 Zone. Although Option 2 is a more typical scenario and its elevated tank would carry the system for some amount of time following a disruption of service, the 620 Zone could nonetheless find itself without a source of supply for reasons including a main break up- or downstream of the MHE station; failure of components in the station or having it taken offline for repairs, replacements, or upgrades; contamination in the MWW system (or portions of the LCS); or any other interruption of flow from MWW.

From a purely engineering perspective, Option 1, while technically possible, is neither preferable nor typical. It allows no buffering of demands and provides very limited backup capability. Pumps must ramp up and down to meet instantaneous flows, creating pressure swings (Staff 3-4). This is both inefficient and problematic now, and will be more-so as the system grows. Option 1 has the most single points of failure and least resilience. The current MHE pump station is a visibly small, stand-alone station essentially providing the sole service to the entire 620 and 498 Zones. Although with Woodmont development the station would grow (double in size, Staff 1-1), the overall concept would remain the same. Another potential Achilles heel is that PEU's contract with MWW requires MWW to provide only 750 gallons per minute (gpm) of fire flow (Attachment Staff 1-4, para. 201.3.1). If the ability of MWW to provide adequate flows were to reduce due, for example, to a large customer connecting to MWW upstream of the Rte 28 meter pit, but remain above 750 gpm,

it is conceivable PEU would have to pay to upgrade MWW's facilities to provide the needed flows (Staff 4-19). This concern is nearly eliminated if storage is added to the LCS.

Option 2A is a somewhat unusual yet creative alternative to Option 2. While on the surface it is a less desirable option because it introduces additional components that can fail, its unique features also eliminate other significant single points of failure under a slightly longer term interruption of service, in the ultimately higher-demand 620 Zone, compared to Option 2. NHDES has indicated its support for the Option 2A concept (letter from Richard Skarinka, April 16, 2020). If I were required to rank the three options operationally, Options 2 and 2A would probably be comparable (both very good to excellent), with Option 1 a distant third.

F. Conclusion

The request to approve a special contract anticipating construction of Option 2A appears reasonable.