

December 12, 2019
W-P Project No. 20174A

Sid Hazelton, PE
Auburn Water & Sewer Superintendent
P.O. Box 414
Auburn, ME 04212-0414

Subject: Response to Questions Regarding Proposed Route 26 and Route 122 Water and Sewer
Main Extensions
Poland, Maine

Dear Mr. Hazelton:

We are responding to your request for additional information regarding the Town of Poland's proposal to extend water and sewer from the South Village system. It is our understanding that the responses will be presented to your Board for review and as a condition of approval of the proposal. In general, the essence of your request is to demonstrate that the proposed water extensions and related water demands will not have an adverse effect on the Poland or Auburn water system, or existing customers currently connected to the Poland water system.

The following details our evaluation of the conditions noted in your November 19, 2019 letter, a copy of which is attached for reference.

Water System Design Criteria

The existing Poland water system was designed to serve the South Village area which included all businesses and residents along Route 122 to Empire Road, and all businesses and residents along Route 26 north and south of the immediate area from the intersection of Routes 122 and 26.

During the design of the original system, Poland and Auburn Water & Sewer District (AWSD) officials selected an average day demand (ADD) of 60,000 gallons per day (gpd) and a maximum day demand (MDD) of 100,000 – 115,000 gpd (or 70-80 gallons per minute (gpm)) as the design criteria for the system.

In addition, it was determined that a capacity of 1,500 gpm would be used as the fire flow design criteria that the system should be capable of providing anywhere in the system at a residual pressure of 20 psi.

Pump Station

The existing pump station was designed to boost water from AWSD's existing water system located at Empire Road and Route 122 to a new storage tank to be designed and constructed at the Poland Springs Resort. For a pump and storage system such as Poland's, water supply pump stations should be designed to pump the full range of expected and projected demands up to the MDD of the system. Demands greater than the MDD are provided from equalization storage.



The pump station includes three pumps each having a design capacity of 80 gpm. Two pumps serve as duty pumps and the third is a back-up. And with two pumps in operation, the station has a capacity of approximately 150 gpm. This demand was confirmed to have no impact on the AWS D water system.

Water Storage Tank

Water storage is provided to supply demands in the system above the maximum capacity of the pumping system(s), for firefighting purposes and in some instances, storage includes an allocated volume for emergency purposes, typically when there is no back-up power for pumping systems.

Poland's water storage tank was designed for equalization volume plus fire-fighting volume; emergency volume was not included because the pump station included a dedicated emergency generator to power the pump station in the event of primary power loss. The total tank volume is approximately 318,000 gallons assuming a full tank from finish floor to overflow. Assuming a maximum operating water level 1-foot below overflow, the available volume is approximately 305,000 gallons.

The categories of storage in the total tank volume included 100,000 gallons for equalization and 180,000 gallons for fire volume leaving approximately 25,000 – 30,000 gallons as a buffer/contingency depending upon how the tank is operated. Typically, equalization storage volume only includes approximately 25-30% of the projected MDD – in Poland's case, the design included nearly an entire day of MDD or 100,000 gallons. Fire volume was sized based on the requirements of the Insurance Services Organization (ISO) requirements which for a target fire flow of 1,500 gpm requires two hours of total volume equal to 180,000 gallons. In summary, the tank design for the Poland system was very conservative.

Existing System Conditions

AWS D provided total annual consumption data for 2018 and 2019 for the Poland water system which is presented in Table 1.

Table 1
2018-2019 Average Day Water Use
Poland Water System

Year	Water Sold (MG)	Bleeder Use (MG)	Total (MG)	Average Day Demand (gpd)
2018	4.2	12.1	16.3	44,665 ¹
2019	3.8	9.9	13.7	37,460

¹used for analysis.

AWS D does not record daily water use and therefore the MDD had to be estimated. Based on the design criteria, the ratio of the ADD to MDD was 1.91 (115,000 gpd/60,000 gpd). For estimating actual MDD, we assumed an MDD/ADD of 2 which is typical for systems of this size. On this basis, the MDD of the



system over 2018-2019 was estimated to be 89,330 gpd of which approximately 66,000 gallons or nearly 75% of the demand is attributed to bleeders.

The AWSD operates the water storage tank over a range of 11 feet between 12 feet and 23 feet of water elevation which is greater than would normally be required. This procedure is employed to promote turnover in the tank and reduce water age.

Evaluation

The proposed water main extensions along Route 122 and Route 26 are being designed primarily to serve two major businesses, Old Castle Lawn & Garden (Route 122) and Shaker Hill Nursery (Route 26) respectively, plus residential customers abutting the mains. Based on the requested MDD of each business, plus a nominal number of residential customers, we have projected a MDD of 11,125 gpm for the Route 122 water main extension and 8,225 gpd for the Route 26 extension for a total MDD added to the system from both extensions of 19,350 gpd. In addition, Old Castle has requested that the water main have the capacity to supply up to 1,000 gpm for firefighting.

Pumping

The existing MDD demand plus projected MDD totals 108,860 gpd. Of that, approximately 60% would be allocated to bleeders. Our assumption is that the bleeder volume would be reduced as the new service is brought online. On this basis, the existing pump station will not be impacted by the added demand.

Storage

As noted, the tank was designed with a fire storage volume equal to 1,500 gpm for 2 hours. Only Old Castle Lawn & Garden has requested capacity for firefighting purposes in amount of 1,000 gpm. On this basis, the tank has adequate capacity to supply Old Castle Lawn & Garden during a fire.

Based on the current tank operational setpoints, the water elevation falls to 12 feet or EL. 614 before starting the pump station to refill the tank. At EL. 614, there is approximately 159,000 gallons remaining in the tank. If there was a fire when the tank is at EL. 614, there would be insufficient volume remaining to supply 1,500 gpm for 2 hours.

Therefore, we recommend that the tank operational setpoints be modified to ensure there is always adequate fire volume in the tank. Per the original design, the highest elevation proposed to be served was 540 feet. To provide a minimum service pressure of 35 psi to this location, the operational elevation of the tank should be no less than EL. 620 or 18 feet. If a fire were to occur when the elevation is at 620 feet, there would be adequate fire volume remaining plus a buffer. If the AWSD finds that the highest elevation currently being served is lower than 540 feet, the low level setpoint of the tank can be adjusted accordingly.

Summary

Based on the proposed demands of the Route 122 and Route 26 water main extensions, the existing Poland pump station and storage tank have adequate capacity to accommodate the proposed water main projects particularly in light that very few customers have been added to the existing system.



We trust that this information addresses your concerns. Should you have any questions, feel free to contact Rob Williamson (207) 523-1403 or at rob.williamson@wright-pierce.com.

Sincerely,
WRIGHT-PIERCE

A handwritten signature in black ink, appearing to read 'R. Williamson', written over a light gray rectangular background.

Robert J. Williamson, PE
Senior Project Manager
rob.williamson@wright-pierce.com

WRIGHT-PIERCE

A handwritten signature in blue ink, appearing to read 'Collin A. Stuart', written over a light gray rectangular background.

Collin A. Stuart, PE
Project Engineer
collin.stuart@wright-pierce.com

CC: Matthew Garside, Poland Town Manager

Attachments

Matt Garside
Poland Town Manager
1231 Maine Street
Poland Maine 04274

11/19/2019

Re: Water and Sewer Main Extensions

Matt,

Thank you for inviting me to your November 7 Town Meeting to discuss the potential of extending water and sewer in the Town of Poland. As we discussed, I will need consensus from the Water and Sewer Boards to move forward with these projects.

We have reviewed the report from Wright/Pierce, and have developed a list of questions and concerns that we would like addressed before moving forward:

Rt. 26 Sewer Extension

- Similar to the three sewer pump stations that were installed as part of the original Poland Sewer Extension, since the Auburn Sewerage District would own and maintain the station, we would require a fee for the perpetual maintenance and replacement. I believe the amount at that time was \$50K/station. A similar analysis would need to be done for this station.
- Based upon the numbers I got from Cyndi Robbins, I supplied her with connection fees and anticipated sewer usage billing information a few days ago. I would need some sort of assurance that her connections would be made, otherwise this project would not be a worthwhile endeavor.
- A formal agreement would need to be in place protecting both the Town and ASD.

Shaker Hill Water Main Extension

- In accordance with Wright/Pierce, this project would require a booster station. If the assumption is that it would be owned and maintained by the AWD, we would need an agreement similar to the Poland Spring Resort Pump Station. In that contract, Nestle provided the station, and AWD bills Nestle for operation and maintenance, as well as depreciation.
- Wright/Pierce has a model of the Auburn Water System. We would require them to run the model with the anticipated flows from the Shaker Hill Nursery and analyze any adverse effects it would have on our system.
- We would need some sort of assurance that the Nursery would use the anticipated water, otherwise, we would need to bleed water and charge the Town as we do under the current arrangement.
- We need a better idea of how much revenue we could anticipate.

Rt. 122 Water Extension to Old Castle

- There was mention of a pressure reducing valve being required (PRV). If so, we would need a fee to operate it in perpetuity.

- We need more information, or assurance to verify that the anticipated usage numbers for Old Castle are correct. Based upon similar facilities, the number appears somewhat high. As of the date of this letter, we have not heard directly from them concerning their water usage. I understand they have a sprinkler system that they may want to connect. I would assume they need an anticipated water bill prior to making a decision to connect. We also need to know how much revenue we could realistically anticipate.
- If a hydrant is installed, it cannot be used for daily water needs.
- We would need some sort of formal commitment from Old Castle that they would connect to the system.
- As with the Shaker Hill Extension, we would require Wright/Pierce to run the hydraulic model with the anticipated domestic flows and fire flows and analyze the potential adverse effects it could have on our system. In particular, we would like to know the effect on the Poland Bottling Plant, and surrounding areas such as West Crestwood/Bishop Road, and the draw on our system. Being fed off the Poland tank, we question the ability to provide water for a long term fire event.
- We would need a bleeder agreement in place similar to Rt. 26 if we are not able to maintain water quality due to lower than anticipated flows.

I will be addressing these projects with Auburn Sewerage District Trustees on 11/19, and the Auburn Water District Trustees on 11/20.

I will let you know how the meetings go, and keep you in the loop. Do you think it would be possible to get the information we are looking for, and authorize Wright/Pierce to go ahead with the hydraulic models?

Thanks,



Sid Hazelton, P.E.

AWSD Superintendent