



July 25, 2017

Edward Balicki
Chief Operator
City of Beacon
One Municipal Plaza
Beacon, New York 12508

Re: *City of Beacon*
Proposal to Assess the City of Beacon Water

Dear Mr. Balicki:

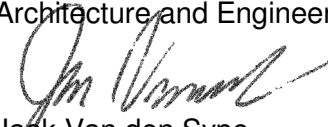
Since 2008, Henningson, Durham & Richardson Architecture and Engineering, P.C. (HDR) has supported the City of Beacon's efforts to study and remediate sanitary sewer overflows (SSO). HDR is pleased to submit this proposal perform a Water Supply Assessment.

HDR proposes to conduct this assignment according to the terms and conditions we are following for our other projects with the City of Beacon.

We appreciate the opportunity to assist the City of Beacon, and we look forward to continuing our work with you. Should you have any questions, please do not hesitate to contact me or Tom Newman.

Sincerely,

Henningson, Durham & Richardson
Architecture and Engineering, P.C.


Jaak Van den Syde
Project Manager

cc:
Enclosures

Sincerely,

Henningson, Durham & Richardson
Architecture and Engineering, P.C.

 P.E.
Tom Newman, PE

Proposal to Assess The City of Beacon Water Supply

Project Understanding

The City of Beacon's (City) existing Master Plan indicates that the City's water supply should be sufficient until 2050; however, there is recent concern that the City may reach its effective capacity well before the 2050 target. The City is concerned about the potential water supply shortfall and in response is seeking a water supply assessment.

HDR proposes to assist the City by evaluating the following items:

1. Review Existing Safe Yield Study: The previous Safe Yield Analysis was conducted in 2014. That analysis was based in large part upon earlier studies from 1992 and 1974. We suspect that these studies may not adequately represent the current infrastructure and other conditions affecting the actual Safe Yield. Furthermore, the 1992 study identified potential water deficits. HDR would review the existing Safe Yield studies, check the methodology and identify appropriate steps to improve Safe Yield analysis accuracy. Based on our preliminary review of City records, we believe that bathymetric surveys are necessary to calculate total available storage and storage capacity lost through silt / sedimentation buildup.
2. Evaluate Distribution Needs: HDR will review existing data on the City's water distribution system and develop a data gap and modeling plan for a Water Distribution Model to map water use and uncover system losses / unaccounted water.
3. Project Water Use and Demands: Estimate projected water demand based on population growth projections, new development projects, and other water demands associated with the Town of Fishkill.
4. Review and Evaluate Impacts on the City's Water Treatment Plant and Finished Water Storage: It has been reported that the existing filtration system may be a bottleneck and additional finished water storage may be required.

In order to evaluate these items, HDR proposes the following tasks:

Tasks

1. Meet with City to discuss Specific Goals of the Project

- HDR will meet with the City to discuss the project goals, the specific needs of the City, and collect available data.
- The meeting is expected to take place at the WTP and include a tour of each of the reservoirs.

Assumptions

- a. HDR will have two attendees.
- b. One meeting (2hr for meeting 4hr recon) up to 6 hours), held in the City of Beacon.

2. Evaluate Existing Safe Yield Studies and Data Collection Needs

- Evaluate Existing Safe Yield Studies
 - Review previous Safe Yield and Water Supply system studies¹ done for the City.
 - Identify/verify the components of the City's water supply system, including reservoirs, impoundments, watershed areas and sub-areas, groundwater wells, auxiliary sources, raw water pipelines, intake structures, meters, and Water Taking Permits and conditions.
 - Using available information regarding the connections between the reservoirs, wells, and water filtration plant, identify any potential bottlenecks that may reduce the effective Safe Yield of the sources.
 - If original data are available, perform a sensitivity analysis to identify critical elements of the system and identify assumptions/parameters that would be a priority to resolve through future data-collection efforts to reduce uncertainty of the Safe Yield calculation.
- Evaluate Data Collection Needs and System Components
 - The most recent Safe Yield study showed a marked decrease in reservoir capacity due to sedimentation therefore we propose conducting bathymetric surveys of some or all of the reservoirs to obtain more accurate measurements of total storage and sedimentation.
 - Check recharge rates, drain depths, and sediment buildup rates in the reservoirs.
 - Check capacity of the two existing wells and initial identification of what is affecting the total well capacity.
 - Evaluate possibly increasing maximum purchased water from Fishkill, or augmenting with new raw water sources if necessary (e.g., Jessen's Pond, Fishkill Creek, or the Hudson).
 - Verify watershed delineations using existing topography and Geographical Information Systems (GIS).

¹ O'Brien & Gere, Reservoir Safe Yield Analysis and Groundwater Supply. 2014
O'Brien & Gere, Water Supply Project - Safe Yield Analysis. December 1992
Bowe-Walsh, Report on Hydrology and Safe Yield (excerpt). 1974

- Review of the missing and incomplete data will be done to identify key components of the system that require further data-gathering efforts.
- Examples include:
 - Well testing & monitoring;
 - Reservoir Inspections; and
 - Stream flow gauging stations.

Assumptions

- a. The City will provide available data to HDR in electronic format.
- b. A new Safe Yield study will not be performed at this time, but could be performed, at additional cost, pending the findings of this review.

3. Evaluate Distribution Needs

HDR will develop a specification to create a water distribution model for the City. HDR will review existing data on the City's water distribution system and develop a data gap and modeling plan for a Water Distribution Model to map water use and uncover system losses/unaccounted water. A water distribution model will be beneficial of the City as they expand their distribution system with additional storage. The benefits of water distribution model include:

- Holistic understanding of system supply, conveyance, and demands.
- Understanding and evaluation of system operation and storage.
- Assessment of system ability to provide level of services under normal and maximum hour peak day conditions.
- Assessment of system capability to provide fire protection.
- Water age analysis.
- Forecast of future system demands and CIP project needs.

Assumptions

- a. Available data will be provided to HDR from the City in electronic format.
- b. Desktop analysis, no field data collection effort.

4. Projected Water Use and Demands

This task will include the following elements:

- HDR will analyze water use based on population growth projections, new development projects, and other water demands.

- Use the City's water use records and future population projections to check and/or generate new water-use projections.
- HDR will also analyze the recent sewer-metering data to determine what the impact of weekend tourism has on water usage at various locations across the City. These data will be used to augment any metered drinking water data that the City may have.

Assumptions

- a. Available data will be provided to HDR from the City in electronic format.

5. Evaluate Impacts on WTP and Finished Water Storage

This task will include the following elements:

- Evaluate whether adding staff to do additional backwashing would be effective.
- Determine or confirm the current maximum capacity of the WTP and infrastructure.
- Evaluate the need for adding another filter bed and identify any bottlenecks.
- Identify what the City's finished water storage capacity needs to be for when the reservoirs are taken offline for planned maintenance and repairs.

6. Deliverables

- HDR will prepare a summary report with findings, conclusions and recommendations from the above tasks.

Assumptions

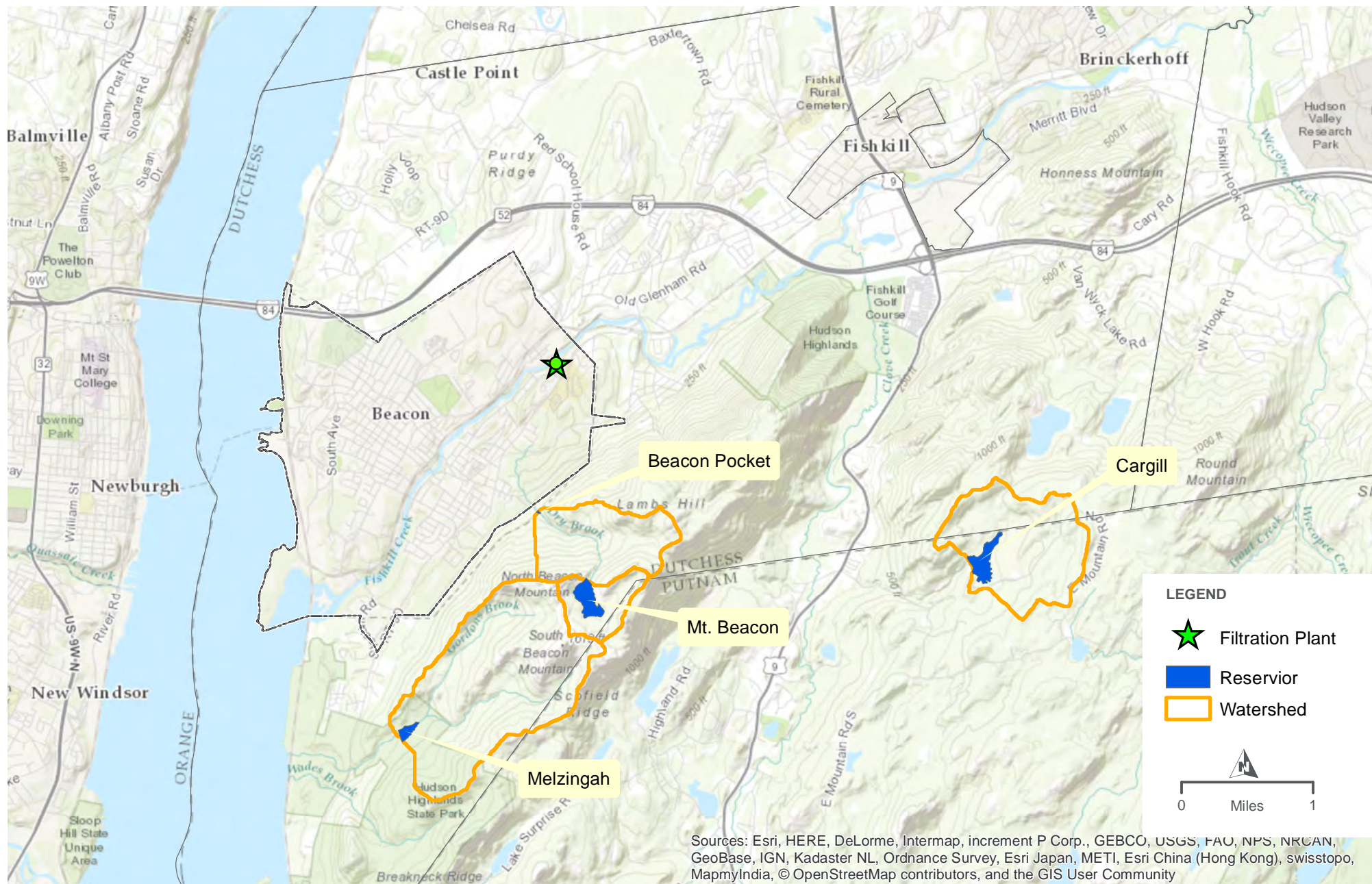
- a. HDR will address one round of consolidated comments to the text of the report.

Budget Proposal

A summary of the lump sum fees associated with each of the above tasks is presented below. Note that the estimated costs of the bathymetric surveys are provided separately for comparison purposes and are not reflected in the subtotal below; some cost savings may result if more than one reservoir is to be surveyed.

Task #	Description	Fee
1	Meet with City to discuss Specific Goals of the Project	\$4,300
2	Evaluate Existing Safe Yield Studies and Data Collection Needs	\$5,800
	Bathymetric Survey – Mt. Beacon and Mt. Beacon Pocket Reservoirs	(\$25,000)
	Bathymetric Survey – Melzingah Reservoir	(\$12,000)
	Bathymetric Survey – Cargill Reservoir	(\$18,000)
3	Evaluate Distribution Needs	\$2,000
4	Projected Water Use and Demands	\$1,600
5	Evaluate Impacts on WTP and Finished Water Storage	\$1,600
6	Deliverables	\$3,000
	Total (without Bathymetric Surveys):	\$18,300
	Total (including Bathymetric Surveys):	\$73,300

ATTACHMENTS



CITY OF BEACON WATER SUPPLY FEATURES

