

N2663

October 3, 2017

Mr. Brian Goetz, Deputy Director
Department of Public Works
680 Peverly Hill Road
Portsmouth, New Hampshire 03801

Ms. Karen Anderson, Town Administrator
Town of Greenland
11 Town Square
P.O. Box 100
Greenland, NH 03840

**Re: Preliminary Design Phase Engineering Services
Breakfast Hill Area Water Transmission Main Improvements
Greenland, NH**

Mr. Goetz and Ms. Anderson,

Enclosed please find a proposed scope of work for preliminary design phase engineering services for the water main extension to the Breakfast Hill Area in Greenland, NH. This work is consistent with the next steps and recommendations in the May 19, 2017 letter report by Underwood Engineers and advances the project to a preliminary design level to better define the basis of design and limits of work. The proposed fee is as follows:

TASK 1 – Hydraulic Modeling and Master Plan Supplement	\$20,200
TASK 2 – Preliminary Field Investigations	\$47,900
TASK 3 – Preliminary Design	<u>\$113,500</u>
TOTAL	\$181,600

Please call if you have any questions.

Very truly yours,

UNDERWOOD ENGINEERS, INC.


Keith A. Pratt, P.E.
President

cc: Robert P. Sullivan, Portsmouth City Attorney

**SUGGESTED PLAN OF WORK
Preliminary Design Phase
Underwood Engineers, Inc.**

**Breakfast Hill Water Main Extension
Portsmouth and Greenland NH**

October 3, 2017

Summary/Background

The Town of Greenland and the City of Portsmouth desire to cooperatively advance the design phase of a water main extension from the existing Portsmouth system to the Breakfast Hill area of Breakfast Hill Road. A conceptual letter report was prepared by Underwood Engineers, Inc. (UE) on May 19, 2017. The report identified 40,050 feet of water transmission main in the Towns of Greenland and Rye to serve the Breakfast Hill Road Area of Greenland (see attached Figure – Attachment 1). The primary purpose of extending municipal water to this area is to mitigate the risks associated with the presence of certain contaminants in groundwater around the Coakley Landfill groundwater management zone. In addition to providing municipal water to the properties in the area, other benefits include redundant water mains to the City's Greenland Well.

The goal of this Plan of Work is to advance the project to a preliminary design level to better define the basis of design and limits of work.

The May 2017 letter report identified suggested next steps including:

- Review and update the City's Water System Master Plan to confirm available water and build-out flows for the Breakfast Hill Road area.
- Complete hydraulic modeling to confirm available flows and pressures to support the users and fire flows. This will further be used to identify any needed improvements in the City's existing system. Additionally, hydraulic modeling will be completed to address water age to the service area.
- Complete additional work to address certain constructability issues such as rock removal, contaminated sites within the work areas, coordination with NHDOT, and brook/railroad/bridge crossings.
- Consider alternative routing along the railroad corridor.
- Update opinions of costs and identify rate strategies.

This Plan of Work will address the above items as well as develop a preliminary design that will include the following:

- Initial (preliminary) development of a topographic survey of the project area using existing aerial or LIDAR techniques. Final survey would be completed during final design.
- Limited subsurface investigations to evaluate groundwater and rock in certain areas based on SCS mapping.
- Preparation of 40' scale drawings identifying the water transmission corridor.

See attached work plan identifying the Project Area.

TASK 1 – Hydraulic Modeling and Master Plan Supplement

Hydraulic Modeling and Water Quality

- Update the Portsmouth water model for the proposed alternatives, based on hydraulic information provided by the City.
- Utilizing the existing hydraulic water model, evaluate the ability of the Portsmouth water system to serve the Study Area. System pressures in the study area will be estimated based on the City's current maximum day demands. Fire flows will also be evaluated to determine the available flows in the study area.
- Hydraulic Impacts to the City's system will be estimated based on the domestic and fire demands in the Study Area. Available fire flows will be identified.
- In addition to hydraulic impacts, the water model will be used to evaluate water age.
- Improvements to the City's system, if necessary, will be identified based on the above evaluation.
- From the modeling, provide recommendations on the following:
 - Recommended transmission main sizes for the loop
 - Needed system improvements in Portsmouth including storage, supply, and/or transmission mains.

Master Plan Supplement and Basis of Design

- Summarize/restate the existing supply capacity of Portsmouth water system.
- Summarize the contributing design flows (average and maximum) from the Project Area in Greenland. Design flows will be based on a 20-year planning window. Build-out flows will also be estimated.
- Provide a basis of design and Master Plan Supplement. The supplement will be in the form of a Technical Memorandum.

TASK 2 – Preliminary Field Investigations

Topographic Survey (Preliminary)

- Provide preliminary mapping at 1"=40' scale of the project area (40,500 feet). This does not include the railroad corridor to Ocean Road. The preliminary survey will be used to develop the preliminary drawings.
- The preliminary survey will be based on existing (available) aerial mapping and/or LIDAR aerial information. Record Drawings, where available, will be used to

supplement the survey. Limited ground work will be completed at this time. The scope includes up to 5-days for additional ground survey, where needed. This may include the railroad crossing and or brook crossings.

- The bridge crossing over route 93 will include a field survey from 200 feet either side of the abutments and will include information on the stringers and sleeve below.
- Supplemental final survey will be provided during final design utilizing ground techniques.

Subsurface Investigations (Preliminary)

- Conduct up to three days of subsurface investigations (borings and probes) to complete a preliminary assessment of groundwater, rock/refusal and other soil conditions.
- Contact Dig-Safe and mark out the drilling locations in advance.
- Obtain an excavation permit from NHDOT.
- Provide a technical memorandum with the findings and boring/probe logs.

TASK 3 – Preliminary Design

Kick-Off and Project Meetings

- Attend and facilitate a kick-off meeting with stakeholders to review goals and objectives. It is anticipated this meeting will be with Greenland and Portsmouth.
- Attend and facilitate two (2) project meetings with stakeholders to review project status once during the mid-point of design and once when the preliminary design is complete. In addition to Greenland and Portsmouth, NHDOT and NHDES will be invited.

Public Meetings

- Attend and provide a presentation at the following public meetings.
 - Two (2) Greenland Selectmen's meetings
 - One (1) Portsmouth City Council meeting

Design Development

- Complete a site walk with City of Portsmouth staff to identify the best corridor for the water transmission main, hydrants and valves.
- Investigate the potential for contaminated sites along the corridor using NHDES's One-Stop data site.
- Meet with NHDOT to discuss the bridge crossing details.
- Develop preliminary structural design of bridge crossing support system.
- Water services will be shown to the edge of the ROW.

Routing Options

- Instead of looping the water transmission main along Lafayette Road to the City's system, the potential exists to loop it to Ocean Road via the existing railroad corridor. This option will be considered further to see if there is benefit over the Lafayette option.
- For the railroad option, the following will be completed:

- Meet with NHDOT.
- Identify easement needed with the landowner of the rail trail.
- Evaluate this option using the hydraulic model.
- Prepare a conceptual work plan.
- Develop a cost opinion for this option.
- Identify potential permits and approvals needed for the work.
- Note, this option will only be advanced to the conceptual design level. Survey and design drawings are not included.

Opinions of Costs

- Develop an opinion of probable cost based on the preliminary design. Opinion of cost will include work within the ROW.
- Provide a typical range of costs to identify the anticipated work for properties to connect outside of the ROW. This will include service installs as well as meter and backflow preventer installs within the buildings.
- Provide an opinion of cost relating to the cost savings or increases for the railroad corridor loop option.
- Additionally, although they will not be developed to a preliminary design level, if certain improvements are needed within the City's existing water system, conceptual level opinions of costs will be provided for those as well.

Project Drawing Preparation

- Develop a preliminary design set of drawings as follows:
 - Title page
 - Index, notes and legend
 - Plan sheets (40,050 feet) at 1"=40'.
 - Bridge crossing preliminary details
 - Preliminary details including:
 - Water trench
 - Hydrant
 - Water service
 - Water meter and backflow preventers (in buildings)
 - Pavement restoration
- Drawings will be submitted to stakeholders at the work sessions for review.
- Revisions will be made to drawings following review by the stakeholders.

Funding Assistance

- Meet with NHDES and the MtBE Trust Fund Advisory Board to consider funding options.
- Provide assistance with applying for MtBE funding.
- Provide assistance with completing SRF application, if appropriate.

SUMMARY OF DELIVERABLES

- Technical memoranda summarizing basis of design and Master Plan Supplement.
- Updated hydraulic model.
- Preliminary Field Survey.
- Subsurface investigation information.
- Preliminary Design Drawings including a PDF version.

SCHEDULE

- Tasks 1 through 2 will be completed within 60 days of authorization to proceed.
- Preliminary drawings will be completed within 150 days of authorization to proceed.
- Meetings and presentations will be scheduled as needed.

TO BE PROVIDED BY TOWN OF GREENLAND/CITY OF PORTSMOUTH

- Access to sites
- Subdivision plans and record drawings of the area
- Record Drawings of the sleeve and stringers at the NHDOT bridge over Rte. 95.
- Hydraulic Model of the City's water system.
- Flow record and water quality data.
- Existing reports, maps, surveys, and GIS data (paper and digital copies).

WORK NOT INCLUDED

- Rate evaluations
- Surveys or questionnaires relating to who is interested in connecting to the proposed system extension.
- Environmental Assessment
- Water quality sampling or other analytical sampling and analysis
- Permitting or permit applications
- Political arrangement evaluations (i.e., Regional districts, IMA's, etc.)
- Wetlands delineation
- Final survey of the project area. Also note, no survey is included for the railroad corridor.
- Design services beyond the proposed water transmission main (i.e., design phase services are not included for any needed improvements to the City's water system).
- Preparation of contract documents or bidding documents
- Final design services

