

DATE: October 1, 2012

COUNCIL COMMUNICATION

INITIATED BY: Public Works Department

AGENDA ITEM: **PRESENTATION AND DISCUSSION REGARDING THE SPRUCE HOLE MUNICIPAL WELL & ARTIFICIAL RECHARGE PROJECT**

PREPARED BY: David Cedarholm, Town Engineer

PRESENTED BY: David Cedarholm, Town Engineer
James Emery, Emery & Garrett Groundwater, Inc.
John Brooks, Emery & Garrett Groundwater, Inc.

AGENDA DESCRIPTION:

The groundwater development firm Emery & Garrett Groundwater, Inc. (EGGI) will provide a presentation updating the Town Council on the status of the Spruce Hole Municipal Well (DGD-PW2) and Artificial Recharge Project. EGGI has been working with Underwood Engineers, Inc. on the permitting and engineering of the Project since 2007. EGGI will present an update on the status of the Large Groundwater Withdrawal Permit application and the Final Hydrogeological Investigation Report (Final Report) submitted to the New Hampshire Department of Environmental Services (NHDES) on behalf of the Town and an overview of the work conducted to assess the artificial recharge component of the project. The last update on the project was given at a Town Council in April 2010 and included a presentation from EGGI. A copy of the text from the Final Report and a few of the key figures are attached for the Councilor's review (the full report is 348 pages and the electronic file is 128 mb). Town Engineer David Cedarholm and Michael Metcalf of Underwood Engineers, Inc. will also describe the most cost effective options for connecting the new well to the UNH/Durham Water System's distribution system and the infrastructure to accommodate the artificial recharge (AR).

The new 12-inch diameter 135 foot deep production well was installed in January 2010 and an 8 day pumping test was conducted on the new well in August 2010. The pumping test was intentionally conducted during the driest period of the year in order to obtain a more conservative estimate of how continuous pumping of the well might impact the water level in the aquifer and nearby private wells and water bodies (i.e. wetlands, seeps, streams and brooks). The pumping test is also necessary to estimate the new production well's maximum and sustainable yield. During the

pumping test, the production well was pumped at a rate of 725 gallons per minute (1,044,000 gallons per day) for a total of 8.4 million gallons while 39 monitoring locations were observed. In addition to observing the pre-pumping conditions in the aquifer, these monitoring locations were also observed for an extended period of time after the test was completed to observe the aquifer's ability to recover from the pumping.

Following the 8 day pumping test, EGGI utilized the data collected from the proposed production well, monitoring wells, private wells and surrounding water bodies to develop a numerical groundwater flow model to simulate the hydrologic impact of various long term pumping scenarios. The development of the numerical model requires careful consideration of aquifer's perimeter boundary conditions, and an extensive calibration exercise of comparing simulated water levels within and around the aquifer with actual water levels measured before, during and after the pumping test. In March of 2012 the Final Report was submitted to NHDES in accordance with their Large Groundwater Withdrawal Permit application requirements with the total proposed production volume of 1,044,000 gallons per day, or 725 gallons per minute, with a maximum annual withdrawal volume of up to 63 million gallons. The attached response letter from Christine Bowman of NHDES was received in August 2012 which includes a list of comments that need to be addressed. EGGI has developed a straight forward plan to address each of NHDES comments and will provide a summary of how each comment will be handled.

On a separate and parallel track EGGI has been working on investigating and permitting the AR component of the project which will allow water from the Lamprey River to artificially recharge the Spruce Hole Aquifer. More than 90 percent of the infrastructure needed to accomplish this task already exists, including the pump station on the Lamprey River and 6,500 feet of 16" raw water main leading to within 2,000 feet of the proposed recharge area. A column test was performed in 2011 to assess the ability of the sand and gravel from the glacial deposits within the Spruce Hole Aquifer to treat water from the Lamprey River. The test confirmed that the aquifer did an excellent treating the Lamprey River water as a result EGGI submitted a Groundwater Discharge Permit application in October 2011 necessary to obtain NHDES's approval to conduct the full scale AR pilot test. The pilot test was conducted from March 29, 2012 to June 4, 2012 during which time approximately 20 million gallons of water was pumped from the Lamprey River and discharged into two separate recharge basins. This amount of water raised the water table in the entire aquifer almost 2 feet and after 60 days most of this water had been retained. EGGI will provide a more details from the pilot test and summary of the results.

Underwood Engineers and EGGI developed a conceptual design for the piping and associated infrastructure for connecting the well to the distribution system and to accommodate the AR. The attached Figure 1 is provided to show the two piping options that were considered. Option A is a piping and valve configuration in that would allow both the withdrawal from the production well and the AR into aquifer to use the same 12" water main. With Option A, it would not be possible to simultaneously withdraw from the production well and artificially recharge the aquifer. The combination of Option A and Option B together provides two separate pipelines so that both withdrawal from the production well and AR into the aquifer can operate simultaneously. The estimated cost of Option A \$1.7 million and the estimated cost for Option A+B is \$2.1 million. At this time Option A is being recommended. Town Engineer Dave Cedarholm and Mike Metcalf will provide more detail about these options and estimated costs.

LEGAL AUTHORITY:

N/A

LEGAL OPINION:

N/A

FINANCIAL DETAILS:

In 2007, \$64,000 was approved from the Capital Fund Budget for phase I of the Project, which included preparation of the preliminary hydrogeologic investigation report and submittal of the large groundwater withdrawal application to NHDES. Phase I also included preliminary engineering of the necessary pipeline and associated facilities. In 2009 the Town Council appropriated \$615,000 from the Capital Fund Budget to proceed with the Phases II and III of the project, which includes monitoring well and production well installation, pumping tests, final permitting, and investigating and pilot testing augmenting the aquifer production using Lamprey River water to artificially recharge the aquifer. In 2010, the Town applied for and received an ARRA grant for the AR component of the project in form of 50% principal forgiveness on a \$445,000 SRF loan which will ultimately reduce the \$615,000 Capital Fund Budget by the amount of \$222,500 less interest.

The estimated cost to connect the new production well to the water distribution system with a 12" diameter water main and utilize the same water main and valves to also artificially recharge the aquifer (Option A described above) is \$1.7 million.

All project costs are shared one-third by the Town and two-thirds by the University of New Hampshire as customary with all major water and wastewater expenditures.

SUGGESTED ACTION OR RECOMMENDATIONS:

Council Communication, 10/1/2012

Re: Spruce Hole Municipal Well & Artificial Recharge Project Update

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No formal action is required. Hear a presentation updating the Town Council on the status of Spruce Hole Municipal Well and Artificial Recharge project and ask questions/provide comments.