



The State of New Hampshire  
DEPARTMENT OF ENVIRONMENTAL SERVICES



Thomas S. Burack, Commissioner

August 30, 2013

Epping Water and Sewer Commission  
157 Main Street  
Epping, NH 03042-2440

*Transmitted via email to [waterandsewer@townofepping.com](mailto:waterandsewer@townofepping.com)*

**Subject: Town of Epping Water and Sewer Department, PWS ID 0761010  
Operation of the Hoar Pond Wells (Source IDs 004, 005, and 006)  
Epping, New Hampshire**

Dear Members of the Commission:

The purpose of this letter is to convey to the Epping Water and Sewer Commission (Epping) the major concern that the New Hampshire Department of Environmental Services (DES) has with the current operations of the water supply sources serving the Town of Epping. Specifically, DES is concerned that the yield of the Hoar Pond wells [Hoar Pond Well No. 1 (HPW1), Hoar Pond Well No. 2 (HPW2), and Hoar Pond Well No. 3 (HPW3)] is or may be degrading over time under their current pattern of use. DES' 2012 sanitary survey report identified the need for additional source capacity as the water system's top priority and recognized that Epping had begun the process of identifying additional supply. However, groundwater level monitoring data collected in HPW3 by Epping and submitted to DES on August 2, 2013 indicates that the existing sources may not be capable of providing their projected production volumes and that the need for additional supply may be more critical.

DES recommends that Epping consider any available alternatives to reduce demand on the Hoar Pond wells or otherwise change their current use pattern, including such options as: a) expanding Epping's efforts to further limit discretionary water use across the system, particularly during high demand summer months; b) implementing a relatively aggressive well maintenance and rehabilitation program for HPW2 and HPW3 to reduce scaling/encrustation in water bearing fractures; or, c) proceeding with exploration for and permitting of other sources that would enable Epping to alternate the use of the Hoar Pond wells with other sources, thereby providing for some water level recovery time.

In specific regard to the water level data collected in HPW3<sup>1</sup> and the amount of drawdown observed in the well during 2012 and 2013, DES has concerns about the sustainability of the well's permitted production volume [115,200 gallons per day (gpd); 80 gallons per minute (gpm)] and the combined permitted withdrawal volume of the Hoar Pond wells (266,400 gpd; 185 gpm) under Epping's current use scenario of the wells (see Figure 1 attached). DES offers the following information for Epping's consideration:

<sup>1</sup> According to Dennis Koch, water level data are collected monthly in HPW1; however, these data were not made available for DES' review. Water level data are not collected in HPW2.

- The projected 180-day water level elevation<sup>2</sup> in HPW3 based on the pumping test results was approximately 38 feet above mean sea level (ft amsl). A review of the water level data collected in HPW3 in 2012 and 2013 indicates that the water level in the well drew down close to or below 38 ft amsl at various times between September 2012 and January 2013, and May 2013 and July 2013. The water level has remained above the pressure transducer, which is installed at approximately 15 ft amsl [depth of 180 feet below top of casing (ft btoc)] according to Dennis Koch.
- According to Dennis Koch, the pump in HPW3 is set at approximately -42 ft amsl (depth of 237 ft btoc), which is in close proximity to the shallowest [significant] water bearing fracture zone at -38 ft amsl [depth of 230 feet below ground surface].<sup>3</sup>
- According to Dennis Koch, the Hoar Pond wells are currently pumped simultaneously for approximately 15 hours per day. It is DES' understanding that Epping may be operating the wells in this way to allow for mixing of water derived from HPW1 with water derived from HPW2 and HPW3 to meet the drinking water standard for arsenic.
- Based on a review of water use data reported by Epping to DES' Water Use Registration and Reporting Program from March 2012 to June 2013, Epping's total monthly production from HPW3 ranged from approximately 1.3 million gallons [February 2013] to 1.8 million gallons [July 2012] and averaged 1.5 million gallons. Monthly peak day production from HPW3 ranged from approximately 52,300 gallons [April 2013] to 81,700 gallons [March 2012]; on average, Epping is using HPW3 at (or below) approximately 54 percent of the well's permitted production volume. From April 2012 to June 2013, HPW2 and HPW3 accounted for approximately 74 percent of Epping's total water usage (average based on monthly totals) with production divided roughly equally between the two wells; HPW1 accounted for approximately 14 percent.

In general, the drawdown measurements cited above imply that the yield (i.e., capacity) of HPW3 and the Hoar Pond well field itself is or may be degrading over time under Epping's current pattern of use. As such, in the near term, DES strongly recommends that Epping review the following and make any changes necessary to optimize the use of the Hoar Pond wells:

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<sup>2</sup> For your reference, the "180-day water level elevations" cited in this letter were derived from the groundwater levels collected near the end of the constant rate pumping test of HPW3. The method for deriving these values is described as follows. Using a semi-logarithmic graph of drawdown versus time, a best-fit straight line is drawn through the data points collected near the end of the pumping test and extended out in time to 180-days. This gives an estimate of what the water level in a well would be after 180 days (6 months) of continuous pumping with no net groundwater recharge, assuming that the drawdown trend in the well remains the same as at the end of the pumping test. It is a tool used to assess the sustainable yield of a well. Since these conditions are unlikely to occur, this method provides a conservative estimate of what the water level in a well would be under extended pumping or drought conditions. Draw down of the water level in a well below this level could mean that the pumping test was performed at a time with more available recharge (e.g., more rainfall) or that the yield of the well may be degrading over time.

<sup>3</sup> According to the well log prepared by Skillings & Sons, Inc. included in Appendix A of the Preliminary Report for HPW3 prepared for Epping by Geosphere Environmental Management, Inc., dated June 26, 2008

- a) The depth setting of the pump in HPW3 relative to the well's total depth and reported fracture depths; and
- b) The pumping operation schedule of the Hoar Pond wells taking into consideration well interference effects, as observed during the 2010 pumping test.

In addition, DES is providing the following comments on the operation of the Hoar Pond wells relative to two private wells monitored per the requirements of Epping's large groundwater withdrawal permit LGWP-2012-0001 (herein referred to as "permit") for the withdrawal of groundwater from HPW3, issued on January 6, 2012. Well HPW3 was activated in March 2012. Groundwater level monitoring data collected in these wells was included in Epping's August 2, 2013 submittal to DES. For the purposes of this review, DES also referenced the following information: 1) the June 2002 pumping test report for HPW2; and 2) water level monitoring data submitted by Epping for 2010 and 2012.

- a) In reference to the monitoring of the private bedrock well serving 46 Beniah Lane [Bolduc property] (see Figure 2 attached):
  - This well was monitored during the 2002 pumping test of HPW2, but was not monitored during the 2010 pumping test of HPW3. Long-term monitoring of this well began in January 2012.
  - In March 2012 and from June 2012 to January 2013, the water level in the well was below the pressure transducer; as such, data are not available. In January 2013, the pressure transducer was removed from the well and re-installed at a greater depth which appears to be adequate based on a review of the 2013 data.
  - Based on a review of all available water level data, this well appears to be more influenced by pumping of HPW2 and HPW3 than pumping of HPW1. Epping's current use scenario of the Hoar Pond wells does not appear to be interfering with the owner's use of the well; however, DES notes that the water level in the well has been within approximately 40 feet of the assumed depth of the pump [160 ft btoc]. As such, increased use of the Hoar Pond wells could potentially adversely affect its use.
- b) In reference to the monitoring of the private bedrock well serving 1 Ben Nevis Lane [Nollet property] (see Figure 2 attached):
  - This well was monitored during the 2010 pumping test of HPW3; it was also monitored from May 2010 to November 2010 to collect additional background water level data prior to the activation of HPW3. Long-term monitoring of this well began in January 2012.
  - The projected 180-day water level elevation in this well based on the pumping test results was approximately 122 ft amsl. A review of the water level data collected in this well in - 2010, 2012, and 2013 indicates that the water level in the well drew down close to or below 122 ft amsl at various times between July 2010 and November 2010 and July 2012 and

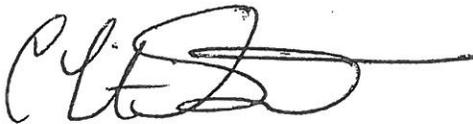
December 2012. The water level has not encountered the Stage I water level trigger for mitigation specified in condition No. 5.d of Epping's permit.

- In general, water level trends observed in this well during 2010, 2012, and 2013 were comparable. Increased drawdown in the summer months is likely attributable to an ambient decline in groundwater levels in the bedrock aquifer and overall increased use of the Hoar Pond wells to meet summer demand.
- Based on a review of all available water level data, this well appears to be more influenced by pumping of HPW1 and HPW2 than pumping of HPW3. Epping's current use scenario of the Hoar Pond wells does not appear to be interfering with the owner's use of the well [the assumed depth of the pump is 130 ft btoc].

**At this time, Epping shall continue to monitor water levels in these private wells in accordance with condition No. 4 of their permit.**

If you have any questions about this letter or any other groundwater permitting issues, please contact me at (603) 271-8866 or [christine.bowman@des.nh.gov](mailto:christine.bowman@des.nh.gov).

Sincerely,



Christine Bowman  
Hydrogeologist  
Drinking Water & Groundwater Bureau



Richard Skarinka, P.E.  
Engineering and Survey Section Manager  
Drinking Water & Groundwater Bureau

Attachments: Figure 1. Hoar Pond Well No. 3 (PWS ID 0761010-006) – Groundwater Level Monitoring.  
Figure 2. LGWP-2012-0001 – Groundwater Level Monitoring.

cc: Greg Dodge, Epping Town Administrator (email)  
Jamie and Tara Bolduc  
Jeffrey Nollet  
Abigail Fopiano, Geosphere Environmental Management, Inc. (email)  
Stephen Roy, DES (email)

Figure 1. Hoar Pond Well No. 3 (PWS ID 0761010-006) - Groundwater Level Monitoring.

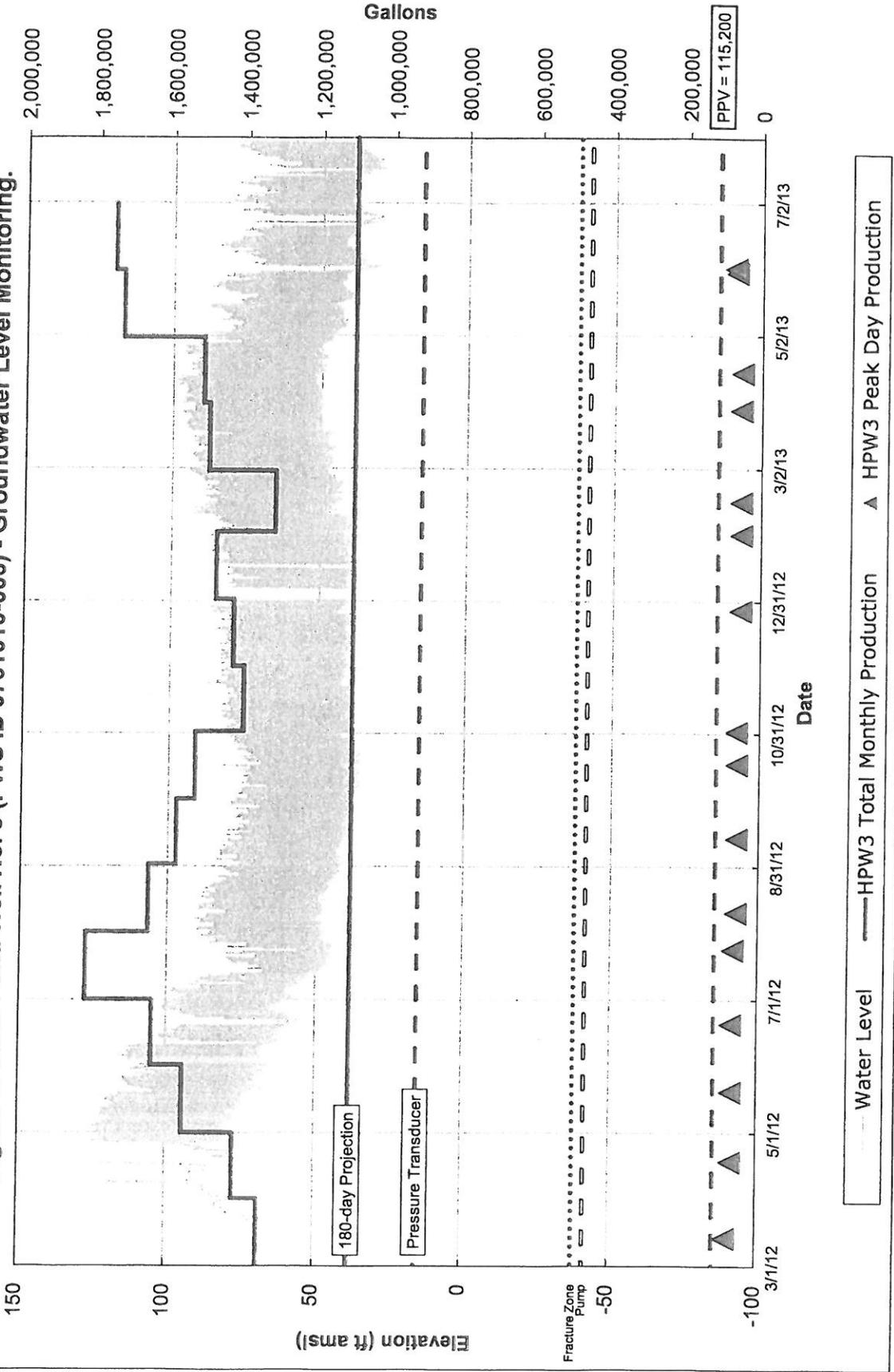


Figure 2. LGWP-2012-0001 – Groundwater Level Monitoring.

