



The

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES

hereby issues

LARGE GROUNDWATER WITHDRAWAL PERMIT

NO. LGWP-2012-0001

to the permittee

TOWN OF EPPING WATER AND SEWER DEPARTMENT
157 MAIN STREET
EPPING, NH 03042-2440
(603-679-5441)

for the withdrawal of the following volumes of groundwater from the following wells for the purpose of community water supply:

Hoar Pond Well No. 3: 115,200 gallons over any 24-hour period

Hoar Pond Wells No. 1, No. 2, and No. 3: a combined total of 266,400 gallons over any 24-hour period

Date of Issuance: January 6, 2012

Date of Expiration: January 6, 2022

Pursuant to authority in N.H. RSA 485-C:21, the New Hampshire Department of Environmental Services (NHDES), hereby grants this permit to withdraw groundwater from Hoar Pond Well No. 3 subject to the following conditions:

1. The permittee shall comply with the requirements of Env-Wq 403 (formerly Env-Ws 388) and RSA 485-C at all times.
2. Water Conservation: The permittee shall implement the approved Water Conservation Plan, dated December 2, 2010, in accordance with Env-Wq 2101 (formerly Env-Ws 390) and NHDES' approval dated February 3, 2011.
3. Metering Requirements: Withdrawals from all sources must be metered at all times. All meters must be selected, installed, tested, and maintained in accordance with the AWWA M6 manual as referenced in Env-Wq 2101. The permittee shall provide NHDES with a certificate of calibration and performance specifications for each meter. The permittee shall document and maintain records of all meter maintenance and calibration activities and submit this information to NHDES in an annual report by January 31 of each year. The permittee shall read source water meters to adequately report the following volumes to the reporting program referenced in condition No. 6 of this permit:
 - a) The 24-hour peak day volume withdrawn from each source during each month; and
 - b) The cumulative total volume withdrawn from each source during each month.
4. Monitoring and Reporting Requirements: The permittee shall establish and maintain the groundwater level monitoring and reporting program as described below:
 - a) Off-site Private Bedrock Wells: The permittee shall install pressure transducers and data loggers and measure water levels at a frequency of at least once every four hours in the private bedrock wells serving the following properties. Water level monitoring shall commence at least 30 days prior to initiating a withdrawal from Hoar Pond Well No. 3 and shall continue indefinitely as a condition of this permit.

Tax Map / Tax Lot	Property Address
20120001DW01	
20120001DW02	
20120001DW03	
20120001DW04	

- b) On-site Production Well: The permittee shall install a pressure transducer and data logger and measure water levels at a frequency of at least once every four hours in Hoar Pond Well No. 3. Water level monitoring shall commence upon initiating a withdrawal from Hoar Pond Well No. 3 and shall continue indefinitely as a condition of this permit.

Private wells that supply drinking water shall be sampled for coliform bacteria [in accordance with Env-Wq 403.14(e)(5) and Env-Wq 403.14(g)] prior to and after the installation of any monitoring equipment.

If a private well owner denies permission to monitor water levels or if the identified well cannot be monitored due to a structural limitation, then the permittee shall propose an alternative monitoring location to NHDES for approval. Upon receiving approval from NHDES, the permittee shall install the monitoring well, if a suitable

alternative residential well or monitoring well is not already available, and monitor water levels at the alternative location at the same frequency required at the original monitoring well.

All water level monitoring shall be completed by a person who can demonstrate, by education or experience, competency in collecting and reporting hydrogeologic measurements.

Monitoring well locations and frequencies may be added or changed if the water level data obtained contradict the information provided in the permittee's application, or if additional data points are required to assess the potential for adverse impacts to occur.

An annual monitoring report and all monitoring data shall be submitted to NHDES annually by January 31 of each year. The annual monitoring report shall note any relevant observations that may affect the water level measurements and include all field notes documenting the monitoring activities for the preceding year.

The annual monitoring report shall be submitted in an electronic format and hard copy format. All water level monitoring data collected shall be submitted in an electronic format only.

5. Mitigation Requirements

- a) In the event that an adverse impact occurs, the permittee shall comply with all of the requirements below and with the impact mitigation and source replacement requirements of Env-Wq 403.
- b) Prior to initiating a withdrawal from Hoar Pond Well No. 3, the permittee shall notify in writing via certified mail the owners of all properties served by private wells or public wells not owned by the permittee within the area estimated to be the influence area of Hoar Pond Well No. 3, as illustrated on Figure 3, titled "Location of Private Water Supply Wells" included in the Final Report titled "Final Hydrogeological Report and LGWP Application" prepared by Geosphere Environmental Management, Inc. (Geosphere), dated April 25, 2011. The permittee shall provide a copy of the notification letter and copies of the certified return mail receipts to NHDES. The notification letter shall: 1) explain to property owners with wells in the identified area that their well may be influenced by the withdrawal at Hoar Pond Well No. 3; 2) provide the property owners with contact information for both the permittee and NHDES in the event they believe they may be adversely impacted by the withdrawal; and 3) explain that a Source Replacement Plan is available and that a copy could be provided to them at their request. The Source Replacement Plan, titled "Draft Source Replacement Plan, Epping Water and Sewer Department Hoar Pond Wellfield: Well No. 1, Well No. 2, and Well No. 3," dated Fall 2011, was prepared by the Town of Epping Water and Sewer Department, and submitted to NHDES as part of the Final Report Addendum prepared by Geosphere, dated November 28, 2011.
- c) Where the status of an unanticipated impact is not clear, the permittee shall gather information needed to quantify the impact and determine its status relative to the adverse impact criteria defined under RSA 485-C:21, V-c and provide this

information to NHDES within 48 hours of being notified by NHDES. A verified adverse impact shall be mitigated in accordance with Env-Wq 403.

- d) NHDES will routinely review the results of all monitoring data, and if water level monitoring data indicates that groundwater is being extracted at a rate that exceeds natural recharge on average, then NHDES will modify the permit in accordance with Env-Wq 403 in order to prevent adverse impacts from occurring. In addition, the permittee shall operate Hoar Pond Well No. 3 in accordance with the management procedures described below. To determine whether a water level monitoring trigger is met or exceeded, the permittee shall obtain and review the water level monitoring data collected per condition No. 4 of this permit annually during the last week of July.

STAGE I MANAGEMENT PROCEDURES

In the event that the following monitoring trigger is met or exceeded, production from Hoar Pond Well No. 3 shall be reduced to 75% of the permitted withdrawal volume such that output from the well does not exceed 86,400 gallons over any 24-hour period.

Trigger: A 15 foot drawdown below the "Projected 180-day No-Recharge Water Level Elevation" at the location listed in Table 1, unless it is determined by NHDES that the drop in water levels is erroneous based upon an analysis of water levels at other similar monitoring points.

As part of Stage I management procedures, the permittee shall increase the frequency of reporting of all on-site and off-site water level measurements to NHDES, and submit all measurements electronically to NHDES by the 15th and 30th day of each calendar month.

STAGE II MANAGEMENT PROCEDURES

In the event that the following monitoring trigger is met or exceeded, production from Hoar Pond Well No. 3 shall be reduced to less than 57,600 gallons over any 24-hour period.

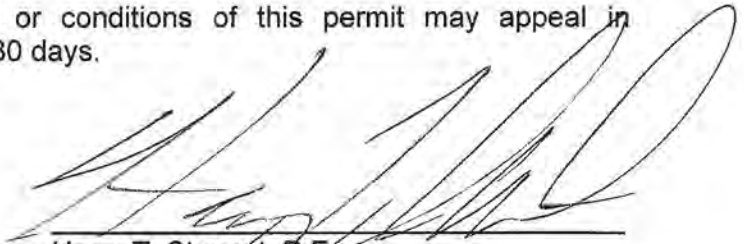
Trigger: A 30 foot drawdown below the "Projected 180-day No-Recharge Water Level Elevation" at the location listed in Table 1, unless it is determined by NHDES that the drop in water levels is erroneous based upon an analysis of water levels at other similar monitoring points.

As part of Stage II management procedures, the permittee shall increase the frequency of reporting of all on-site and off-site water level measurements to NHDES, and submit all measurements electronically to NHDES by the 15th and 30th day of each calendar month.

6. The permittee shall register its new source of water with the NHDES Water Use Registration and Reporting Program and maintain the water use reporting requirements established by RSA 488, Env-Wq 2102 and this permit.
7. The permittee shall apply for renewal of this permit at least 365 days prior to its expiration date in accordance with Env-Wq 403. The permittee shall continue to

comply with all conditions in this permit until the permit is renewed or the facility is closed in accordance with all applicable requirements, regardless of whether a renewal application is filed.

Any person aggrieved by any terms or conditions of this permit may appeal in accordance with RSA 21-O:7, IV within 30 days.



Harry T. Stewart, P.E.,
Director Water Division

Table 1. Trigger Water Level Elevations for Town of Epping Water and Sewer Department's Large Groundwater Withdrawal Permit LGWP-2012-0001.

Tax Map / Tax Lot	Property Address	NHDES-Assigned Station ID*	Projected 180-day No-Recharge Water Level Elevation (feet AMSL)	Stage I Trigger Water Level Elevation (feet AMSL)	Stage II Trigger Water Level Elevation (feet AMSL)
		20120001DW01	122	107	92

* See enclosed Electronic Data Reporting Program Letter and Guidelines Document

PROJECT NARRATIVE

**Large Well Siting Approval/Large Groundwater Withdrawal Permit LGWP-2012-0001
Town of Epping Water and Sewer Department, PWS ID 0761010
Hoar Pond Well No. 3
Epping, New Hampshire**

January 6, 2012

BACKGROUND

The Town of Epping Water and Sewer Department (Epping) has submitted an application to the New Hampshire Department of Environmental Services (NHDES) requesting approval of a large community production well and issuance of a large groundwater withdrawal permit for the withdrawal of up to 115,200 gallons per day (gpd) or 80 gallons per minute (gpm) over a 24-hour period. Epping is requesting approval for this new well to be used in combination with its existing sources for the purposes of municipal water supply.

The purpose of developing the new community production well (designated Hoar Pond Well No. 3) is to: 1) offset recorded losses in yield from the system's other groundwater sources; 2) provide source redundancy for production wells that currently serve the water system; and 3) accommodate potential increases in water demand based on historic water use trends and projected future growth in areas served by the water system.

Hoar Pond Well No. 3 (Well No. 3) is located at Epping's Hoar Pond well field together with two existing bedrock production wells, Hoar Pond Well No. 1 (Well No. 1) and Hoar Pond Well No. 2 (Well No. 2). Wells No. 1 and No. 2 were approved by NHDES in 1999 and 2004 with permitted production volumes of 129,600 gpd and 100,800 gpd, respectively. When Well No. 3 is brought online, it will operate in conjunction with Wells No. 1 and No. 2.

The Hoar Pond well field is located in the west-central portion of the town of Epping on the northwest side of Hoar Pond. The well field is within the catchment area of Hoar Pond, which is drained by an unnamed stream that discharges to the Lamprey River approximately 2,600 feet south of the pond. The potential impact area for the withdrawal from Well No. 3 encompasses approximately five square miles of the southern-facing slopes of the Middle Lamprey River watershed and is bounded on the north by the regional watershed divide and on the south by the Lamprey River. The eastern and western limits of the potential impact area are defined by topographic divides.

Drilling results indicate that bedrock beneath the Hoar Pond well field is comprised of schist and metasedimentary rocks of the Berwick Formation and occurs at depths ranging from 40 to 80 feet beneath the ground surface. Surficial materials at the site consist primarily of glacial till. It is reported that Well No. 3 encountered 50 feet of glacial till, and was completed in bedrock to a depth of 1,000 feet; two water-bearing fracture zones were reportedly intercepted at depths of approximately 230 and 450 feet.

WITHDRAWAL TESTING AND CONCLUSIONS

A withdrawal testing program was conducted by Geosphere Environmental Management, Inc. (Geosphere) from April 6, 2010 through April 23, 2010. The purpose of withdrawal testing is to provide data to estimate long-term sustainable water quantity and quality; observe the response of

the aquifer to pumping; evaluate the degree of hydraulic connection with overlying deposits; and, assess the potential for adverse impacts to water resources and users that may result from the proposed withdrawal. The withdrawal testing program included monitoring during pre-pumping, pumping, and water level recovery periods, where Well No. 3 was pumped at approximately 80 gpm between April 13, 2010 and April 21, 2010. Prior to the start of pumping Well No. 3, Wells No. 1 and No. 2 had been pumping continuously at rates of 45 gpm and 70 gpm, respectively, for approximately five days (by the end of the 8-day pumping period, the pumping rate of Well No. 1 was reduced to 35 gpm).

Discharge from the well was metered during the withdrawal testing program to maintain a constant pumping rate, and water quality samples were collected during the pumping period to characterize the quality of the water derived from the well.

During the withdrawal testing program, water level measurements were collected at: Wells No. 1, No. 2, and No. 3; two on-site bedrock monitoring wells; six on-site overburden monitoring wells (three shallow/deep well pairs); three on-site piezometers; three on-site surface water staff gauges; six off-site private bedrock water supply wells; and one off-site private overburden water supply well. The seven private water supply wells are located at distances ranging from approximately 950 to 2,050 feet from Well No. 3 in two residential neighborhoods located to the north and southwest of the Hoar Pond well field. Shallow groundwater and surface water level measurements were recorded to assess the degree of hydraulic connection between the bedrock aquifer, overburden, Hoar Pond, and surrounding wetlands.

Water level measurements collected during the withdrawal testing program indicate that the two on-site bedrock monitoring wells; three on-site deep overburden monitoring wells; and six off-site private bedrock water supply wells responded to pumping. Water levels in the off-site private overburden water supply well, piezometers, and at the surface water staff gauges did not respond to pumping of Well No. 3.

Pumping-induced drawdown of water levels in the on-site monitoring wells ranged from approximately 0.3 to 36.5 feet and was greatest in bedrock wells located closest to the production wells. In off-site private bedrock water supply wells, pumping-induced drawdown of water levels ranged from approximately 5.0 to 17.8 feet and was greatest in a well located approximately 950 feet southwest of Well No. 3.

Based on a distance-drawdown analysis of graphical projections of water level responses in the monitored bedrock wells that assume 180 days of continuous pumping with no net recharge from precipitation to the aquifer, and inference from the refined conceptual hydrologic model of the withdrawal, pumping-induced drawdown is estimated to extend on the order of 4,000 feet from the well site. Overall, based on monitoring results presented in the final report, a production rate of 266,400 gpd (185 gpm) is a production rate that the well field and geologic formation can sustain.

Results of the water quality sampling conducted during the withdrawal testing program indicate that each parameter, with the exception of manganese, was below the applicable Maximum Contaminant Level (MCL) or Secondary Maximum Contaminant Level (SMCL). Testing results of water samples collected near the beginning, middle, and end of the pumping period showed that concentrations of manganese in water derived from Well No. 3 equaled 0.06 mg/l, 0.052 mg/l, and 0.062 mg/l, respectively, which exceed the SMCL of 0.05 mg/l. Iron (SMCL of 0.3 mg/l) was also detected at a concentration of 0.23 mg/l in the water sample collected near the

beginning of the pumping period; however, concentrations were below the laboratory reporting limit (0.05 mg/l) in subsequent samples. Results of the water quality sampling program also indicate that the concentration of radon is elevated in water derived from Well No. 3.

PUBLIC INVOLVEMENT

Pursuant to RSA 485-C:21, II through V-a, materials submitted in support of the large groundwater withdrawal permit (the preliminary application, final report, and supplemental materials) were sent (via certified mail) to municipalities and public water suppliers in the potential impact area of the withdrawal. Copies of the above-referenced materials were sent to the town of Epping and the Plumer Court community water system, the only public water supplier in the potential impact area other than the permittee. No public hearings were requested, and no public meetings were held regarding the application for this large groundwater withdrawal permit.

LARGE GROUNDWATER WITHDRAWAL PERMIT PUBLIC NOTIFICATION, MONITORING, REPORTING AND WITHDRAWAL REQUIREMENTS

To provide a means for notification in the event of an unforeseen impact, the large groundwater withdrawal permit requires Epping to notify any property owner with a private well within the estimated zone of influence of Well No. 3 prior to initiating a withdrawal from the well. As part of the notification, Epping must explain to each property owner that their well may be influenced by the withdrawal at the production well and provide them with contact information at Epping and NHDES in the event they believe their well may be impacted by the withdrawal. More information concerning this requirement is provided in the large groundwater withdrawal permit under condition No. 5.

The large groundwater withdrawal permit requires Epping to conduct a water level monitoring program that includes monitoring of the production well and off-site private bedrock water supply wells. General monitoring requirements are summarized as follows:

- On-site well – The permit requires that water levels in Well No. 3 be monitored so that water level fluctuations in off-site monitored wells can be compared to the operation of the production well.
- Off-site wells – The permit requires that water levels in four private bedrock water supply wells be monitored to assess the potential for or detect the occurrence of an adverse impact.

The large groundwater withdrawal permit requires a reduction in the withdrawal from Well No. 3 if:

- Trigger water levels are met or exceeded in an off-site monitored well; or
- NHDES determines that the withdrawal is not sustainable based on a review of the monitoring data.

In the event that an adverse impact is reported and verified, an impact mitigation program would be implemented in accordance with conditions of the large groundwater withdrawal permit and Env-Wq 403. The program would implement actions necessary to mitigate the impact including

reducing the withdrawal volume, establishing water use restrictions for customers of the water system, modifying or replacing an impacted source at no initial capital cost to the user, and expanding (or establishing) a monitoring network to assess the effectiveness of the mitigation program. More information concerning these requirements is provided in the large groundwater withdrawal permit under condition No. 5.

Epping is required to submit an annual monitoring report in hard copy and electronic format to NHDES by January 31st of each year. As stipulated in the permit, the annual report shall include a summary of trends and variability observed in the monitoring data, all monitoring data and records required by the permit, and an assessment of the potential impacts associated with the withdrawal from Well No. 3. The annual report will be available to the public for review. A complete description of monitoring and reporting requirements is presented in more detail in the large groundwater withdrawal permit under condition No. 4.