The

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES

hereby issues

LARGE GROUNDWATER WITHDRAWAL PERMIT

NO. LGWP-2013-0001

to the permittee

TOWN OF MARLBOROUGH WATER WORKS
P.O. BOX 487
MARLBOROUGH, NH 03455-0487
(603-876-3751)

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

Well No. 3: 138,960 gallons over any 24-hour period

Well No. 4: 132,802 gallons over any 24-hour period

Wells No. 3 and No. 4: a combined total of 142,560 gallons over any 24-hour period

Date of Issuance: August 14, 2013
Date of Expiration: August 14, 2023

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 Wells No. 3 and No. 4 subject to the following conditions:

1. The permittee shall comply with the requirements of Env-Wq 403 and RSA 485-C at all times.

2. Water Conservation: The permittee shall implement the approved Water Conservation Plan, dated December 2011, in accordance with Env-Wq 2101 and NHDES' approval dated January 6, 2012.

3. Metering Requirements: Withdrawals from the wells 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. 5 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   a) The 24-hour peak day volume withdrawn from each source during each month; and

   b) The cumulative total volume withdrawn from each source during each month.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. 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) 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.

5. The permittee shall register its new sources 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.

6. 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

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PROJECT NARRATIVE

Large Well Siting Approval/Large Groundwater Withdrawal Permit LGWP-2013-0001
Town of Marlborough Water Works, PWS ID 1481010
Wells No. 3 and No. 4
Marlborough, New Hampshire

August 14, 2013

BACKGROUND

The Town of Marlborough Water Works (MWW) has submitted an application to the New Hampshire Department of Environmental Services (NHDES) requesting approval of two large community production wells and issuance of a large groundwater withdrawal permit for the withdrawal of up to 142,560 gallons per day (gpd) or 99 gallons per minute (gpm) over a 24-hour period. MWW is requesting approval for these new wells to serve as their primary municipal water supply sources.

The purpose of developing the new community production wells (designated Well No. 3 and Well No. 4; herein referred to as the "production wells") is to: 1) replace MWW's primary water supply well, Well No. 2; and 2) accommodate potential increases in water demand based on historic water use trends and projected future growth in areas served by the system.

MWW is currently served by two gravel packed wells, Well No. 1 and Well No. 2, which were constructed in the 1950s. Well No. 2 serves as MWW's primary water supply source; Well No. 1 is operated manually on an as-needed basis. Both of these sources are vulnerable due to their proximity to cultural features, lack of control by MWW of the area in the immediate vicinity of the wells, and aging infrastructure. In a letter to MWW dated December 11, 2008, NHDES informed MWW that the road adjacent to Well No. 2 (Fitch Court) would have to be relocated farther from Well No. 2 [if the well was to remain in service] within one year of the opening of a new school for which Fitch Court is the only access route. The school opened in September 2010 but due to funding delays related to the development of the subject wells, MWW required extensions to the one year deadline. In the most recent letter to MWW, dated October 5, 2012, NHDES granted MWW an extension until December 31, 2013. The vulnerability of MWW's existing sources and issues related to Well No. 2 serve as the basis for development of the production wells. Well No. 2 will be removed from service and decommissioned after the production wells are brought online; Well No. 1 will be retained as a back-up source.

The production wells are located in northwest Marlborough on the north side of Minnewawa Brook approximately 950 feet northwest of Well No. 2 at the "Pavilion Site." The potential impact area for the withdrawal from the production wells encompasses approximately 4.1 square miles of the Minnewawa Brook and Robbins Brook watersheds from a point approximately 720 feet downstream of the well site.

The well site is underlain by a mapped stratified drift aquifer that generally extends along Minnewawa Brook from Marlborough-center to the confluence of Otter Brook in Keene. The portion of the aquifer that underlies the well site is a northwest-southeast trending band of drift deposits that are constricted between till-covered/bedrock hills to the north and south. The deposits underlying the well site are comprised of interlayered sands and gravels, with some poorly sorted silty layers, and clay layers that are not laterally continuous. The aquifer is unconfined and is on the order of 50 feet thick with a saturated thickness of approximately 40 feet. The production wells are screened from a depth of 29 feet to 43 feet below ground surface in the stratified sand and gravel deposits. The drift deposits are underlain by sandy till, which in turn is underlain by schist and metasandstone bedrock of the Rangely Formation.

WITHDRAWAL TESTING AND CONCLUSIONS

A withdrawal testing program was conducted by Nobis Engineering, Inc. (Nobis) from July 18, 2012 through August 13, 2012. 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 100 gpm between July 25, 2012 and July 30, 2012 and Well No. 4 was pumped at approximately 100 gpm between August 6, 2012 and August 9, 2012. Because the production wells are screened in the same aquifer over the same depth interval, and are located only four feet apart, NHDES approved a shorter duration pumping period with reduced monitoring for the testing of Well No. 4.

Discharge from the production wells was metered and measured using an orifice weir during the withdrawal testing program to maintain constant pumping rates, and water quality samples were collected during each pumping period to characterize the quality of the water derived from the wells.

During the withdrawal testing program, water level measurements were collected at: the production wells; 15 overburden monitoring wells; 12 wetland piezometers; 4 surface water staff gauges; and 2 private water supply wells (1 unused overburden well and 1 bedrock well). The 2 private water supply wells serve properties located approximately 500 feet and 900 feet to the northwest of the production wells. Groundwater and surface water measurements were recorded to assess the degree of hydraulic connection between the overburden aquifer, bedrock, Minnewawa Brook, and other surrounding streams and wetlands.

Groundwater level measurements collected during the pumping of Well No. 3 indicate that 13 monitoring wells and 6 piezometers responded to pumping. Water levels at the staff gauges and in the private water supply wells did not respond to pumping of Well No. 3. Pumping-induced drawdown of water levels in the monitoring wells ranged from approximately 0.1 feet to 13.2 feet and was greatest in wells located closest to Well No. 3. Pumping-induced drawdown of water levels in the piezometers ranged from approximately 0.1 feet to 0.6 feet and was greatest in piezometers located in a wetland north of Well No. 3.

The cone of depression of the proposed withdrawal is asymmetrical and is elongated in the east-west direction (parallel to Minnewawa Brook) when compared to the north-south direction. Based on an analysis of graphical projections of water level responses in the monitored wells that assume 180 days of continuous pumping of Well No. 3 (or Well No. 4) at 100 gpm 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 400 feet west (downgradient) and 690 feet east (upgradient) of the production wells. To the north and south of the production wells, the cone of depression extends beneath a wetlands complex and Minnewawa Brook, respectively; however, insufficient water level data are available to estimate the exact extent.

Based on an evaluation of the wetland north of the production wells and the piezometer water level data, Nobis concluded that the subject wetland has the ability to maintain an adequate moisture regime to support wetland conditions during any deep unusual draw down periods that might occur and that the withdrawal from the production wells is not likely to negatively affect the value of the wetland system, which is a criterion for adverse impacts under RSA 485-C:21, V-c.(g).

Results of the water quality sampling conducted during the withdrawal testing program indicate that each parameter, with the exception of pH, was below the applicable Maximum Contaminant Level (MCL) or Secondary Maximum Contaminant Level (SMCL) in water derived from the production wells. Results of the water quality sampling program also indicated that the concentration of radon is elevated in water derived from the wells.

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 Roxbury, the City of Keene, and the Marlborough Estates community public water system. No public hearings were requested, and no public meetings were held regarding the application for this large groundwater withdrawal permit.

LARGE GROUNDWATER WITHDRAWAL PERMIT MONITORING, REPORTING AND WITHDRAWAL REQUIREMENTS

No initial monitoring of water users or water-related natural resources is incorporated into the permit due to the lack of substantial influence of the production wells on these entities. 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 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. 4.