NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES

hereby issues

LARGE GROUNDWATER WITHDRAWAL PERMIT

NO. LGWP-2019-0001

to the permittee

CITY OF DOVER COMMUNITY SERVICES DEPARTMENT
DOVER WATER DEPARTMENT
271 MAST ROAD
DOVER, NH 03820
(603-516-6450)

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

Well DWP-PW2: 288,000 gallons over any 24-hour period

Well DWP-PW2 and the Willand Pond 12-inch Well: a combined total of 864,000 gallons over any 24-hour period

Date of Issuance: November 8, 2019
Date of Expiration (if the withdrawal is not activated): November 8, 2024
Date of Expiration (if the withdrawal is activated): November 8, 2029

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 Well DWP-PW2 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, signed May 12, 2014, in accordance with Env-Wq 2101 and NHDES' approval dated June 10, 2014.

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. 6 of this permit:

   a) The 24-hour peak day volume withdrawn from each source during each month and the date the water use occurred; and

   b) The cumulative total volume withdrawn from each source during each month.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 monitoring and reporting program as described below:

   a) Willand Pond Surface Water Level Monitoring

      i. Prior to initiating the withdrawal, the permittee shall identify (or establish) a permanent local benchmark for use as a vertical reference point for monitoring the surface water elevation of Willand Pond;

      ii. The permittee shall construct a permanent staff gauge in Willand Pond to facilitate the measurement of the surface water level in the pond. The staff gauge shall be installed in an area of the pond that will not become dewatered, and where the gauge can be easily read from the shoreline and the risk of disturbance is minimal. The gauge location shall be established in accordance with Env-Wq 403.30;

      iii. Upon installation, and once yearly thereafter after ice out, the permittee shall calibrate the staff gauge to the benchmark, in accordance with Env-Wq 403.30, and determine the staff gauge measurement that corresponds to an elevation of 184 feet NGVD 29;

      iv. On an annual basis from April 1 to October 30, the permittee shall read and record the staff gauge measurement every two weeks; and

      v. If the surface water elevation of Willand Pond reaches 184 feet NGVD 29, the permittee shall follow the management procedures described in condition No. 5c of this permit.

   b) All monitoring shall be completed by a person who can demonstrate, by education or experience, competency in collecting and reporting hydrologic measurements.

      Monitoring locations and frequencies may be added or changed if the 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 in an electronic format. The annual monitoring report shall note any relevant observations that may affect the measurements and include all field notes documenting the monitoring activities for the preceding year.

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) 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.

   c) NHDES will routinely review environmental conditions and the results of all monitoring data, and if necessary, 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 Well DWP-PW2 and the Willand Pond 12-inch Well in accordance with the management procedures described below.

   WILLAND POND SURFACE WATER LEVEL MANAGEMENT PROCEDURES

   In the event that the following monitoring trigger is met, production from Well DWP-PW2 and the Willand Pond 12-inch Well shall cease.

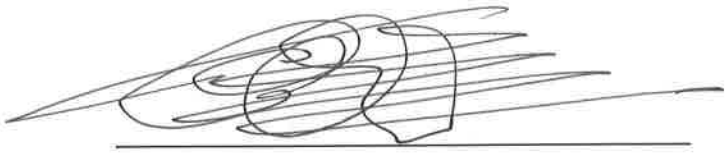
   Trigger: A surface water elevation of Willand Pond less than or equal to 184 feet NGVD 29.

   As part of these management procedures, the permittee shall notify NHDES in the event that this trigger is encountered.

6. 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.

7. The permittee shall apply for renewal of this permit no more than 6 months 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.



Thomas O'Donovan, P.E.,
Director Water Division

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PROJECT NARRATIVE

Large Well Siting Approval/Large Groundwater Withdrawal Permit LGWP-2019-0001
City of Dover Water Department, PWS ID 0651010
Well DWP-PW2
Somersworth, New Hampshire

November 8, 2019

BACKGROUND

The City of Dover Water Department (Dover) 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 288,000 gallons per day (gpd) or 200 gallons per minute (gpm) over a 24-hour period. Dover 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 Well DWP-PW2) is to: 1) provide additional water supply capacity for the system; and 2) aid in managing the surface water level in Willand Pond. Well DWP-PW2 will be used in conjunction with Dover's Willand Pond 12-inch Well (WPW) to withdraw up to a maximum combined volume of 864,000 gpd (600 gpm) depending on available recharge and the surface water level in Willand Pond.[1]

Well DWP-PW2 is located on the northwest shore of Willand Pond, just east of the Dover/Somersworth town line. The potential impact area for the combined withdrawal from DWP-PW2 and WPW encompasses approximately 3.3 square miles and includes the catchment area of Willand Pond, the entire Rollins Brook watershed, and the contributing area to Fresh Creek upstream of the limit of tidal influence.

The well site is underlain by approximately 75 feet of glacial sand and gravel deposits. Well DWP-PW2 is screened from a depth of 47 feet to 55 feet below ground surface in fine- to coarse-grained sands and gravels. These deposits are underlain by fine- to medium-grained sands, which in turn are underlain by a thin veneer of till overlying bedrock of the Berwick Formation which occurs at approximately 80 feet in depth.

WITHDRAWAL TESTING AND CONCLUSIONS

A withdrawal testing program was conducted by Emery & Garrett Groundwater, Inc. (EGGI) from March 21, 2012 through April 9, 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. Additionally, the purpose of DWP-PW2 is to operate in conjunction with Dover's previously approve 12-inch production well (WPW) to regulate the surface elevation of Willand Pond. Due to disconnected commercial land development within Willand Pond's outlet stream and associated filling within its drainage network, the pond cannot sufficiently drain water during periods of prolonged seasonal rain or snow melt that raises the pond surface elevation. In order

[1] The WPW served Dover from 1954 to 1966 and was deactivated due to aesthetic water quality issues. As part of the work performed to re-establish WPW as a community water supply well, an extended pumping test was performed where WPW was pumped at 600 gpm between July 22, 2010 and October 20, 2010 (90 days). In a letter dated December 2, 2011, NHDES approved the reactivation of WPW with a permitted production volume of 587,520 gpd (408 gpm), which is the rate at which the well was historically used.

to reduce the potential to flood NH Route 108 and surrounding residences and properties, Dover intends to pump both well DWP-PW2 and WPW and 'pull' surface water levels in the pond down. The withdrawal testing program included monitoring during pre-pumping, pumping, and water level recovery periods, where DWP-PW2 was pumped at approximately 200 gpm between March 28, 2012 and April 2, 2012.

Discharge from DWP-PW2 was measured manually 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 DWP-PW2 and WPW; 4 overburden exploration wells; 18 monitoring wells; 8 piezometers; and 3 surface water stations. Shallow groundwater and surface water level measurements were recorded to assess the degree of hydraulic connection between the overburden aquifer, Willand Pond, and surrounding wetlands.

The nearest private domestic wells to the well site (within the 1,000-foot buffer of the 180-day zone of influence of the withdrawal) are approximately 1,400 feet northwest and are presumed to be installed in bedrock. As such, no private domestic wells were monitored during the withdrawal testing program.

Water level measurements collected during the withdrawal testing program indicate that WPW, 4 overburden exploration wells, 5 monitoring wells, 6 piezometers, and 1 surface water station responded to pumping of DWP-PW2.

Based on a distance-drawdown analysis of graphical projections of water level responses in the wells that assume 180 days of continuous pumping of DWP-PW2 at 200 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 850 feet to the northwest, 1,150 feet to the southwest, and 1,750 feet to the northeast of DWP-PW2, and into the portion of the aquifer that extends beneath the northwestern portion of Willand Pond. Overall, based on monitoring results presented in the final report, a production rate of 288,000 gpd (200 gpm) is a production rate that DWP-PW2 and the geologic formation can sustain. In general, the areal extent and degree of hydraulic influence of pumping DWP-PW2 are on the same order of magnitude as those estimated from modeling efforts conducted for the reactivation and approval of WPW.

Results of the water quality sampling conducted during the withdrawal testing program indicate that each parameter, with the exception of iron and pH was below the applicable Maximum Contaminant Level (MCL) or Secondary Maximum Contaminant Level (SMCL). Water quality testing results showed a decreasing trend in the concentration of iron in water derived from DWP-PW2; over the course of the withdrawal testing program, the iron concentration decreased from 0.83 milligrams per liter (mg/l) to 0.62 mg/l, which is above the SMCL of 0.30 mg/l. The SMCL range for pH is 6.5 to 8.5; testing results showed that the water derived from DWP-PW2 has a pH in the range of 5.9 to 6.2. Manganese was also elevated in water derived from DWP-PW2, although not above the SMCL of 0.05 mg/l; over the course of the withdrawal testing program, the manganese concentration decreased from 0.044 mg/l to 0.036 mg/l. Results of the water quality sampling program also indicate that the concentration of radon is slightly elevated in water derived from DWP-PW2.

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 Rollinsford and the city of Somersworth, both of which have municipal water systems that also intersect the potential impact area of DWP-PW2. No public hearings were requested, and no public meetings were held regarding the preliminary application for this large groundwater withdrawal permit.

On December 11, 2012, the city of Somersworth requested a public hearing following submittal of the final report; NHDES subsequently held a public hearing on the application in Somersworth on January 9, 2013. At the hearing, a summary of the regulations governing large groundwater withdrawals was presented by NHDES, a project summary was presented by Dover and EGGI, a question and answer session was held, and oral testimony was recorded. After the public hearing, the 45-day written comment period on the report commenced, and closed on February 23, 2013. Oral testimony and comments received during the public hearing related to: the development potential of a property abutting the well site, the use of the Willand Pond recreational facilities, potential for influencing water levels in the wetland complex north of Willand Pond, and management of the surface water level in Willand Pond. The oral testimony received during the January 2013 hearing that was pertinent to the large groundwater withdrawal permitting process did not contradict NHDES' decision on the permit application.

No written testimony or comments were received during the written comment period.

LARGE GROUNDWATER WITHDRAWAL PERMIT MONITORING, REPORTING AND WITHDRAWAL REQUIREMENTS

The large groundwater withdrawal permit requires Dover to monitor the surface water elevation of Willand Pond, and requires cessation of the withdrawal from Wells DWP-PW2 and WPW if:

- A trigger surface water elevation is met in Willand Pond.

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.

Dover is required to submit an annual monitoring report in an 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 DWP-PW2. 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.