The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

WATER CONSERVATION PLAN APPROVAL

February 25, 2014

Steve Fournier
Town of Newmarket
186 Main Street
Newmarket, New Hampshire 03657

Subject: Newmarket, Newmarket Water Works (PWS ID: 1731010)
Water Conservation Plan

Dear Mr. Fournier:

On February 18, 2014, the New Hampshire Department of Environmental Services ("DES") Drinking Water and Groundwater Bureau received a Water Conservation Plan (the "Plan"), signed on February 12, 2014, for the Newmarket Water Works ("NWW") located in Newmarket, New Hampshire . Pursuant to RSA 485:61 and Env-Wq 2101, community water systems seeking permits from DES for new sources of groundwater shall submit a water conservation plan to DES. Based on review of the Plan, DES has determined the Plan complies with Env-Wq 2101, *Water Conservation* rules.

DES approves the plan on the following conditions:

1. By **March 1** of each year, the water system shall submit a water balance for the prior year.

2. On **February 25, 2017**, and every three years thereafter, the water system shall submit a detailed and completed compliance report form to DES documenting compliance with the Plan. Required information includes contact information for the water-system owner and for the individual responsible for carrying out plan tasks; dates tasks were performed; and information related to the meter maintenance program, leak detection and repair, and public outreach.

3. The water system shall continue reporting to the DES Water Use Registration and Reporting Program.

4. Revisions to the Plan shall not be implemented without further approval from DES.

A copy of the *Water Conservation Plan Ongoing Compliance Form* and the online electronic *Water Balance Reporting Form* may be located by going to the DES website, www.des.nh.gov,

clicking on the "A-Z List" in the top right corner of the page, and scrolling down to Water Conservation.

Please feel free to contact me with any questions at (603) 271-0659 or via e-mail at stacey.herbold@des.nh.gov .

Sincerely,

Stacey Herbold
Water Conservation Program
Drinking Water and Groundwater Bureau

ec: Sean Grieg, Newmarket Public Works
Christine Bowman, NHDES
Derek Bennett, NHDES *(AC)*

RCVD 2/18/14

WATER CONSERVATION PLAN

Town of Newmarket Water Department
4 Young Lane
Newmarket, New Hampshire
603-659-8810
Public Water System Number 1731010

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Water Department Personnel

Superintendent Water/Sewer: Sean Greig

System Technician: Joel Drelick

Water Operator: Ben Trottier

System Overview

The Newmarket Water System is operated by the Town of Newmarket's Water Department. Newmarket's existing water system serves approximately 5,000 out of the town's 9,436 residents, based on the 2008 census and has approximately 2,000 accounts.

(1.) Residential Accounts
(2.) Industrial/Commercial/Institutional Accounts
(3.) Municipal Accounts
    (a.) Public works Department
    (b.) Buildings and Grounds Department
    (c.) Police Department
    (d.) Fire Department
    (e.) Wastewater Department

Water Use Trends / Population Trends

Underwood Engineers in 2005 performed a future water projection based on 2001 to 2005 usage (Table 1). The average daily water production for 2005 was 468,000 gpd.

Table 1: Average Daily Production Volume Projection

Year	Average Daily Production	Maximum Daily Production
2010	484,450 gpd	700,250 gpd
2015	500,850 gpd	796,350 gpd
2020	517,300 gpd	822,500 gpd
2025	533,700 gpd	848,600 gpd
2030	550,150 gpd	874,750 gpd

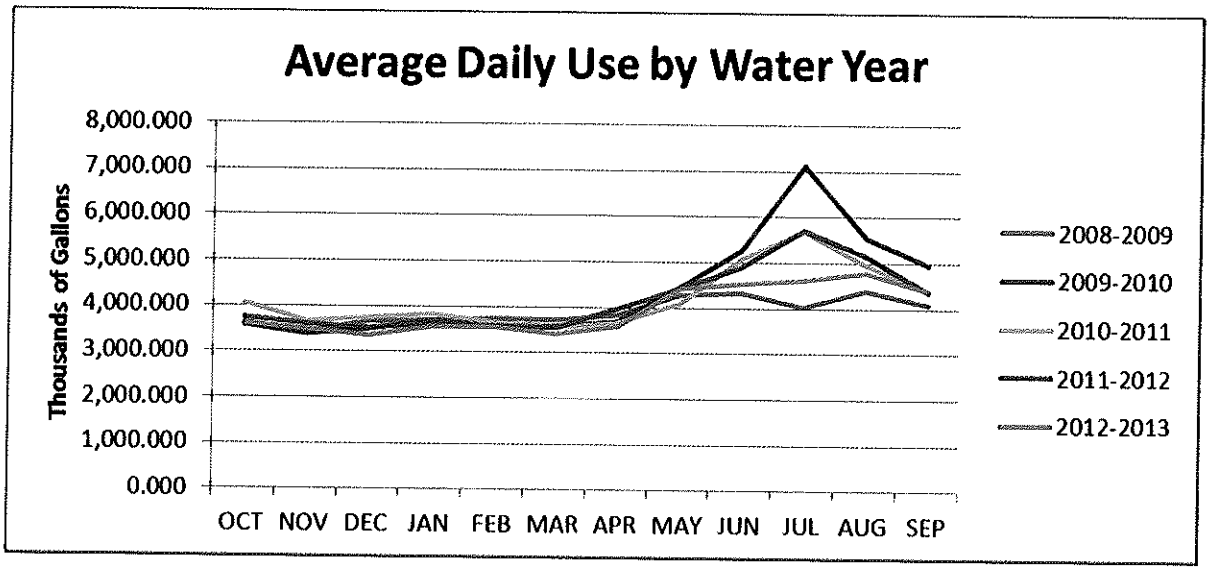
As a result of the recession, the town's average daily production volumes have not increased as predicted (Table 2).

Table 2: Actual Average Daily Production

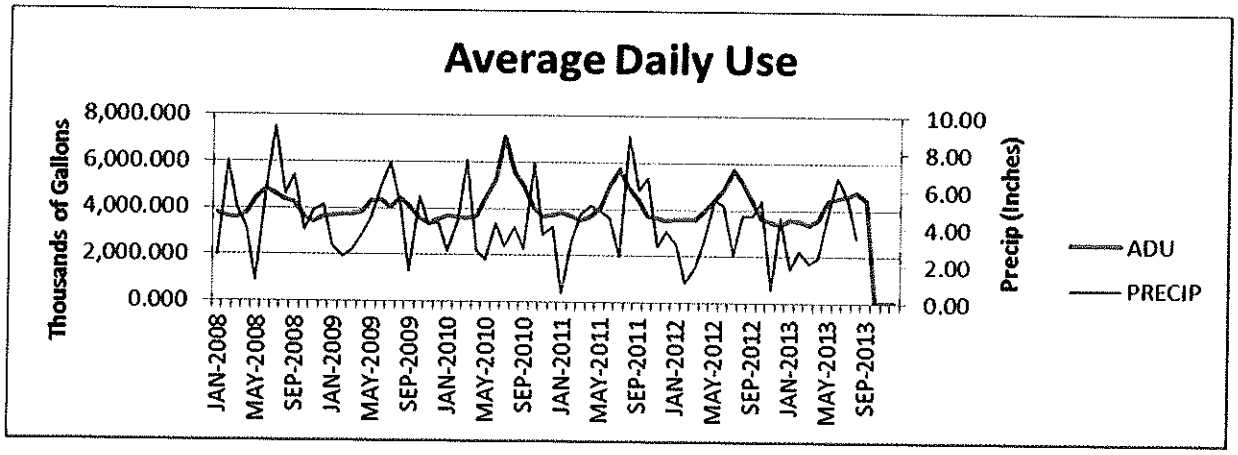
YEAR	Average Daily Production
2010	446,228
2011	395,917
2012	409,839
2013	374,933

ADU has varied by millions of gallons during the summer months (Chart 1. & 2.). Variation can be attributed to precipitation influencing outdoor water use. For example, the summer of 2010 was very dry (Graph 2.) and in July ADU was more than 1 million gallons greater than ADU in July of the previous two summers (Graph 1.).

Graph 1: Average Daily Water Use per Month by Water Year



Graph 2: Monthly Average Daily Water Use vs Precipitation



System Side Management

(A.) Source Meters

(1.) Sewall Well Route 152
Source Meter: Badger magnetoflow electromagnetic meter Version 2.4,
Model: Primo SN: 0111-189/17397404
Size: 6 inch

(2.) Bennett Well Route 152
Source Meter: Badger magnetoflow electromagnetic meter version 2.4,
Model: Primo SN: 011-188/17397403
Size: 6 inch

(3.) MacIntosh Well Ashawamp Road
See below for meter selection – The meter will be installed per the manufacturer's specifications.

(4.) Packers Falls Surface Water Treatment Plant: **These meters are inactive.**

Lamprey River Intake
Source Meter: Rockwell Propeller 30
Meter Model PA 15208 SN: 37773
Size: 12 inch

Piscassic River / Follets Brook Intake
Source Meter: Rockwell Propeller 30
Meter Model PA15208 SN: 37772
Size: 12 inch

(B.) Analytic meters – there are two low flow analytic meters at the wells which are considered when conducting water audits.

(C.) Meter Testing

a. Source meters will continue to be tested and calibrated every year. The town maintains a certification book for the source meters.

(D.) Meter reading

a. The source meters will continue to be read and recorded daily and will never be read less than once a month.

(E.) Water Use Reporting

a. Monthly production volumes will continue to be submitted to the DES Water Use and Registration Program on a quarterly basis.

(F.) Meter Selection, Installation, and Maintenance

a. The Town of Newmarket Water Department source meters will be selected, installed, and maintained in compliance with "Manual of Water Supply Practices M6, Water Meters-Selection, Installation, Testing and Maintenance," (American Water Works Association, 1999).

i. New source meters were installed several years ago at the Bennett and Sewell wells. There was not enough straight pipe beyond the source meters per manufacturer installation recommendations. This was discussed with the NHDES at that time. A change would require a major plumbing project at both the Bennett and Sewell wells. Even though the meters are not installed to the manufacturer's installation recommendations, the meters accuracy was checked and was within the manufacturer's specifications. The meters are calibrated and checked for accuracy every year and are within specifications. Any new well will have a meter installed to the current requirements.

Service Meters

The town has metered all residential, commercial/industrial, irrigation, and municipal connections. The town will continue to read the meters monthly with radio reading. The town will also continue to bill quarterly. The water operator can read all services meters within about six hours.

The town has approximately 2000 service water meters. The town installed approximately 500 new water meters from 2008 to 2009, and 1400 new meters in 2010. The remaining meters were installed prior to 2005. The department is creating a database that will track meter ages and failures. The department will compile the information and create a model to determine

when meters need to be changed out. The town will use this model to create a meter change out program.

The Majority of service meters in the Town of Newmarket water system are Badger model 25, 5/8" and 5/8" x ¾" bronze disc meters. The Town does have a few model 70, 1", model 120, 1.5" and model 170, 2" bronze disc meters. The meters meet or exceed new meter accuracy standards set forth in AWWA standard C700. The meter product will meet or exceed repaired meter accuracy set forth in AWWA manual M-6 Chapter 5. The following chart summarizes the meter's warranty.

Meter Model Size	AWWA New Meter ACCURACY	AWWA Repaired Meter Accuracy (AWWA M6 Manual)	Badger Meter Extended Low Flow Meter Accuracy
Model 25, 5/8" and 5/8"x3/4"	Five years from the date of shipment or registration of 750,000 gallons, whichever occurs first	15 years from date of shipment or registration of 2,500,000 gallons, whichever occurs first, with a 25 gallon safe maximum operating capacity and a 15gpm maximum rate for continuous operation	Badger Meter warrants product low flow accuracy of 98.5% at a rate of 1/8 gpm for (5) years from date of shipment or registration of 675,000 gallons, whichever occurs first.
Model 70, 1"	Five years from the date of shipment or registration of 1,100,000 gallons, whichever occurs first	15 years from date of shipment or registration of 3,250,000 gallons, whichever occurs first, with a 70 gallon safe maximum operating capacity and a 50 gpm maximum rate for continuous operation	Badger Meter warrants product low flow accuracy of 95% at a rate of 3/4 gpm for (3) years from date of shipment or registration of 1,100,000 gallons, whichever occurs first.
Model 120, 1.5"	Two years from the date of shipment or registration of 1,600,000 gallons, whichever occurs first	15 years from date of shipment or registration of 5,600,000 gallons, whichever occurs first, with a 120 gallon safe maximum operating capacity and a 80 gpm maximum rate for continuous operation	Badger Meter warrants product low flow accuracy of 95% at a rate of 1.25 gpm for (2) years from date of shipment or registration of 1,440,000 gallons, whichever occurs first.
Nodel 170, 2"	Two years from the date of shipment or registration of 2,100,000 gallons, whichever occurs first	15 years from date of shipment or registration of 10,400,000 gallons, whichever occurs first, with a 170 gallon safe maximum operating capacity and a 100 gpm maximum rate for continuous operation	Badger Meter warrants product low flow accuracy of 95% at a rate of 1.5 gpm for (2) years from date of shipment or registration of 1,890,000 gallons, whichever occurs first.

The Town has Badger Remote Orion water meters, the remote readers that mount on top of the meters have the following warranty: Badger will, at Badger's option, repair or replace non-performing product at no cost during the first (10) years of the warranty. Badger will apply these prorated price discounts to product price discounts to product list prices in effect at the time of product return and according to the following prorated price discount schedule: years 11 through 12--75% discount; years 13 through 15 -- 50% discount; year 16 -- 40% discount; Year 17 -- 30% discount; Year 18 -- 20% discount; year 19 through 20 – 10% discount.

The Town of Newmarket Water Department service meters will be selected, installed, and maintained in accordance with "Manual of Water Supply Practices M6, Water Meters-Selection, Installation, Testing, and Maintenance," (American Water Works Association 1999).

Water Audit

Annually, by March 1, a water balance for the prior year will be submitted to DES. The water balance will include the following information:

1. System input volume: The amount of water distributed into the water system.
2. Authorized metered consumption: All water consumed that is metered.
3. (System Input Volume – Authorized Metered Consumption)/System Input Volume x 100%

If #3., above, exceeds 15%, a water audit will also be submitted with the water balance. The water audit will be completed in accordance with "Manual of Water Supply Practices M36, Water loss and Control Programs" (American Water Works Association 2009).

Water Balance 2013					
	Water Pumped 2013 Gallons	Total Water Billed 2013 Cubic Feet	Total Water Billed 2013 Gallons	Water Pumped Minus Water Billed	Percent Water Loss
January	11,101,392	1,285,147	9,612,903	1,488,489	13.41%
February	10,288,804	1,327,167	9,927,208	361,596	3.51%
March	11,346,796	1,419,569	10,618,374	728,422	6.42%
April	10,860,000	1,402,761	10,492,649	367,351	3.38%
May	11,851,000	1,510,411	11,297,872	553,128	4.67%
June	11,886,296	1,543,845	11,547,958	338,338	2.85%
July	12,213,800	1,548,912	11,585,863	627,937	5.14%
August	12,317,904	1,592,467	11,911,651	406,253	3.30%
September	12,203,192	1,573,576	11,770,347	432,845	3.55%
October	11,154,404	1,389,123	10,390,641	763,763	6.85%
November	11,119,700	1,465,474	10,961,742	157,958	1.42%
December	10,708,400	1,392,135	10,413,172	295,228	2.76%
Totals for Year	137,051,688	17,450,585	130,530,378	6,521,310	4.76%

The town repaired two water breaks in January, and one service break on Wadliegh Falls Road in October.

Leak Detection

The Department has completed an aggressive meter installation plan. The water loss has decreased from 25% in the 2005 Underwood Engineers Water Storage and Distribution Improvements Report to less than 5% for 2013. The Town's water loss is well below industry standards.

The Water Department monitors trends daily on the water system SCADA system. Changes in pressure, trends, and pumping are investigated.

The Department has created a water map with valves, hydrants, sources, pipe size, pipe age, and pipe material with the GIS system. The Department takes pictures of repairs and installations. The pictures are added into the GIS mapping.

The type of leak (ex. main, service, hydrant), the nearest address, the date the leak was discovered, the date the leak was repaired, and the estimated size of the leak (gpm) will be kept on file and included with the system's three year ongoing compliance report.

In-house Leak Detection Equipment:

Heath Aquascope Leak Detector Kit

Leak detection will be performed on an as needed basis.

Pressures Management

(1.) Existing minimum distribution pressure: 40 Psi

(2.) Existing maximum distribution pressure: 95 Psi

The pressure is monitored on the SCADA system. The town has no plans to reduce pressure zones in excess of 80 Psi. New water mains are pressure tested at 150 Psi for one hour. The department monitors trends and pressure for changes and investigates those changes daily.

Intentional Water Loss

The Department does not have any bleeders in the water system, nor does it intentionally overflow its storage tank to improve water quality, improve hydraulics, or prevent freeze-ups.

Consumption Side Management

The Water Department water rate for everyone is $4.25/100 cubic feet plus a $6.00 per unit per quarter system charge. The water consumption is billed quarterly. The water rate will continue to be based on usage and will either be a uniform block rate or an increasing block rate.

The water bills contain consumption in 100 cubic feet. The water bill shows previous and current read, water consumption, and rate. The Water Department will send out possible leak letters if the customer's meter indicated a possible leak.

Educational Outreach

Currently, the town uses its Consumer Confidence Report to educate water users on water saving tips and action. The department has water a conservation pamphlet available at the town hall. The Department intends to use the Town's website, channel 13, and informational mailings to educate its customers about water use and conservation. The Town personnel works with home owners with high water bills by supplying information and support to find leaks.

Zoning Ordinance / Bylaws

The Town does not have the following water efficiency bylaws:

(1.) Indoor
  (a.) Water efficient fixtures beyond the existing fire code
(2.) Irrigation system
  (a.) Prohibition or restrictions to irrigation systems
  (b.) Require soil moisture sensors
  (c.) Require rain sensors
(3.) Other water efficiency ordinances

Water Use Restrictions

See attachment A for water use restrictions. The Newmarket Town Council is responsible for approving the water restriction stage. The Newmarket Police Department is responsible for enforcement.

Reporting and Implementation

The Newmarket Water System will report to DES as follows:

1. A water balance will be submitted to DES annually (See Water Audit section, above.)
2. Monthly water production volumes will continue to be reported quarterly to the DES Water Use and Registration Program.
3. Records will be kept of leaks discovered and repaired, leak detection activities, service meters replaced, source meters tested/calibrated, residential rate changes, and water efficiency educational materials distributed/ events held. The information will be submitted to DES every three years on an ongoing compliance form supplied by DES.

The activities outlined in the water conservation plan will be completed by water system personnel under the supervision of a certified water system operator.

I certify that I have read this Water Conservation Plan, understand the responsibilities of the water system as referenced in the plan, and that all information provided is complete, accurate, and not misleading.

Owner Name (print): STEPHEN R. FOURNIER, TOWN ADMINISTRATOR

Owner Signature: _____ Date: 2/12/14