

STATE OF NEW HAMPSHIRE  
THE NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION  
HAMPSTEAD AREA WATER COMPANY, INC

DW 06-104

MOTION TO AMEND PETITION FOR APPROVAL OF FINANCING AND STEP  
INCREASE

The Petitioner, Hampstead Area Water Company, Inc. (HAWC), respectively moves to amend its petition to the N.H. Public Utilities Commission (Commission) for approval of financing for a hydrology study in order to ascertain the water resources within its franchise areas. Additionally, HAWC is seeking implementation of a step increase for additions to plant and a step adjustment surcharge. In support of this Motion to Amend the Petition, HAWC says:

1. HAWC is presently franchised in most areas of Atkinson, New Hampshire and Hampstead, New Hampshire. Besides the systems in Hampstead and Atkinson, HAWC currently has satellite systems in Camelot Court in Nottingham, Colby Pond in Danville, Cornerstone Estates in Sandown, Cricket Hill-Maplevale Farms & Woods in East Kingston, Lamplighter Estates in Kingston, Cooper's Grove in East Kingston and Kingston, Oak Hill in Chester, Rainbow Ridge in Plaistow, Sargent Woods in Newton, Stoneford Estates, Waterford Estates, and Autumn Hills, all in Sandown.
2. That, after the Stipulation in this docket was approved by PUC Commission Order No. 24,728, dated February 2, 2007, and as a result of communications with the Department of Environmental Services (DES), HAWC proceeded with the Hydrology study and large groundwater permit. HAWC contracted with Hydroterra to assist HAWC in ascertaining the water resources available within its Atkinson core systems and to prepare an Application for a large groundwater permit to be submitted to DES. DES had sent a

letter dated March 30, 2006 to HAWC outlining its suggestions, filed in this docket as part of the Petition, and HAWC worked with DES subsequently during this process.

3. That the Application for a large groundwater permit that Hydroterra prepared was rejected by DES. As a result of the DES rejection, HAWC dismissed Hydroterra and hired Emery & Garrett, a preeminent groundwater engineering firm with extensive experience in large groundwater permitting. Emery & Garrett were subsequently successful in obtaining approval for a large groundwater permit on behalf of HAWC. A copy of the approval is attached at Exhibit 1.
4. At the time of the Petition, HAWC has estimated the total cost to be \$162,069.50. Unfortunately due to length of the DES process and the extensive community participation in that process, the cost for the study has increased since the initial 2006 estimate to an actual cost of \$286,133 to date. As part of the study, the Company drilled a number of test wells at Midpoint, Settlers Ridge and Fieldstone. The three test wells drilled at Midpoint are not productive due to the uranium levels. As such, the costs of the three wells of \$70,142 have been included with the study costs. The test wells at Settlers Ridge and Fieldstone will be further developed and ultimately placed in service upon completion. The costs of the test wells at Settlers Ridge and Midpoint are not included with the study costs. This makes the total additional financing needed attributable to the hydrology study to be \$356,275. See Schedules and supporting invoices attached collectively as Exhibit 2.
5. As stated in the original Petition, this will be financed by a loan from Lewis Builders Development, Inc., an affiliated company. The initial approved note has been revised to reflect the current amount. See the revised proposed Promissory Note, Exhibit 3.

6. It would be in the public good for HAWC to have approval of this additional financing request. HAWC provides the following in support:
  - a. HAWC now has more information and data concerning the water supply within its Atkinson franchise, and it can better serve the needs of the expanding population therein.
  - b. The hydrology study performed by Emery & Garrett has had application in well exploration and water supply in Atkinson as well as HAWC utilizing that knowledge for the interconnection with the Hampstead core. The hydrology study has assisted HAWC in its long range water supply planning for the Atkinson and Hampstead core system.
7. As part of the Stipulation filed here and approved by the Commission by Order No. 24,728 dated February 2, 2007, HAWC was granted leave to file documentation in support of a step increase and step adjustment surcharges. While the items on this docket related to the software upgrade and the replacement of the truck fleet have already been included in rates as part of HAWC's last rate case, the financing and step increase has not.
8. Attached is the Testimony of Stephen St. Cyr and Schedules referred to collectively as Exhibit 4, showing the cost of debt for the proposed financing and step increase as follows:
  - a. Schedule 1 (SPS-1) is entitled Calculation of Revenue Requirement and shows the additional revenue of \$97,647 required as a result of the financing. There is proposed a 6.82% increase in the Revenue Requirement over the Total Stipulated Water Revenues in DW 08-065.

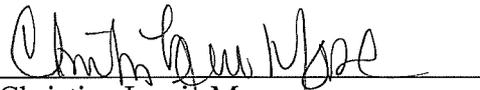
- b. Schedule 2 (SPS-2) is entitled Rate of Return and shows the cost of debt incurred as a result of the 2010 Lewis financing. This is 6.2124%.
  - c. Schedule 3 (SPS-3) is entitled Calculation of Rates and shows the rate change requests as a result of the step increase to be \$0.43 to the Consumption Charge per hundred ccf.
9. Additionally, HAWC estimates that there will be step adjustments surcharges totaling approximately \$10,750.50. Pursuant to the Stipulation these are to be recouped over a period not to exceed one (1) year. See Stipulation, Section III (C), p.6.
10. For all the reasons set out above and in the Testimony of Stephen St. Cyr, it would be in the public good for HAWC to have approval of the step increase request, approval of the increased financing, and step adjustment surcharges, as proposed.

WHEREFORE your Petitioner prays:

- A. That the Commission find that it would be in the public good for the HAWC to be permitted to increase the financing the hydrology study and large groundwater permit, as proposed;
- B. That the Commission find that it would be in the public good to approve the step increase and step adjustment surcharges, as proposed
- C. That the Commission, by appropriate order, grant HAWC permission for the additional financing for the hydrology study and large groundwater permit, as proposed;
- D. That the Commission, by appropriate order, grant HAWC permission for the step increase and the step adjustments surcharges, as proposed;
- E. That the Commission make such further findings and orders as may be appropriate on the circumstances.

Dated the 16<sup>th</sup> day of April, 2010

Respectfully submitted,  
HAMPSTEAD AREA WATER COMPANY, INC.

  
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Christine Lewis Morse  
Vice President

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Schedule A

**HAWC System History**

<b>Company</b>	<b>Year</b>	<b>Docket</b>	<b>Order</b>	<b>Franchise Area</b>
Walnut Ridge Water Company	1977	DE 76-179	12,827	Atkinson
Lancaster Farms-Salem	1984	DR 84-267	17,312	144 Acres
Bricketts Mill-Hampstead	1985	DE 85-149	17,848	80 Acres
Squire Ridge-Hampstead	1985	DE 85-274	17,967	140 Acres
Kent Farm-Hampstead	1987	DE 86-198	18,560	1,700 Acres
Kent Farm-Hampstead	1987	DE 86-198	18,598	Supp Order
Woodland Pond-Hampstead	1987	DE 87-211	18,980	701 Acres
Bryant Woods-Atkinson	1988	DE 87-226	19,230	2,340 Acres
Hampstead Area Water Company	1989	DE 89-047	19,717	Hampstead Merger*
Hampstead Area Water Company	1989	DE 89-047	19,751	1,650 Bryant Woods Merger**
Walnut Ridge Water Company	1990	DE 90-129	19,992	55 Acres
HAWC-Bricketts Mill Extension	1990	DE 90-049	19,783	1,246 Acres
HAWC-Hampstead	1991	DE 91-121	20,224	1,350 Acres
HAWC-Hampstead	1991	DE 91-144	20,320	370 Acres
HAWC-Rainbow Ridge-Plaistow	1993	DE 92-129	20,774	152 Acres
HAWC-Stoneford-Sandown	1996	DE 96-201	22,551	301 Acres
HAWC-Colby Pond-Danville	1998	DE 97-154	22,854	177 Acres
HAWC-Oak Hill-Chester	2000	DW 00-059	23,577	
HAWC-Walnut Ridge & Lancaster	2002	DW 01-204	23,954	Atkinson Merger***
HAWC-Camelot Court- Nottingham	2004	DW 02-198	24,296	44 Acres
HAWC-Cornerstone-Sandown	2004	DW 02-198	24,296	188 Acres
HAWC-Lamplighter-Kingston	2004	DW 02-198	24,296	13.66 Acres
HAWC-Maplevale-East Kingston	2004	DW 03-150	24,299	107 Acres
HAWC-Dearborn Ridge-Atkinson	2005	DW 04-055	24,501	37 Acres
HAWC-Hampstead Expansion	2005	DW 04-062	24,520	519.56 Acres
HAWC-Mill Woods-Sandown	2005	DW 05-063	24,544	35 Acres
HAWC-Waterford Village- Sandown	2005	DW 05-070	24,545	90.37 Acres
HAWC-Jameson Ridge-Atkinson	2005	DW 05-092	24,592	67.85
HAWC-Autumn Hills-Sandown	2005	DW 06-016-	24,608	45.55 Acres

\*Merged Bricketts Mill, Kent Farm, Squire Ridge and Woodland Pond into HAWC

\*\*Merged Bryant Woods into Walnut Ridge with requirement that the Bryant Woods rates apply

\*\*\*Merged Lancaster Farms and Walnut Ridge into HAWC



The  
NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES  
hereby issues  
LARGE GROUNDWATER WITHDRAWAL PERMIT

NO. LGWP-2009-0002

to the permittee

HAMPSTEAD AREA WATER COMPANY  
54 SAWYER AVENUE  
ATKINSON, NH 03811  
(603-362-4299)

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

Fieldstone Well Field

HWC-FS1	56,160 gallons over any 24-hour period
HWC-FS1 and FS-4E	a combined total of 57,600 gallons over any 24-hour period

Settlers Ridge Well Field

HWC-SR3	136,800 gallons over any 24-hour period
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Date of Issuance: December 18, 2009

Date of Expiration: December 18, 2019

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 HWC-FS1, FS-4E, and HWC-SR3 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 May 8, 2008, in accordance with Env-Wq 2101 (formerly Env-Ws 390) and NHDES' approval dated June 5, 2008.
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 six months prior to initiating a withdrawal from HWC-SR3 and shall continue indefinitely as a condition of this permit.

Property Identification Number	Property Address
00001200002300000001	14 Pope Road
00001200001900000001	145 Main Street

- 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 HWC-SR3. Water level monitoring shall commence upon initiating a withdrawal from HWC-SR3 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. All field notes shall be signed and dated by the personnel responsible for collecting measurements.

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 the large groundwater withdrawal, 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 areas estimated to be the influence areas of wells HWC-FS1 and FS-4E and HWC-SR3, as illustrated on Figure 1, titled "Maximum 180-Day Zone of Influence and Projected Drawdown, Fieldstone Well Field," and Figure 2, titled "Maximum 180-Day Zone of Influence and Projected Drawdown, Settlers Ridge Well Field," included in the Final Report Addendum titled "Response to NHDES Comments (June 29, 2009), Final Well Siting Report, Hampstead Area Water Company, Walnut Ridge Water System, Groundwater Development at the Fieldstone and Settlers Ridge Well Fields," prepared by Emery & Garrett Groundwater, Inc., dated August 18, 2009. The permittee shall provide a copy of the notification letter and copies of the certified return mail receipts to NHDES. The permittee shall explain to property owners with wells in the identified areas that their well may be influenced by the withdrawal at either HWC-FS1 and FS-4E or HWC-SR3 and that a Source Replacement Plan is available and that a copy could be provided to them at their request. The Source Replacement Plan, titled "Groundwater Development at the Fieldstone and Settlers Ridge Well Fields, Source Replacement Plan," dated October 27, 2009, was prepared by Hampstead Area Water Company, and submitted to NHDES as part of Hampstead Area Water Company's November 4, 2009 response to NHDES' review letter dated October 29, 2009. The permittee shall 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.

- c) The permittee shall maintain the Emergency Well Services Contract included in the letter submitted to NHDES by Hampstead Area Water Company, Inc., dated November 4, 2009, or an equivalent contract with a company capable of providing pump- and well-related services, including the drilling of new wells, for the term of this permit, so that in the event of an adverse impact to a public or private well, mitigation steps can be undertaken expeditiously.
- d) 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.
- e) 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 HWC-SR3 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 on a minimum of a monthly basis.

#### STAGE I MANAGEMENT PROCEDURES

In the event that the following monitoring trigger is met or exceeded, production from HWC-SR3 shall be reduced to 75% of the permitted withdrawal volume such that output from the well does not exceed 102,600 gallons over any 24-hour period.

*Trigger:* A ten foot drawdown below a "Projected 180-day No-Recharge Water Level Elevation" at the locations listed in Table 1, unless it is determined by NHDES that the drop in water levels at a specific monitoring point 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 15<sup>th</sup> and 30<sup>th</sup> day of each calendar month.

#### STAGE II MANAGEMENT PROCEDURES

In the event that the following monitoring trigger is met or exceeded, production from HWC-SR3 shall be reduced to 50% of the permitted withdrawal volume such that output from the well does not exceed 68,400 gallons over any 24-hour period.

*Trigger:* A twenty foot drawdown below a "Projected 180-day No-Recharge Water Level Elevation" at the locations listed in Table 1, unless it is determined by NHDES that the drop in water levels at a specific monitoring point 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 15<sup>th</sup> and 30<sup>th</sup> day of each calendar month.

### STAGE III MANAGEMENT PROCEDURES

In the event that the following monitoring trigger is met or exceeded, production from HWC-SR3 shall be reduced to less than 57,600 gallons over any 24-hour period.

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

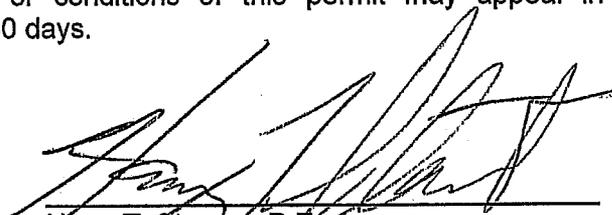
As part of Stage III management procedures, the permittee shall increase the frequency of reporting of all on-site and off-site water level measurements to NHDES, and submit all measurements electronically to NHDES by the 15<sup>th</sup> and 30<sup>th</sup> day of each calendar month.

### STAGE IV MANAGEMENT PROCEDURES

In the event that the water level measurements submitted to NHDES as part of Stage III management procedures indicate that production from HWC-SR3 is adversely impacting private wells and the adverse impacts will continue, the withdrawal from HWC-SR3 shall cease.

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 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.

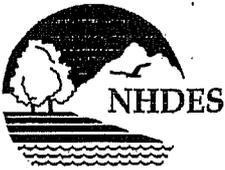


Harry T. Stewart, P.E.,  
Director, Water Division

Table 1. Trigger Water Level Elevations for Hampstead Area Water Company's Large Groundwater Withdrawal Permit LGWP-2009-0002.

Property Identification Number	Property Address	NHDES-Assigned Station Number*	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)	Stage III Trigger Water Level Elevation (feet AMSL)
000012000023000000001	14 Pope Road	18238	255	245	235	225
000012000019000000001	145 Main Street	18239	194	184	174	164

\* See enclosed Electronic Data Reporting Program Letter and Guidelines Document



The State of New Hampshire  
**DEPARTMENT OF ENVIRONMENTAL SERVICES**



Thomas S. Burack, Commissioner

December 18, 2009

John Brooks  
Emery & Garrett Groundwater, Inc.  
56 Main Street  
P.O. Box 1578  
Meredith, NH 03253

**RE: Large Well Siting Approval/Large Groundwater Withdrawal Permit LGWP-2009-0002  
Walnut Ridge/Bryant Woods Water System, Hampstead Area Water Company, EPA ID 0112080  
Wells HWC-FS1, FS-4E, HWC-SR3, and HWC-SR4  
Atkinson, New Hampshire**

Dear Mr. Brooks:

The New Hampshire Department of Environmental Services (NHDES) has conditionally issued to Hampstead Area Water Company (HAWC) the following: 1) an approval of four new large community production wells (wells HWC-FS1, FS-4E, HWC-SR3, and HWC-SR4) in accordance with New Hampshire Administrative Rules Env-Dw 302, *Large Production Wells for Community Water Systems*; 2) a large groundwater withdrawal permit for three wells (wells HWC-FS1, FS-4E, and HWC-SR3) in accordance with RSA 485-C:21, *Approval for Large Groundwater Withdrawals* and New Hampshire Administrative Rules Env-Ws 388, *Major Groundwater Withdrawal*; and 3) an approval of HWC-SR4 as a mechanical backup well to source EPA-010 in accordance with Env-302.29. The approval and permit are based on information prepared for HAWC by Emery & Garrett Groundwater, Inc. (EGGI).

HAWC is seeking approval of four new large community bedrock production wells, designated HWC-FS1, FS-4E, HWC-SR3, and HWC-SR4, at production rates of 56,160 gallons per day (gpd) [39 gallons per minute (gpm)], 57,600 gpd (40 gpm), 136,800 gpd (95 gpm), and 56,160 gpd (39 gpm), respectively. HWC-FS1 and FS-4E are located in southwestern Atkinson west of Fieldstone Lane in the proposed Fieldstone well field approximately 300 feet north of the Salem-Atkinson town line. HWC-SR3 and HWC-SR4 are located in central Atkinson between West Side Road and NH Route 121 in the existing Settlers Ridge well field approximately 600 feet northwest of Pope Road. The purpose of developing the new community production wells is to: 1) address chronic water shortages experienced by the water system over the last 5+/- years; 2) offset recorded losses in yield from the system's other groundwater sources; 3) provide source redundancy for production wells that currently serve the water system; and 4) accommodate potential increases in water demand based on historic water use trends and projected future growth in areas served by the water system.

### CONDITIONAL APPROVAL

This decision to conditionally approve HWC-FS1, FS-4E, HWC-SR3, and HWC-SR4 is based on information contained in the following documents:

1. Preliminary application report titled "Preliminary Hydrogeologic Investigation, Hampstead Area Water Company, Inc., Walnut Ridge Water System, Groundwater Development at the Settlers

Ridge, Midpoint, and Fieldstone Well Fields” (Preliminary Application), prepared for HAWC by EGGI, dated March 24, 2008.

2. Preliminary application report addendum titled “Preliminary Hydrogeologic Investigation, Addendum, Hampstead Area Water Company, Inc., Walnut Ridge Water System, Groundwater Development at the Settlers Ridge, Midpoint, and Fieldstone Well Fields” (Preliminary Application Addendum), prepared for HAWC by EGGI, dated July 30, 2008. The report contains the response to NHDES’ letter containing Preliminary Application review comments dated July 8, 2008.
3. Letter to Christine Bowman of NHDES from John Brooks of EGGI, dated October 1, 2008. The letter requested approval to modify the pumping test and water quality sampling programs of HWC-FS1 and FS-4E from that proposed in the Preliminary Application.
4. Letter to Christine Bowman of NHDES from John Brooks of EGGI, dated October 28, 2008. The letter requested approval to modify the pumping test program of HWC-SR3 and HWC-SR4 from that proposed in the Preliminary Application and amended in the Preliminary Application Addendum.
5. Final report titled “Final Well Siting Report, Hampstead Area Water Company, Walnut Ridge Water System, Groundwater Development at the Fieldstone and Settlers Ridge Well Fields, Volumes I and II” (Final Report), prepared for HAWC by EGGI, dated March 13, 2009.
6. Final report addendum titled “Response to NHDES Comments (June 29, 2009), Final Well Siting Report, Hampstead Area Water Company, Walnut Ridge Water System, Groundwater Development at the Fieldstone and Settlers Ridge Well Fields” (Final Report Addendum), prepared for HAWC by EGGI, dated August 18, 2009. The report contains the response to NHDES’ letter containing Final Report review comments dated June 29, 2009.
7. Letter to Christine Bowman of NHDES from Charles Lanza of HAWC, dated November 4, 2009. The letter contains the response to NHDES’ letter containing Final Report Addendum review comments dated October 29, 2009 and includes the amended versions of HAWC’s Source Replacement Plan and Emergency Well Services Contract.

The following requirements are associated with the approval of HWC-FS1, FS-4E, HWC-SR3, and HWC-SR4 for use as large production wells for a community water system and **must be complied with as a condition of approval:**

- 1) HAWC must maintain a wellhead protection program for the Wellhead Protection Areas (WHPA) consisting of: 1) updating the inventories required by Env-Dw 302.09 and 302.19 at intervals no greater than three years as required by Env-Dw 302.21(a)(1) starting 90 days from the date of this letter; 2) completing written notification requirements to the owner of each known and potential contamination source listed in the inventories at intervals no greater than three years as required by Env-Dw 302.21(a)(2) starting 90 days from the connection of HWC-FS1, FS-4E, HWC-SR3, or HWC-SR4 to the water system; and 3) submit a request to conduct site visits to survey all potential contamination sources (except for pesticide application and agricultural operations) located within the WHPAs to ascertain compliance with best management practices for preventing groundwater contamination at intervals no greater than three years as required by Env-Dw 302.21(b), starting within one year of the date of this letter. Written notification shall include

a copy of Env-Wq 401, *Best Management Practices for Groundwater Protection*, Drinking Water and Groundwater Bureau Fact Sheet WD-DWGB-22-4 *Best Management Practices (BMPs) for Groundwater Protection*, and BMP Flyer for Backyard Mechanics and Hobbyists. These three documents are available on the NHDES website at <http://des.nh.gov/organization/divisions/water/dwgb/dwspp/bmps/index.htm>.

- 2) NHDES approved a waiver of the requirements of Env-Dw 302.06(e) and (f) for the portion of the sanitary protective area (SPA) of HWC-FS1 that overlaps the golf course fairway, in a letter to EGGI dated October 29, 2009. This waiver was approved based on the requirement that activities in this area will include only those related to typical golf course maintenance including occasional mowing with a tractor, and will not include the application of fertilizers, pesticides, or herbicides, or other activities that could pose a contamination risk to the groundwater.
- 3) NHDES approved a waiver of the requirements of Env-Dw 302.06(d) for the portion of property Tax Map 12, Lot 8-1 (the Town Forest property) that is within the SPAs of HWC-SR3 and HWC-SR4, in a letter to EGGI dated October 29, 2009. This waiver was approved based on the nature of the funding program through which the land was acquired and designated as Town Forest and the consequent restrictions on the use of the property established through the associated Project Agreement (copy included in the Final Report Addendum). The waiver was approved conditional upon the current undeveloped status of the portion of the property within the SPAs being maintained, which will be a checklist item during future sanitary surveys of the water system.
- 4) HAWC must implement and adhere to the conditions of Large Groundwater Withdrawal Permit No. LGWP-2009-0002, which is attached to this document.
- 5) HAWC must implement the approved Water Conservation Plan, dated May 8, 2008, in accordance with Env-Wq 2101 (formerly Env-Ws 390) and NHDES' approval dated June 5, 2008. Additionally, **within 60 days of the date of this letter**, HAWC must submit a response plan, in accordance with Env-Wq 2101.05(j), outlining how the water system intends to reduce unaccounted-for water to below 15% within two years. The results of a water audit conducted following protocols and procedures described in the AWWA M36 manual (Third Edition) titled "Water Audits and Loss Control Programs" should accompany the response plan and be used to substantiate the intended actions of the water system.
- 6) Withdrawals from HWC-FS1, FS-4E, HWC-SR3, HWC-SR4, and EPA 10 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. HAWC must provide NHDES with a certificate of calibration and performance specifications for each meter. HAWC must document and maintain records of all meter maintenance and calibration activities and submit this information to NHDES in the annual report required by condition No. 3 of the attached large groundwater withdrawal permit. HAWC must read source water meters to adequately report the following volumes to the reporting program referenced in condition No. 6 of this approval:
  - 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.

- 7) HAWC must 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 and this approval.
- 8) In accordance with Env-Dw 717.07(a), *Groundwater Monitoring and Treatment*, HAWC must collect raw water samples from each source approved by this letter and have the samples analyzed for *E. coli* using a method that provides enumeration. Sampling of raw water collected from each source shall be conducted for **6 consecutive months**, with the first month's sample taken **within 30 days prior** to placing the source in service and providing water to the public. **All raw water samples must be taken before any treatment.** Results shall be reported to NHDES as part of the GWR-Investigative Monitoring required to demonstrate that the source water is free from fecal contamination and that 4-log treatment is not required. A special analysis request form for these samples is available linked to the water system's Master Sampling Schedule, which is available through the Public Water System Query on NHDES' One Stop Data and Information website at [http://www2.des.state.nh.us/OneStop/Public\\_Water\\_Systems\\_Query.aspx](http://www2.des.state.nh.us/OneStop/Public_Water_Systems_Query.aspx).
- 9) Approval for each source approved by this letter shall lapse four years from the date of this letter if the well is not connected to the water system within that time, in accordance with Env-Dw 302.24(e), unless an extension is granted by NHDES. If approval lapses, HAWC must satisfy the requirements of Env-Dw 302.24(f) to regain approval.

With reference to the proposed monitoring program for the Fieldstone well field proposed in the Final Report on page 38, NHDES concurs that the monitoring program shall include the monitoring of water levels in the proposed production wells FS-4E and HWC-FS1, and monitoring well FS-6P.

#### SOURCE SPECIFICATIONS

Table 1, below, summarizes specifications for HWC-FS1, FS-4E, HWC-SR3, and HWC-SR4. The Permitted Production Volume is the maximum volume of groundwater allowed by NHDES to be pumped from a water supply production well in any 24-hour period. The Sanitary Protective Area is a circle, centered on each well, with the radius listed in Table 1. The location of HWC-FS1, FS-4E, HWC-SR3, and HWC-SR4 and the WHPAs delineated for the wells are illustrated on the attached map titled "Figure 28 – Potential Impact Area and Proposed WHPAs with Potential Contaminant Threats and Public Water Supplies, Hampstead Area Water Company, Atkinson, New Hampshire" included in the Final Report.

**Table 1**

Source Name	Well Status	Permitted Production Volume	Sanitary Protective Area Radius	Wellhead Protection Area	Source Description
HWC-FS1	New	56,160 gallons per 24-hour period <sup>1</sup>	200 feet	As shown on Figure 28	Approximately 480 feet west of Fieldstone Lane
FS-4E	New	57,600 gallons per 24-hour period <sup>1</sup>	250 feet	As shown on Figure 28	Approximately 360 feet west of Fieldstone Lane
HWC-SR3	New	136,800 gallons per 24-hour period	350 feet	As shown on Figure 28	Approximately 1,200 feet east-northeast of Old Village Road pump house
HWC-SR4	New [back-up well to Source ID .010 (a.k.a. EPA 10 or BRW 10)]	56,160 gallons per 24-hour period <sup>2</sup>	200 feet	As shown on Figure 28	Approximately 1,000 feet northeast of Old Village Road pump house

<sup>1</sup> The Permitted Production Volume is the maximum volume of groundwater that may be pumped from the specified well in any 24-hour period, when the well is operated independently. If HWC-FS1 and FS-4E are both operated during the same 24-hour period, the combined maximum volume of groundwater that may be pumped from the wells shall be limited to 57,600 gallons per 24-hour period.

<sup>2</sup> The Permitted Production Volume is the maximum volume of groundwater that may be pumped from the specified well in any 24-hour period, when the well is operated independently. If EPA 10 and HWC-SR4 are both operated during the same 24-hour period, the combined maximum volume of groundwater that may be pumped from the wells shall be limited to 56,160 gallons per 24-hour period.

## **CHEMICAL MONITORING PROGRAM**

A water quality sampling program was conducted as part of the well siting approval of HWC-FS1, FS-4E, HWC-SR3, and HWC-SR4.

### Wells HWC-FS1 and FS-4E

A total of four water quality samples were collected from HWC-FS1: three during the well's pumping test program over the period September 16 through 23, 2009 and one on October 14, 2008 near the end of the combined pumping test of HWC-FS1 and FS-4E. Results of the water quality sampling program indicate that each parameter, with the exception of arsenic, iron, manganese, and pH, was below the applicable Maximum Contaminant Level (MCL) or Secondary Maximum Contaminant Level (SMCL).

The MCL for arsenic is 0.010 milligrams per liter (mg/l); testing results show concentrations of arsenic in water derived from HWC-FS1 in the range of 0.018 to 0.036 mg/l, which exceeds the MCL. The SMCL for iron is 0.30 mg/l; testing results show concentrations of iron in water derived from HWC-FS1 in the range of 0.40 to 7.00 mg/l, which exceeds the SMCL. The SMCL for manganese is 0.05 mg/l; testing results show concentrations of manganese in water derived from HWC-FS1 in the range of 0.12 to 0.20 mg/l, which exceeds the SMCL. The SMCL range for pH is 6.5 to 8.5; testing results show that the water derived from HWC-FS1 is slightly acidic and has a pH in the range of 5.7 to 6.4, which is less than the lower limit of the SMCL range.

A total of three water quality samples were collected from FS-4E during the well's pumping test program over the period October 6 through 14, 2008. Results of the water quality sampling program indicate that each parameter, with the exception of pH was below the applicable MCL or SMCL. Testing results show that the water derived from FS-4E is slightly acidic and has a pH in the range of 5.8 to 6.5, which is less than (or near) the lower limit of the SMCL range.

In addition, results of the water quality sampling program also indicate that the concentration of radon is elevated in water derived from HWC-FS1 and FS-4E. Three water samples were collected from HWC-FS1 and two water samples were collected from FS-4E and analyzed for radon. In the samples collected from HWC-FS1, radon was detected at concentrations equal to 10,903 picocuries per liter (pCi/L), 12,500 pCi/L, and 16,000 pCi/L. In the samples collected from FS-4E, radon was detected at concentrations equal to 85,296 pCi/L and 101,600 pCi/L. Although there is currently no state- or federally-enforced drinking water standard for radon, NHDES strongly encourages HAWC to implement measures to reduce the concentration of radon in the water supply.

### Wells HWC-SR3 and HWC-SR4

A total of three water quality samples were collected from HWC-SR3 and HWC-SR4 during the wells' pumping test program over the period November 6 through 14, 2008. Results of the water quality sampling program indicate that each parameter, with the exception of iron, manganese, and pH, was below the applicable MCL or SMCL.

Testing results show concentrations of iron in water derived from HWC-SR3 and HWC-SR4 in the range of 1.70 to 3.70 mg/l and 0.59 to 0.89 mg/l, respectively, which exceeds the SMCL. Testing results show concentrations of manganese in water derived from HWC-SR3 and HWC-SR4 in the range of 0.17 to 0.24 mg/l and 0.10 to 0.13 mg/l, respectively, which exceeds the SMCL. Testing

results show that the water derived from HWC-SR3 may be slightly acidic and has a pH in the range of 6.3 to 7.0.

You must notify NHDES when any of the wells listed in Table 1 above becomes active by contacting Linda Thompson of the Drinking Water and Groundwater Bureau at (603) 271-3544 or [linda.thompson@des.nh.gov](mailto:linda.thompson@des.nh.gov). Once you notify NHDES that the well is active, Chemical Monitoring staff will contact you with an updated Master Sampling schedule. You may need to add a sampling tap to each of the wells, if taps are not already installed, and you must contact staff so that the schedule will accurately reflect the correct sampling locations. If you have any questions about the Chemical Monitoring requirements, contact Tricia Madore at (603) 271-3907 or at [tricia.madore@des.nh.gov](mailto:tricia.madore@des.nh.gov). Please note that NHDES may initiate enforcement action if the system fails to implement a chemical monitoring program when the well becomes active.

### CONNECTION REQUIREMENTS

Please note that the connection of the wells to the water system and treatment facilities must comply with the requirements of New Hampshire Administrative Rules Env-Ws 374, *Design Standards For Large Public Water Systems*. Prior to connecting the wells to the water system, provide a schematic depicting the chemical monitoring program sampling locations and any required treatment system, including the storage location of chemicals, chemical feed equipment, motor controls, and instrumentation. Please forward this information and any questions you may have regarding connecting the wells to the water system to the attention of Rick Skarinka at NHDES at (603) 271-2948 or [richard.skarinka@des.nh.gov](mailto:richard.skarinka@des.nh.gov).

### EMERGENCY PLAN

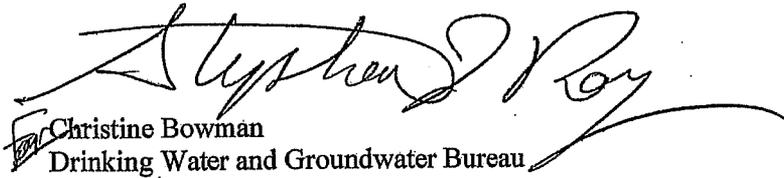
HAWC shall update its emergency plan for the water system in accordance with New Hampshire Administrative Rules Env-Dw 302.26 and Env-Ws 360.15. This plan shall continue to be updated and submitted to NHDES once every 6 years and shall be reviewed annually by the system and updated as needed. NHDES' records indicate that HAWC is due to submit an updated Emergency Plan by March 2015. Additionally, the plan will be a checklist item during each sanitary survey of the water system and lack of one will be a survey deficiency. Guidance documents and other emergency planning information are available on the NHDES website at <http://des.nh.gov/organization/divisions/water/dwgb/index.htm> [see 'Programs']. You may contact Johnna McKenna at (603) 271-7017 or [johnna.mckenna@des.nh.gov](mailto:johnna.mckenna@des.nh.gov) for more information or assistance in completing emergency planning for the water system.

### ELECTRONIC DATA REPORTING PROGRAM

Please note that water level data collected as a condition of the attached large groundwater withdrawal permit, as specified in section No. 4 titled "Monitoring and Reporting Requirements," shall be submitted annually to NHDES in an electronic format. The requirements and specifications of the electronic data reporting program are summarized in the attached letter and associated guidelines document.

If you have any questions about this approval or the attached permit 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) or Stephen Roy at (603) 271-3918 or [stephen.roy@des.nh.gov](mailto:stephen.roy@des.nh.gov).

Sincerely,



Christine Bowman  
Drinking Water and Groundwater Bureau

Attachments: Large Groundwater Withdrawal Permit No. LGWP-2009-0002  
Project Narrative  
Decision Statement

Enclosures: Figure 28, Potential Impact Area and Proposed WHPAs with Potential Contaminant Threats and  
Public Water Supplies, Hampstead Area Water Company, Atkinson, New Hampshire  
Electronic Data Reporting Program Letter and Guidelines Document

cc: Charles Lanza, HAWC  
Daniel Tinkham, EGGI (email)  
Board of Selectmen, Town of Atkinson  
Board of Selectmen, Town of Salem  
Water Wheel Estates Unit Owners Association  
Wright Farm Condominium Association  
The Commons of Atkinson, c/o Royal Management Company  
Merrimack Valley Jewish Federation (Camp Hadar)  
Merrimack Valley YMCA (Camp Otter)  
Cliff Sinnott, Rockingham Planning Commission (w/ Enclosure)  
Stephen Roy, NHDES (email)  
Derek Bennett, NHDES (email)  
Brandon Kernen, NHDES (email)  
Richard Skarinka, NHDES (email)  
Johnna McKenna, NHDES (email) (w/ Enclosure)  
Linda Thompson, NHDES (email)  
Selina Makofsky, NHDES (email)  
Donna Jones, NHDES (email)  
Debra McDonnell, NHDES (email)  
George Hastings, NHDES (email) (w/ Enclosure)  
Jennifer Thompson, NHDES (email) (w/ Enclosure)

## DECISION STATEMENT AND PROJECT NARRATIVE

**Large Well Siting Approval/Large Groundwater Withdrawal Permit LGWP-2009-0002  
Walnut Ridge/Bryant Woods Water System, Hampstead Area Water Company, EPA ID 0112080  
Wells HWC-FS1, FS-4E, HWC-SR3, and HWC-SR4  
Atkinson, New Hampshire**

**December 18, 2009**

### 1.0 BACKGROUND

Hampstead Area Water Company (HAWC) has submitted an application to the New Hampshire Department of Environmental Services (the Department) requesting approval of four large community production wells and issuance of a large groundwater withdrawal permit for the withdrawal of up to 194,400 gallons per day (gpd) or 135 gallons per minute (gpm) over a 24-hour period to serve the Walnut Ridge/Bryant Woods water system (EPA ID 0112080) in Atkinson, New Hampshire. HAWC is requesting approval for: the combined withdrawal of up to 57,600 gpd (40 gpm) from wells HWC-FS1 and FS-4E; the withdrawal of up to 136,800 gpd (95 gpm) from well HWC-SR3; and the use of well HWC-SR4 as a mechanical back-up to existing production well EPA 10 at a production volume of 56,160 gpd (39 gpm).

HWC-FS1 and FS-4E are located in southwestern Atkinson west of Fieldstone Lane in the proposed Fieldstone well field approximately 300 feet north of the Salem-Atkinson town line in an area of undeveloped woodland adjacent to the Atkinson Resort and Country Club (ARCC) golf course.

HWC-SR3 and HWC-SR4 are located in central Atkinson between West Side Road and NH Route 121 in the existing Settlers Ridge well field approximately 600 feet northwest of Pope Road in an undeveloped open-space area associated with the Settlers Ridge development approximately 840 and 350 feet west of Stewart Farm Pond, respectively.

The purpose of developing the new community production wells is to: 1) address chronic water shortages experienced by the water system over the last 5+/- years; 2) offset recorded losses in yield from the system's other groundwater sources; 3) provide source redundancy for production wells that currently serve the water system; and 4) accommodate potential increases in water demand based on historic water use trends and projected future growth in areas served by the water system.

The wells are located within the upper reaches of the Lower Spicket River watershed. The Spicket River drains the western portions of Atkinson via Hog Hill Brook and Providence Hill Brook, flowing southward through Salem, New Hampshire eventually flowing into the Merrimack River in Lawrence, Massachusetts. The potential impact area for the withdrawals from the wells encompasses approximately 5.2 square miles of the western-facing slopes of the Spicket River watershed and is bounded on the west, south, and east by Providence and Hog Hill Brooks, Captain Pond; and a regional watershed divide, respectively. The northern limit of the potential impact area is defined by a topographic divide. In the down-gradient direction, the potential impact area extends to the confluence of Providence Hill Brook and Captain Pond Brook in Salem.

Moderate topographic relief and thin soils characterize the areas proximal to the well fields. Small wetlands are scattered throughout the watershed within which the well fields are located, with more extensive wetlands occurring near the Settlers Ridge well field.

Emery & Garrett Groundwater, Inc. (EGGI's) mapping and geologic well logs show that large portions of the areas proximal to the wells are underlain by granites or granite gneisses, and that pegmatite dikes are locally abundant and highly fractured. The water-bearing capacity of the bedrock units underlying the area is dependent on the presence of fractures, faults, or other brittle bedrock structures. The glacial geology of the area largely consists of a relatively thin veneer of glacial till over shallow bedrock.

At the Fieldstone well field, results of geophysical surveys and drilling indicate that bedrock occurs at or generally within 10 feet of the ground surface. Well FS-4E was completed as part of a previous exploration program undertaken by HAWC, as such, little was initially known about the depths of individual water-bearing fracture zones within the well; however, subsequent packer testing of the well undertaken by EGGI indicates that a significant water-bearing fracture zone is not present within the upper 189 feet of the borehole. HWC-FS1 encountered bedrock at 6 feet below ground and was completed in bedrock to a depth of 450 feet; water-bearing fracture zones were intercepted at depths of 95, 250, 378, and 418 feet.

At the Settlers Ridge well field, results of geophysical surveys and drilling indicate that bedrock occurs at depths ranging from 0 to 35 feet beneath the ground surface; surficial materials at the site consist of till and weathered bedrock. It is reported that HWC-SR3 encountered 30 feet of glacial till, and was completed in bedrock to a depth of 500 feet; four water-bearing fracture zones were intercepted at depths between 152 and 275 feet. HWC-SR4 penetrated 50 feet of glacial till and weathered bedrock and was completed in bedrock to a depth of 450 feet; two main water-bearing fracture zones were intercepted at depths of 123 and 144 feet.

## **2.0 WITHDRAWAL TESTING AND CONCLUSIONS**

Withdrawal testing programs were conducted by EGGI at the Fieldstone and Settlers Ridge well fields from September 8 through October 22, 2008 and October 29 through November 22, 2008, respectively. The purpose of withdrawal testing is to provide data to estimate long-term sustainable water quantity and quality; observe the response of the aquifers 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 withdrawals. Details and results of the withdrawal testing program conducted at each well field are summarized below.

### **Fieldstone Well Field**

The withdrawal testing program at the Fieldstone well field included monitoring during pre-pumping, pumping, and water level recovery periods, during two separate tests as follows:

- Test 1 – HWC-FS1 was pumped between September 16 and 23, 2008; the pumping rate during the final 6 days of the test was 40 gpm. FS-4E was not pumped during this test; and

- Test 2 – FS-4E was pumped at 40 gpm from October 6 through 14, 2008 and HWC-FS1 was pumped at 20 gpm from October 7 through 14, 2008, resulting in the wells being pumped simultaneously for seven consecutive days.

Production from the wells during the pumping portion of the test was maintained at a constant rate and water quality samples were collected to characterize the quality of the water derived from the wells.

During the withdrawal testing program, water level measurements were collected at: HWC-FS1 and FS-4E; one off-site bedrock well that previously served the water system but is inactive; one off-site bedrock well that the ARCC uses as a source of irrigation water; three on-site bedrock monitoring wells; and nine off-site private bedrock water supply wells including eight in the town of Salem and one in the town of Atkinson. The private water supply wells are located mostly to the south and southeast of the well field, with one well to the southwest of the well site, at distances ranging from approximately 540 feet to 2,600 feet from HWC-FS1 and FS-4E. No private wells were identified north of the well site for a distance in excess of one mile due to the expanse of the golf course in the area and the waters system's service area.

Water level measurements collected during the withdrawal testing program indicate that the three on-site bedrock monitoring wells responded to pumping of HWC-FS1 and FS-4E. During the second pumping test, the pumping-induced drawdown of water levels ranged from approximately 2 to 80 feet in these wells and was greatest in wells closest to the production wells. Water levels in HAWC's inactive production well, ARCC's irrigation well, and the private water supply wells did not show any apparent response to the pumping of HWC-FS1 and FS-4E.

Based on graphical projections of water level responses that assume 180-days with no net recharge to the bedrock aquifer, and inference from the revised geologic model for the site, pumping-induced drawdown is estimated to extend approximately 1,200 to 1,600 feet [southeast/west to northwest] of the well field. Areas where the greatest amount of pumping-induced drawdown is estimated to occur underlie the ARCC property.

Given the amount of pumping-induced drawdown observed in HWC-FS1 and FS-4E, the hydraulic connection between the two wells, and the depth of the water-bearing fractures in FS-4E; EGGI revised its recommended capacity of the combined yield from the well field from 60 gpm to 40 gpm to ensure that water levels in the wells remain above water-bearing zones. Based on water level observations made during the withdrawal testing program and projected drawdowns, withdrawals from HWC-FS1 and FS-4E do not present the potential to cause an adverse impact, and a production rate of 57,600 gpd (40 gpm) is a production rate that the wells and the geologic formation can sustain.

Results of the water quality sampling conducted during the withdrawal testing program indicate that each parameter, with the exception of arsenic, iron, manganese, and pH, was below the applicable Maximum Contaminant Level (MCL) or Secondary Maximum Contaminant Level (SMCL). Results of the water quality sampling program also indicate that the concentration of radon is elevated in water derived from HWC-FS1 and FS-4E.

### Settlers Ridge Well Field

The withdrawal testing program at the Settlers Ridge well field included monitoring during pre-pumping, pumping, and water level recovery periods. During the withdrawal testing program, HWC-SR3 was pumped at 95 gpm from November 6 through 14, 2008 and HWC-SR4 was pumped at 107 gpm from November 7 through 14, 2008, resulting in the wells being pumped simultaneously for seven consecutive days. Production from the wells during the pumping portion of the test was maintained at a constant rate and water quality samples were collected to characterize the quality of the water derived from the wells.

During the withdrawal testing program, water level measurements were collected at: HWC-SR3 and HWC-SR4; three (two off-site and one on-site) bedrock wells that serve the water system; two off-site bedrock wells that previously served the water system but are inactive; two off-site bedrock wells that serve another community water system; two on-site bedrock monitoring wells; four on-site piezometers; three on-site surface water staff gages; one stream flow weir in the outlet stream of Stewart Farm Pond; and nine off-site private water supply wells including eight bedrock wells and one dug well.

Piezometer and surface water level and flow measurements were recorded to assess the degree of hydraulic connection between the bedrock aquifer, shallow overburden, and Stewart Farm Pond and associated wetlands. The private water supply wells are located at distances ranging from approximately 800 to 3,100 feet from HWC-SR3 and HWC-SR4.

Based on observations made during the withdrawal testing program, it was determined that HWC-SR3 and HWC-SR4 are not hydraulically connected to each other and do not appear to capture groundwater from different bedrock fracture networks that are not hydraulically connected, as evidenced by relatively distinct water level responses at the production wells and monitoring locations. As such, the monitoring locations can be grouped by whether the observed water level response was the result of pumping HWC-SR3 or HWC-SR4.

#### *Well HWC-SR3*

Based on the monitoring results, the pumping of HWC-SR3 resulted in pumping-induced drawdown in five private bedrock water supply wells monitored. Water level drawdown in the two most influenced (and closest) private wells ranged between 14 and 33 feet, with projected drawdown estimates, assuming 180-days of continuous pumping of HWC-SR3 with no recharge, ranging between 22 and 79 feet. Water level influences on the other three private wells were slight, with projected drawdowns generally less than approximately 4.5 feet. In general, the private wells influenced by HWC-SR3 were located to the east of the well site.

Relative to available information about the private wells, projected drawdowns on the order of that observed under an assumed condition of constant pumping of HWC-SR3, do not cause an adverse impact as defined by RSA 485-C:21-V. To verify this assessment, long-term monitoring of water levels in private wells is required as a condition of the large groundwater withdrawal permit for the use of HWC-SR3 [see attached].

*Well HWC-SR4*

Based on the monitoring results, the pumping of HWC-SR4 resulted in pumping-induced drawdown in the on-site bedrock well that serves the water system (EPA 10); two off-site bedrock wells that serve the neighboring water system; two on-site bedrock monitoring wells; one on-site piezometer; a private water supply well approximately 2,500 feet to the north-northwest of the well site; and flow leaving Stewart Farm Pond.

Drawdown of water levels ranged from approximately 35 to 51 feet in the on-site wells influenced by pumping of HWC-SR4. In each of the two wells serving the neighboring water system, pumping-induced drawdown was approximately 9 and 14 feet; based on graphical projections of the water level responses, pumping-induced drawdown in these wells after 180-days with no net recharge to the bedrock aquifer, is estimated to be approximately 20 and 29 feet. Approximately 0.5 feet of pumping-induced drawdown was observed in the private well influenced by HWC-SR4; based on a graphical projection of its water level response, pumping-induced drawdown in this well after 180-days with no recharge is estimated to be approximately 2 feet. In the on-site piezometer, approximately 0.10 feet of pumping-induced drawdown was observed.

Observations of surface water flow in the stream outletting Stewart Farm Pond during the withdrawal testing program indicate that the withdrawal from HWC-SR4 did affect flow leaving the pond. A hydrograph analysis of the stream flow data suggests that on the order of 37 gpm was captured by pumping HWC-SR4 as induced infiltration or captured groundwater discharge; a value which represents greater than 50% of flow leaving the pond during the withdrawal testing program.

Based on the results of the withdrawal testing program, specifically, impacts to water levels in wells serving the neighboring water system and flow in the Stewart Farm pond outlet stream; HAWC revised its request to permit HWC-SR4 at this time as a new large groundwater withdrawal well. Alternatively, HAWC requested approval for use of the well as a mechanical backup to existing production well EPA 10.

No responses to pumping HWC-SR3 or HWC-SR4 were observed in the two off-site bedrock wells that serve the water system; the three other on-site shallow piezometers; and the three on-site surface water staff gages in the pond.

Based on graphical projections of water level responses at the monitoring points that responded to pumping HWC-SR3 (assuming 180-days of continuous pumping at 95 gpm with no recharge), pumping-induced drawdown is estimated to extend approximately 1,500 to 2,400 feet to the south and northeast of the well with the most influence at points closest to well.

Results of the water quality sampling conducted during the withdrawal testing program indicate that each parameter, with the exception of iron, manganese, and pH, was below the applicable MCL or SMCL.

### **3.0 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 withdrawals. Municipalities that were sent copies of the above-referenced materials are the towns of Atkinson and Salem. Public water suppliers that were sent copies of the above-referenced materials are Water Wheel Estates, Wright Farm Condominiums, the Commons of Atkinson, Camp Hadar, and Camp Otter.

On April 8, 2008, the town of Atkinson requested a public hearing following submittal of the preliminary application; the Department subsequently held a public hearing on the application in Atkinson on May 7, 2008. At the hearing, a summary of the regulations governing large groundwater withdrawals was presented by the Department, a project summary was presented by 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 application commenced, and closed on June 21, 2008. Testimony and comments received during the public hearing and written comment period related to the issue of one permit application being submitted for withdrawals from multiple well fields; the water system's need for additional water supply capacity; potential impacts on the quantity and quality of water derived from private wells and wells serving other community water systems; how adverse impacts would be mitigated; potential impacts on water-dependent natural resources; and whether groundwater recharge is adequate to sustain the withdrawals. Oral and written comments were considered during the Department's review of the preliminary application and proposed withdrawal testing program.

On April 1, 2009, the town of Atkinson requested a public hearing following submittal of the final report; the Department subsequently held a public hearing on the report in Atkinson on April 28, 2009. At the hearing, a summary of the regulations governing large groundwater withdrawals was presented by the Department, results of the withdrawal testing program were presented by 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 June 15, 2009. Testimony and comments received during the public hearing and comment period related to the water system's need for additional water supply capacity; the water system's use of the water and water conservation efforts; land uses in close proximity to the well sites; potential impacts on the quantity and quality of water derived from private wells; adequacy of the duration and timing of the withdrawal testing programs; potential impacts on water-dependent natural resources; and long-term monitoring requirements. Oral and written comments were considered during the Department's review of the final report.

Section 5.0 below presents the Department's responses to comments received as part of the hearings held pursuant to RSA 485-C:21 V, and during the associated written comment periods.

### **4.0 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 HAWC to notify any property owner with a private or public well within the estimated zones of influence of HWC-FS1 and FS-4E and HWC-SR3 prior to initiating

a large groundwater withdrawal from the wells. As part of the notification, HAWC must explain to each property owner that their well may be influenced by the withdrawals at the production wells and provide them with contact information at HAWC and the Department 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.

In association with the use of HWC-SR3, the large groundwater withdrawal permit requires HAWC 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 HWC-SR3 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 the two private bedrock water supply wells which responded most significantly to pumping HWC-SR3, 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 HWC-SR3 if:

- Trigger water levels are met or exceeded in off-site monitored wells; or
- The Department 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 or ceasing the withdrawal from the production well(s), 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.

HAWC is required to submit an annual monitoring report in hard copy and electronic format to the Department by January 31<sup>st</sup> 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 HWC-SR3. Regarding well HWC-SR4, a large groundwater withdrawal permit was not issued for the well due to the fact that use of the well at large groundwater withdrawal rates would require further evaluation of impacts. 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.

In regard to the use of HWC-FS1 and FS-4E, monitoring of water levels in private water supply wells or water resources is not incorporated into the permit due to the lack of substantial influence of the withdrawals from the wells on these entities.

In regard to the use of HWC-SR4, since HAWC has only requested approval of the well as a back-up supply to production well EPA 10 at a production volume of 56,160 gpd (39 gpm), monitoring of groundwater levels in the wells serving the neighboring water system, the surface water level in Stewart Farm Pond, and stream flow in the tributary of Hog Hill Brook outletting Stewart Farm Pond is not incorporated into the permit at this time. If, in the future, HAWC would like to use HWC-SR4 at a greater production volume, any work necessary to evaluate the effects of the withdrawal on these water users and water resources must be undertaken prior to finalizing the permitting process for the well.

## 5.0 DEPARTMENT RESPONSE TO PUBLIC INPUT

The Department has received several letters and verbal testimony from individuals, one town commission and two homeowners associations, relating to HAWC's application for a large groundwater withdrawal permit. Many of the letters submitted present general questions about the permitting process and do not cite specific items related to this individual permit; refer to and describe other local requirements or approvals that may apply to this application but are unrelated to the groundwater permitting process administered by the Department; or provide statements of opposition to HAWC's application but do not refer to or state any specific concerns or deficiencies with the application or provide any technical reasons as to why the permit should be denied. A subset of the letters submitted to the Department; however, do provide comments that refer to information or data collected as part of the technical evaluation portion of the process, and make statements or recommendations that are contrary to the final decision of the Department to issue a large groundwater withdrawal permit. In accordance with RSA 485-C:21, V, the Department specifically considered legally and technically relevant comments and recommendations made and issues the additional findings below in support of its decision.

Note that some of the comments and recommendations submitted to the Department regarding HAWC's large groundwater withdrawal permit application presented similar items, issues or concerns. Where appropriate, the Department groups the comments into generally similar topic areas and specifically cites comments or recommendations from the input received that presented the most detail, as needed.

### a.) Application and report submittal process

Mr. Bill Bennett (Atkinson resident) provided the following written comment referencing the format of HAWC's preliminary application for a large groundwater withdrawal permit:

*Three geographically distinct well fields were combined into one application for large groundwater withdrawal. We are concerned that this may not have been proper, and the decision to combine those three fields into one application had a perhaps unseen and adverse consequence for citizens of Atkinson:*

*Had there been three separate applications, HAWC would need to justify a planned withdrawal from each site. We question HAWC's ability to adequately justify ANY need*

*for new supply. However, had HAWC been able to justify one such need, the granting of that application would negate the need for the other two applications?*

Mr. Jon Longchamp (Atkinson resident) provided verbal testimony at the public hearing for the preliminary large groundwater withdrawal application stating that he was *concerned about the grouping of multiple well fields and large production wells in one application* and that each well or well field *should be broken out into multiple applications*.

Amendments made to the Groundwater Protection Act in 2007 established that the large groundwater withdrawal permitting process and its requirements apply to instances where multiple wells are proposed to be used by an entity for a given purpose [see RSA 485-C:21,I.]. Specifically, the amendment defined a large groundwater withdrawal as one that is from a well or wells at the same property or for the same place of business. In this instance, the place of business is HAWC's Walnut Ridge/Bryant Woods water system with the intended use for the provision of water to customers of the system. The rationale for the amendment was to avoid an instance where an applicant might consider developing numerous, small volume withdrawals (<40 gpm) within the same aquifer, watershed or impact area and; therefore, circumvent the requirement to adequately assess the impact that this large number of small withdrawals may have on other water users and water-related natural resources. In effect, such an approach would avoid the requirements and evaluation necessary under the large groundwater withdrawal permitting program, even though, in aggregate, the wells or well fields would withdraw more than the large groundwater withdrawal threshold of 57,600 gallons per day which may have overlapping impact areas and/or source water areas.

The Department finds that HAWC's application adequately addresses the application submittal requirement of RSA 485-C:21 by including and considering all of its proposed wells and well fields, and developing a potential impact area based on the aggregate proposed withdrawal volume; in this instance, that 'aggregated' impact area largely incorporates the eastern portion of the Spicket River watershed.

#### **b.) Groundwater well siting issues**

Mr. Bill Bennett (Atkinson resident), the Town of Atkinson Conservation Commission and the Settlers Ridge Condominium Association each submitted comments pertaining to the area immediately surrounding the proposed new wells at the Settlers Ridge well field (inclusive of proposed wells HWC-SR3 and HWC-SR4). Each comment letter provided a concern with, or recommendation to disapprove, the location of the well(s) due to the fact that some portions of the 350 foot protective radius for the proposed wells overlie either surface water [Stewart Farm Pond], the Slade Town Forest, or open space within the common area of the Settlers Ridge Condominium subdivision. Collectively, the comments noted that these areas are not fully under the control of the water system and, as such, may, in the future, be subject to a modification of use.

The purpose for a sanitary protective area (SPA) around a well that is proposed for use in a community water system is to establish an area in the immediate vicinity of the well within which there is minimal risk of groundwater contamination. The requirement to establish an SPA for a community production well comes from administrative rule Env-Dw 302, *Large Production Wells for Community Water Systems* and not the large groundwater withdrawal permitting rules.

Therefore, the Department makes no findings relative to the large groundwater withdrawal permitting process and the location of the wells.

In reference to the community well siting rules and the attached approval for the new community water supply wells issued by the Department for the Settlers Ridge wells, the Department issued a waiver to HAWC for ownership of the SPAs for proposed well HWC-SR3 and HWC-SR4 due to meeting the requirements of Env-Dw 302.31 *Waivers*. The Department finds that the current status of the neighboring parcels as largely non-developed areas meets the intent of Env-Dw 302.06, *Sanitary Protective Area* and approves the locations. The Department finds that the likelihood of those parcels presenting a risk to groundwater quality near the wells is low, and that general developmental limitations for these parcels [designated open space for a nearby subdivision, an open surface water body, and a designated town forest] is a favorable conjunctive use for land near a community water supply well. In addition, HAWC submitted supporting information on the developmental restrictions on the subject parcels in its submittal of June 2008 (preliminary report addendum) and August 2009 (final report addendum).

**c.) Demonstration of Need and appropriateness of application for new sources of water**

Mr. Bill Bennett (Atkinson resident) submitted the following comments pertaining to the basis for HAWC's application for a large groundwater withdrawal permit:

*Justification for the large groundwater withdrawal.:*

*...HAWC has applied to DES to produce up to 648,000 gallons per day from new wells. For the year 2007, HAWC's Atkinson metered sales were around 200,000 gallons per day (gpd), and historically had been increasing by only approximately 1000 gpd per year.*

*In light of HAWC's approximately 33% water loss, or approximately 66,000 gallons per day, it would seem that finding and fixing the system leaks would be the most responsible way in which to increase HAWC's effective water supply. At the current growth rate of 1000 gallons/day/year (representing the addition of 5 new customers per year), that "new found" water would supply them for at least the next 50 years. Given Atkinson's state of development, it is unlikely HAWC could experience growth in Atkinson at any faster rate.*

*And in an additional submittal: HAWC's customer-demand growth rate in Atkinson can in no way be interpreted to justify their LGW volume request. Atkinson has little undeveloped land, so the potential for any increase in new customers for HAWC is limited.*

Mr. John Wolters (Atkinson resident), similarly presented a summary of information related to HAWC's unaccounted-for water estimate it provided to the New Hampshire Public Utilities Commission as part of public utility filing requirements, and submitted the following comment relating to the reason for HAWC's large groundwater withdrawal permit application:

*The Department of Environmental Services responded to HAWC's need for additional water because of a shortage at the peak seasonal demand. DES then determined that a*

*large water withdrawal was necessary. The following points were not adequately evaluated in accepting the large water withdrawal application.*

- 1. No large water withdrawal was required to meet the peak seasonal demand.*
- 2. For 2008 HAWC had a 25.97% water loss rate for its entire system.*
- 3. In recent years, the Town of Atkinson had a 36% and 38% water loss rate which currently has not been corrected.*
- 4. DES uses 15% water loss as a reasonable factor. DES has not made a demand to require HAWC to comply with its standard. Instead, DES is authorizing pumping more water to a system filled with leaks, old pipes and a substandard method of distributing water. Perhaps implementing the 15% water loss standard would be expensive to HAWC, however, that would eliminate the need to have a large water withdrawal for the peak demand shortfall.*
- 5. The approved application for a large water withdrawal is being justified, based on faulty estimates. The number of new customers' projected for 2008 to 2014 is 350. For the past 6 years there is no history during high growth periods to reasonably project 50 new customers a year when history shows 6 to 8 new customers a year is the reality.*

RSA 485:61, Rules for Water Conservation requires that all new permit applications for water withdrawals implement water conservation practices. The Department adopted rules (Env-Wq 2101) which establishes the requirement for applicants for a large groundwater withdrawal permit to submit and receive approval for a water conservation plan to meet the requirement of RSA 485:61. The water conservation plan requirements of Env-Wq 2101 are more extensive than and supersede the conservation management plan and demonstration of need requirements under Env-Ws 388.05. The Department finds that the information provided in HAWC's March 24, 2008 preliminary application and May 8, 2008 water conservation plan demonstrates the need for the withdrawal and meets the requirements under the water conservation rules.

As noted in the preliminary application and presented at the public meetings, HAWC's Walnut Ridge/Bryant Woods water system is classified as a large community water system and, as such, is required to meet the design standards of Env-Ws 374, Design Standards for Large Public Water Systems which state that the water system must develop sufficient water source capacity to meet both its peak demand and its average day demand with its largest source out of service. According to water use records submitted by HAWC to the Department's water use reporting program, the water system's average day demand (by month) commonly fluctuates between 190,000 (spring) and 510,000 (summer) gallons per day.

In reference to Section C, Table II (Table Appendix), Table III (page 8), and the existing source evaluation presented in the March 2008 preliminary application, the basis for HAWC's request to develop new sources does not solely include demand from new connections; much of the need for the withdrawal comes from the fact that many of the water system's existing source wells in Atkinson have exhibited a decrease in yield over time and new sources are needed to make up for that lost yield, as well as meet the design standard for a large community water system referenced above. This decrease in capacity of the water system is evidenced by HAWC issuing system-wide exterior water-use bans in the summer of 2002 and the summer of 2007, and implementing a discretionary water use restriction in the summer of 2006 that remains in effect today.

The water conservation plan submitted by HAWC in conjunction with their preliminary application included an estimate of unaccounted-for water at the system of approximately 36% (inclusive of both apparent losses and real losses). HAWC's water conservation plan that was approved by the Department on June 5, 2008 meets the requirements of the water conservation rules by including provisions to conduct annual estimates of unaccounted-for water by comparing source meter readings to service meter readings, implement an ongoing leak detection program, establish a system water pressure management plan, and initiate an educational and outreach program encouraging water conservation practices. Additionally, and in accordance with the requirements of Env-Wq 2101, a condition of the attached large community well approval requires that HAWC submit a response plan within 60-days of the new source approval contained herein to the Department to reduce the percent of unaccounted-for water at the system to below 15% within the next two years. Condition No. 2 of the large groundwater withdrawal permit also requires HAWC to implement the provisions of their approved water conservation plan.

Mr. Jon Longchamp (Atkinson resident) submitted the following comment pertaining to the Department's position on consideration of potential new service connections to the water system due to the fact that these potential connections, in-part, establish the need for the large groundwater withdrawal permit:

*Although not directly stated in the application the majority of the 395 new service connections are related to the proposed Atkinson's Heights Project (388 units) being developed by the parent company of the HAWC, Lewis Builders. This raises serious conflict of interest concerns in my mind with the builder and the water company being one in the same. How is this viewed by NHDES?*

RSA 485-C:21 does not require the Department to conduct a review of individual developers and/or owners of any or all potential future consumers or connections to a water system that is requesting approval for a new large groundwater withdrawal. Additionally, the statute does not give the Department authority to make a subjective determination as to the appropriateness of individual connections to a water system that, when connected, may increase the demand for water supply. Therefore, the Department did not consider the issue of connection ownership in its permit decision, nor does the Department make any findings regarding this issue.

**d.) Impacts on water levels in private water supply wells**

A number of comment letters were received from residents of the town of Atkinson expressing concern that private wells would be dewatered by HAWC's operation of its new wells if permitted. Commonly these letters cited a range of depths for private wells in town being on the order of 300 to 500 feet, and the idea that HAWC's wells, being deeper, would deplete water levels in shallower wells such that they will become dry, or to the point where they are non-usable. None of the letters referred to deficiencies or other aspects of the geologic conceptual model for the impact area or the evaluation program for the proposed withdrawals, or provided other specific technical reasons for the idea that other water supply wells over a broad area would consequently be impacted beyond use as a function of HAWC's use of the new wells.

Emblematic of the comments received is the following comment submitted by Mr. Bill Bennett (Atkinson resident):

*People in Atkinson, the large majority of whom get their water from private wells, are concerned about the effect of HAWC's large groundwater withdrawal (LGW) and Hampstead interconnection on their private wells. Most private wells in town are 150 to 400 feet deep; HAWC's wells, 600 to 800 feet deep, have the potential to deplete the water-bearing strata currently accessed by our private wells.*

In a related comment, Mr. Lou Farrell (Atkinson resident) provided verbal testimony following submission of HAWC's final report and presentation of the proposed withdrawal's effects on water levels in private wells near the Settlers Ridge well field. Mr. Farrell stated that he felt that it was not correct or appropriate to approve any groundwater withdrawal if any long-term monitoring related to the effects of the withdrawal is determined to be necessary.

The large groundwater withdrawal permitting process requires an applicant to assess the relative impact that the withdrawal may cause on other water users (Env-Ws 388.16). In reference to the conceptual geologic model developed for the withdrawal site and surrounding area (Env-Ws 388.06), the applicant must estimate a zone of influence and potential impact area of the withdrawal based on the conservative assumption of continuous operation of the withdrawal for a period of 180-days (RSA 485-C:21, V-e.) with no net recharge to groundwater from precipitation. The applicant must inventory water users within the potential impact area, and offer to monitor all water users within 1,000 feet of the withdrawal and representative water users within an area that extends a distance of 1,000 feet from its estimated zone of influence (Env-Ws 388.08 and 388.09), during the withdrawal testing program required by Env-Ws 388.13. The withdrawal testing program thereby collects data and measurements that quantify the actual level of impact that the withdrawal has on other water users and serves to refine the zone of influence of the withdrawal based on observed water level influences.

Following the withdrawal testing program, the applicant gauges the impacts observed against the adverse impact criteria of RSA 485-C:21, V-c, inclusive of those for private water supply wells. To address any remaining uncertainties related to the observed impacts from the proposed withdrawals and the extent of the observed influence area, the applicant must develop a long-term impact monitoring program in accordance with Env-Ws 388.20, to ensure adverse impacts do not occur, provided that available information does not suggest that an impact is irreversible or will occur immediately. In the event that a confirmed adverse impact occurs that is related to the permitted withdrawal, the permittee must implement a source replacement program to mitigate the impact in accordance with Env-Ws 388.21 and Env-Ws 388.22.

The estimated zones of influence presented in HAWC's March 2008 preliminary application and addendums submitted through November 4, 2009 extended to a distance of approximately 2,000 feet at certain geologically controlled orientations from the proposed withdrawals for both the Settlers Ridge and Fieldstone well fields. Although proposed, HAWC did not test or request final approval for the Midpoint well field [see below]. In addition to those water users within 1,000 feet of the proposed new wells, HAWC extended 'offer to monitor' requests to all (~90) lot owners with developed properties not connected to the water system, up to a distance of 3,000 feet from the proposed new wells (as opposed to limiting their offer to monitor to representative locations only). Based on affirmative well owner responses, the proximity to the proposed wells and the conceptual model for the well fields, HAWC monitored water levels in 18 private water supply wells and 6 active public water supply wells during the withdrawal testing program.

As summarized above, water levels in five private bedrock wells and two public wells were influenced in response to pumping of the Settlers Ridge wells HWC-SR3 and HWC-SR4. As HAWC is not pursuing a final approval for HWC-SR4 as a new large groundwater withdrawal well at this time [see below], the discussion below focuses on the evaluation of the influence area of HWC-SR3 only. Based on observed influences at five private wells from pumping at HWC-SR3, the revised estimate for the zone of the influence of the well extends on the order of 1,500 to 2,400 feet from the well and is elongated along an inferred bedrock fracture zone. The greatest water level drawdown observed at the private wells that were influenced after eight days of continuous pumping was approximately 33 feet. The estimate for the projected drawdown in this well, assuming 180-days of continuous pumping of HWC-SR3 and no recharge, was approximately 78 feet, a depth that maintains a sufficient volume of water above the pump in the well. The projected drawdown at the other four private wells influenced by HWC-SR3 were all less than about 22 feet. The proposed new wells tested at the Fieldstone well field (FS-4E and HWC-FS1) had no apparent influence on any of the private wells monitored during the withdrawal testing program.

The Department finds that the impact assessment and evaluation program completed by HAWC meets the requirements of Env-Ws 388. The Department finds that water levels in private water supply wells will be impacted by the withdrawal from HAWC's new well HWC-SR3, however those impacts to private wells are not irreversible or immediate, and do not meet the definition of adverse impact in RSA 485-C:21, V-c. Further, the Department finds that the long-term impact monitoring and reporting program for water levels in private wells proposed by HAWC meets the requirements of Env-Ws 388.20, and that the source replacement program developed by HAWC to mitigate an unanticipated occurrence of an adverse impact meets the requirements of Env-Ws 388.21 and 388.22.

Condition No. 5e. of the large groundwater withdrawal permit requires HAWC to reduce the production rate from HWC-SR3 based on specified water levels being encountered in the private wells monitored as part of the long-term monitoring program to ensure that adverse impacts do not occur. Condition No. 5b. of the large groundwater withdrawal permit requires HAWC to notify all lot owners with private wells within the revised zone of influence of HWC-SR3 and provide appropriate contact information should they experience a problem with their private well that they believe is attributable to HWC-SR3. Condition No.5a.of the permit requires HAWC to implement the provisions of their source replacement plan and mitigate a confirmed adverse impact in the event that one occurs.

**e.) Recharge to the Bedrock and the related matter of Groundwater Age Dating**

Mr. Bill Bennett (Atkinson resident) submitted the following comments pertaining to the concept of recharge limits to the bedrock aquifer in which the proposed withdrawals are being installed and the role that isotope-based age dating of groundwater may play in the evaluation of aquifer [formation] capacity:

*Insufficiency of knowledge about, and understanding of, southern New Hampshire hydrogeology.*

*While we do not know with certainty that LGW activity in Atkinson would adversely impact private wells, we are concerned that no one knows with reasonable certitude that*

*it would not. DES feels that isotope ratio determination of groundwater "age" (the time since the water was last in free exchange with the atmosphere) would only confuse the issue; as an engineer I have never found it harmful to have more data. Any particular piece of information may turn out to be the key to furthering one's understanding of a problem.*

*When water is pumped up from 800 feet below the surface in Atkinson, does anyone know from whence it came?*

The matter of withdrawals from 'deep strata' exceeding the available recharge to fractured bedrock based on ambient groundwater flow, in addition to stable isotope age-dating of groundwater, was also referenced in verbal input.

In the field of hydrogeology, determination of the sustainable yield of a well or potential available capacity of its water-bearing formation based on an assessment of potential recharge under ambient, non-pumping conditions is not a technically viable approach nor is it standard practice. Under a pumping condition, groundwater withdrawal wells, by design, change the hydraulic gradient and remove water from storage in the aquifer thereby altering the vertical and horizontal component of groundwater flow in the saturated fracture network intersected by the well. Recharge to such a pumping well and its formation is then induced from other parts of the formation or other reservoirs of water which may include shallow saturated fractures, saturated overburden deposits (soil units), surface water features or any combination thereof. Therefore the volume of water available to the well or wells in a well field under pumping conditions can be much greater than what may be available assuming ambient or non-stressed conditions only. The effects of induced recharge are evidenced by water level observations at both the production wells and observation wells presented on plots provided in the March 2009 final report and subsequent data submittals. These plots depict decreases in the slope of the declining water levels in the wells during the long-term pumping test and reflect the fact that the steepened gradient caused by pumping at the wells and the associated expansion of the zone of influence was slowly equilibrating in response to induced recharge.

In reference to the above, the concept of using age-dating of groundwater from a production well (a single spot in the formation) and establishing the sustainability of the withdrawal or its formation, and otherwise determining the 'time' of recharge to the formation under a pumping scenario from sampling results is not a viable approach nor technically justifiable. In light of the fact that induced recharge to the wells will occur under pumping conditions, an incidental sample of old water in the wells would not mean that the withdrawals are not sustainable. Establishing a recharge rate to a bedrock aquifer would require a broader spectrum of study that would include many sampling points throughout the regional fractured bedrock aquifer at varying depths. Interpretation of the results of such an assessment would be difficult and costly, and it would have questionable value to evaluating the effects from HAWC's proposed withdrawal wells due to the fact that the groundwater age present in production well water would represent mixed age signals from specific fractures and source areas that are intersected by the withdrawal wells and would likely change over time as the wells are pumped. The complexity of flow through the fractured bedrock aquifer would make the interpretation of sampling results and their applicability to the HAWC's withdrawal lack certainty. In addition, such an evaluation would not be useful or relevant to the requirement to assess for adverse impacts caused by the withdrawals

under RSA 485-C:21, nor is age-dating of groundwater a requirement under Env-Ws 388 or Env-Dw 302.

The Department finds that HAWC's withdrawal wells will not cause an adverse impact by withdrawing groundwater at a rate that exceeds the long-term recharge rate to the formation in accordance with RSA 485-C:21, V-c. Condition Nos. 4 and 5.e. of the permit requires HAWC to implement a program of water level monitoring in the bedrock aquifer that is source to the HWC-SR3 and reduce the volume of water pumped from the well based on observed water levels [trigger levels] at those bedrock monitoring wells. Further, the Department finds that withdrawal testing program meets the requirements of Env-Ws 388.13.

**f.) Comments pertaining to the Withdrawal Testing Program and Impact Evaluation**

Withdrawal Test Duration

Mr. Andrew Earley (Atkinson resident) submitted the following comment pertaining to the duration of the withdrawal testing program specifically conducted at the Settlers Ridge well field:

*...I am even more concerned that decisions regarding whether or not to allow the Hampstead Water Company to withdraw large amounts of water from local well fields, are being based on a "30 Day testing period". This 30 day test appears to be accepted in the industry and considered a valid testing period. I do not believe this test period properly reflects the full impact over a prolonged period of time. In other words, general conclusions should not be accepted from the "30 day analysis" conducted by Emery & Garrett, because, in my opinion they do NOT truly reflect the true impact that large water removal will have on residential wells. The testing period is simply too short and should extend for at least 1 full calendar year (if not longer), in order to accurately illustrate the impact water removal will have on residential wells during various times of the year when the water table will be higher (spring) and lower (summer). I do not feel the testing is valid or credible based on the short testing period conducted from October 29 – November 22, 2008.*

As stated above, the applicant for a large groundwater withdrawal must conduct a withdrawal testing program to assess the impacts caused by the withdrawal and evaluate its influence area. The applicant must then develop a long-term monitoring and testing program based on the observed influence area and projected drawdown based on the assumption of 180-days of continuous pumping with no net recharge from precipitation or snowmelt. The withdrawal testing program required by Env-Ws 388.09 and Env-Dw 302.11 consists of three periods

- a. The antecedent period, during which non-pumping hydrologic conditions are monitored for 7 days immediately preceding the start of pumping;
- b. The pumping period, which, for large bedrock water supply wells is at least 7 days, or, 72 hours if the water level in the well has stabilized and projected drawdown does not exceed available drawdown in the well; and

- c. The recovery period, which follows shut down of the pump and continues until the water level in the test well or the nearest well within 5 feet of the pumping well has recovered to 95% of the pre-pumping level.

The Department does not concur that a one-year(+) evaluation/testing program is needed prior to issuance of a large groundwater withdrawal permit. The method of using data collected through the existing testing program and projecting drawdown assuming six months of continuous pumping from the withdrawal while recharge to groundwater ceases due to evaporation and plant uptake, is adequately conservative to estimate a worst-case influence area of the well within the context of the observations collected. Moreover, based on the Department's experience with many bedrock water supply wells used for community water systems in southeast New Hampshire, the existing drawdown projection method coupled with both the implementation of a long-term monitoring program (under Env-Ws 388.20) and the mitigation/source replacement criteria (under Env-Ws 388.21 and Env-Ws 388.22) adequately positions the permit holder to observe the effects of the withdrawal over time, proactively reduce the volume of water withdrawn to reduce the effects of the withdrawal if needed, and mitigate a confirmed adverse impact should one occur. As such, the Department finds that HAWC has met the requirements of the withdrawal testing program required by Env-Ws 388.09 and Env-Dw 302.11, and impact evaluation required by Env-Ws 388.16.

#### Impacts on wetlands and other water-related natural resources

In response to the final report, the town of Atkinson conservation commission provided both verbal and written testimony pertaining to concerns over the potential to impact Stewart Farm pond and its associated wetlands near the Settlers Ridge well field. Specifically, the commission referenced the fact that in March 2009, the town of Atkinson voted to nominate Stewart Farm pond as a prime wetland under RSA 482-A:15 and stated that the pond *is directly impacted by the HAWC withdrawal* referring to production from proposed wells HWC-SR3 and HWC-SR4. The commission also suggested that *...a prime wetlands hearing is needed before any water withdrawal from this well is approved...* The Department's Wetlands Bureau received the prime wetland designation request from the town on May 1, 2009, and accepted the designation request on October 10, 2009.

RSA 485-C:21 and the large groundwater withdrawal permitting rules require that an applicant evaluate the impacts on water-related natural resources caused by a large groundwater withdrawal and requires that no unmitigated adverse impact results from the withdrawal. Env-Ws 388.07 requires that an applicant inventory water resources within the estimated impact area of the withdrawal and Env-Ws 388.08 requires the applicant to estimate the effect on water resources that may result from the withdrawal. RSA 485-C:21, V-c. establishes the criteria for adverse impacts to wetlands and surface water caused by a large groundwater withdrawal. Specifically, no large groundwater withdrawal shall cause an unmitigated impact as determined by the following:

(f) Reducing surface water levels or flows that will, or do, cause a violation of surface water quality rules adopted by the department; and

g) Causing a net loss of values for submerged lands under tidal and fresh waters and its wetlands as set forth in RSA 482-A;

HAWC's preliminary application of March 24, 2008 and addendum of July 30, 2008 described the monitoring network for the Settlers Ridge withdrawal testing program to include water level monitoring at four overburden piezometers and two shallow bedrock wells along the periphery of the pond and wetland area, three surface water staff gages installed in the pond, and one weir installed in the pond's outlet stream [a tributary stream to Hog Hill Brook].

Based on the results presented in HAWC's March 13, 2009 final report, no influence on water levels in the pond were caused by the withdrawal from either HWC-SR3 or HWC-SR4. The report discusses the fact that the surface elevation of the pond and surrounding wetland areas appears 'fixed' by the height of the beaver dam that is impounding its outlet, and that the influence of production from the wells are characterized through changes in flow in the pond outlet stream flowing over/through the dam. Based on flow records at the weir in the outlet stream for the pond [Figure 19, Final Report], the groundwater withdrawal from proposed well HWC-SR4 is estimated to have caused a 37 gallons per minute reduction in stream flow, which equates to approximately 50% of the estimated ambient stream flow occurring at the time of the test.

In response to the Department's comment letter requiring further evaluation of flow impacts to the stream in light of the adverse impact criterion related to stream flow impacts, in their addendum to the final report dated August 18, 2009, HAWC retracted its request for approval of HWC-SR4 as a new large groundwater withdrawal well at this time and reduced their request to use the well as a mechanical backup to a nearby, pre-existing well in accordance with Env-Ws 302.29, pending possible additional data collection.

Since HAWC has withdrawn its request to permit HWC-SR4 as a new large groundwater withdrawal at this time, the Department has made no finding pertaining to impacts to the outlet stream to Stewart Farm pond meeting the definition of an adverse impact under RSA 485-C:21. In the event that HAWC requests approval for HWC-SR4 as a new large groundwater withdrawal well at a later date, the Department would make a determination at that time regarding the adequacy of the impact evaluation and any mitigation strategy proposed, as necessary. Based on the data collected, however, a net loss in values to Stewart Farm pond (i.e., an adverse impact) does not appear likely due to the fact that the beaver dam controls the elevation of pond and wetland areas regardless of withdrawal from HWC-SR4.

In reference to the conservation commission's reference to the need for a prime wetland, the Department notes that this large groundwater withdrawal permit only addresses the requirements of RSA 485-C and does not make findings or approval relative to the requirements of other state statutes.

#### Discharge of groundwater during the withdrawal test at Settlers Ridge

Mr. Bill Bennett (Atkinson resident) provided the following comment pertaining to the discharge location for the Settlers Ridge pumping test:

*... On page 20, the report details the installation of instrumentation to monitor the water level of Stewart Farm Pond during the pump testing of wells SR3 and SR4. However, during the actual pump tests, the effluent was discharged into Stewart Farm Pond ... The*

*inconsistency of those two approaches is not explained in the Report. The effluent from SR3 and SR4, when discharged into the Pond, would likely return promptly to the aquifer accessed by SR3 and SR4, possibly invalidating pump test results...*

In reference to the discussion above, in the preliminary report addendum of July 30, 2008, HAWC proposed a method to evaluate potential impacts on flow from the pond by deducting metered flow of the withdrawal test discharge line from the weir stream flow measurement record. This approach was based on the assumption that the beaver dam at the pond's outlet fixed the pond's surface elevation.

As described in the impact description discussion in the final report dated March 13, 2009 (Section XV, page 34), this method did not preclude the ability to evaluate and quantify stream flow reductions caused by withdrawal from well HWC-SR4 [see the discussion above]. Further, the assumption that the beaver dam established the elevation of the pond was validated by water level observations collected before, during and after the pumping test. In the addendum to the final report dated August 18, 2009, HAWC further acknowledged reductions in stream flow of the outlet stream for Stewart Farm pond caused by withdrawals at HWC-SR4, and recognized the need for a qualified professional to further assess impacts to stream flow before proceeding with permitting of HWC-SR4 as a new large groundwater withdrawal well.

In reference to the above, the Department finds that the withdrawal testing program design meets the requirement Env-Ws 388.09 and did adequately provide for the ability to evaluate impacts to water resources potentially influenced by the withdrawal. Further, the evaluation completed in response to observations collected during the withdrawal testing program adequately identified and quantified impacts to water-related natural resources, and the proposed large groundwater withdrawal well the imparted those impacts was not permitted as a new large groundwater withdrawal.

#### Water level fluctuations and precipitation effects on the well capacity estimates

Mr. Bill Bennett (Atkinson resident) provided the following comment pertaining to the effects of precipitation on drawdown evaluation:

*...Pump tests were carried out during the Fall wet season. The contribution of rain events during the pump tests to water levels in the test wells was not insignificant. Perhaps I missed it, but in reading the report, I did not find where correction for that was made in the well sustainable capacity numbers. Does the Report accurately reflect well capacities in time of limit precipitation?*

As described in sections V and X. of HAWC's final report of March 13, 2009, the planned start of the withdrawal tests at both the Fieldstone and Settlers Ridge well fields were postponed by nine and 11 days due to the occurrence of significant pre-test rain events. These rain events caused substantial water level increases (>1 foot) in the background (ambient) monitoring wells used for each of the well fields, and the pumping tests were not started until water levels at these background monitoring locations stabilized at near pre-event levels. Postponing of the tests was required in order to comply with Env-Ws 388.09, which requires that an applicant for a new large production well postpone a pumping test if a high recharge event occurs that will prohibit the

ability to use the test data to evaluate capacity of the proposed new wells and their potential impact.

Relatively minor rainfall events on day three of the Fieldstone withdrawal test and day two of the Setters Ridge withdrawal test caused generally less than 0.2 feet of water level rise in the background wells which largely dissipated and re-stabilized over the following day. As shown on the water levels plots [Figures 9 through 13 and Figures 20 through 23] in the final report, the effect of these precipitation events on water levels was insignificant and non-discernable in the production wells. As such, no offset or correction was necessary to remove incidental recharge effects in the 180-day drawdown projection required by Env-Ws 388, an analysis which is standard practice for conservatively estimating the capacity of a production well relative to available drawdown even at low recharge times of the year.

The Department finds that HAWC meets the requirements of Env-Ws 388 for projection of drawdown in the production wells, and that HAWC met the requirement to perform the withdrawal tests at times when recharge events did not preclude adequate evaluation of pumping test data.

#### Production rate for the Fieldstone Well Field

Mr. Bill Bennett (Atkinson resident) provided the following comment pertaining to the capacity of the Fieldstone wells HWC-FS1 and FS-4E:

*In the report, E&G recommends a combined limit of 40 gpm for wells FS1 and FS-4E. However, the water chemistry data for water withdrawn near the end of the pump testing show that, even at 40 gpm, the well is beginning to draw upon deoxygenated "old" water of which the replenishment rate is unknown. Further, the well draw-down depth at the end of the pump test is 175 feet (at 42 gpm). This is deeper than many private wells in Atkinson, some of which are on a little more than 100 feet deep. (there may be some dug wells in the area with depth considerably less than that.) It would appear that the Fieldstone well field cannot safely sustain 40 gpm and should, if permitted at all, be restricted to a production rate considerably less.*

Env-Dw 302.11(c)(1)b.2 requires that an applicant for a new large production well demonstrate that the 180-day projected drawdown in the well does not exceed 90% of its available drawdown. Env-Dw 302 defines available drawdown as:

(e) "Available drawdown" means the distance between the water level in the well casing and the uppermost productive water bearing zone, the pump intake, or the top of the screen, whichever distance is least.

The combined withdrawal test of HWC-FS1 and FS-4E at the Fieldstone well field was performed at 60 gpm and resulted in 180-day projected drawdowns in the wells of 167 and 214 feet below ground surface [Final report, section VII]. Initial drilling records of HWC-FS1 indicated its uppermost significant water bearing zone was located at a depth of 250 feet, sufficiently below projected drawdown. HAWC's final report addendum of August 18, 2009 presented in Section II [page 6] the results of a program of borehole characterization efforts and 'packer' tests in FS-4E that indicated the no significant flow enters the well above a depth of 189

feet, a depth that is exceeded under a 60 gpm pumping rate projection. As a result, and in consideration of observations from pre-test pumping of HWC-FS1 alone, HAWC revised its requested production rate from the well field downward to 40 gpm to keep the projected drawdown in the well above the uppermost water-bearing zone. The Department finds that the method used to evaluate drawdown in the context of water-bearing zones in the well, and the resultant reduction in requested production rate meets the requirements stipulated in Env-Dw 302.11(c.)

The Department finds that simply using pumping water levels from the production well to assess impacts to water levels in private wells is not a hydraulic valid approach and does not meet the requirements under Env-Ws 388. As groundwater is pumped from a bedrock well, the increase in vertical gradient in the well induces significant turbulent flow through the water-bearing fracture network within the immediate vicinity of the borehole; such flow produces significant frictional losses in formation hydraulic head which imparts its greatest effect at the borehole wall itself. The result is that the greatest drawdown occurs within the production well, and it is significantly more drawdown than that which occurs within the formation. This turbulent flow/frictional head loss effect significantly diminishes with distance from the well as the well's zone of influence equilibrates with induced recharge [see prior discussion], and groundwater flow to the well becomes laminar, and horizontal. In order to assess the potential to impact water levels in private wells and meet the requirements of the withdrawal testing program of Env-Ws 388, an applicant shall offer to conduct *actual* monitoring of water levels in private wells that may be influenced by the withdrawal. As previously described, HAWC conducted water level monitoring in nine of the private wells that were closest to the Fieldstone well field, and no apparent effect was observed in any of the private wells monitored as part of the test. The Department refers to its response above [item d.)] for additional discussion pertaining to the effect of the withdrawals on water levels in private wells.

The Department does not concur that reduction in dissolved oxygen in pumped water during the withdrawal test at the Fieldstone well field implies that the production is exceeding the 'replenishment' rate, as cited. The dissolved oxygen content of bedrock groundwater is commonly low, and the values observed in the initial portion of the pumping test may be artificially high due to the fact that the water column in the well was exposed to air in the wellhead and equilibrated with atmospheric levels of oxygen prior to the test. In this scenario, the oxygen levels dropped as the well was purged of the aerated water and displaced by water from the formation.

Moreover, changes in dissolved oxygen in water produced from a pumping well are not necessarily a function of water age or indicative of a source that can not otherwise produce a sustainable volume of water. The amount of dissolved oxygen in groundwater can be governed by the parent chemistry of the bedrock unit (or units) that is source for water to the well, whereby the mineral assemblage in the parent rock consumes available oxygen and enriches the water in iron and manganese through chemical oxidation/reduction reactions. In addition, as a pumping well operates, it may induce recharge of water that is depleted in oxygen by capturing water from shallow units or surface water after it has interacted with organic rich deposits at the bottom of surface water features. The Department refers to its response above in item e.) pertaining to the value of age determination when assessing the sustainability of well or its formation.

**g.) Comments related to Midpoint Well field**

The Department received numerous comments and questions strictly pertaining to the new source well proposed at the existing Midpoint Well field. The questions submitted related to the discharge of pumping test water, the recharge rate to well field, impacts on private water supply wells near the well field, water quality sampling, and monitoring of the surrounding wetlands during pumping. In the final report of March 13, 2009, HAWC stated that they were not pursuing approval of the proposed well at Midpoint well field at this time, as such, the Department makes no findings with respect to the comments it received about this well field.

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Sources\LARGEWIT\Atkinson\_WalnutRidge\Correspondence\0112080\_ResponseTo110409Submittal\_ProjectNarrative.doc

3/11/2010

**HAMPSTEAD AREA WATER CO.**  
**CONSTRUCTION WORK IN PROGRESS**  
**12/31/09**

Page 1 of 1

<u>Date</u>	<u>Payee</u>	<u>Description</u>	<u>Amount</u>	<u>New MidPoint Wells</u>	<u>Settlers Ridge Wells</u>	<u>Fieldstone Wells</u>
12/4/06	McKinney Artesian Well		6,885.00	<b>6,885.00</b>		
2/9/07	GS Analytical # 54030	well # 9	210.00	210.00		
2/9/07	GS Analytical # 54031	well # 11	210.00	210.00		
2/9/07	GS Analytical # 54032	well # 12	210.00	210.00		
2/9/07	GS Analytical # 54033	well # 3	150.00	150.00		
3/5/07	McKinney Well	well # 1	4,305.00		<b>4,305.00</b>	
3/5/07	McKinney Well	well # 2	4,185.00		<b>4,185.00</b>	
3/26/07	McKinney Well # 5589	test well	4,485.00			<b>4,485.00</b>
3/26/07	McKinney Well # 5590	test well	4,915.00			<b>4,915.00</b>
3/30/07	McKinney Well # 5594	test well	3,615.00			<b>3,615.00</b>
3/30/07	LBD # 6841	new roads	7,351.63			7,351.63
4/25/07	LBD # 6891	well road	2,170.16			2,170.16
8/30/07	Unitil	power	12,308.41			12,308.41
9/7/07	RCRD		4.00			4.00
11/30/07	Emery & Garrett	# 7265	4,704.19	4,704.19		
12/3/07	GS Analytical	# 59281	470.00			470.00
1/7/08	Clearwater Artesian Well	# 10829	11,746.00		<b>11,746.00</b>	
1/14/08	Clearwater Artesian Well	# 10834	9,820.00	<b>9,820.00</b>		
1/24/08	Clearwater Artesian Well	# 10840 MP 2	12,038.00	<b>12,038.00</b> *		
2/6/08	Granite State Anal.	# 60318	435.00		435.00	
2/19/08	Granite State Anal.	# 60519	235.00	235.00		
12/31/08	Reclass to Fieldstone		1,312.82			1,312.82
1/22/09	Emery & Garrett		27,957.50		27,957.50	
3/24/09	Emery & Garrett		28,982.50		14,491.25	14,491.25
6/8/09	Unitil	refund	(12,308.41)			(12,308.41)
7/31/09	LBD # 8636		7,836.82	7,836.82		
7/31/09	LBD # 8637		993.96			993.96
7/31/09	LBD # 8638		2,995.85			2,995.85
7/31/09	LBD # 8639		1,894.56		1,894.56	
7/31/09	LBD # 8642		347.41			347.41
7/31/09	LBD # 8643		3,529.92	3,529.92		
7/31/09	LBD # 8644		6,761.20		6,761.20	
7/31/09	LBD # 8646	MP 2	23,101.60	<b>23,101.60</b> *		
7/31/09	LBD # 8647		24,589.33			<b>24,589.33</b>
7/31/09	LBD # 8648		1,211.89	1,211.89		
7/31/09	LBD # 8649		25,531.33		<b>25,531.33</b>	
7/31/09	LBD # 8650		3,362.64		3,362.64	
7/31/09	LBD # 8682		173.60			173.60
7/31/09	LBD # 8683		225.68			225.68
8/31/09	LBD # 8704		906.49			906.49
8/31/09	LBD # 8732		86.80			86.80
9/30/09	Emery & Garrett		5,870.74		2,935.37	2,935.37
11/30/09	LBD # 8845		2,994.76			2,994.76
	<b>Balance 12/31/09</b>		<b>248,811.38</b>	<b>70,142.42</b>	<b>103,604.85</b>	<b>75,064.11</b>
	<b>Number of Wells Drilled</b>			<b>3</b>	<b>4</b>	<b>4</b>
	<b>Number of Wells Permitted</b>			<b>0</b>	<b>1</b>	<b>2</b>

3/5/2010

**HAMPSTEAD AREA WATER CO.**  
**LARGE GROUNDWATER WITHDRAWAL PERMIT**  
**PUC RELATED COSTS**

<u>Date</u>	<u>Payee</u>	<u>Description</u>	<u>Amount</u>
2/28/06	LBD # 6072	Legal	272.96
3/31/06	LBD # 6153	Legal	605.63
7/8/06	Steve St Cyr		673.31
8/2/06	Steve St Cyr		1,130.25
8/31/06	Eagle Tribune		591.71
9/7/06	Steve St Cyr		25.68
10/10/06	Steven Patnaude	transcript	147.65
10/31/06	LBD # 6557		8.53
10/31/06	LBD # 6555		275.55
10/31/06	LBD # 6562		61.42
11/2/06	Stephen St Cr	Oct	398.16
11/30/06	LBD # 6618		145.01
11/30/06	LBD #6615		25.59
12/29/06	Steven Patnaude	transcript	265.25
12/31/06	LBD # 6670		3,038.50
12/31/06	LBD # 6677		817.89
12/31/06	Stephen St Cr	Dec	513.75
12/31/06	LBD # 6682		245.68
1/31/07	LBD # 6728	legal	878.59
3/3/07	Steve St Cyr		25.69
4/30/07	LBD # 6900	legal	118.93
5/3/07	Steve St Cyr		25.69
5/31/07	LBD # 6987	legal	576.50
6/1/07	Steve St Cyr		51.37
6/30/07	LBD # 7033	legal	189.79
7/31/07	LBD # 7126	legal	203.47
8/31/07	LBD # 7158	legal	766.45
9/28/07	LBD # 7223	legal	27.87
11/1/07	LBD # 7339	legal	10.50
11/30/07	LBD # 7357	legal	157.91
12/1/07	Steve St Cyr		210.00
2/29/08	LBD # 7557	legal	65.98
5/3/08	Steve St Cyr	April	26.25
5/31/08	LBD # 7762	legal	735.13
7/31/08	LBD # 7899	legal	47.13
8/31/08	LBD # 7961	legal	207.35
2/28/09	LBD # 8318	legal	433.55
<b>Balance 12/31/09</b>			<b><u><u>14,000.67</u></u></b>

**HAMPSTEAD AREA WATER CO.**  
**LARGE GROUNDWATER WITHDRAWAL PERMIT**  
**CONSTRUCTION\DESIGN\ENGINEERING INVOICES**

<u>Date</u>	<u>Payee</u>	<u>Description</u>	<u>Amount</u>
4/4/06	Geosphere Environmental		2,746.50
4/28/06	Lewis Builders # 6239	Engineering	1,216.51
5/31/06	LBD # 6321	Engineering	493.53
5/31/06	LBD # 6281	Engineering	157.80
5/31/06	LBD # 6305	Legal	25.59
5/31/06	LBD # 6308	Legal	153.54
6/30/06	LBD # 6339	Engineering	2,106.08
6/30/06	LBD # 6342	Engineering	88.70
6/30/06	LBD # 6349	Engineering	490.63
6/30/06	LBD # 6352	Accounting	92.13
6/30/06	LBD # 6358	Legal	1,060.96
7/25/06	Equipco	Data loggers	9,003.51
7/31/06	LBD # 6402	Engineering	1,565.60
7/31/06	LBD # 6407	Legal	307.08
8/31/06	LBD # 6456	Legal	293.88
8/31/06	LBD # 6458	Legal	90.48
8/31/06	LBD # 6462	Engineering	1,465.29
9/18/06	Hydroterra		1,475.00
9/22/06	LBD # 6495	Engineering	238.15
9/27/06	Cabelas		238.70
9/30/06	LBD # 6525	data loggers	1,124.92
9/30/06	Lewis Equipment	# 5593	1,841.55
9/30/06	LBD # 6511	Engineering	1,083.67
9/30/06	LBD # 6503	Legal	90.48
9/30/06	LBD # 6504	Legal	149.58
9/30/06	LBD # 6508	Acctg	61.42
10/16/06	LBD # 6540	Eng	499.25
10/30/06	Hydroterra		940.00
10/31/06	LBD # 6579		1,270.93
11/10/06	LBD # 6584		568.08
11/30/06	LBD # 6623		189.36
1/19/07	LBD # 6712	engineering	786.19
1/26/07	Hydroterra		4,055.00
1/31/07	LBD # 6721	engineering	395.95
2/28/07	LBD # 6776	engineering	2,218.09
2/28/07	LBD # 6780	legal	1,390.54
3/15/07	LBD # 6816	engineering	1,906.36
3/30/07	LBD # 6840	legal	743.68
3/30/07	LBD # 6875	engineering	1,253.50
4/25/07	LBD # 6882	engineering	381.97
4/25/07	LBD # 6889	test well	415.50
4/30/07	LBD # 6911	engineering	608.43
5/21/07	LBD # 5957	engineering	883.31
5/31/07	LBD # 7015	engineering	485.66
6/22/07	LBD # 7021	engineering	441.05
6/30/07	St Cyr	June	51.38
7/31/07	LBD # 7175	engineering	1,697.04
8/31/07	LBD # 7176	engineering	1,267.78
8/31/07	LBD # 7204		16.53

**HAMPSTEAD AREA WATER CO.**  
**LARGE GROUNDWATER WITHDRAWAL PERMIT**  
**CONSTRUCTION\DESIGN\ENGINEERING INVOICES**

<u>Date</u>	<u>Payee</u>	<u>Description</u>	<u>Amount</u>
9/28/07	LBD # 7233	engineering	1,102.25
10/31/07	LBD # 7297	engineering	2,570.95
11/30/07	Emery & Garrett	#7263	26,771.59
11/30/07	Emery & Garrett	# 7264	5,641.68
11/30/07	Emery & Garrett	# 7266	2,866.68
11/30/07	LBD # 7365		4,590.35
12/31/07	LBD # 7431		3,531.10
1/31/08	LBD # 7488	eng.	2,465.08
2/26/08	Electrical Installations	VFD (1)	5,497.50
2/29/08	LBD # 7547	eng.	1,463.49
3/31/08	LBD # 7614	eng.	742.35
4/11/08	EGGI	# 8152	18,970.86
4/15/08	EGGI	# 8151	1,571.75
4/15/08	EGGI	# 8154	20,985.00
4/30/08	LBD # 7679	eng.	657.51
4/30/08	Eagle Tribune		370.30
4/30/08	Union Leader		210.80
5/31/08	LBD # 7773	eng	2,658.30
6/4/08	Platinum Plus	Fondriest	3,718.19
6/30/08	LBD # 7850	eng	1,317.84
7/17/08	Town of Atkinson	copy of study	24.00
7/23/08	PC Connection	acc for notebooks	424.29
7/24/08	Town of Atkinson	copies	12.00
7/29/08	CDW	Server	6,014.92
7/31/08	LBD # 7912	eng	593.88
7/31/08	LBD # 7915	eng	63.63
8/11/08	East Coast Lumber	mat. for catch basin	97.74
8/31/08	LBD # 7972		2,704.98
8/29/08	PC Connection	Server warranty	210.13
8/31/08	LBD # 7995	water box	510.10
8/31/08	LBD # 7996	Kevin Hatch	600.00
8/31/08	LBD # 7998		18,066.70
9/2/08	Emery & Garrett		14,962.06
9/15/08	PC Connection	2 notebook comp.	2,384.58
9/22/08	PC Connection	warranty notebooks	1,022.92
9/28/08	PC Connection	acc for notebooks	1,002.68
9/30/08	LBD # 8016	eng	4,468.23
10/7/08	NH Wetlands Bureau		200.00
10/14/08	Fondriest		2,003.59
10/20/08	Granite State Anal.		60.00
10/30/08	GSG Supply		11.14
10/31/08	LBD # 8073	eng.	4,489.44
11/20/08	LBD # 8115		530.25
11/21/08	Emery & Garrett		18,942.41
11/30/08	LBD # 8123		3,706.08
11/30/08	LBD # 8135		52.19
12/1/08	GSG Supply		338.48
12/23/08	Emery & Garrett		2,750.00
12/31/08	LBD # 8178		1,848.09

**HAMPSTEAD AREA WATER CO.**  
**LARGE GROUNDWATER WITHDRAWAL PERMIT**  
**CONSTRUCTION\DESIGN\ENGINEERING INVOICES**

<u>Date</u>	<u>Payee</u>	<u>Description</u>	<u>Amount</u>
12/31/08	LBD # 8183		212.10
1/30/09	LBD # 8247	eng.	1,018.08
2/28/09	LBD # 8318		848.40
3/19/09	Town of Atkinson	DVD-meeting	15.00
3/31/09	LBD # 8392		1,101.52
4/30/09	LBD # 8455		663.63
4/30/09	Eagle Tribune	adv.	370.30
4/30/09	Union Leader	adv.	223.98
5/21/09	Emery & Garrett		5,338.63
5/31/09	LBD # 8526		1,497.87
6/30/09	LBD # 8595		341.87
7/1/09	RCRD		11.50
7/31/09	LBD # 8645		14,779.83
7/31/09	LBD # 8654		2,413.13
8/17/09	RCRD		25.00
8/17/09	RCRD		26.00
8/31/09	LBD # 8708		1,579.61
9/30/09	LBD # 8751		268.13
10/30/09	LBD # 8795		192.14
11/30/09	LBD # 8832		1,345.70
12/31/09	LBD # 8909		544.28
12/31/09	Transfer to 186.01 Hydrology		7,390.78
<b>TOTAL</b>			<b><u>286,132.42</u></b>

**HYDROLOGY**  
**PROMISSORY NOTE**

Initial Interest Rate 5.50%  
Principle Balance: \$356,275.00  
Date: July 1, 2010  
Term: Five (5) years

Hampstead Area Water Company, Inc. (HAWC) promises to pay to Lewis Builders Development, Inc., (LBDI), the sum of Three Hundred and Fifty Six Thousand Two Hundred Seventy Five and 00/100<sup>th</sup> Dollars (\$356,275.00) ("Principal"), plus interest calculated from the date of this note at the rate of Five and 50/100<sup>th</sup> (5.50%) percent, and payable as follows:

In Sixty (60) monthly installments of \$6,805.27 commencing on July 1, 2010 and every month thereafter, to be paid on the 1<sup>st</sup> day of each month until the balance is paid in full.

Hampstead Area Water Company, Inc. may prepay this note at any time.

HAMPSTEAD AREA WATER  
COMPANY, INC.

\_\_\_\_\_  
Witness:

By: \_\_\_\_\_  
Christine Lewis Morse, Its Vice  
President, duly authorized.

ACKNOWLEDGED AND ACCEPTED  
LEWIS BUILDERS DEVELOPMENT, INC.,

BY \_\_\_\_\_  
Christine Lewis Morse, its President duly authorized

## HAWC Hydrology Study

PRINCIPAL:	\$356,275.00	P + 2.25%
INTEREST RATE:	5.500%	
NO. OF MONTHS:	60	
PAYMENT/MO.:	\$6,805.27	
PAYMENT/YR.:	\$81,663.24	

#	PRINCIPAL	INTEREST	TOTAL	PRINCIPAL BALANCE
1	\$5,172.34	\$1,632.93	\$6,805.27	\$351,102.66
2	\$5,196.05	\$1,609.22	\$6,805.27	\$345,906.61
3	\$5,219.86	\$1,585.41	\$6,805.27	\$340,686.75
4	\$5,243.79	\$1,561.48	\$6,805.27	\$335,442.96
5	\$5,267.82	\$1,537.45	\$6,805.27	\$330,175.14
6	\$5,291.97	\$1,513.30	\$6,805.27	\$324,883.17
7	\$5,316.22	\$1,489.05	\$6,805.27	\$319,566.95
8	\$5,340.59	\$1,464.68	\$6,805.27	\$314,226.36
9	\$5,365.07	\$1,440.20	\$6,805.27	\$308,861.29
10	\$5,389.66	\$1,415.61	\$6,805.27	\$303,471.63
11	\$5,414.36	\$1,390.91	\$6,805.27	\$298,057.27
<b>12</b>	<b>\$5,439.17</b>	<b>\$1,366.10</b>	<b>\$6,805.27</b>	<b>\$292,618.10</b>
13	\$5,464.10	\$1,341.17	\$6,805.27	\$287,154.00
14	\$5,489.15	\$1,316.12	\$6,805.27	\$281,664.85
15	\$5,514.31	\$1,290.96	\$6,805.27	\$276,150.54
16	\$5,539.58	\$1,265.69	\$6,805.27	\$270,610.96
17	\$5,564.97	\$1,240.30	\$6,805.27	\$265,045.99
18	\$5,590.48	\$1,214.79	\$6,805.27	\$259,455.51
19	\$5,616.10	\$1,189.17	\$6,805.27	\$253,839.41
20	\$5,641.84	\$1,163.43	\$6,805.27	\$248,197.57
21	\$5,667.70	\$1,137.57	\$6,805.27	\$242,529.87
22	\$5,693.67	\$1,111.60	\$6,805.27	\$236,836.20
23	\$5,719.77	\$1,085.50	\$6,805.27	\$231,116.43
<b>24</b>	<b>\$5,745.99</b>	<b>\$1,059.28</b>	<b>\$6,805.27</b>	<b>\$225,370.44</b>
25	\$5,772.32	\$1,032.95	\$6,805.27	\$219,598.12
26	\$5,798.78	\$1,006.49	\$6,805.27	\$213,799.34
27	\$5,825.36	\$979.91	\$6,805.27	\$207,973.98
28	\$5,852.06	\$953.21	\$6,805.27	\$202,121.92
29	\$5,878.88	\$926.39	\$6,805.27	\$196,243.04
30	\$5,905.82	\$899.45	\$6,805.27	\$190,337.22
31	\$5,932.89	\$872.38	\$6,805.27	\$184,404.33
32	\$5,960.08	\$845.19	\$6,805.27	\$178,444.25
33	\$5,987.40	\$817.87	\$6,805.27	\$172,456.85
34	\$6,014.84	\$790.43	\$6,805.27	\$166,442.01
35	\$6,042.41	\$762.86	\$6,805.27	\$160,399.60
<b>36</b>	<b>\$6,070.11</b>	<b>\$735.16</b>	<b>\$6,805.27</b>	<b>\$154,329.49</b>
37	\$6,097.93	\$707.34	\$6,805.27	\$148,231.56
38	\$6,125.88	\$679.39	\$6,805.27	\$142,105.68
39	\$6,153.95	\$651.32	\$6,805.27	\$135,951.73
40	\$6,182.16	\$623.11	\$6,805.27	\$129,769.57
41	\$6,210.49	\$594.78	\$6,805.27	\$123,559.08
42	\$6,238.96	\$566.31	\$6,805.27	\$117,320.12
43	\$6,267.55	\$537.72	\$6,805.27	\$111,052.57
44	\$6,296.28	\$508.99	\$6,805.27	\$104,756.29
45	\$6,325.14	\$480.13	\$6,805.27	\$98,431.15
46	\$6,354.13	\$451.14	\$6,805.27	\$92,077.02

**HAWC**  
Hydrology Study

PRINCIPAL:	\$356,275.00	P + 2.25%
INTEREST RATE:	5.500%	
NO. OF MONTHS:	60	
PAYMENT/MO.:	\$6,805.27	
PAYMENT/YR.:	\$81,663.24	

#	PRINCIPAL	INTEREST	TOTAL	PRINCIPAL BALANCE
47	\$6,383.25	\$422.02	\$6,805.27	\$85,693.77
<b>48</b>	<b>\$6,412.51</b>	<b>\$392.76</b>	<b>\$6,805.27</b>	<b>\$79,281.26</b>
49	\$6,441.90	\$363.37	\$6,805.27	\$72,839.36
50	\$6,471.42	\$333.85	\$6,805.27	\$66,367.94
51	\$6,501.08	\$304.19	\$6,805.27	\$59,866.86
52	\$6,530.88	\$274.39	\$6,805.27	\$53,335.98
53	\$6,560.81	\$244.46	\$6,805.27	\$46,775.17
54	\$6,590.88	\$214.39	\$6,805.27	\$40,184.29
55	\$6,621.09	\$184.18	\$6,805.27	\$33,563.20
56	\$6,651.44	\$153.83	\$6,805.27	\$26,911.76
57	\$6,681.92	\$123.35	\$6,805.27	\$20,229.84
58	\$6,712.55	\$92.72	\$6,805.27	\$13,517.29
59	\$6,743.32	\$61.95	\$6,805.27	\$6,773.97
<b>60</b>	<b>\$6,774.22</b>	<b>\$31.05</b>	<b>\$6,805.27</b>	<b>(\$0.25)</b>

**STATE OF NEW HAMPSHIRE  
PUBLIC UTILITIES COMMISSION**

**PREFILED DIRECT TESTIMONY OF STEPHEN P. ST. CYR**

**HAMPSTEAD AREA WATER COMPANY  
MOTION TO AMEND PETITION FOR APPROVAL OF FINANCING AND  
STEP INCREASE**

**DW 06-104**

**April \_\_\_\_\_, 2010**

Q. What is your name and business address?

A. My name is Stephen P. St. Cyr and my business address is 17 Sky Oaks Drive, Biddeford, Me.

Q. Who is your employer?

A. My employer is Stephen P. St. Cyr & Associates.

Q. What are your responsibilities in this case?

A. My responsibilities are to prepare the financial exhibits and to prepare the prefilled direct testimony which describes the financial schedules. In addition, I am prepared to testify in support of such schedules and testimony.

Q. Have you prepared testimony before this Commission?

A. Yes, I have prepared and presented testimony in numerous cases before the Public Utilities Commission, including requests for new and expanded franchises, requests for approval of State Revolving Fund (“SRF”) and commercial bank financings and requests for rate increases.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to support the Company’s effort to borrow additional funds from Lewis Builders, an affiliated company, related to financing for a hydrology study previously approved by the Commission in this docket. In addition, the purpose of my testimony is to support the Company’s effort for a step increase associated with the cost of this debt.

Q. Please describe the hydrology study.

A. In March 2006, the New Hampshire Department of Environmental Services (NHDES) requested the Company to undergo a system wide capacity assessment. The Company decided to commence this assessment initially in Atkinson. The current Atkinson core system relies exclusively on many bedrock driven wells that have seen declining production for some time now. This had been a subject of concern of both the Company and NHDES. The Company determined that a hydrological study would be able to identify additional groundwater sources to supply the Company's Atkinson customers. The study included an assessment of the existing system capacity, an assessment of water supply/water demand, and development of a source water protection program, preparation of a management of sources plan, preparation of a demand management plan, identification of potential, new sources of water supply, and preparation of a large groundwater withdrawal permit application.

Q. Did the Company hire a firm to conduct the hydrology study?

A. Yes. After reviewing several proposals from various vendors, the Company selected Hydroterra. Unfortunately the application for the large groundwater permit submitted by Hydroterra was rejected by DES. The Company subsequently retained Emery & Garrett, a preeminent groundwater engineering firm with extensive experience in large groundwater permitting. Emery & Garrett were subsequently successful in obtaining approval for a large groundwater permit on behalf of HAWC. A copy of the approval is attached to the Motion to Amend the Petition at Exhibit 1

Q. What are the costs of the hydrology study?

- A. The project total \$356,275.
- Q. What is the amount of the financing from Lewis Builders Development, Inc.?
- A. The Company is financing the total costs of \$356,275 by Lewis Builders Development, Inc., an affiliated company.
- Q. What are the terms and conditions of this loan?
- A. The term is 5 years. The interest rate is 5.5% (2.25 % above the prime rate of 3.25%). The Company is assuming that the loan begins July 1, 2010.
- Q. Why should the Commission approve the financing?
- A. The Commission should approve the financing because it is in the best interest of the Company and its customers. The hydrology study is necessary in order to insure present and future water supply.
- Q. How is the Company proposing to recover the cost of debt?
- A. The Company is proposing a step increase to recover the cost of debt.
- Q. Why is a step increase appropriate?
- A. As part of the Stipulation filed here and approved by the Commission by Order No. 24,728 dated February 2, 2007, HAWC was granted leave to file documentation in support of a step increase and step adjustment surcharges. While the items on this docket related to the software upgrade and the replacement of the truck fleet have already been included in rates as part of HAWC's last rate case, the financing and step increase has not.
- Q. Would you please explain Schedule SPS 1-1, entitled Calculation of Revenue Requirement?

- A. The sum of the additions to rate base less the related accumulated depreciation result in a rate base of \$320,648. The Company is applying the cost of the debt of 6.2124% to determine the additional net operating income required. In addition, the Company adds a full year depreciation and taxes to the additional net operating income required in order to determine the total additional revenue requirement of \$97,647. This is 6.82% increase over the Total Stipulated Water Revenues in DW 08-065.
- Q. Would you like to explain SPS-2?
- A. SPS-2 is entitled Rate of Return. It shows the amount of the Lewis Financing of \$356,275, the interest expense of \$18,006, the amortization of the financing costs of \$2,150, and the Total Interest of \$20,156. The Total Interest of \$20,156 over an average beginning and ending year balance yields a cost of debt of 6.2124%, to be used as the rate of return. Please note that the Company apportioned 50% of the financing and step increase costs to financing costs and 50% to rate case expenditures. The amortization of the financing costs over a five (5) year term amounts to \$2,150 as shown on SPS-2.
- Q. Would you please explain SPS-3?
- A. The Company utilized the Total Proforma Annual Consumption as agreed upon in DW 08-065. The Company took the Total Additional Revenue Requirement of \$97,647 and divided it by the Total Proforma Annual Consumption of 228,445 ccf, resulting in an increased consumption rate of \$0.4274 per ccf.
- Q. What does the Company propose for the costs incurred as attributed to proceeding?

A. HAWC estimates that there will step adjustments surcharges for totaling approximately \$10,750.50 which is one half of the total financing and step increase estimated costs of \$21,501. Pursuant to the Stipulation these are to be recouped over a period not to exceed one (1) year as a step adjustment surcharge. See Stipulation, Section III (C), p.6.

Q. How does the Company propose to repay the debt as revised?

A. The Company's ability to repay the new debt is only possible with approval of the proposed step increase.

Q. Is there anything else that the Company would like to bring to the Commission's attention?

A. No.

Q. Please summarize the approvals that the Company is requesting.

A. The Company respectfully requests that the PUC approve the revised Lewis Financing of \$356,275 and the related step increase of \$0.43 to the consumption charge, as well as step adjustment surcharges of approximately \$10,750.50.

Q. Does this conclude your testimony?

A. Yes.

# Hampstead Area Water Company

SPS-1

## DW 06-104 Step Increase

2010 Lewis Financing Calculation of Revenue Requirement	
Addition to Rate Base:	Actual <u>Costs</u>
Hydrology Study	\$356,275
Less: Accumulated Amortization ( $\$356,275 / 5 \text{ years} / 1/2 \text{ year}$ )	<u>35,628</u>
Net Plant	\$320,648
Add: Cash Working Capital	<u>0</u>
Total Additions to Rate Base	\$320,648
Rate of Return	<u>6.2124%</u>
Additional Net Operating Income Required	\$19,920
Add: Operating and Maintenance Expenses	
Amortization Expense	71,255
State Property Taxes ( $\$320,648 / 1,000 \times \$6.60$ )	2,116
Local Property Taxes ( $\$320,648 / 1,000 \times \$13.13$ )	4,210
Business Enterprise Taxes ( $\$19,406 \times \$0.0075$ )	<u>146</u>
Total Additional Revenue Required	<u>\$97,647</u>
Stipulated Total Water Revenues in DW 08-065	\$1,310,082
Stipulated Increase in Water Revenues from Step 1 in DW 08-065	61,757
Stipulated Increase in Water Revenues from Step 2 in DW 08-065	<u>59,325</u>
Total Stipulated Water Revenues in DW 08-065	<u>\$1,431,164</u>
Total Revenue Requirement	<u>\$1,528,811</u>
Percentage Increase	<u>6.82%</u>

SPSt. Cyr  
4/14/2010

**Hampstead Area Water Company****SPS-2****DW 06-104 Step Increase****Rate of Return**

	<u>Beginning Balance</u>	<u>Ending Balance</u>	<u>Average Balance</u>	<u>Interest Expense</u>	<u>Amort. of Fin. Costs</u>	<u>Total Interest</u>	<u>Cost of Debt</u>
2006 Lewis Financing	<u>\$356,275</u>	<u>\$292,618</u>	<u>\$324,447</u>	<u>\$18,006</u>	<u>\$2,150</u>	<u>\$20,156</u>	<u>6.2124%</u>

Note: The Company estimates that it will incurred \$21,501of financing and step increase costs. The Company has attributed 50% of the costs to financing costs and 50% of the costs to rate case expenditures. As such, the amortization of financing costs amounts to \$2,150 ( $\$21,501 / 2 / 5$ )

SPSt. Cyr  
4/14/2010

Hampstead Area Water Company

SPS-3

DW 06-104 Step Increase

Calculation of Rates

Marginal Increase in Water Revenues			\$97,647
Less: Fire Protection Revenues			
Municipal		\$0	
Private		0	<u>0</u>
Revenue from General Metered Customers			\$97,647

Customer Charge Revenue

Meter Size	Present Rate	Proposed Rate	Proforma # of Cust.	Annual Revenues
5/8"			2,859	
3/4"			0	
1"			48	
1 1/2"			1	
2"			<u>1</u>	<u>0</u>
			<u>2,909</u>	

Consumption Charge Revenue			<u>\$97,647</u>
Consumption Charge Revenue		\$97,647	
Total Proforma Annual Consumption (ccf)*		228,445	
Consumption Rate per Customer (per ccf)			<u>\$0.4274</u>

\* Based on Total Proforma Annual Consumption (ccf) as agreed upon in DW 08-065

SPSt. Cyr  
4/14/2010