The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Clark B. Freise, Assistant Commissioner

WATER CONSERVATION PLAN APPROVAL

February 7, 2017

L. Todd Bickford
Glencliff Home
New Hampshire Department of Health and Human Services
393 High Street
Glencliff, NH 03238

Subject: **Benton – Glencliff Home (PWS ID #: 0224010)**
Water Conservation Plan, NHDES # 160092

Dear Mr. Bickford:

On January 30, 2017, the New Hampshire Department of Environmental Services ("DES") Drinking Water and Groundwater Bureau received a Water Conservation Plan (the "WCP"), signed on January 19, 2017, for Glencliff Home located in Benton, New Hampshire. Pursuant to RSA 485:61 and Env-Wq 2101, community water systems seeking permits from DES for new sources of groundwater shall submit a water conservation plan to DES. Based on review of the WCP, DES has determined the WCP complies with Env-Wq 2101, *Water Conservation* rules.

Pursuant to Env-Wq 2101, the Town of Benton and the North Country Council were provided a copy of the WCP, along with other required materials.

Glencliff Home also submitted a request to waive Env-Wq 2101.19(c), the requirement to have a meter installed for each water source prior to initiating a withdrawal from a water source. Glencliff Home proposes to delay the installation of water meters on Well #1 and Well #2 at least a year from the activation of Well #3, when a final determination regarding the future use of Well #1 and Well #2 has been determined based on the capacities of all three wells.

DES approves the WCP and the waiver request based on the following conditions:

1. A waiver to Env-Wq 2101.19(c), source meter installation, will expire **one year from source activation of Well #3**. By that date, Glencliff Home shall submit documentation that water meters have been installed on Well #1 and Well #2. If Glencliff Home has decided to deactivate or decommission Well #1 and Well #2, Glencliff Home shall submit a written statement to the DES Water Conservation Program stating as such.

2. No later than source activation, all source meters, distribution meters, meters measuring water consuming processes, and any transfer meters and data loggers shall be installed. Please note that a water meter shall be installed on Well #3 by no later than source activation. Please note Condition #1, above, in regard to the water meters on Wells #1 and #2. Please refer to section II.A.1. of the WCP for an explanation of the water meter installation for the cistern as well as non-potable water.

3. No later than source activation, source meters, distribution meters, and any other meters measuring water consuming processes prior to distribution shall be read on a monthly basis—no sooner than 27 days and no later than 33 days from the last meter reading.

4. No later than final source approval, the system shall begin reporting monthly production volumes to the DES Water Use Registration and Reporting program on a quarterly basis. DES has assigned **WUID 20200** to the facility. The total monthly volume withdrawn from each source shall be reported to DES on a quarterly basis. The first quarter report is due **April 15, 2017**.

    a. The water system shall register as a data provider and utilize the DES OneStop reporting tool to submit water use data. Instructions for using the tool are enclosed with this letter.

    b. Prior to reporting, the water system shall provide the method of measuring water use for hydropower to the DES Water Use Registration and Reporting program. If you have any questions about Water Use Registration and Reporting or registering as a data provider, please call (603) 271-6685 or email stacey.herbold@des.nh.gov.

5. All meters shall be installed per the manufacturer's instructions or American Water Works Association standards.

6. Upon source activation, all meters shall be tested and maintained based on the schedule proposed in the WCP.

7. Within one year of final source approval, a leak detection program shall be implemented, including a comprehensive leak detection survey to be completed every two years in accordance with the "Manual of Water Supply Practices, Water Audits and Loss Control Programs", document identification number AWWA M36, American Water Works Association, 2016.

8. Leaks shall be repaired within 60 days of discovery.

9. From the date of this WCP Approval, all new non-metallic pipes installed in the system shall be outfitted with detectable tracer tape or detectable tracer wire, or be GPS located and maintained in a GIS system.

10. Upon source activation, a water conservation outreach and education program shall be implemented in accordance with the WCP.

11. Within five years of source activation, all buildings with water fixtures of unknown age shall be investigated to determine if water use (ex. gallon per minute, gallon per flush) meets current plumbing and efficiency standards (summarized in Appendix D of the WCP).

12. Within five years of source activation, water fixtures older than 1994 or no longer meeting current plumbing and efficiency standards (summarized in Appendix D of the WCP) shall be replaced with WaterSense certified fixtures.

13. Within five years of source activation, all commercial kitchen appliances that do not meet current efficiency or ENERGY STAR standards (summarized in Appendix D of the WCP) shall be replaced with models meeting current efficiency or ENERGY STAR standards.

14. In accordance with Env-Wq 2101.21, if the system wishes to obtain a waiver from replacing water fixtures or commercial kitchen appliances, a waiver request shall be submitted to DES

containing an economic analysis which shows the payback period for the measure is greater than four years.

15. In accordance with the WCP, as buildings are constructed or renovated, WaterSense certified fixtures shall be installed and water saving measures shall be incorporated.

16. Every three years from the date of this approval, a *Water Conservation Plan Ongoing Compliance Reporting Form* shall be submitted to DES documenting how the system has maintained compliance with the WCP. The following records shall be maintained by the water system to include with the report:

    a. A leak log including the date a leak was discovered, the date a leak was repaired, the type of leak (ex. water main, service line, hydrant, valve), the approximate size of the leak (gpm), and the nearest address/building to the leak.

    b. A log including the dates water efficiency outreach and education actions were taken and what was done.

    c. Date of installation and replacement of all meters, as well as testing and calibration records.

    d. Leak detection survey reports.

    e. Number/Inventory of fixtures replaced during the reporting period.

17. Revisions to the WCP shall not be implemented without further approval from DES.

The *Water Conservation Plan Ongoing Compliance Reporting Form* may be located by going to the DES website (www.des.nh.gov), clicking on the "A-Z List" in the top right corner of the page, clicking "Water Conservation," and scrolling down to "Forms/Applications."

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

Sincerely,

Kelsey Vaughn

Kelsey Vaughn
Water Conservation Program
Drinking Water and Groundwater Bureau

Attached: (2) Water Use Registration Guidance and Water Use Reporting Guidance

ec: Lynnette Carney, Underwood Engineers, Inc.
David Brown, Glencliff Home
Town of Benton
North Country Council
Christine Bowman, DES
Steve Roy, DES
Stacey Herbold, DES

Water Conservation Plan

For

Glencliff Home
New Hampshire Department of Health and Human Services

Benton, New Hampshire

FINAL
January 19, 2017

Prepared by:
Underwood Engineers, Inc.
99 North State St.
Concord, NH 03301

UNDERWOOD engineers

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

Owner Name: Glencliff Home, NH Department of Health and Human Services

Owner Signature: _____ Date: 1/19/17

L. Todd Bickford, Administrator

WATER CONSERVATION PLAN: Glencliff Home

A community water system seeking authorization for a new source of water must submit a water conservation plan to the New Hampshire Department of Environmental Services (NHDES) for approval demonstrating how the water system proposes to comply with water conservation standards pursuant to Env-Wq 2101, *Water Conservation* rules. **Glencliff Home** is an existing community water system.

Activities outlined in the water conservation plan will be completed by maintenance staff, under the supervision of one of the five (5) certified water system operators at the facility. This report will be submitted to (***Appendix B***):

- NHDES
- Town of Benton, NH, via certified mail within 10 days w/ Water Conservation Rules Summary (Env-Wq 2101):

  Benton Town Hall
  221 Coventry Road (Rt 116)
  Benton, NH 03785

- North Country Council (NCC), via certified mail within 10 days w/ Water Conservation Rules Summary (Env-Wq 2101):

  North Country Council
  Mt. Eustis Commons
  262 Cottage Street
  Suite 246
  Littleton, NH 03561

I. Introduction

A. Contact Information

1. Name and location of system:
   Glencliff Home
   NH Department of Health and Human Services
   393 High Street
   Glencliff, NH 03238
   Public Water Supply # 224010

2. Current owner of system and mailing address:
   State of NH DHHS
   Attn: L. Todd Bickford
   393 High Street
   Glencliff, NH 03238

3. Name and mailing address of designer of water conservation plan:
   Lynnette Carney, P.E.
   Underwood Engineers, Inc.
   99 North State Street
   Concord, NH 03301

B. System Overview

1. Brief description of the community being served (ex. number of units, apartments, partially attached condos, individual homes, shared common facilities, population, etc.):

   Glencliff Home is a State operated nursing home for the Department of Health and Human Services (DHHS) that offers long term residential housing and care to adults that are developmentally disabled, mentally ill and/or suffering from dementia. Residents of this psychiatric nursing home are cared for in a home-like atmosphere. Glencliff Home contracts with a psychiatrist, but not medical doctors, and residents needing intensive medical care are sent to a nearby hospital. Glencliff Home is classified under the Water Conservation Rules as an Industrial, Commercial and Institutional (ICI) Water User, and subject to En-Wq 2101.19 to 2101.22 of the Water Conservation Rules.

   The facility is located on the side of Mount Moosilauke in the rural Town of Benton, NH, and is considered 'off-the-grid'. The facility operates a water turbine, a wood-chip burning plant and diesel powered generators to provide all power and heat for the facility. The facility operates their own water and sewer systems that serve a population of 230 according to the NHDES One-Stop site. The operators report that the home serves 120 residents and has a

day staff of about 70, and a night staff of about 20-25, in addition to operational personnel. As a remote, stand-alone facility, the staff of Glencliff Home recognizes the importance of their water supply, and are judicious in their use of water. Potable water is critical to the operation of the Home.

The facility includes a 120 bed multi-wing residence building with a kitchen (Brown Building and Lamott Wing), an administration building, recreation building, woodchip plant, laundry building, service building, various maintenance buildings, boiler building, carpenter shop and mechanics garage.

Glencliff Home is in the process of permitting a new community supply well, Well #3, to provide potable water for the facility. Once on-line, they hope to use Well #3 as their primary potable water source and retain the cistern for fire protection.

2. Description of water sources, including water sources to be developed for non-potable uses such as irrigation:

Potable Water

The Glencliff Home currently obtains potable water from two wells and a cistern that acts as a large dug well.

Well #1 is reportedly 900 ft deep and located in the yard to the east of the main facility resident building (Lamott Wing). Although the consumer confidence report (CCR) reports the combined capacity of Wells #1 and #2 as 19 gpm, operators report that Well #1 is currently off-line because the yield is so low they cannot do a drawdown test on it. The well is piped through an adjacent below grade vault in the yard which houses valves and water meters, but the meters are no longer operational.

Well #2 is reportedly 1,000 ft deep and located in the same yard area, approximately 20 ft from Well #1. Operators report that Well #2 has a diminished capacity. Well #2 is piped through the same below grade vault as Well #1, through a meter that is no longer operational.

Water from both Wells #1 and #2 is piped through a 3-inch PVC pipeline, approximately 1,700 ft up the mountain to the cistern, where it is stored and blended with water derived from the cistern.

Well capacities, as reported in the CCR are shown below. Operators report that actual capacities are much less.

Source	Notes	Capacity* (gpm)	Capacity* (gpd)
Well #1	Approx 900 ft deep	9.5	13,700
Well #2	Approx 1,000 ft deep	9.5	13,700
Cistern	Concrete structure; 28 ft ID; acts as a source (dug well/spring) and as storage	Unknown	Unknown
Total Capacity		**32.5 +**	**46,800 +**

**19 gpm combined well capacity per CCR. Reported that actual capacity is much less.*
Units: gpm = gallons per minute; gpd = gallons per day

Well #2 is operated on a time clock and currently operates between 8 am and 11 am. The pump rate is unknown; but assuming a rate of about 8 gpm (based on operator reports of diminished capacity), for 3 hours would yield **1,440** gallons/day pumped from Well #2 to the cistern.

The cistern is a concrete structure, 28 ft in diameter (inside) with about 24 ft sidewalls. The cistern acts as both a storage tank and a groundwater source. The cistern has concrete walls that are perforated in the lower level, a domed concrete top, and a crushed stone floor. The amount of groundwater entering the cistern is unknown, but it is the primary (potable) water source for the facility. The volume of the cistern (to the high water level) is about 106,000 gallons. The intended operating range (according to plans dated 2002) is about 6 ft, which is about 28,000 gallons.

The cistern is buried in a fenced field that is higher on the mountain, and water flows by gravity through an 8-inch pipeline from the cistern to the Glencliff Home facility, where it is used to serve the potable water uses at the facility and for fire protection of the Brown Building, and 4 hydrants behind Brown Building.

When the new source (Well #3) is on-line, the staff hope to use Well #3 as the potable water source, leaving the cistern source for use as fire protection and a back-up potable supply. Once Well #3 is on-line, the staff plans to rest Wells #1 and #2 for at least 6-months to see if some capacity can be restored in these wells. Depending on the final capacity of Well #3, and the results of resting of Well #1 and #2, final decisions regarding the future use of these wells will be determined. As such, Glencliff Home requests a waiver from Env-Wq 2101.19(c) to delay the installation of new meters on Wells #1 and #2 at least a year, until a final determination as to the future use of these wells has been determined.

Water from the wells has a higher pH and alkalinity than water from the cistern, and therefore requires less chemical treatment (soda ash) to alter the

pH and alkalinity. The staff therefore would prefer to use more well water than cistern water.

Non-Potable

A separate non-potable system exists at the Glencliff Home, which is used for facility operations and fire protection.

Water impounded by a dam on Slide Brook, higher on the mountain, is piped (by gravity) to the facility through a 10-inch penstock that is approximately 2-miles long. The penstock splits near the boiler building, with one line that supplies non-potable water to the facility, and one that continues down the mountain to the hydropower turbine.

Non-potable water is used at the facility for laundry, boilers, fire protection, maintenance uses, and to generate electricity from a hydropower turbine. The dam was under reconstruction in 2015 and 2016 (scheduled to be completed soon). During the reconstruction, regular non-potable uses (laundry) were occasionally supplied by the potable system. The additional usage during those instances was estimated to be approximately 3,000 gpd.

There is no irrigation at the facility, and no sources will be developed for irrigation. Select (flower) planting boxes and potted flowers around the grounds of the main building are watered by hand using watering cans, filled from the non-potable system.

3. Name designation of each proposed water source and any existing sources (currently potable):
    a) BRW #1 (existing)
    b) BRW #2 (existing)
    c) Cistern (existing)
    d) BRW #3 (proposed)

4. Number of connections proposed for each of the following classes (potable):

    The following connections are existing. No new connections are proposed at this time.

    a) Residential (potable): 3 existing (Superintendant's house, Doctor's House and Birchwood)
    b) Industrial/Commercial/Institutional: approx. 11 existing
    c) Non-potable (fire suppression, boilers, laundry): 8 existing
    d) Municipal: 0

5. Water Uses and Sources:

   Quantity of water consumed for each use is unknown.

Water Use	Source	
	Potable	Non-Potable
Sanitary use	X	
Kitchen	X	
Cleaning	X	
Boilers		X
Laundry		X
Outdoor use		X
Fire Protection	X	X

   The boiler at the wood-chip plant was installed in 2012, and there is no known water discharge from the boiler. Make-up water is provided from the non-potable water system. Condensate is returned back to the boiler.

   There is no central air conditioning at the facility.

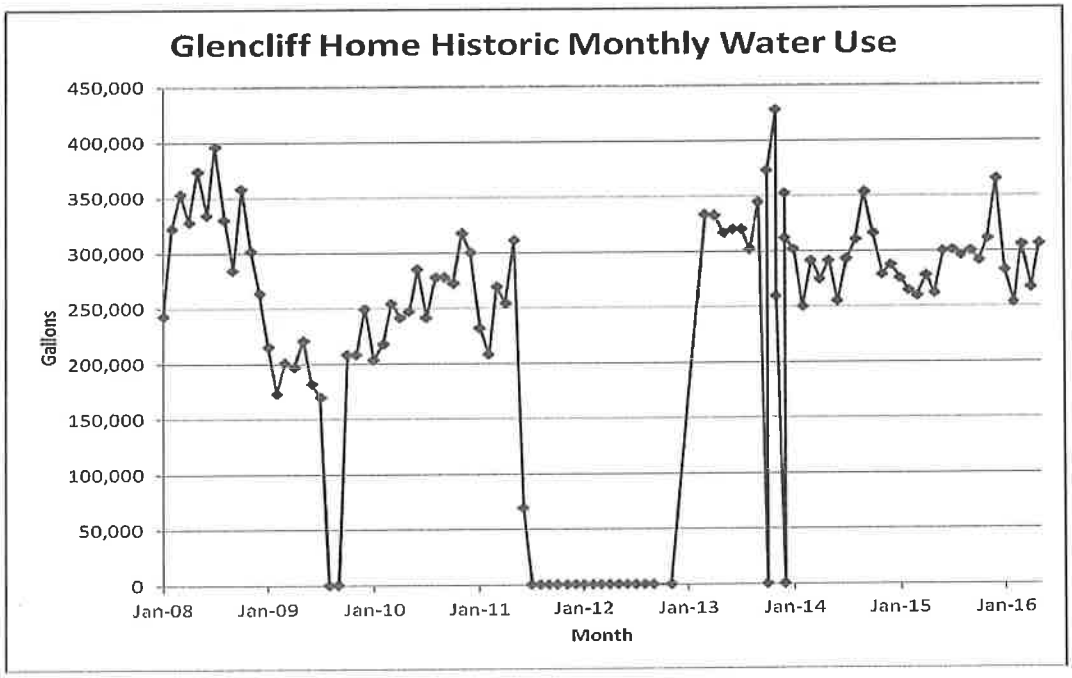
   The commercial kitchen for the facility is located in the Lamott Wing and was constructed in 2008.

   A table is included in ***Appendix C***, which provides general water use and approximate fixture counts for each building, where available.

6. The water system does not provide water to any consecutive water systems or privately owned redistribution systems.

7. There are no existing or proposed connections that receive more than 20,000 gpd.

8. Typical monthly water use is shown below from the meter in the Water Room of the Lamott Wing. This meter measures all potable use at the facility.



Average monthly flow from 2014-2016 was 291,000 gallons per month, which equates to an average daily flow during this period of about 9,600 gpd. Water use data was unavailable for several months where 0 flow is displayed.

The maintenance staff reported that in (approx) May 2016 they identified a cooler with a single pass cooling system in the Service Building that was operational, but no longer necessary. This cooler was disconnected and they report that average daily flows the last 2 months have been about 7,200 gpd, i.e. a reduction of about 2,400 gpd.

9. Please provide the following information based on metered source withdrawal volumes from the last complete year. Please report in gallons.

   Year: 2015
   Average daily use (ADU): 9,618 gpd*
   Lowest ADU (Mar 2015): 8,394 gpd*
   Highest ADU (Dec 2015): 11,781 gpd*
   *note – values are prior to removal of cooler noted above.

C. Transfer of Ownership

1. The system ownership is not proposed to be transferred.

II. System Side Management

A. Water Meters

1. Source and Other System Side Meters

a) According to Env-Wq 2101.19(c), water meters must be installed and maintained for each water source prior to initiating a withdrawal from a conservation source.

(1) There is currently a meter where the potable water system enters the facility (source & distribution meter). This measures the combined flow from Well #1, #2 and the cistern, as it enters the building from the cistern. There is no metering on the non-potable water system.

(2) Although new meters can be installed on Well #1 and Well #2 in the existing vault, it is not possible to measure the flow of groundwater into the cistern.

The pipeline leaves the cistern below grade and there is no access to install a flowmeter, nor would daily reading of a meter at this location be practical, given its remote location. Flow out of the cistern (combined Well #1, #2 and cistern flow) is currently measured where the piping enters the Lamott Wing.

b) The existing meter where the potable water enters the Lamott Wing also acts as the distribution meter.

c) Meter information for each proposed and existing water source and other system side meters – Potable system:

Name Description	*Meter Size, Make, Model, Flow Range, Installation Date*
BRW #1 Production	1 inch meter installed 2002, not functioning
BRW #2 Production	1 inch meter installed 2002, not functioning
Entering Lamott Wing (combined BRW #1, #2 & cistern) (Source and Distribution)	2 inch Neptune HP Turbine, 4-200 gpm range, installed 2013. Sensus W-3500 DR Fire main regular meter, installed 2002.
BRW #3 Production	The meter will be selected during final design and be similar to existing meters (likely ¾" or 1" Neptune T-10 meter)

There are no meters on the non-potable system.

d) No later than the source activation date, source meters and other system side meters will be read at least every 30 days.

(1) Potable System

(a) The (potable) meter at the facility entrance (Lamott Wing) is typically read daily (Monday through Friday) and total flow is recorded.

(b) The fate and future use of Wells #1 and #2 is unknown at this time. If they are to be used in the future, the existing non-functioning meters will be replaced with similar positive displacement type meters.

(c) The new piping arrangement to connect Well #3 to the system has not yet been determined. It is anticipated that the existing domestic meter in the Water Room could be re-used to meter domestic distribution flow. It is anticipated that the cistern supply would be connected separately to the fire suppression system in the water room. The existing fire meter may be calibrated and re-used, or a new fire meter could be installed.

(2) Non-Potable System

(a) There currently are no metering facilities on the penstock from the dam, nor could metering be easily installed on the buried pipe.

(b) New meters will be installed on the non-potable line to the laundry and the boiler buildings.

(c) Hydrant flows will be measured with a hydrant meter during flushing activities.

(d) Water use for maintenance activities in the 'lower campus' cannot be readily measured, and use is considered to be of small quanity.

(e) KW production of the water wheel will be reported, and NHDES can convert this information to estimated water use.

2. Service Meter Installation, Reading and Maintenance

a) Meters are not installed at existing service connections. Glencliff Home does not bill for water since it is an institution and provides water only for its own facilities. Many of the existing services were constructed without provisions to install meters and would be cost prohibitive to retrofit.

3. Meter Selection, Installation and Maintenance

a) A new source meter will be installed on Well #3. The staff would like to delay the decision regarding installation of new meters on Wells #1 and #2 at least a year, until the final use of those wells is determined. Under current conditions, very little water is derived from those sources (about 15%).

b) All meters will be American Water Works Association (AWWA) certified, with the exception of c), below.

c) AWWA does not have standards for magnetic flow meters. If a magnetic flow meter is proposed, the meter make, model, size and manufacturer specifications will be forwarded to the NHDES Water Conservation program for review. The meter will not be installed until receiving approval for its use from NHDES.

d) The size of final meter selections will be based on an evaluation of flowrate from the wells, and the system design for Well #3. It is anticipated that the meters would all be 3/4"-inch or 1-inch Neptune T-10 positive displacement meters, or something similar.

e) Meters will be installed as specified by the manufacturer, including requirements for horizontal or vertical placement, distance of straight run of pipe upstream and downstream of the meter and strainer installation. If the manufacturer does not supply installation specifics, meters will be installed in accordance with the "Manual of Water Supply Practices M6, Water Meters-Selection, Installation, Testing, and Maintenance" (AWWA, 2012).

f) The following meter testing and calibration schedule or meter change-out schedule will be implemented. If the manufacturer's accuracy warranty extends beyond the schedule below, the meter will be tested or changed-out no later than the warranty expiration date.

Meter Size (inches)	Testing Rate (years)
<1"	10 yrs
1"-2"	4 yrs
3"	2yrs
>3"	1 yr

g) A log will be maintained that includes the year the meter was installed, tested, calibrated, repaired and replaced. Calibration certificates will be kept on file.

B. Water Balance and Water Audit

1. The calculation of a direct water balance (system input volume – authorized metered consumption) is not possible because meters are not installed on consumption connections. The age of the facility precludes installation of consumption meters.

C. Leak Detection and Repair

1. Description of the system's leak detection program (ex. acoustic leak detection, zone meters, night flow analysis) to be implemented within one year of source approval:

   a) An acoustic leak detection survey of the entire system will be completed every two years from the date of final source approval.

      (1) Glencliff Home had a leak detection survey completed by M2 Service Group in May 2013. The report indicated that 3.67 miles of AC, DI and HDPE pipe were surveyed and no leaks were identified. Glencliff Home will continue to conduct periodic acoustic leak detection surveys. They are applying for a leak detection grant in 2016.

   b) Metered production/usage is recorded daily, 5 days/week. The cistern level is monitored weekly. A sudden or steady increase in the production volume will be investigated.

   c) Maintenance staff make daily checks of certain buildings with critical facilities (Brown, Lamott Wing, Administration, Laundry, Birchwood Cottage), to make sure there are no leaks, no water in the basement, ensure operation of the furnaces in the winter, etc.

   d) Maintenance staff make monthly checks of the plumbing facilities to check for proper operation of toilets, faucets, drains, etc. to prevent wasted water, and to ensure proper operation for the facility residents.

   e) Maintenance staff are promptly notified by the nursing staff of plumbing issues in the main residential building (Brown Building and Lamott Wing). The maintenance staff receive notifications for all maintenance requests via e-mail, and they are logged when the notification is received and when the problem is resolved. There is also a log book on every floor.

2. Mapping of existing water mains and valves is shown on 2002 construction plans when major changes were last made to the water system.

3. Non-metal pipes will either be GPS located and stored in a GIS system or equipped with detectable tracer tape or detectable tracer wire during new installation.

4. Leak detection will be conducted in accordance with the "Manual of Water Supply Practices M36, Water Audits and Loss Control Programs" (AWWA, 2016).

5. Leaks will be repaired within 60 days of discovery unless a waiver is obtained in accordance with Env-Wq 2101.23.

6. A log of all leaks will be maintained, including the date the leak was discovered, the date the leak was repaired, the type of leak (ex. service, main, hydrant, valve), the size of the leak (gpm) and the location.

D. Pressure Management

1. The only pressure gages are in the "Water Room" in the basement of the Lamott Wing where the blended (potable) source water enters the facility. At that location, the pressure is about 85 psi.

2. Pressure at other locations in the system is unknown.

III. Consumption Side Management

A. Conservation Rate Structure and Billing

1. There is no existing rate structure or billing system since Glencliff Home only serves its own facilities and residents.

B. Educational Outreach Initiative

1. No later than the source activation date, Glencliff Home will implement water conservation outreach by educating the staff at the facility. Workers will be reminded of water saving practices and are already proactive in notifying maintenance personnel of any leaks or leaky fixtures. Operational personnel will be reminded on the importance of water conservation and become aware of water use in their work. Water is a critical and limited resource at this facility, and most staff are already aware of the importance of this resource.

   Quarterly staff meetings are held with the Administrator, Deputy Administrator, Head of Nursing, maintenance personnel, nursing staff, dietary staff, etc. for all three shifts. An agenda item will be added to these meetings to remind staff of the importance of water conservation. Information contained in NHDES Water Efficiency Fact Sheets (***Appendix A***) located at http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm#efficiency or EPA WaterSense materials located at http://www.epa.gov/watersense/ will be reviewed during these quarterly meetings and made available to staff.

2. Glencliff maintenance personnel will maintain a log indicating how the system has complied with III.B.1., above. The log will include dates the outreach and education actions were taken and what was done.

C. Water Efficiency Practices

1. Existing Water Efficiency Practices

   a) The staff at Glencliff Home already subscribe to many water efficient practices. Non-potable water is used for fire protection, laundry and other utility uses. Planting and flower boxes and pots around the facility are watered by hand with a watering can, using non-potable water. There is no irrigation of the grass. Facilities are checked regularly for leaks and malfunctioning plumbing. Water is a critical resource at the facility, and also a limited resource, of which the staff is very aware.

   b) Ozone is used in the laundry system to reduce detergent and hot water use.

c) The only commercial kitchen on campus is located in the Lamott Wing and was constructed in 2008. Based on the kitchen inventory (Appendix C), only a steam cooker (Cleveland 22CGT6.1) is ENERGY STAR certified, but several other appliances have water- and energy-efficiency features that are mentioned in the NHDES Water Efficiency Fact Sheets. For instance, the dishwasher (Hobart C44A [208 volt, 15 kW]) has a high temp rinse, and the ice machines (Scotsman CU1526SA-1 [150 lb]) are air-cooled.

d) Based on the kitchen inventory (Appendix C), the pre-rinse spray valves and hand faucets in the commercial kitchen meet the current standards listed in Appendix D (pre-rinse spray valves = 1.6 gallons per minute [gpm] and hand faucets = 2.2 gpm).

2. Proposed Water Efficiency Practices

a) Within 5 years of source activation, water fixtures older than 1994 (as identified in Appendix C) and no longer meet current standards listed in Appendix D (toilets = 1.6 gallons per flush [gpf], urinals = 1.0 gpf, residential and commercial kitchen sinks = 2.2 gallons per minute [gpm], public sinks = 0.5 gpm, and showerheads = 2.5 gpm) will be replaced with WaterSense certified fixtures, which use 20% less water than standard fixtures.

(1) Toilets in some buildings are wall-mounted units or constructed in a way such that they are difficult to be changed without a major renovation. These fixtures may not be able to be retrofitted or replaced until renovations to the entire bathroom or building take place.

(2) In some circumstances, WaterSense certified toilets may not meet the needs of residential use. In these cases, standard flow models shall be used.

b) Within 5 years of source activation, all buildings listed in Appendix C as having fixtures of unknown age shall be investigated to determine if water use meets today's plumbing standards (summarized in Appendix D). Those that do not shall be replaced as described in section III.C.2.a) above.

c) Within 5 years of source activation, all commercial kitchen appliances that do not meet today's standards (summarized in Appendix D) or ENERGY STAR standards shall be replaced unless the payback period will be more than 4 years.

d) As buildings are constructed or renovated, WaterSense certified fixtures will be installed and water saving measures will be incorporated.

e) An upcoming tunnel project will capture steam system condensate from the laundry building. This is currently the only location where condensate is not captured and recycled.

f) Water efficiency practices for institutions, kitchens/cafeterias, laundry facilities, and outdoor uses will be used as described in the NHDES Water Efficiency Fact Sheets.

IV. Reporting and Implementation

A. It is not possible to complete a water balance at the facility, since there are no consumption meters, nor is it reasonable to install such meters.

B. Upon receiving a Water Use ID number from NHDES, the Glencliff maintenance staff will report monthly production volumes, quarterly to the NHDES Water Use Registration and Reporting Program. Monthly means once every calendar month, but no sooner than 27 days after and no later than 33 days after the previous reading.

C. The Glencliff maintenance staff will submit a form supplied by NHDES once every three years from the date of the water conservation plan approval documenting how compliance with the requirements of Env-Wq 2101, *Water Conservation* rules, is being achieved. The system may attach the meter, leak, and outreach and education logs to the form or fill out the form manually. The form will also include an update on fixture replacements/retrofits or renovations that have taken place on campus.

Appendix A
Water Efficiency Fact Sheets

ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

WD-DWGB-26-10 2013

Water Efficiency: Laundry Facilities

Laundry facilities vary in size from industrial operations to self-service machine businesses. Laundry operations can use the water efficiency practices in this fact sheet to save water and the costs associated with water supply and wastewater discharge. A large amount of energy goes into heating water for washing. Reducing the amount of water used in laundry operations will also save on energy costs. A comprehensive audit should be performed to assess the facility's water system and identify locations where these practices can be employed to conserve water. Read the fact sheet "Water Efficiency: Business or Industry Water Use and Conservation Audit" for directions, at www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm; scroll to WD-DWGB-26-16.

- Wash full loads only.
- Reduce water volumes for partial loads.
- Install a system to reuse rinse water for wash water make-up. Computer controlled rinse water reclamation systems can save as much as 25 percent over conventional systems.
- Employ a rinse water or wash water treatment system to allow reclamation and reuse of the water in laundry operations. These systems treat wastewater for reuse in initial wash cycles and can save up to 50 percent of total water use for the entire system.
- Investigate washing systems that internally reuse rinse water and wash water in a continuous batch or "tunnel" type process with counter current flow. These washers can reduce water use by as much as 60 percent when compared with washer-extractor types. They also use less chemicals and energy and are less labor-intensive.
- Install a laundry system that uses ozone rather than detergent as a cleaning agent. These systems work on a closed loop process and use cold water only. Water needed for the rinse cycle is reduced since no detergent is present.
- Schedule wash loads carefully to minimize the need to adjust the chemical/detergent composition and machine variables. Develop methods using minimum water requirements based on load soil conditions and treatment requirements.
- Install water saving devices on all fixtures.
- Inspect and repair valves, sensors and other controls regularly.
- Use static rinse tanks where feasible.
- Meter flows through the cleaning systems for more effective operations control. By

metering flows, minimum flow rates can be accurately maintained.

- Back-flush filter systems only when necessary.
- Replace conventional machines in laundromats with water-saving horizontal-axis machines. These washers rotate laundry rather than agitating it and use much less water.
- Post water efficiency signs telling customers how they can save water and money by washing full loads only or lowering the water level settings on partial loads.

Crystal Laundry in Manchester saves approximately 675,000 gallons of water per month by using a horizontal flow "tunnel-type" washing machine that reuses rinse waters for bleaching and washing. This washing system is capable of using approximately 40 percent less water than a conventional type machine, based on equivalent cleaning requirements.

For Additional Information

Please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or dwgbinfo@des.nh.gov or visit our website at http://des.nh.gov/organization/divisions/water/dwgb/index.htm. All of the bureau's fact sheets are online at http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm. More information about the DES Water Conservation Program can be found at http://des.nh.gov/organization/divisions/water/dwgb/water_conservation/index.htm.

Resources

Pennsylvania DEP, General water conservation tips for laundries.
www.elibrary.dep.state.pa.us/dsweb/Get/Document-80658/3920-FS-DEP1825.pdf

US EPA, Energy Star, Listing of commercial washers that meet the Energy Star rating.
www.energystar.gov

References

New England Interstate Water Pollution Control Commission; *MRI Water Conservation Technical Bulletin #8, Water Conservation Best Management Practices Laundry Facilities;* NEIWPCC, Lowell, MA; 1996.

U.S. Department of Defense; *MIL-Handbook-1165, Water Conservation;* U.S. Dept. of Defense; 1997; pp 51-55.

Vickers, Amy; *Handbook of Water Use and Conservation;* WaterPlow Press, Amherst, MA; 2001; pp 278-278.

Note: This fact sheet is accurate as of February 2013. Statutory or regulatory changes or the availability of additional information after this date may render this information inaccurate or incomplete.

ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

WD-DWGB-26-13 2013

Water Efficiency: Institutions

Schools, colleges, universities and other institutions that provide room and board can realize significant water and cost savings by implementing the water efficiency practices in this fact sheet. These practices address water use outdoors and in living areas, classrooms, cafeterias and laundries. A comprehensive audit should be performed to assess the facility's water system and identify locations where these practices can be employed to conserve water. For instructions, visit the fact sheets webpage at www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm and scroll to WD-DWGB-26-16, "To find the fact sheet "Water Efficiency: Business or Industry Water Use and Conservation Audit."

General Water Efficiency Practices

- Locate and repair leaks. Metering at strategic points in the facility helps detect leaks and maintain minimum flow rates.
- Develop a maintenance program. Routinely inspect all plumbing and fixtures, equipment, water lines, irrigation systems, valves and pumps for leaks, clogging, worn out gaskets and faulty operation. Keep replacement and repair parts on hand.
- Educate residents about water efficiency practices.

Domestic/Sanitary Water Efficiency Practices

- Install ultra low-flow toilets that use a maximum of 1.28 gal/flush (4.8 L/flush) or retrofit existing toilets with displacement bottles or dams. Install ultra low-flow urinals that use a maximum of 0.5 gal/flush (1.9 L/flush) or use waterless urinals.
- Install low flow faucets, faucet aerators or laminar flow restrictors that limit flow to $\leq$1.5 gpm.
- Install low flow showerhead devices that limit flow to $\leq$2.0 gpm.
- Install flow restrictors on plumbing fixtures wherever possible.
- Install automatic faucet shut-off valves in public water use areas.
- Replace older model piped-in drinking water fountains with stand-alone water coolers/dispensers.
- Replace top-loading vertical-axis washing machines with front-loading horizontal-axis types.
- If a commercial type laundry exists onsite, consider using tunnel or similar washers that recycle the final rinse water into the next wash cycle. Visit the fact sheets webpage (see above) and scroll

to WD-DWGB-26-10, "Water Efficiency Practices for Laundry Facilities."

Kitchen/Cafeteria Water Efficiency Practices

- Minimize or eliminate pre-wash spray systems and replace spray heads with low-flow models.
- Install automatic shut-off valves in all water-using kitchen equipment or shut off water when not in use.
- Remove garbage disposals. Replace them with strainers, or reuse wash and rinse water for disposal purposes. Composting food waste is the most practical disposal method for water conservation and nutrient recycling.
- Replace water-cooled ice machines with air-cooled models or retrofit to recirculating non-contact cooling.
- Use flake ice machines. These require less bleed-off than cube ice machines.
- Reuse non-contact cooling water for other purposes.
- Upgrade to water-saving machinery as old equipment wears out.
- Install on-demand point-of-use water heating systems to eliminate the need to purge lines for hot water. Insulate pipes to retain heat.
- Operate dishwashers, sanitizers and sterilizers with full loads only and shut them off when not in use. Install sensors on conveyor systems that automatically shut off water when no dishes are present.
- Use high-temperature rinse dishwashers rather than low-temperature ones as they require less water and wash more racks per hour.
- Consider using ultrasonic pre-rinse units or hand scrape dishes rather than rinsing with water.
- Pre-rinse utensils and dishes in a water basin.
- Rinse vegetables in a water basin.
- Reuse rinse water where appropriate for pre-rinsing, dish washing, garbage disposers, or scrapping troughs.
- Operate scrapping troughs only when washing dishware.
- Eliminate scrapping troughs or minimize the water flowing through them.
- Do not use running water to melt ice or frozen foods.
- Provide self-serve water dispensers and eliminate serving water with meals except upon request.

Outdoor Water Efficiency Practices

Visit the fact sheets webpage (see above) and scroll to the "Water Efficiency" fact sheets at the bottom of

the page for additional ways to save water outdoors.

- Cover outdoor swimming pools when not in use to prevent evaporative losses.
- Wash fleet vehicles less often.
- Sweep parking lots, driveways, walks and steps rather than hosing them off.
- Watering frequency should be based on soil moisture, weekly precipitation and plant/turf conditions. Typically, established landscape plants and turf grass require an inch of water per week, and this amount may be applied in one application.
- Employ rain sensors and soil moisture sensors on outdoor irrigation systems to ensure they do not turn on when not needed.
- Be sure sprinkler heads are producing drops rather than a mist. This helps reduce evaporative losses.
- Incorporate soil moisture and rain sensors into automatic sprinkler systems.
- Operate automatic sprinkler systems connected to public water systems only when the water demand is low, usually between 4:00 and 6:00 AM.
- Don't water the pavement. Adjust sprinklers so they water only the plants.
- Plant drought-resistant turf grass. The most drought-tolerant grasses are the fine-leaf fescues. The University of New Hampshire Cooperative Extension recommends a mix containing hard fescue, Chewings fescue and perennial ryegrass.
- Soil moisture sensors are useful in determining how wet your soil is. You can check the moisture of the soil to determine watering needs. In some instances you will find that you do not need to water even if it has not rained recently. Water should be applied until the soil moisture meets the Cooperative Extension's recommendations for your soil type.
- Check soil moisture before watering, even if it hasn't rained. Then spot water, irrigating only those areas that are dry. Water by hand, if possible.
- Do not irrigate during windy conditions.
- Use hose nozzle shut-off devices
- Use drip or trickle irrigation wherever possible. These systems apply water near the root zone of the plant, ensuring a complete watering while eliminating excess water usage.
- Minimize your lawn area. Replace grass with moss, rocks, gravel, wood chips or mulched flowerbeds.
- Plant species native to New Hampshire. Native plants are hardier and tend to need less water. Check out the New England Wildflower Society's website for information about native plants at www.newfs.org.

- Use mulch wherever possible.

For Additional Information
Please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or dwgbinfo@des.nh.gov or visit our website at http://des.nh.gov/organization/divisions/water/dwgb/index.htm. All of the bureau's fact sheets are online at http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm. More information about the DES Water Conservation Program can be found at http://des.nh.gov/organization/divisions/water/dwgb/water_conservation/index.htm.

Resources
UNH Cooperative Extension, Fact sheets on cultural requirements for turf and choosing varieties of turf grass. www.extension.unh.edu/Agric/AGNLT.htm

References
New England Interstate Water Pollution Control Commission; *MRI Water Conservation Technical Bulletin #5, Water Conservation Best Management Practices for Domestic/Sanitary Water Use;* NEIWPCC, Lowell, MA; 1996.

New England Interstate Water Pollution Control Commission; *MRI Water Conservation Technical Bulletin #6, Water Conservation Best Management Practices for Kitchen Water Use;* NEIWPCC, Lowell, MA; 1996.

U.S. Department of Defense; *MIL-Handbook-1165, Water Conservation;* U.S. Dept. of Defense; 1997; pp 25-37.

Vickers, Amy; *Handbook of Water Use and Conservation;* WaterPlow Press, Amherst, MA; 2001; pp 267-277.

Note: This fact sheet is accurate as of February 2013. Statutory or regulatory changes or the availability of additional information after this date may render this information inaccurate or incomplete

Appendix B
Notification Process

Public Notification Instructions
Once a final draft of the water conservation plan is agreed upon by the applicant and NHDES, NHDES will send a signature line to the applicant for addition to the plan along with a summary of the requirements of Env-Wq 2101, *Water Conservation* rules. Within 10 working days of receiving the summary from NHDES, the applicant is required to provide a copy of the water conservation plan via certified mail with return receipt requested to the governing board of the municipality in which a proposed source is located, all municipalities that will receive water from the water system (if any), all wholesale customers (if any) and the regional planning commission serving the location of the proposed source. In most cases, only the municipality and the regional planning commission will require notification. All signed copies of the certified mail return receipts (the green cards) must be forwarded to NHDES along with the final, signed water conservation plan.

Additional Attachments
The applicant must provide the governing boards with a summary of the requirements of Env-Wq 2101, which may be found at: http://des.nh.gov/organization/divisions/water/dwgb/water_conservation/index.htm, and request that the governing board amend local site planning requirements to reflect the requirements of Env-Wq 2101 or to promote water efficiency.

Notification of Consecutive Water Systems and Privately Owned Redistribution Systems
Within 5 working days of obtaining final approval of the source from NHDES, the system is required to notify any consecutive water system or privately owned redistribution system receiving water from the system, that pursuant to Env-Wq 2101.13, the systems must implement a water conservation plan and should contact the NHDES Water Conservation Program using the contact information below.

Kelsey Vaughn, Water Conservationist
New Hampshire Department of Environmental Services
Drinking Water and Groundwater Bureau
PO Box 95
Concord, NH 03302-0095
kelsey.vaughn@des.nh.gov
Phone: (603) 271-0659
Fax: (603) 271-0656

Appendix C
Table of Water Uses and Kitchen Inventory

Glencliff Home
Water Services and Uses

10/19/2016

Building	Potable/Non-potable	Supplied from	Types of Water Use	Water Using Devices (approx)	Fixture age/last renovation
Carpenter Shop	non-potable	2" copper or PVC		1 sink -1 lav.- 1 toilet 2 hosebibs	pre-1994 post 1994
Grounds/Mechanics Garage	non-potable	from the carpenter shop		1 toilet-3 lav.- 2 hosebibs	
Birchwood Cottage	potable	from Superintendants house	Residential, sanitary, kitchen	2 toilets -2 tub/shower 2 lav. -1washer - 1 hosebib	1-pre-1994 1 post 1994
Maintenance Facility	non-potable			out of service	
Old Boiler Building (abandoned)	potable & non-potable	10" DI	none - disconnected	out of service	
	potable & non-potable	8" CI	none - disconnected		
Recreation Building	potable	from laundry building	sanitary	2 toilets -2 lav.	pre-1994
Laundry Building	non-potable w/ backflow device	10" AC	laundry, fire protection	1 toilet - 1 lav. - 2sink	pre-1994
	potable w/ backflow device	8" CI	sanitary	1-200# 3-90# 2-50#washers	
Adams Hall (abandoned)	non-potable (?)	10" DI	none - disconnected	out of service	
	potable (?)	8" CI	none - disconnected	out of service	
Service Building	non-potable	10" AC	fire protection		
	potable	8"CI	sanitary; 1 bath warehouse; 1 old dinning hall	2 toilet - 2 lav. - 2sink	pre-1994
Administration Building	potable	6" CI (?)	sanitary, fire protection	2 toilets-2 lav.	1-2014; 1 pre-1994
Doctor's House	potable	from Admin bldg	Residential, sanitary, kitchen used for visiting family	2 toilets -2 lav. -1 hosebib 1sink- 1 tub/shower	post 1994
Superintendants House	potable	from Admin bldg	Residential, sanitary, kitchen	2 toilets - 1 tub/shower 1 sink -1 washer-2 hosebibs	post 1994
Brown Building	potable	from cistern	Residential, sanitary, kitchen fire protection	24 sinks -24 toilets 4 showers - 4 tubs 4 mop sinks - 4 hosebibs 1 washer	renovated 2002
Brown Building - Lamott Wing (constructed 2000)	potable	from cistern	Residential, sanitary, kitchen fire protection	20 sinks - 37 toilets 41 lav. Sink - 8 tubs 6 mop sinks - 4 showers	constructed 2000
Woodchip plant building	non-potable w/ backflow device		boiler makeup, fire protection		
	potable w/ backflow device			1 toilet - 1 lav. sink 1 mop sink - 1 hosebib	constructed 2011
Fire Protection-hydrants	potable		fire protection	4 hydrants on back side of Brown Building	
	non-potable		fire protection	6 hydrants in central loop	

* service connection information approximated from September 2002 plans by Vollmer Associates entitled "Water System Improvements", Revision A

Worksheet 9. Commercial-Grade Kitchen Appliances

Dishwasher	Location: Lamott building Kitchen dish room	Make/ Model	Quantity	Racks washed per day	Building hot water fuel type	Booster water heater fuel type	Operating days per year	ENERGY STAR Qualified?
208volt 15kw	Under Counter							
	Door Type							
Low Temp.	Single Tank Conveyor	Hobart C44A	1	90	#2 Fuel	Electric	365	NO
Or High Temp. X	Multi Tank Conveyor							
Leaks or Other Comments								

Ice Machine (2)	Location: Kitchen	Make/ Model	Quantity	Harvest rate (pounds ice per day)	Potable water use (gallon per 100 pounds ice)	Operating days per year	ENERGY STAR Qualified?
Scotsman CU1526SA-1 150 lb.	Ice Making Head						
	Remote Condensing Unit /Split System						
	Self-Contained Unit	Scotsman CU1526SA-1	2	150	18 gal/100 lbs	345	N/O
Leaks or Other Comments							

Steam Cooker Cleveland - model 22CGT6M	Location: Lamott building Hot prep area	Make/ Model	Quantity	Pounds of food cooked per day per unit	Number of pans per unit	Operating hours per day	Operating days per year	ENERGY STAR Qualified?
Groen Steam Kettle DH20	Electric							
	~~Natural Gas~~ Propane	Cleveland	2	25-30	4		365	NO
Leaks or Other Comments	Propane	Groen	1	50 lbs per week			52	NO

Clothes Washer	Location: Laundry	How is water for each unit heated?	Make/ Model	Quantity	Average number of loads per week	Type of water heating	Type of clothes dryer	~~Electric or Gas Drier~~ Steam	ENERGY STAR Qualified?
		~~Electric Heat~~	UNIMAC 90	3	39	STEAM			
			UNIMAC 50	1	4	STEAM			
		~~Gas Heat~~ →	MILNOR 200	1	4	STEAM			
			MILNOR 50	1	4	STEAM			
Leaks or Other Comments		Steam							

Combi Oven	Location:	Make/ Model	Quantity	Operating hours per day	Operating days per year	Pounds of food cooked per day per oven
	Electric Heat					
	Gas Heat					
Leaks or Other Comments						

See Worksheet 10 for Commercial-Grade Kitchen Fixtures.

Worksheet 10. Commercial-Grade Kitchen Fixtures

Location	Hand Faucet	Pre-Rinse Spray Valve	Marked (gpm)	Timed			Leaks? Comments
				Num. of Cups/ Pints/ Quarts.	Num. Secs.	Calc. Rate (gpm)	
Dish room	1		1.50	6 quarts	60	1.50	
Dish room		2	1.42	5 quarts	60	1.42	
Bakery	1		1.50	6 quarts	60	1.50	
Bakery		1	1.42	5 quarts	60	1.42	
Hot Food prep	1		1.50	6 quarts	60	1.50	
Hot Food prep		1	1.42	5.5 quart	60	1.46	
Kitchen	2		1.50	6 quarts	60	1.50	
Kitchen		1	1.42	5.5 quarts	60	1.42	
SERVING AREA	1		1.50	6 quarts	60	1.50	
hand sink serving	1		1.50	6 quarts	60	1.50	
hand sink Hot prep	1		2.00	8 quarts	60	2.00	
hand sink bakery	1		2.00	8 quarts	60	2.00	

See Worksheet 9 for Commercial-Grade Kitchen Appliances.

Glencliff Home In-House Requisition

State Contract, P&P Purchase Order, or
GH Field Purchase Order #: _____ Date: _____

Preferred Vendor: _____ Vendor Code: _____

Vendor Address: _____ Contact Person: _____

Telephone #: _____ Date Required: _____

☐ **Order Placed** ☐ **Please Order** ☐ **Registered**

- ☐ Request to Submit a Requisition
- ☐ NOTICE State Funds Already Committed
- ☐ Request a Field Order Purchase
- ☐ Request for Cash
- ☐ Misc Shopping Items Needed
- ☐ Request for Reimbursement

- ☐ Regular Budget
- ☐ Maint Project or Special Budget
- ☐ Trust Fund _____
- ☐ Store Card Request
- ☐ Bank Card Request
- ☐ Other

☐ Price Quote Attached ☐ Spec Sheet/Electronic Order Attached ☐ Price Incl Shipping

	Quantity	UM	Item #	Item Description	Price Each	Amount
1	1	yr 2000	Milnor 200lb	Model # 42044W92 / Serial # ABO/00001292601		$0.00
2	2	yr 2010	Unimac 100lb	Model # UWN100T3VQU1002 / Serial # 0912013811		$0.00
3	3	yr 2010	Unimac 100lb	Model # UWN100Y3VQU1002 / Serial # 0912012429		$0.00
4	4	yr 2010	Unimac 100lb	Model # UWN100Y3VQU1002 / Serial # 0912017425		$0.00
5	5		Unimac unimax50	Model # UC50PN2AU2 / Serial # 030542940051978		$0.00
6	6		Milnor 35	Model # 30022M5J / Serial # AAV/ 7288901		$0.00
7						$0.00
8						$0.00
9						$0.00
10						$0.00
11						$0.00
12						$0.00
13						$0.00
14						$0.00
15						$0.00
16						$0.00
17						$0.00
18						$0.00
19						$0.00
20						$0.00
					Shipping Cost Estimate:	
					Total:	$0.00

Request to include: Description with special specifications, Color, Size, Quantity per case, Manufacturer's name & number if available. Specification sheet should also be included for equipment requests.

Requested By: _____

Dept Head Approval: _____

Revised: 8/13

Appendix D
Water Efficiency Standards

National Efficiency Standards and Specifications for Residential and Commercial Water-Using Fixtures and Appliances

Adapted from information provided by the U.S. EPA Office of Water, the Alliance for Water Efficiency, and other sources)

Fixtures and Appliances	EPAct 1992, EPAct 2005, "Energy Independence and Security Act of 2007" *(or backlog NAECA updates)*		WaterSense® or Energy Star®		Consortium for Energy Efficiency	
	Current Standard	Proposed/Future Standard	Current Specification	Proposed/Future Specification	Current Specification	Proposed/Future Specification
Residential Toilets	1.6 gpf[1]	1.28 gpf/ 4.8 Lpf proposed by efficiency advocates for tank-type only	Tank-type toilets: WaterSense = 1.28 gpf (4.8L) with at least 350 gram waste removal + LA Spec.		No specification	
Residential Lavatory (Bathroom) Faucets	2.2 gpm at 60 psi[2]	1.5 gpm/ 5.7 Lpm proposed by efficiency advocates	WaterSense = 1.5 gpm maximum & 0.8 gpm minimum at 20 psi		No specification	
Residential Kitchen Faucets				None proposed at this time	No specification	
Residential Showerheads	2.5 gpm at 80 psi		WaterSense = 2.0 gpm		No specification	
Residential Clothes Washers	MEF ≥ 1.26 ft^3/kWh/cycle *No specified water use factor Note: MEF measures energy consumption of the total laundry cycle (wash + dry). The higher the number, the greater the energy efficiency	Energy Independence and Security Act of 2007 specified effective in 2011: MEF ≥ 1.26 ft^3/kWh/cycle WF ≤ 9.5 gal/cycle/ft^3 Also specified: DOE shall publish final rule by Dec 31, 2011, determining if standards will change effective 1/1/2015.	Energy Star (DOE) effective July 1, 2009: MEF ≥ 1.8 ft^3/kWh/cycle WF ≤ 7.5 gal/cycle/ ft^3	Energy Star (DOE) To be effective Jan 1, 2011: MEF ≥ 2.0 WF ≤ 6.0 gal/cycle/ft^3	Tier 1: MEF ≥ 1.80 ft^3/kWh/cycle; WF ≤ 7.5 gal/cycle/ft^3 Tier 2: MEF ≥ 2.00 ft^3/kWh/cycle; WF ≤ 6.0 gal/cycle/ft^3 Tier 3: MEF ≥ 2.20 ft^3/kWh/cycle; WF ≤ 4.5 gal/cycle/ft^3	

[1] EPAct 1992 standard for toilets applies to both commercial and residential models.
[2] EPAct 1992 standard for faucets applies to both commercial and residential models.

DOE: Department of Energy
EPA: Environmental Protection Agency
EPAct 1992: Energy Policy Act of 1992
EPAct 2005: Energy Policy Act of 2005
EF: energy factor
ft^3: cubic feet
gal: gallons
gpm: gallons per minute
gpf: gallons per flush
kWh: kilowatt hour
MEF: modified energy factor
MaP: maximum performance
NAECA: National Appliance Energy Conservation Act
psi: pounds per square inch
WF: water factor
Lpf: Litres per flush

Updated March 2010
Koeller/Dietemann

National Efficiency Standards and Specifications for Residential and Commercial Water-Using Fixtures and Appliances

Adapted from information provided by the U.S. EPA Office of Water, the Alliance for Water Efficiency, and other sources)

Fixtures and Appliances	EPAct 1992, EPAct 2005, "Energy Independence and Security Act of 2007" *(or backlog NAECA updates)*		WaterSense® or Energy Star®		Consortium for Energy Efficiency	
	Current Standard	Proposed/Future Standard	Current Specification	Proposed/Future Specification	Current Specification	Proposed/Future Specification
Standard Size and Compact Residential Dishwashers[3]	*Standard models*: Energy Independence and Security Act of 2007 specified: effective 1/1/2010: Standard Size: 355 KWh/year (.62 EF + 1 watt standby) WF ≤ 6.5 gallons/cycle Compact Size: 260 kWh WF ≤ 4.5 gallons/cycle EF is the number of cycles the machine can run for each kWh of electricity	Also specified by the Act: DOE shall publish final rule by 1/1/2015 determining if dishwasher standards will change effective 1/1/2018.	Energy Star (DOE) Effective since July 1, 2009 Standard Size: 324 kWh/year WF ≤ 5.8 gallons/cycle Compact Size: 234 kWh/year WF ≤ 4.0 gallons/cycle kWH/yr is replacing EF since it includes the cycles the machine can run for each kWh, but also includes up to 8 kWh/yr of standby power (when the machine isn't cycling)	Energy Star effective July 1, 2011: Standard Size: 307 kWh/yr 5.0 gallons per cycle Compact Size: 222 kWh/yr 3.5 gallons per cycle	*Effective Aug. 11, 2009:* *Standard models*: EF; maximum kWh/year Tier 1: EF ≥ 0.72 cycles/kWh; and 307 max kWh/year; 5.0 gallons per cycle Tier 2: EF ≥ 0.75 cycles/kWh; 295 max kWh/year; 4.25 gallons per cycle *Compact models*: Tier 1: EF ≥ 1.0 cycles/kWh; 222 max kWh/year; 3.5 gallons per cycle	Could adjust Tiers after July 1, 2011 when new Energy Star becomes effective

[3] ***Standard models***: capacity is greater than or equal to eight place settings and six serving pieces; ***Compact models***: capacity is less than eight place settings and six serving pieces

DOE: Department of Energy
EPA: Environmental Protection Agency
EPAct 1992: Energy Policy Act of 1992
EPAct 2005: Energy Policy Act of 2005
EF: energy factor
ft^3: cubic feet
gal: gallons
gpm: gallons per minute
gpf: gallons per flush
kWh: kilowatt hour
MEF: modified energy factor
MaP: maximum performance
NAECA: National Appliance Energy Conservation Act
psi: pounds per square inch
WF: water factor
Lpf: Litres per flush

Updated March 2010
Koeller/Dietemann

National Efficiency Standards and Specifications for Residential and Commercial Water-Using Fixtures and Appliances

Adapted from information provided by the U.S. EPA Office of Water, the Alliance for Water Efficiency, and other sources)

Fixtures and Appliances	EPAct 1992, EPAct 2005 *(or backlog NAECA updates)*		WaterSense® or Energy Star®		Consortium for Energy Efficiency	
	Current Standard	Proposed/ Future Standard	Current Specification	Proposed/Future Specification	Current Specification	Proposed /Future Specification
Commercial Toilets	1.6 gpf[4]/6.0 Lpf Except blow-out fixtures: 3.5-gpf/13 Lpf Note: Some states prohibit blow-out at 3.5 gpf	1.28 gpf/ 4.8 Lpf proposed by efficiency advocates for tank-type only	Tank-type only: WaterSense at 1.28 gpf (4.8L) with at least 350 gram waste removal + LA Spec.	Flushometer valve/ bowl combinations: WaterSense specification in development. No release date promised.	No specification	
Commercial Urinals	1.0 gpf	0.5 gpf/ 1.9 Lpf proposed by efficiency advocates	WaterSense = 0.5 gpf/1.9Lpf (flushing urinals only)		No specification	
Commercial Faucets	Private faucets: 2.2 gpm at 60 psi[5] Public Restroom faucets: 0.5 gpm at 60 psi[5] Metering (auto shut of) faucets: 0.25 gallons per cycle[6]			WaterSense draft specification now under consideration	No specification	

[4] EPAct 1992 standard for toilets applies to both commercial and residential models.

[5] In addition to EPAct requirements, the American Society of Mechanical Engineers standard for public lavatory faucets is 0.5 gpm at 60 psi (ASME A112.18.1-2005). This maximum has been incorporated into the national Uniform Plumbing Code and the International Plumbing Code for all except private applications, private being defined as residential, hotel guest rooms, and health care patient rooms. All other applications subject to the 0.5 gpm/1.9 Lpm flow rate maximum.

[6] Metering faucets not subject to flow rate maximum

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NAECA: National Appliance Energy Conservation Act
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Updated March 2010
Koeller/Dietemann

National Efficiency Standards and Specifications for Residential and Commercial Water-Using Fixtures and Appliances

Adapted from information provided by the U.S. EPA Office of Water, the Alliance for Water Efficiency, and other sources)

Fixtures and Appliances	EPAct 1992, EPAct 2005 *(or backlog NAECA updates)*		WaterSense® or Energy Star®		Consortium for Energy Efficiency	
	Current Standard	Proposed/ Future Standard	Current Specification	Proposed/Future Specification	Current Specification	Proposed /Future Specification
Commercial Clothes Washers (Family-sized)	MEF ≥ 1.26 ft^3/kWh; WF ≤ 9.5 gal/cycle/ft^3	New standards under development: DOE scheduled final action: January 2010; Rulemaking process postponed by DOE in 2008; began again in Dec. 2009.	Energy Star (DOE) MEF ≥ 1.72 ft^3/kWh/cycle; WF ≤ 8.0 gal/cycle/ft^3		Adopted Jan 1, 2007 (Note: this spec covers only normal capacity family washers, NOT large capacity commercial washers) Tier 1: 1.80 MEF 7.5 gal/cycle/ft^3 Tier 2: 2.00 MEF 6.0 gal/cycle/ft^3 Tier 3: 2.20 MEF 4.5 gal/cycle/ft^3	

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Commercial Dishwashers	No standard		Energy Star (EPA) using NSF/ANSI standards for water use and ASTM standards for energy use Effective **10/11/2007** *Under counter*: Hi Temp: 1.0 gal/rack; <= 0.90 kW; Lo Temp 1.70 gal/rack <= 0.5 kW *Stationary Single Tank Door*: Hi Temp: 0.95 gal/rack; <= 1.0 kW Lo Temp: 1.18 gal/rack; <= 0.6 kW *Single Tank Conveyor*: Hi Temp: 0.70 gal/rack; <= 2.0 kW; Lo Temp: 0.79 gal/rack; <= 1.6 kW *Multiple Tank Conveyor*: Hi Temp: 0.54 gal/rack; <= 2.6 kW Lo Temp: 0.54 gal/rack; <= 2.0 kW		No specification	

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Fixtures and Appliances	EPAct 1992, EPAct 2005 *(or backlog NAECA updates)*		WaterSense® or Energy Star®		Consortium for Energy Efficiency	
	Current Standard	Proposed/ Future Standard	Current Specification	Proposed/Future Specification	Current Specification	Proposed /Future Specification
Automatic Commercial Ice Makers[7]	Effective 1/1/2010: Energy and condenser water efficiency standards vary by equipment type on a sliding scale depending upon harvest rate and type of cooling (see link to additional information at end of this table)		Energy Star (EPA) Energy and water efficiency standards vary by equipment type on a sliding scale depending upon harvest rate and type of cooling (see link to additional information at end of this table). Water cooled machines excluded from Energy Star		Energy and water (potable and condenser) standards are tiered and vary by equipment type on a sliding scale depending upon harvest rate and type of cooling (see link to additional information at end of this table)	
Commercial Pre-rinse Spray Valves (for food service appli-cations)	Flow rate ≤ 1.6 gpm (no pressure specified; no performance requirement)		No specification	Proposed Energy Star specification abandoned after standard established in EPAct 2005; WaterSense specification in development in conjunction with Energy Star	No specification (program guidance recommends 1.6 gpm at 60 psi and a cleanability requirement)	

[7] Optional standards for other types of automatic ice makers are also authorized under EPAct 2005.

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Fixtures and Appliances	EPAct 1992, EPAct 2005 *(or backlog NAECA updates)*		WaterSense® or Energy Star®		Consortium for Energy Efficiency	
	Current Standard	Proposed/ Future Standard	Current Specification	Proposed/Future Specification	Current Specification	Proposed /Future Specification
Commercial Steam Cookers[8]	No standard		Energy Star (EPA) *Electric*: 50% cooking energy efficiency; idle rate 400–800 Watts *Gas*: 38% cooking energy efficiency; idle rate 6,250–12,500 British thermal units/hour *No specified water use factor		*Electric*: 50% cooking energy efficiency; idle rate 400–800 Watts *Gas*: 38% cooking energy efficiency; idle rate 6,250–12,500 British thermal units/hour Water Use Factor (for both electric and gas models): Tier 1A: ≤ 15 gal/hr Tier 1B: ≤ 4 gal/hr	

[8] Idle rate standards vary for 3-, 4-, 5-, and 6-pan commercial steam cooker models.

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Information/materials on EPAct 2005/NAECA standards:

Schedule for development of appliance and commercial equipment efficiency standards:
http://www.eere.energy.gov/buildings/appliance_standards/2006_schedule_setting.html

Commercial Clothes Washers and Dishwashers (agenda/presentations at 4/27/06 DOE public meeting on rulemaking):
http://www.eere.energy.gov/buildings/appliance_standards/residential/home_appl_mtg.html

Automatic Commercial Ice Maker Standards:
http://www.eere.energy.gov/buildings/appliance_standards/pdfs/epact2005_appliance_stds.pdf (Page 18)

Pre-rinse Spray Valves
http://www.eere.energy.gov/buildings/appliance_standards/pdfs/epact2005_appliance_stds.pdf (Page 10)

Information/materials on WaterSense specifications:

Toilets
http://www.epa.gov/watersense/products/toilets.html

Urinals
http://www.epa.gov/watersense/products/urinals.html

Bathroom Lavatory Faucets
http://www.epa.gov/watersense/products/bathroom_sink_faucets.html

Information/materials on Energy Star specifications:

Residential Clothes Washers
http://www.energystar.gov/index.cfm?c=clotheswash.pr_crit_clothes_washers

Commercial Clothes Washers
http://www.energystar.gov/index.cfm?fuseaction=clotheswash.display_commercial_cw

Residential Dishwashers
http://www.energystar.gov/index.cfm?c=dishwash.pr_dishwashers

Commercial Dishwashers
http://www.energystar.gov/index.cfm?c=new_specs.comm_dishwashers

Automatic Commercial Ice Makers
http://www.energystar.gov/index.cfm?c=new_specs.ice_machines

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Commercial Steam Cookers
http://www.energystar.gov/index.cfm?c=steamcookers.pr_steamcookers

Information/materials on CEE specifications:

Residential Clothes Washers
http://www.cee1.org/resid/seha/rwsh/rwsh-main.php3

Residential Dishwashers
http://www.cee1.org/resid/seha/dishw/dishw-main.php3

Commercial, Family-Sized Clothes Washers
http://www.cee1.org/com/cwsh/cwsh-main.php3

Commercial Ice-Makers
http://www.cee1.org/com/com-ref/ice-main.php3; Spec Table: http://www.cee1.org/com/com-kit/ice-specs.pdf

Pre-rinse Spray Valves
http://www.cee1.org/com/com-kit/prv-guides.pdf

Commercial Steam Cookers
http://www.cee1.org/com/com-kit/sc-hc-specs.pdf