

not include the tons of materials collected for recycling at the semi-annual DropOff-SwapOff days nor does it include information on the more than 1,000 households that contract with private haulers for the collection of their trash and recyclable materials.

*Recycling Savings Exceed \$1.5 M*

The recycling program received revenue of \$25,833 for paper and avoided \$93,282 in disposal costs by not disposing of paper as trash. Since 1998, when the Town began receiving revenue for recycled paper, recycled paper revenue has totaled \$400,382 and avoided disposal costs have totaled \$1,121,286, for an overall savings of \$1,521,668. In 2009, the Municipal Collection Program received an average of \$19.40 per ton for recycled paper collected at the curb. Curbside subscribers received a paper rebate of \$7.00 in fall of 2008 and a \$2.00 paper rebate in 2009.

| Year | Disposal cost | Paper revenue | Avoided disposal cost |
|------|---------------|---------------|-----------------------|
| FY98 | \$110,564     | (\$8,061)     | \$38,798              |
| FY05 | \$185,136     | \$51,812      | \$112,032             |
| FY06 | \$187,549     | \$31,889      | \$113,107             |
| FY07 | \$195,783     | \$35,302      | \$119,898             |
| FY08 | \$194,254     | \$58,188      | \$116,818             |
| FY09 | \$194,254     | \$25,833      | \$93,282              |

(FY = July 1 through June 30)

*Reuse and Recycling DropOff & SwapOff Events Achieved Record Attendance*

The Spring DropOff & SwapOff event attracted 889 households. The Fall DropOff & SwapOff event was also a great success with 981 households participating (this was the largest event to date). The weather was cooperative and both events went smoothly, thanks to the volunteers that make these events possible. Concord's first unwanted medication collection was included in the October event. Nine boxes of unwanted medication and four boxes of SHARPS were collected in addition to a container of controlled substances collected by the Police Department. This program will continue at the next DropOff event due to its popularity.

| Drop Off Swap Off Participants |     |         |
|--------------------------------|-----|---------|
| Year                           | May | October |
| 1999                           | 521 | 430     |
| 2005                           | 716 | 722     |
| 2006                           | 960 | 728     |
| 2007                           | 908 | 840     |
| 2008                           | 974 | 918     |
| 2009                           | 889 | 981     |

*Composting Site Turns Yard Waste into Garden Gold*  
Residents made more than 6,700 visits to the Compost Site as noted in the table below.

| Year | Visits to the Composting Site |       |                |              |
|------|-------------------------------|-------|----------------|--------------|
|      | Leaves & grass                | Brush | Paint Drop-off | Paint Pickup |
| 2002 | 4,931                         | 253   | 400            | 86           |
| 2003 | 5,825                         | 334   | 138            | 90           |
| 2004 | 5,963                         | 329   | 204            | 148          |
| 2005 | 6,078                         | 418   | 230            | 118          |
| 2006 | 6,651                         | 615   | 298            | 158          |
| 2007 | 7,880                         | 697   | 296            | 171          |
| 2008 | 8,093                         | 508   | 222            | 138          |
| 2009 | 6,723                         | 667   | 210            | 145          |

*Keeping Mercury Out Of the Environment*

Concord Public Works collected 6,405 linear feet of fluorescent light bulbs and 394 lbs. of nickel cadmium, lithium, and lead acid batteries from residents and municipal facilities for recycling and disposal. This is in addition to 64,530 lbs. of computers, TVs, and electronics that were collected at the two DropOff events. Another 5,327 linear feet of fluorescent bulbs and 13,364 lbs. of computers and electronics were collected from businesses at two business recycling events.

**WATER AND SEWER DIVISION**

Alan Cathcart,  
Superintendent

In 1974 and 1976, Annual Town Meeting established separate Water and Sewer Enterprise Funds to ensure that the operation, maintenance and capital improvement of the water and sewer systems would be financially viable. Expenses incurred for each system are covered entirely by revenues generated by the activity. The Water and Sewer Division of Concord Public Works is responsible for managing the day-to-day operations of

the water and sewer infrastructure and as of 2008, the total assets for each system are 18.7 million and 29.9 million dollars, respectively.

## WATER SYSTEM

Concord was provided with legislative authority to establish a public water system in 1872. In 1874, water from Sandy Pond, Lincoln, began flowing through the original network of water mains to Concord Center. Today, the water system has grown to include both groundwater and surface water sources, a total of seven pumping stations, two treatment facilities, and a high pressure water main network consisting of over 130 miles of pipe. Two covered storage reservoirs, one located at Annursnac Hill and the other located at Pine Hill in Lincoln provide total reserve capacity of 7.5 million gallons. There are presently 5,437 customers receiving potable water service and fire protection from this supply. This represents approximately 95% of Concord residents and businesses, together with a small number of Acton properties along Route 2A.

### *Water Use and Demand Management*

2009 turned out to be a particularly wet year with 50.75 inches of rainfall. The mean annual rainfall calculated from data collected over the past 119 years of record is 41.67.

Total water production used to meet residential, commercial, institutional and municipal purposes during this past year was approximately 676 million gallons with an average daily demand of 1.85 million gallons. The peak day water demand occurred on May 22, registering just over 3.4 million gallons. Over the past decade, this value has continued to be measured well below peak demand days measured regularly back in the 1990's. While this is partially attributed to the unusually high rainfall noted above, it also provides further evidence that demand management initiatives promoted and incorporated into our conservation outreach efforts and continued investment made into water system improvement activities are also having a positive impact.

There is a significant level of regional interest focused on long-range water resource management planning and allocation. This attention has highlighted challenges with respect to meeting present consumer expectations with due consideration of environmental impacts at-

tributed to water withdrawals. "Stream flow criteria" and "integrated water resource management strategies" are heavily influencing this debate. It is expected that this discussion will lead to water allocation policies designed to balance competing interests. With broader demands being placed on these limited resources, it is expected that the value of these precious resources will increase.

There is nothing to report with respect to Concord's appeal of our "Water Management Act Registration Statement." The State's authority to condition water withdrawal registration rights issued to the Town in the 1980's was challenged by other communities and the State Supreme Court upheld a favorable decision issued by the Superior Court for these other systems prior to Concord's appeal. Regardless of the legal and regulatory findings, Concord will continue to do its best to protect customers' interests while maintaining a balance with its interest to promote sustainable and environmentally responsible water resource management.

### *Water Conservation Program Highlights*

Concord's Water Division continues to provide a variety of water conservation support services to residents and commercial establishments. Grant funds available through the Massachusetts Environmental Trust and MA DEP were invested in the distribution of conservation devices for the home, indoor and outdoor residential water use audits, low flow toilet rebates, and the distribution of pre-rinse spray nozzles to institutions and businesses in the food service industry. In keeping with our goal of reducing unaccounted for water lost to aging infrastructure, a contractor performed a leak detection survey on 50% of our distribution system.

Concord's customary goodwill and water conservation skills were creatively leveraged in the 3<sup>rd</sup> annual Community Conservation Challenge. Participants partnered with the San Marcos Sister City Committee to raise funds to help bring drinking water to the 400 people who live in El Uval, where water is customarily transported in barrels on horseback. 88 families conserved over 500,000 gallons of water, and helped earn more than \$3,500 for the El Uval Drinking Water project. This new supply will result in a marked improvement in public health and hygiene for this entire community.

If you are interested in learning more about what you can do to save water and money, visit the Town of Concord

website ([www.concordma.gov](http://www.concordma.gov)) and search for the Water and Sewer Division and water conservation programs. You can also find additional information and opportunities through the Environmental Protection Agencies national “watersense” imitative.



*Steve Bloomfield of San Marcos Sister City Committee accepting the Water Conservation Challenge check from Melissa Simoncini, Environmental & Regulatory Coordinator*

### Water Quality

In accordance with Massachusetts Department of Environmental Protection regulations, all water quality testing activities continue to demonstrate that the drinking water provided to our customers satisfies State and Federal requirements. A summary of the water quality test results is available on the Town website and our Annual Water Quality Report is sent to every customer each spring.

In November of 2006, the EPA published the Ground Water Rule in the Federal Register, the purpose of which is to provide for increased protection against microbial pathogens in public water systems that use ground water sources, such as Concord. The EPA is particularly concerned about ground water systems that are susceptible to disease-causing fecal contamination. While water quality testing activities performed within the Concord system continue to demonstrate that our groundwater supplies are adequately protected against such threats, a “table top” vulnerability assessment was performed at each of our groundwater supplies and submitted to MA DEP. As part of this exercise sampling, testing and public notification strategies were also updated to improve possible detection and associated reporting efforts.

The re-evaluation of Concord’s sampling activities led to an opportunity to optimize a required Total Coliform Rule sampling plan that was submitted to and approved by DEP in December. The revised plan includes two reservoirs and the elimination of several distribution system sampling locations.

Regulations promulgated by the US EPA, effective in 2013, will require the Town to provide additional protection against microbial contamination due largely to Cryptosporidium and E.coli in surface water supplies. In anticipation of this mandate, staff has already begun to evaluate treatment and infrastructure needs relative to Nagog Pond. A thorough review of water quality, infrastructure, regulations, and short and long term goals was completed. This effort will result in a recom-

ANNUAL WATER REPORT SUMMARY TABLE

| Water Statistics                             | 2009   | 2008   | 2007   |
|--|--------|--------|--------|
| Miles of Main                                | 130.22 | 129.75 | 129.55 |
| Hydrants                                     | 1,262  | 1,250  | 1,248  |
| Main Pipe - New (linear feet)                | 2,491  | 1,080  | 12,354 |
| Main Pipe - Replaced or Rehabilitated (lf)   | 1,908  | 3,600  | 2,648  |
| Number of Service Accounts                   | 5,437  | 5,436  | 5,436  |
| Total Water Demand (million gal.)            | 676    | 707    | 753    |
| Daily Average Demand (million gal.)          | 1.85   | 1.93   | 2.06   |
| Peak Day Demand (million gal.)               | 3.00   | 3.47   | 3.81   |
| Annual Precipitation (inches)                | 50.75  | 63.74  | 38.57  |
| Mean Annual Precipitation (inches)           | 41     | 41     | 41     |
| Residential Rate per Unit (unit = 748 gal.)  |        |        |        |
| Base Rate- Step 1                            | \$3.83 | \$3.72 | \$3.61 |
| Conservation Rate – Step 2 (May 1 – Oct. 31) | \$7.51 | \$7.06 | \$6.71 |
| Conservation Rate – Step 3 (May 1 – Oct. 31) | \$9.58 | \$9.28 | \$8.83 |
| General Service Rate per Unit of 748 gallons |        |        |        |
| Step 1 - (<50 Units)                         | \$3.83 | \$3.72 | \$3.61 |
| Step 2 - (>50 Units)                         | \$4.86 | \$4.62 | \$4.46 |

mendation for water treatment alternatives and work plans for upgrading the dam and conveyance systems. Nagog Pond continues to be operated under a filtration waiver due to a comprehensive watershed protection program and the high quality of the water.

#### *Pumping Station Rehabilitation and Upgrades*

Maintenance and inspection of all seven water production facilities and related treatment systems continues to be performed on a daily basis. Improvements were made in existing chemical control strategies employed within each of these stations and involved more frequent testing of process alarms and controls along with the installation of electrical/chemical feed system interlocks. Much of this work was done in concert with recently revised guidance outlined through MA DEP.

At the request of the Department of Conservation and Recreation's Office of Dam Safety, a consultant was retained to update and finalize a Phase I Nagog Dam Assessment Report. This work was required to characterize the present condition of the 100-year-old dam and associated control structures and to determine further assessment, maintenance or rehabilitation needs. The findings demonstrated the need for a more detailed and invasive Phase II assessment to refine noted rehabilitation or replacement needs of the concrete dam, spillway, and gate/control valves.

A detailed assessment of the Nagog Pond ozone treatment facility and related Rt. 2A pump station was performed to identify immediate and long-term improvement needs with attention placed on the latest treatment technologies and regulatory and permitting trends. Particular focus has been placed on notable advancements in ozone generation technology and compliance issues associated with the Long-Term 2 Enhanced Surface Water Treatment Rule which will be enforced in 2013.

#### *Water Main Rehabilitation and Extension Programs*

The replacement of individual water services along Belknap St. and Elsinore St. was completed in the spring before bringing the new mains in that area online. This work was coordinated with CMLP undergrounding work and CPW Roads Program. An aging and poorly designed valve cluster located near the intersection of College Rd. and Barrett's Mill Rd. was also replaced.

Water main replacement activities were completed along sections of Walnut St. and Chestnut St. All water mains along these streets were replaced with 8-inch cement lined ductile iron pipe. To avoid unnecessary handling costs, the older transite main was abandoned in place.

The contractor retained to perform annual road improvements re-laid a section of an existing 12-inch water main inside a sleeve under a new drainage culvert installed on Sudbury Rd. This will allow future water main replacement/rehabilitation activities to be performed with minimal disturbance to the newly installed box culvert.



*Nagog Pond Drinking Water Reservoir*

The Water Division was able to incorporate water main improvements into the Pine St. Bridge and Flint Bridge replacement projects. The Pine St. water main work involved the addition of a new 12-inch CLDI water main within the new decking. The installation of this main established a new and very important hydraulic interconnection between West Concord and Harrington Ave. neighborhoods. Town employees were used to complete the installation of approximately 200 feet of main which was located outside the limit of MA Highways work. The scope of work involved within the Flint Bridge included the installation of a new 8-inch CLDI water main and the abandonment, in place, of an older 8-inch main.

In addition to these State and municipally funded projects, approximately 1,600 feet of new 8-inch-ductile iron pipe was installed along Wheeler Rd. to the intersection of Sudbury Rd. for the purpose of serving the newly reconstructed Verrill Farm Stand.

## SEWER SYSTEM

Concord was provided with legislative authority to create a municipal sewer system in 1894. By early 1900 a small centralized collection system was constructed, carrying wastewater from Concord center via a network of gravity mains to a collection chamber located at 141 Keyes Rd. where it was then pumped to a cluster of filter beds located approximately one mile away on fields adjacent to Great Meadows. Over the years, service needs and treatment goals have evolved resulting in a series of collection system expansion initiatives and treatment system improvements. The present sewer system serves over 1,804 customers (35% of the community) and consists of 33 miles of collector mains, two pumping stations, and six neighborhood lift stations.

### *Pumping Station Rehabilitation and Removal*

Pump system improvements were scheduled and performed at the Assabet Pumping Station in West Concord, and the Lowell Rd. Pumping Station at Keyes Rd. At the Assabet station, both the lead and lag sewage pumps were replaced with new 40 HP pumps. Within the Lowell Rd. station, the second of the three original 75 HP pump systems was replaced. The standby pump is the only original pump remaining at this station and is slated to be replaced in the near future.

A request for bids was developed and contract issued for the rehabilitation of the Laurel St. and Pilgrim Rd. sewer ejector stations, two of the original neighborhood lift stations. The mechanical and electrical systems for all of these stations were installed in the mid-1980's

and have served their useful life. The upgrade includes the installation of emergency bypass systems and re-conditioning of the subsurface chambers along with the integration of newer, more efficient and operator friendly submersible pumping systems. Park Lane and Gifford Lane stations are of a similar vintage and are slated for similar upgrades.

### *Sewer Main Extension and Rehabilitation Programs*

The Water and Sewer Division continued activities in the sewer system. No sewer mains were installed and no major sewer rehabilitation was undertaken. Spot repairs at leaking collection system/sewer service connection joints along Walden Terrace was completed. This trenchless technology involves the insertion of a flexible plastic liner into the collector main which is then inflated and chemically cured to the wall of the individual service connections. This technique effectively eliminates any structural disturbance from occurring within the public right-of-way.

### *Infiltration and Inflow Inspection and Rehabilitation*

The Town has an ongoing program to investigate and eliminate infiltration and inflow (I/I) from the Town's sewer system. Inflow refers to rainwater that enters the sewer system via connections to storm drainage systems. Infiltration refers to water which seeps into cracks or leaks in the sanitary sewer system. The goal of this program is to decrease the amount of clear water unnecessarily treated at the municipal wastewater treatment plant.

TV inspections of over 11,123 linear feet of sewer collector mains resulted in 832 linear feet of joint-tested

ANNUAL SEWER REPORT SUMMARY TABLE

| Sewer Statistics                   | 2009   | 2008   | 2007   |
|------------------------------------|--------|--------|--------|
| <u>Assabet Pumping Station</u>     |        |        |        |
| Total Pumped (million gallons)     | 87.92  | 98.44  | 84.06  |
| Monthly Average (million gallons)  | 7.33   | 8.2    | 7.01   |
| Daily Average (million gallons)    | 0.24   | 0.27   | 0.23   |
| <u>Lowell Road Pumping Station</u> |        |        |        |
| Total Pumped (million gallons)     | 340.88 | 387.80 | 311.44 |
| Monthly Average (million gallons)  | 28.41  | 32.32  | 25.95  |
| Daily Average (million gallons)    | 0.93   | 1.06   | 0.85   |
| <u>Collection System</u>           |        |        |        |
| Number of Service Accounts         | 1,804  | 1,780  | 1,772  |
| Miles of Sewer Main                | 33.36  | 33.36  | 33.36  |
| Main Pipe Inspected (lf.)          | 11,123 | 6,340  | 5,487  |
| Main Pipe Rehabilitated (lf.)      | 832    | 0      | 2,720  |
| Rate per Unit (unit = 748 gallons) | \$8.35 | \$7.95 | \$7.57 |

and sealed activities. This work was targeted along sections of Sudbury Rd., Academy Lane, Devens St., Elm St., Main St., River St., Thoreau Ct., Willow St., and Belknap St. Town employees inspected 44 manholes and performed sewer jetting activities throughout the collection system.

#### *Wastewater Treatment Plant Operations and Facilities Improvements*

Woodard & Curran, Inc. continues to operate the Town's Wastewater Treatment Plant located off of Bedford St. under the supervision of the Water and Sewer Division. The plant maintains excellent compliance with its regulatory requirements, in accordance with State and federally issued permits.

In accordance with the National Pollutant Discharge Elimination System Permit, the facility was required to meet a new summer seasonal monthly average for total phosphorous limit of 0.2 mg/l. The performance of the "CoMag" phosphorus reduction system continues to be outstanding, eliciting ongoing national and international attention. EPA was so impressed with its performance that a tour of the facility was included in their regional wastewater technology symposium to highlight innovative technologies for nutrient removal.

#### *Wastewater Planning*

Long-range wastewater planning interests have continued to maintain a high level of interest within the community. The Wastewater Planning Task Force, formed at the request of the Board of Selectmen, presented and Town Meeting approved Article 41 "Wastewater

Planning Capacity Study" that allowed an evaluation of wastewater treatment and capacity management alternatives to be investigated to accommodate wastewater flows above and beyond those flows necessary to meet existing requirements.

Woodard & Curran was tasked to complete a Capacity Assessment of the new wastewater treatment plant, focusing on process-specific flow and loading capacity constraints. Their findings indicate that for a relatively modest level of investment, flow and (nutrient) loads to this facility could be increased from its present permitted rate of 1.2 million gallons per day (average). It is understood that regardless of what alternatives are evaluated, any significant increases or changes in municipal wastewater management efforts will involve State and Federal review and approval.



*Gifford Land Sewer Ejector Station - Bypass Installation*



*The swap off -- in which residents contribute no longer wanted, but still usable, articles for another person to take at no charge.*



*The failing dry laid stone retaining wall on Monument St. at Hutchins Farm will be restored and reconstructed using CPA funds.*