

Chapter 12

Flow and Loading Reduction Alternatives

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FLOW AND LOADING REDUCTION ALTERNATIVES

12.1 INTRODUCTION

A. **Purpose.** The identification of flow and loading reduction alternatives for centralized water and sewer services is important in order to minimize the expense of new facility construction. These alternatives can also conserve water and minimize impact to natural resources regardless of whether a centralized facility exists. Reduction of wastewater flows and loadings to on-site septic systems can reduce the impact of pollutant discharges to groundwater and surface waters downgradient of recharge areas. The objective of this chapter is to review methods that could be utilized to reduce the wastewater volume and pollutant loadings generated by residential and non-residential sources.

B. **Local Comprehensive Plan Goals and Objectives.** Eastham's 2002 Local Comprehensive Plan includes a goal of maintaining the "overall quality and quantity of Eastham's groundwater." One of the steps identified to achieve this goal is active encouragement of water conservation activities. The methods identified in this chapter can be incorporated into a local water conservation plan.

12.2 REDUCTION OF HOUSEHOLD WATER CONSUMPTION

A. **Plumbing Codes and Water Reduction Devices.** Water use and wastewater flows from households may be reduced through the utilization of household water-saving devices. Some of the devices available are water saver toilets, reduced flush toilets, vacuum flush toilet systems, washwater recycling systems for toilet flushing, faucet aerators, flow limiting valves, and pressure reducing valves.

Approximately 70 percent of the total volume of wastewater generated within the average home is derived from the toilet, laundry, and bath. The most substantial water-saving and wastewater

reductions can be made in these areas. Water saving toilets, reduced flush devices, and restricted flow showerheads are common water-saving devices. It must be noted however, that the nitrogen load remains the same even if water consumption is reduced.

Water-saving devices are more expensive than standard fixtures and would probably not be installed by homeowners without external incentive. However, the use of such devices by individual customers should be encouraged in new construction or as replacements for improperly functioning devices. State building codes now require the installation of low flow devices during new construction.

Homeowners can also conserve water outside the home by taking an active role in stormwater management on their properties by directing runoff from their roofs into natural environments or into rain barrels for use in watering.

12.3 WASTEWATER REUSE AND RECYCLING

Lawns could potentially be watered with reclaimed wastewater to conserve the use of clean water and minimize the amount of treated water that needs to be recharged. As discussed in Chapter 3, the proposed Reclaimed Water Permit Program and Standards Regulations (the “Reclaimed Water Regulations” 314 CMR 20.00) are a new set of regulations governing the use of reclaimed water in Massachusetts.

Reclaimed water is defined as domestic wastewater that is treated to a level such that it is suitable for beneficial reuse. Eliminating or reducing the concentrations of microbial and chemical constituents of concern through treatment and/or limiting public or worker exposure to the water via design or operational controls achieves making reclaimed water suitable and safe.

The draft regulations establish a system of classification and standards specific to the proposed use. The highest standards apply to those proposed uses with greatest potential for exposure to the public. These draft regulations do not include standards for indirect aquifer discharge. Those standards are included in the proposed revisions to the Groundwater Discharge Permitting Program Regulations in 314 CMR 5.00.

According to the proposed regulations, the number of allowable uses has expanded consistent with the national experience. For the most stringent classification, namely Class A, proposed

uses include landscape irrigation such as golf courses, parks, playgrounds, and athletic fields, cooling water where a mist or aerosols are created, agricultural use where there is contact with the edible portion of the crop, and toilet flushing. It should be noted that the proposed standard for toilet flushing is more stringent than what was required by the previous guidance. However, existing uses will be allowed to retain their current effluent standards.

Class B uses include landscape irrigation where contact with the public is less likely such as ornamental nurseries and sod farms, cooling water where mists and aerosols are not created, and agricultural use for pasture land and for irrigation of unprocessed food crops where there is no contact between the reclaimed water and the edible portion of the crop.

Class C uses include industrial process water, silviculture (forest cultivation), orchard/vineyard irrigation where there is no contact between the reclaimed water and the edible portion of the crop, and processed food crops that undergo commercial pathogen-destroying processing before human consumption (MassDEP, 314 CMR 20.00).

12.4 REDUCTION OF WASTEWATER LOADINGS

The opportunities for reducing wastewater pollutant loadings are limited to the non-toilet related (grey-water) components of wastewater. The loadings associated with food wastes are added into wastewater when garbage grinders are installed in kitchen sinks. The wastewater loading associated with food can be significant. This load could be reduced by disposing of food waste as a solid waste or using a household composting unit. The use of garbage grinders in homes with septic systems contributes additional nitrogen to the groundwater and increases the solids loading to the septic tank, requiring more frequent pumping.

Commercial and industrial businesses may also have opportunities to reduce wastewater loadings by reprocessing of grey-water waste byproducts from their operations. Individual businesses need to determine if any wastes could be recycled, reused, or disposed of as a solid waste instead of adding them to the wastewater flow.

12.5 PHARMACEUTICAL LOAD REDUCTION

In the past, it was not uncommon to flush unused medicines down the toilet as a means of disposal. Many drugs are not degraded by the wastewater treatment process or in a septic

system, and consequently are released into the environment. According the MassDEP, the exception to the rule are the medications that the Food and Drug Administration advises to be flushed down the toilet instead of thrown in the trash because of their high abuse potential. As the awareness about proper pharmaceutical disposal has increased, residents often inquire about proper disposal of unused prescription medicines. Recommendations for disposal of prescription drugs as outlined by the Eastham Health Department and Cape Cod Cooperative Extension are as follows:

1. State law that no one “except a law officer” can accept or take possession from another person of prescription medications.
2. If you have some to dispose of, remove them from the labeled medication container, which can then be thrown away empty. (You can crush or break plastic vial if it makes you feel better).
3. Soak pills in hot water in a coffee can or other container until they basically turn to mush. You can throw it in trash, which gets burned at SEMASS.

MassDEP provides additional public education on pharmaceuticals and personal care products on their website located at <http://www.mass.gov/dep/toxics/stypes/ppcpedc.htm>.

12.6 WATERLESS TOILETS

Waterless toilets (composting and incinerating toilets) were discussed in Chapter 7. These toilets provide flow and loading reductions because they do not utilize water and they convert sanitary wastes to solid waste or to a usable soil conditioner. As discussed in Chapter 7, these toilets are not considered a feasible solution for watershed-wide application because they are typically not well suited to handle high seasonal flows and loadings, and there is usually poor public acceptance of handling composted or incinerated human waste. A public health threat could occur if the systems were implemented on a large scale without proper operation, management, and waste disposal. These systems may be suitable for isolated areas and informed individuals who are willing to take on the significant responsibility of the systems.

12.7 SUMMARY

By means of its Local Comprehensive Plan, the Town of Eastham has goals to expand and improve public education and the dissemination of information about water contamination issues and to actively promote water conservation. Opportunities to reduce wastewater loadings are mainly the reduction of food wastes or other non-sanitary (grey-water) wastes. It is recommended that the Town implement a thorough public education program and continue with enforcement of the building codes to encourage water conservation.