

# DECENTRALIZED WASTEWATER MANAGEMENT:

## *Designing infrastructure to match your community*



This wastewater treatment system in Pembroke, MA serves three large shopping plazas.

Variations to build a new Lowes Store were exchanged for a wastewater treatment system large enough to accommodate the new site as well as an adjacent strip mall anchored by a supermarket, a variety of restaurants and retail outlets and an office complex. The design flow is 40,000 GPD of high strength wastewater.

Pembroke took the opportunity to transform the demand for real estate into the remediation of existing facilities. Now the wastewater is

treated to standards high enough to recharge the town's ground water resources and reduce nutrient loading to adjacent coastal estuaries.

Pembroke is demonstrating the potential in the decentralized or distributed approach to infrastructure development. Just as information systems have been distributed into networks where the most appropriate technologies are assembled to create the most productive outcome, so too can we create a distributed infrastructure for water and wastewater management.

In towns like Pembroke, policy makers are beginning to implement new models of service delivery that draw on the collaborative efforts of public, private and nonprofit interests. These new approaches include cost sharing cooperation, public enterprises, life cycle competitive procurement, privatization, public private partnerships as well as leasing and concessions.

### **Infrastructure reconsidered**

Infrastructure (the structure beneath the structure), the underlying utility framework on which we depend is so fundamental to society, economy and resource management that its "refreshment" and expansion properly conceived represents an opportunity to address a number of societal issues which taken separately are too costly to consider.

The current challenges are The popular understanding of decentralized wastewater management emerged from the onsite tradition and it is primarily focused on the maintenance and control of traditional septic or onsite and small cluster treatment systems. This limits its potential as an entirely new architecture to address an emerging range of civic and environmental obligations.

Decentralization, is most effective when it is structured under sewer ordinances or the provisions for a special purpose district. It is an adaptive new architecture that incorporates the following characteristics.

- It will be infrastructure on demand and readily deployable.
- It will be performance based, modular, scaleable adjustable and affordable.
- Planning will be continuous, iterative strategic but also adaptable
- It will enable the site to define the technologies, processes, organizational structures and operating skills that most effectively provide for environmental results.
- It will arise from collaborative efforts among community and watershed interests to moderate financial and environmental risk
- It will meet the economic demands of a dynamic and growing community as well as the discharge standards of the receiving natural system (e.g. Total Maximum Daily Load (TMDL) discharge standards)

Among the possibilities for simultaneous advancement that are made immediately available through the adoption of the decentralized approach are; water quality and supply, new economic activity, increases in property values and associated municipal revenues, the preservation of recreational resources, smart growth, green growth and quality of life characteristics.

### ***OPPORTUNITY IN THE MIDST OF UNFUNDED MANDATES***

Pembroke is not alone. Across the country city, county and public utility managers are exploring novel approaches to providing infrastructure. In the process they are transforming demand into a portfolio of public private partnerships, networks for efficient governance and value propositions that improve the prospects for their communities and the natural systems on which they depend.

In Mobile, Alabama an EPA Demonstration Project seeks to demonstrate that “by withdrawing wastewater directly from a large, urban sewer line; treating locally; and reusing the effluent, we hope to show large municipal water/wastewater utilities a way to effectively address capacity issues ...by incorporating decentralized wastewater management concepts into their large systems.” (Kevin White, University of Southern Alabama and member of the Project Team)

In these changes in perception and the associated demands we are seeing the emergence of a cost effective, sustainable, distributed infrastructure for wastewater treatment and water resource management.

This is a local government opportunity for cities and counties. This is an infrastructure that can be incrementally planned and permitted as well as installed and modified on a just in time basis.

Alternative, collection treatment and disposal technologies have been reviewed and certified by of States and the Federal EPA. Small diameter low pressure collection

systems reduce the cost of excavation for large pipe gravity sewer as well as the inflow and infiltration that typically accompany gravity sewers. Sub-surface drip irrigation systems adapted from agriculture lower the need for surface water discharges and their associated permitting difficulties and costs. They also distribute water into soils that are not satisfactory for conventional sub-surface disposal.

The resources are available to alter both the expectations for and the costs of a wastewater infrastructure that can be integrated with water resource management and conform to the watershed agenda. In some states cluster developments with as few as 24 homes can install a common collection, advanced treatment, and disposal system that will cost less per home than conventional on-lot septic systems. Service providers, sources of funds, knowledgeable third party experts and experienced engineering firms are in place in most states and regions.

Utilization of decentralized wastewater treatment is consistent with Peter Hutchinson's recommendations at the 2004 ICMA Conference in San Diego. Reflecting on the pressures of managing government in "times of permanent financial crisis," Hutchinson urged frequent strategic reviews, rightsizing, rewarding performance not good intentions, buying services competitively, making administrative systems allies not adversaries and using flexibility to establish accountability.

#### "Solution Tracks"

The ICMA has initiated a program that it calls Solution Tracks. It seeks to identify critical issues facing city and county managers that may be informed by the range of knowledge available to ICMA through its membership and networks. The two community stories which follow are "Solution Track" stories in that they are instructive

#### Track 1 Fairhaven Massachusetts

Ten years ago Fairhaven MA installed one of the first distributed municipal wastewater treatment infrastructures in the northeast. West Island had 400 cottages on it. The onsite systems had failed, the soils were so difficult for disposal that much of island had been given to The Massachusetts Department of Environmental Management because it was not able to be developed. If a sewer system were to be built soil discharge of treated effluent would have to be used for disposal because small ocean discharges were no longer permitted.

The town's professional manager was not concerned. He had knowledge from an old and then largely discredited engineer that about eighteen feet below the surface was a permeable layer of sand with the capacity to receive treated effluent. Fairhaven now discharges the wastewater from its satellite plant into a small wicking well that is tapped into a preglacial beach.

Local solutions informed by indigenous knowledge dramatically reduced the cost of wastewater disposal in Fairhaven. Jeffrey Osuch: Executive Secretary of the Town estimates are that at least 50% of the increases in property values on the island are attributable to the decentralized municipal sewer. He estimates these increases to be

about \$50,000 / home and more than enough to off set the costs of infrastructure investment.

## Track 2: Carroll County

Decentralized sewer concepts have altered zoning in Carroll County which is just west of Atlanta, GA.

In Carroll County they have significant development pressure, difficult soils, and the need to stimulate local economic development. County officials concluded they would never be able to build a central sewer system.

Health officials concluded that they should increase lot size from ½ acre to 1 acre to provide for an additional disposal field in the event of failure. The doubling of lot size would cut the value of real estate in half. The alternative was to allow the ½ acre zoning if advanced treatment systems were used.

Ultimately the county zoned for 10,000 square foot lots, with 40 % open space and watershed quality effluent standards. This provides the developer with 40 additional lots and open space for wastewater and storm water management. It provides the county with a wastewater treatment facility and additional revenue from the additional houses and their increase in value.

Essentially, the developer would build the infrastructure to meet watershed quality discharge standards and transfer it to the County. Planners anticipated that property serviced by municipal infrastructure would increase in value enough to offset the cost of building it.

In fact, as Carroll County explored the potential of distributed sewer, it became apparent that it could be an infrastructure with the capacity to pay for itself. Properly structured:

- Growth would pay for the new infrastructure that supports it.
- Rapid returns on investment would offset the costs to commercial sites through disposal field preservation.
- Appreciation in property value generally associated with municipal infrastructure would offset some of the costs of remediation.

Lee Gorman the Director of Planning for Carroll County concluded that, “Without access to central sewer, decentralized wastewater management gives us the opportunity to introduce density incentives as part of a framework for land use planning and watershed management.

This strategy is primarily a process of altering perspective, It has little, if anything, to do with what can be secured with government funding. It is active citizenship in partnership with local government and regulators in pursuit of a framework to increase water quality and supply, in order to preserve the quality of natural systems and recreational resources, to enhance property values and provide for economic development, community preservation and the quality of life.

“Distributed sewer,” and the changes in perception that it both represents and demonstrates, is one of those possibilities that is so immediately available, proven, cost

effective, versatile and affordable that those communities who neglect exploring its potential will have to ask themselves if they passed on an extraordinary opportunity.

## **Resources**

For additional information on decentralized wastewater management and its potential as an emerging infrastructure visit the following web sites.

<http://www.epa.gov/region1/assistance/ceitts/wastewater/techs/bioclere.html>

[www.epa.gov/owm/mab/smcomm/nsfc.htm](http://www.epa.gov/owm/mab/smcomm/nsfc.htm)

[www.aquapoint.com](http://www.aquapoint.com)

[www.nowra.org](http://www.nowra.org)

[www.capecodcommission.org/water/CapeCodRegionalWastewater.pdf](http://www.capecodcommission.org/water/CapeCodRegionalWastewater.pdf)

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