

Decentralized Wastewater and Water Supply: Further Reading





Maine towns that lack funds to build centralized sewer systems have found it difficult to encourage traditional village-type growth. Current zoning regulations tend to promote low-density development in areas where higher densities are desired (such as village growth centers). The Maine State Planning Office (SPO) hired Stone Environmental to determine if decentralized wastewater infrastructure could support higher densities in Maine's villages without compromising the quality of the state's watersheds.

Stone studied the state's environmental laws and regulations, and the characteristics of its soils, groundwater, and bedrock. We analyzed decentralized wastewater technologies and the options for managing decentralized infrastructures. We then compared our findings with Maine's growth goals to determine whether the use of decentralized wastewater systems is desirable and feasible in the state. Finally, we summarized our findings in a set of handouts and technical papers to educate local decision makers and real estate developers.

- An eight-page brochure, *Partners in Building Maine's Future: What Subdividers and Planners Need to Know about Septic System Options in Local "Growth" Areas*. It provides a comprehensive look at the issues surrounding decentralized water and wastewater infrastructure.
- Four two-page handouts that provide an overview of decentralized infrastructure from four angles.
 - *Technology Choices for Developers and Subdividers in Non-Sewered Areas*
 - *Management of Decentralized Wastewater Systems in Maine*
 - *Creating Communities with Decentralized Wastewater Solutions*
 - *Partners in Building Maine's Future: Decentralized Wastewater and Smart Growth.*
- Four technical assistance bulletins (TABs) that describe in detail the scientific basis for our findings.
 - *Decentralized Wastewater and Water Supply Technologies and Performance (TAB #9)*
 - *Management, Policy Options and Guidance for Water Supply and Decentralized Waste Water (TAB #10)*
 - *How to Make Growth Areas Work Without Sewers: Three Approaches Plus None of the Above (TAB #11)*
 - *Decentralized Wastewater and Water Supply: Further Reading (TAB #12)*

We conducted our work for the Maine SPO between May and December 2003.

Stone Environmental was founded in 1992 and quickly established itself as one of the top US firms evaluating the environmental effects of agrochemical use. Since then, we have grown into a successful multidisciplinary team of more than 25 scientists and 40 employees, and added services in the areas of water resources and wastewater, site investigation, and information for sustainable development. Stone is based in Montpelier, Vermont, an area admired for its quality of life and strong environmental values.

For further information, please contact Scott Johnstone, leader of Stone's Water Resources and Wastewater Group, at 802.229.6432 or sjohnstone@stone-env.com.

TECHNICAL ASSISTANCE BULLETINS

Decentralized Wastewater and Water Supply: Further Reading

A technical assistance series prepared by:

Maine State Planning Office

Maine Department of
Environmental Protection

Maine Department of Human
Services, Division of Health
Engineering

Stone Environmental, Inc.
Evan D. Richert

With input from a number of pro-
fessional and citizen planners

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- Waste Water Design Textbooks
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- Water Supply Protection
- Decentralized Waste Water Management Options
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- Land Use Planning Options

TA Bulletin # 12

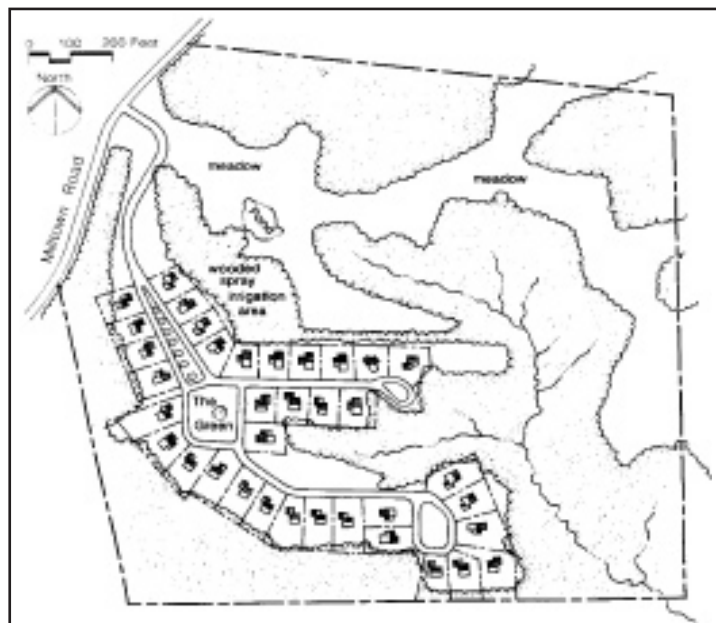
This TA Bulletin is one in a series of documents intended to provide guidance to volunteer board and committee members on specific planning topics.

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December, 2003

Decentralized water supply and waste water treatment and disposal technology choices have a significant impact on meeting development density goals and replicating traditional New England village land use patterns. Decentralized management of water supplies and waste water treatment systems can be set up in existing communities and in areas of new development that use onsite and clustered systems of any size for residential and commercial waste water treatment and dispersal. These onsite and clustered systems are protective of public health, drinking water supplies, and the quality of water resources if they are properly planned, installed, operated, and maintained. When they are managed properly, these systems can also protect property values, preserve tax bases, result in life-cycle cost savings, and further Maine's ultimate goals for intelligent development and land use. Current state regulations, recent technology improvements (including management system technologies for smaller systems), and new management models give development planners and designers more options for meeting land use planning and public health and environmental goals.

This document provides references and website links for further research, including and complementing the information and references supplied in TA Bulletins 9, 10, and 11. The references are organized first by general topic, then alphabetically by author within each topic.



Example of a development that combines smart growth principles with offsite waste water disposal technology. *Source: Natural Lands Trust, Inc.*

Waste Water Treatment Technologies and Processes

Environment Cape Cod, *The Second Compendium of Information on Alternative Onsite Septic system Technology in Massachusetts*, June 2001. Available from Barnstable County Department of Health and the Environment (online at <http://www.barnstablecountyhealth.org/AlternativeWebpage/index.htm>).

This publication contains readable explanations of onsite waste water treatment, pretreatment, and alternative disposal systems (such as drip), and ways to manage these more complicated systems.

US Environmental Protection Agency. 2002. *Onsite Wastewater Treatment Systems Manual*, EPA-625-R-00-008, Washington, DC: U.S. Environmental Protection Agency. (Online at <http://www.epa.gov/ORD/NRMRL/Pubs/625R00008/625R00008.htm>, accessed on June 27, 2003.)

This recently updated manual contains current information on the history of onsite systems and on establishing treatment performance standards. It details treatment processes and systems, provides some fact sheets on specific technologies, and describes treatment system selection strategies.

National Small Flows Clearinghouse (NSFC) (<http://www.nsfrc.wvu.edu>) and *Small Flows Quarterly* magazine are premier sources of information on wastewater treatment and management.

Waste Water Treatment System Design (Textbooks)

Bedinger, M.S., J.S. Fleming, and A.I. Johnson, eds. 1997. *Site Characterization and Design of On-Site Septic System*. Fredericksburg, VA: American Society of Testing and Materials.

Symposium proceedings; contains papers under the subjects of system operation and evaluation, system site characterization and design, and alternative systems components and design.

Burks, B.D., and M.M. Minnis. 1994. *Onsite Wastewater Treatment Systems*. Madison, WI: Hogarth House, Ltd.

An easily readable, comprehensive text that discusses both the science and the engineering of onsite systems. Contains chapters on site evaluation, system design, treatment alternatives, and land use management.

Crites, R. and G. Tchobanoglous. 1998. *Small and Decentralized Wastewater Management Systems*. Boston: WCB/McGraw-Hill.

A premier engineering text for the design of decentralized treatment systems.

Metcalf & Eddy Inc. 1991. *Wastewater Engineering Treatment, Disposal and Reuse, Third Edition*. New York: McGraw-Hill, Inc.

An important reference text on wastewater treatment system design, although it is not specific to small or decentralized systems.

Septic System Performance and Potential Impacts

The following references on the performance and impacts of onsite systems are compiled from Maine DEP resources and the scientific literature:

Bicki and Brown, 1991. On-Site Sewage Disposal: The Influence of System Density on Water Quality, *Journal of Environmental Health*, March/April 1991.

This paper is a compilation of several previous studies relating onsite system density to groundwater and surface water sampling. At the time, the paper concluded that a lot size necessary to prevent contamination is

approximately one-half to one acre.

Frenzel, S.A., and C.S. Couvillion. 2002. Fecal-Indicator Bacteria in Streams Along a Gradient of Residential Development, *Journal of the American Water Resources Association* 38(1): 265-273.

The authors performed fecal-indicator bacteria sampling at 14 stream locations in Anchorage, Alaska as part of a study to determine the effects of urbanization on water quality. They found that areas served by centralized sewer systems had significantly higher fecal-indicator bacteria concentrations than did areas served by septic systems, although the source of the bacteria could not be determined.

Pizor, P.J., G.H. Nieswand, and R.M. Hordon. 1984. A Quantitative Approach to Determining Land Use Densities from Water Supply and Quality. *Journal of Environmental Management* 18:49-56.

This article presents a quantitative method for making a specific linkage between the volume and quantity of water available in an area and recommended lot size. The method may apply to areas serviced by infrastructure or by onsite septic systems and wells.

Maine Department of Environmental Protection. *The Quality of Maine Waters — A Condensed Version of the 1996 Maine Water Quality Assessment*. Accessed online at <http://www.state.me.us/dep/blwq/docmonitoring/spiral.htm>, June 16, 2003.

An important reference work for any person interested in learning about or protecting Maine's waters. Includes assessments of groundwater, surface waters, and estuaries and coastal areas.

Maine Department of Environmental Protection and the Maine Geological Survey. 1999. *Residential Septic System Impacts on Groundwater Quality in Maine, Part I, Characterization of Nitrate Concentrations in Domestic Wells at 18 Subdivisions*. Executive Summary available online at <http://www.state.me.us/dep/blwq/docmonitoring/nitsum.htm>. Paper copies of Parts I and II may be obtained by e-mailing LWPUB@state.me.us.

The investigators conducted a survey of nitrate-nitrogen concentrations in domestic wells in 18 unsewered subdivisions to determine the possible impact of onsite septic systems on groundwater quality. The study concluded that the Maine Subsurface Wastewater Disposal Rules are adequately protecting residential wells from nitrate-nitrogen contamination caused by conventional septic systems.

NDWRCDP, 2003. *Evaluation of Approaches to Planning and Management of Cluster Wastewater Collection and Treatment Systems*, Lombardo Associates, Inc., for NDWRCDP, Washington University, MO.

This report was not available at press time, but will be released during 2003 and will be available at www.ndwrmdp.org.

Thomas, M.A. 2000. The Effect of Residential Development on Groundwater Quality Near Detroit, Michigan. *Journal of the American Water Resources Association* 36(5): 1023-1038.

Two water-quality studies were conducted on the outskirts of the Detroit metropolitan area to determine how recent residential development has affected groundwater quality. The greatest influence on groundwater quality appeared to be from septic system effluent (domestic sewage, household solvents, and water-softener backwash) and infiltration of stormwater runoff from paved surfaces (road salt and fuel residues). The effects of human activities were apparent in 76 percent of young (shallow) waters tested at depths below 25 feet (Michigan's current minimum well depth requirement).

Van Cuyk, S., R. Siegrist, A. Logan, *et al.* 2001. Hydraulic and Purification Behaviors and Their Interactions During

Wastewater Treatment in Soil Infiltration Systems. *Water Research* 35(4): 953-964.

Four three-dimensional soil lysimeters were established in a pilot laboratory, and were dosed with septic tank effluent in order to investigate the dynamic, interactive processes that occur in the disposal fields of onsite systems. Media utilization and effluent retention times (as measured by using a bromide tracer) increased during the first two months of operation, gradually increasing to two days or more. Purification processes were gradually established over four or more months, after which there were high removal efficiencies for organic constituents, microorganisms, and virii, but only limited removal of nutrients.

Weiskel, P.K., B.L. Howes, and G.R. Heufelder. 1996. Coliform Contamination of a Coastal Embayment: Sources and Transport Pathways. *Environmental Science & Technology* 30(6): 1872-1881.

The investigators conducted seasonal measurements of fecal coliform sources and transport pathways contributing to fecal coliform contamination of Buttermilk Bay, a shallow embayment adjacent to Buzzards Bay, MA. Onsite disposal of sewage was the single largest fecal coliform source in the watershed-embayment system, but due to attenuation during subsurface transport, only a minute fraction reached bay waters. Instead, surface water flows, via storm drains and natural streams, contributed the major terrestrial input. Management practices in similar settings should account for migratory waterfowl, but remediation efforts should focus on the redirection of stormwater runoff through the groundwater transportation pathway.

Weiskel, P.K., and B.L. Howes. 1992. Differential Transport of Sewage-Derived Nitrogen and Phosphorus through a Coastal Watershed. *Environmental Science & Technology* 26(2): 352-360.

Changes in land use in coastal watersheds to residential development with onsite sewage disposal represent a potential change in both the quantity and quality of nutrient impacts to coastal marine systems. Though a minor source of phosphate to the receiving waters of the study area, septic effluent is a potentially major source of dissolved nitrogen to coastal waters. Where marine or estuarine systems are nitrogen-limited, septic systems may contribute substantially to eutrophication.

Wilhelm, S.R., S.L. Schiff, and W.D. Robertson. 1996. Biogeochemical Evolution of Domestic Waste Water in Septic Systems: 2. Application of Conceptual Model in Sandy Aquifers. *Ground Water* 34(5): 853-864.

Aqueous geochemical data from unconfined sand aquifers beneath two operating domestic septic systems were used to illustrate and evaluate a conceptual model of septic system geochemistry.

Choosing Options at the Community Level

Several states in the northeast United States, including Massachusetts and Rhode Island, have mandated that local communities have plans in place for managing decentralized waste water systems. This section includes reports from communities in these states that have successfully gone through their own assessment processes to develop plans and programs:

Arenovski, A., and Shephard. 1996. *A Massachusetts Guide to Needs Assessment and Evaluation of Decentralized Wastewater Treatment Alternatives*. Produced by the Ad-Hoc Committee for Decentralized Wastewater Management. Accessed online at <http://www.brandeis.edu/marinestudies/plan.pdf>, November 13, 2003.

A planning document that primarily covers the environmental, regulatory, geographic, demographic, and technological variables that arise during the process of planning for decentralized waste water management.

National Decentralized Water Resources Capacity Development Project (NDWRCDP), 2002. *Application of a Risk-Based Approach to Community Wastewater Management: Tisbury, Massachusetts*. NDWRCDP, Washington University,

St. Louis, MO (WU-HT-00-26).

This report provides risk assessment tools for protection of a community drinking water supply, freshwater pond, and coastal embayments using nitrogen modeling.

National Small Flows Clearinghouse (NSFC), 2003. *Small Community Wastewater Solutions: A Guide to Making Treatment, Management and Financing Decisions* (#FMBKGN210). Available by order via e-mail from nsfc_orders@mail.nesc.wvu.edu or by phone at (800) 624-8301.

The book is a comprehensive guide to making community waste water treatment decisions. It aims to help property owners become critical thinkers with respect to the information, concerns, and recommendations that will surface as they begin the process of solving their waste water problems. It also provides the tools small communities need to access this data and to make independent, informed judgments and choices.

University of Rhode Island, Civil and Environmental Engineering. 1994. *Wastewater Management Guidance Manual for Non-Sewered Communities*. Available from Office of Environmental Coordination, Rhode Island Department of Environmental Management.

University of Rhode Island, Cooperative Extension Service. 2000. *Rapid Site Assessment Guide*. Accessed online at <http://www.uri.edu/ce/wq/mtp/rapid/rapid.html> on June 27, 2003.

An internet-based guide to general analysis of subdivisions and land development projects. It offers step-by-step directions using readily available computer-generated maps and other data.

Water Supply Systems and Environmental Protection

The following reference books and online resources provide information about the development and protection of drinking water supplies:

Alth, M. and C. Alth. 1992. *Wells and Septic Systems*. New York: McGraw-Hill, Inc.

A reference work on water supplies and waste water treatment systems written primarily for the homeowner. Easily readable text and clear, concise figures.

Web Resources

National Agricultural Library, www.nal.usda.gov, Water Quality Information Center (WQIC) provides publications, searchable databases, and other water-related services.

National Drinking Water Clearinghouse (NDWC), online at www.ndwc.wvu.edu, is a national clearinghouse on water related topics. They also publish *OnTap*, a free publication with drinking water news for small communities.

Water Resources Publications (WRP) is a company specializing in publishing and distributing books and software about water resources. Online at <http://www.powells.com/psection/EnvironmentalEngineering.html>.

Decentralized Wastewater Management Options

Following are papers and reports discussing decentralized waste water management from a variety of perspectives, including national references and planning papers and implementation guides at the state and local levels from different parts of the country:

Chateaufneuf, R.J. 2002. *Onsite Wastewater Management Approaches in Rhode Island*. Paper presented at the New England Interstate Water Pollution Control Commission 2002 Short Course and Exhibition. Available by contacting

NEIWPCC at (978) 323-7929.

This paper describes the various state and municipal onsite waste water management approaches being employed in Rhode Island to protect natural resources and to help restore resources that appear to be impaired due at least in part to the effects of onsite systems. Three case studies are presented that highlight approaches and driving forces affecting regulatory and policy changes in the Rhode Island onsite arena.

Kansas Department of Health and Environment, Watershed Management Section, 1999. *Assessing Wastewater Options for Small Communities in Kansas*. Available by calling 1-785-296-4195.

Provides a comprehensive overview of both planning and implementation phases of a successful decentralized waste water management system or program. Focuses primarily on clustered or larger-scale decentralized systems, but provides an entire chapter on funding methods and mechanisms.

Purdue Extension Service, *Small Community Wastewater Cluster Systems*, ID-265, 2001. Accessed online at <http://www.agcom.purdue.edu/AgCom/Pubs/AE/ID-265.pdf>, June 16, 2003.

This document discusses design options for cluster systems, and the advantages and disadvantages of using cluster systems for waste water treatment and dispersal. There is also information about choosing the right alternative, building community support, finding the right consultant, and finding funding to build small community systems.

Schwartz, J.J., A.B. Waterman, A.T. Lemley, L.P. Wagenet, P. Landre, and D.J. Allee. 1998. Homeowner perceptions and management of private water supplies and wastewater treatment systems. *Journal of Soil and Water Conservation* 53(4): 315-319.

A study in three counties in upstate New York showed that an average of one-third to the homes using wells or springs for their water supply tested positive for an indicator bacteria. Most of the respondents had never previously tested their drinking water, and of those with septic systems, one-third had never had their septic tanks pumped. In spite of these problems, most respondents said that they were satisfied with their water supply. More educational programs are needed, as is research into what things influence how homeowners manage their water supplies and septic systems.

U.S. Environmental Protection Agency, *Voluntary National Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems*, EPA 832-B-03-001, March 2003. Accessed online at <http://www.epa.gov/owm/mtb/decent/download/guidelines.pdf>, November 13, 2003.

The Voluntary Guidelines were developed to raise the level of performance of onsite and clustered waste water treatment systems through improved management programs. The five management models or levels are described, and their application to local conditions is briefly discussed.

U.S. Environmental Protection Agency, *Draft Handbook for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems*, EPA 832-D-03-001, February 2003. Accessed online at <http://www.epa.gov/owm/mtb/decent/handbook.htm>, November 13, 2003.

EPA has developed a draft Management Handbook to complement the Voluntary National Guidelines discussed above. The Handbook is an implementation guide containing case studies, detailed discussions and supplementary material to assist states and communities in implementing the management guidelines.

U.S. Environmental Protection Agency, *National Water Quality Inventory: 1996 Report to Congress*, EPA 841-R-97-008, 1998. Accessed online at <http://www.epa.gov/owow/305b/96report/>, November 13, 2003.

This report informs Congress and the public about general water quality conditions in the United States. This document characterizes water quality, identifies widespread water quality problems of national significance, and describes various programs implemented to restore and protect the nation's waters.

U.S. Environmental Protection Agency, *Response to Congress on Use of Decentralized Wastewater Treatment Systems*, EPA 832-R-97-001b, April 1997. Accessed online at <http://www.epa.gov/owm/mtb/decent/response/index.htm>, November 13, 2003.

A report requested by the Congressional House Appropriations Committee to determine the benefits of onsite and decentralized systems as compared to "current" (i.e. centralized) systems. The report addresses the issues raised when considering decentralized treatment options.

Venhuizen, David. 2001. *Winfield Township Wastewater Facility Plan: Overview of Options for Management Strategies and Technologies*. Accessed online at http://www.venhuizen-ww.com/html/papers/dc_winfield.html, June 16, 2003.

An excellent general discussion of decentralized management options, written for the lay reader.

Electronic Tools for Management Assistance

Following are product websites for several electronic database tools used to manage decentralized systems. These tools are described in greater detail in the white paper "Management, Policy Options, and Guidance for Water Supply and Decentralized Wastewater".

- SepTrack: <http://www.buzzardsbay.org/septrfct.htm>
- SepticPlanner: <http://www.landplot.com/septic2.html>
- Integrated Wastewater Information Management System: <http://www.stone-env.com>
- Computer Aided Septic System Tracking: <http://www.casst.com>
- Carmody Waste Recording Services: <http://www.carmodydata.com>
- Purdue University Onsite Wastewater Disposal Permit Database: <http://danpatch.ecn.purdue.edu/~epados/onsiteOnline/database.htm>

Land Use Planning and Decentralized System Options

Following are references relating to land use and "smart growth" aspects pertinent to the use of small community waste water systems:

American Planning Association, 1998. *The Principles of Smart Development*, PAS Report No. 479, APA: Chicago, Ill. Not specific to community waste water disposal systems, but good background on lot configurations for traditional styles of development. See pp. 19-24.

American Rivers, NRDC, and Smart Growth America, 2003. *Paving Our Way to Water Shortages: How Sprawl Aggravates Drought*

This paper ties development uses to water shortages, stormwater, impervious surfaces, etc., and how using smart growth principles can help alleviate the problems.

Arendt, Randall, 1994. *Rural by Design*, American Planning Association: Chicago, Ill.

An important reference work on small town development and open space zoning and preservation. See chapter 3, Sewage Disposal, for a discussion of the design and use of common waste water disposal systems.

Arendt, Randall, 1992. "Open Space Zoning: What It Is & Why It Works," *Planning Commissioners Journal*, July/Au-

gust 1992; also available at www.plannersweb.com/articles/are015.html

Bicki, Thomas J., and Brown, Randall B., 1991. "On-Site Sewage Disposal: The Influence of System Density on Water Quality," *Journal of Environmental Health*, March/April 1991

Calthorpe, Peter, 1993. *The Next American Metropolis*, Princeton Architectural Press: New York, N.Y.

A leading reference work on traditional neighborhood development. Includes a chapter on ecology and habitat, in which Calthorpe argues for use of onsite waste water treatment facilities that use biological systems to reclaim water.

Campoli, Humstone and MacLean, 2002. *Above and Beyond; Visualizing Change in Small Towns and Rural Areas*, American Planning Association, Chicago, Ill.

Provides visual examples of the incremental changes from rural to suburban areas, and their impacts on fragmenting natural and community resources.

Duany, Andres and Plater-Zyberk, Elizabeth, 1991. *Towns and Town-Making Principles*, Rizzoli International Publications, Boston, MA.

Provides examples of two newly designed "rural villages" in Maryland, pp. 26-37.

Ewing, Reid, 1996. *Best Development Practices*, American Planning Association: Chicago, Ill.

Good discussion of cluster development as a best land use practice, advocating for "small housing clusters." See especially pp. 25-27.

Fader, Steven, 2000. *Density by Design: New Directions in Residential Development*, Urban Land Institute: Washington, D.C.

Not specific to community waste water disposal systems, but includes case studies of single-family detached subdivisions in suburban settings. Offers a sense of the design options possible if a development of suburban lots away from public sewers is freed from the constraint of conventional on-site septic systems.

Heart, Bennett, et. al., 2002. *Community Rules: A New England Guide to Smart Growth Strategies*, Conservation Law Foundation and Vermont Forum on Sprawl.

Does not directly address community waste water systems, but a New England-oriented guidebook for traditional forms of development in which community systems probably must play an important role.

Nelessen, Anton Clarence, 1994. *Vision for a New American Dream: Process, Principles, and an Ordinance to Plan and Design Small Communities*, American Planning Association: Chicago, Ill.

A leading reference on small town traditional neighborhood development. In his section on Ecological Responsibility (pp. 141-152), Nelessen addresses small community waste water systems that enable the development of traditional neighborhoods in towns without public sewer systems.

NDWRCDP, 2003. *Wastewater Planning and Creative Zoning*. University of Rhode Island Cooperative Extension Service for NDWRCDP, Washington University, St. Louis, MO.

This report was not final at press time, but will be available in 2004 through the web site www.ncwrcdp.org.

Shephard, Frank C., 1996. *Managing Wastewater: Prospects in Massachusetts for a Decentralized Approach*, Waquoit

Bay National Estuarine Research Reserve.

Southern Maine Regional Planning Commission, *Subdivision Model Ordinance*. Available on the Maine State Planning Office's web site under Land Use Planning, Publications. Accessed online at <http://www.state.me.us/spo/landuse/pubs/> on June 27, 2003.

U.S. Environmental Protection Agency, "*Model Ordinances to Protect Local Resources: Open Space Development*". Accessed online at <http://www.epa.gov/owow/nps/ordinance/mol3.htm> on June 27, 2003.

Contains model ordinance language for open space development, including sections for design standards, open space requirements, and management. Also contains links to other aspects of local resource protection as it pertains to non-point source pollution control.

Other documents in this series:

Summaries:

- Technology Choices for Developers and Subdividers in Non-Sewered Areas
- Management of Decentralized Waste Water Systems in Maine
- Creating Communities With Decentralized Wastewater Solutions
- Partners in Building Maine's Future: Decentralized Waste Water and Smart Growth

Handbook:

Partners in Building Maine's Future: What Subdividers and Planners Need to Know About Septic System Options in Local "Growth" Areas

TA Bulletins:

- TA Bulletin # 9: Decentralized Waste Water and Water Supply Technologies and Performance
- TA Bulletin # 10: Management, Policy Options, and Guidance for Decentralized Water Supply and Waste Water
- TA Bulletin # 11: How to Make Growth Areas Work Without Public Sewers: Three Approaches Plus "None of the Above"

For Further Information Contact:

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Maine Department of Environmental Protection
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Maine Department of Human Services, Wastewater & Plumbing Control Program
(207) 287-5689
Web Address: <http://www.maine.gov/dhs/eng/plumb/index.html>

Copies of this report are available from the Maine State Planning Office, 38 State House Station, Augusta, ME, 04333-0038. Request the appropriate subject document from the Land Use Technical Assistance Series, or view and download this document from the SPO website (<http://www.state.me.us/spo/>).

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