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Regional Wastewater Management Plan
Status of Local Planning

MARCH 2013

Table of Contents

HOW DID WE GET HERE? 1

WHAT ARE COMPREHENSIVE WASTEWATER MANAGEMENT PLANS? 3
- CWMP REGULATORY REVIEW 4

WHERE WE ARE? WASTEWATER PLANNING STATUS BY TOWN 6
- CWMP ACTIVITIES IN THE MEPA/DRI REVIEW PROCESS 6
- CWMP ACTIVITIES OUTSIDE THE MEPA/DRI REVIEW PROCESS 16

NEXT APPROPRIATE STEPS 20
- COMMON ELEMENTS AND NEEDS 20
- TECHNICAL ASSISTANCE NEEDS 21

How Did We Get Here?

CAPE COD COMMISSION

Wastewater management planning has been an integral part of Cape Cod's earliest water-quality protection efforts. The use of outhouses in the early colonial days soon gave way to the use of cesspools when the modern indoor toilet required a remote receptacle for waste. Cesspools later advanced to two-staged septic systems that ultimately transitioned to today's version of the 1995 Title 5 systems. There are more than 123,000 septic systems on Cape Cod today.

Early consideration of wastewater collection on Cape Cod dealt with providing village infrastructure in Hyannis, Woods Hole, and the Massachusetts Military Reservation (MMR), dating back to the 1930s. The Hyannis solution for collected sewage was disposal into sand beds in the interior back woods that today are adjacent to the Cape Cod Mall. The Woods Hole solution consisted of an outfall pipe, which has since been decommissioned and wastewater is now sent to an upgraded facility in North Falmouth.

At several points in the mid-20th century, wastewater systems were evaluated, debated, and rejected. Several early plans called for regional facilities combining Dennis and Harwich and giant systems for Yarmouth and Barnstable. In 1964, Harwich received a nod-of-the-head from the US Department of the Interior for an outfall of primary-treated effluent into Nantucket Sound, which the town did not select as its preferred alternative. A small collection and treatment system to serve a downtown gained a toehold in Chatham during the 1960s.

During the 1970s and into the 1980s, federal funding could have offset the capital costs for wastewater facilities, but the sentiment of Cape Codders was that sewers would change the character of their villages and towns. As a result, in the regional 208 Area-wide Water Quality Management Plan for Cape Cod in 1978, extensive sewering for Cape Cod was not recommended or pursued by town or state officials. In retrospect, it must be remembered that the issue of coastal eutrophication was obscured by the concern for significant multiple threats to drinking water.

As Cape Codders struggled to preserve their communities during a time of unprecedented growth during the 1970s and 1980s, water quality planning became the common denominator for a strategy to regulate land use

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to protect groundwater for drinking water purposes. The recommended strategies of the 208 Plan of 1978 were implemented at many levels and served Cape Cod well for the protection of drinking water supplies. Of the Cape's 160 groundwater wells, 42% produce drinking water with less than 0.5 parts per million (ppm) nitrate nitrogen. Only 6% of the wells, which are the less protected, have been more significantly impacted by residential development and are approaching 5 ppm.

In the early 1990s, however, Cape Codders began to document eutrophic conditions of the near coastal waters of estuaries and bays. The source of coastal eutrophication was found to be the diffuse and low concentrations of nitrogen in the aquifer resulting from septic systems. Whereas 1 ppm of nitrogen in groundwater is acceptable for drinking water purposes, it is much too high for coastal ecosystems, which begin to suffer at concentrations over 0.37 ppm. This concern raised a host of new questions, namely: How many of the Cape's surface waters have been affected? How much nitrogen is getting into them? How do we account for the nitrogen that gets released into the watershed? How much nitrogen is too much? How much nitrogen needs to be removed?

Meanwhile citizens from across the nation were finding that their surface water quality was also deteriorating, leading to urgent action by regulators to implement the long-dormant sections of the 1972 federal Clean Water Act that requires the identification of Total Maximum Daily Loads (TMDLs) to clean up fouled waters. This collective surge of momentum and need for problem definition begat the Massachusetts Estuaries Project (MEP) in 2001 that would provide scientific answers for Cape Codders. Because we were already seeing the harmful effects of nitrogen on our estuaries it became accepted that Cape Cod's resource-protection efforts would need to shift and focus on restoration.

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What are Comprehensive Wastewater Management Plans?

Comprehensive Wastewater Management Plans (CWMPs) are required to be prepared in order for communities to gain access to federally subsidized funds from the State Revolving Fund (SRF) loan program under the Massachusetts Water Pollution Abatement Trust. A major goal of the trust is to provide incentives to communities to undertake projects that have meaningful water quality and public health benefits and address the needs of the communities and the watersheds. Since wastewater infrastructure projects can cost tens of millions of dollars, these long-term, low-interest loans are typically sought by communities to finance them. The SRF loan is administered by the Massachusetts Department of Environmental Protection (MassDEP), whose regulation 310 CMR 44 provides specific requirements for what should be contained in the CWMP. There are several different types or combinations of CWMPs, depending on the focus of the plan: drinking water, wastewater, and/or stormwater. The general outline of the plan is:

1. Assess the need for the project.
2. Examine alternatives to the project.
3. Propose a plan and schedule for the project.
4. Evaluate all the environmental impacts of the project including, without limitation, secondary growth impacts and impacts of the overall water balance in the watershed or subwatersheds.
5. Identify means of mitigating those impacts.
6. Demonstrate that the project is not only environmentally appropriate and cost effective, but also implementable from a legal, institutional, financial, and management standpoint.

MassDEP will review the scope of work for any Comprehensive Management Plan or Integrated Water Resource Management Plan used to fulfill the requirements in accordance with MassDEP's Guide to Water Resource Management Planning. The guide provides more-detailed information on the contents of a CWMP.

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CWMP REGULATORY REVIEW

All projects approved by MassDEP to receive an SRF loan from the trust shall, at a minimum, comply with the requirements of the Massachusetts Environmental Policy Act (MEPA) and the regulations promulgated under 301 CMR 11.00. The scope of work for all Comprehensive Management Plans and Integrated Water Resource Management Plans must provide for a public-participation program that includes, at a minimum, one public meeting to discuss the alternatives to the project and their environmental impacts, and one public hearing on the environmental impacts, plan, and schedule of the project.

Comprehensive Wastewater Management Plans often involve exceptional sewer lengths of 10 or more miles and/or treatment volumes of 2.5 million gallons per day (gpd) and require state Groundwater Discharge Permits, therefore, the MEPA process will require that the CWMP be prepared as an Environmental Impact Report (EIR; MEPA Regulations 301 CMR 11.03 Review Thresholds). CWMPs may also trigger mandatory EIR thresholds for land and wetland alterations, impacts to endangered or threatened species or archeological sites, and other factors. Any non-state entity EIR that is required by the MEPA regulations must also be reviewed as a Development of Regional Impact (DRI) under the Cape Cod Commission Act. The time frame for completing a CWMP can range from more than 14 years to just under 5 years.

The Cape Cod Commission plays a duel role, where staff provides technical assistance to the towns on technical, planning, and wastewater management issues, and directed support to the Commission board itself, which conducts the regulatory review that can either deny or approve a CWMP with conditions. As a DRI, the CWMP must meet the minimum performance standards of the Cape Cod Regional Policy Plan, be consistent with local zoning, and follow the guidance and policies of the Cape Cod Regional Wastewater Management Plan (RWMP). The Commission and MEPA Office have an agreement that allows for an optional joint MEPA/DRI regulatory review so that the town's single CWMP can be used for both reviews.

Once the MEPA process is formally finished, the Commission's DRI process is typically finished within several months, concluding with a DRI decision permit that includes findings and conditions for approval (see the Cape Cod Commission section of Regulatory and Planning Initiatives for more information). Conditions for approval typically include

requirements for adaptive management, monitoring, compliance, and reporting. There is no pre-set determination for the time that the MEPA process must begin. Some towns have filed immediately when the process begins, others have filed towards the end of the planning process. Close communication between the town, MassDEP, and the Commission throughout the process ensures a smooth regulatory review. The Commission has developed a new set of guidance policies for its regulatory review requirements for CWMPs as a part of the RWMP.

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Where We Are?
Wastewater Planning Status by Town

All 15 Cape Cod towns have engaged in the CWMP process during the last 10 years. Of those, seven are in the MEPA review process. Eight towns have retained engineering consultants to undertake various components of a CWMP, but have yet to file their plans with MEPA. The start dates and progress of the CMWPs are shown in Table SLP-1. The following is a synopsis of each of the town's CWMP status grouped according to its regulatory review stage. A link is provided to each town's wastewater planning web site. A Cape Cod Commission regulatory review file of comments letters, public hearings, and decision documents are available for each town's CWMP that is undergoing the MEPA/DRI review.

CWMP ACTIVITIES IN THE MEPA/DRI REVIEW PROCESS

PROVINCETOWN

Provincetown completed the MEPA/DRI review process in 2001. The facility and Phase 1 and 2 areas were subsequently built and are performing well. The plan dealt with the public health issues of failing septic systems and inadequate infrastructure. The comprehensive plan was approved by state agencies through the MEPA and by the Cape Cod Commission through DRI review.

The plan included a number of innovative aspects, including a lot-by-lot assessment of Title 5 systems, use of the Route 6 median and right-of-way for effluent disposal, combination of force mains, conventional gravity and vacuum sewers, and "checkerboard" sewer areas. The CWMP did not deal with the eutrophication issues that plague Cape Cod's south coastal embayments. The plan included three phases. The town is presently expanding sewers into the Phase 3 area and is upgrading the facility to its planned capacity. During this implementation, the town was able to use measured wastewater flow to compare to the design capacity and to negotiate the use of that excess capacity for new wastewater flow.

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TABLE SLP-1: Status of Local Wastewater Planning by Town, as of Winter 2012

TOWN	CWMP START DATE	JOINT MEPA/ DRI REVIEW	NEEDS ASSESSMENT	TECHNOLOGY ASSESSMENT	ALTERNATIVES SCREENING	ALTERNATIVES SELECTION: PREFERRED PLAN	DRAFT EIR/DRI	FINAL EIR/DRI
Barnstable	July 2009	Yes		September 2010			May 2012	
Bourne	June 2009	No	April 2007					
Brewster	July 2009	No	November 2010					
Chatham	June 2009	Yes						October 2009
Dennis	June 2009	No	September 2005					
Eastham	July 2009	No	March 2009					
Falmouth	2007	Yes	December 2007	December 2007			Septem-ber 2012	
Harwich	June 2009	No				Under way		
Mashpee	June 2009	Yes	November 2007	February 2008	Under way			
Orleans	June 2009	Yes	January 2007	October 2007	January 2008	May 2008	April 2009	October 2011
Provincetown	June 2009	Yes						March 2001
Sandwich			Under way					
Truro			Under way					
Wellfleet	July 2009	No	Under way					
Yarmouth	June 2009	Yes	July 2005				October 2010	

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MASHPEE CWMP/MEPA/DRI STATUS

The Mashpee CWMP was scoped through a joint MEPA/DRI review as an Environmental Notification Form (ENF) in 2001. In 2007 the town submitted its Needs Assessment Report entitled, "Town of Mashpee, Popponesset Bay and Waquoit Bay-East Watersheds Needs Assessment Report." The Needs Assessment Report documented the significant level of effort that had gone into determining the Total Maximum Daily Load (TMDL) of nitrogen for the two subject embayments over the course of six years. Mashpee has been engaged in numerous county, state, and federally funded projects over the years, including the 2009 MassDEP Pilot Project and the 2009 Cape Cod Commission TMDL Implementation Project, which were both funded by the US Environmental Protection Agency. Through these projects, the town was able to run a number of scenarios through the MEP linked water quality model by the School for Marine Science and Technology (SMAST) at the University of Massachusetts at Dartmouth, to evaluate TMDL compliance strategies including an assessment of cranberry bogs and streams for potential additional natural attenuation. The projects also allowed Mashpee, together with representatives of Barnstable and Sandwich, to participate in the determination of a TMDL nitrogen-loading allocation for Popponesset Bay for each town. The town also received wastewater grant funds from Barnstable County to model sewer collection systems in the Popponesset watershed and technical assistance from the US Geological Survey and Commission staff, to use the Sagamore Lens groundwater model to evaluate potential wastewater disposal sites.

The needs assessment identifies Santuit Pond as being listed on the Clean Water Act 303d list of "impaired waters." The Cape Cod Pond Atlas identifies 18 additional freshwater ponds that are impaired. The needs assessment contains a characterization of the nine operating private sewage treatment facilities, including treatment efficiency and excess capacity. This work allowed the town to focus on three potential wastewater scenarios that were developed in 2012. These options (1A, 1B, and 1C) are being reviewed and are planned to be the basis for developing a preferred alternative in 2013. The wastewater scenarios include use of the existing private plants at their planned capacity and either three or four subregional plants with consideration of shared town responsibility. Off-site disposal of effluent outside of the impaired watersheds is an important consideration for the plan's approach. The alternatives analysis included consideration of private effluent disposal sites at New Seabury, Willowbend, and others, in addition to the town's transfer facility site.

The town has reformulated the Sewer Commission Wastewater Committee and has an in-house coordinator for the wastewater project as the town proceeds with selecting a preferred alternative. New considerations for the town as it develops its preferred alternative include consideration of the use of the MMR treatment facility and disposal site as long-term regional solutions are being evaluated. Recently the Cape Cod Water Protection Collaborative prepared a draft inter-municipal agreement between the towns on responsibilities and potential nutrient-trading opportunities for the shared Popponesset Bay.

FALMOUTH CWMP/MEPA/DRI STATUS

The Town of Falmouth completed the MEPA/DRI process for the West Falmouth Harbor Wastewater Facility Plan (WWFP) in 2001. The WWFP focused on a plant upgrade to achieve better nutrient-removal rates. The upgrade was required because the facility was previously permitted in the 1980s before knowledge about coastal nitrogen sensitivity in the watershed to West Falmouth Harbor, which is nitrogen impaired owing to surrounding residential development and a nitrogen effluent plume. The planned upgrade is now complete, and water quality conditions within the groundwater have improved significantly. However, due to nitrogen sensitivity, the location has a limited capacity to increase treated effluent discharge.

The Cape Cod Commission reviewed an Environmental Notification Form (ENF) in 2007 for Town of Falmouth Comprehensive Wastewater Management Planning Project for the South Coastal Watersheds including the Needs Assessment Report and Alternatives Screening Report for Little Pond, Great Pond, Green Pond, Bournes Pond, Eel Pond, and Waquoit Bay. The Needs Assessment Report identifies wastewater needs within a study area that includes the estuary watersheds, while the Alternatives Screening Report reviews the potential technologies to address the identified needs. The Needs Assessment Report and Alternatives Screening Report provide the basis for the development of a draft comprehensive wastewater plan Environmental Impact Report. Falmouth prepared a draft CWMP that included collection of wastewater in the south coastal areas generally south of Route 28, treatment at a proposed regionally shared facility on the MMR, and effluent disposal through injection wells. The town formulated a new internal review committee to evaluate additional alternatives, and in 2012 submitted a draft Comprehensive Wastewater Management Plan/Draft EIR (DEIR) for joint MEPA/DRI review.

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The 2012 draft CWMP/DEIR presents a significant change from the screened alternatives presented in the 2007 ENF. In addition to plans for sewering specific portions of the south coastal estuaries and upgrading the West Falmouth treatment facility and discharge options, the DEIR includes specific opportunities for innovative on-site technologies and on-site non-discharging systems, tidal flushing, aquaculture, and permeable reactive-barrier demonstration projects, and non-structural nitrogen reduction strategies consisting of fertilizer controls and stormwater management.

The town is presently implementing the recommendations of the advisory committee and a $2.77 million Town Meeting vote through the procurement process to retain an omnibus engineering consultant to oversee design aspects of the entire project and separate expert consulting capacity to prepare feasibility studies for the pilot projects. Pending future Town Meeting approvals, the town proposes to appropriate $9 million in Spring 2013 to provide the design of the Little Pond Watershed collection system, necessary facility upgrades, and pilot project implementation. Subsequent to the design, the town proposes to appropriate necessary funds, loans, and grants in 2014 to construct the Little Pond Watershed collection system and implement the pilot projects over the next five years, concluding in 2020. The draft CMWP/DEIR estimates the cost of this initial phase of work at $44 million.

The town received wastewater grant funds from Barnstable County (1) to receive technical assistance from the US Geological Survey and Cape Cod Commission staff to use a groundwater model to evaluate potential wastewater disposal sites; (2) to conduct detailed hydrogeologic modeling of a likely discharge site, the Falmouth Country Club; and, (3) technical assistance through the Cape Cod Water Protection Collaborative. Through its review, the Commission supported the additional evaluation of the MMR as a potential shared regional facility for the Upper Cape as one the town's alternatives.

CHATHAM – CWMP/MEPA/DRI STATUS

The Chatham CWMP is truly the first town-wide plan to be completed that incorporates the state and federal TMDLs to restore coastal water quality for several large coastal embayments. The CWMP/Final EIR (FEIR) provides a strategy for wastewater management and reduction of nitrogen loading to restore and protect Chatham's marine embayments, addresses other areas of concern (areas experiencing high groundwater, failing

systems, and industrial/commercial areas) and includes an Adaptive Management Plan for its implementation.

The CWMP/FEIR details a two-phased implementation program to meet nitrogen Total Maximum Daily Loads (TMDLs) in Stage Harbor, Pleasant Bay, Sulphur Springs, and Taylors Pond. Phase 1 actual wastewater flows are projected to be an average annual of 0.94 million gallons per day (mgd). The actual Phase 2 wastewater flows will be 38 percent more than Phase 1, for an annual average flow of 1.3 mgd over 30 years. The extension of sewers to the remaining part of town will take another 10 years, with an estimated completion date of 2040.

The estimated Phase 1 costs are $210 million (in 2007 dollars) over the initial 20 years. The town has adopted a number of innovative approaches for funding the project. The town has established a capital facilities plan with the goal of not having to raise the tax rate; however, it is acknowledged that modest tax increases will be necessary to meet the costs of the proposed plan. Expected homeowner charges are estimated at $3,000 to $10,000 for hook-up and $400 for annual operation and maintenance.

The state and the Cape Cod Commission reviewed this 11-year project as a Draft Environmental Impact Report (DEIR) in 2008 and as a Final EIR (FEIR) in 2009. An expanded Adaptive Management Plan scope was part of the conditions of the Commission's DRI approval, which included components of implementation progress, Groundwater Discharge Permit monitoring, and monitoring of marine waters for TMDL compliance. The final Adaptive Management Plan was submitted to the Commission two years after the DRI approval.

The town completed the treatment facility and main sewer trunk line construction in 2012 and is seeking SRF funding for the next stage of sewer expansion in the nitrogen-sensitive Stage Harbor watershed system. The town also recently signed an agreement with the Town of Harwich to further evaluate using a portion of the Chatham plant's treatment capacity with the Town of Harwich for its eastern portion in the shared Pleasant Bay watershed. The potential sharing of the facility is allowed by condition in the DRI approval. Chatham has also been a lead town in the effort to improve circulation in Muddy Creek with a culvert-widening project that would likely reduce nitrogen-removal requirements.

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COMMISSION

ORLEANS CWMP/MEPA/DRI STATUS

The CWMP provides a strategy for wastewater management to achieve reductions of nitrogen loading to restore and protect Orleans's marine embayments. The CWMP also addresses freshwater ponds and areas with septic system problems associated with frequent pumping, intensity of use, and mounded systems. It provides modest capacity for expanded residential housing in the commercial district. The plan also discusses opportunities for regional management, and includes an adaptive management approach for its implementation.

The CWMP proposes collection of an annual wastewater flow of 0.64 MGD from 2,800 properties to serve 53% of the town to meet its nitrogen management and water-quality needs. The project would be implemented in six phases over a 15- to 20-year period of implementation.

The phased sewer plan also accommodates septage and sludge handling and proposes five small package-treatment systems that will hasten nutrient removal for subwatersheds to Pleasant Bay as the plan is phased in. The phased plan also targets nutrient reduction through certain non-structural elements, including fertilizer control program, stormwater management, a water conservation program coupled with a wastewater flow- and load-reduction initiative, enhancement of embayment flushing rates, and land use controls.

The 2008 estimated cost of the CWMP is $150 million over the 15- to 20-year implementation period. The average cost to a homeowner is estimated at $2,600 per year. The town has adopted a cost-recovery policy that incorporates property tax assessment to pay for 80% of the costs and rely on betterments for the remaining 20% of the costs.

The town asked the Cape Cod Commission staff to participate in reviewing the needs assessment, alternatives assessment, and preferred alternative reports prior to their formal submittal. The town submitted the Draft EIR/ENF for formal review in 2009. Staff prepared and presented reports to the Cape Cod Commission, which forwarded comments to the MEPA office. The town received its MEPA certificate on the Final EIR and Cape Cod Commission DRI approval in 2011. The town has since engaged independent consultants to review the use of alternative sewer collection technologies and the MEP findings about the Nauset Marsh. The town has received significant input from the community as the board of selectmen considers its appropriate next steps.

As part of its CWMP process, Orleans took advantage of a Cape Cod Water Protection Collaborative grant to examine potential cost savings that could be realized if the planned Orleans wastewater facility were shared with the towns of Brewster and/or Eastham. The resulting study, entitled Wastewater Regionalization Study: Orleans-Brewster-Eastham was released in December 2009. The study identified a potential 6–9% savings in capital costs, and an 18–25% savings in operation and maintenance (O&M) costs resulting from a shared facility.

The Orleans CWMP DRI approval contained several conditions related to the potential of operating the Orleans facility as a shared municipal facility. The Town of Orleans agreed to meet with Brewster and Eastham representatives to discuss potential regionalization options and report to the Commission on the status of those discussions. The DRI decision also directs the Town of Orleans to keep options open for sharing the proposed facility, as well as disposal capacity at the facility, for a finite period of time. The intent of this condition was to create an opportunity for the three towns to pursue a shared facility, while allowing Orleans to proceed with its single town plan in a reasonable time frame.

Another regional issue raised by the Orleans CWMP was that the proposed Orleans wastewater facility will discharge into the Nauset Marsh system, which has assimilative capacity for nitrogen. The Town of Brewster expressed concern about the potential for Orleans to use up this assimilative capacity, leaving Brewster with fewer disposal alternatives as it develops its own wastewater management plan. The DRI decision capped the amount of assimilative capacity that may be used by Orleans in order to address this concern.

BARNSTABLE CWMP/MEPA/DRI STATUS

The Town of Barnstable is working on a town-wide nutrient management plan that will provide the basis of the town's CWMP. The town completed the MEPA/DRI review process for what is known as the Wastewater Facility Plan (WWFP) in 2007 for upgrades and expansion of the Hyannis Water Pollution Control Facility (WPCF). That project began in 1988 to evaluate issues associated with the town's existing facility and sewer needs that were completed in 1993. The WWFP resolved wastewater disposal issues relative to wastewater disposal site capacity and identified nine areas of concern (AOCs) for sewer hook-up. The approval conditions

required an Adaptive Management Plan for monitoring conditions around the wastewater facility as it approaches a discharge rate of 3.7 MGD prior to attaining its design capacity of 4.2 MGD. The additional 0.5 MGD may require the use of an approved remote site known as the Route 132 site. The DRI conditions also included the scope for the nutrient management plan and provisions for continuing sewer expansion under the WWFP while acknowledging the nutrient management issues.

The town has implemented the upgrades at its present facility and has completed a sewer extension project for the Stewart's Creek area. Plans to sewer the Lake Wequaquet area were not approved by the town due to cost, unclear objectives, and segmentation from a town-wide comprehensive plan.

The town reformulated a citizens advisory committee for wastewater planning and has been working on the nutrient management plan/ CWMP. It was submitted as an Alternatives Screening Analysis DEIR/ ENF for joint MEPA/DRI review in May 2012. The Needs Assessment and Alternatives Screening Analysis reports conclude with five alternative plans, not including the no-action alternative. Each alternative assumes a portion of the town will remain on Title 5 systems where nutrient removal is not required, and that remote recharge sites for treated effluent will be needed. The alternatives include a totally decentralized solution; a decentralized solution with some larger facilities; and centralized alternatives with either a single town plant or more than one. Because the Hyannis WPCF is located in a zone of contribution to public water supply (Zone II) and would require expensive total organic carbon (TOC) removal options, the CWMP also includes ocean outfall as an alternative as well as the alternative of abandoning existing public water supply wells.

The MEPA certificate scope for the Final EIR included extensive comments and significant additional work to resolve them. One component of the MEPA certificate is to engage in a targeted-watershed approach. The Commission is presently working with Barnstable and Yarmouth on developing a targeted-watershed scope for the Lewis Bay watershed. The Commission and the town have also discussed the use of the Watershed MVP tool to evaluate targeted-watershed approaches for Three Bays. The town's wastewater committee is presently considering the next appropriate steps.

YARMOUTH - CWMP/MEPA/DRI STATUS

The Town of Yarmouth's wastewater committee began its work in 2003. In 2010 the town submitted its Draft EIR/CWMP. The draft CWMP targeted areas that would require wastewater collection to restore water quality in the Lewis Bay and Parkers River watershed, and for dealing with the constraints of Title 5 on economic redevelopment of the Route 28 area. The town's plan included approximately 125 miles of sewer lines and the collection of 2.75 MGD of wastewater to be treated at a single facility in the Parkers River watershed. The project would ultimately serve 9,580 properties in 2035. Phase 1 of the plan would begin with the treatment facility and main trunk line sewer to serve Route 28 and portions of the Parkers River and Lewis Bay watershed.

The town submitted its FEIR in July 2011, but did not complete the DRI process before going to September 2011 Town Meeting to seek Phase 1 design and construction funds. Phase 1 through Phase 5 of Yarmouth's CWMP was scheduled to be implemented over a 25-year period. The estimated cost of this total plan was $275 million. The first phase had an estimated cost of $55 million. Town Meeting did not approve the expenditure. The town withdrew the CWMP from the DRI review process and is evaluating the next appropriate steps.

Yarmouth officials have met with Cape Cod Commission staff and Barnstable officials to discuss the scoping of a targeted-watershed approach for Lewis Bay.

CAPE COD COMMISSION

CWMP ACTIVITIES OUTSIDE THE MEPA/DRI REVIEW PROCESS

SANDWICH

The Town of Sandwich has established a water quality committee to oversee water quality and wastewater planning efforts. The committee developed a scope of work for a Comprehensive Wastewater Management Plan and submitted the scope under the Sagamore Lens Natural Resource Damages Assessment related to past groundwater contamination at the Textron facility at the MMR. The town received an award of $400,000 for its water/wastewater plan. The town completed a comprehensive needs assessment and also an interim wastewater solutions plan to accommodate economic development in the South Sandwich Village Center (often referred to as the Golden Triangle area).

A private developer is presently working on a development project that includes a public-private wastewater component involving the construction of a facility that would accommodate the private project and a certain amount of general public wastewater need.

The project is moving through the joint MEPA/DRI regulatory review process. The town has also been participating in discussions at the MMR about the potential use of the base's wastewater infrastructure as a regional option with the other Upper Cape towns. The sown is presently considering the appropriate next steps.

HARWICH

The Town of Harwich established a water quality committee, which began to coordinate both fresh and marine water sampling. The committee is also responsible for the Town of Harwich wastewater planning effort, which consists of developing a CWMP and participating in the Alliance for Pleasant Bay. The Harwich efforts were on hiatus while waiting for the Massachusetts Estuaries Project (MEP) to complete the technical reports on the Herring River and several of the south-side embayments. The MEP reports were received by the town in 2010–2012. The town has submitted an expanded ENF and anticipates participating in joint MEPA/DRI review with the Cape Cod Commission.

The CWMP includes options for regional infrastructure with the Town of Chatham for the East Harwich economic development area of town. The town has recently signed an agreement with the Town of Chatham to evaluate an option to use Chatham's wastewater treatment plant capacity to treat wastewater from East Harwich are in the shared Pleasant Bay Watershed. Harwich is also the lead town in a shared effort to improve circulation in Muddy Creek with a culvert-widening project that would likely reduce nitrogen-removal requirements. The town is moving forward to its next appropriate steps.

DENNIS

The Town of Dennis has been working through the Dennis Water District on wastewater planning issues. The district completed the fundamental portions of a needs assessment. The town recently received the MEP technical reports for nutrient management numbers for the Herring River, Swan Pond, and Bass River. Dennis has identified a number of areas that may require sewer for nutrients and for constraints of Title 5 on economic redevelopment of Dennisport. The district filed and passed legislation to become the Dennis Water and Sewer District. The district and the town are considering the next appropriate steps for wastewater planning.

BOURNE

The Town of Bourne recently completed a targeted wastewater planning effort for the Buzzards Bay downtown area. A portion of Buzzards Bay is sewered and the wastewater is conveyed to Wareham for treatment and disposal. The Wareham portion is limited to 200,000 gallons per day.

The Cape Cod Commission worked with the Town of Bourne to develop a wastewater and water supply report for Buzzards Bay. The report provided the town with a detailed assessment of the needs, alternatives, facility siting, and estimated costs of providing wastewater infrastructure to support the revitalization of Buzzards Bay. The town voted to approve the report's recommendations to pursue the appropriate next steps to obtain in-house expertise to guide the project and to conduct necessary steps for siting and infrastructure evaluations.

CAPE COD
COMMISSION

The Town of Bourne does not have MEP technical reports for Sequetegue, Pocasset, or Buttermilk Bay to pursue meaningful wastewater assessments for the other portions of town.

EASTHAM

The Town of Eastham completed a town-wide needs assessment. The needs assessment concluded that a new public water supply system to protect the public health was an overriding concern. Town Meeting did not approve the expenditure of funds for the planned water system. The Town of Eastham is close to concluding the new-source approval process for several gravel-pack well sites that were part of the proposed water system.

Eastham is actively pursuing the protection and restoration of its freshwater ponds. The town has completed a town-wide assessment and is pursuing in-pond restoration efforts.

Eastham shares the watershed to Town Cove with Orleans and has signaled a willingness to have further discussions with the Town of Orleans about potential opportunities to share the proposed wastewater treatment facility in Orleans. The town is considering the next appropriate steps.

WELLFLEET

The Town of Wellfleet completed a draft of its CMWP Needs Assessment and Alternatives Analysis reports in June 2012. The objectives of the CWMP are to protect and enhance the ecosystem of Wellfleet Harbor, promote aquaculture-based water quality management solutions, identify low-cost and sustainable remedies, develop least-cost alternatives and, only as a final resort, engage in structured solutions. The CWMP process has allowed Wellfleet to pursue and implement pilot aquaculture solutions resulting in significant increases in shellfish harvest. The pilots have a well-structured monitoring component, and the planning process has assembled the appropriate information for the town to make informed decisions.

TRURO

The Town of Truro approved funds for a Comprehensive Water Management Plan, acknowledging that protection of private-well drinking water is a paramount importance, and established a water resources oversight committee. The CWMP kicked off in 2012, will assemble existing data, and will develop a GIS program to evaluate land and water data, historic septic-system management information, and key areas for further analysis and characterization. The town has held a series of workshops since it began this work.

BREWSTER

The Town of Brewster began its CWMP process in 2009. The town chose to pursue an Integrated Water Resources Management Plan (IRWMP) because it wanted to closely evaluate drinking water and freshwater pond issues in addition to coastal water. The Draft IWRMP - Phase II report was issued in November 2012. The report recommends a number of alternatives for coastal nitrogen reduction in the Pleasant Bay Watershed, including innovative/alternative (I/A) and cluster systems, fertilizer reduction, irrigation wells to recycle and reduce groundwater concentrations, permeable reactive-barrier technologies, and alternative toilets.

The town is continuing its efforts for drinking water protection through its bylaws and the Brewster Water Protection District of Critical Planning Concern. A number of specific opportunities for stormwater treatment are identified with conceptual designs, and freshwater pond-protection strategies are recommended. The town is looking to secure funding for Phase III of the IRWMP and is implementing a public outreach component of the plan as it evaluates its next appropriate steps.

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Next Appropriate Steps

All Cape Cod towns are engaged, at some stage, in the wastewater planning process. Over the last 10 years towns have relied upon the MEP-determined TMDLs that define the problem, and hired consultants that have applied conventional engineering designs to resolve it. The results, in many cases, have been conventional infrastructure projects that Town Meetings or leaders have rejected. In reaction, the towns are presently looking at alternative technologies, and attempting to re-focus on priority areas. As indicated in the previous CWMP synopsis, many towns are still working on their CWMPs as they consider their next appropriate steps.

Charting the Cape's next appropriate steps will involve establishing criteria for prioritizing watersheds for regional solutions. These criteria include watersheds to coastal waters that have:

- severely impaired water quality;
- an exceptional amount of nitrogen overloading;
- high percentage of removal required to restore water quality;
- the potential use of existing infrastructure as a fundamental building block; and
- are shared between one or more towns.

COMMON ELEMENTS AND NEEDS

A number of common elements and needs can be capitalized on as the region moves forward in developing targeted watershed plans for water quality restoration.

Every CWMP can capitalize on several fundamental lessons learned from the last 10 years of experience:

- Limit growth in nitrogen-sensitive watersheds.
- Place disposal sites out of critical Zone II and nitrogen-sensitive watersheds.
- Identify non-structural alternatives.
- Sewer the densest areas, regardless of town lines.

- Employ adaptive management plans to measure ecosystem response.
- Regionalize treatment and operating contracts for operations & maintenance.
- Capitalize on natural attenuation.
- Enhance the program regarding non-nitrogen Title 5 needs (for example, for public health needs).
- Extend the life and capacity of existing systems.

TECHNICAL ASSISTANCE NEEDS

To achieve the goals of the RWMP, Cape Cod towns will need the appropriate resources and technical services, including the following:

WATER RESOURCE EXPERTISE

Developing cost-effective wastewater solutions relies on having a strong technical command of the Cape's water resources. Every solution depends on understanding the resources, the data that describe them, and the regulations that protect them, and having the tools to better manage them. Targeted watershed projects to reduce nitrogen will need to evaluate a range of collection, treatment, and on-site technology scenarios. As a result of the Cape Cod Commission's effort to develop an RWMP, a number of tools will provide a better approach to wastewater planning, including regionally consistent GIS data layers; technology cost comparisons; Watershed MVP (Multi-variant Planner), an interactive map-based nitrogen and infrastructure cost calculator; a Cape-wide infrastructure cost estimate; a cost model that projects long-term user costs; and a GIS site-screening matrix for both green infrastructure and wastewater disposal sites. As they are developed, these tools will be made available to help the towns identify their next appropriate steps.

TECHNOLOGY AND ENGINEERING EXPERTISE

Finding appropriate, acceptable, and effective treatment and collection and on-site technologies requires a solid command of conventional and

alternative technologies. This includes costs, understanding prior use and the ramifications of long-term operation and management, and understanding effectiveness for water quality restoration. Innovative technologies will need to be proved feasible for widespread use and will require focused piloting and flexible permitting. Conventional technology will need to be proved for both short- and long-term advantages. The Barnstable County Septic System Test Center at the MMR is a fundamental facility for on-the-ground testing; however, additional resources for engineering and technology assessment are necessary.

DISPOSAL SITE ASSESSMENTS

Selecting suitable locations and options for disposal of treated effluent is a serious challenge for Cape Cod, given its sole source aquifer and sensitive water resources. A regionally consistent database is essential for screening potential sites. Groundwater models to evaluate the potential impacts to downgradient receptors, and groundwater mounding and hydrologic balance need to be applied. The application and constraints of MassDEP regulation requiring the use of advanced treatment technologies to remove trace amounts of compounds of emerging concern from facilities located anywhere in a Zone II requires additional review. A uniform feasibility assessment of the ocean outfall option needs to be crafted and a use of regional facilities, such as the MMR, requires better definition.

ADAPTIVE MANAGEMENT

Any successful project—whether it is interim, long-term, local or regional, alternative or conventional—will require an adaptive management process that monitors progress and performance and allows managers, regulators, and stakeholders the flexibility to modify their approaches. While the Cape Cod Commission has developed several Adaptive Management Plans in cooperation with towns that have recently completed their CWMP reviews, new technologies will require regulatory flexibility to allow them and resources to implement them. Adaptive management may result in the review of new technologies where more-traditional technologies have been previously identified.

For more information on future public education resources, regional collaboration opportunities, community engagement, and Cape-wide advocacy efforts, see the RWMP sections on Watershed Solutions and Tools and Resources.