

Local Planning Efforts

Barnstable

The Cape Cod Commission and the Town of Barnstable met and discussed the use of WatershedMVP to evaluate targeted watershed approaches for each of the watersheds in which they have jurisdiction. In 2015, the town reformulated its Citizen's Advisory Committee (CAC) for wastewater planning to better address local needs. In addition to local participation, the newly formed committee (the Water Resources Advisory Committee or WRAC) includes state and regional representatives. Town staff provided modifications to Commission-developed watershed scenarios and presented those scenarios to their WRAC for review and discussion. Those scenarios are included in this report.

The Town of Barnstable operates the Hyannis Water Pollution Control Facility (WPCF), located off Bearses Way in Hyannis, which is the primary wastewater treatment facility serving approximately 2,900 properties in Hyannis and Barnstable village. The treatment facility has been upgraded and permitted to treat additional flows up to a total of 4.2 million gallons per day (MGD), upon meeting requirements of an adaptive management plan approved by the Commission in 2007. Property along Route 132 was acquired by the town in 2002 to potentially accommodate future disposal needs. The site is approved under a 2006 Massachusetts Environmental Policy Act (MEPA) certificate to discharge up to 0.5 MGD. The site is not presently in use. However, a force main and sewer has been extended to the site from the WPCF.

The WPCF treats an average daily flow of 1.46 MGD and a maximum monthly average flow of 1.94 MGD. Treatment performance has averaged 5 milligrams per liter (mg/L) total nitrogen in the treated effluent and the facility has a discharge limit of 5 mg/L under the 2007 Development of Regional Impact (DRI) decision and a limit of 10 mg/L under a Groundwater Discharge Permit (GWDP). The facility is also equipped with sludge thickening, storage and dewatering facilities sized for the current process conditions.

The Town of Barnstable also operates two smaller facilities – the Marstons Mills Wastewater Treatment Facility (WWTF) and the Red Lily Pond Cluster System. The Marstons Mills WWTF is limited to a discharge flow of 42,900 gallons per day (GPD) and is intended to service the Barnstable United Elementary School and the Village at Marstons Mills affordable housing development. The Red Lily Pond Cluster System currently serves 17 homes. According to the comprehensive wastewater management plan (CWMP) approved in 2007, no performance sampling of the system occurs and the system is assumed to produce comparable effluent to any conventional single family septic system.

In addition to municipally-owned facilities, there are two privately-owned treatment facilities treating wastewater from the Cotuit Landing shopping plaza and the Cape Regency nursing and

rehabilitation facility. These facilities provide high levels of wastewater treatment. The treatment facility at Cotuit Landing was designed with additional treatment capacity beyond the expected needs of the shopping plaza for potential treatment of flows from neighboring properties.

Barnstable is working on a town-wide nutrient management plan that will provide the basis of its CWMP. The plan will address nitrogen and other needs in watersheds draining to Three Bays, Centerville River, and Lewis Bay. A nitrogen total maximum daily load (TMDL) for Barnstable Harbor will be drafted by MassDEP in the coming years after data collection, analysis, and modeling have been completed. The MEPA certificate scope for the Final Environmental Impact Report (FEIR) includes engagement in a targeted watershed approach, consistent with the 208 Plan Update.

In the fall of 2014, Barnstable adopted local nitrogen-oriented fertilizer management regulations consistent with the Cape-wide Fertilizer Management District of Critical Planning Concern (DCPC).

In 2015, the Town submitted a Statement of Interest to the US EPA for a hydrogeologic site characterization as an initial step toward piloting a permeable reactive barrier in the town. One of three sites proposed by the Town was selected for characterization. The work was completed in 2016. The draft report is presently being reviewed by the Town.

Also in 2015, the Town agreed to work with Mashpee and Sandwich on approaches for the Popponesset Bay watershed and a potential development of a watershed permit. It is expected that these three towns will collaborate on the first watershed permit in the region in close coordination with the Cape Cod Commission and the Massachusetts Department of Environmental Protection.

In June 2016, Barnstable received \$28,850 from the Commission to fund upgrades to three stormwater treatment BMPs. Funding was part of \$142,149 in local grants made available to communities by the Commission in support of 208 Plan implementation.

Bourne

The Town of Bourne completed a targeted wastewater planning effort for the Buzzards Bay downtown area. A portion of the Buzzards Bay area is sewered and up to 200,000 gallons per day (gpd) of wastewater is conveyed to Wareham for treatment and disposal. Bourne is limited to this flow through its agreement with the Town of Wareham.

The Cape Cod Commission worked with the Town of Bourne to develop a wastewater and water supply report for Buzzards Bay in 2012. The report provided the town with a detailed

assessment of the needs, alternatives, facility siting options, and estimated costs of providing wastewater infrastructure to support the revitalization of the Buzzards Bay area.

In March 2013 the town hired a wastewater coordinator and soon after hired a contractor to determine if either of two identified sites – Queen Sewell Park and land behind the Bourne Veterans Memorial Community Center – is suitable for wastewater disposal. The Queen Sewell Park site was determined to be a suitable site to consider moving forward.

Town staff is currently coordinating with the Cape Cod Commission on next steps for the Buzzards Bay area, in particular, how to manage the utilization of the Queen Sewell Park disposal site. The Commission and the Cape Cod Water Protection Collaborative met with the Bourne Board of Selectmen in December 2015 to develop a plan for completing watershed reports and launch a financial review to assist the town with development of a wastewater funding program.

In addition, a public-private partnership in the Cataumet area is moving forward. The owner of Kingman Marina has constructed a neighborhood scale wastewater treatment facility to service the marina, 15 new townhomes adjacent to the marina, and about 52 existing homes in the adjacent Cedar Point neighborhood. In exchange for capacity at the facility for the Cedar Point neighborhood the town allowed for increased density in the new townhome development.

Most recently, the town received a grant through EPA's Southeast New England Program (SNEP) for coastal watershed restoration, in collaboration with the Buzzards Bay Coalition and neighboring towns to identify options for treatment in the Buttermilk Bay watershed.

Commission staff met with Bourne staff to review and discuss watershed scenarios and the town requested that the Commission complete watershed reports on their behalf.

At the Spring 2017 Town Meeting, Bourne voted to fund, as part of the Capital Improvements Plan, \$335,000 to continue investigations related to effluent disposal for the planned Buzzards Bay Wastewater Facility.

Brewster

In 2009, the Town of Brewster formed a Comprehensive Water Planning Committee (CWPC). The CWPC was charged with coordinating the efforts of the Town staff and consultants. The Town chose to pursue development of an Integrated Water Resources Management Plan (IRWMP) because it wanted to closely evaluate drinking water and freshwater pond issues in addition to coastal water quality impairments.

Phase I of the IRWMP was completed in 2011. As a result, the Town initiated a number of intermediate projects to expand the Town's data and understanding of water quality. In January

2013, Phase II of the IRWMP was issued. The report recommends several 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 barriers, and alternative toilets.

The Town of Brewster submitted the IWRMP to the Cape Cod Commission for a 208 consistency review. The goals of Phase III are to:

- Evaluate the Pleasant Bay nitrogen management alternatives identified in the Phase II report and select a preferred plan with recommendations for what Brewster needs to do to restore water quality within Pleasant Bay;
- Finalize recommended stormwater regulations developed in Phase II;
- Encourage proper management of stormwater, septic systems, fertilizers and other potential pollutants that impact Brewster's Ponds (e.g., new regulations);
- Continue with current outreach activities (e.g., website, brochure);
- Facilitate communication between the CWPC, the Cape Cod Commission, the public, and with other Town boards and agencies involved in the project.

The Town is continuing its efforts toward drinking water protection through bylaws and the Brewster Water Protection District of Critical Planning Concern (DCPC). A number of specific opportunities for stormwater treatment have been identified and conceptual designs have been developed. There are a number of freshwater pond protection strategies that are also recommended.

In the fall of 2014, Brewster adopted local nitrogen-oriented fertilizer management regulations consistent with the Cape-wide Fertilizer Management DCPC.

Brewster is a member of the Orleans, Brewster and Eastham Ground Water Protection District which, until June 1, 2016, operated the Tri-Town Septage Treatment Facility in Orleans. The member towns voted to decommission and remove the facility, which is expected to take place in 2017.

In 2015, the Town completed a Pleasant Bay Nitrogen Alternatives Analysis report describing a recommended plan of non-traditional technologies to reduce nitrogen loading from existing development. Three of these approaches have already been implemented and reduce the nitrogen input from Brewster's portion of the Pleasant Bay Watershed by approximately 50%. They include fertilizer reductions at the Town-owned Captains Golf Course, the recapture of nitrogen through the golf course irrigation wells, and the adoption of a fertilizer bylaw. In addition, shellfish propagation was identified in the report as an option to meet the remaining load reduction.

Since 2015, the Town has worked with its other watershed Towns through the Pleasant Bay Alliance to evaluate shellfish aquaculture and propagation activities that the Town cannot take on its own given its limited access to the Bay. The Town facilitated discussions on this topic in

the fall of 2015 through a District Local Technical Assistance (DLTA) grant from the Cape Cod Commission. No immediate opportunities to incorporate shellfish management into the Town's plans were identified, however, Brewster remains open to future cooperation with its neighboring Towns to increase shellfish propagation in Pleasant Bay. Ongoing work with the Pleasant Bay Alliance and Brewster's three neighboring communities in the Pleasant Bay watershed resulted in an assessment of the combined effect of the four towns' wastewater and nitrogen management plans. This has resulted in the development of the Pleasant Bay Composite Nitrogen Management Analysis.

The Town is currently investigating the potential to utilize nitrogen-reducing leach field technologies to meet the remainder of its nitrogen obligation for Pleasant Bay. These systems are being tested at the Massachusetts Septic System Test Center. A new Board of Health regulation could be used to implement the construction of these systems, perhaps at the time of a property transfer when a septic system inspection is required under the State Environmental Code Title 5 (314 CMR 15.00).

In a June 2016 letter to the Commission, Brewster provided an update on watershed planning. The information in this letter, along with information from the IWRMP, was used to inform the watershed reports for Brewster watersheds.

Chatham

The Chatham Comprehensive Wastewater Management Plan (CWMP) of 2009 is the first town-wide plan on Cape Cod to be completed that incorporates the state and federal total maximum daily loads (TMDLs) to restore coastal water quality for several large coastal embayments. The town completed the necessary treatment facility upgrades in 2010 and the main sewer trunk line construction in 2012. Phase II sewer expansions into the Stage Harbor watershed system were completed in Fall 2015.

The Chatham Wastewater Treatment Facility (WWTF), located on an 80-acre parcel on Sam Ryder Road, recently underwent a major upgrade as part of Phase 1 of the CWMP. The facility has a permitted capacity of 1.0 million gallons per day (MGD) (annual average) and 2.3 MGD (peak day) and two existing sand beds, which have been in operation for 35 years. The permit requires a discharge limit of 10 milligrams per liter (mg/L) with an annual limit of 9.132 pounds/year, which corresponds to an annual average discharge of 3 mg/L.

The upgrade to the WWTF included several improvements to its sludge processing capabilities. Dewatered sludge is discharged and taken off site for disposal. The site also accepts septage collected from Chatham parcels only.

In 2013 Chatham signed an agreement with the Town of Harwich to further evaluate the possibility of using a portion of the treatment capacity in Chatham to serve the eastern portion

of Harwich, which is part of the shared Pleasant Bay watershed. The potential sharing of the facility is allowed by condition in the Development of Regional Impact (DRI) approval of the Chatham CWMP.

In the fall of 2014, Chatham adopted local nitrogen-oriented fertilizer management regulations consistent with the Cape-wide Fertilizer Management District of Critical Planning Concern (DCPC).

Chatham has also been a lead town, along with Harwich, in the effort to improve circulation in Muddy Creek with a culvert-widening project that would likely reduce nitrogen removal requirements. The project received local, state, and federal support and was completed in May 2016. In addition, the town was a recipient of a technical assistance grant through EPA's Southeast New England Program (SNEP) in support of a stormwater best management practice (BMP) constructed in the Oyster Pond watershed in 2016.

Through the Pleasant Bay Alliance, the Town of Chatham is working with its three neighboring communities in the Pleasant Bay watershed to assess the combined effect of the four towns' wastewater and nitrogen management plans. This has resulted in the development of the Pleasant Bay Composite Nitrogen Management Analysis.

At the Spring 2017 Town Meeting, Chatham voted to fund design and construction of Phase 1D of the CWMP, a cost of \$31,000,000, and to execute an IMA with the Town of Harwich to accept wastewater flow from Harwich to be treated at the Chatham WWTF.

Dennis

In August 2015, Dennis, led by its Comprehensive Wastewater Management Task Force (CWMTF) and its consultant, completed its Water Quality Evaluation and Mitigation Alternative Study Final Report. The report provides an updated needs assessment, as well as potential nitrogen management scenarios. The scenarios include locations and layouts of offsite wastewater solutions and other non-traditional nitrogen management technologies. Four scenarios were chosen for more detailed comparison and analysis. During the fall of 2015 and winter of 2016, Dennis evaluated these four scenarios, as well as additional community partnership scenarios with the neighboring towns of Harwich and Yarmouth. The Massachusetts Estuaries Project (MEP) nitrogen reduction goals were the primary factor in the scenarios, but economic development goals and protection of non-nitrogen areas of concerns also shaped the chosen scenario (scenario 6A from the Water Quality Evaluation and Mitigation Alternative Study Final Report). This recommended plan proposes to include a minimum of six phases that would occur over a 30-year period.

All proposed scenarios in Dennis, including scenario 6A, include combinations of traditional sewerage methods with centralized treatment facilities, as well as non-traditional nitrogen

management options including aquaculture, and permeable reactive barriers (PRB). Furthermore, the baseline of each scenario is the assumption that Dennis will implement stormwater and fertilizer management programs. As suggested in the 208 Plan Update, up to a 25% nitrogen reduction credit can be obtained by towns that implement stormwater and fertilizer management programs to reduce nitrogen contributions to each watershed. In addition to implementing the stormwater and fertilizer management program, scenario 6A includes a hybrid sewer collection system with a mix of gravity, pressure and vacuum sewers and one centralized wastewater treatment facility. The recommended plan meets the MEP nitrogen reduction goals and also provides sewers to all of Dennis's planning districts and several areas of concern (AOCs). It also allows flexibility to implement partnership options. In the future, Dennis may implement sewerage in additional areas identified under Scenario 7A in the Water Quality Evaluation and Mitigation Alternative Study.

Since submission of the 208 Plan Update, the Town of Dennis and their consultant met with Cape Cod Commission staff to discuss potential watershed scenarios and the use of the decision support tools generated through the 208 planning process. Cape Cod Commission staff participated in a November 2015 wastewater forum planned by the town and sponsored by the Board of Selectmen and Wastewater Task Force, to promote an understanding of the wastewater issues in Dennis, what is being done and what needs to be done. The forum was geared toward the local Financial Committee, Capital Committee, Planning Board, Conservation Commission, Economic Development Committee, Water Quality Advisory Committee and any interested citizen. It is anticipated the town will submit a plan for regulatory review this year.

In June 2016, Dennis received \$15,000 from the Commission to evaluate effluent recharge sites and possible community partnerships. An additional \$35,000 was provided for the towns of Dennis, Harwich and Yarmouth for a regional treatment facility cost study. Funding was part of \$142,149 in local grants made by the Commission in support of 208 Plan implementation.

At the Spring 2017 Town Meeting, Dennis voted to transfer \$300,000 from the Solar Special Revenue Fund to the Wastewater Stabilization Fund and to appropriate \$125,000 to establish a Swan Pond Shellfish Program.

In June 2017, Dennis submitted their CWMP to the Massachusetts Environmental Policy Act Office for review.

Eastham

The Town of Eastham completed a town-wide needs assessment in March 2009. The needs assessment concluded that a new public water supply system to protect public health was an overriding concern.

The spring 2014 Town Meeting approved \$45.8 million to fund a scaled-back version of the full town-wide water system. The Cape Cod Commission approved this project as a Development of Regional Impact (DRI) in February 2015.

In May 2015 Eastham staff, along with the town's consultant, met with Commission staff to discuss the 208 planning process, decision support tools, and scenario development for their watersheds, the beginnings of a shift toward wastewater planning after a necessary focus on securing a clean drinking water supply for residents.

Eastham shares the watershed to the Nauset estuary with the Town of Orleans and is willing to have further discussions about potential opportunities to share the wastewater treatment facility proposed in the approved Orleans Comprehensive Wastewater Management Plan (CWMP). The town sent a representative to each of the Orleans Water Quality Advisory Panel meetings, as it discussed potential scenarios in 2014 and early 2015. The Town of Eastham is actively pursuing the protection and restoration of its freshwater ponds. The town completed a town-wide assessment and is pursuing in-pond restoration efforts. Alum treatments for Herring Pond and Great Pond are complete and others are under consideration.

In the fall of 2014, Eastham adopted local nitrogen-oriented fertilizer management regulations consistent with the Cape-wide Fertilizer Management District of Critical Planning Concern (DCPC).

Eastham is a member of the Orleans, Brewster and Eastham Ground Water Protection District which, until June 1, 2016, operated the Tri-Town Septage Treatment Facility in Orleans. The member towns voted to decommission and remove the facility, which is expected to take place in 2017. In addition, the town is working with neighboring towns through the Pleasant Bay Alliance.

Eastham staff is working with the Commission and the Cape Cod National Seashore on a number of other projects to address nitrogen in their watersheds. The Commission is assisting the town to modify a design for stormwater management along Route 6 and to conduct hydrogeologic modeling at a previously identified site for a permeable reactive barrier.

Eastham submitted conceptual watershed scenarios based on discussions with the Commission, use of available decision support tools, and ongoing local water quality planning efforts.

At the Spring 2017 Town Meeting, Eastham voted to fund wastewater planning and pilot projects in the amount of \$150,000, as part of its Capital Plan.

Falmouth

The Town of Falmouth continues to implement the recommendations of its Water Quality Management Committee and its South Coast Watersheds Comprehensive Wastewater Management Plan (CWMP)/Targeted Watershed Management Plan. In addition, it is partnering with the Town of Mashpee and the Cape Cod Water Protection Collaborative on the analysis of flushing of the Moonakis System in Waquoit Bay.

The Town of Falmouth completed the Massachusetts Environmental Policy Act (MEPA)/Development of Regional Impact (DRI) process for the West Falmouth Harbor Wastewater Facilities Plan (WWFP) in 2001. The WWFP focused on a necessary upgrade to the existing treatment facility in order to achieve better nutrient-removal rates. The sensitivity of West Falmouth Harbor to nitrogen loading was not well understood when the facility was permitted in the 1980s. The upgrade is now complete and water quality conditions within the groundwater have improved significantly. However, the disposal location has limited capacity due to sensitivity of the estuary to nitrogen inputs.

The Falmouth wastewater treatment facility (WWTF) was upgraded from a lagoon treatment process to include Sequencing Batch Reactors (SBR) and denitrification filters in 2005. The facility is currently permitted with an effluent flow restriction of 0.8 million gallons per day (MGD). The permit limits flows to the WWTF to 0.23 MGD inside the West Falmouth Harbor watershed and 0.57 MGD outside the West Falmouth Harbor watershed. On January 10, 2014, the town received a Certificate of Adequacy from the Secretary of Energy and Environmental Affairs to sewer the Little Pond Service Area and discharge up to 260,000 gallons per day (GPD) at a new disposal site north of the existing beds and outside the West Falmouth Harbor watershed.

The Cape Cod Commission reviewed an Environmental Notification Form (ENF) for the Town of Falmouth CWMP for the South Coastal Watersheds in 2007. The ENF included the Needs Assessment Report and Alternatives Screening Report for Little Pond, Great Pond, Green Pond, Bourne Pond, Eel Pond, and Waquoit Bay. This draft CWMP included collection of wastewater in the south coastal areas, generally south of Route 28, treatment at a proposed regionally-shared facility at Joint Base Cape Cod, and effluent disposal through injection wells. The town formulated a new internal review committee, the Water Quality Management Committee (WQMC), to evaluate additional alternatives, and in 2012 submitted a draft CWMP/Draft Environmental Impact Report (DEIR) for joint MEPA/DRI review.

The 2012 draft CWMP/DEIR represented a significant change from the screened alternatives presented in the 2007 ENF. In addition to plans for sewerage specific portions of the south coastal estuaries and upgrading the West Falmouth treatment facility and discharge options, the DEIR included specific opportunities for innovative on-site technologies and non-discharging systems, tidal flushing, aquaculture, permeable reactive barrier demonstration projects, and

non-structural nitrogen reduction strategies consisting of fertilizer controls and stormwater management.

Through its review, the Commission supported the additional evaluation of Joint Base Cape Cod as a potential shared regional facility for the Upper Cape as one of the town's alternatives.

The town implemented the recommendations of the WQMC and approved \$2.77 million 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. Spring 2013 Town Meeting appropriated \$9 million to provide the design of the Little Pond watershed collection system, necessary facility upgrades, and pilot project implementation.

In January 2014, a MEPA Certificate of Adequacy was issued for the Falmouth South Coast Watersheds CWMP. The Commission approved the CWMP as a DRI in February 2014 with conditions to develop an adaptive management plan. Spring 2014 Town Meeting subsequently approved \$50 million to construct a targeted watershed approach for a Little Pond watershed collection system and implement the pilot projects over the next five years, concluding in 2020.

Members of the WQMC, town staff, and their consultants (Science Wares, Inc.) met with Commission staff to review watershed scenarios and provided input on the non-traditional approaches to be included.

In June 2016, Falmouth received \$24,299 from the Commission to support the Bourne Pond shellfish project and a sediment aeration project in Great Pond. Funding was part of \$142,149 in local grants made by the Commission in support of 208 Plan implementation.

Harwich

The Town of Harwich submitted its Draft Comprehensive Wastewater Management Plan (CWMP) for review in 2013 and its Final CWMP Single Environmental Impact Report (SEIR) in March 2016. The Massachusetts Environmental Policy Act (MEPA) Unit issued its certificate on May 13, 2016. Since 2007, Harwich wastewater planning efforts have been coordinated predominantly by the Wastewater Implementation Committee (WIC) and Board of Selectmen (BOS).

The recommended plan detailed in the CWMP was developed by the WIC and BOS working closely with their consultant and includes a core system of collection and conveyance utilizing two centralized treatment facilities. Implementation of the plan is phased over 40 years and was chosen as the preferred scenario because it allows for multiple effluent recharge sites in different watersheds, allows for easier phasing with adaptive management, presents a regional solution between the Towns of Harwich and Chatham (and potentially Dennis in the future), and reduces the overall size of the facilities in Harwich. Wastewater collection in the Pleasant Bay watershed

will be done through a community partnership with Chatham to treat wastewater generated and collected in the Pleasant Bay watershed at the existing Chatham treatment facility. Treated effluent would initially be recharged at the Chatham facility but may, in the future, be conveyed back to East Harwich for recharge depending on water quality results. Sewer system construction in the Pleasant Bay watershed is proposed to be completed over phases 2, 3 and 8, as defined in the CWMP.

Harwich is also a lead town, along with Chatham, in a shared effort to improve circulation in Muddy Creek (part of the Pleasant Bay watershed) with a culvert-widening project that is projected to reduce nitrogen removal requirements.

The CWMP allows infrastructure components to be implemented, results monitored and the later program phases adapted as needed. The plan incorporates recommended non-infrastructure program components, including fertilizer and stormwater management programs, potential land use changes, open space acquisition, and several community involved conservation and pollution reduction programs.

Through the Pleasant Bay Alliance, the Town of Harwich is working with its three neighboring communities in the Pleasant Bay watershed to assess the combined effect of the four towns' wastewater and nitrogen management plans. This has resulted in the development of the Pleasant Bay Composite Nitrogen Management Analysis.

At the Spring 2017 Town Meeting, Harwich voted to fund design of a portion of Phase 2 of the CWMP and the cost to implement the Chatham IMA and purchase capacity at the Chatham treatment facility for a total cost of \$9,035,000. In addition, Harwich voted to fund the Cold Brook restoration project (also part of Phase 2 of the CWMP) in the amount of \$2,000,000.

Mashpee

The Mashpee Comprehensive Wastewater Management Plan (CWMP) was scoped through a joint Massachusetts Environmental Policy Act (MEPA)/Development of Regional Impact (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." Also in 2007, the town completed a technology screening report, which was followed shortly by its draft alternative scenarios and site evaluation report in March 2008.

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 were reviewed and served as the basis for development of their preferred alternative. 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.

Following completion of the 208 Plan Update, the town incorporated non-traditional technologies into its CWMP. In April 2014, the Sewer Commission met with Cape Cod Commission staff to begin the discussion around filing its CWMP. The current draft plan includes a significant aquaculture undertaking and an adaptive management approach to achieving water quality goals. In September 2014, the Massachusetts Secretary of Energy and Environmental Affairs issued a certificate of adequacy for the Draft Environmental Impact Review (DEIR) for Mashpee's Comprehensive Watershed Nitrogen Management Plan. In the Summer of 2015, the Massachusetts Secretary of Energy and Environmental Affairs issued a final certificate for Mashpee's Comprehensive Watershed Nitrogen Management Plan. The plan is currently under review by the Commission, although the Commission has already notified the town that Phase I of its plan is consistent with the 208 Plan Update.

At the October 2015 Mashpee Town Meeting, the town voted to appropriate \$250,000 for shellfish propagation, \$32,500 as the first installment on a 3-year monitoring study associated with the shellfish project, funded a full time permanent water quality technician position, \$100,000 to reauthorize the Sewer Commission Facilities Study Account and hire a consultant to complete studies and develop a preliminary design for the connection of properties to existing treatment facilities, \$80,000 to support the development of inter-municipal agreements with neighboring communities, as well as authorized the use of town-owned land for the purposes of developing wastewater treatment facilities.

In October 2015, the town also reached out to Barnstable and Sandwich regarding approaches for Popponesset Bay and a potential watershed permit. It is expected that these three towns will collaborate on the first watershed permit in the region in close coordination with the Cape Cod Commission and the Massachusetts Department of Environmental Protection. To accommodate discussions with Barnstable and Sandwich regarding the watershed permit, a DRI extension of the Mashpee CWNMP review has been agreed upon.

In the fall of 2014, Mashpee adopted local nitrogen-oriented fertilizer management regulations consistent with the Cape-wide Fertilizer Management District of Critical Planning Concern (DCPC).

In June 2016, Mashpee received \$14,600 from the Commission for construction of a floating shellfish seed upweller system to grow quahog seed for initial implementation of their shellfish restoration plan. Funding was part of \$142,149 in local grants made by the Commission in support of 208 Plan implementation.

Mashpee has been working jointly with Falmouth to evaluate the Quashnet River/Moonakis River and anticipates receiving the SMAST Moonakis River report in June 2017. The report will consider improved flushing and shellfish/finfish habitat restoration.

At the Spring 2017 Town Meeting, Mashpee voted to fund monitoring of shellfish aquaculture in Popponesset Bay and Waquoit Bay in the amount of \$49,500. Amendments to the Town's nutrient control bylaw were also approved.

Orleans

The Orleans Comprehensive Wastewater Management Plan (CWMP) was approved by Massachusetts Environmental Policy Act (MEPA) and the Cape Cod Commission in 2011 and provides a strategy for wastewater management to achieve reductions of its share of nitrogen loading to restore and protect Orleans's coastal 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 and includes an adaptive management approach for its implementation.

The town received its MEPA certificate on the Final Environmental Impact Review (FEIR) and a Development of Regional Impact (DRI) approval in 2011. The town has since engaged independent consultants to review the use of alternative sewer collection technologies and the Massachusetts Estuaries Project findings about the Nauset Marsh. The town received significant input from the community as the board of selectmen considers its appropriate next steps.

The town appropriated \$1.045 million at the spring 2014 Town Meeting for engineering, planning and hydrogeologic studies necessary for the development of septage, wastewater, groundwater and stormwater management plans needed to maintain and protect the water resources of the town by integrating the CWMP with a new Adaptive Management Plan and components of the Cape-wide Section 208 Water Quality Management Plan.

The town established a Water Quality Advisory Panel (WQAP) that included diverse representation and professional facilitation, consistent with the 208 planning process. The WQAP established a consensus plan for moving forward that includes reduction, remediation, and restoration strategies and is expected to achieve a 40% cost savings over the original CWMP. In 2015, Town Meeting appropriated an additional \$1 million to further investigate potential disposal sites and locations for innovative remediation and restoration solutions identified in the consensus plan. Those investigations are underway. An additional \$691,000 was approved by voters in May 2016 to fund an Amended Water Quality Management Plan and associated Adaptive Management Plan. Development of those plans are in progress.



Orleans is a member of the Orleans, Brewster and Eastham Ground Water Protection District which, until June 1, 2016, operated the Tri-Town Septage Treatment Facility in Orleans. The member towns voted to decommission and remove the facility, which took place in May of 2016. Through the Pleasant Bay Alliance, the Town of Orleans has been working with their three neighboring communities in the Pleasant Bay watershed to assess the combined effect of the four towns' wastewater and nitrogen management plans. This has resulted in the development of the Pleasant Bay Composite Nitrogen Management Analysis.

In the fall of 2014, Orleans added phosphorus to its local fertilizer management regulations consistent with the Cape-wide Fertilizer Management District of Critical Planning Concern (DCPC).

Orleans requested that the Commission use the consensus plan scenarios from the WQAP as its watershed report submission.

In June 2016, Orleans received \$15,000 from the Commission for implementation of shellfish/aquaculture demonstration project in Lonnie's Pond. Funding was part of \$142,149 in local grants made by the Commission in support of 208 Plan implementation.

At the Spring 2017 Town Meeting, Orleans voted to fund continued implementation of its water quality management plan in the amount of \$3,733,660 and demolition of the Tri-Town Facility in the amount of \$870,000.

Provincetown

Provincetown completed a wastewater facilities plan (WWFP) in 2001. The plan dealt with the public health issues of failing septic systems and inadequate infrastructure for its commercial downtown area. The comprehensive plan was approved by state agencies through the Massachusetts Environmental Policy Act (MEPA) and by the Cape Cod Commission through Development of Regional Impact (DRI) review in 2001. The wastewater facility and phase 1 and 2 areas were subsequently built and are performing well. 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 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.

The Provincetown wastewater treatment facility (WWTF) is an advanced secondary treatment plant that is capable of treating a maximum daily flow (MDF) of 650,000 gallons per day (GPD), with discharge to four subsurface disposal beds at six locations along Route 6. Additional

upgrades may be required to increase the capacity to allow a MDF of 750,000 in the future, and will occur when required.

AECOM is currently under a 20-year design-build-operate (DBO) agreement with the Town of Provincetown to design, permit, construct and operate its wastewater collection, treatment, and disposal systems.

The current sludge management plan includes periodic removal from the Sequencing Batch Reactors (SBRs), storage for aeration and mixing, and hauling by a contractor for disposal at a facility in Cranston, RI.

Provincetown has also developed and is implementing a multi-year stormwater management program, with an eye toward managing stormwater runoff in the Commercial Street area. In recent phases of the program Commercial Street was reconstructed using porous pavement over a stone reservoir. Beach closures as a result of bacteria in stormwater runoff have decreased significantly since project implementation.

In the fall of 2014, Provincetown adopted local nitrogen-oriented fertilizer management regulations consistent with the Cape-wide Fertilizer Management District of Critical Planning Concern (DCPC).

Sandwich

The Town of Sandwich has an established water quality committee to oversee water quality and wastewater planning efforts. In October 2015 town staff and Sandwich's consultant met with Cape Cod Commission staff to discuss watershed planning, decision support tools, and scenario development for Sandwich watersheds. In the same month, Mashpee reached out to the town regarding approaches for Popponesset Bay, and a potential watershed permit, and agreed to participate with Mashpee and Barnstable in this shared effort. It is expected that Barnstable, Mashpee, and Sandwich will collaborate on the first watershed permit in the region in close coordination with the Cape Cod Commission and the Massachusetts Department of Environmental Protection.

Previously the committee developed a scope of work for a Comprehensive Wastewater Management Plan (CWMP) and submitted the scope under the Sagamore Lens Natural Resource Damages Assessment, related to past groundwater contamination at the Textron facility at Joint Base Cape Cod (JBCC). The town received an award of \$400,000 to conduct its water/wastewater plan and completed a comprehensive needs assessment, as well as an interim wastewater solutions plan to accommodate economic development in the South Sandwich Village Center.

The town spent several years working with a private developer on a project that included a public-private wastewater component for construction of a facility that would accommodate the private project, in addition to some public wastewater needs. That project will not be completed, but the town is again seeking a private partner to create new economic growth and to potentially participate in infrastructure development.

The town participated in discussions at JBCC about the potential use of its existing wastewater infrastructure as a regional option for the Upper Cape towns.

In February 2016, the Town of Sandwich requested a meeting with Commission staff to discuss watershed scenarios and potential modifications to watersheds in which Sandwich has jurisdiction. The town provided collection footprints and assumptions for a single treatment facility to serve all three watersheds (Popponesset Bay, Three Bays and Waquoit Bay), consistent with the Sandwich CWMP, and identified locations for non-traditional approaches, in addition to credits for stormwater and fertilizer reduction. The Town proposes a 25% fertilizer management credit and a 6.25% stormwater management credit. While the proposed interventions alone do not meet nitrogen allocations identified in Appendix 8C of the 208 Plan Update, the town expressed a preference to rely on nutrient trading or cost sharing to reduce the load allocated to the downgradient towns in the shared watersheds of Popponesset Bay, Three Bays and Waquoit Bay, where nitrogen reductions can be more cost effectively attained.

Truro

The Town of Truro approved funds for an Integrated Water Resources Management Plan (IWRMP), acknowledging that protection of private-well drinking water is of paramount importance, and established a water resources oversight committee. The IWRMP kicked off in 2012 with a focus on septic systems and stormwater runoff and their impact on drinking water and embayment water quality. The planning process seeks to assemble existing data, and develop a GIS program to evaluate land and water data, historic septic-system management information and key areas for further analysis and characterization.

The Water Resource Oversight Committee (WROC) and its consultant completed Phase I of the IWRMP in October 2014. Phase I of the report concluded that water samples from local wells show nitrogen levels are within safe levels. But some neighborhoods show concentrations have risen above the typical amount found in Truro. Phase II of the IWRMP began in March 2015. The focus of Phase II is to define potential threats to groundwater quality and solutions to protect against these threats. The WROC is also developing a presentation on Truro's water quality and groundwater protection as part of the Public Education and Outreach aspect of the IWRMP. The consultant presented the findings of the Collected Water Flow Data from Beach Point to the Board of Selectmen at their February 28, 2017 meeting. Based on the data collected and modeling, groundwater is mostly moving towards East Harbor, not Cape Cod Bay as previously studied. In June 2016, Truro received \$9,400 from the Commission to design

stormwater rain gardens adjacent to the Truro Library. Funding was part of \$142,149 in local grants made by the Commission in support of 208 Plan implementation.

The proposed project comprises site survey and final design of a stormwater treatment and infiltration project. The project will rely on enhanced soils and plantings to reduce nitrate transported by stormwater runoff before it percolates to the local aquifer.

Following construction, the WROC will sample water quality at or near the Library facility on an annual basis to monitor any changes in nitrate levels in groundwater. From these or other potential sources, the WROC would obtain annual samples from at least one nearby well on an annual basis for analysis for nitrate.

In June 2016, the Town signed an Agreement for a Project Management Plan (Scope of Work) with the US Army Corps of Engineers (USACE) that will build upon a study conducted in 1998 that evaluated restoring tidal flow within the Pamet River. The updated study will supplement the prior investigation by providing numerical model predictions to further define potential impacts with reintroducing tidal flow to the upper portion of the Pamet River. The goal of this study is to recommend an alternative that will restore flushing while avoiding impacts to residential septic systems, drinking water well and generalized flooding. Data Collection and groundwater sampling began in late Fall 2016 and is expected to continue through late Spring 2017.

At the Spring 2017 Town Meeting, Truro appropriated \$3,700,000 for the repair and replacement of the culvert which connects Cape Cod Bay with East Harbor ('Pilgrim Lake') in North Truro, including design, permitting and construction. The project has environmental benefits such as increasing tidal flushing to improve water quality, wetland restoration, as well as minimizing potential threats to road utilities and infrastructure.

Wellfleet

The Town of Wellfleet has an established Comprehensive Wastewater Management Planning (CWMP) Committee that is charged with providing a comprehensive strategy for addressing wastewater treatment and disposal issues for the next 40 years and for the foreseeable build out conditions in town. The CWMP Needs Assessment and Alternatives Analysis, completed in 2012, led Wellfleet to pursue and implement pilot scale ecotoilet and oyster restoration solutions. The objectives of the CWMP are to protect and enhance the Wellfleet Harbor ecosystem, 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 oyster restoration project is a two-acre site in Wellfleet Harbor and has a well-structured monitoring component. Water quality monitoring has been ongoing since 2012 and has

provided necessary data for the town to make informed decisions moving forward. In addition, it has informed the 208 Plan Update Technologies Matrix and other oyster restoration projects across the region, including those in Falmouth and Mashpee.

Yarmouth

In 2010, the Town of Yarmouth submitted its Comprehensive Wastewater Management Plan (CWMP) as a Draft Environmental Impact Report (DEIR). The draft CWMP targeted areas that would require wastewater collection to restore water quality in the Lewis Bay and Parkers River watersheds and deal with Title 5 constraints on economic redevelopment in the area of Route 28. The town's plan included approximately 125 miles of sewer lines and the collection of 2.75 million gallons per day (MGD) of wastewater to be treated at a single facility in the Parkers River watershed. The project would ultimately serve 9,580 properties by 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 plan relies on gravity, pressure, and vacuum sewers. The MEP nitrogen reduction goals were the primary factor in choosing sewerage locations. The phasing of these sewerage areas also takes the town's economic goals into consideration.

The town submitted its Final Environmental Impact Report (FEIR) and received Massachusetts Environmental Policy Act (MEPA) approval in July 2011, but did not complete the Cape Cod Commission Development of Regional Impact (DRI) process before going to September 2011 Town Meeting to seek Phase 1 design and construction funds. Phases 1 through 5 were scheduled to be implemented over a 25-year period. The estimated cost of the 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.

Wastewater planning in the community had effectively come to a stop prior to the development of the 208 Plan Update.

In January 2016 town staff met with the Board of Selectmen to discuss a new financing plan for implementation of a program that would meet water quality standards in all Yarmouth watersheds.

The recommended plan includes a combination of traditional sewerage methods with centralized treatment facilities as well as non-traditional nitrogen management options including a permeable reactive barrier (PRB) at the Buck Island Road effluent recharge site. The Town of Yarmouth is proposing a phased wastewater program that includes a collection system, a conveyance system and a centralized treatment facility, each constructed over several years. In addition to the proposed sewerage, the recommended plan involves public outreach to promote nitrogen reduction and to prevent sewer system inflow, zoning modifications for growth

management and establishment of the activity centers, development of sewer ordinances, and continued maintenance of Title 5 and I/A systems in the northern and western areas of the town that will not be served by the proposed wastewater collection system. The town also plans to implement stormwater and fertilizer improvement programs. As suggested in the 208 Plan Update, up to a 25% nitrogen reduction credit can be obtained by towns that implement stormwater and fertilizer management programs to reduce nitrogen contributions to each watershed.

During the spring 2016 town meeting, the town approved \$200,000 for additional CWMP planning.

In April 2016, Yarmouth submitted a request for assistance to continue CWMP development and town staff met with the Commission to discuss the request in early May.

In June 2016, Yarmouth received \$35,000 from the Commission for the towns of Dennis, Harwich and Yarmouth for a regional treatment facility cost study. Funding was part of \$142,149 in local grants made by the Commission in support of 208 Plan implementation.

At the Spring 2017 Town Meeting, the town appropriated \$200,000 for wastewater planning and engineering services, including engineering studies and evaluation of recharge sites; updating, modification, and pre-implementation services for the Comprehensive Wastewater Management Plan and support for related filings with the Massachusetts Environmental Policy Act office and the Cape Cod Commission.