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CAPE COD COMMISSION

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12 December 2015

Mr. Scott Michaud
Cape Cod Commission
3225 Main Street
P.O. Box 226
Barnstable, MA 02563

Re: Nitrogen Loading and Drainage Calculations
123 Waterhouse Road, Bourne, MA

Dear Mr. Michaud,

I am writing this letter to state my views regarding the nitrogen loading calculations for 123 Waterhouse Road, Bourne, MA, on behalf of Mr. Franco Raponi.

I provide a little background on myself. I hold a Ph.D. in Oceanography from the Scripps Institution of Oceanography, focusing on coastal oceanography. From 1978 through 2000, I was a Senior Scientist at the Woods Hole Oceanographic Institution, in the Department of Geology and Geophysics. While there, I worked on a wide variety of coastal problems, including on teams funded through the National Science Foundation, NOAA, and others on problems regarding nitrogen discharge to the coastal oceans in Massachusetts. My work included Buzzards Bay shorelines as well as Vineyard Sound. I was lead scientist on work with the Buzzards Bay Coalition regarding nitrogen loading in all coastal ponds bordering Buzzards Bay. I also worked for five years or so on the Black Sea, the largest anoxic basin in coastal waters in the world, putting together a coalition of five countries to measure oxygen starvation throughout the Black Sea (a program called HydroBlack, then CoMSBlack). This work put me into direct contact with biologists and chemists studying the dynamics of coastal nitrogen and other nutrient loading.

In 2000, I left WHOI voluntarily to devote full time to my consulting company, the Woods Hole Group (WHG), which was founded in 1986. While at WHG, I have worked on various coastal nutrient enhancement problems around the Cape and elsewhere. In 2004, I started up several companies in the Middle East, where we expanded our work to include water treatment. Teaming with an American company, HeadWorks, we marketed high end treatment plants to a variety of customers throughout the Middle East. HeadWorks has sold on-board wastewater treatment solutions to many of the world's largest cruise liners, focusing primarily on Movable Bed Biofilm Reactors (MBBR). Thus, I am familiar with nitrogen loading calculations, and with a variety of package plant applications.

I have reviewed various documents provided to me by Mr. Raponi, regarding his application for an expansion of his medical facilities in Bourne, including the following documents:

Oct 2015 letter from Mr. Jack Landers-Cauley to the CCC
Feb 2015 Site and Septic Design Plan
Dec 2015 updates on Amphidrome wastewater management system

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Misc. other documents and filings

The project proponent has proposed to install and use an Amphidrome wastewater management system, a based on a biological filter high biomass treatment technology. Amphridrome is one of a well-known, high-end wastewater treatment system, comparable if not better than the MBBR (or Movable Bed Biofilm Reactor) and MBR (membrane biological reactor). Amphidrome is an energy efficient, customized treatment system appropriate for the present site constraints, and is offered by a company from Massachusetts (improving likelihood of rapid support when needed), utilizing a Biologically Active Filter (BAF) high biomass technology to provide simultaneous removal of BOD, ammonia, suspended solids and nitrate-nitrogen in an extremely small footprint. This advanced process qualifies as an Innovative/Advanced (I/A) technological solution for secondary treatment (reference, for example, http://www.mass.gov/eea/agencies/massdep/water/wastewater/title-5-innovative-alternative-technology-approvals.html).

The proposed technology will reduce the Title V wastewater nitrate concentration to less than 10 ppm, a reduction leading to compliance with nutrient regulatory requirements within the Back River ACEC in Bourne, MA, as well as a CCC marine water discharge area. Actual experience shows the Title V wastewater concentrations to be in the vicinity of 5 ppm, rather than the regulatory target of 10 ppm. With the installation of the I/A system, together with the proposed additional loadings (for a total flow of 1,862 gpd), the total site nitrogen is 2.98 parts per million ("ppm"), in compliance with the 2002 Regional Policy Plan's 5 ppm standard. The addition of the I/A system significantly lowers the daily nitrate load from existing conditions under a Title 5 septic system (1332 gallons with nitrogen load between 6.99 and 13.37 ppm). Thus, the I/A system satisfies the design objective to "maintain or improve existing levels of nitrogen loading," and the policy of "no net increase."

The upgraded I/A system comes at a large price. The capital investment is large, and there will be an annual maintenance program required to maintain the system at design levels. These additional costs should be considered by the CCC in determining the need for monetary contribution from the project proponent to the Town of Bourne. In fact, the site could serve as a positive model for the Town of Bourne, as I am not aware of another site using such advanced technology in a development of similar scale.

In summary, I believe Mr. Raponi has made a significant monetary and moral effort to meet the requirements set forth by the CCC for redevelopment of his property. Fairness would demand that CCC recognize this fact by reducing or eliminating the indicated monetary contribution associated with this improvement.

Sincerely,

David G. Aubrey, Ph.D.
Chairman and CEO