

July 22, 2010

TO: Mr. Robert Haynes, Hearing Officer

FROM: Lee Ann Walling, Chief of Planning
Kevin Coyle, Principal Planner

RE: Technical Response to Wandendale Public Comments

This memo identifies and addresses the significant issues relative to Tidewater Environmental Services Inc.'s application for a Coastal Zone Permit to operate a regional wastewater treatment facility. It also will respond to public concerns raised at the May 19 public hearing and in comments DNREC received via letter and electronic mail. We won't respond to individual comments, but rather categorically.

Sizing of project

Tidewater's Coastal Zone application is for 3.0 million gallons per day. As a comparison, the City of Seaford is currently treating about 1 mgd. Before Tidewater revised its offset calculations and submitted a revised application on March 19, 2010, Tidewater and DNREC's Groundwater Discharges Section already had agreed to reduce the project to 1.45 mgd because the utility had not set aside a large enough spare area for the RIBs; this major change was not reflected in the revised application.

In a March 3, 2010, letter to DNREC, Tidewater agreed to seek a construction permit for 1.45 mgd and to use the spray area as its required spare area, adding, "we plan to implement our system in phases as it will take many years to approach the 1.45 mgd capacity." Because it is required by regulation to set aside a spare area that equals 100 percent of the RIB treatment area, the eventual initial operating permit would be for 725,000 gpd. A March 10, 2010, response letter from the Groundwater Discharges Section to Tidewater confirms those numbers.

Wandendale's customer base

The downsizing of the project ultimately will enable Tidewater to treat 3,233 new connections, rather than the 8,400 projected in its initial and revised applications. In addition, there are 1,600 septic systems in the service area that could voluntarily hook up to Wandendale, for a total of 4,833 equivalent dwelling units vs. the original projection of 10,000. Neither the existing septic system users nor new subdivisions can be required to connect to Wandendale; developers of new subdivisions can voluntarily request to be included in a franchise area.

In his June 1 response to public comments, Tidewater official Bruce Patrick stated that the utility has franchise areas for several proposed developments, totaling approximately 2,000 EDUs. The Office of State Planning Coordination reports that Tidewater indeed has "certificated" 1,942 EDUs¹, but also

¹ May 24, 2010 e-mail from John Schneider, Watershed Assessment Section, DNREC, to Kevin Coyle, DNREC Planning Section

noted that preliminary county approvals for 1,086 of those EDUs have expired; as of May 2010, no construction had been completed on any of the certificated subdivisions.

Public concern over Rapid Infiltration Basin (RIBs) technology

Much of the testimony at the May 19 public hearing revolved around the RIBs technology. Extremely detailed hydrology and engineering studies and tests have been performed and continue to be performed, and DNREC's Groundwater Discharges Section is closely reviewing the Groundwater Impact Assessment² required for the project.

The Groundwater Discharges Section has questioned whether the nitrogen loads from the proposed RIBs could create a preferential flow path to nearby surface waters, causing localized eutrophication.³ At a design flow of 1.45 MGD with an effluent nitrogen concentration of 5.0 mg/l, the facility would generate more than 22,000 pounds of nitrogen annually. If this load is spread out evenly over the 13.5 acres of RIB area, the resulting nitrogen load would average 1,634 pounds of nitrogen per acre per year. Conversely, if the effluent were applied to agricultural lands at an average hydraulic loading rate of 2.0 inches per week, the nitrogen loading rate to the agricultural field would be less than 120 pounds of nitrogen per acre per year. That is a ratio of approximately 14 to 1 (1,634 to 120), and spray irrigation would not create a hydraulic pathway to surface waters, further protecting surface waters from potential nutrient impacts. If we assume a modest nitrogen removal rate of 50 percent from crop uptake, the nutrient loss from the agricultural sites would be less than 60 pounds of nitrogen per acre per year.

The Groundwater Discharges Section also pointed out that the wastewater treatment plant cannot begin operations in full denitrification mode – meaning that initially the effluent nitrogen concentrations may more likely be in the 10 to 25 mg/l range until the system reaches 10 to 20 percent of design flow. This means that early in the project effluent nitrogen concentrations will likely exceed the Inland Bays treatment standard of 5 mg/l by a factor of 2 to 5. The Section suggests that it may be appropriate to consider greater utilization of spray technology during early phases of the project. That section will require a more detailed wastewater disposal plan as part of any wastewater construction permit application to consider the method and rates of discharge.

The public will also have the opportunity to address its concerns about Rapid Infiltration Basins to technical experts when Tidewater's construction permit goes to public hearing.

² "Hydrogeologic Evaluation for Subsurface Wastewater Discharge Capacity for the Lands of Wandendale Farms Inc.," September 2009

³ July 20, 2010 Memorandum from Ronald Graeber, Groundwater Discharges Section, to Lee Ann Walling, DNREC Planning Section

Concerns that Wandendale will facilitate sprawl

The Coastal Zone Act has never been used (and was not intended) to regulate residential development. This permit could enable residential development outside the Coastal Zone. Within the Coastal Zone, there are many sprawling subdivisions as well as growing towns such as Lewes, Rehoboth Beach and Bethany Beach. The Wandendale farm itself could be converted to a residential subdivision and not be subject to the Coastal Zone Act.

If one were to consider requiring offsets from the residential growth occurring outside the Coastal Zone where the base density is two units per acre, what assumptions would one use to project buildout and rate of growth, density, homes on individual septic systems vs. hookups to Wandendale, impervious cover runoff, traffic counts for families vs. senior citizens, fertilizer use, air emissions, and other variables? The what-ifs and assumptions are virtually impossible to calculate, with any reasonable degree of certainty in Sussex County, for the sake of determining offsets from residential development.

Location of RIB area upgradient of wellhead protection area

The Department's Preliminary Land Use Service comments⁴ noted that the project's proposed Spray Area "B" was located upgradient of a wellhead protection area as delineated by the Delaware Geological Survey and expressed concerns that the RIB area presented a "potential source of contamination if there is a failure in the system that may cause the TWU (Tidewater) Public Drinking Water System to exceed drinking water standards."

In a May 6, 2010 addendum to its Coastal Zone Act application, Tidewater noted that it had changed Area B from RIBs to spray and documented the change in an Attachment H.3.⁵

Importing pollution into the Coastal Zone and sufficiency of offset

If one agrees with the argument that the Coastal Zone Act does not regulate residential development, sprawling or otherwise, within the Coastal Zone and that the residential development served by Wandendale will be outside the Coastal Zone, there is still the question of pollution being imported into the Coastal Zone, in a watershed with a regulatory Pollution Control Strategy to limit nutrient pollution.

Homes built in the service area, whether or not they connect to Wandendale, will generate nutrient and other pollution through the application of fertilizers and pesticides, increases in impervious cover, stormwater runoff, etc. Hydrology of the area indicates that pollutants will travel through the Columbia Aquifer over a period of many years, become diluted, and eventually discharge into the Inland Bays/Atlantic Ocean basin.

⁴ June 13, 2008 Preliminary Land Use Service comments, 2008-05-02, Office of State Planning Coordination

⁵ May 6, 2010 addendum to Coastal Zone Act application by Tidewater Environmental Services Inc.

The net effect on the watershed and the Inland Bays is difficult to assess. The effect of advanced treatment for the houses that connect to Wandendale is considerable. The migration of other, non-wastewater pollutants through the groundwater is difficult, if not impossible, to determine.

The offset initially accepted in the Secretary's assessment notes that these homes would be allowed under Sussex County zoning to be served by septic or a smaller community wastewater system. The treatment plant proposed by Tidewater would function as a built-in offset, treating to a much higher standard (especially for phosphorous) than alternatives.

On March 15, 2010, DNREC's Watershed Assessment Section stated that, "as proposed, the Wandendale wastewater facility will meet the applicable provisions of the Inland Bays Pollution Control Strategy. The facility will be designed to achieve Performance Standard Nitrogen Level 1 and will eliminate existing onsite wastewater treatment and disposal systems in its service area. In addition, water features on the parcel to which the regulations apply will be buffered."⁶

Arguably, the advanced treatment can be viewed as a benefit to the Inland Bays watershed, no matter what side of Route 24 the homes are built on – outside or inside the Coastal Zone. Our hydrogeologist indicates the following about groundwater migration within the area:⁷

The majority of the Wandendale Planning Area is located in the Rehoboth Bay and Indian River watersheds; however, a small portion is located within the Broadkill River Watershed. This spatial analysis indicates that in theory, only the wastewater generated from the Broadkill portion would be "imported" from the Delaware Bay Basin to the Inland Bays/Atlantic Ocean Basin. Wastewater generated from the remainder of the Wandendale Planning Area would remain within the Inland Bays/Atlantic Ocean Basin.

Stegner's (1972) analog model study of groundwater flow in the vicinity of Rehoboth Bay found that almost all of the flow in the Columbia aquifer discharges to the Rehoboth Bay (Andres, 1987). It would be assumed that any groundwater not discharging to the Bays would likely discharge to the Atlantic Ocean via a deeper flow path.

Based on Stegner's (1972) findings and the watershed delineations presented it would be assumed that any wastewater discharged within the Rehoboth Bay or Indian River Watersheds, regardless of system or wastewater classification, would be discharged to groundwater discharging to tributaries feeding into the Inland Bays, directly to the Inland Bays, or the Atlantic Ocean, depending on the flow path.

Travel time to Love Creek and other tributaries is estimated from 5 to 15 years by our hydrogeologist; Tidewater's engineers estimate 15 to 35 years. Also, any nutrients are likely to be significantly diluted by natural infiltration and precipitation; our hydrogeologist concurs that the project models "abundant dilution."

⁶ March 15, 2010 e-mail from Lyle Jones, Watershed Assessment Section, DNREC, to Lee Ann Walling, Kathy Bunting-Howarth and John Schneider

⁷ July 16, 2010 e-mail from Scott Strohmeier, Groundwater Discharges Section, to Lee Ann Walling, DNREC Planning Section

In developing an offset for pollution imported into the Coastal Zone, how does one determine how much groundwater pollution will come from homes on septic systems, how much will come from homes connected to Wandendale, and how much will come from agricultural fields? How would you calculate the travel time and dilution rates? Because new development and existing septic systems cannot be compelled to connect to Wandendale, we cannot determine the share of pollution that will come from its future customers. Note that accounting for and offsetting pollution from residential development – inside or outside the Coastal Zone – has never been considered before.

Additional offsets and/or conditions

Given the above technical considerations, there are reasonable requirements that could be imposed as conditions of a Coastal Zone permit, such as:

- Limit the Coastal Zone permit to 1.45 mgd instead of 3 mgd.
- Require a timetable for the construction and operation permit application(s).
- Use spray irrigation to the maximum extent practicable under normal operations. An additional preference is for farm fields to be sprayed before wooded areas to fertilize the agricultural fields and minimize impact to forest habitat.
- Prepare a surface water assessment report to demonstrate that the project meets TMDLs established for the appropriate watershed(s).
- Tidewater's Coastal Zone application indicated it would comply with all recommendations from the Natural Heritage and Endangered Species program, including a request that tree clearing be limited during the peak breeding period of April 15 through July 31 and particularly in June. Permit conditions should include these recommendations, and Heritage staff should be permitted to survey the site.
- The easternmost portion of Wandendale borders on Love Creek. Tidewater stated in its application that a buffer zone of 200 feet will be maintained between wetlands (including those along Love Creek) and the project, and promised annual monitoring to examine the effect of spray irrigation on nesting birds and amphibians. The buffers and the monitoring should be a permit condition that we enforce.
- A loss of 10 acres of trees will occur when the treatment facility and RIBs are constructed. Tidewater stated that the loss of trees will be offset by the buffers and the addition of trees as new landscaping. Landscaping is not an adequate offset for the loss of forest. The trees should be replaced – if not on the project site then in an appropriate location within the subwatershed – at the ratio of 1.3 to 1 (13 acres of trees). Tidewater should minimize the footprint of the facilities that require clearing of trees.