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 EDUs[1], but also

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[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 Assessment[2] 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.

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

[3] July 20, 2020 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 comments[4] 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.

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[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."

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[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.

TIDEWATER
ENVIRONMENTAL SERVICES, INC.
1100 South Little Creek Road
Dover, Delaware 19901

March 3, 2010

Mr. Jack Hayes
Department of Natural Resources and Environmental Control
Division of Water Resources
89 Kings Highway
Dover, DE 19901

RE: Wandendale - Phased approach

Dear Mr. Hayes:

As you know we have submitted a detailed soils investigation report and a preliminary groundwater impact assessment that illustrate that our proposed RIB area at Wandendale has a capacity of 1.45 MGD. Our overall plan is to use the spray area as our "spare area"; however, we plan to implement our system in phases as it will take many years to approach the 1.45 MGD capacity.

At this point, our initial phases are estimated as follows:

Phase 1	150,000 gpd
Phase 2	150,000 gpd
Phase 3	300,000 gpd
Total for first three phases	600,000 gpd

Initially, we are proposing to use ½ of the RIB area for the spare for the initial phases, so we would have 725,000 gpd capacity of spare area available for the first three phases. Based on this methodology, we do not need any additional spare area, until we approach the 725,000 gpd limit. Therefore, we are requesting that any additional soils or hydro-geo work needed to demonstrate the full spare area capacity of 1.45 MGD in the spray area be deferred until such time as it is needed. Our suggested approach would be to use the operating permit as a trigger for requiring the additional work, i.e., when we approach 80% of 725,000 gpd limit that we have available for spare, which would be 580,000 gpd or near the buildout of our third phase, we would need to start the additional work to demonstrate that we have 100% spare for the 1.45 MGD and it would need to be completed and approved before we could exceed 725,000 gpd.

302-734-7500 1-800-523-7224 fax 302-734-9295

In summary, our approach is to secure a construction permit for 1.45 MGD, but our operating permit would be limited to 725,000 gpd until we demonstrate the additional spare area capacity as mentioned above. We believe that a phased approach like this makes a lot of sense and we request your concurrence as we proceed in this matter.

Should you have any further questions, please feel free to contact me at 302-734-7500, ext. 1023.

Sincerely,

Bruce E. Patrick

Bruce E. Patrick, P.E.
Vice President of Engineering
Tidewater Environmental Services, Inc.

cc: Hilary Valentine

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER RESOURCES
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

March 10, 2010

Mr. Bruce Patrick, P.E.
Vice President of Engineering
Tidewater Environmental Services, Inc.
1100 South Little Creek Road
Dover, DE 19901

RE: Wandendale – Phasing Approach

Dear Mr. Patrick,

This letter shall serve to inform you that the Department concurs with your phased approach for the Wandendale on-site wastewater treatment and disposal system applications as outlined in your March 3, 2010 letter. It is our understanding that a construction permit for 1.45 mgd will be sought, and an operating permit would be limited to 725,000 gpd until additional spare area is approved.

Should you need to discuss this matter any further please do not hesitate to contact me at 739-9331.

Sincerely,

Hilary Valentine

Hilary Valentine
Environmental Engineer
Groundwater Discharges Section

cc: Jack Hayes
SIR file

From: Strohmeier Scott A. (DNREC)
Sent: Friday, July 16, 2010 11:29 AM
To: Walling Lee Ann (DNREC)
Cc: Coyle Kevin F. (DNREC)
Subject: RE: Wandendale CZA Permit

Hi Lee Ann,

You are correct in stating that the hydrogeologic assessment report did indicate a travel time of 15-35 yrs prior to discharging to down gradient streams and bays. In addition, it should be noted that the consultant, Eastern Geosciences, Inc., indicated that approximately ten percent will be directed toward Sarah Run with a travel time of 2 years. Sarah Run feeds into Burton Prong.

It should be known that groundwater modeling has limitations due to the system complexities being modeled; however, it is the only resource that allows the scientific community to evaluate what may potentially happen over time based on credible input data. It is my opinion that the flow path results may be more accurate than the dilution results provided from modeling. When it comes to the fate and transport modeling of a contaminant plume the transverse, longitudinal, and vertical dispersivity values play a major role in determining the contaminant dilution potential. These parameters are not typically gathered in the field and making a determination of which value to use can be difficult, so as not to bias the results. According to Robertson et al. (1991), past studies have indicated that the dispersive capabilities, and therefore the contaminant dilution potential of many sand and gravel aquifers, are much less than previously thought (Sudicky et al., 1983; Feyburg, 1986; Garabedian, 1987; Moltyaner and Killey, 1988a, b).

The proposed Wandendale Regional facility will be required to have tertiary treatment with total nitrogen concentrations of 5 mg/L. Even if no additional dilution occurred the total nitrogen would be 5 mg/L prior to discharging to the RIB, which is required by the November 11, 2008 Regulations Governing the Pollution Control Strategy for The Indian River, Indian River Bay, Rehoboth Bay, and Little Assawoman Bay Watersheds. It is not to say that additional dilution won't occur, but it may be possible that the total nitrogen may continue to persist in the groundwater plume at a concentration close to 5 mg/L prior to discharging to a surface water body. The Robertson et al. (1991) study observed almost complete nitrate as nitrogen attenuation within the last 2 meters of the plume flowpath before discharging to the river. This was attributed to denitrification occurring within organic matter-enriched riverbed sediments.

With this being said, modeling of the proposed system has shown that radial flow of varying intensity should occur with abundant dilution; however, the modeling does have limitations and may not result in exactly what has been stated. On the other hand the system will be required to meet the Watershed Assessment Section PCS regulations for total nitrogen and total phosphorus (if high mobility potential is determined), which were determined through vigorous research and modeling and implemented to achieve the TMDLs. Performance standards will be gauged via composite/grab sampling at the end of pipe for a variety of parameters, including but not limited to total nitrogen and phosphorus.

I may have given more info than you asked for, but I want to give you a clear understanding of the issues involved.

-Scott

P.S. – If you would like to see the Robertson et al. (1991) paper let me know.

From: Walling Lee Ann (DNREC)
Sent: Thursday, July 15, 2010 3:36 PM
To: Strohmeier Scott A. (DNREC)
Cc: Coyle Kevin F. (DNREC)
Subject: FW: Wandendale CZA Permit

Scott,

TESI said travel time would be 15 to 35 years for groundwater from the site to get to Love Creek or Rehoboth Beach, and that 90 percent of it would be diluted by the time it got there anyway. Does that ring true with you?

> There were also a number of comments regarding the site being within the Love Creek headwater area. The hydrogeologic evaluation for the site has demonstrated that reclaimed water from this facility will travel in a semi-radial flow path within the ground-water flow system and that Love Creek will receive only a portion of that ground-water after travel times of 15 to 35 years and more than 90 percent dilution by natural infiltration of precipitation. Other portions of the ground-water originating from this site will eventually discharge to Burton Prong and Rehoboth Bay, again with travel times of 15 to 35 years and greater than 90 percent dilution. Given the high level of treatment prior to discharge, the long travel times and the high rate of natural dilution, the discharge from this project will protect and improve the water quality of the Inland Bays and allow the Inland Bays to attain their duly promulgated water quality standards. Hence, the proposed wastewater disposal system is entirely protective of the surface water resources in the area.

From: Bunting-Howarth Katherine E. (DNREC)
Sent: Tuesday, July 13, 2010 3:09 PM
To: Walling Lee Ann (DNREC)
Subject: FW: Wandendale CZA Permit

This good enough?

Katherine E. Bunting-Howarth
Director, Division of Water
Delaware Department of Natural Resources and Environmental Control
89 Kings Highway
Dover, DE 19901
phn: (302)739-9949
fax: (302)739-7864

From: Strohmeier Scott A. (DNREC)
Sent: Tuesday, July 13, 2010 1:49 PM
To: Coyle Kevin F. (DNREC)
Cc: Barndt John T. (DNREC); Bunting-Howarth Katherine E. (DNREC); Schneider John W. (DNREC);

Schepens Dave J. (DNREC)
Subject: FW: Wandendale CZA Permit

Kevin,

Please find the attached map to help address the issue of "importing pollution". I geo-referenced the map submitted by TESI in ArcMap to evaluate the location of the TESI Wandendale Planning Area relative to the State's watershed boundaries. 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, which is denoted by the red polygon (I created a colored polygon over this portion of the planning area for ease of reference). This spatial analysis indicates that in theory, only the wastewater generated from the red polygon 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.

Andres, S. A., 1987, Estimate of direct discharge of fresh groundwater to Rehoboth and Indian River Bays: Delaware Geological Survey Report of Investigation No. 43, 37 p.

Stegner, S. R., 1972, Analog Model study of groundwater flow in the Rehoboth Bay area, Delaware: Technical Report 12, University of Delaware, College of Marine Studies, 69 p.

-Scott

From: Coyle Kevin F. (DNREC)
Sent: Thursday, July 08, 2010 2:35 PM
To: Bunting-Howarth Katherine E. (DNREC)
Cc: Lovell Stewart E. (DNREC); Schneider John W. (DNREC); Graeber Ronald E. (DNREC); Walling Lee Ann (DNREC); Cherry Philip J. (DNREC)
Subject: Wandendale CZA Permit

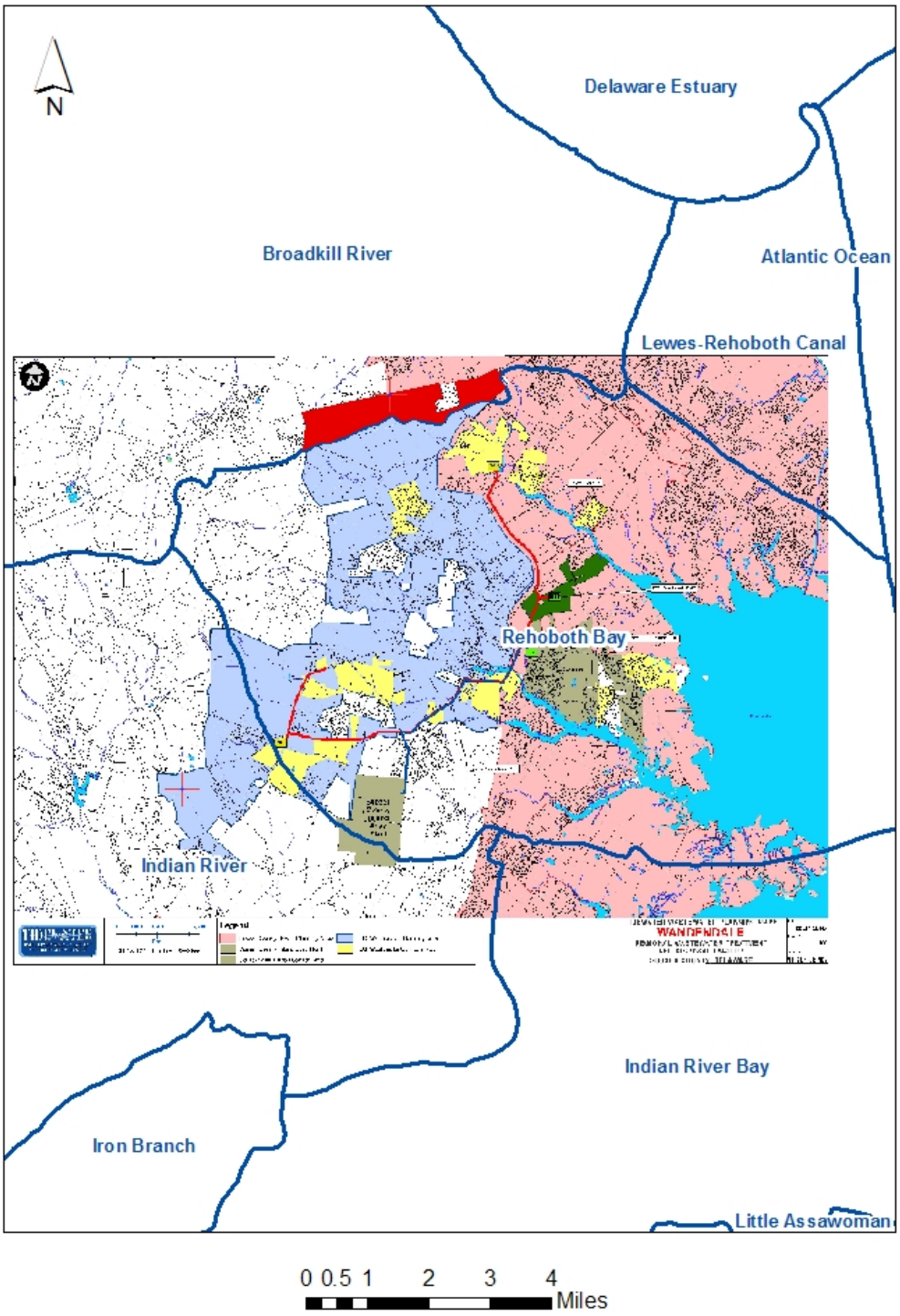
Kathy – In preparing a Technical Response Document for the Wandendale CZA Permit, one of the arguments put forth at the public hearing is that the WWTP would be "importing pollution (i.e., wastewater)" into the Coastal Zone and, subsequently, into the Inland Bays. Assuming that the Service Area depicted in the attached map is within the same watershed, we need to address that argument by stating that <u>any</u> wastewater discharged in that area, whether from individual on-site septic systems, community systems, or centralized sewer, eventually ends up in the Inland Bays. Would you please

forward this request to the appropriate staff for a response? We are on a fairly tight schedule and would appreciate an answer by early next week. Thanks.

Kevin F. Coyle, AICP
Principal Planner

DNREC, Office of the Secretary
89 Kings Highway
Dover, DE 19901
302.739.9071
302.739.6242
Kevin.Coyle@state.de.us

TESI Wandendale Planning Area Watersheds



MEMORANDUM

To: Lee Ann Walling

Thru: Dave Schepens

From: Ronald E. Graeber

Re: Tidewater Environmental Services, Inc.Wandendale Regional Wastewater Treatment and Disposal Plant Coastal Zone Act Application

Date: July 20, 2010

I have reviewed the Wandendale Coastal Zone Act Application (CZAA) to site a wastewater treatment and disposal facility, and would like to raise a few issues and concerns relative to the CZAA. The Wandendale CZAA states that the treatment and disposal facility will have a 3.0 Million Gallon per Day (MGD) capacity, using a mix of RIBs and spray irrigation for disposal of the treated effluent. The report does not, however, state what percent of the design flow will be diverted to the RIBs and what percent will be available for spray irrigation. Before any proposed offsets can be verified, we must know how much effluent will go to the RIBs vs. the irrigation fields. In order to get a better grasp of this issue I reviewed the correspondence generated by the hydrogeologic reports that have been submitted for this project to date. The hydrogeologic report evaluation limits the total disposal capacity to 1.45 MGD; using RIBs exclusively for disposal of the treated wastewater. Based on my review of the hydrogeologic report for the project, I believe the applicant plans to focus exclusively on using RIBs for wastewater disposal, and only use spray irrigation if the RIBs cannot accommodate the full 1.45 MGD of flow. The applicant should be directed to provide loading details for the 2 different disposal methods, and explain how the wastewater will be initially disposed.

I am concerned that the nitrogen loads from the proposed RIBs could create a preferential flow path to nearby surface waters, causing localized eutrophication. At a design flow of 1.45 MGD with an effluent nitrogen concentration of 5.0 mg/l, the facility would generate over 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’s 1634 lb/acre/yr vs. 120 lb/acre/year; and spray irrigation would

not create a hydraulic pathway to surface waters, further protecting surface waters from nutrient impacts. If we assume a modest nitrogen removal rate of 50% the nutrient loss from the agricultural sites would be less than 60 pounds of nitrogen per acre per year.

One additional thought to consider is that the wastewater treatment plant cannot begin operations in full denitrification mode; meaning that initially the effluent nitrogen concentrations would more likely be in the 10 to 25 mg/l range until the system reaches 10 to 20% of design flow. This means that early in the project effluent nitrogen concentrations will likely exceed 5 mg/l by a factor of 2 to5. My recommendation would be to require the applicant to focus initially on spray irrigation for wastewater disposal, using the effluent with the higher nitrogen concentration to fertilize the agricultural fields, before discharging treated wastewater to the RIBs. Based on the statements above I recommend the conditions be included in any CZA permit to protect the Coastal Zone from potential harmful impacts from pollutants. I also recommend that the applicant be required to submit a detailed wastewater disposal plan addressing the issues and concerns in compliance with the permit conditions.

From: Jones Lyle A. (DNREC)
Sent: Monday, March 15, 2010 7:59 AM
To: Walling Lee Ann (DNREC); Bunting-Howarth Katherine E. (DNREC); Schneider John W. (DNREC)
Cc: Volk Jennifer A. (DNREC)
Subject: Wandendale

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. For these reasons, the Watershed Assessment Section has no objection to moving forward with the Coastal Zone Act permit hearing.

From: Schneider John W. (DNREC)
To: Coyle Kevin F. (DNREC);
cc: Bunting-Howarth Katherine E. (DNREC); Cherry Philip J. (DNREC); Hall Bryan (OMB); Jones Lyle A. (DNREC); Schepens Dave J. (DNREC); Walling Lee Ann (DNREC);
Subject: Wandendale
Date: Monday, May 24, 2010 4:06:30 PM

Kevin—This is to document our conversation this morning regarding a division of labor for information & analysis pertinent to Wandendale. As you know, I asked Bryan to provide information about those subdivisions with certificated EDUs included in the Wandendale service area. He provided identical information to both of us on CDs. Below is Bryan's list of those subdivisions with his notes regarding status. He has requested Sussex County concurrence. The question in my mind is, how many of the EDUs are viable given the state of the economy, the lack of construction progress, and the County's major subdivision sunsetting process? Some of the subdivisions below have already been sunsetted. You agreed that the OTS should handle information and analysis pertinent to land use and the status of potential EDUs which are included in TESI's application.

I agreed that the Watershed Assessment Section will handle information and analysis pertinent to the nutrient loading consequences resulting from the expiration of subdivision approvals via sunsetting. For example, Coastal Farm (aka Marine Farm) has been sunsetted. If the owner of the parcel sought subdivision approval in the future, the number of EDUs will likely change. Regardless, there is no longer a commitment to participate in the Wandendale system for that parcel. But the parcel is in the CPCN, so the wastewater management options are somewhat limited. Further, although I'm not certain of the applicability to the Coastal Zone Permit, compliance with the Inland Bays Pollution Control Strategy (PCS) will be required.

We did not discuss this, but another concern is the relationship between EDUs and the treatment & disposal options available to TESI. We heard testimony from a few of the 1,600 homeowners with septic systems in the service area. Consistent with comments we have heard as part of other proceedings, homeowners will not abandon properly functioning septic systems & agree to hook-up fees and sewer service fees. Add that uncertainty to that of sunsetting &/or lack of economic viability of, especially, the larger subdivisions. Although

spray irrigation is proposed as part of the disposal mix, will flows ever be great enough to employ it? Although the wastewater treatment plant will be required to meet PCS performance standards, miserly flows will present treatment challenges.

If I have misstated any of the land use information, please correct me. John

PLUS – 04-07-08 Avebury (234-16.00-28.00) – 400 EDU's

The Proposed Sussex County RPC project has received final approval; however, no construction has been completed at this time.

PLUS – 05-07-06 Burton's Pond (234-17.00-17.00) – 367 EDU's

The proposed Sussex County RPC project has several phases (Phase 1 – Single Family, Phase 2 – Multi-Family, Phase 3 – Community Center / Multi Family). At this time Phase one has preliminary approval which at this time has expired requiring the proposed phase to go through the County process as a new application. No action has been taken on either Phase 2 or 3 and no new construction has been completed within any proposed phases defined within this site.

LUPA 2004 Coastal Farm (aka Marine Farms) (334-11.00-5.00) – 719 EDU's

The proposed Sussex County RPC project preliminary approval has expired and is subject to go through the County process as a new application. No new construction has been completed on this site.

Norwood (234-10.00-26.00) – 34 EDU's

The proposed project has final approval from the County; however, no construction has occurred on this site at this time. SPECIAL NOTE – due to the projects size, it would was not seen through PLUS Process.

PLUS 04-07-09 Welch Run (234-15.00-40.00) – 296 EDU's

The proposed Sussex County RPC project has received preliminary approval from the County and has been granted a year time extension. No construction has occurred on this site at this time.

PLUS 05-05-20 Wetherby (234-16.00-27.00) – 126 EDU's

The proposed Sussex County RPC project has final approval from the County;

however, no construction has occurred on this site at this time.

Total 1,942 Certificated EDU's

TIDEWATER ENVIRONMENTAL SERVICES, INC.
PUBLIC HEARING
May 19, 2010

LIST OF EXHIBITS INTRODUCED BY DNREC AT THE PUBLIC HEARING

Exhibit 1	Tidewater Environmental Services, Inc. Application for a Coastal Zone Act Permit, dated September 24, 2009, and received on September 25, 2009
Exhibit 2	Affidavit of Publication, News Journal, dated October 5, 2009
Exhibit 3	Letter from Philip Cherry, DNREC, to Kenneth Davis, CABE Associates, dated December 3, 2009, regarding offset calculations
Exhibit 4	Letter from Kenneth Davis, CABE Associates, to Philip Cherry, DNREC, dated January 5, 2010, regarding offset calculations
Exhibit 5	Letter from Bruce Patrick, Tidewater Environmental Services, Inc., to Jack Hayes, DNREC, dated March 3, 2010, regarding a phased approach to implementing the wastewater treatment and disposal system
Exhibit 6	Letter from Hilary Valentine, DNREC, to Bruce Patrick, Tidewater Environmental Services, Inc., dated March 10, 2010, regarding a phased approach to implementing the wastewater treatment and disposal system
Exhibit 7	E-mail correspondence from Lyle Jones, DNREC, to Lee Ann Walling, et al., dated March 15, 2010, regarding the project's ability to satisfy provisions of the Inland Bays Pollution Control Strategy
Exhibit 8	Revised Application for a Coastal Zone Act Permit, dated March 19, 2010, and received on March 19, 2010
Exhibit 9	Secretary's Environmental Assessment Report, dated April 2010, and signed on April 23, 2010
Exhibit 10	Affidavit of Publication, News Journal, dated April 26, 2010
Exhibit 11	Revised Offset Chart from Secretary's Assessment Report, dated May 17, 2010
Exhibit 12	E-mail from Rich Anthony, Plan Delaware, to Kevin Coyle and Lee Ann Walling, with an attached memorandum, dated May 18, 2010

EXHIBITS INTRODUCED BY THE PUBLIC AT THE PUBLIC HEARING ON MAY 19, 2010

Moyer Exhibit 1	Research paper by A. Scott Andres, Delaware Geological Survey
Austin Exhibit 1	Statement from John Austin
Austin Exhibits 2 & 3	Aerial photographs of proposed Rapid Infiltration Basins (RIBs) areas
Austin Exhibit 4	Letter from Office of State Planning Coordination, dated June 13, 2008, regarding PLUS review of the Wandendale Regional Water Recharge Facility
Granke Exhibit 1	Statement from Mabel Granke
Callanen Exhibit 1	Statement from Steve Callanen on behalf of the Southern Delaware Group of the Sierra Club, including an attached report from the U.S. Geological Survey
Callanen Exhibit 2	Statement from Sallie Callanen on behalf of Save Our Coastal Communities
DE Nature Society Exhibit 1	Statement from Brenna Goggin on behalf of Delaware Nature Society
Center for the Inland Bays Exhibit 1	Statement from Chris Bason on behalf of the Center for the Inland Bays
League of Women Voters Exhibit 1	Statement from John Sykes on behalf of the League of Women Voters
Citizens Coalition Exhibit 1	Statement from Henry Glowiak on behalf of the Citizens Coalition
Ferragut Exhibit 1	Statement from Ted Ferragut

POST-HEARING EXHIBITS

Callanen Exhibit 1A	E-mail from Steve and Sallie Callanen to Robert Haynes, dated May 19, 2010
Green Delaware Exhibit 1A	E-mail from Alan Muller, Green Delaware, to Robert Haynes, dated May 19, 2010
Green Delaware Exhibit 2A	E-mail from Alan Muller, Green Delaware, to Collin O'Mara and Robert Haynes, with an attached letter, dated June 1, 2010

POST-HEARING EXHIBITS (cont.)

Austin Exhibit 1A	E-mail from John Austin to Collin O'Mara, dated May 19, 2010
Austin Exhibit 2A	E-mail from John Austin to Robert Haynes, dated May 20, 2010
Austin Exhibit 3A	E-mail from John Austin to Robert Haynes and Collin O'Mara, dated May 29, 2010
Kratt Exhibit 1A	E-mail from Betty Kratt to Kevin Coyle, dated May 22, 2010
Kratt Exhibit 2A	E-mail from Paul Kratt to Kevin Coyle, dated May 26, 2010
Maegerle Exhibit 1A	E-mail from Robert Maegerle to Robert Haynes, dated May 23, 2010
Love Creek Woods Exhibit 1A	Petition from the Love Creek Woods Home Owners Association of Lewes, DE, dated May 2010 (Received May 24, 2010)
Payne Exhibit 1A	E-mail from Bill Payne to Kevin Coyle, with attached letter, dated May 25, 2010
Moyer Exhibit 1A	Letter from William Moyer to Collin O'Mara, dated May 27, 2010
Wuslich Exhibit 1A	E-mail from Ron Wuslich to Robert Haynes and Kevin Coyle, with an attached e-mail to George Bunting and Gerald Hocker, dated May 29, 2010
Sierra Club Exhibit 1A	E-mail from Steve and Sallie Callanen, Sierra Club, to Robert Haynes and Kevin Coyle, dated June 1, 2010
Artesian Water Company Exhibit 1A	E-mail from Chris Hogenmiller, Artesian Water Company, to Kevin Coyle, with an attached letter from John Thaeder, dated June 1, 2010
TESI Exhibit 1A	Letter from Kenneth Davis, CABE Associates, to Philip Cherry, DNREC, dated May 6, 2010, regarding minor updates to the permit application
TESI Exhibit 2A	Letter from Jeremy Homer, Parkowski, Guerke & Swayze, to Robert Haynes, with an attached letter from Bruce Patrick, Tidewater Environmental Services, Inc., dated June 1, 2010