FPM group — Engineering and Environmental Science

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VIA MAIL AND EMAIL

August 6, 2014

Ms. Janice Scherer
Principal Planner
Long Range Planning Division
Town of Southampton
116 Hampton Road
Southampton, NY 11968

Re: **Evaluation of Hydrology and Nitrogen Issues**
Final Environmental Impact Statement (FEIS), Canoe Place Inn (CPI),
Canal & Eastern Properties, Hampton Bays, NY, May 2014
FPM File No. 1159g-14-01

Dear Janice:

FPM Group (FPM) has reviewed the relevant portions of the provided Final Environmental Impact Statement (FEIS) for the above-referenced Maritime Planned Development District (MPDD) with the objective of evaluating hydrology and nitrogen issues for the Town of Southampton (Town). In particular, this review has focused on evaluation of potential impacts to groundwater and surface water conditions in the project area with the objective of identifying those issues that do not appear to have been sufficiently or correctly addressed in the FEIS.

This written report of our evaluation includes comments intended to assist the Town in further responding to the applicant and developing project requirements for the MPDD that is the subject of the FEIS. Issues that appear to have been resolved are not included in this report.

Comments Regarding Assessment of Current and Proposed Groundwater Conditions

The responses to comments provided in the FEIS address many of the issues raised in the draft EIS (DEIS) concerning groundwater quality and potential impacts on surface water quality. We note the following issues and comment on those for which additional information is recommended:

- As discussed in Appendix M (pages 8 and 9) and referenced on pages 1-17 and 3-58 of the FEIS, although groundwater in the Upper Glacial Aquifer is anticipated to flow generally to the east/southeast in the CPI area and to the west/southwest beneath the eastern properties, this groundwater flow pattern is likely to be affected by local conditions associated with the Shinnecock Canal, including the subsurface walls and structures. These structures may elevate groundwater levels in their vicinity and/or divert groundwater flow to the north or south. It is stated in Appendix M that groundwater wells will be installed on the property to determine the actual groundwater flow patterns and rates for design purposes. As discharge of stormwater will occur on all three properties and discharge of wastewater is planned for two of the properties, we recommend that at least three properly-installed, developed, and surveyed groundwater

monitoring wells be installed on each property for this purpose, with at least one well in each of the two areas intended for wastewater discharge. At least one round of synoptic water levels should be obtained and water levels in the wells closest to the shorelines should be monitored over at least a 12-hour period to assess the range of tidal fluctuation. This information should be used in developing the final locations and designs for the stormwater and wastewater management facilities.

- In Appendix M it is stated that nitrate-N levels in the upper aquifer (Upper Glacial Aquifer) in the area of the project site are 1 to 6 milligrams per liter (mg/l); this range is supported by the Suffolk County Comprehensive Water Resources Management Plan (2010). However, subsequent calculations of nitrogen loading to groundwater are based on the nitrate-N level reported by the Hampton Bays Water District for water in the deeper (Magothy) aquifer (2.0 mg/l). This assumed nitrate concentration is lower than what would be expected based on a median value of 3.5 mg/l for the Upper Glacial Aquifer derived from the published range. We recommend that unless site-specific nitrate data are available for the Upper Glacial Aquifer, evaluations of nitrate loading to the Upper Glacial Aquifer should be performed using the median value of 3.5 mg/l for nitrate in the Upper Glacial Aquifer in this area based on published data.

- Response to Comment G-5 (page 3-11 and following) is correct in that groundwater in the project area is anticipated to flow towards and discharge to Shinnecock Bay and, therefore, a discussion of the nitrogen load in groundwater relative to the Total Maximum Daily Load (TMDL) for nitrogen for the Peconic Estuary is not relevant. However, what should be included in the FEIS is a more in-depth discussion of the nitrogen load relative to the condition of Shinnecock Bay. Although a TMDL for nitrogen has not yet been developed for Shinnecock Bay, we note that Shinnecock Bay and Inlet have been listed since 2010 on New York State's Section 303(d) List of Impaired/TMDL Waters due to nitrogen pollution reportedly sourced from onsite wastewater treatment systems and urban runoff (see attached excerpt from the draft 2014 Section 303(d) list). Although a TMDL for nitrogen has not yet been developed for Shinnecock Bay, nitrogen is clearly a contributing factor to the extensive algal blooms that have resulted in the bay's impaired classification. Although it appears that the proposed wastewater management practices relative to nitrogen, as presented in the FEIS, are intended to conform to the SCDHS requirements relative to drinking water criteria (10 mg/l) and Best Management Practice (BMP) for treated wastewater discharged within a 25-year travel time to a surface water body (7 mg/l), both of these criteria are higher than the nitrogen level in groundwater that may contribute to the impaired condition of Shinnecock Bay. The FEIS should acknowledge the recognized impaired condition of Shinnecock Bay relative to nitrogen and the apparent need for reducing nitrogen loads in groundwater below currently-promulgated criteria.

APP acknowledged but issue is not mitigated

- The SONIR model inputs have been adjusted and the models re-run for the FEIS. These adjustments generally provide what are likely more reasonable estimates of nitrogen in recharge from the project. We note that the nitrogen recharge under the current conditions for the CPI property (unoccupied) is calculated at 0.34 pounds per year and is solely attributed to stormwater recharge; this appears to be a reasonable estimate of the nitrogen being recharged under current conditions and is a better estimate of the current condition than the "grandfathered" flow used during the DEIS. The resulting nitrogen concentration in the recharged stormwater is 0.01 mg/l; this recharge is being added to the existing Upper Glacial Aquifer groundwater, which has a nitrogen concentration estimated at 3.5 mg/l (see above). The result is that groundwater recharge, as it presently exists on the property, is diluting the nitrogen concentration in the groundwater, thereby improving groundwater quality.

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- The nitrogen recharge for the CPI property, if developed as proposed, is calculated at 640.13 pounds per year, or nearly a 2,000 % increase over the current conditions. The concentration of nitrogen in recharge from all sources on the developed property (with sanitary waste contributing by far the largest amount) is calculated at 7.48 mg/l. This concentration exceeds the SCDHS BMP of 7 mg/l for wastewater discharges within a 25-year travel time to a surface water body and will be added to the existing Upper Glacial Aquifer groundwater (with an existing estimated nitrogen concentration of 3.5 mg/l), potentially resulting in groundwater with highly-elevated nitrogen concentrations at the downgradient side of the CPI property. The SONIR model results clearly indicate that treatment of the sanitary waste to remove nitrogen is a key concern for redevelopment of the CPI property, as discussed further below.

- The nitrogen recharge for the Canal property is calculated at 10.79 pounds per year (recharge concentration of 0.34 mg/l), with nearly all of the nitrogen resulting from application of fertilizer to landscaped areas. We note that although nearly two acres of this property will be landscaped (Table 1-5 of FEIS, page 1-13), the area to be fertilized is considered to be half of this area (40,511 square feet). This resulted from the reasoning that not all of the landscaped areas will be established in fertilizer-dependent vegetation (Comment G-76, page 3-62). While the use of native vegetation with lower fertilization requirements is desirable, Comments G-76 and G-78 clearly state that the "final landscape plan will ensure that the acreages indicated on Table 1-5 of this Final EIS are achieved in terms of limiting fertilizer dependent vegetation". We note, however, that this table does not include any information about how much of the landscaped area will include fertilizer-dependent vegetation vs. native vegetation. As the fertilized landscaping contributes the greatest amount of nitrogen to recharge on the Canal property, Table 1-5 should be modified to specify the area of landscaping that will be planted with native vegetation.

Table 1-5 modified in Oct. 2014 FEIS

- Comment G-70 discusses how pet waste is factored into the SONIR model calculations. While we would agree that the "pick up after your pet" philosophy can be expected to reduce pet waste nitrogen impacts, we note that pick up of pet urine is not practical and a portion of pet owners continue to leave solid pet waste on the ground; both of these wastes contribute to nitrogen impacts. Although Comment G-70 clearly states that pet waste was factored into the updated SONIR model for the Canal property included in the FEIS, the SONIR model output for the Canal property in the FEIS does not show this input. Although there are five residential cottages included on the CPI property, pet waste input was not factored into this model either. These models should be re-run with pet waste nitrogen impacts factored in.

- The nitrogen recharge for the Eastern property, which would receive sanitary waste from the Canal property for treatment in a Nitrex wastewater treatment system, is calculated in the FEIS at 96.10 pounds per year (recharge concentration of 2.05 mg/l), with nearly all of the nitrogen resulting from discharges from the Nitrex system. We note that the SONIR input value for the concentration of nitrogen in the Nitrex system discharge is 3.00 mg/l in the model run for the FEIS, whereas the input value for the model run included in the DEIS was nearly twice this value (5.00 mg/l). The value selected for this input factor significantly affects the SONIR model result and must be chosen with care. We could find no justification in the FEIS for this reduction in the nitrogen concentration in the Nitrex system discharge. A review of the documentation for the Nitrex system (Appendix N in the FEIS) does not provide any information to support this reduction in the nitrogen concentration in the discharge. In fact, Appendix N (page 17) indicates only that the total nitrogen in the Nitrex system discharge may be up to 10 mg/l. Based on

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this information, the nitrogen in recharge from the Nitrex system, assuming that the system functions in accordance with the information in Appendix N, may be up to 10 mg/l (or somewhere in the range of 320 pounds per year). We recommend that the applicant provide supporting information for the selection of the nitrogen concentration value to be used in the SONIR model for the Eastern property and that the SONIR model be re-run as necessary to more accurately predict the nitrogen impacts from this system.

App adds Exh. N w/"average" N 2.92mg/l from 15 Nitrex systems

Comments Regarding Proposed Wastewater Treatment – CPI Property

Based on the information provided, it appears that use of a Nitrex wastewater treatment system has been precluded for the CPI property. However, the applicant has proposed adding a Nitrex permeable reactive barrier (PRB) to the property which, in concert with a traditional septic tank/leaching field wastewater management system, is anticipated to provide for significant nitrogen removal from the sanitary waste to be discharged onsite. If the PRB functions as intended, it can also be anticipated to remove nitrogen from other sources (ambient groundwater, stormwater, etc.). In general, this appears to be a good approach. However, there are a number of design issues that should be addressed before approving this approach, as follows:

- As discussed in Appendix M, the proposed chambered drainfield area for the effluent from the conventional wastewater treatment system is located in the northeastern portion of the CPI parcel, where the current surface elevation ranges from approximately 12 to 18 feet above mean sea level (MSL). The concept grading and drainage plan for CPI shows a net cut in this area of about 0.5 feet, which will result in a final surface elevation of between 11.5 and 17.5 feet. The closest test hole to the proposed drainfield area (#3) demonstrates a water table elevation of about 1.94 feet MSL and it is reported that groundwater elevations fluctuate between 2 and 3 feet in this area. Therefore, the thickness of the unsaturated zone following grading is anticipated to range between 6.5 and 13.5 feet in the drainfield. Allowing for the minimum two-foot separation between the bottom of each drainage chamber and the water table (as required in Suffolk County) and allowing for sufficient overlying soil to support the lawn and event parking proposed for this area, suggests that the available interval in which to locate the drainage structures may not be sufficient. The applicant should provide sufficient design information for the proposed drainage area to support the conceptual design, including verifying that the SCDHS will allow the planned parking above the drainage system. Appendix M indicates that an Engineering Report will be submitted to address these issues, but such a report is not included in the FEIS.

SCDHS not concerned abt. parking

monitoring will be done in site plan review

- A Nitrex PRB is proposed for nitrogen removal from groundwater migrating through the CPI property. The PRB, it is claimed, will remove 98% of the existing and proposed nitrogen load. Furthermore, the proposed wastewater plan for the CPI property relies on the PRB to reduce the nitrogen load to below 7 mg/l. However, the provided design information is limited and insufficient for an evaluation of the efficacy of the PRB. For example, the PRB depth is reported as 6 feet – is this 6 feet below grade or 6 feet into the water table? What is the actual permeability of the PRB? Will it be comparable to or greater than the surrounding highly permeable sands or will it be less permeable, which may cause groundwater to mound behind or flow around the PRB? What is the mass of Nitrex to be used and its nitrogen removal rate? What is the mass distribution within the PRB – that is, will more mass be placed downgradient of the wastewater discharge area where the nitrogen load will be greatest? How long is the initial Nitrex installation expected to last and what is the planned PRB renewal/recharge frequency? How will

the Nitrex PRB be renewed/recharged relative to the proposed new infrastructure (roads, utilities, etc.) to be installed as part of the project? The applicant should provide sufficient PRB design information, including long-term maintenance procedures and frequency, to allow for its evaluation.

FPM looked @ Sec. 1.3.7 + Appendix M-1

- The applicant provides a single photograph (page 15 in Appendix M) to illustrate the performance of a Nitrex PRB. However, there is no supporting monitoring information or other examples of Nitrex PRBs and associated performance information provided. The applicant should provide sufficient supporting information concerning the performance of Nitrex PRBs, including monitoring information, such that the anticipated performance of the proposed Nitrex PRB can be confirmed.

- It is reported in Appendix M that the nitrogen removal performance of the septic system-PRB will be monitored by periodic sampling of groundwater monitoring wells for the first 10 years of operation. However, there is no plan presented for use of the monitoring data other than to calculate groundwater flow, nitrogen flux and nitrogen removal. It is recommended that the applicant provide a plan for use of these data in assessing PRB performance and determining when maintenance/recharge is needed. The applicant should be required to commit to an ongoing PRB maintenance/recharge program to ensure continued PRB performance.

- Section 4 of Appendix M states that it is assumed that the septic system and PRB are outside of the jurisdiction of the New York State Department of Environmental Conservation (NYSDEC). We note that as the PRB will include placement of materials into the water table for the purpose of chemically reacting with the groundwater, it is our understanding that the NYSDEC will have jurisdiction over PRB installation (as it constitutes in-situ chemical treatment) and may impose additional requirements for monitoring. As the Nitrex PRB is essential to the reduction of nitrogen impacts from the project, we recommend that the applicant seek NYSDEC approval for the proposed PRB and provide confirmation to the Town that the PRB will be permitted by the NYSDEC.

App still rejects concept of NYSDEC jurisdiction

Comments regarding Canal/Eastern Properties Issues

Based on the information provided it is clear that placement of a wastewater treatment system on the Canal property is not advisable and that use of the Eastern property for this purpose appears to be acceptable from a hydrogeologic perspective. There remain several issues concerning operation of the Nitrex wastewater treatment system (in addition to the SONIR model issues discussed above) for which additional information should be provided so that potential impacts can be better assessed, as follows:

- Appendix N includes information concerning wastewater treatment for the Canal and Eastern properties. A flow equalization tank is included in the treatment train for the purpose of managing wastewater flow such that the treatment system receives a constant flow "as best as possible", with a design flow of 11,870 gallons per day (gpd). As the Canal property is expected to experience some level of seasonal occupancy, it can be expected that wastewater flow may vary seasonally beyond the range that the flow equalization tank can control for a "constant flow". As flow excursions outside of the normal operating range typically result in sub-optimal wastewater treatment plant performance, the applicant should provide additional information regarding the flow range that the wastewater treatment plant is designed for and measures that will be taken to address flows outside of this range such that the Town can be assured that the Nitrex system will function throughout the year.

- Appendix N provides a cursory outline of the inspection and sampling requirements of the SCDHS for wastewater treatment systems. However, the information provided is insufficient to evaluate whether the requirements of the SCDHS will be adequate for the Nitrex system. Furthermore, there is little information provided concerning maintenance of the system and whether maintenance activities unique to Nitrex systems have the potential for impacts (noise, odor, etc.) to nearby residents. More detailed information should be provided regarding inspection, sampling and maintenance requirements for the Nitrex system.

If you have any questions, please do not hesitate to call me at 737-6200, ext. 228.

Very truly yours,

Stephanie O. Davis, CPG
Senior Project Manager
Vice President

SOD:sod
Attachment

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Part 3b - Waterbodies for which TMDL Development May be Deferred (Requiring Verification of Cause/Pollutant/Source) (con't)

Water Index Number	Waterbody Name (WI/PWL ID)	County	Type	Class	Cause/Pollutant	Source	Year
	Mohawk River Drainage Basin						
H-240 (portion 14)	Mohawk River, Main Stem (1201-0094)	Oneida	River	C	Floatables	Urban Runoff	2004
H-240 (portion 14)	Mohawk River, Main Stem (1201-0094)	Oneida	River	C	Copper	Urban Runoff	2004
H-240 (portion 14)	* Mohawk River, Main Stem (1201-0094)	Oneida	River	C	Oxygen Demand [1]	Urban Runoff	2004
H-240 (portion 14)	* Mohawk River, Main Stem (1201-0094)	Oneida	River	C	Pathogens	Urban Runoff	2004
H-240- 21 thru 28	Minor Tribs to Mohawk River (1201-0040) [78]	Schnectady	River	C	Aquatic Toxicity	Industrial/Urban Runoff	2010
	Lower Hudson River Drainage Basin						
H- 95-14-P354	Sylvan Lake (1304-0029)	Dutchess	Lake	B(T)	Oxygen Demand [1]	Onsite WTS	2010
H-139-13-59	Quaker Creek (1306-0025)	Orange	River	D>C	Oxygen Demand [1]	Agriculture	2004
	Delaware River Drainage Basin						
D- 1- 1 thru 11 (selected)	Minor Tribs to Lower Neversink River (1402-0023) [79]	Orange	River	C	Aquatic Toxicity	Municipal/Urban	2010
	Ramapo/Hackensack River Basin						
NJ- 1 (portion 2)	Hackensack River, Low, and mnr tribs (1501-0026)	Rockland	River	A	Aquatic Toxicity	Urban/Storm Runoff	2010
NJ- 1- 4	Nauraushaun Brook, Lower, and tribs (1501-0010)	Rockland	River	A	Aquatic Toxicity	Urban/Storm Runoff	2010
NJ- 1/P977a-	Minor Tribs to DeForest Lake (1501-0029) [80]	Rockland	River	A	Aquatic Toxicity	Urban/Storm Runoff	2010
NJ- 1/P977a-12	West Br.Hackensack, Upper, and tribs (1501-0009)	Rockland	River	C(T)	Aquatic Toxicity	Urban/Storm Runoff	2010
NJ- 5	Pascack Brook and tribs, within NYS (1501-0015)	Rockland	River	C	Aquatic Toxicity	Urban/Storm Runoff	2010
	Atlantic Ocean/Long Island Sound Drainage Basin						
(MW1.2) SI- 8-1-1	Springville Creek, Upper, and tribs (1701-0186)	Richmond	River	B	Aquatic Toxicity	Urban/Storm Runoff	2010
(MW3.2) LIS- 4	Burling Brook and tribs (1702-0120)	Westchester	River	C	Aquatic Toxicity	Urban/Storm Runoff	2010
(MW7.1b) AO-SB	Shinnecock Bay and Inlet (1701-0033) [81]	Suffolk	Estuary	SA	Nitrogen	Onsite WTS, Urb Runoff	2010
(MW7.1c) AO-QB	Quantuck Bay (1701-0042) [81]	Suffolk	Estuary	SA	Nitrogen	Onsite WTS, Urb Runoff	2010

78 The specifically identified impaired water(s) in this segment include College Creek (-23), Cowhorn Creek (24), Schemerhorn Creek (-25), Brandywine Creek (-25-1) and other tribs to Schemerhorn Creek.

79 The specifically identified impaired water(s) in this segment include Gold Creek (-2-1).

80 The specifically identified impaired water(s) in this segment include the West Branch Hackensack River, Lower (-12).

81 These listings are a result of impairments due to extensive algal blooms that are thought to be the result of multiple factors, including elevated nitrogen levels. Further study is necessary to determine the relative contribution of these multiple factors, the role of nitrogen loading in the Bay, whether a TMDL is the more appropriate management response (and if so, what is the appropriate TMDL target/endpoint). Until these issues regarding causes and pollutants are clarified, Part 3b is the most appropriate place to list the waters of these Bays. Other tributary embayments to these waters were also considered for listing, however decisions regarding these additional listings have been deferred pending further study regarding harmful algal blooms.

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TOWN OF SOUTHAMPTON

November 19, 2014

RECEIVED
NOV 21 2014
TOWN OF SOUTHAMPTON
DEPT. OF LAND MANAGEMENT
ADMINISTRATION DIVISION

Ms. Janice Scherer
Principal Planner
Long Range Planning Division
Town of Southampton
116 Hampton Road
Southampton, NY 11968

Re: **Evaluation of Hydrology and Nitrogen Issues**
Final Environmental Impact Statement (FEIS), Accepted October 2014
Canoe Place Inn (CPI), Canal & Eastern Properties, Hampton Bays, NY
FPM File No. 1159g-14-01

Dear Janice:

FPM Group (FPM) has reviewed relevant portions of the Final Environmental Impact Statement (FEIS) for the above-referenced Maritime Planned Development District (MPDD), which was accepted by the Town of Southampton (Town) in October 2014. This review was performed specifically for hydrology and nitrogen issues, focusing on potential impacts to groundwater and surface water conditions in the project area. In particular, we have evaluated how the FEIS accepted by the Town has been modified to address certain issues discussed in our August 6, 2014 correspondence to the Town concerning the May 2014 version of the FEIS.

This written report includes an assessment of how each of our previous comments has been addressed, whether the issue was resolved, and whether there are remaining concerns. ***If there are remaining concerns or recommendations, these are highlighted in bold italics.*** Our responses are intended to assist the Town in developing project requirements for the MPDD that is the subject of the accepted FEIS.

Comments Regarding Assessment of Current and Proposed Groundwater Conditions

We previously commented on the following issues identified in the May 2014 FEIS and made certain recommendations. Our assessment of how these issues were addressed in the accepted FEIS is presented beneath each comment.

Comment:

As discussed in Appendix M (pages 8 and 9) and referenced on pages 1-17 and 3-58 of the FEIS, although groundwater in the Upper Glacial Aquifer is anticipated to flow generally to the east/southeast in the CPI area and to the west/southwest beneath the eastern properties, this groundwater flow pattern is likely to be affected by local conditions associated with the Shinnecock Canal, including the subsurface walls and structures. These structures may elevate groundwater levels in their vicinity and/or divert groundwater flow to the north or south. It is stated in Appendix M that groundwater wells will be installed on the property to determine the actual groundwater flow patterns and rates for design purposes. As discharge of stormwater will occur on all three properties and discharge of wastewater is planned for two of the properties, we recommend that at least three properly-installed, developed, and surveyed

groundwater monitoring wells be installed on each property for this purpose, with at least one well in each of the two areas intended for wastewater discharge. At least one round of synoptic water levels should be obtained and water levels in the wells closest to the shorelines should be monitored over at least a 12-hour period to assess the range of tidal fluctuation. This information should be used in developing the final locations and designs for the stormwater and wastewater management facilities.

Assessment:

Section 1.3.5 of the FEIS has been modified to provide for installation of groundwater monitoring wells and conducting sufficient monitoring to evaluate groundwater levels, flow patterns and rates for wastewater and stormwater drainage design. A plan for conducting this monitoring will be developed during the site plan review process, as noted on page 3-60 and elsewhere. Appendix M (now M-1) has also been modified to include provisions for determination of groundwater flow patterns for use in wastewater treatment design. We conclude that the October 2014 FEIS appears to address the issues in the above comment and ***we recommend that a groundwater monitoring plan be developed during the site plan review process for use in design of the wastewater treatment and drainage systems.***

I am approved w/o knowing details

Comment:

In Appendix M it is stated that nitrate-N levels in the upper aquifer (Upper Glacial Aquifer) in the area of the project site are 1 to 6 milligrams per liter (mg/l); this range is supported by the Suffolk County Comprehensive Water Resources Management Plan (2010). However, subsequent calculations of nitrogen loading to groundwater are based on the nitrate-N level reported by the Hampton Bays Water District for water in the deeper (Magothy) aquifer (2.0 mg/l). This assumed nitrate concentration is lower than what would be expected based on a median value of 3.5 mg/l for the Upper Glacial Aquifer derived from the published range. We recommend that unless site-specific nitrate data are available for the Upper Glacial Aquifer, evaluations of nitrate loading to the Upper Glacial Aquifer should be performed using the median value of 3.5 mg/l for nitrate in the Upper Glacial Aquifer in this area based on published data.

Assessment:

Appendix M (now M-1) has been revised (page 11 of 34) to indicate that a nitrate value of 3.5 mg/l is representative of groundwater quality in the upper Glacial Aquifer in proximity to the project site and will be used for preliminary design purposes. It is also noted that 3.5 mg/l of nitrate is consistent with data for groundwater discharging to nearby Mecox Bay, as reported by Professor Gobler of Stony Brook University. We also note that the assessment of nitrogen loading to groundwater has also been modified to reflect this value. We conclude that the October 2014 FEIS appears to address this issue.

Comment:

Response to Comment G-5 (page 3-11 and following in the May 2014 FEIS) is correct in that groundwater in the project area is anticipated to flow towards and discharge to Shinnecock Bay and, therefore, a discussion of the nitrogen load in groundwater relative to the Total Maximum Daily Load (TMDL) for nitrogen for the Peconic Estuary is not relevant. However, what should be included in the FEIS is a more in-depth discussion of the nitrogen load relative to the condition of Shinnecock Bay. Although a TMDL for nitrogen has not yet been developed for Shinnecock Bay, we note that Shinnecock Bay and Inlet have been listed since 2010 on New York State's Section 303(d) List of Impaired/TMDL Waters due to nitrogen pollution reportedly

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sourced from onsite wastewater treatment systems and urban runoff. Although a TMDL for nitrogen has not yet been developed for Shinnecock Bay, nitrogen is clearly a contributing factor to the extensive algal blooms that have resulted in the bay's impaired classification. Although it appears that the proposed wastewater management practices relative to nitrogen, as presented in the FEIS, are intended to conform to the SCDHS requirements relative to drinking water criteria (10 mg/l) and Best Management Practice (BMP) for treated wastewater discharged within a 25-year travel time to a surface water body (7 mg/l), both of these criteria are higher than the nitrogen level in groundwater that may contribute to the impaired condition of Shinnecock Bay. The FEIS should acknowledge the recognized impaired condition of Shinnecock Bay relative to nitrogen and the apparent need for reducing nitrogen loads in groundwater below currently-promulgated criteria.

Assessment:

The October 2014 FEIS includes a revised response to Comment G-5 (page 3-12 and following) that recognizes the impaired condition of Shinnecock Bay and the need to reduce nitrogen loading. Text has also been added to Section 1.3.7 (page 1-24) and elsewhere regarding the impaired condition of Shinnecock Bay.

what about mitigating the problem?

Comment:

The SONIR model inputs have been adjusted and the models re-run for the (May 2014) FEIS. These adjustments generally provide what are likely more reasonable estimates of nitrogen in recharge from the project. We note that the nitrogen recharge under the current conditions for the CPI property (unoccupied) is calculated at 0.34 pounds per year and is solely attributed to stormwater recharge; this appears to be a reasonable estimate of the nitrogen being recharged under current conditions and is a better estimate of the current condition than the "grandfathered" flow used during the DEIS. The resulting nitrogen concentration in the recharged stormwater is 0.01 mg/l; this recharge is being added to the existing Upper Glacial Aquifer groundwater, which has a nitrogen concentration estimated at 3.5 mg/l (see above). The result is that groundwater recharge, as it presently exists on the property, is diluting the nitrogen concentration in the groundwater, thereby improving groundwater quality.

this is what exists

Assessment:

This Comment did not require a response.

Comment:

The nitrogen recharge for the CPI property, if developed as proposed, is calculated at 640.13 pounds per year, or nearly a 2,000 % increase over the current conditions. The concentration of nitrogen in recharge from all sources on the developed property (with sanitary waste contributing by far the largest amount) is calculated at 7.48 mg/l. This concentration exceeds the SCDHS BMP of 7 mg/l for wastewater discharges within a 25-year travel time to a surface water body and will be added to the existing Upper Glacial Aquifer groundwater (with an existing estimated nitrogen concentration of 3.5 mg/l), potentially resulting in groundwater with highly-elevated nitrogen concentrations at the downgradient side of the CPI property. The SONIR model results clearly indicate that treatment of the sanitary waste to remove nitrogen is a key concern for redevelopment of the CPI property.

FPM

Assessment:

This Comment did not require a response. We note that the October 2014 FEIS includes revised calculations for nitrogen discharge, as discussed below.

Comment:

The nitrogen recharge for the Canal property was calculated at 10.79 pounds per year (recharge concentration of 0.34 mg/l), with nearly all of the nitrogen resulting from application of fertilizer to landscaped areas. We note that although nearly two acres of this property will be landscaped (Table 1-5 of FEIS, page 1-13), the area to be fertilized is considered to be half of this area (40,511 square feet). This resulted from the reasoning that not all of the landscaped areas will be established in fertilizer-dependent vegetation (Comment G-76, page 3-62). While the use of native vegetation with lower fertilization requirements is desirable, Comments G-76 and G-78 clearly state that the "final landscape plan will ensure that the acreages indicated on Table 1-5 of this Final EIS are achieved in terms of limiting fertilizer dependent vegetation". We note, however, that this table does not include any information about how much of the landscaped area will include fertilizer-dependent vegetation vs. native vegetation. As the fertilized landscaping contributes the greatest amount of nitrogen to recharge on the Canal property, Table 1-5 should be modified to specify the area of landscaping that will be planted with native vegetation.

Assessment:

In the October 2014 FEIS Table 1-5 has been modified to indicate the acreage of total vegetation and native vegetation. This appears to be reflected on the Conceptual Planting Plans, on page 1-28 where the landscaping is described, and is also factored into the SONIR calculations.

Comment:

The response to Comment G-70 discusses how pet waste is factored into the SONIR model calculations. While we would agree that the "pick up after your pet" philosophy can be expected to reduce pet waste nitrogen impacts, we note that pick up of pet urine is not practical and a portion of pet owners continue to leave solid pet waste on the ground; both of these wastes contribute to nitrogen impacts. Although Comment G-70 clearly states that pet waste was factored into the updated SONIR model for the Canal property included in the FEIS, the SONIR model output for the Canal property in the FEIS does not show this input. Although there are five residential cottages included on the CPI property, pet waste input was not factored into this model either. These models should be re-run with pet waste nitrogen impacts factored in.

Assessment:

The SONIR model runs included in the October 2014 FEIS were re-run to factor in pet waste and the response to Comment G-70 has been revised to reflect this change. We note that nitrogen from pet waste constitutes the greatest fraction (70%) of nitrogen input to recharge from the Canal property. Clearly, measures to pick up pet waste are essential for this property which is located close to the Shinnecock Canal. ***Please note that the concentration of nitrogen in recharge from the Canal property is now estimated at 1.12 mg/l; this value should be reflected on pages 3-13 and 3-56 of the FEIS (the old value of 0.34 mg/l remains in the accepted FEIS).***

new info. from FPM

(*)

Comment:

The nitrogen recharge for the Eastern property, which would receive sanitary waste from the Canal property for treatment in a Nitrex wastewater treatment system, is calculated in the FEIS at 96.10 pounds per year (recharge concentration of 2.05 mg/l), with nearly all of the nitrogen resulting from discharges from the Nitrex system. We note that the SONIR input value for the concentration of nitrogen in the Nitrex system discharge is 3.00 mg/l in the model run for the FEIS, whereas the input value for the model run included in the DEIS was nearly twice this value (5.00 mg/l). The value selected for this input factor significantly affects the SONIR model result and must be chosen with care. We could find no justification in the FEIS for this reduction in the nitrogen concentration in the Nitrex system discharge. A review of the documentation for the Nitrex system (Appendix N in the FEIS) does not provide any information to support this reduction in the nitrogen concentration in the discharge. In fact, Appendix N (page 17) indicates only that the total nitrogen in the Nitrex system discharge may be up to 10 mg/l. Based on this information, the nitrogen in recharge from the Nitrex system, assuming that the system functions in accordance with the information in Appendix N, may be up to 10 mg/l (or somewhere in the range of 320 pounds per year). We recommend that the applicant provide supporting information for the selection of the nitrogen concentration value to be used in the SONIR model for the Eastern property and that the SONIR model be re-run as necessary to more accurately predict the nitrogen impacts from this system.

Assessment:

In the October 2014 FEIS Appendix N has been revised to include supporting information regarding the anticipated nitrogen in recharge from the Nitrex system (pages 17 through 19). This information indicates an average nitrogen concentration of 2.92 mg/l in effluent from 15 Nitrex systems, with a range of 1.9 to 4.5 mg/l and supports the use of 3.00 mg/l used in the SONIR model run for the Eastern property.

Comments Regarding Proposed Wastewater Treatment – CPI Property

Based on the information provided in the May 2014 FEIS, it appeared that use of a Nitrex wastewater treatment system had not been considered for the CPI property. However, in the October 2014 FEIS the use of a Nitrex system for the CPI property is under consideration, and will be discussed below. The applicant has also proposed adding a Nitrex permeable reactive barrier (PRB) to the property which, in concert with a traditional septic tank/leaching field wastewater management system, is anticipated to provide for significant nitrogen removal from the sanitary waste to be discharged onsite. If the PRB functions as intended, it can also be anticipated to remove nitrogen from other sources (ambient groundwater, stormwater, etc.). The following comments and responses pertain to wastewater issues for the CPI property:

Comment:

As discussed in Appendix M, the proposed chambered drainfield area for the effluent from the conventional wastewater treatment system is located in the northeastern portion of the CPI parcel, where the current surface elevation ranges from approximately 12 to 18 feet above mean sea level (MSL). The concept grading and drainage plan for CPI shows a net cut in this area of about 0.5 feet, which will result in a final surface elevation of between 11.5 and 17.5 feet. The closest test hole to the proposed drainfield area (#3) demonstrates a water table elevation of about 1.94 feet MSL and it is reported that groundwater elevations fluctuate between 2 and 3 feet in this area. Therefore, the thickness of the unsaturated zone following grading is anticipated to range between 6.5 and 13.5 feet in the drainfield. Allowing for the

minimum two-foot separation between the bottom of each drainage chamber and the water table (as required in Suffolk County) and allowing for sufficient overlying soil to support the lawn and event parking proposed for this area, suggests that the available interval in which to locate the drainage structures may not be sufficient. The applicant should provide sufficient design information for the proposed drainage area to support the conceptual design, including verifying that the SCDHS will allow the planned parking above the drainage system. Appendix M indicates that an Engineering Report will be submitted to address these issues, but such a report is not included in the FEIS.

Assessment:

As noted above, Section 1.3.5 of the FEIS has been modified to provide for installation of groundwater monitoring wells and conducting sufficient monitoring to evaluate groundwater levels, flow patterns and rates for wastewater and stormwater drainage design. A plan for conducting this monitoring will be developed during the site plan review process. Appendix M (now M-1) has also been modified to include provisions for determination of groundwater flow patterns for use in wastewater treatment design. We conclude that the October 2014 FEIS appears to address the issues in the above comment and ***we recommend that a groundwater monitoring plan be developed during the site plan review process for use in design of the wastewater treatment and drainage systems.*** We also note that Appendix M (now M-1) has been modified (page 26) to address the question of parking above the sanitary waste drainage system – we understand that the SCDHS does not restrict parking above a conventional drainage system and, therefore, this does not present a concern.

Comment:

A Nitrex PRB is proposed for nitrogen removal from groundwater migrating through the CPI property. The PRB, it is claimed, will remove 98% of the existing and proposed nitrogen load. Furthermore, the proposed wastewater plan for the CPI property relies on the PRB to reduce the nitrogen load to below 7 mg/l. However, the provided design information is limited and insufficient for an evaluation of the efficacy of the PRB. For example, the PRB depth is reported as 6 feet – is this 6 feet below grade or 6 feet into the water table? What is the actual permeability of the PRB? Will it be comparable to or greater than the surrounding highly permeable sands or will it be less permeable, which may cause groundwater to mound behind or flow around the PRB? What is the mass of Nitrex to be used and its nitrogen removal rate? What is the mass distribution within the PRB – that is, will more mass be placed downgradient of the wastewater discharge area where the nitrogen load will be greatest? How long is the initial Nitrex installation expected to last and what is the planned PRB renewal/recharge frequency? How will the Nitrex PRB be renewed/recharged relative to the proposed new infrastructure (roads, utilities, etc.) to be installed as part of the project? The applicant should provide sufficient PRB design information, including long-term maintenance procedures and frequency, to allow for its evaluation.

– not responded to by App.

Assessment:

The October 2014 FEIS contains considerable additional information concerning PRB design, anticipated lifespan, and replacement. A monitoring plan and commitment are also included. This information is located primarily in Section 1.3.7 (pages 1-22 and following) and Appendix M-1. This information includes length (950 feet), depth (6 feet into groundwater), nitrogen removal (773 pounds per year), permeability (higher than the surrounding sandy aquifer), anticipated lifespan (about 40 years), and some information about replacement. We understand that the greatest mass of Nitrex material will be placed downgradient of the primary wastewater discharge area; this area of the PRB will likely eventually require replacement.

no response as to:
– renewal/recharge frequency;
– or relative to new infrastructure
– long-term maintenance

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Comment:

The applicant provided a single photograph (page 15 in Appendix M, May 2014 FEIS) to illustrate the performance of a Nitrex PRB. However, there is no supporting monitoring information or other examples of Nitrex PRBs and associated performance information provided. The applicant should provide sufficient supporting information concerning the performance of Nitrex PRBs, including monitoring information, such that the anticipated performance of the proposed Nitrex PRB can be confirmed.

Assessment:
The October 2014 FEIS now includes Appendix M-2, which contains performance information for an existing PRB located in a setting that is similar to CPI. This information demonstrates a reduction in nitrate across the PRB, with ambient groundwater nitrate ranging from between approximately 0.1 and 10 mg/l, and nitrate downgradient of the PRB ranging from about 0.02 to 0.05 mg/l, which demonstrates a one to two order of magnitude reduction. This information supports the anticipated performance of the PRB.

not similar not a sufficient comparison

Comment:

It is reported in Appendix M of the May 2014 FEIS that the nitrogen removal performance of the septic system-PRB will be monitored by periodic sampling of groundwater monitoring wells for the first 10 years of operation. However, there is no plan presented for use of the monitoring data other than to calculate groundwater flow, nitrogen flux and nitrogen removal. It is recommended that the applicant provide a plan for use of these data in assessing PRB performance and determining when maintenance/recharge is needed. The applicant should be required to commit to an ongoing PRB maintenance/recharge program to ensure continued PRB performance.

Assessment:

Appendix M-1 (formerly Appendix M) now includes a more detailed protocol for monitoring and data evaluation, and a commitment to replace/rejuvenate the PRB media when the nitrogen removal becomes appreciably less than 94% of actual wastewater nitrogen discharges (page 31). This commitment is also reflected on page 1-23 of the accepted FEIS. ***We recommend that a formal PRB monitoring plan be developed. This plan should be tailored to the actual designs of the PRB and other onsite wastewater treatment systems, which will not be fully developed until later in the site planning process. Please note that this monitoring plan is <u>not</u> the same as the groundwater monitoring plan to be used during design of the wastewater treatment and drainage systems.***

different monitoring where is the commitment in the law?

Comment:

Section 4 of Appendix M in the May 2014 FEIS stated that it is assumed that the septic system and PRB are outside of the jurisdiction of the New York State Department of Environmental Conservation (NYSDEC). We note that as the PRB will include placement of materials into the water table for the purpose of chemically reacting with the groundwater, it is our understanding that the NYSDEC will have jurisdiction over PRB installation (as it constitutes in-situ chemical treatment) and may impose additional requirements for monitoring. As the Nitrex PRB is essential to the reduction of nitrogen impacts from the project, we recommend that the applicant seek NYSDEC approval for the proposed PRB and provide confirmation to the Town that the PRB will be permitted by the NYSDEC.

insufficient response

Assessment:

Section 4 of what is now Appendix M-1 in the October 2014 FEIS now includes a statement indicating that, based on discussions with the SCDHS and NYSDEC, the proposed Nitrex PRB does not require SCDHS or NYSDEC permits. This issue appears to have been addressed.

* "discussions" - nothing in writing

This topic was not raised in FPM's 8/6/14 report

Comments on Nitrex Treatment System vs. Conventional Treatment System/PRB for CPI

On pg. 1-24 of the accepted FEIS it is stated: "In order to achieve the 100% nitrogen reduction goal, either an active or passive alternative sewage treatment system will be chosen by the Town Board as part of the CPI component of the MPDD development. If the passive PRB option with conventional subsurface sanitary system is chosen, a monitoring protocol of the Nitrogen output may be required by the Town Board to both study and determine the long term effectiveness of this approach." We understand that the Town is contemplating requiring a Nitrex treatment system for the CPI property in lieu of the conventional treatment system with the downgradient PRB. We have the following observations with respect to this issue:

- With the conventional system/PRB all components will be below grade and normal at-grade activities (parking, use by occupants, etc.) will not be impeded. At present, this system has been conceptually designed and a site layout reasonably well confirmed. If a Nitrex system is used there will be a need for above-grade components housed in an additional onsite building requiring the necessary setbacks, etc. Furthermore, normal at-grade uses may not be permitted above the below-grade Nitrex system components (exclusive of the leaching field) as the SCDHS typically does not allow other uses above the components of a non-traditional waste treatment system. Selection of a Nitrex treatment system would necessitate a re-evaluation of the site layout and setbacks to assess whether the required setbacks can be achieved and whether there are negative impacts on other aspects of this project;

should be done

- The conventional system/PRB requires little in the way of maintenance and is relatively inexpensive to operate. The Nitrex system requires more maintenance and is more expensive to operate. As there are operating components to the Nitrex system, there may be a somewhat higher level of noise associated with this system;

maintenance of PRB not confirmed

- Perhaps most importantly, while a properly-designed Nitrex treatment system may be anticipated to remove significant amounts of nitrogen from the wastewater that passes through the system (94% reduction, with an estimated nitrogen concentration of 3 mg/l in the treated effluent), this system will do nothing to address other sources of nitrogen in groundwater at CPI. These additional sources include stormwater runoff, fertilizer from landscaped areas, pet waste, nitrogen in irrigation water, and nitrogen in the groundwater that is migrating onto the CPI property from upgradient. Nitrogen from these sources will continue to enter the groundwater and migrate downgradient, eventually discharging to Shinnecock Bay. A review of the SONIR model output for the CPI property helps to quantify the annual amount of nitrogen anticipated to originate from these sources: 0.53 pounds from stormwater, 19.43 pounds from landscaping fertilizer, 3.38 pounds from pet waste, and 0.26 pounds from irrigation, for a total of 23.59 pounds per year from these sources, none of would be addressed by a Nitrex treatment system. Groundwater migrating through the property already contains 3.5 mg/l of nitrogen, none of which would be addressed by the Nitrex treatment system. If a Nitrex system effluent (3.0 mg/l nitrogen) is added to the ambient groundwater and the

without testing, no proof PRB will accomplish removal levels claimed

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other nitrogen sources are also added, the nitrogen content in the groundwater leaving the CPI property (without a PRB) can be expected to be well in excess of 3.5 mg/l. However, if a conventional treatment system/PRB combination is used, although the nitrogen in the total site recharge is calculated to be 7.52 mg/l (Appendix L-2), with a PRB removal efficiency of 94%, the nitrogen concentration downgradient of the PRB may be in the range of 0.45 mg/l. We conclude that the PRB can be expected to remove a very substantial percentage of the nitrogen from all sources, thereby significantly reducing the nitrogen impacts site-wide. Appendix M-1 includes calculations of nitrogen removal by the PRB (page 14) that support considerable removal of nitrogen by the PRB.

based on what?

Overall, it is our opinion that the conventional wastewater treatment system, combined with a properly-designed Nitrex PRB, a monitoring program to document its performance, and a plan to replace/renew the PRB when needed, will provide greater nitrogen removal from groundwater than a Nitrex treatment system. Furthermore, there are siting, setback, maintenance, and other issues that would have to be assessed before selecting a Nitrex treatment system for the CPI property.

then eliminate Eastern & put conventional system + PRB on Canal; will have to reduce density on Canal

Comments regarding Canal/Eastern Properties Issues

Based on the information provided it is clear that placement of a wastewater treatment system on the Canal property is not advisable and that use of the Eastern property for this purpose appears to be acceptable from a hydrogeologic perspective. There remained several issues concerning operation of the Nitrex wastewater treatment system (in addition to the SONIR model issues discussed above) for which additional information was needed so that potential impacts can be better assessed.

Comment:

Appendix N in the May 2014 FEIS included information concerning wastewater treatment for the Canal and Eastern properties. A flow equalization tank is included in the treatment train for the purpose of managing wastewater flow such that the treatment system receives a constant flow "as best as possible", with a design flow of 11,870 gallons per day (gpd). As the Canal property is expected to experience some level of seasonal occupancy, it can be expected that wastewater flow may vary seasonally beyond the range that the flow equalization tank can control for a "constant flow". As flow excursions outside of the normal operating range typically result in sub-optimal wastewater treatment plant performance, the applicant should provide additional information regarding the flow range that the wastewater treatment plant is designed for and measures that will be taken to address flows outside of this range such that the Town can be assured that the Nitrex system will function throughout the year.

Assessment:

Appendix N in the October 2014 FEIS now includes additional information regarding the flow range of the Nitrex system, which is indicated to be between zero and the design flow of 11,870 gpd. It is also stated that the design flow is 100% greater than the average flow anticipated in the system. This information suggests that a wide flow range has been considered in the design of this system.

Comment:

Appendix N in the May 2014 FEIS provides a cursory outline of the inspection and sampling requirements of the SCDHS for wastewater treatment systems. However, the information

provided is insufficient to evaluate whether the requirements of the SCDHS will be adequate for the Nitrex system. Furthermore, there is little information provided concerning maintenance of the system and whether maintenance activities unique to Nitrex systems have the potential for impacts (noise, odor, etc.) to nearby residents. More detailed information should be provided regarding inspection, sampling and maintenance requirements for the Nitrex system.

Assessment:

Section 7 in Appendix N in the October 2014 FEIS provides additional information concerning the inspection and sampling requirements for the Nitrex wastewater treatment system. Additional information is also provided concerning maintenance of the system and the potential for impacts (noise, odor, etc.) to nearby residents. The additional information addresses these issues.

review Sec. 7 Appendix N to see if it's responsive

If you have any questions, please do not hesitate to call me at 737-6200, ext. 228.

Very truly yours,

Stephanie O. Davis, CPG
Senior Project Manager
Vice President

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