DEIS Appendix 9.11 – Natural Resource Management Plan

Comment A9.11-1-34X: I have very few comments on this Appendix as it actually is a turf management plan-the "Natural Resources Management Plan" is a misnomer and the title should reflect exactly what it is. [Dr. Michael W. Klemens, LLC, Letter, March 18, 2008, Comment X, page 5]

> **Response A9.11-1-34X:** The Natural Resource Management Plan is an evolving document. Please see Response 3.1-1-PHT. The NRMP will include not only the turf management plan component, but will also integrate the HMP developed for this project, as well as other management recommendations such as deicing management that result from the project's various town reviews. The NRMP will include the following components:
>
> - Best Management Practices and the use of Integrated Pest Management in order to avoid or minimize environmental problems and manage those problems at the source;
>
> - Environmental Monitoring Program to evaluate the effectiveness of the management program.

Comment A9.11-2-34Y: I strongly recommend that the Applicant consider an organic golf course. I also strongly recommend that the Board retain a specialist in the area to review the Applicant's findings and conclusions, including the IPM, and its effects on aquatic systems and wildlife. I would recommend that the Board retain Dr. Stuart Z. Cohen of Environmental Turf Services to review the FEIS submission of this chapter. Dr. Cohen is a recognized expert in the field not only of evaluating IPM's, but also assessing impacts of these IPM's to aquatic systems and wildlife. [Dr. Michael W. Klemens, LLC, Letter, March 18, 2008, Comment Y, page 5]

> **Response A9.11-2-34Y:** The Planning Board requested that Dr. A. Martin Petrovic, a turfgrass specialist from Cornell University, review the proposed IPM program as outlined in the NRMP. Comments raised by Dr. Petrovic are addressed below (see also Letter MP in Appendix C). Please also see Response 3.1-1-PHT regarding the potential for an organic golf course.

Comment A9.11-3-34Z: Finally, in case there is any confusion on the part of the Board, the preparers of the plan, Audubon Environmental are not part of or endorsed by the conservation group that is widely known and respected as the National Audubon Society. [Dr. Michael W. Klemens, LLC, Letter, March 18, 2008, Comment Z, page 5]

Response A9.11-3-34Z: Audubon International is a not-for-profit, 501(c)(3), environmental education organization dedicated to improving the quality of life and the environment. They work to make that happen where people live, work, and play. Nature is not confined to parks, preserves, or protected areas only. With the majority of land in this country privately-owned and managed, environmental stewardship must take place with the cooperation of homeowners, businesses, schools, and other property owners and land managers. They are an independent organization and like many other Audubon groups, Audubon International is not affiliated with any other local, state, or national Audubon society.

Comment A.9.11-4-MP0: Review of Natural Resources Management Plan (NRMP). The NRMP is composted of eight major sections including: environmental planning, construction management, best management practices to protect environmentally sensitive areas, integrated pest management for both the community and golf course, water conservation, environmental monitoring and natural resource management center. In general, the NRMP is a sound conceptual plan to produce a viable golf course and to protect the environmental from contamination from fertilizer and pesticide applications. Golf courses managed in a responsible fashion, as outlined in the NRMP, have been shown not to pose an unreasonable risk to water quality. However, the NRMP lacks site specific detail in many cases that is needed to assess or minimize the risk to water quality from application of fertilizer or pesticides. The following are issues that the applicant needs to elaborate, clarify or modify to improve the NRMP and minimize the risks to the environment. If a specific section is not mention I agree with the content or approach outlined." [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 1]

Response A.9.11-4-MP0: Comment noted.

Comment A.9.11-5-MP1: [NRMP Section 1.2.3] The Town should require the applicant to obtain and maintain Audubon International Signature Program (or equivalent) to protect the environment on and off the site." [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 2]

Response A.9.11-5-MP1: The Applicant is working with Audubon International and has commissioned the development of a Natural Resource Management Plan (NRMP) for the site by Audubon International. Audubon International's detailed NRMP (which includes the IPM Plan) for the proposed Silo Ridge Resort Community is included as Appendix 9.11 of the DEIS. The development of the NRMP is on-going. See Response 3.1-1-PHT. While the Applicant is striving to receive AI certification for the golf course, such certification is not guaranteed, and so cannot be included as a mitigation measure at this time.

Comment A.9.11-6-MP2: [NRMP Section 2.1.3 – Soils] Has any onsite data been collected as to the actual soils found on this site and if not they should be? It is likely the current golf course (open in 1992) has greens and possibly tees that are constructed mostly with sand and have received sand top dressing since construction. How many acres of sand based areas are there currently on site and how much will there be on the new golf course? Sand based areas are more likely to have nutrients and pesticides leaching through the soil and present a different risk the other parts of this site. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 2]

Response A.9.11-6-MP2: Soils samples have been taken on site. Locations of the soil samples are given in Table A9-1, below. Samples were taken the day after pesticides were applied to the golf course at locations where one would expect to detect pesticides the day after an application, and thus represent the 'worst case scenario' based on management inputs on the golf course. Appendix L, "Soil Testing Results," provides the results of that testing. As expected, one would see low concentrations of pesticides in the soils just after application and this was the case for samples taken from the greens (SR-1 and SR-7) and from one low point in the drainage way. These low concentrations should degrade rather quickly. The soil samples also showed that pesticides were not found at detectable concentrations in locations where applications had not been made recently.

Table A9-1, "Summary of Soil Samples Taken in May 2008"

Sample number	Location	Detections	Compound Detected
SR-1	Hole # 2, green	yes	Deltamethrin, iprodione, chlorothalonil, PCNB
SR-2	Hole #2, near Cascade Brook	No detections	
SR-3	Hole #4, 25 ft from Cascade Brook	No detections	
SR-4	Hole #8 fwy, near green	No detections	
SR-5	Near swale and silos at Rt 44	No detections	
SR-6	Hole #17, fwy west of hole	No detections	
SR-7	Hole #17, green	yes	Deltamethrin, iprodione, chlorothalonil, PCNB
SR-8	Hole #15, tee, west of hole	No detections	
SR-9	Hole #13, fwy near low spot	yes	PCNB
SR-10	Hole #13, wetland buffer east of fwy hole at low point	No detections	

Comment A.9.11-7-MP3: [NRMP Section 3.0 - Construction Management] It appears that this project is in conflict with the goals of Audubon International of resource conservation if the current golf course is to be rebuilt consuming a lot of energy and natural resources during construction. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 2]

> **Response A.9.11-7-MP3:** Audubon International does not make the decision to develop or re-develop property. Audubon International works with companies to make the development as environmentally sensitive and sustainable as possible. Please see also Response 8.0-1-PHT, which addresses LEED certification, and Response 3.2-6-34B, which discusses LID.

Comment A.9.11-8-MP4: [NRMP Section 4.1.2.1] There is a risk of off site movement from all fertilizers including natural organics that often contain large amounts of phosphorus, therefore, fertilizers containing any phosphorus should not be applied in the No Spray Zones unless a deficiency is indicated by a soil test (a value less than 4 lbs/acre based on the Cornell Nutrient Analysis Laboratory test, see Petrovic, A. M., D. Soldat, J. Gruttadaurio, and J. Barlow. 2005. Turfgrass growth and quality related to soil and tissue nutrient content. Intern. Turfgrass Soc. Res. J. 10:989-997). Nitrogen fertilizer should be applied to help establish these areas but should not be routinely used in the No Spray Zone once established. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 2]

> **Response A.9.11-8-MP4:** The NRMP's nutrient management program addressed the phosphorus issue by requiring soil testing before any application; the wording of the NRMP will be modified to conform to Dr. Petrovic's recommendation. AI wants to ensure that there is adequate ground cover to prevent erosion and ultimately sediment loss. This may require the use of nitrogen in the No Spray Zone to get the ground cover established. Once established, some subsequent, but minimal nitrogen applications could be required, in order to maintain the ground cover. These could be limited to slow release materials or spoon feeding on a very infrequent basis.

Comment A.9.11-9-MP5 [NRMP Section 4.1.2.2] Reference to Table 6.8 I believe should be to Table 6.9. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 2]

> **Response A.9.11-9-MP5:** Comment noted. This will be revised.

Comment A.9.11-10-MP6: [NRMP Section 5.0 IPM for the Community] Strongly consider an organic approach to all non-golf turf areas. The only pest that is problematic with a lawn organic IPM is weeds. Using all techniques to produce a dense lawn in outline in this section will lead to minimal weed problems. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 2]

Response A.9.11-10-MP6: AI disagrees that weeds will be the only problem. The Cornell University Gardening Resources website notes that insect problems including grubs, cutworms, sod webworms, chinch bugs and bluegrass billbugs can be problematic on lawns as well as disease problems including brown patch, dollar spot, fairy ring, leaf spot, Pythium, red thread, rust and snow mold which can result in reduced quality. The Applicant is not willing to commit to a totally organic approach for lawn maintenance.

Comment A.9.11-11-MP7: [NRMP Section 5.2 Turfgrass Selection]. To enhance the chance of a successful establishment, the sunny, medium – maintenance lawns should be seeded between mid-August to September 10. If these lawns can not be seeded during this period, a mix must be much higher in perennial ryegrass and very little Kentucky bluegrass should be used. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 2]

Response A.9.11-11-MP7: This revision can be made to the NRMP. However, a higher perennial ryegrass mixture will mean this will be the predominant grass in the landscape and it is inferior for wear, stress and pest tolerance.

Comment A.9.11-12-MP8: In Table 5-2, remove all reference to phosphorus and potassium application rates. As indicated they only be apply if shown by a soil test the area is deficient (a value less than 4 lbs/acre for phosphorus and 150 lbs/acre for potassium, based on the Cornell Nutrient Analysis Laboratory test). To reduce the risk of surface or ground water contamination, no fertilizers should be applied past October. Also, the nitrogen rates should be lowered as follows: low to a range of 0-1 lb. of nitrogen/1000 sq.ft./yr, medium to 1- 3 lbs. of nitrogen/1000 sq.ft./yr and high 2-4 lbs. of nitrogen/1000 sq.ft./yr. Because the greatest environmental risk is during establishment, no fertilizer should be applied pre-plant and fertilizer should only be applied until after germination has occurred. [Dr. A. Martin Petrovic, Letter, July 5, 2008, pages 2 and 3]

Response A.9.11-12-MP8: This edit can be made to the NRMP. However, this reference was meant to only show what a possible schedule might be, not that it was to be followed without the recommended soil testing. The nitrogen rates suggested by Dr. Petrovic are acceptable given that it presents a range of choices. AI disagrees with the recommendations for no pre-plant fertilizer especially if there is a phosphorus requirement as determined by a soil test. In order for phosphorus to be effective, it has to be incorporated in the soil rootzone. If this step is not taken, the roots will concentrate in the upper part of the soil profile, which will limit moisture availability for evapotranspiration and result in a less drought tolerant turf.

Comment A.9.11-13-MP9: [NRMP Section 5.3.3] All lawns irrigation must conform to NRCC lawn irrigation requirements on a weekly schedule or use on-site weather

station (from golf course) estimated evapotranspiration amount for irrigation. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 3]

> **Response A.9.11-13-MP9:** The NRMP noted that the NRCC website should be used. If the golf course has the capability to provide information from its on-site weather state for ET data for the other irrigated areas that could also be included in the irrigation management program.

Comment A.9.11-14-MP10: [NRMP Table 5-3] Reduce or omit pesticides based on organic option. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 3]

> **Response A.9.11-14-MP10:** This table can be modified as necessary to make certain only a low-risk least toxic approach is taken.

Comment A.9.11-15-MP11: [NRMP Section 6.1.3] In order to reduce erosion during construction, all site that are to be established in turf (include lawns and golf course turf) with a slope >15% should be sodded. Sodded site should not be fertilized until rooted, approximately 2-3 weeks after installation. In order to reduce environmental damage during construction, the considerations listed on page 6-9 should be required not just considered. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 3]

> **Response A.9.11-15-MP11:** The NRMP will be edited to include this recommendation.

Comment A.9.11-16-MP12: [NRMP 6.1.4.3 Mowing] All clipping collected from greens, tees and fairways must not be deposited in the No-Spray Zones, in the wetlands, any water course or in any buffer zone. Clippings from greens, tees and fairways should be deposited in the roughs or other out of play areas as a safe way for disposal and as a nutrient source for the rough grasses. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 3]

> **Response A.9.11-16-MP12:** The NRMP will be edited to include this requirement.

Comment A.9.11-17-MP13: [NRMP Tables 6-3 to 6-6]. Remove phosphorus (P) and potassium (K) applications amount but indicated if P and K is warranted based on soil testing (a value less than 4 lbs/acre for phosphorus and 150 lbs/acre for potassium, based on the Cornell Nutrient Analysis Laboratory test). After established, roughs should not need to be fertilized more than once per year especially if clipping are be applied to roughs. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 3]

> **Response A.9.11-17-MP13:** The NRMP will be edited to include this recommendation. Again, this portion of the NRMP was intended to illustrate what a possible schedule would look like, not make it a requirement.

Comment A.9.11-18-MP14: [NRMP Section 6.2.2.2 Fertigation] I would strongly recommend fertigation be used, especially during establishment as a way reduce nutrient runoff and/or leaching from surface fertilization. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 3]

> **Response A.9.11-18-MP14:** This is always suggested as an option and will add appropriate information to the NRMP.

Comment A.9.11-19-MP15: [NRMP Section 6.4 Pesticide Selection] The pesticide selection is based on several factors, one being that pesticides pass risk assessment. Audubon International states that based on years of research and monitoring of existing golf course, surface water contamination is far more problematic than leaching into groundwater. Furthermore, my research and others have concluded that the risk of pesticide or nutrient runoff from turf is limited to sites with high runoff potential (wet soils, shallow depth to groundwater or bedrock, very steep slopes). Therefore a truly site-specific risk assessment analysis is needed. Tier 1 screening in not dependent on site factors, where Tier 2 and tier 3 screening using the SWRRBWQ (could also use Turf PQ) model can and should be done on the parts of this site that has a high risk to runoff. These high risk sub-watersheds must be evaluated for phosphorus, nitrogen (nitrate and ammonium) and pesticides using site specific conditions to determine if the project poses an unreasonably risk. If an unreasonable risk is found, mitigation by the methods list in this report can be evaluated with a goal of reducing the risk to below the water quality standards (acute aquatic, chronic aquatic and human health). Amphibian toxicity should also be added to the water quality standards (can use method developed by Environmental Turf Services, Wheaton, MD). [Dr. A. Martin Petrovic, Letter, July 5, 2008, pages 3 and 4]

> **Response A.9.11-19-MP15:** This issue was discussed at length with Dr. Petrovic and the other Town's Consultants at a workshop meeting on July 7, 2008. The Applicant and their consultants do not believe that a risk assessment is necessary for this project. The project involves redevelopment of an existing golf course which is being actively managed at the current time. The existing golf course does not include no spray zones, riparian zones, buffer zones, nor does the existing golf course have a Natural Resource Management Plan to direct a formal Integrated Pest Management plan process. Based on the environmental assessments at the site, there are limited amphibian communities within the aquatic resources located within or adjacent to the existing golf course. The proposed project will establish a number of mitigative measures to address these conditions, including no spray zones, riparian planting zones, buffer zones, and a habitat management plan, all of which will be re incorporated into a formal Natural Resources Management Plan to direct the golf course management. Additionally, the project proposes biomonitoring to assess whether there are

any changes to the baseline conditions. Please see Response 3.2-34-GP38a. After considering these points, during the July 7, 2008 meeting, Dr. Petrovic agreed that a risk assessment was not necessary for the project.

Comment A.9.11-20-MP16: [NRMP - Pest threshold] All pest thresholds for treatment decisions should be mandated and update annually to reflect changes in pest knowledge and if unacceptable damage is noted at a lower threshold. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 4]

Response A.9.11-20-MP16: The NRMP will be edited to include this recommendation.

Comment A.9.11-21-MP17: Application of pesticides or fertilizers should not be made to frozen or waterlogged soils to reduce the potential for runoff into surface water. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 4]

Response A.9.11-21-MP17: This is an excellent point. The NRMP will be revised to reflect this requirement.

Comment A.9.11-22-MP18: [NRMP Section 7.1.2.2 Water conservation] Research has shown that the need for irrigation can be reduced by 25% with the use of plant growth regulators (PGR). I would recommend that PGR be used on fairways to reduce water use and clipping productions. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 4]

Response A.9.11-22-MP18: This is a good point. The NRMP will be revised to reflect this suggestion.

Comment A.9.11-23-MP19: [NRMP Section7.2.3 Subsurface drainage] All subsurface drainage water must be diverted to some water quality treatment structure and no be allowed to be directly discharged into a wetland or water course. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 4]

Response A.9.11-23-MP19: All subsurface drainage is being directed to the stormwater management system. The NRMP will be edited to add this requirement to Section 7.2.3 in the first paragraph.

Comment A.9.11-24-MP20: [NRMP Section 8.1 Pre-construction water quality and soil sampling] Since much of the site of this project that will be disturbed is currently a golf courses that receives pesticides and fertilizers, base line sampling is necessary to understand what the currently levels of contamination are. Several pesticides that are currently used on golf courses have ½ lives greater that 150 days, thus are likely to be present in the current golf course soil. This is important in terms of how soils are to be handled, stored and processed during construction. If

contaminated, more protection from erosion and dust may be necessary to one protect the construction workers and to the surrounding environment. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 4]

> **Response A.9.11-24-MP20:** Please see Response A.9.11-6-MP2. Additionally, the Applicant is also considering ceasing pesticide applications six months prior to anticipated start of construction. Regardless, prior to construction, all pesticides that have been applied to the golf course will be analyzed if applications of the pesticide have been within the soil half-life of the pesticide or within the past 6 months, whichever is greater. Based on the results of the analysis and if the results indicate concentrations in the soils above a toxicologically significant level, a management plan will be implemented to protect workers and the surrounding environment.

Comment A.9.11-25-MP21: 8.1.1.2 Groundwater Sample location: Usually on just golf course projects, at least four groundwater monitoring wells are installed not three. On a project with housing, more may be needed. I defer to others to comment on the number and locations of groundwater monitoring wells with a goal of defining if contamination has occurred and to the extent of contaminations. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 4]

> **Response A.9.11-25-MP21:** The purpose of the monitoring program is to provide a representative sample of the groundwater, not to monitor all groundwater. See Response 3.2-24-GP38a; this response indicates that three groundwater well are adequate but that their locations may be changed.

Comment A.9.11-26-MP22: [NRMP Section 8.1.2 Frequency] surface water should also be analyzed at least once during the winter months, especially just after snow melt. This is often the time when phosphorus runoff is the greatest. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 6]

> **Response A.9.11-26-MP22:** Please see Response 3.2-24-GP38a regarding the proposed sampling plan. The NRMP will be edited to reflect final sampling protocols. There is a sample protocol recommended to correspond with snow melt in the spring.

Comment A.9.11-27-MP23: [NRMP Section 8.1.3 Sample Variables]: With the use of pesticides on the site by the current golf course, any pesticide that was applied to the current golf course within the 12 months preceding construction with a ½ life greater than 100 days should be added to the list for pre-and post construction monitoring. Any of these pesticides not detected in the pre-construction or the first post construction sampling could then be removed from the list of pesticides to be monitored for. The pesticides listed in tables 8-1 and 8-2 may need to be changed if the list of pesticides to be used changes (8-1 if an organic approach is used, 8-2 based on a

new site specific risk assessment). [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 4]

Response A.9.11-27-MP23: Please see Response A.9.11-25-MP21. With regard to testing, the NRMP proposed to test for all pesticides that have been applied to the golf course within the soil half-life of the pesticide or within the past 6 months, whichever is greater. The sample program will be for a one time determination in surface and groundwater. This will occur just prior to construction and if a pesticide is detected the protocols for continued sampling and analysis will be followed as given in the monitoring program of the NRMP (Section 8.5 Criteria for Management Response). If a pesticide is not detected, it will be dropped from further analyses.

Comment A.9.11-28-MP24: Other Recommendation: To verify if the golf course and community lawns are managed as described in this NRMP, at least yearly the Town of Amenia must receive a report on use of pesticides, fertilizers, irrigation, water quality monitoring and other management methods agreed to in the NRMP. Since NRMP often need to be modified, the Town of Amenia and the applicant must agree upon a system that allows modification to the NRMP. [Dr. A. Martin Petrovic, Letter, July 5, 2008, page 5]

Response A.9.11-28-MP24: The NRMP will be modified as needed to capture the latest technologies or products. The applicant will notify the Town of any proposed changes and the reason for those changes one month prior to implementing any changes. This will allow the Town to review the changes.