

We note below that 90-plus percent of the site is comprised of poorly to very poorly drained hydric soils. Also, a significant percentage of impervious cover is located within the city's wellhead protection area.

Comments by division and program follow.

Fish and Wildlife

Forested Wetlands. According to our GIS database and State Wetland Maps, the forest on this property is primarily wetlands. Forested wetlands can support an array of plant and animal species. Species dependent on those wetlands require adequate upland buffers in which to complete their life cycles. Upland buffers around wetlands also protect water quality and the function and integrity of the wetland. This forest is part of a larger forest block and wetland complex. Forest fragmentation separates wildlife populations, increases road mortality, and increases "edge effects" that leave many forest dwelling species vulnerable to predation and allows the infiltration of invasive species. The site plan at this time does not include details, but Lot #s 6, 7, and 15 contain a portion of this forested wetland complex.

Recommendation: We recommend that Lot #s 6, 7, and 15 be reconfigured to exclude forested wetlands and leave at least a 100-foot buffer intact between the lot line and the wetland boundary. This will ensure that impacts to this habitat are avoided and an adequate upland buffer is left intact.

Key Wildlife Habitat. The forest on this property is mapped as Key Wildlife Habitat in the Delaware Wildlife Action Plan (DEWAP). DEWAP is a comprehensive strategy for conserving the full array of native wildlife and habitats-common and uncommon- as vital components of the state's natural resources. This document can be viewed via our program website at <http://www.dnrec.state.de.us/nhp>. This document also contains a list of species of greatest conservation need as well as species-habitat associations.

Nuisance Waterfowl. Wet ponds created for stormwater management purposes may attract resident Canada geese and mute swans that will create a nuisance for community residents. High concentrations of waterfowl in ponds create water-quality problems, leave droppings on lawn and paved areas and can become aggressive during the nesting season. Short manicured lawns around ponds provide an attractive habitat for these species.

The Division of Fish and Wildlife does not provide goose control services, and if problems arise, land managers, residents or the home-owners association will have to accept the burden of dealing with these species (e.g., permit applications, costs, securing services of certified wildlife professionals). Solutions can be costly and labor intensive; however, with proper landscaping, monitoring, and other techniques, geese problems can be minimized.

Recommendation: We recommend Delaware native plants, including tall grasses, wildflowers, shrubs, and trees be planted at the edge and within an adequate buffer (15-30 feet in width) around the ponds, to be planted in accordance with the Sediment and Stormwater Plan approval agency requirements. When the view of the surrounding area from the pond is blocked, geese can't scan for predators and are less likely to reside and nest in the area of the pond.

At this time, we do not recommend using monofilament grids due to the potential for birds and other wildlife to become entangled if the grids are not properly installed and maintained. In addition, the on-

going maintenance (removing entangled trash, etc.) may become a burden to the homeowners association or land manager. *Edna Stetzar - (302) 653-2880, Edna.Stetzar@state.de.us*

Soil and Water

Sediment and Stormwater Program. *Comments provided by David Cahill with the Kent Conservation District. Phone: 741-2600 ext.3*

The subject proposal has been reviewed for code compliance, plan conformity and completeness in accordance with this agency's authority and area of expertise. The following items have been identified as elements which need to be addressed by the applicant.

City and State Code Requirements:

1. As the disturbance for this site will exceed 5,000 square feet, a detailed sediment and stormwater management plan must be reviewed and approved by our office prior to any land disturbing activity (i.e. clearing, grubbing, filling, grading, etc.) taking place. The review fee and a completed Application for a Detailed Plan are due at the time of plan submittal to our office. Construction inspection fees based on developed area and stormwater facility maintenance inspection fees based on the number of stormwater facilities are due prior to the start of construction. Please refer to the fee schedule for those amounts.
2. The following notes must appear on the record plan:
 - The Kent Conservation District reserves the right to enter private property for purposes of periodic site inspection.
 - The Kent Conservation District reserves the right to add, modify, or delete any erosion or sediment control measure, as it deems necessary.
 - A clear statement of defined maintenance responsibility for stormwater management facilities must be provided on the Record Plan.
3. A soils investigation supporting the stormwater management facility design is required to determine impacts of the seasonal high groundwater level and soils for any basin design.

Advisory comments to the applicant:

1. Green Technologies (bio retention, bio swales etc.) must be considered before traditional facilities can be considered.
2. As discussed during a pre-application meeting with the site engineer the site is a good candidate for some unusual and different practices. The plans provided for the PLUS process did not reflect the practices discussed.
3. The preferred methods of stormwater management are those practices that maximize the use of the natural features of a site, promote recharge and minimize the reliance on structural components.
4. It is recommended that the stormwater management areas be incorporated into the overall landscape plan to enhance water quality and to make the stormwater facility an attractive community amenity.
5. A letter of no objection to recordation will be provided once the detailed Sediment and Stormwater Management plan has been approved.

Drainage Program. The parcel is within the White Oak Tax Ditch watershed. The White Oak Tax Ditch Main, with established rights-of-way, runs through the property. Any change to the location of the tax ditch or the tax ditch rights-of-way will require a change to the White Oak Tax Ditch court order. Contact Robert Enright (302) 739-9921 to discuss possible changes to the court order.

The White Oak Tax Ditch drains approximately 800 acres west of Route 1 drain along with approximately 660 acres east of Route 1. The Drainage Program requests the engineer take precautions to ensure the project does not hinder any off site drainage upstream of the project or create any off site drainage problems downstream by the release of onsite storm water. The Drainage Program requests the engineer check existing downstream ditches and pipes for function and blockages prior to the construction. Notify downstream landowners of the change in volume of water released on them.
James Sullivan - (302) 739-9921, James.Sullivan@state.de.us

Flood Management. We have some concerns with this subdivision proposal regarding the Special Flood Hazard Area. The site plan does not indicate where the current, effective floodplain is located. We like to see this on all PLUS applications for subdivision review. Our review shows the "water quality areas" (as shown on the site plan) will be placed directly in the Little River watercourse. The City has adopted a floodplain ordinance as a participating community in the National Flood Insurance Program (NFIP). This ordinance requires 3 things in this situation:

1. A Base Flood Elevation must be submitted with any proposal greater than 5 acres or 50 lots.
2. FEMA and adjacent communities must be notified prior to any alteration or relocation of a watercourse.
3. The community shall assure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained. If the location of the Special Flood Hazard Area will be changed as a result of the watercourse being altered, the hydraulic and hydrologic analysis must be submitted to FEMA. We would recommend this be done prior to development of the site.

There are severe flooding issues upstream of this property related to the culverts under SR1. Any mitigation to solve this issue could have a significant impact on the design of this property.

Gregory Williams - (302) 739-9921, Gregory.Williams@state.de.us

Water Resources

Soils Assessment. According to the Kent County soil survey update, Mattapex (MtB), Leipsic (LeB), Hurlock (HvA), Othello (Ot), and Tent (TeA), Corsica (CoA) and Kentuck (KnA) were mapped in the immediate vicinity of the proposed construction (Figure 1). Mattapex and Leipsic are moderately well-drained soils of low-lying uplands that have moderate limitations for development. Hurlock Othello, Tent, Corsica, and Kentuck are poorly to very poorly-drained wetland associated (hydric) soils; these soils have severe limitations for development and should be avoided. Approximately 90%+ of the project area is comprised of poorly to very poorly-drained soils.

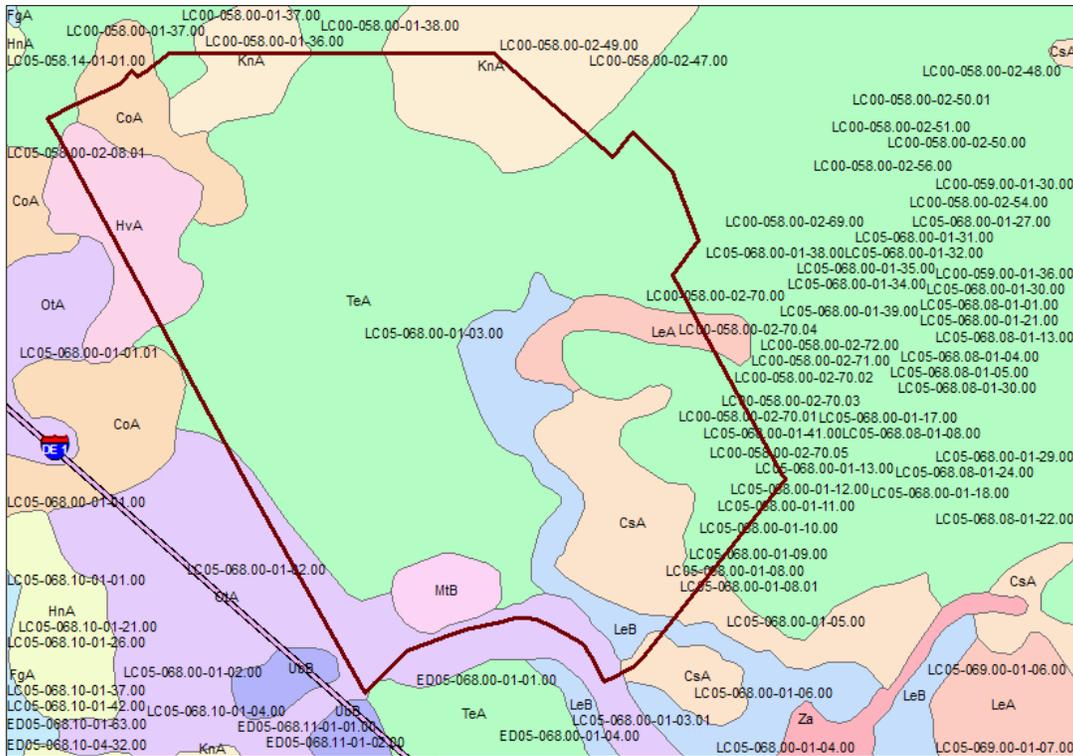


Figure 1: NRCS soil survey mapping update in the immediate vicinity of the Garrison Oak TP

Wetlands. According to the Statewide Wetland Mapping Project (SWMP) mapping, palustrine wetlands (PFO1A, PFO1/4A, PFO1C, and Pf10) were mapped over much of the proposed project area (Figure 2).

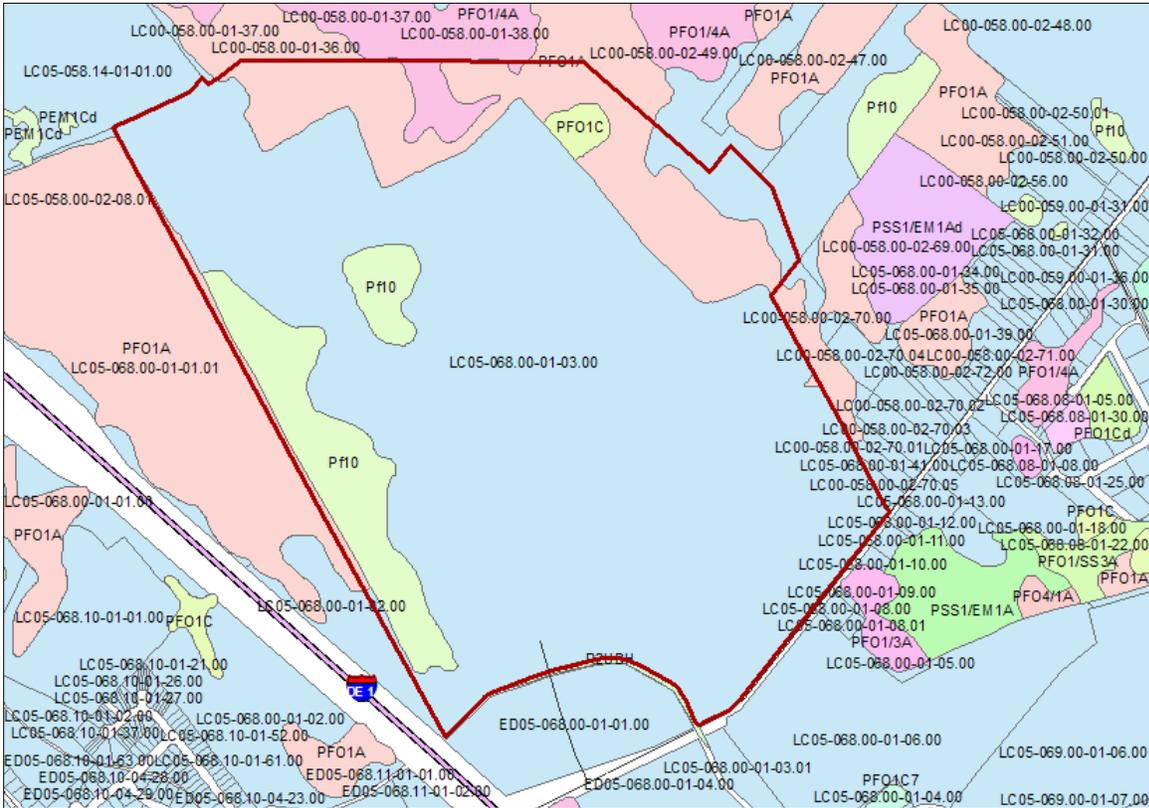


Figure 2: SWMP mapping in the immediate vicinity of the Garrison Oak TP project

The applicant is responsible for determining whether any State-regulated wetlands (regulated pursuant to 7 Del.C. Chapter 66 and the Wetlands Regulations) are present on the property. This determination can only be made by contacting the Division of Water Resources' Wetlands and Subaqueous Lands Section at 302/739-9943 and consulting the State's official wetland regulatory maps, which depict the extent of State jurisdiction. The area regulated by State law may be very different from the area under federal authority. No activity may take place in State-regulated wetlands without a permit from DNREC's Wetlands Section.

In addition, most perennial streams and ditches and many intermittent streams and ditches are regulated pursuant to the Subaqueous Lands Act (7 Del.C. Chapter 72) and the Regulations Governing the Use of Subaqueous Lands. Ponds which are connected to other waters are also regulated, while isolated ponds are not. Any work in regulated streams, ditches or ponds requires a permit from the Wetlands and Subaqueous Lands Section. An on-site jurisdictional determination is recommended in order to determine whether any regulated watercourses exist on the property. Please contact the Wetlands and Subaqueous Lands Section at 302/739-9943 to schedule an on-site visit. Such appointments can usually be scheduled within 2 to 3 weeks.

When designing a project on a site with regulated watercourses, any extensive piping, filling or burying of streams or ditches in excess of the minimum needed for road crossings should be avoided. Where road crossings are necessary, bridge spans which avoid significant impacts to stream banks and channels should be used wherever possible. Where placement of culverts is unavoidable, culvert designs which utilize multiple barrels at different elevations to preserve a low flow channel are usually preferred.

Contact the Wetlands and Subaqueous Lands Section for further information regarding preferred designs.

The applicant should also be reminded that they must avoid construction/filling activities in those areas containing wetlands or wetland associated hydric soils as they are subject to regulatory jurisdiction under Federal 404 provisions of the Clean Water Act. A site-specific field wetlands delineation using the methodology described in the 1987 United States Army Corps of Engineers (USACE or “the Corps”) manual is the acceptable basis for making a jurisdictional wetland determination for nontidal wetlands in Delaware.

The applicant is forewarned that the Corps views the use of the National Wetlands Inventory (NWI) mapping or the Statewide Wetlands Mapping Project (SWMP) mapping as an unacceptable substitute for making such delineations. To ensure compliance with said Corps regulatory requirements, it is strongly recommended that a field wetlands delineation using the above-referenced methodology be performed on this parcel before commencing any construction activities. It is further recommended that the Corps be given the opportunity to officially approve the completed delineation. In circumstances where the applicant or applicant’s consultant delineates what they believe are nonjurisdictional isolated (SWANCC) wetlands, the Corps must be contacted to evaluate and assess the jurisdictional validity of such a delineation. The final jurisdictional authority for making isolated wetlands determinations rests with the Corps; they can be reached by phone at 736-9763.

Based on a review of existing buffer research by Castelle et al. (Castelle, A. J., A. W. Johnson and C. Conolly. 1994. *Wetland and Stream Buffer Requirements – A Review*. J. Environ. Qual. 23: 878-882.), an adequately-sized buffer that effectively protects wetlands and streams, in most circumstances, is about 100 feet in width. In recognition of this research and the need to protect water quality, the Watershed Assessment Section recommends that the applicant maintain/establish a minimum 100-foot upland buffer (planted in native vegetation) from all water bodies (including ditches) and wetlands.

Impervious Surfaces and Best Management Practices. In the calculation for surface imperviousness, all forms of surface imperviousness should be included in the calculation, including rooftops, sidewalks, roads, parking areas, and open-water stormwater structures. Failure to comprehensively account for all these source of imperviousness will not accurately reflect this project’s true environmental impacts. If this calculation does not reflect all of the aforementioned forms of post-construction surface imperviousness, it should be recalculated.

Studies have shown a strong relationship between increases in impervious cover to decreases in a watershed’s overall water quality. It is strongly recommended that the applicant implement best management practices (BMPs) that reduce or mitigate some of its most likely adverse impacts. Reducing the amount of surface imperviousness through the use of pervious paving materials (“pervious pavers”) in lieu of asphalt or concrete in conjunction with an increase in forest cover protection or additional tree plantings – are some examples of practical BMPs that could easily be implemented to help reduce surface imperviousness.

TMDLs. Total Maximum Daily Loads (TMDLs) for nitrogen and phosphorus have been promulgated through regulation for the Leipsic River watershed. A TMDL is the maximum level of pollution allowed for a given pollutant below which a “water quality limited water body” can assimilate and still meet water quality standards to the extent necessary to support use goals such as, swimming, fishing,

drinking water and shell fish harvesting. Although TMDLs are required by federal law, states are charged with developing and implementing standards to support these desired use goals. In the Leipsic River watershed, a post-development TMDL reduction level of 40% will be required for nitrogen and phosphorus. Additionally, a TMDL reduction level of 75% will be required for bacteria.

As indicated above, Total Maximum Daily loads (TMDLs) for nitrogen and phosphorus have been proposed for the Leipsic River watershed. The TMDL calls for a 40% reduction in nitrogen and phosphorus from baseline conditions. The TMDL also calls for a 75% reduction in bacteria. A pollution control strategy will be used as a regulatory framework to ensure that these nutrient reduction targets are attained.

The Department has developed an assessment tool to evaluate how your proposed development may reduce nutrients to meet the TMDL requirements. Additional nutrient reductions may be possible through the implementation of Best Management Practices such as increasing the amount of passive, wooded open space (planted with native woody and herbaceous vegetation), wider vegetated buffers along watercourses, use of pervious paving materials to reduce surface imperviousness, and the deployment of green-technology stormwater management treatment technologies. Contact Lyle Jones at 302-739-9939 for more information on the assessment tool.

Soils, wetlands, subaqueous lands and TMDL comments provided by John Martin, Watershed Assessment Section, (302) 739-9939, John.Martin@state.de.us

Water Supply. Should dewatering points be needed during any phase of construction, a dewatering well construction permit must be obtained from the Water Supply Section prior to construction of the well points. In addition, a water allocation permit will be needed if the pumping rate will exceed 50,000 gallons per day at any time during operation.

All well permit applications must be prepared and signed by licensed water well contractors, and only licensed well drillers may construct the wells. Please factor in the necessary time for processing the well permit applications into the construction schedule. Dewatering well permit applications typically take approximately four weeks to process, which allows the necessary time for technical review and advertising. *Ricardo Rios - (302) 739-9944, Ricardo.Rios@state.de.us*

Water Resource Protection Areas. DNREC Water Supply Section, Ground-Water Protection Branch (GPB) has reviewed the Garrison Oak Technical Park PLUS project and determined it falls partially within a wellhead protection area for the City of Dover as delineated by DNREC. Although the City of Dover's Source Water Protection Ordinance meets the minimum standards of protection, this protection does not extend over all the scientifically delineated wellhead areas. This project is located in one of these areas.

Wellhead protection areas are surface and subsurface areas surrounding a public water supply well where land use activities or impervious cover may adversely affect the quantity and quality of ground water moving toward such wells.

Given that this is a wellhead protection area, the City is strongly encouraged to apply impervious cover limitations on this development. The Developer states that the impervious cover for this project is approximately 56%. This value is based on the impervious cover for the entire parcel. Based on a

review of the site plan, but our review finds that impervious cover is higher in that portion of the parcel within the wellhead protection area (Figure 1).

Impervious cover prevents precipitation from infiltrating through the soil to the water table aquifer. Impervious cover refers to structures including but not limited to roads, sidewalks, parking lots, and buildings. Any impervious cover within this wellhead protection area has the potential to have a negative affect the quality and quantity of drinking water available to the City.

DNREC recommends that the portion of the new development within the scientifically delineated wellhead protection area not exceed 20% impervious cover (DNREC, 2005). Some allowance for augmenting ground-water recharge should be implemented if the impervious cover exceeds 20% but is less than 50%. However, the development should not exceed 50%. A water balance calculation should be required to determine the quantity of clean water to be recharged via a recharge basin (Kaufmann, 2005). The purpose of an impervious cover threshold is to minimize loss of recharge (and associated increases in storm water) and protect the quality and quantity of ground water and surface water supplies.

In addition, because the project is located within a wellhead protection area and the wellhead is a source of public drinking water, the storage of hazardous substances or wastes should not be allowed within the area unless specific approval is obtained from the relevant state, federal, or local program.

Anne Mundel - (302) 739-9945, Anne.Mundel@state.de.us

References

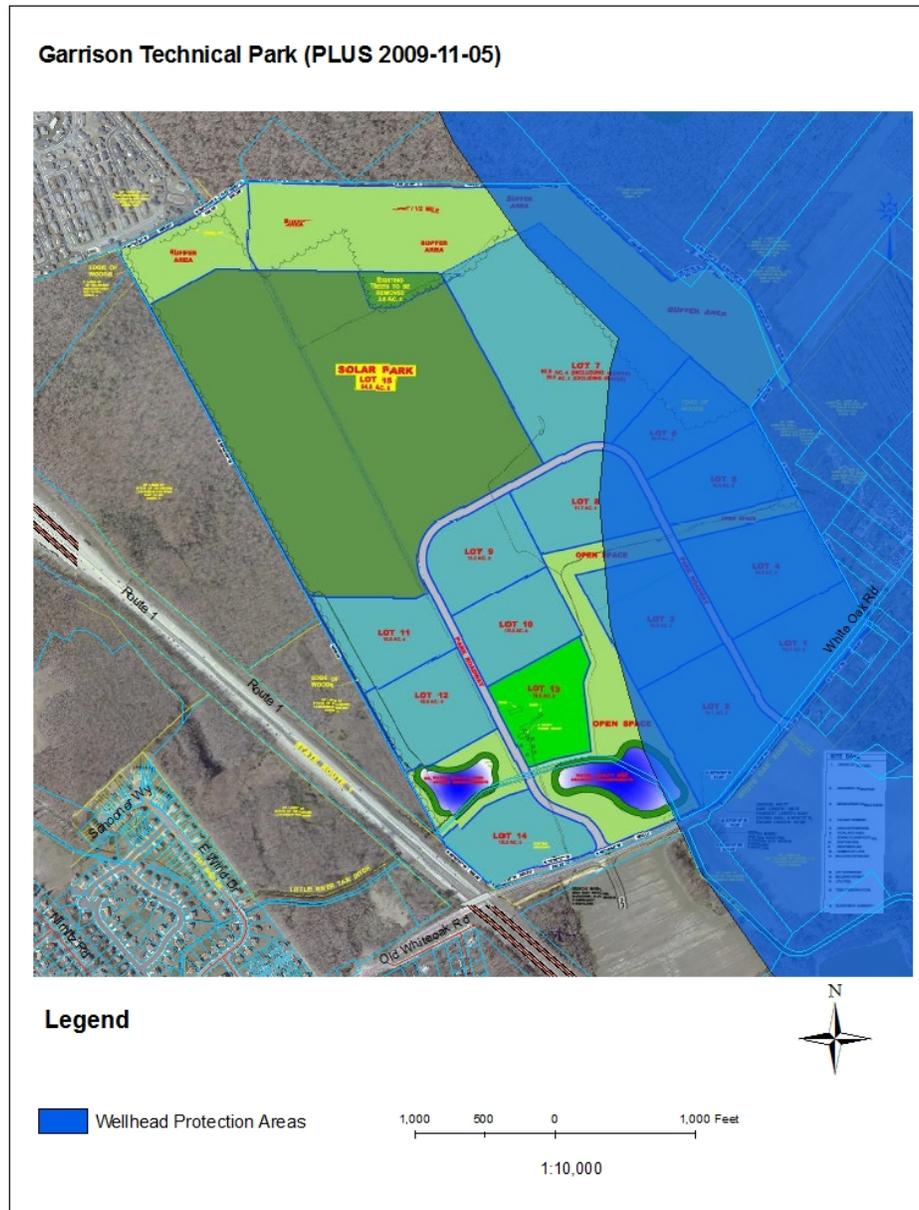
Delaware Department of Natural Resources and Environmental Control, 2005, Source Water Protection Guidance Manual for the Local Governments of Delaware, p. 144.

http://www.wr.udel.edu/publications/SWAPP/swapp_manual_final/swapp_guidance_manual_final.pdf

Kauffman, G.J., Wozniak, S.L., and Vonck, K.J., 2005, Delaware Ground-Water Recharge Design Manual: Newark, DE, Water Resources Agency, University of Delaware, p. 31.

Listed as: "Supplement 1 – Groundwater Recharge Design Methodology"

<http://www.wr.udel.edu/swaphome/Publications/SWPguidancemanual.html>



Air and Waste

Hazardous Waste Sites. No SIRB sites were found within a ½-mile radius of the proposed development. One salvage yard, White Oak Salvage, is located adjacent to the proposed site. Based on the nearby proximity of the salvage yard and the previous agricultural use of the proposed project site, which may have involved the use of pesticides and herbicides, SIRB recommends that a Phase I Environmental Site Assessment be performed prior to development. In addition, should a release or

imminent threat of a release of hazardous substances be discovered during the course of development (e.g., contaminated water or soil), construction activities should be discontinued immediately and DNREC should be notified at the 24-hour emergency number (800-662-8802). SIRB should also be contacted as soon as possible at 302-395-2600 for further instructions.

Krystal Stanley - (302) 395-2644, Krystal.Stanley@state.de.us

Tank Management Branch. There is one inactive LUST project on the proposed project site:

Name: Garrison Farm (Inactive)

Facility ID: 1-000589

Project: K9907126

Should any underground storage tanks or petroleum contaminated soil be discovered by any person during construction, the DNREC-TMB at (302) 395-2500 and the DNREC Emergency Response Hotline at (800) 662-8802 must be notified within 24 hours.

Should any contamination be encountered, PVC pipe materials will have to be replaced with ductile steel and nitrile rubber gaskets in the contaminated areas.

Also, please note that if any aboveground storage tanks (ASTs) less than 12,500 gallons are installed, they must be registered with the TMB. If any ASTs greater than 12,500 gallons are installed, they are also subject to installation approval by the TMB. *Elizabeth Wolff - (302) 395-2500, Elizabeth.Wolff@state.de.us*