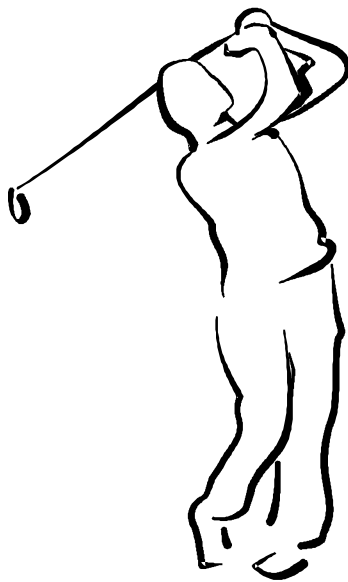


**VOLUNTARY ENVIRONMENTAL GUIDELINES  
RECOMMENDED FOR GOLF COURSES  
IN WORCESTER COUNTY  
& THE DELMARVA PENINSULA**

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Prepared by Worcester County Department of Planning, Permits & Inspections

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A publication of the Maryland Coastal Zone Management Division, Department of Natural Resources pursuant to National Oceanic and Atmospheric Award # NA77OZ0188.



Printed with funds from the Environmental Protection Agency. This document does not necessarily reflect the opinion or position of the Environmental Protection Agency.



## Introduction

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According to a recent article in *Smithsonian*, golf courses are opening at a rate close to one per day and occupy close to 3,750 square miles of the United States<sup>1</sup>. Nationwide, golf continues to grow in popularity. The National Golf Association, which collects data on golf courses, has recorded 265 new courses open for play in the first half of this year. The Association's latest research shows that nearly 27 million people in America play at least one round of golf annually, and that the number of people enjoying the sport is on the increase.

Proponents of the industry recognize that golf courses benefit local communities by providing economic benefits, recreational opportunity, green open space and urban wildlife habitat. While the golf industry as well as individual golf course facilities are employing and searching for ways to reduce the use of fertilizers, pesticides, fossil fuels and potable water -- the development and management practices of some golf courses have been the subject of debate, primarily regarding impacts to local natural systems.

In keeping with national trends, golf continues to grow in popularity in Worcester County and the Delmarva Peninsula. Similar to other coastal areas, the region is characterized by high groundwater tables, an intricate network of waterways, proximity to fragile coastal waters, sandy soils, and an abundance of wildlife. Any local discussion of modern golf course design and maintenance should address the specific qualities of this region as well as new, cost-effective methods of environmental protection that allow for high quality development.

High quality golf course design must integrate many considerations, including: aesthetic values, operational flexibility, ease of maintenance, and a variety of player challenges. These may be enhanced by the use of planning, design and maintenance practices that protect natural features and that are based upon principles of environmental protection. Courses that take extra steps to minimize environmental impacts or protect habitats may find that these changes make the course unique and memorable, and give the player a sense of place which can be lost when a natural landscape is highly altered. Avoiding adverse environmental effects can decrease construction time (by minimizing regulatory review) and boost local community relations. Lowering the environmental impacts of chemical use may also reduce management costs.

The guidelines that follow are based upon local ecology, a large and growing body of scientific knowledge and the principles of sustainable resource management. They are intended to be voluntary and educational in nature, however a close review and consideration of these guidelines, particularly in the early planning stages of a new course, will assist in identifying areas of potential regulation. It is important to note that some of the issues addressed in the guidelines involve mandatory requirements under existing regulatory programs such as Federal and State wetlands regulations, the Maryland Forest Conservation Law and the Chesapeake Bay Critical Area law.

Many courses in Worcester County and the Delmarva peninsula already employ some techniques described in the guidelines. All existing and new courses are strongly encouraged to take on challenges presented here, whether it is to enhance the habitat quality of their course, or to reduce impacts to the local watershed or aquifer. Educational guidelines are included out of recognition of the importance of educated users to the success of ecologically-sensitive golf.

Finally, it is important to note that some of the guidelines that follow are relevant to home lawn and landscaping design and care. The { symbols indicate guidelines that homeowners are also encouraged to follow.

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<sup>1</sup>Stuller, J. April 1997. "The Greening of the Greens." *Smithsonian*.

## What are the Guidelines and How Should They Be Used?

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**These guidelines are envisioned as a tool of value for local use under a variety of circumstances.** The guidelines are meant to provide a framework for environmental responsibility in developing goals for existing golf courses and golf-related facilities and for considering issues associated with the development of new courses and facilities. They are designed to educate and inform the public and relevant decision makers about environmental responsibility, and to help set goals for environmental performance of golf courses.

**These guidelines are voluntary...** They presume regulatory compliance and are designed to suggest opportunities to go beyond that which is required by existing laws and regulations. While specific examples are sometimes provided, the guidelines should be interpreted as representing a whole philosophy of good environmental design and management, rather than specific dictates, each of which must be met in all cases.

**...however they address issues for which there may be associated mandatory requirements.**

These guidelines are designed to provide a useful framework for planning and implementing environmentally-sound golf course development and maintenance. For any project, it is important to engage the relevant governmental agencies early in the process to ensure regulatory compliance. Appendix II provides general information about local, state and federal laws and regulations that may impact golf-related development.

**These guidelines were developed through a collaboration of an array of experts holding various perspectives.** The participants in the “working group” who were consulted in the development of the document are listed on the last page of this document. The “working group” consisted of representatives of the golf course development and maintenance community, and the scientific and regulatory community. The process of sharing information and ideas and developing consensus has enriched the final product.

**These guidelines are meant to be used as a guide to making good decisions relative to planning and siting, design, construction, maintenance and operation of a golf course.** Good environmental practice and design is the result of a multitude of factors and a thorough understanding of how these factors interrelate on a specific site.

**Some of the guidelines that follow are relevant to environmentally-sensitive home lawn and landscaping design and care.** Look for the { symbols for guidelines that homeowners are also encouraged to follow.

Adapted from *Environmental Principles for Golf Courses in the United States*; CRM: 1992.

### SITING & PLANNING

*A thorough analysis of the site or sites under consideration should be completed to evaluate environmental suitability in the context of regulatory requirements and design objectives. It is very important to involve a team of qualified golf and environmental professionals in this process. Cooperative planning and informational sessions with regulatory agencies, community representatives, and environmental groups should be part of the initial planning phase. Early input from these groups is very important to the development and approval process—and to community relations. A continued dialogue and exchange of information, even after the course is completed, can benefit both the facility and the surrounding community.*

*Some sites may be far more suitable than others to golf course development. Some sites may include environmentally valuable elements that would be greatly impacted by development of a golf course. Other sites may be more suitable and even improved by the development of a golf course if careful design, construction and management are used to avoid or minimize environmental impacts. Such sites include previously disturbed areas, such as filled, deforested, degraded or contaminated lands. Following are site characteristics that should be evaluated when analyzing suitability of a potential site.*

## **SOILS**

1. Pesticide and fertilizer movement will be lowest on sites where seasonal water table is not excessively high. These sites are generally most conducive to golf course development.
2. Consideration should be given to sites where parking lots, buildings and other impervious surfaces can be placed near soils that are suitable for the infiltration of stormwater.

## **DRAINAGEWAYS & WETLANDS**

1. Initiate a functional assessment of any wetlands on site. High-quality wetlands such as mature forested wetlands or tidal wetlands should be left undisturbed. When choosing locations for fairways, lower quality wetlands such as farmed wetlands or pioneer forested wetlands should only be considered for conversion of vegetation. For access purposes, avoid filling of wetlands, except for small, isolated and degraded wetland areas.
2. Any wetland creation for mitigation should be designed to be compatible with the surrounding ecosystem.
3. Consider sites that would require minimal waterway crossings and would permit a vegetated buffer along all natural streams, wetlands, ponds and other drainage ways.
4. Where practicable, the site should allow for ponds and stormwater and water quality management facilities to be located in areas other than wetlands. Locations for ponds in wetland buffers or stream buffers should also be avoided, unless the design will be compatible with or enhance existing habitat or water quality. Locations for ponds should be considered in upland areas or in areas that have been previously drained.

## **HABITATS**

1. An environmental analysis should be conducted by a professional environmental consultant to identify the effects of development on sensitive habitats that may exist on the site and, in some

cases, adjacent to the site.

- A. Consideration should be given to potential impacts to sensitive aquatic species by a proposed golf course. Sensitive aquatic species include State-listed rare, threatened and endangered species, species in need of conservation, and other species that are not listed, such as darters, that are sensitive to small temperature changes.
  - B. Potential changes to the current hydrological regime, and the impacts of such changes should be considered, to the extent possible.
2. Sites should be considered where there may be opportunities to protect, enhance or restore environmentally sensitive areas through golf course development by establishing buffer zones or by setting un-maintained or low-maintenance areas aside within the site to enhance existing habitat and provide conservation areas.
  3. Sites that are already disturbed (e.g., cropland, landfills and borrow pits) are often ideal for golf course development and offer opportunities for restoration.
  4. Consider potential impacts to forest resources on the site, including fragmentation of existing forest.

## **WATER RESOURCES**

1. A water availability study should be conducted to determine sources of water, how much water would be needed for irrigation, and the potential impacts on groundwater and surface water systems.
2. Consider the site in terms of the potential for re-use of stormwater for irrigation purposes, as this would reduce use of groundwater.
3. Golf courses are excellent treatment systems for recycled water. Sites where recycled water is available, economically feasible, and agronomically and environmentally acceptable may be appropriate for conversion to a golf course.

## DESIGN

*When designing a golf course, it is important to begin by identifying sensitive features on the proposed site. Utilizing what nature has provided is both environmentally and economically wise. Emphasizing the existing characteristics of the site can help retain natural resources, allow for efficient maintenance of the course and will likely reduce permitting, mitigation and site development costs. Good design incorporates protection of ground- and surface water and existing sensitive features, as well as anticipates future maintenance needs and sustainability of resource use. The following guidelines describe design considerations that incorporate environmental protections, from golf course construction to operation.*

### **SITE INVENTORY**

1. A site inventory and analysis study should be conducted by experienced professionals. The identification of environmentally sensitive areas and other natural resources is important so that a design can be achieved that avoids sensitive features while allowing for course playability and aesthetics.

### **PROTECTING GROUND & SURFACE WATER QUALITY**

1. Consider the pre-deforestation water budget of the site (as opposed to the pre-development budget) and providing for the budget as closely as possible in the golf course design.
2. The design of the golf course should minimize waterway crossings. Waterway crossings should be designed to minimize the clearing of vegetation that may result in detrimental impact to significant habitat or water quality.
3. Under certain circumstances, re-locations of existing waterways may be appropriate, however, forested streams should not be channelized or re-located.
4. { Buffer zones or other protective measures should be maintained and/or created, if appropriate, to protect high quality surface water resources or environmentally sensitive areas. The design and placement of buffer zones will vary based on the water quality classifications of the surface waters being incorporated into the course. The Maryland Coastal Bays Program can assist in the planning of buffer zones. }
5. Surface and subsurface drainage systems utilized in the design of the golf course should be directed internally for collection and use as a supplemental source for irrigation, to the extent practicable. Drainage away from the course should be minimized.
6. In unusual soil or water conditions, it may be necessary to consider installing an underdrain system, beneath appropriate portions of the fairways, greens, or tees to collect leachate. The purpose of the underdrain would be to collect fertilizer- and pesticide- contaminated leachate. The leachate could then be treated by approved methods, such as a sand-peat filter system, or as

appropriate, stored for irrigation use.

7. Water quality monitoring needs will be depend upon the characteristics of the site and course design, and should be determined through conference with local and state agencies. Pre-construction monitoring may be required to establish baseline information for evaluation of impacts if occurring during or after construction of the course. A management plan should be established in advance in the event that detrimental impacts are detected.
8. Avoid siting buildings and parking lots in stream buffers, wetlands, wetland buffers or floodplains.
9. { The use of pervious surfaces throughout the facility is encouraged. }

### **CONSERVING HABITAT**

1. The best means for effectively conserving habitat is to conduct a comprehensive environmental assessment prior to the initiation of planning and design.
2. { The design of the course should enhance and protect sensitive habitat areas, such as shorelines and wetlands, to the extent practicable. }
3. { For golf courses immediately adjacent to water bodies, present and future shoreline erosion potential and its effects on existing shoreline habitat, should be taken into consideration. }
4. { Degraded areas within the site when present, should be improved or revived through the use of native plants and/or non-invasive, beneficial plants. }
5. { The design of the golf course should provide for the creation or enhancement of native habitat, where possible. Native and/or naturalized vegetation should be retained or replanted when appropriate in areas that are not in play. The planting of exotic or invasive plants should be avoided. In playing areas, designers should select grasses that are best adapted to the local environmental conditions to provide the necessary characteristics of playability yet permit the use of environmentally sustainable maintenance techniques. }
6. If a site is selected which may affect a state-listed threatened or endangered species, a detailed analysis can be made, with assistance from a qualified biologist, of any impact that may occur due to the design of the golf course. Design modifications that would protect the species habitat during and after the development process should be identified.
7. Given that tree clearing is a necessary aspect of golf course design, examine opportunities to enhance forest resources in areas on the project site not targeted for tree clearing. Specimen trees should be considered during the design phase, and incorporated as features. Minimization of forest fragmentation should be taken into account in the design process.

### **IRRIGATION**

1. Emphasis should be placed upon the design of irrigation, drainage and retention systems that provide for efficient use of water and the protection of water quality and habitat. Drainage and



stormwater retention systems should, when possible, be incorporated in the design as features of the course to help provide for both the short- and long-term irrigation needs of the course.

2. Water reuse strategies for irrigation should be utilized when economically feasible and environmentally and agronomically acceptable. It is important that recycled water meets applicable health and environmental standards and that special consideration be given to water quality issues and adequate buffer zones. Water reuse may not be feasible on some sites that drain into high quality wetlands or sensitive surface waters. Suitable soils, climatic conditions, groundwater hydrology, vegetative cover, adequate storage for treated effluent and other factors will all influence the feasibility of water reuse.

### **MAINTENANCE CONSIDERATIONS**

1. Retain a qualified golf course superintendent/project manager early in the design and construction process(es) to integrate sustainable maintenance practices in the development, maintenance and operation of the course.
2. Design the course with sustainable maintenance in mind. Sustainable maintenance includes: use of low-maintenance, native plants, reduced areas requiring high maintenance, conservation of water resources. The design should incorporate Integrated Plant Management and resource conservation strategies that are environmentally responsible, efficient, and cost effective. Integrated Plant Management is based upon an understanding of the ecology and biology of turfgrass or other plant community to be protected and the pests to be controlled. It emphasizes plant nutrition and overall plant health.

### **DESIGN OF FACILITIES & STRUCTURES**

1. Investigate and consider use of eco-friendly/sustainably harvested materials in the design of the built environment of the golf course. Some examples include: clam shells, non-asphalt roof products, wood floors, benches made from recycled plastics and certain engineered wood products for building framings.
2. Consider designing buildings that are oriented to make use of passive solar heating and prevailing breezes. Consider using building designs (overhangs, porches and trellises) and vegetation (trees and vines) to create indoor shade and reduce summer energy consumption.

## CONSTRUCTION

*The construction process requires qualified contractors who are experienced in the special requirements of golf course construction and who are knowledgeable about the potential environmental impacts of construction activities. Involvement of the golf course superintendent is critical at this phase. One of the most important aspects of appropriate construction is proper scheduling and sequencing of activities that will allow for the most efficient progress of the work while optimizing environmental conservation and resource management. The following practices, many applicable to any construction operation, will protect and/or enhance natural resources during the construction process. It is important to note that some of the following guidelines will generally be required by existing laws and regulations.*

1. Provide for qualified professionals to monitor all staking and clearing operations. Provide a procedure for tagging and protecting any sensitive habitats on the site.
2. Using flags or protective fencing, delineate areas to remain undisturbed. Keep these indicators in place until construction is complete
3. Develop strategies to reduce disruption to wildlife, plant species and identified environmental resource areas. For example, schedule heavy construction work for times that will minimize disruption of bird and other wildlife breeding periods.
4. Consider transplanting selected native flora specimens from areas proposed for clearing to appropriate areas elsewhere on the golf course. For example, woody vegetation could be collected from an area that is to be cleared and replanted along an unvegetated stream edge elsewhere on the site.
5. Save brush from clearing operations for use as brush piles in appropriate areas on the golf course. Brush piles provide good habitat for native animal species.
6. Employ and regularly monitor all required and other appropriate erosion and sediment control methods during construction. Minimize soil exposure by clearing and exposing soil in phases.
7. The use of mulch is recommended when seeding because its application will reduce soil erosion rates by as much as 95%. Clearing of sensitive areas such as steep slopes and areas adjacent to waterways should be minimized. If such an area is cleared, the re-vegetation of the area should be conducted immediately using sodding or other methods for purposes of stabilization.
8. Schedule construction and turfgrass establishment to allow for the most efficient completion of work.
9. Establish process for monitoring and maintenance of soil erosion control measures until establishment of turfgrass is accomplished.
10. Promote re-use and recycling of scrap construction materials, as well as other materials used on the construction site, during the construction phase.

## MAINTENANCE

**PLA**  
**NT**  
**PRO**  
**TEC**  
**TIO**  
**N &**  
**NUT**  
**RIE**  
**NT**  
**MA**  
**NAG**  
**EME**  
**NT**

*Because much of the Delmarva peninsula is characterized by sandy soils and shallow upper aquifers, chemical management is an essential element of golf course maintenance. Reduced chemical use also reduces costs. Management of water use primarily includes finding ways to reduce water use, and particularly, to reduce reliance upon potable water. Waste management on the golf course can extend throughout the facility to include waste minimization practices in the club house as well as on the course itself. Not only does an effort to reduce wastes serve to reduce costs, it also has an important educational function. While wildlife habitat protection and enhancement is a component of a well-designed course, habitat management and monitoring, once the course is built, is equally important. Habitat management also involves identifying areas and ways to enhance habitat on the golf course grounds. The existence of native habitat can enhance the beauty of the landscape that is unique to the individual golf course site, adding to the aesthetic value of the course.*

1. { Use products and practices that reduce the potential for contamination of ground and surface water. Strategies include various Best Management Practices and proper timing, based upon plant needs. }
2. { Use irrigation conservation practices to reduce the opportunities for leaching. }

### **PEST AND CHEMICAL MANAGEMENT**

1. In the case of reclaimed areas (e.g., “Brownfields”) where prior heavy metal and/or pesticide contamination is a concern, lowering soil acidity and maintaining a high organic content will reduce the threat of metal contaminated turfgrass soils. Adding activated carbon to turfgrass soils will serve to inactivate organochlorine pesticides. Another option is inoculating soil with bacteria having the capability of neutralizing pesticides.
2. { Establish and clearly identify “no-spray” zones near surface waters to minimize drift and run-off. }
3. { Employ the principles of Integrated Plant Management (IPM), a system that relies on a combination of common sense practices of preventing and controlling pests (e.g., weed, diseases, insects) in which monitoring is utilized to identify pests, damage thresholds are considered, all possible management options are evaluated and selected control(s) are implemented. IPM involves a series of steps in the decision-making process:
  - A. Through regular monitoring and record keeping, identify the pest problem, analyze the conditions causing it, and determine the damage threshold level below which the pest can be tolerated.
  - B. Devise ways to change conditions to prevent or discourage recurrence of the problem. Examples include: utilizing improved (e.g., drought resistant, pest resistant) turfgrass varieties, modifying microclimate conditions, or changing

cultural practices.

- C. If damage thresholds are met, select the combination of control strategies to suppress the pest populations with minimal environmental impact, to avoid surpassing threshold limits. Control measures include biological, cultural, physical, mechanical, and chemical methods. Biological control methods must be environmentally sound and should be carefully researched and tested before implementation. {
4. { Non-chemical control measures should focus on practices such as the introduction of natural pest enemies (e.g., parasites and predators), utilizing syringing techniques, improving air movement, soil aeration techniques, and mechanical traps. The selection of chemical control strategies should be utilized only when other strategies are inadequate. {
  5. Supervisory golf course maintenance personnel should be encouraged to attend a credible training program in IPM.
  6. { Although some management practices may require use of herbicides in a wetland (e.g. control of *Phragmites australis*) special care should be taken when applying herbicides in proximity to a wetland, as herbicides applied to these areas may severely damage the wetland. {
  7. All plant protection products should only be applied by or under the supervision of a trained, licensed applicator or as dictated by law.
  8. Ensure continuing education of applicators (including state licensing, professional association training and IPM certification). Training for non-English speaking applicators should be provided in the worker's native language.
  9. Facilities should inform golfers and guests about golf course chemical applications. Common methods include permanent signs on the first and tenth tee boxes and/or notices posted in golf shops and locker rooms.
  10. Where possible, the use of chemical measures for managing ponds and lakes should be reduced or eliminated. Rather than using chemical substances to control algae, techniques with fewer long term impacts should be considered. These may include reducing nutrient inputs and/or dredging.

## **WATER CONSERVATION**

1. { Use native drought-tolerant plant materials wherever possible throughout the golf course. For areas in play (greens, tees and fairways), use plant materials that are: well-adapted to local environmental conditions; can be efficiently managed; and provide the designed playing characteristics. {
2. { Minimize use of potable water for course irrigation, golf cart cleaning and other maintenance activities. {
3. { Design the course irrigation system and provide controls for proper water management and conservation to minimize over-watering. Irrigation should be responsive to existing conditions, rather than on a set schedule. Use modern irrigation technologies that provide highly efficient water usage. Inspect systems regularly for leaks and monitor water usage. {

4. Have a water conservation plan for drought conditions. Prioritize water application during critical periods.
5. { Use conservation practices, such as watering at appropriate times to minimize evaporation and reduce the potential for disease. {
6. Consider conversion to effluent irrigation systems when available, economically feasible and agronomically and environmentally acceptable.

## **WASTE MANAGEMENT**

1. { Leave grass clippings and other organic materials in place whenever agronomically possible. If clippings are removed, compost and, if possible, recycle them. {
2. { Dispose of chemical rinsate in a manner that will not increase the potential for point or non-point source pollution. Methods include rinsate recycling or "spraying out" diluted compound in previously untreated areas. {
3. { Dispose of chemical packaging according to label directions (e.g., triple rinsing, recycling or returning to manufacturer). {
4. { Other waste products, such as used motor oil, electric batteries and unused solvents, should be recycled where possible. {
5. { Promote reduced packaging, reduced use of disposable products, and recycling in the clubhouse as well as on the course. {

## **WILDLIFE HABITAT MANAGEMENT**

1. { Analyze the site and look for opportunities to establish or enhance native wildlife habitat on the golf course. {
2. { Habitat for wildlife species that help control pests (e.g., bats, bluebirds, purple martins, etc.) should be protected. Additional habitat for these beneficial species should be created whenever feasible and environmentally desirable. {
3. Consider enhancement of man-made ponds for avian and aquatic species through edge and bottom construction and the use of native vegetation and placement of nest materials in appropriate areas.
4. { Retain native vegetation where possible. Keep understory vegetation and debris intact when they pose no safety, pest or play problems. Vegetated buffers along waterways provide essential riparian habitat for songbirds and other wildlife and should be retained in areas where it will not impact visibility or other aspects of the golf course. "Soft edges" (e.g., a variety of smaller shrubs that grade into larger shrubs and small trees at the edge of a woody patch) provide better habitat

than an abrupt “hard edge”, and are encouraged. Plant additional native trees adjacent to existing woodland, where possible. {

5. { Retain dead snags where possible as these provide habitat for woodpeckers and other cavity-nesting animals. (Monitor snags for safety and development of undesirable pests.) Use brush from clearing operations to create piles within appropriate areas. Brush piles provide habitat for many native species. {
6. { Efforts should be made to minimize forest fragmentation and retain wildlife corridors through the golf course. Specifically, avoid placing fences or other barriers in places that will discourage movement of non-nuisance wildlife. {
7. Consider reducing the width of fairways by incorporating unmaintained roughs of less intensively managed turf (a higher height and higher tolerance for pest or weed invasion) and no-mow zones in out-of-play areas as meadow and/or indigenous shrubs that provide habitat for native species. “Unmaintained roughs” might, for example, include seasonally mowed zones for which mowing is timed to prevent disturbance of ground-nesting bird habitat.
8. { Use native plant species for landscaping purposes wherever possible. {
9. { Placement of nest boxes is encouraged in areas where no use will threaten nesting birds or juveniles but yet will allow easy access to service and clean boxes. {
10. { Species such as skunks, non-migratory Canada geese, and deer, when they become damaging, should be managed by deterrence. Deterrent methods could include dogs, noisemakers and repellents. Consult federal and state agencies prior to initiating any action to harass wildlife. Managed hunting may be appropriate where legal and safe. {
11. { Control invasive plant species such as *P. australis* where possible to enhance wetland areas. *P. australis* is an invasive plant of disturbed wetlands and its control will enhance wildlife habitat in these areas. {

## FACILITY OPERATIONS

1. Facilities should  
*Practices and technologies that conserve natural resources, including water and energy can be incorporated into the facility operations policy. The following guidelines could be adopted by any facility seeking to reduce its impact upon the local environment.*  
d conduct an environmental assessment in order to develop and implement an overall environmental policy and/or long-range plan that reflects or expands on these principles.
2. Maintain ongoing records to measure and document progress towards environmental improvement.
3. The environmentally responsible practices adopted for the maintenance of the golf course should extend to all areas of the facility.
4. { Facilities should develop and initiate programs for minimizing use of resources, reusing materials, recycling and waste reduction. }
5. { Facilities should properly store and dispose of solvents, cleaning materials, paints and other potentially hazardous substances. }
6. { Facilities are urged to join in the efforts of programs, such as the Maryland Coastal Bays Program, that help to foster communication and effective environmental management and policies. }
7. Facilities should take active steps to educate users, neighbors and the general public about their environmental policies and practices.

## EDUCATION

*Educational outreach to both visiting golfers and the local community will promote public understanding and appreciation of actions taken at the golf course to protect habitat and ground- and surface waters. Educational outreach might include early morning bird watching tours, pamphlets describing IPM practices undertaken at the course, or interpretive signs placed throughout the course. Such outreach efforts can heighten the value of the golfing experience for users, as well as encourage both users and the larger local community to incorporate the land use ethic of the golf course into areas of their own lives.*

### PUBLIC EDUCATION SHOULD HELP USERS AND THE LOCAL COMMUNITY TO:

1. Recognize that golf courses are managed land that can be compatible with the natural environment:
  - A. support maintenance practices that protect wildlife and natural habitat.
  - B. educate others about the benefits of environmentally responsible management of golf courses and other managed lands.
  - C. take pride in Delmarva's environmentally responsible courses.
2. Support golf course management decisions that protect or enhance the environment and encourage the development of environmental protection and enhancement plans.
  - A. respect designated environmentally sensitive areas within and adjacent to the course.
  - B. accept the natural limitations and variations of turfgrass growing under conditions that protect environmental resources (e.g., brown patches, thinning, loss of color).
3. View, identify, learn more about, and appreciate, local flora and fauna. Consider placing placards and/or making informational materials available on the course to help clients and visitors identify birds and plants.
4. Commit to long-range conservation efforts (e.g., efficient water use, Integrated Plant Management, landscaping with native vegetation) at home. Inform visitors of the environmentally-friendly practices employed on the course that they can use at home.
5. Support research and education programs that expand our understanding of the relationship between managed lands and the environment.



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## Glossary

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*The definitions that follow are provided for the purpose of clarification of terms used in this document, and are not regulatory/legal definitions unless specifically noted as such.*

**Best Management Practices (BMPs)**—A set of actions required or encouraged by a regulatory or advisory authority to protect and to minimize negative impacts to natural resource(s). BMPs are often employed voluntarily because they are cost-effective.

**Chesapeake Bay Critical Area**—A geographical area around the Chesapeake Bay’s tidal waters and tributaries as designated under Maryland’s Chesapeake Bay Critical Area Law. Specific land use regulations are applicable within this Area to provide for the conservation of fish, wildlife and plant habitats.

**Effluent** —Treated wastewater.

**Exotic Plant**—A plant species that is not native to the ecosystem in which it is growing.

**Fairway**—the area of closely-mown turf between the tee and the green that is maintained to reward a well-hit shot.

**Floodplain**—land that is subject to flooding, characterized by relatively flat topography and soil types that were laid down during past inundations by flood waters. A 100-year floodplain is the land adjacent to tidal or non-tidal waters susceptible to inundation by the “100-year” flood.

**Forest**— [as defined under the Forest Conservation Law]. A biological community dominated by trees and other woody plants covering a land area of 10,000 square feet or greater. Forest includes areas that have at least 100 trees per acre with at least 50% of those trees having a 2 inch or greater diameter at 4.5 feet above the ground and larger; and forest areas that have been cut but not cleared. Forest does not include orchards.

**Forest Conservation Law**—Maryland state law implemented by local government that provides for the preservation of existing trees and forest, and the planting of trees and establishment of new forest in conjunction with land development outside of the Chesapeake Bay Critical Area.

**Golf Course**— a piece of land containing typically 18 golf holes for playing the game of golf. Golf courses often contain other golf facilities such as practice areas and greens.

**Golf Hole** —Area of turf maintained for playing the game of golf, including a teeing area, fairway, features such as sand bunkers, rough area and green complex.

**Green**— The finishing area of a golf hole made up of a putting surface, collar area and greenside features.

**Impervious Surface**—Hard surface, such a concrete, through which water cannot pass. Such areas experience up to 9 times as much runoff as do vegetated areas due to the fact that impervious surfaces force water to run quickly off the land instead of allowing it to soak into the ground.

**Integrated Plant Management (IPM)**—a system that relies on a combination of common sense practices of preventing and controlling pests (e.g., weed, diseases, insects) in which monitoring is utilized to identify pests, damage thresholds are considered, all possible management options are evaluated and selected control(s) are implemented. IPM involves a series of steps in the decision-making process.

**Leach**—to lose soluble matter as a result of filtering through of water.

**Native Vegetation**—Plants species that are indigenous to Worcester County. Specimens propagated elsewhere, but planted in the County, are included in this definition. A list of these plant species may be obtained from the Planning, Permits and Inspections Dept. of Worcester County

**No-Spray Zone**—A defined area in which spraying of pesticides, herbicides and other chemicals is prohibited.

**Nutrients**—Nitrogen and phosphorus. These chemicals are essential to life. Large amounts of nutrients introduced to an ecological system, however, can be disruptive.

***Phragmites australis***—common reed; a native perennial wetland grass that has become an aggressive invader of wetland systems on the Eastern Shore during the past two decades.

**Recycled Water**—wastewater that is treated and cleaned for re-use.

**Rinsate, Chemical**—The remaining material in spray tanks or containers generally sprayed out in diluted form on open turf areas.

**Rough**—the area along side fairways and greens where the turf is maintained at a greater height and might also include shrubs, trees and other plants.

**Sediment and Erosion Control**—A system of structural and vegetative measures that minimize soil erosion and off-site sedimentation.

**Sensitive Species**—Generally refers to organisms that are state-listed as endangered, threatened, rare, or in need of conservation. Maryland's list (COMAR 08.03.08 promulgated pursuant to The Maryland Nongame and Endangered Species Act and the Natural Resources Article 10-2A-01 - 06) includes federally-listed species.

**Specimen Tree**—a tree with a 30" diameter trunk.

**Superintendent, Golf Course**—The individual responsible for managing, maintaining and improving a golf facility. A superintendent's areas of expertise and responsibilities usually include: administration, communication, education, environmental stewardship, golf strategy, resource management, and science.

**Tee**—The starting point for each golf hole.

**Vegetated Buffer**—An area adjacent to a pond, wetland, stream bank or shoreline where development is restricted or prohibited, that separates land development from an aquatic resource, provides riparian habitat, and protects the aquatic resource from the adverse effects of development. The width, allowable uses of and the type of vegetation in the buffer will vary, depending upon the natural resource and management objectives. Generally, undisturbed mature forest will provide the greatest water quality and habitat benefits, but may not always meet the management objectives of a golf course. Buffers composed of managed woodland, of scrub/shrub vegetation or a low-managed turfgrass may meet the objectives of the golf course and still provide some natural resource benefits.

**Waterway**—A natural or man-made channel that carries water either continuously or intermittently.

**Wetlands**— *Tidal wetlands* are lands that are continuously or intermittently inundated by the rise and fall of the tide. *Non-tidal wetlands* are the transition zones between open water or aquatic environments and uplands. They are inland, freshwater areas, not subject to tidal influence.

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## Appendix I. Allied Organizations and Programs

*following organizations and programs provide educational outreach, conduct research, or provide funding that is relevant to environmentally-sound golf course design and management.*

### **American Society of Golf Course Architects**

221 N. LaSalle St.  
Chicago, IL 60601  
(312) 372-7090  
<http://www.golfdesign.org>

This is a non-profit organization comprised of leading professionals in the field of golf course design in the United States and Canada. The organization is involved in a variety of golf course issues, including responsible environmental design.

### **Audubon Cooperative Sanctuary Program for Golf Courses**

Audubon Society of New York State, Inc.  
46 Rarick Road  
Selkirk, NY 12158  
(518) 767-9051

This program provides an advisory information service on how to conduct proactive environmental projects on golf courses. A golf course may become a “Certified Cooperative Sanctuary” when certain tasks are completed and managed.

### **Golf Course Builders Association of America**

920 Airport Road, Suite 210  
Chapel Hill, NC 27515  
(919) 942-8922  
staff@gcbaa.org; <http://www.gcbaa.org>

The Association administers a professional certification program for golf course builders and works with other organizations on a variety of issues that affect the golf course industry.

### **Golf Course Superintendents Association of America**

1421 Research Park Drive  
Lawrence, KS 66049-3859  
(800) 472-7878  
<http://www.gcsaa.org>

The Association works to advance the profession of its members and strives to enrich the quality of golf and its environment.

### **The Irrigation Association**

8260 Willow Oaks Corporate Drive; Suite 120  
Fairfax, VA 22031  
703-573-3551

<http://www.irrigation.org>

The Association strives to improve the products and practices used to manage water resources. The Association's interest in water resources encompasses the application, conservation, drainage, improvement and recovery of water for economic and environmental enhancement in agriculture, turfgrass/landscape care, and forestry.

### **National Golf Course Owners Association**

<http://www.ngcoa.org>

Through area chapters, the organization provides support for owners dealing with common issues from community relations to environmental regulations.

### **National Golf Foundation**

1150 S. U.S. Highway One; Suite 410  
Jupiter, FL 33477  
(561) 744-6006  
(800) 733-6006  
[ngf@ngf.org](mailto:ngf@ngf.org); <http://www.ngf.org>

The Foundation generates and disseminates golf business information.

### **United States Golf Association**

P.O. Box 708  
Far Hills, NJ 07931  
908-234-2300  
[usga@usga.org](mailto:usga@usga.org); <http://www.usga.org>

The USGA publishes books, reports and articles about many issues related to golf courses, including environmental issues. *The Green Section Record* magazine, published by USGA, contains articles about individual projects and recent research.

### **The Urban Land Institute**

1025 Thomas Jefferson Street, NW; Suite 500W  
Washington, D.C. 20007  
202-624-7000  
<http://www.uli.org>

The Institute conducts research and provides impartial information in the land use and development field.

### **The Wildlife Links Program**

National Fish & Wildlife Foundation  
1120 Connecticut Ave., NW Suite 900  
Washington, D.C. 20036  
202-857-0166

The program's overall goal is to protect and enhance—through proper planning and management—the wildlife, fish, and plant resources found on golf courses. Environmental and golf organizations are encouraged to participate and lend expertise and financial support.

## **Appendix II. Checklist of Regulatory Programs Affecting Golf Course Development in Worcester County, MD**

*This checklist outlines generalized aspects of site evaluation, design and construction for golf course development. Awareness of the requirements described below can facilitate an efficient completion of the permitting process and compliance with local, state and federal environmental regulations.*

### **T     On-Site Sewage Disposal**

If the site does not have access to central sewer service, identify areas on the site suitable for on-site sewage treatment and disposal. The most well-drained soils should be evaluated for on-site sewage disposal. In most areas, a two-foot dry zone is required to reduce bacterial contamination of groundwater. “Perc” tests must be conducted by the County during the “wet season”.

**For more information:** Rick Wells, Worcester County Department of Planning, Permits & Inspections; 410-632-1200

### **T     Groundwater & Surface Water Withdrawal**

All golf course facilities must obtain a “water appropriations permit” from the State.

**For more information:** Maryland Department of the Environment; 410-631-3590.

### **T     Wetlands**

When considering the suitability of the site, locations of tidal and non-tidal wetlands must be identified. A qualified wetlands consultant should conduct a wetlands delineation. Fairways, tees and greens will need to be sited to avoid wetlands.

Many wetlands in Worcester County are seasonally wet. The existence of potential wetlands can be determined through soil analysis. Hydric soils are a good indicator that a wetland may be present.

**For more information:** Steve Dawson, Maryland Department of the Environment; 410-543-6703; Woody Francis, U.S. Army Corps of Engineers; 410-962-5689

### **T     Zoning**

Golf courses are permitted by right in the E-1 zone. Golf courses are permitted by special exception in the following zones: A-1; R-1; R-2; R-3; R-4.

**For more information:** Phyllis Wimbrow, Worcester County Department of Planning, Permits & Inspections; 410-632-1200

### **T     Site Development Plan**

A proposed site development plan must be submitted to the County. Site plans for which the area of all structural improvements, including parking and incidental facilities, exceeds 10,000 square feet will be reviewed by the County’s Technical Review Committee and reviewed and approved by

the County Planning Commission. The County zoning and subdivision control code provides a detailed description of what features must be shown on a site plan.

**For more information:** Phyllis Wimbrow, Worcester County Department of Planning, Permits & Inspections; 410-632-1200

T     **Erosion & Sediment Control/Stormwater Management**

Effective sediment and erosion control during the development process provides protection both to land and to water bodies. Sediment contamination of surface waters is particularly damaging to aquatic life. Stormwater management protects the water quality of wetlands and waterways as well as reduces local flooding and stream channel erosion during and following development. Worcester County law states that any clearing or grading which exceeds 5,000 square feet in area, or filling exceeding 100 cubic yards, is subject to the County's Sediment and Erosion Control and the Stormwater Management Regulations. A project meeting these criteria is required to submit a Stormwater Management Plan and a Sediment and Erosion Control Plan. The plans must be submitted to the Worcester Soil Conservation District (recently renamed the Natural Resources Conservation Service) for approval. Stormwater Management Plans are valid for a period of one (1) year; Sediment and Erosion Control Plans are valid for a term of two (2) years.

**For more information:** Kelly Henry, Worcester County Department of Planning, Permits & Inspections; 410-632-1200

T     **Cultural Resources Preservation**

Maryland Historical Trust may be contacted to determine whether an architectural or archeological resource that exists on a proposed site is of national or state significance.

**For more information:** Maryland Historical Trust; 410-514-7659

T     **Forest Conservation**

Golf course projects are usually subject to the Worcester County Forest Conservation Law. (Sites in the Chesapeake Bay Critical Area will be subject to the forest conservation requirements of the Critical Area law.) The site under consideration should be evaluated in terms of the golf course design requirements and the requirements of the law. The law requires preparation and implementation of a Forest Conservation Plan, which includes:

- identification of existing forest stands
- protection of the most desirable forest stands (in perpetuity) and
- reforestation in certain areas (subject to zoning and the original percentage of the land that was forested).

If the site's forest coverage falls below the threshold percentage for its zone, trees must be planted to obtain the afforestation threshold. If the amount of forest that would need to be cleared reduces existing forest cover below the thresholds, then reforestation is required in a 2:1 ratio elsewhere on the site. The Forest Conservation Plan must be submitted jointly with the Site Development Plan, the erosion and sediment control and stormwater management applications to Worcester County's Department of Planning, Permits & Inspections.

**For more information:** Rudy Espinoza, Worcester County Department of Planning, Permits & Inspections; 410-632-1200

T     **Chesapeake Bay Critical Area**

Lands within 1,000 feet of the Pocomoke River and its tidal tributaries are subject to the requirements of Worcester’s Chesapeake Bay Critical Area Program. These include: a mandatory 100-foot buffer from tidal wetlands, waters, or tributary streams, forest and woodland vegetation retention provisions, special habitat protection requirements, and impervious surface reductions. Golf courses have been built under the requirements of the Chesapeake Critical Area elsewhere in the state. Queenstown Harbor Golf Links Golf Course in Queenstown is one example.

**For more information:** LeeAnne Chandler, Chesapeake Bay Critical Area Commission; 410-260-7035; Rudy Espinoza, Worcester County Department of Planning, Permits & Inspections; 410-632-1200

T     **Federal and State-Listed Threatened and Endangered Species Habitat**

Few species protected by law occur in Maryland. Even if such species’ habitat is present on a particular site, development of a golf course would not necessarily be precluded. However, identification of potential sensitive habitat areas early in the planning phase is wise to ensure that any impacts are minimized or prevented. Worcester County maintains SSPRA (Sensitive Species Project Review Area) maps at the Worcester County Department of Planning, Permits and Inspections office. These maps show areas where such habitats may exist. Additional information may then be sought from the Heritage and Biodiversity Conservation Program, with assistance from the County Department of Planning, Permits & Inspections.

**For more information:** Scott Smith, Department of Natural Resources; 410-827-8612

T     **Licensed Consultants**

**For a list of licensed professionals,** contact MD Licensing & Regulations at (410) 333-6322

T     **Pesticide Use Certification**

Golf courses are required to maintain a pesticide business license and pest control applicator certificate.

**For more information:** Maryland Department of Agriculture, Pesticide Regulation Section; 410-841-5710



### Appendix III. Wetlands Protection: Typical Special Permit Conditions for Golf Courses

*Federal and State of Maryland authorizations for activities associated with golf course construction will likely include some special permit conditions that must be followed during construction and subsequent management of the golf course. Listed below are some typical special conditions and management practices that may be included. Therefore, these should be seriously considered during the planning, siting, and design stages of the golf course project.*

#### **Work in Wetlands**

- All wetland areas on the property shall be located on site, and be clearly identified with silt fence, construction fencing, or other means to preclude unauthorized disturbances to wetland areas during project construction.
- No stockpiling of fill material or other disturbances in wetlands, other than those specifically authorized, shall occur during project construction. Should any areas be disturbed, restoration to pre-existing wetland conditions is required and will be accomplished by permittee.
- Heavy equipment working in wetlands (crossing wetland/open water areas) shall be avoided if possible and, if required, and authorized, shall minimize soil and vegetation disturbances by using techniques such as timber mats, geo-textile fabric, and low pressure tire vehicles.
- Any wetlands disturbed during project construction shall be restored to pre-existing wetland conditions/ pre-construction contours upon completion of the work.

#### **Temporary Fill**

- Temporary fill in waters and wetlands that are authorized (e.g., access roads, cofferdams) shall be properly stabilized during use to prevent erosion.
- Temporary fill in wetlands shall be placed on geo-textile fabric on the existing wetland grade.
- Temporary fills shall be disposed of at an upland site, be suitably contained to prevent erosion and subsequent transport into any waterway or wetland.
- Temporary fill areas shall be restored to their original pre-construction condition/ contours and be re-vegetated with comparable native species as approved.

#### **Sediment and Erosion Control**

- All fill material authorized shall be contained to prevent erosion and filling of adjacent waterways and wetland areas.
- ***All work shall be performed in accordance with the required Soil Erosion and Sediment control plan as approved by the Soil Conservation District,*** (which shall be available at the construction site) and that these required sediment and erosion control measures must be properly established prior to project construction and be maintained until stabilization of the authorized fill occurs.
- Adequate sedimentation and erosion control management measures, practices and devices, such as vegetated filter strips, geo-textile silt fences, phased construction, or other devices, shall be installed and properly maintained to reduce erosion and retain sediment on-site, both during and after

construction. These devices shall be capable of preventing erosion, collecting sediment (both-suspended and floating materials), filtering fine sediment, and be removed upon completion of work with the disturbed areas stabilized.

- The sediment collected by these devices shall be removed and placed at an upland location, in a manner that will prevent erosion into any waterway or wetland. All exposed soil and fills shall be permanently stabilized at the earliest practicable date.
- Runoff or accumulated water containing sediment or other suspended materials shall not be discharged into waters or wetlands unless treated by approved sediment control devices or structures.

### **Water Crossings**

- All temporary and permanent crossings of water-bodies shall have adequate culverts, be bridged, or otherwise designed to withstand and to prevent the restriction of high flows. The design shall also prevent the obstruction or movement by aquatic life indigenous to the water-body.
- No open trench excavation shall be conducted in-stream without use of approved diversion structures.
- Temporary stream access crossings shall not be constructed or utilized unless approved. If temporary stream access crossings are determined necessary at any time during construction, necessary permits, modifications, or approvals for such crossings must be obtained before installation of the crossings. Temporary stream access crossings shall be removed and the disturbance stabilized prior to completion of authorized activities. Temporary bridges, culverts, or cofferdams shall be used for equipment access across streams. Temporary structures shall be removed and the areas restored.
- Motor driven construction equipment shall not be allowed within the stream channel unless specifically authorized.
- To protect important aquatic species, activities within stream channels are prohibited as determined by the classification of the stream

### **Water Management**

- Culverts must be installed as necessary to maintain existing hydrology and drainage patterns within wetland areas.
- All runoff from the golf course should be contained on site during and after construction to allow collected stormwater to evaporate, infiltrate or be re-used for course irrigation. Both tee areas and the greens will incorporate perimeter under-drains that will enable the transport of runoff directly into proposed interior ponds.
- A water quality-monitoring program incorporating monitoring wells will be established at the time of construction for those greens and tees adjacent to the shoreline.
- Review of, and concurrence on, the final stormwater management design is required prior to working in waters, wetlands and buffers.

### **Mitigation**

- All wetland impacts authorized must be mitigated in accordance with the plans and representations, as proposed to the Corps and MDE by the permittee.
- **Wetland mitigation authorized must be performed/initiated concurrently with project construction and be completed prior to the golf course becoming operational.** The wetland creation shall meet or

exceed an 85% density of mature plants within one year (growing season) after initiation and be maintained for a minimum of 3 years.

- Converted-forested non-tidal wetland areas will maintain a mix of scrub/shrub native emergent habitats. No grubbing, stump or root removal will occur within these areas and all mowing will be restricted to 1 - 2 times a year. Any planting of vegetation within this zone will only include coastal panic grass, eastern gamma grass and little blue stem. Seasonal maintenance of these areas will be done in order to maintain vegetation at heights no less than 2 to 3 feet depending upon relation to golf course feature.
- In those areas designated as “Park Cleared” on the plans, no vegetation in excess of 4-inch diameter breast height (dbh) will be removed, except for the removal of limbs, allowing for a 6-foot clearance. These areas will border greens and tees and will be maintained at a width of 30 to 50 feet.

### **Management**

- ***No work is to be initiated in any non-tidal wetland or wetland buffer until a Water Appropriation and Use Permit for this project has been secured from the Water Management Administration.***
- All authorized conversions of wetlands shall be limited to the narrowest width necessary to accommodate reasonable golf play at fairway crossings. Tree clearing shall be selective and shall be the minimum necessary to ensure playability. Converted wetlands are encouraged to be maintained as a scrub/shrub plant community, at a minimum height of 4 feet.
- Any modification of or design changes to this project, proposed by the permittee or as required by any subsequent agency review, (e.g. Water Appropriations Authorization, etc.) may require a reconsideration of and possible modification and/or revocation of this authorization.
- That the permittee schedule a pre-construction meeting with the Corps/MDE at least 7-14 days prior to commencement of any work as authorized herein to review the permit conditions and phasing of project construction.
- ***An Integrated Pest Management Plan will be implemented in managing the course.***
- Wooded wetland buffers along the shoreline will receive a selective clearing of dead, damaged or diseased trees only, which will be replaced with Maryland native tree species, adapted to this shoreline and acceptable to the Corps/ MDE. This vegetated corridor will remain in forested/brushy vegetation.

### **Conservation Easements & Deed Restrictions**

- The proposed non-tidal wetland mitigation, creation and enhancement area must be placed into a permanent conservation easement recorded in the Land Records of Worcester County to prevent future development, timber harvesting, and other disturbances.
- Any easements and/or covenants concerning tidal and/or non-tidal wetlands that are subsequently approved by the Corps/MDE after the effective date of this permit must be recorded in the Land Records of Worcester County and that the Corps / MDE be furnished with confirmatory evidence that these documents were recorded prior to initiation of any work authorized herein. Additionally, these easements and/or covenants must be recorded prior to the sale of any property upon which Corps/MDE authorization has been granted.
- The permittee must disclose to a prospective purchaser of the property the terms and conditions of this authorization prior to the sale of the property, including the applicable deed restrictions referenced within this authorization.

- The permittee must record this permit with the Registrar of Deeds or other appropriate official charged with the responsibility for maintaining records of title to or interest in real property and have all permit conditions recorded in the land records of Worcester County. Confirmatory evidence that this has been completed must be provided to the Corps/MDE prior to this authorization being effective and initiation of any work authorized herein.
- ***Deed restrictions for all lots which contain wetlands, must be implemented with restrictions prohibiting future impacts to wetlands within these lots and, must appear on the subdivision plat, individual lot plats, as well as be specifically disclosed when these lots are offered for sale.***
- The applicant, as developer, or any subsequent landowner or Permittee, shall notify all potential lot purchasers for those lots containing non-tidal wetlands and wetland buffers of restricted activities within these wetlands and buffers, by including a description of these restricted activities within their deeds. These deed restrictions, as approved by the Corps/MDE, must be recorded for all future sales of these lots or portions thereof, and read as follows:
  - Except as expressly authorized pursuant to any permits or letters of authorization previously obtained from and issued by the Corps / MDE (or their successors or assigns), neither the Permittee, nor any subsequent owner or owners of the Property or any portion thereof, shall undertake or cause to be undertaken any of the following within or upon the wetland or buffer areas:
    - Construct or place buildings, sheds, walkways, roads, signs or other structures on or above the ground with the wetland or buffer areas;
    - Dump or place trash, brush, soil waste, or other fill material within the wetland or buffer areas, or otherwise use the ground within the wetland or buffer areas for disposal of such materials;
    - Excavate, dredge, or remove loam, peat, gravel, soil, rock or other material substance within the wetland or buffer areas;
    - Remove or destroy trees, shrubs or other vegetation, or any other material substance within the wetland or buffer areas in violation of Section 404 of the Clean Water Act and/or the applicable provisions of the Maryland Non-tidal Wetlands Protection Act, or
    - Engage in any activities on the wetland or buffer areas that would violate any governmental regulation concerning drainage, flood control, water conservation, erosion control, soil control, or fish or wildlife habitat preservation.
    - Alteration of vegetation or other substances within the wetland or other substances within the wetland or buffer as required for routine maintenance of the wetland or buffer areas consistent with State and federal law is permissible.
  - The above restrictions must be indicated on all subdivision plats or individual lot plats describing lots containing wetlands or wetland buffers for the subdivision.
  - Deed restrictions as outlined in the original authorization for lots containing non-tidal wetland and wetland buffer, must be implemented for those same lots. The restrictions prohibit future impacts to wetlands within these lots and must appear on the subdivision plat and individual lot plats. Failure to record these restrictions will invalidate this permit.

### **Marsh Creation**

- All material deposited within the marsh establishment site shall consist of clean sandy material. No more than 10% of the material shall pass through a standard #100 sieve.
- The marsh establishment area shall be planted within one year following completion of the filling operation. Maintenance planting and debris removal shall be performed as needed.
- The marsh shall be maintained at an 85% vegetative coverage for a minimum of three years.

- A detailed marsh maintenance plan shall be submitted and approved prior to project commencement showing the source of hydrology and the source and amount of soil to be used in constructing the wetland.

### **Disposal of Excess Material**

- Unless otherwise approved, all excess fill, material, debris, and construction material shall be disposed of outside of all tidal and non-tidal waters and wetlands, non-tidal wetlands buffers, and the 100-year floodplain, and in a location and manner which does not adversely impact surface or subsurface water flow into or out of wetlands or other waters.

### **Temporary Staging Areas**

- Temporary construction trailers or structures, staging areas and stockpiles shall not be located within tidal or non-tidal waters and wetlands, non-tidal wetlands buffers, or the 100-year floodplain unless specifically approved.

### **Inspections**

- The permittee shall permit the Corps and Maryland Department of the Environment representative(s) to make periodic inspections at any time deemed necessary to ensure that the work is being performed in accordance with the terms and conditions of the permit. *The Corps/MDE may also require post-construction engineering drawings (as-built plans) for completed work.*

### **Compliance & Enforcement**

- Any activity performed in Federally regulated waters, including wetlands, that is not in total compliance with all the terms, and conditions, of the permit constitutes unauthorized work and is subject to an enforcement action by the Corps/Maryland Department of the Environment.
- When unauthorized work occurs in a regulated wetland or other waters, it is subject to one or more of the following responses by the Corps/Maryland Department of the Environment:
  - A Cease and Desist order and/or an administrative compliance order requiring remedial action.
  - Initiation and assessment of Class I administrative penalty orders pursuant to Section 309(g) of the Clean Water Act up to \$10,000 per day up to a maximum of \$125,000.
  - Initiation and assessment of a Class II administrative penalty for continuing violation of \$10,000 per day up to a maximum of \$125,000.
  - Referral of the case to the U.S. Attorney/ State Attorney General with a recommendation for a civil or criminal action.
  - Acceptance of an after-the-fact application if determined appropriate.

### **GENERAL**

- A copy of the permits, approved plans and drawings shall be available at the construction site.
- No attempt shall be made by the permittee to forbid the full and free use by the public of all navigable waters at or adjacent to the activities authorized by this permit.

- All provisions of this permit shall be binding on any assignee or successor in interest to the permittee.

## Local, State and Federal Agency Contact Information

**Army Corps of Engineers, Eastern Shore Permits Branch.** 410-962-5689.

**Cecil County Planning and Zoning;** County Office Building; 129 East Main St, Room 300; Elkton, MD 21921. 410-996-5220.

**Chesapeake Bay Critical Area Commission;** 45 Calvert Street, 2<sup>nd</sup> Floor; Annapolis, MD 21401; 410-260-7516.

**Dorchester County Planning and Zoning Commission;** 501 Court Lane; P.O. Box 107; Cambridge, MD 21613. 410-228-3234.

**Kent County Office of Planning & Zoning;** Court House; Chestertown, MD 21620. 410-778-7423.

**Maryland Coastal Bays Program;** 9609 Stephen Decatur Highway; Berlin, MD 21811. 410-213-BAYS.

### **Maryland Department of the Environment**

Regional Non-tidal Wetlands and Waterways Division; 410-543-6703

Groundwater Appropriations; 410-631-3590

Tidal Wetlands Division; 410-631-8075

State Groundwater Permits Division, Groundwater Discharge Section; 410-631-3323

State Groundwater Permits Division, Innovative & Alternative Septic Systems; 410-631-3779

### **Maryland Department of Natural Resources**

Forest Service, Eastern Regional Office; 410-543-6745

Natural Resources Police; Nuisance Wildlife; 1-800-442-0708

Wildlife & Heritage Division, Wye Mills Office; 410-827-8612; Regional Office: 410-543-6575

**Queen Anne's County Department of Planning and Zoning;** 107 N. Liberty St.; Centreville, MD 21617. 410-758-1255.

**Somerset County Department of Technical and Community Services;** Somerset Office Complex; 11916 Somerset Avenue, Room 102; Princess Anne, MD 21853. 410-651-1424.

**Talbot County Office of Planning and Zoning;** Easton, MD 21601. 410-770-8030.

**Wicomico County Planning Office;** Government Office Bldg.; N. Division St. & East Church St.; Salisbury, MD 21803. 410-548-4860.

**Worcester County Planning, Permits & Inspections;** One West Market St.; Court House Room 116; Snow Hill, MD 21863. 410-632-1200.

## Guidelines Working Group

**Nick Carter, Biologist; Cooperative Oxford Laboratory;** MD Department of Natural Resources; 904 S. Morris Street; Oxford, MD 21654

**David Casnoff, Ph.D., Agronomist, CAC Associates;** 2002 Cortland Road; Davidsonville, MD 21035

**Lee Anne Chandler, Natural Resources Planner, Chesapeake Bay Critical Area Commission;** 45 Calvert Street, 2<sup>nd</sup> Floor; Annapolis, MD 21401

**David Ciekot, Environmental Consultant;** 5535 Morris Neck Road; Cambridge, MD 21613

**Steve Dawson, Regional Chief, Eastern Region Non-tidal Wetlands and Waterways Division;** District Court/Multi-Service Center; 201 Baptist Street, Suite #22; Salisbury, MD 21801

**Woody Francis, Regulatory Project Manager/Biologist;** U.S. Army Corps of Engineers; P.O. Box 1715; Baltimore, MD 21203

**Lee Goodwin, Williamsburg Environmental Group, Inc.** 3000 Easter Circle; Williamsburg, VA 23188

**Fred Heinlen, Superintendent; River Run Golf Course;** 11605 Masters Lane; Berlin, MD 21811

**Rachel Horsey, Regional Forest Conservation Program Coordinator;** Forest Service, MD Department of Natural Resources; District Court/Multi-Service Center; 201 Baptist Street, Suite #22; Salisbury, MD 21801

**Bill Kerman, Hurdzan/Fry Golf Course Design, Inc.** 1270 Old Henderson Road; Columbus, OH 43220

**Richard Klein, President, Community & Environmental Services;** P.O. Box 206, Maryland Line, MD 21105-0206

**Tom List, Superintendent, Ocean City Golf and Yacht Club;** 11401 Country Club Drive; Berlin, MD 21811

**Bill Love, Golf Course Architect, W.R. Love Golf Course Architecture;** P.O. Box 510; College Park, MD 20741

**Bruce Mertz, MD Nutrient Management Program, MD Dept of Agriculture,** Wayne A. Cauley, Jr. Bldg; 50 Harry S. Truman Parkway; Annapolis, MD 21401

**Joe Perry, Superintendent, Eagle's Landing Golf Course;** 12367 Eagle's Nest Road; Berlin, MD 21811

**Spencer Rowe, Environmental Consultant; S.R., Inc;** 12409 Kent Road; Ocean City, MD 21842

**Don Seaborn, Regulatory & Legal Affairs Division, National Association of Home Builders;** 1201 15<sup>th</sup> Street, NW; Washington, D.C. 20005-2800

**Scott Smith, Biologist, DNR/Wildlife & Heritage Division;** P.O. Box 68; Wye Mills, MD 21679

**Larry Whitlock, Lawrence T. Whitlock Associates, Inc;** 3409 Coastal Highway; Ocean City, MD 21842

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