

GOLF COURSE DEVELOPMENT

Location

- Golf courses should be located so as to be easily accessible to the resort areas of the city and activity centers;
- Golf courses should be located on land that consists of medium-textured soils;
- Setbacks of at least 150 feet should be provided between the centerlines of fairways and the course property line. At least 50 feet of this setback should be an existing forested area or planted as a forested buffer. Assistance from the Virginia Department of Forestry is available regarding forested buffers.



Aerial of VB National Golf Course

Design

- Where tees and fairways are planned to be separated by landscaped corridors, these design attributes should ultimately convey a strong sense of privacy, peacefulness, natural beauty and safety. These corridors can also serve as interesting wildlife habitats, thereby making very positive contributions toward protecting the natural environment and helping the marketing potential of the golf course project. In the absence of acceptable natural vegetation in these areas, significant tree stands using native and diverse species with suitable understory landscape material should be planted, where deemed appropriate by the golf course architect or planner, in order to achieve these objectives. Low cost plant material and tree seedlings are available for this and other purposes from the Virginia Department of Forestry. Additional features within these landscaped corridors, such as water traps, creek crossings and other design attributes are also encouraged as aesthetic complements of the golf course.
- Although public trails are appropriate along the outer periphery of golf courses, there should be no connection between these trails and on-course golf paths; and
- Significant archeological and historic sites located on the site should be identified and impacts to these cultural resources described prior to the submission of preliminary site development plans.

Water Quality / Stormwater Management

- Stormwater and water quality control structures should be used to supplement natural filtering systems such as wetlands and floodplains;
- Wetponds and sand-peat filter combinations should be used where conventional infiltration practices are not suitable. A sand-peat filter, a modified version of a wastewater effluent device, may be used in conjunction with a golf course facility. Typically, it consists of an earthen dike with the following layers from bottom to top:
 - 6-inch deep bed of washed bank-run gravel which is fitted with a perforated underdrain pipe;
 - 24-inch layer of fine-medium sand;
 - 4-inch layer of 50/50 peat-sand mixture; and
 - 18-inch layer of peat which is planted in grass.
- The runoff from the sand-peat filter should be released onto natural soils in order to allow recharge into the groundwater system and replenish the base flow of receiving waterways.
- Wet ponds should be designed to serve as a component of the site's irrigation system in order to reduce groundwater withdrawals for course watering;
- Waterways that traverse the proposed site should not be altered or rerouted. All waterway crossings should be kept to a minimum number and designed to minimize impacts on the waterways. Elevated crossings on pilings should be used to minimize impacts on the natural or constructed waterway, drainage way, or wetland.
- The distance between the golf course tees, fairway, and greens and adjacent waterways and tidal or non-tidal wetlands, as defined in the City's Southern Watershed Management and Chesapeake Bay Preservation Area Ordinances (except those established in connection with best management practice facilities or with water landscape features within a golf course which are not connected by surface flow to tidal waters) should be no less



than 100 feet from the top of bank, shoreline or edge of such wetlands. Further, buffer areas should either remain in their native vegetative state with trees and shrubs or planted with native material that will enable them to become a forested area in the future. In all cases where new trees are planted, tree survival rates should be taken into account when determining the desired number expected to reach maturity. Sodding these waterway and wetland protection buffer areas does not offer the same level of pollutant removal capabilities as those areas that consist of tree and shrub cover and, therefore, buffer areas should be treated with more than turf alone.

- Facility hazards such as grass bunkers, lakes, and sand traps should be designed as a component of the site's stormwater management system.
- Golf course development plans should include a Best Management Practice facilities maintenance plan. Retention areas should be designed so that maintenance necessitated from siltation deposition is easily achieved. Facility design criteria should include the use of fore bays for sediment control and the establishment of emergent wetlands around the fore bay perimeter.
- Water traps and associated drainage ways should be sized, positioned, and designed to replicate, to the greatest extent possible, storm water effluent characteristics that replicate natural storm flows necessary to protect the normal functioning of receiving hydrologic systems.

Golf Course Natural Resource Protection Plan

In addition to adhering to the General Golf Course Development Guidelines, a Natural Resource Protection Plan should be submitted by applicants who wish to develop such facilities. The following information should be considered when developing the Plan:

- Golf course design should include measures to retain existing woodland cover. The clearing of forested areas should be limited to no more than 25% of the total forest acreage. Reforestation must be implemented to replace any acreage over the 25% limit. Off-site reforestation may be acceptable within other areas of the watershed. An



Signature Golf Course at West Neck

acceptable reforestation plan utilizing, as a minimum, Virginia Department of Forestry guidelines, should be provided prior to or upon submittal of preliminary site plans.

- Rare and endangered species and their natural habitat areas and Natural Heritage Areas, as identified by the U. S. Fish and Wildlife Service and Virginia Department of Conservation and Recreation, should be identified and protective measures described if applicable.
- A water quality monitoring program which includes baseline monitoring of appropriate chemical, physical, and biological parameters, as deemed appropriate upon consultation with the Virginia State Water Control Board, should be established for adjacent surface waters. The baseline monitoring program should include:
 - Monthly water column monitoring for a minimum period of twelve months prior to the commencement of golf course development activities;
 - The monitoring of adjacent surface water columns for a three year period after course development at frequencies determined appropriate upon consultation with the Virginia State Water Control Board;
 - Storm event monitoring conducted for a three year period after course development at frequencies determined appropriate upon consultation with the Virginia State Water Control Board; and,
 - Biological monitoring of benthic organisms inhabiting adjacent surface waters after course development at frequencies as determined appropriate upon consultation with the Virginia State Water Control Board.
- A groundwater quality and quantity monitoring program should be established in accordance with all criteria required by any groundwater withdrawal permit issued for the site by the Virginia State Water Control Board.
- Irrigation wells should be located or distributed so to avoid adversely affecting groundwater resources and adjacent surface water systems.
- An Environmental Management Plan, including Integrated Pest Management procedures, should be submitted, as a component of the Golf Course Natural Resources Protection Plan, which clearly describes course

operations relating to the application of fertilizers, pesticides, and herbicides. A description of the site's storm water management system, designed for control of storm water volumes as well as product residuals associated with grounds management, should be included in the Plan. The Environmental Management Plan should emphasize a site specific and integrated approach to chemical use and pest control. The following guidelines should be considered when developing an environmental management plan:

- a. A description of spill prevention control and countermeasure procedures;
 - b. A description of appropriate handling and mixing procedures;
 - c. Fertilizer selection based upon low leaching characteristics;
 - d. Chemical selection for pest control based upon vegetative-cover density and type and the identification of "key Pests" prior to the use of control measures;
 - e. Coordinated selection of chemicals, dosage, and treatment schedules in order to minimize hazards to non-target organisms and the surrounding ecosystems;
 - f. Selection and utilization of pest and drought resistant vegetation for maintained course areas such as fairways, tees, and greens;
 - g. Application of chemicals at times and under weather conditions that are deemed optimal and when the potential for adverse impacts to the surrounding ecosystems is minimized;
 - h. Introduction and maintenance of natural enemies, and other biological controls, to control "key" pests;
 - i. Utilization of chemical products only when the course superintendent has established a need to either prevent or control pest problems and when, in his or her professional opinion, there are no biological agents or cultural management practices that can effectively control the problem.
- Areas used to store or dispose of pesticides, fungicides, and herbicides should be designed to contain any possible spills and protect the environment from flooding or accidental leakage to surface waters or to the groundwater system. Site development plans should clearly identify this area;

- Sediment control during construction of golf courses should be implemented in accordance with accepted erosion and sediment control practices including the following techniques:
 - Tees, fairways, and greens should be laid out to minimize the need for widespread disturbance of the land;
 - Clearing and soil exposure should only occur on the portion of the site where construction activity will commence soon. Such activity should be phased in order to enable effective erosion and sediment management of excavated land and be a component of the plan of development;
 - Whenever possible, major excavation should occur during the drier seasons of the year to minimize erosion and sedimentation of waterways; and

- The following techniques should be used, when feasible, to minimize the effect of heat pollution of nearby waterways caused by parking areas and other impervious surfaces. While it is recognized that such areas comprise a proportionally small amount of land in relation to the overall golf course area, these facilities are often located in areas that affect large natural ecosystems. Summertime rainwater runoff can quickly increase the temperature of receiving streams by 15 degrees Fahrenheit and can be damaging to aquatic life in these waterways:
 - Maintain a dense buffer of trees and other shading vegetation along both natural and manmade drainage areas and receiving waterways;
 - Avoid locating wet ponds within waterways that naturally flow intermittently or perennially;
 - Manage groundwater use to sustain acceptable ground water levels. If possible, irrigation wells should be located or distributed so as to avoid depleting groundwater sources, especially those that contribute to surface waterways; and

- Adhere to the provisions of the City's Storm water Management Ordinance, Southern Watersheds Management Ordinance, Chesapeake Bay Preservation Area Ordinance and all other applicable development ordinances. Consider the use of multiple BMP's, both structural and non-structural, in order to reduce the temperature of heated water entering the environment.