

# 5. Golf Courses



It is very difficult to plan, design and construct a golf course without affecting wetlands in some way. Courses encompass such large areas of land that they often include numerous wetland crossings and encroachments. It is DEM's responsibility to ensure that applicants avoid wetland alterations and minimize impacts for every golf course design.

## Site Selection and Planning

When choosing a site, it is important for the planner to consider whether there is sufficient buildable area for a course, whether there is access to adequate amounts of water, and whether the topography is appropriate. A site that includes large areas of wetland may not be a good choice if construction will result in many impacts to wetlands. Sometimes a beautiful site may not be feasible due to wetland constraints or the finances needed to develop the golf course in an environmentally sound way. The planner should therefore:

- Evaluate alternative sites before making a final selection.
- Attempt to locate the course on previously used or abandoned properties, such as landfills, sand and gravel operations, or farms.
- Evaluate if the proposed site will be able to supply the amount of water necessary for the course through the development of a water budget and a drought contingency plan that establishes alternate water sources. The water budget should not deplete nearby wetlands or streams.

## Course Design

Once a site is chosen, the course designer must give careful consideration to all wetland areas. Protecting these areas can and should be considered together with course playability and aesthetics. The designer should therefore:

- Design fairways, tees, greens, and golf cart paths to avoid wetlands and filling of floodplains.
- Complete a Floodplain Evaluation if filling a floodplain is unavoidable.
- Be sure to consider alternative sizes if upland space is limited. Consider a 9-hole course instead of an 18-hole course.
- Protect existing wetlands, and improve or restore previously degraded areas if possible.
- Create and maintain buffer zones around wetlands to protect their functions and values.
- Design a course that will naturally "hold" water, maintain wetland hydrology, and require minimal topographic changes.
- Ensure that irrigation, drainage, and retention systems encourage efficient use of water and protect wetland water quality.
- Maintain interconnected, naturally vegetated wildlife corridors and passages in the golf course design.

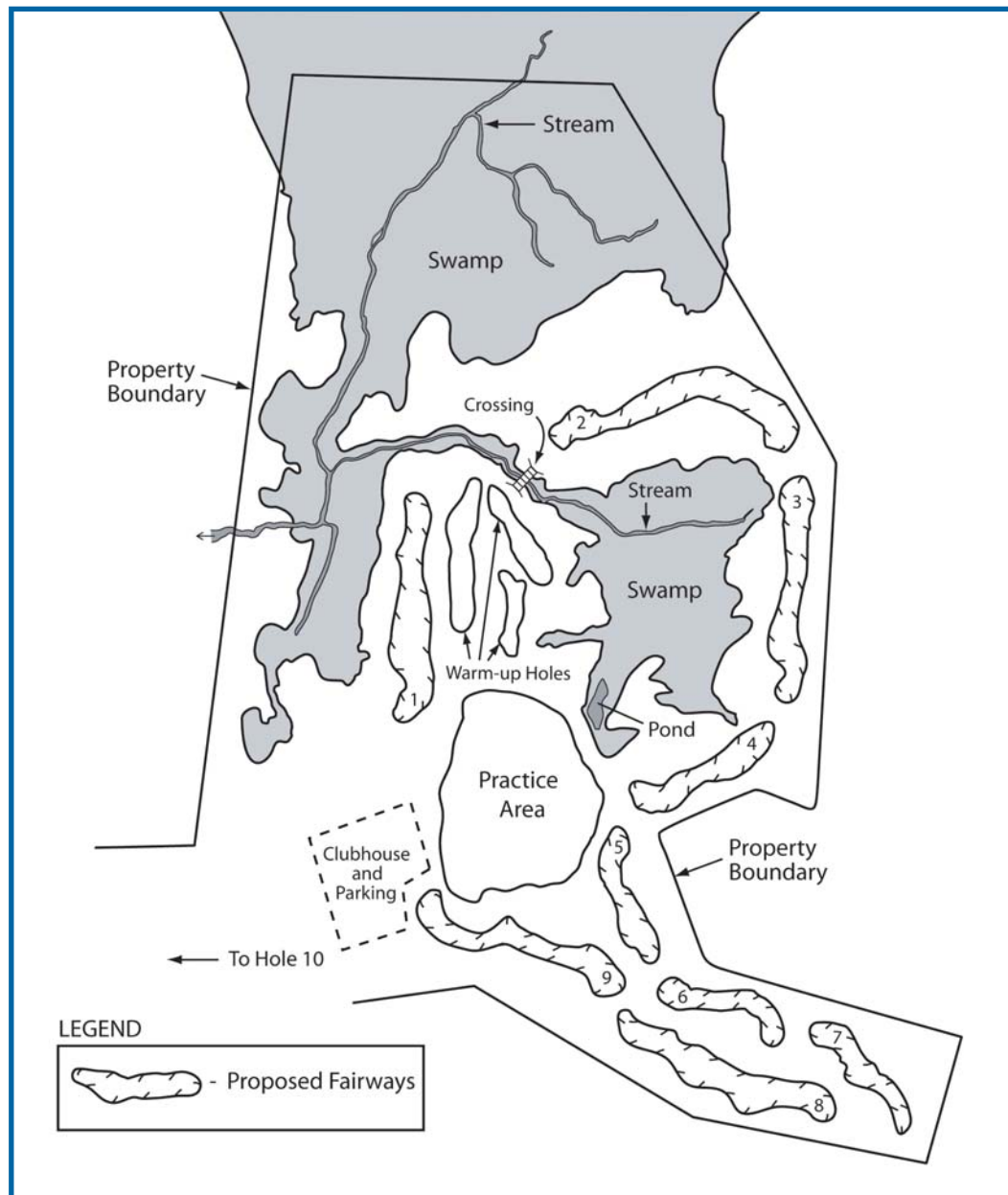
- Include plantings that serve as noise and lighting shields for wetland wildlife.
- Avoid the use of lighting in or around wetlands, especially near bodies of water.
- Design signs and barriers to keep golfers out of sensitive areas. Designate sensitive wetland areas as “no play” zones.
- For unavoidable wetland crossings, design bridges that can be installed as a complete unit from overhead or can be built one section at a time to limit work in wetlands.
- Incorporate low-impact pervious surfaces for roads and paths which help infiltrate surface water.
- Utilize geographically native and drought-resistant grasses for the turf. These types of grasses benefit wetland wildlife habitat by requiring less water and less pesticide and fertilizer application, which maintain good wetland water quality. (URI’s Department of Plant Sciences and Entomology) is a good resource for turfgrass management information: <http://www.uri.edu/cels/pls>)
- Develop a stormwater management and pollution prevention plan that takes into consideration runoff, infiltration rates, topography, and pollutants. See the *Rhode Island Stormwater Manual* (pending revision 2010).
- Develop a practical and long-term maintenance plan for stormwater controls that can be followed effectively.

### **Wetland Flyovers**

"Flyovers" of wetlands within fairways, especially wetlands dominated by woody vegetation, should be avoided. Wetland flyovers commonly require that wetland trees and shrubs be cut to ~ 4 to 8 feet in height. The tree topping and cutting severely alters the wetland wildlife habitat and may also change the wetland's hydrology. In addition, flyovers necessitate ongoing maintenance and repetitive encroachment into the altered wetland in order to maintain the desired tree height. It is easier, less environmentally damaging, and may be less costly to simply avoid fairway alignments that require flyovers of wetlands.

### Example 10: Avoiding a Large Wetland Complex

This example is an aerial view of one-half of an existing golf course. The challenge with upgrading this site was to avoid the large Swamp.



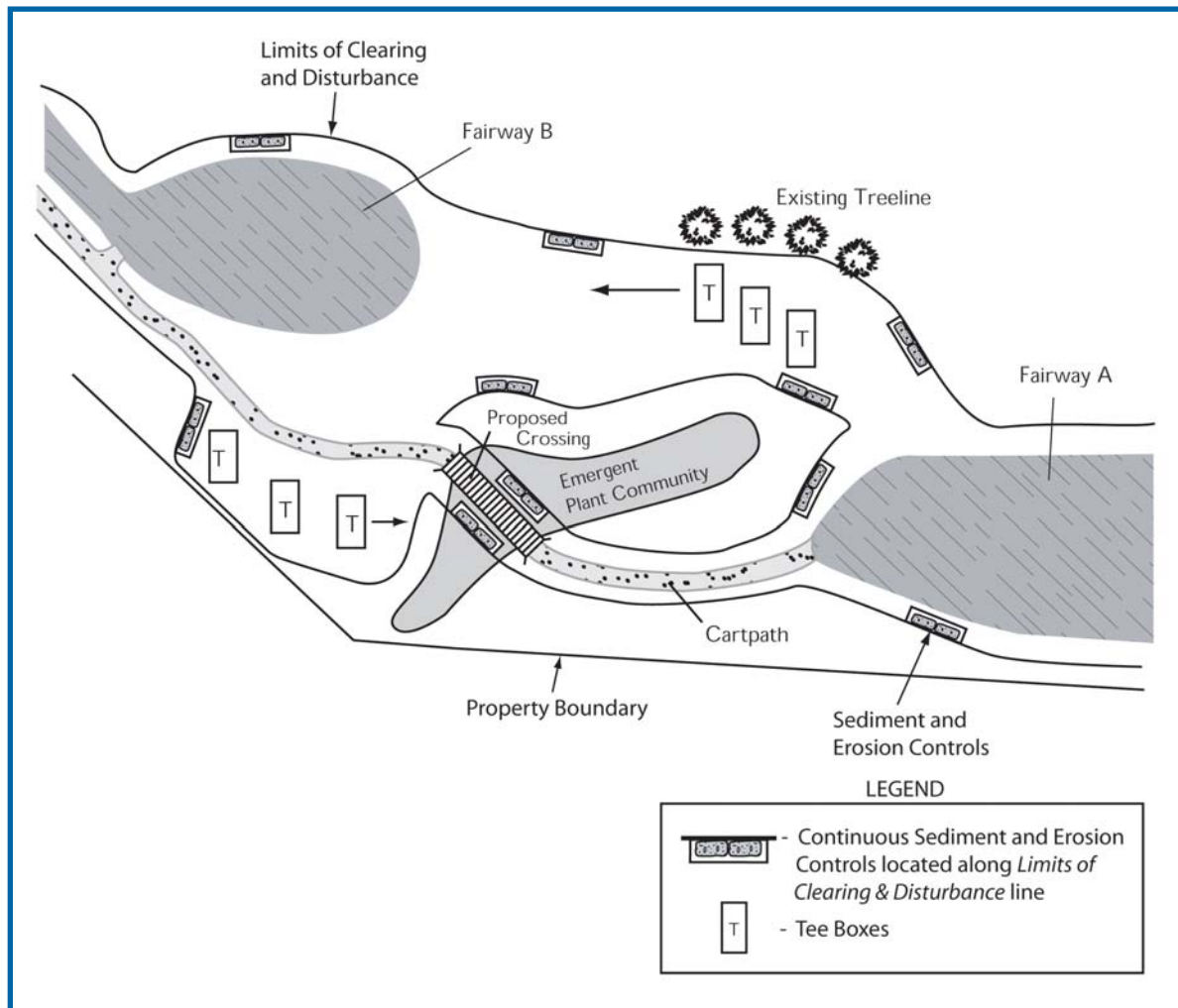
Example 10

#### How wetland impacts were minimized:

- ✓ The fairways were located outside the wetlands near the edges of the property.
- ✓ A wetland corridor was maintained within the interior of the property, thus preserving wildlife habitat.
- ✓ A crossing was located at a narrow spot while spanning the entire Stream and Swamp to minimize disturbance of another wetland corridor
- ✓ Whenever possible, additional vegetated corridors beyond the Perimeter or Riverbank Wetlands were maintained around the wetland areas.

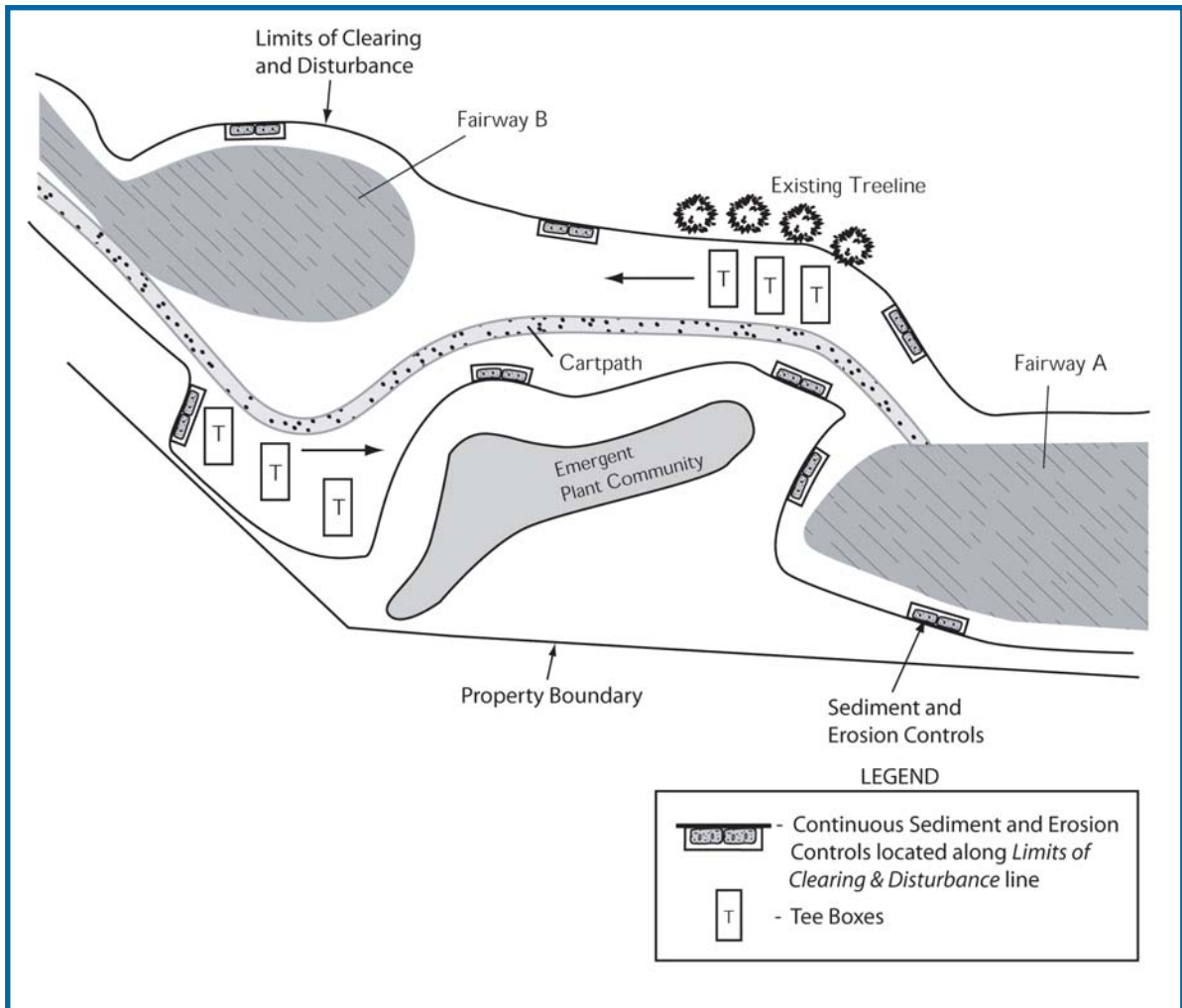
### Example 11a: Original Design for Emergent Plant Community Crossing

This example illustrates a golf course section that encroaches on an Emergent Plant Community. This particular course is proposed to be built on old farmland. The plant community illustrated only has low ground vegetation, without any large trees that would need to be trimmed for flyovers. This original design bisects the Emergent Plant Community wetland with a crossing for a cart path from Fairway A to Fairway B.



Example 11a

### Example 11b: Revised Design at Emergent Plant Community



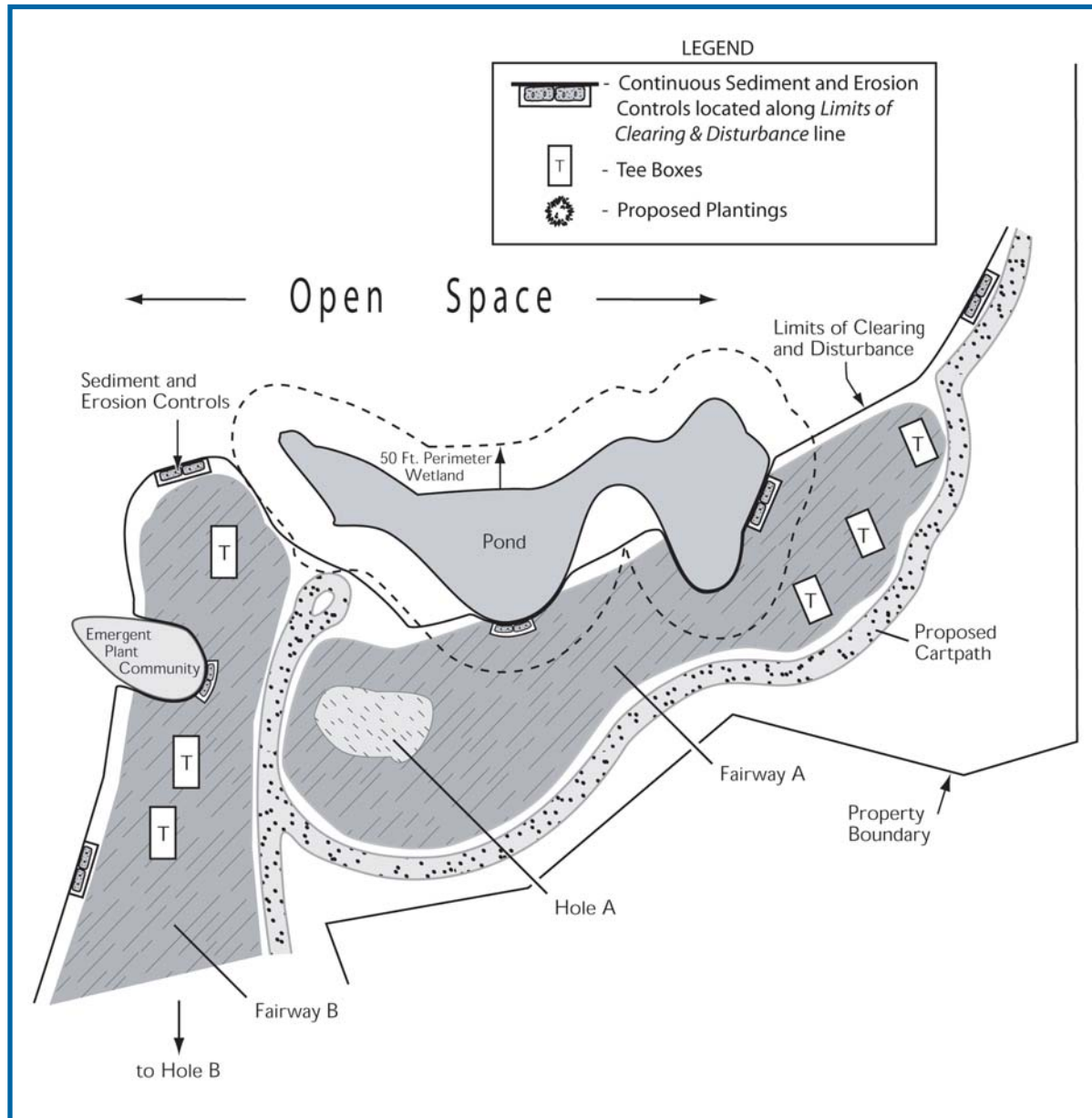
Example 11b

#### How wetland impacts were minimized :

- ✓ The cart path was moved around the wetland thus avoiding the Emergent Plant Community and eliminating the crossing.
- ✓ Narrow but reasonable Limits of Clearing and Disturbance were maintained.
- ✓ The existing tree line was maintained where possible.
- ✓ Existing vegetation surrounding the Emergent Plant Community was maintained to buffer the wetland from noise and light.

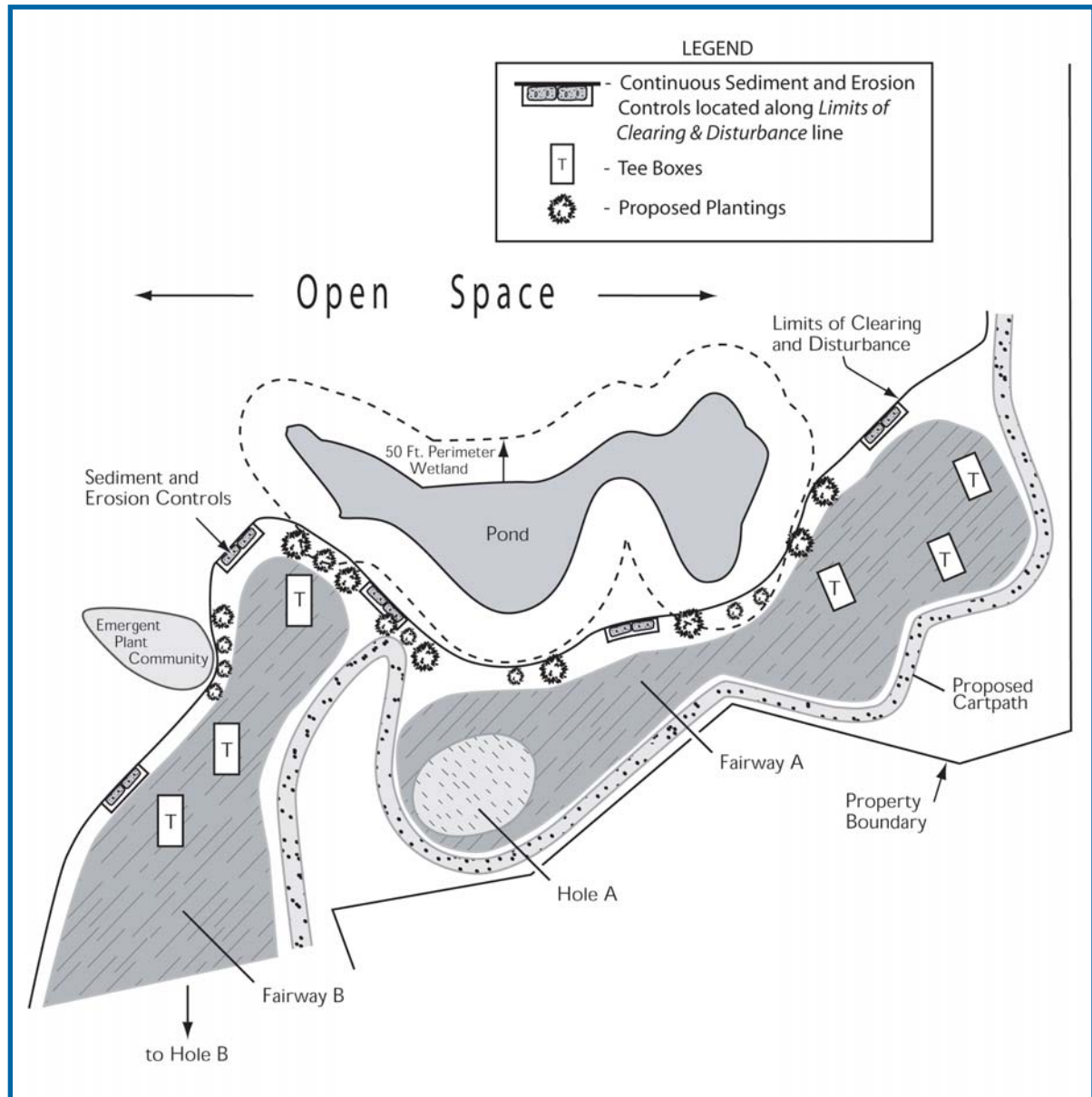
## Example 12a: Original Design with Multiple Wetlands

In this second example, it was much more difficult to design a course that avoided impacting wetlands – a Pond, a Perimeter Wetland and an Emergent Plant Community. This original design for Fairways A and B greatly impacts these wetland areas.



Example 12a

## Example 12b: Revised Design with Multiple Wetlands



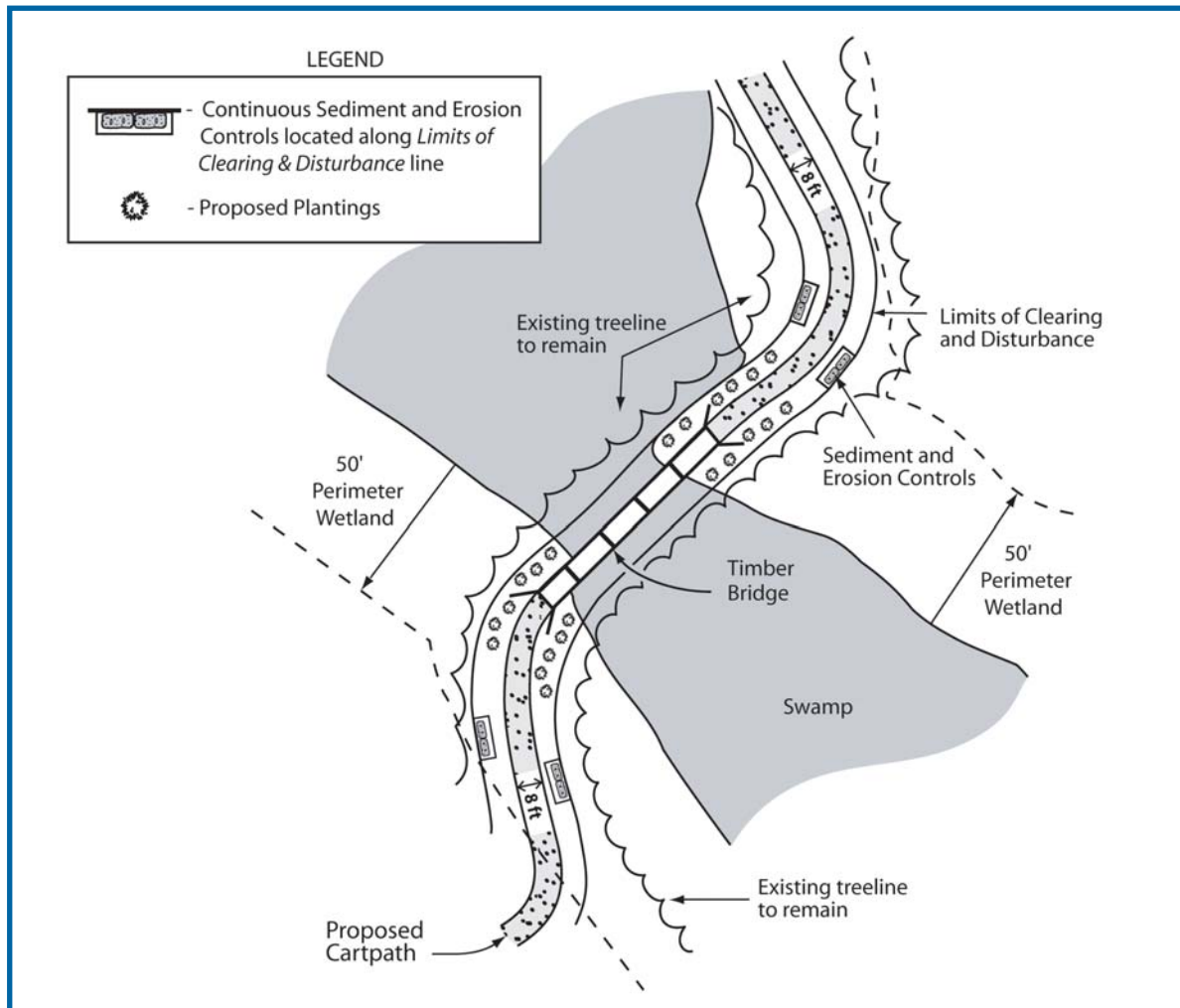
Example 12b

### How wetland impacts were minimized:

- ✓ Fairway B and its tee boxes were moved to avoid the Emergent Plant Community.
- ✓ Fairway A and its tee boxes were adjusted to avoid bisecting corners of the Pond and to preserve the Perimeter wetland.
- ✓ Narrow but reasonable Limits of Clearing and Disturbance were maintained.
- ✓ Open space for wildlife habitat corridors was maintained adjacent to the Pond.
- ✓ The existing vegetation was maintained, and plantings were installed, as appropriate, along the Limits of Clearing and Disturbance line within and adjacent to wetland areas to buffer impacts from loss of wildlife habitat and to reduce the effects of disturbance to wildlife.

### Example 13: Crossings

Roads and cart path crossings are other common elements proposed in golf course applications. The designer should first try to avoid any crossings. If crossings are unavoidable, their impacts should be minimized. In this particular golf course, a cart path crossing was proposed to access upland for another part of the course. The path and crossing were laid out within an already cleared area, which minimized further wetland encroachment and preserved the wetland corridor.



Example 13

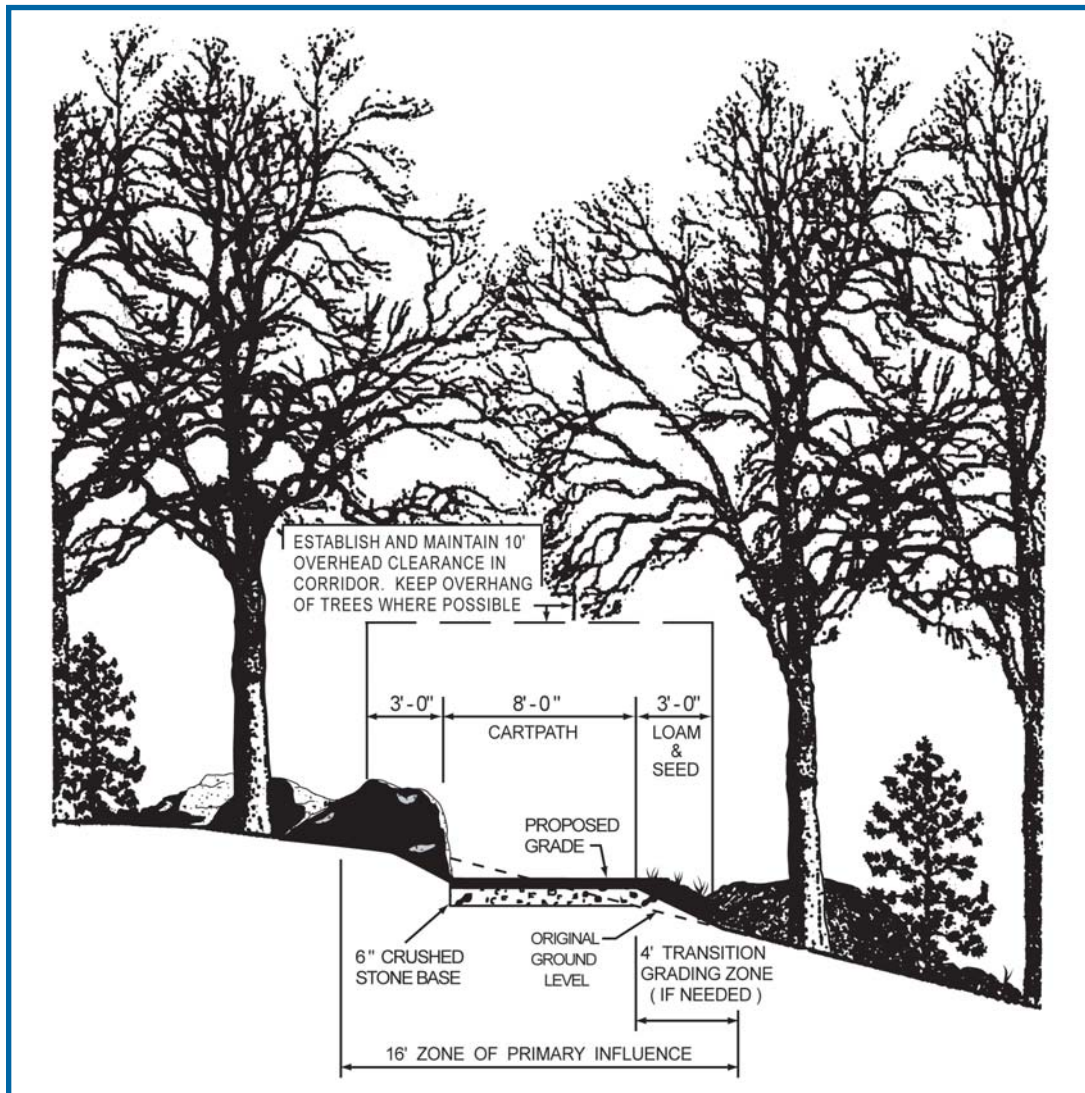
#### How wetland impacts were minimized:

- ✓ The cart path and Limits of Clearing and Disturbance are narrow and utilize an already disturbed area to maintain habitat.
- ✓ The bridge crosses the Swamp at its narrowest point and spans a small portion of Perimeter Wetland on either side to allow a clear passage for water and wildlife.
- ✓ The timber bridge structure was installed in sections which limited impacts to the Swamp and Perimeter Wetland.
- ✓ Proposed plantings were installed along the Limits of Clearing and Disturbance line within and adjacent to wetland areas to buffer impacts from loss of wildlife habitat and reduce the effects of disturbance to wildlife.



### Example 14: Cart paths

Quite often cart paths are proposed in or near wetlands, including Forested, Perimeter and Riverbank Wetlands. It is always best to try to avoid these areas; however, if it is not possible, then impacts should be minimized. The following example illustrates a conscientious design.



Example 14

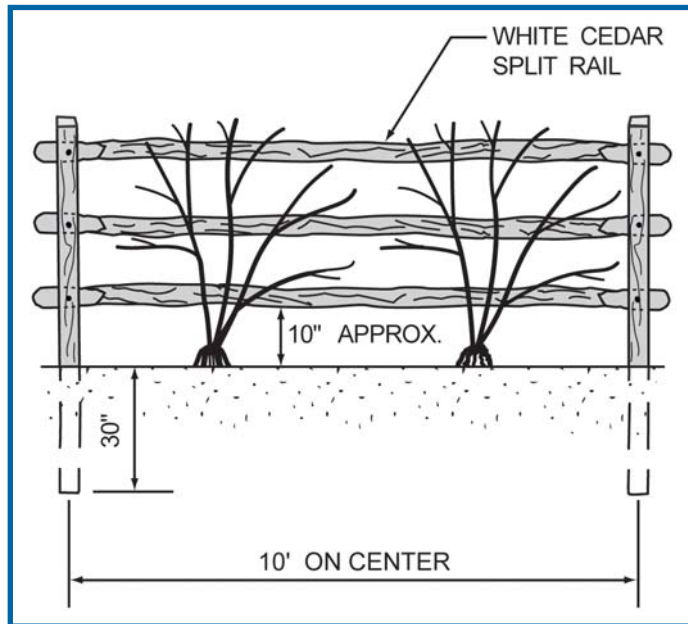
#### How wetland impacts were minimized:

- ✓ Only a minimum width of forest was disturbed, including a narrow path and area of influence.
- ✓ The overhead tree canopy was preserved.
- ✓ The surface of the proposed path was covered with crushed stone, shells, or other porous material that helps recharge groundwater and prevent the incorporation of pollutants into surface runoff.
- ✓ Minimum grading was required.

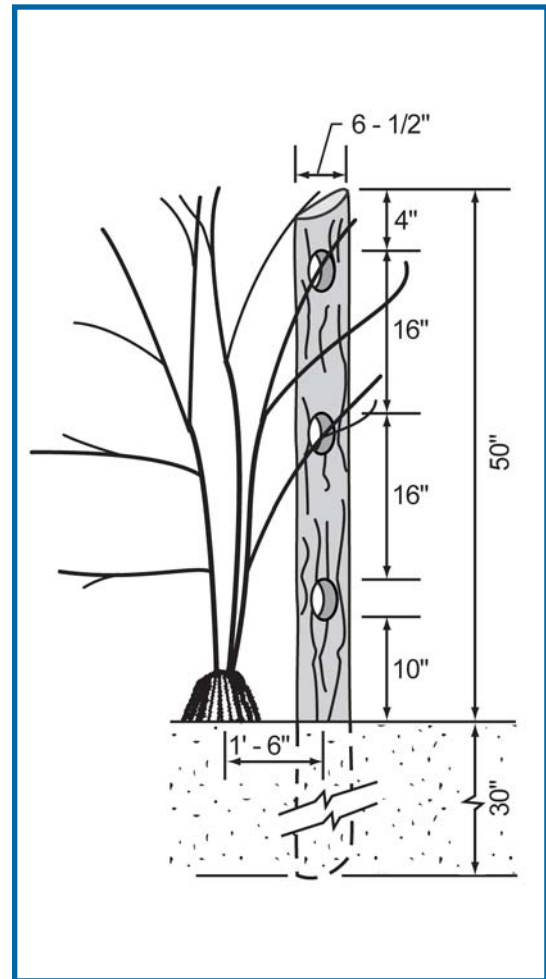
Other porous materials include wood chips, and leaf litter. Cart paths should be installed as close to existing grades as possible. This will prevent future erosion and sedimentation impacts to nearby wetlands.

### Example 15: Preserved Areas

Commonly, golf course designs include fairways and flyovers around sensitive wetland and wildlife areas. Golf balls are often shot over and around these areas thus creating a need to keep people from trampling through preserved areas for lost golf balls. A rail fence, with native non-invasive rose plantings, is one way to keep people out of sensitive areas. In addition, signs are often posted that read: Conservation Area: Do Not Enter.



Example 15a



Example 15b

#### How wetland impacts were minimized:

- ✓ The fence is nearly four feet tall, thus making it very difficult for anyone to climb over to retrieve a ball and thus preventing regular foot or cart traffic through the wetland.
- ✓ Native rose bushes or other thorny shrubs are planted to further discourage entrance to the protected areas.

## Construction

DEM often finds that projects are not constructed as shown on the approved plans, nor are all the permit conditions met. It is especially important on large projects, such as golf courses, for plans and conditions to be strictly followed. It is helpful to utilize design consultants who are experienced with golf course construction, as well.

- Install proper soil erosion and sediment controls prior to the initial phase of construction (phased or overall project).
- At a pre-construction meeting with all contractors and subcontractors, take note of sensitive wetland/habitat areas that must be avoided per DEM approved permit plans and conditions.
- Establish and stabilize material storage and staging areas prior to construction. Install and maintain proper soil erosion and sediment controls around such areas during the life of the project. Stockpile erosion controls for ready replacement of those that deteriorate.
- Phase any clearing that is necessary, instead of cutting and clearing all vegetation at the same time. This will help to control erosion and protect the wetland and wildlife.
- Keep heavy equipment use to a minimum, especially near wetlands or other sensitive areas to reduce soil compaction.
- Recycle any trees and stumps that are removed into mulch or woodchips to be used on site. Woodchips and mulch are not to be placed in a wetland.

## Course Use and Maintenance

**Water:** A water budget and a drought and dry weather contingency plan that establishes alternate water sources and a method for scaling back irrigation should be developed. A complete application package should include information on irrigation rates or other ways the water withdrawal may affect wetlands.

**Pesticides and Fertilizers:** DEM is responsible for protecting wetland areas that could become degraded from runoff carrying pesticides or fertilizers. All pesticides used in Rhode Island must be registered with the EPA and RIDEM/Division of Agriculture & Resource Marketing. Pesticides must be applied in accordance with label instructions and any state Pesticide Management Plan for that pesticide. Pesticide Applicators must be licensed or certified by RIDEM/Division of Agriculture & Resource Marketing and file the appropriate Pesticide Use report with the Division annually.

## References

This list provides additional sources for information on golf courses. (Also see Chapter 12.)

- *Environmental Guidelines for the Design and Maintenance of Golf Courses* by R. O. Powell and J. B. Jollie (1990)
- *Environmental Principles for Golf Courses in the U.S.* by The Center for Resource Management (1996)
- *Golf Courses and the Environment* by the Massachusetts Audubon Society (1999)
- *Manual of Environmental Best Management Practices for Construction and Maintenance of Golf Courses* by Mason & Associates, Inc. (Unpublished, 2002)