

6. *Bike Paths, Foot Paths, Trails and Boardwalks*



Bike paths, foot paths, trails and boardwalks are excellent means of showcasing wetlands and the natural environment, especially for people who may not otherwise enjoy natural areas. It is the Department's responsibility to protect wetland areas from unnecessary and undesirable impacts and intrusions into wildlife habitat. Good project planning and design simultaneously protect wetlands and provide opportunities for recreational use of the environment.

Planning and Site Selection

Bike paths are unique in that they require long, undivided stretches of land. These are most commonly in the form of former railroad beds or utility easements. It is not a surprise that these stretches of land may include many wetlands and may even follow a larger river or stream. Other smaller trails and paths may specifically be proposed to enhance an area that is set aside for conservation or recreation, which is also likely to have wetland habitat. For all projects, in order to protect wetlands and their functions and values, it's important for the planner to do the following:

- ✓ Research and evaluate the area to decide if the trail will be able to accommodate all projected users without degrading the natural resources. Not all wetland areas can support all types of paths while maintaining wildlife values. If this can't be accomplished, it may be necessary to downsize the project or look for an alternative route for the path or trail. Be sure to take safety standards into consideration when choosing a site.
- ✓ Create a design that works with the natural environment. Look for existing disturbed corridors and popular routes, and research the area to find out what types of wildlife are the most sensitive and will need the most protection.
- ✓ Avoid areas with steep slopes and rough terrain, as they will be more expensive to convert to a suitable surface and to maintain. If these areas cannot be avoided, it may be necessary to limit the scope of the project or the possible uses of the path. Fewer grade changes will help limit wetland impacts.
- ✓ Evaluate the site for engineering constraints such as poor drainage and the presence of floodplains. If floodplain wetlands cannot be avoided, strive to balance cuts and fills within the project limits.

Design

Good trail design is critical to help prevent unnecessary and detrimental impacts to wetlands, whether the trail is constructed on a previously disturbed railroad bed or on an undisturbed natural area. The following are general tips to protect wetlands and minimize impacts:

✓ Grading

- Utilize natural land contours to avoid excessive fill.
- Design retaining walls in areas of steep or irregular topography to minimize amount of cut and fill needed alongside a path.

✓ Maintain habitat values

- Preserve the natural character of the area, while making it available for recreational use.
- Skirt sensitive wetland areas, and provide for views from the periphery instead of bisecting wetlands.
- Preserve natural buffers within and around wetlands.
- Use lookouts and overlooks to enjoy wetlands instead of crossing sensitive areas.
- Be sensitive to the wildlife that use the area.
- Propose limited access to sensitive areas for bird-watching, nature study and non-motorized boating.
- Build outside of areas used by sensitive species and critical wetland areas, such as special aquatic sites.
- Avoid disturbing all rare plants and wildlife.

✓ Wetland Crossings (see Chapter 9 for more details)

- Utilize existing structures and pathways, wherever possible.
- If crossing a sensitive habitat or creating a new trail, keep the crossing as narrow as possible.
- Timber bridges and elevated boardwalks are good options.
- Utilize wildlife passage structures.
- Elevate boardwalks, observation decks, and bridges to minimize disturbance to wetland vegetation, as well as to protect wetlands underneath.
- Allow spacing between slats in boardwalks to allow light penetration underneath.

✓ View corridors and recreational access areas

- Utilize existing disturbed or thinned areas for rest areas, or for canoeing or fishing access.
- If necessary, thin trees and shrubs sparingly for a view of the wetland area.
- Keep recreational corridors narrow.
- Create a minimum number of well-chosen corridors.

✓ Path dimensions

- Paved multi-use paths in the vicinity of wetlands should not be any wider than 10 feet with 2-4 feet of clearance on either side for a safety and work zone, unless specific circumstances dictate otherwise. In Rhode Island they have been permitted up to 14 feet to allow for emergency vehicle passage.
- Foot paths in the vicinity of wetlands should not be wider than 3-5 feet.
- Height clearance is recommended at 7 feet for pedestrians/bicycling and 10 feet for horseback riding.
- Selective thinning of trees and shrubs may be necessary adjacent to the primary path in order to provide the necessary height clearance for multiple path uses.

✓ Signage - Place informational signs at the entrance to sensitive habitat areas.

✓ Pervious surfaces

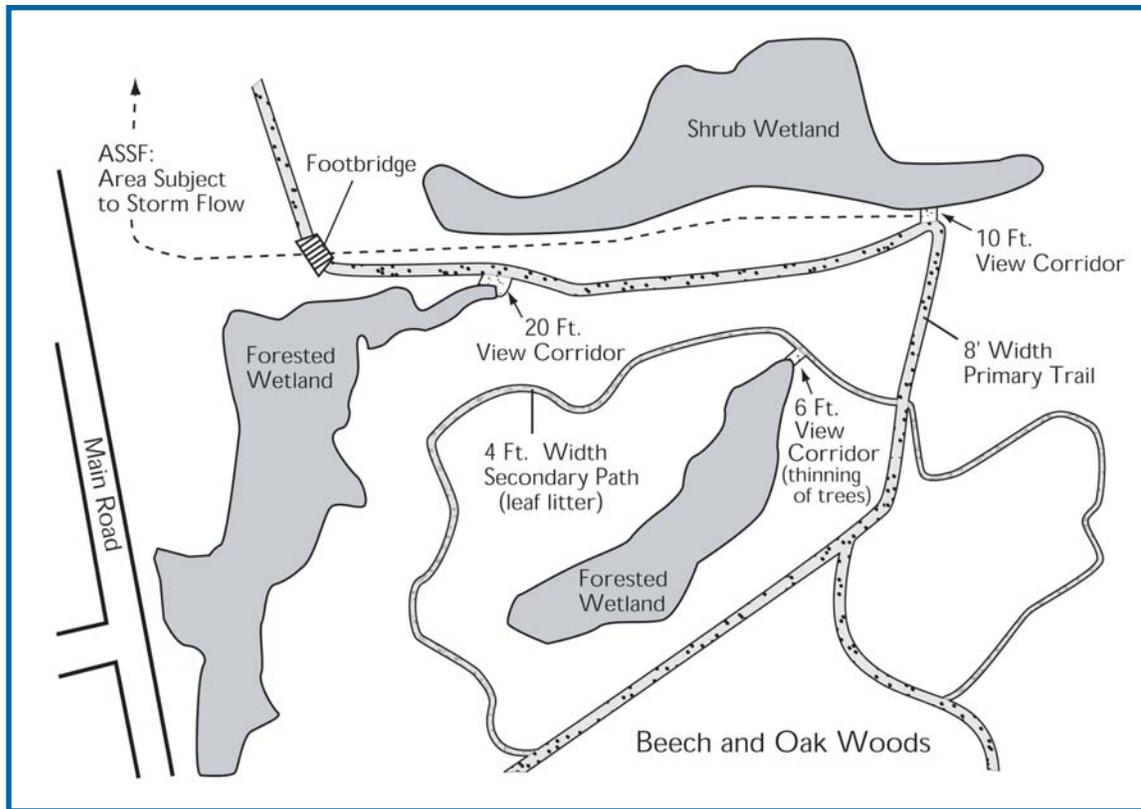
- Examples include: shells, stone dust, bark mulch, wood chips, leaf litter, or plastic grates filled with stone.
- These alternative surfaces are more natural and often encourage water infiltration.
- Many surfaces are safe and sturdy enough for bikes and wheelchairs.
- Alternative surfaces require smaller equipment to construct, thus allowing for a narrower area of disturbance.

✓ Plantings and buffers

- Plantings should screen sensitive wetland areas from human disturbance: 1-3 rows of evergreen shrubs and/or trees (6 ft minimum height) work well. (Also see Chapter 10.)
- Consider using fences at the limits of work to visually screen human activity.
- Use vegetation, such as native non-invasive thorny plants or a dense evergreen screen, to discourage entry to sensitive areas.
- Propose vegetation on both sides of the path to provide a buffer between the wetland and developed areas.
- Propose planting schemes that are both aesthetic and attractive to wildlife, such as berry producing trees and shrubs.
- Preserve and enhance existing tree cover and shrubs. Where possible, consider weaving paths around existing trees to help maintain canopy cover and to preserve large diameter trees.
- Avoid using invasive species such as Honeysuckle, and try to control existing non-native and invasive species such as Bittersweet.

Example 16: Path Layout and Design

The following example is a portion of a forested conservation area with a proposed trail system. The trails will be used for walking and nature study. The design incorporates many mitigation measures that are described below.



Example 16

How wetland impacts were minimized:

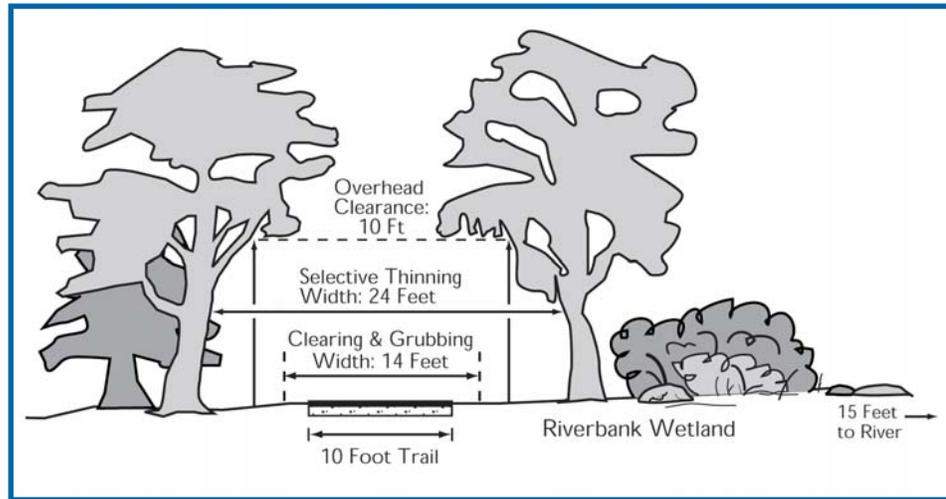
- ✓ The trails avoid almost all of the wetland areas and are narrow so that less vegetation was cut.
- ✓ The primary trails were centered on old farm roads and previously disturbed areas.
- ✓ The secondary trails were built by trimming woody vegetation, but no trees were removed.
- ✓ Trails are composed of soil, leaf litter or wood chips, depending on the existing ground conditions. All materials are permeable and allow natural stormwater flow and absorption.
- ✓ No grade changes were needed for path construction.
- ✓ Trails are maintained by mowing or hand removal of larger vegetation.
- ✓ The path crossed an Area Subject to Storm Flowage wetland but avoided a more sensitive Forested Wetland.
- ✓ Instead of installing a simple culvert, the footbridge was built with timber decking, which required less fill material and caused less disturbance during construction.
- ✓ View corridors are not numerous and were kept narrow with proposed signage to explain the sensitive habitat.

Example 17: Path Width and Buffers

This cross-section illustrates the ideal placement of a multi-use path in a Forested, Riverbank or Perimeter Wetland in a **suburban or rural** area.

How wetland impacts were minimized:

- ✓ The path is wide enough to support multiple uses, such as bikes and pedestrians.
- ✓ The River has a large buffer zone to protect wildlife habitat and water quality values.



Example 17

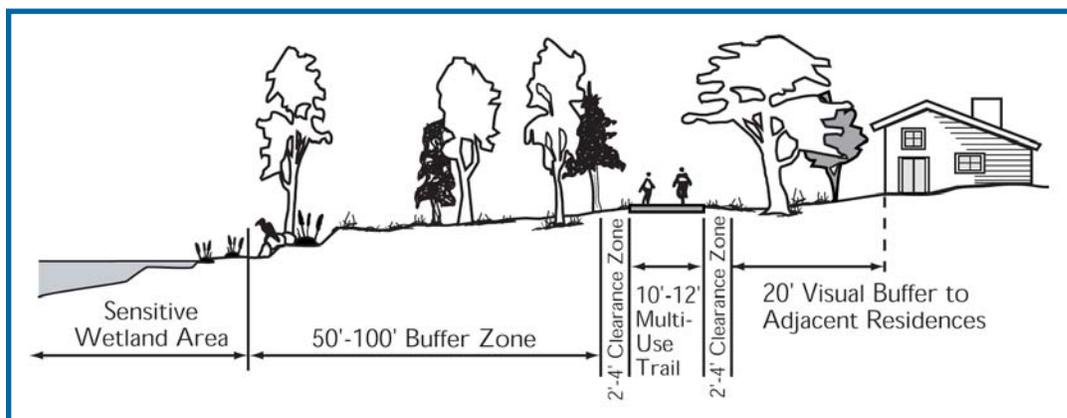
- ✓ The neighboring areas are also buffered from noise along the path.
- ✓ The path and cleared areas are narrow to keep wildlife impacts to a minimum.
- ✓ Only minimal clearing was done to provide the necessary height for the multiple-use trail.

In order for path users to fully appreciate the wetland area that is being protected, view corridors might be added at a few select points along the trail that would bring users closer to the edge of the wetland, with signage provided about the wetland and its importance.

For an **urban** path, the cross-section would likely look very different with less vegetation and existing development on either side. It is still important to establish a buffer on both sides of the trail to protect the wetland as much as possible and to help screen out the encroaching development.

Example 18: Vegetative Clearing

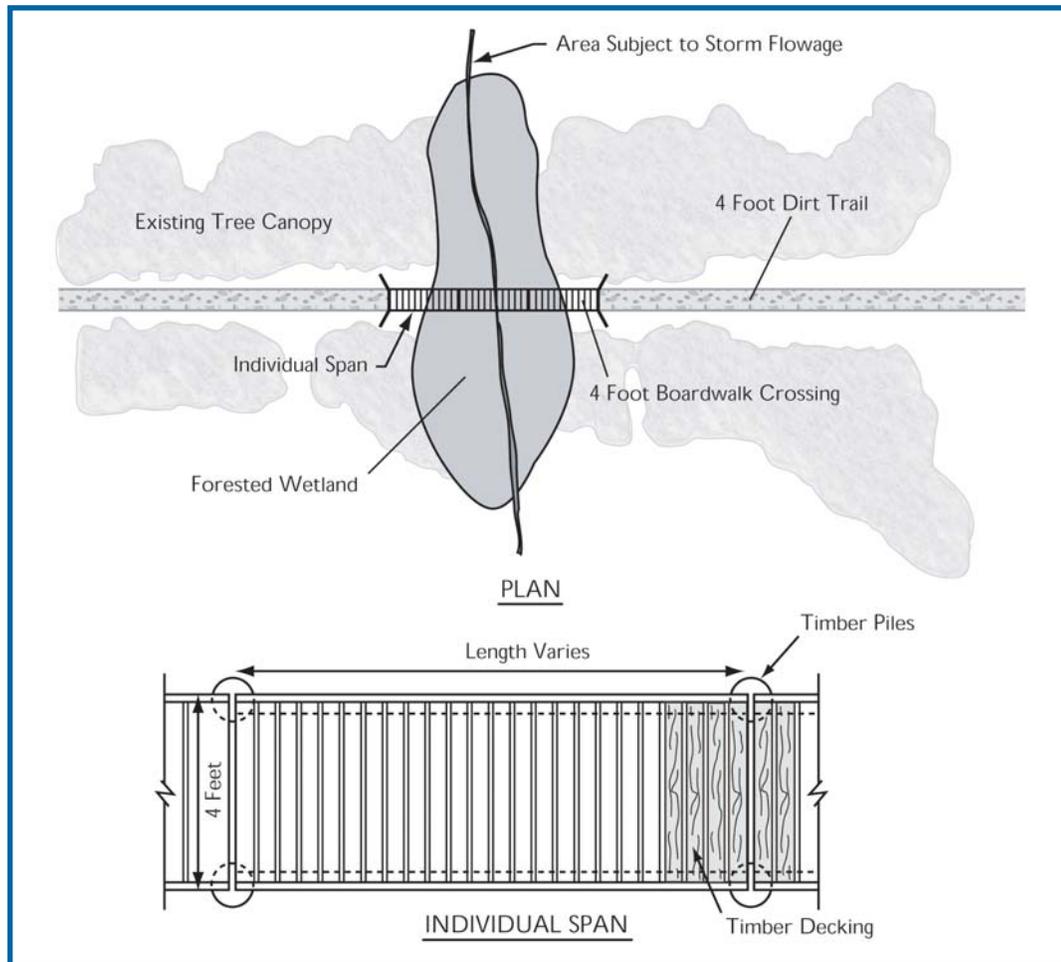
This drawing illustrates the width of clearing for a trail. The dimensions listed here are sufficient for a multiple-use trail for bikers and pedestrians.



Example 18

Example 19: Wetland Crossings

Wetland crossings are sometimes unavoidable in path and trail applications (please see Chapter 9 for more details on crossings). Wooden bridges, platforms, boardwalks and small footbridges are often the best ways to cross wetland areas, if they must be crossed, or to provide viewing platforms at the edge of wetlands. The following example is a conservation area with existing dirt trails. The Forested Wetland and Area Subject to Storm Flowage needed to be spanned to allow passage through these seasonally flooded areas. The trail is primarily used for wildlife viewing and environmental education.



Example 19

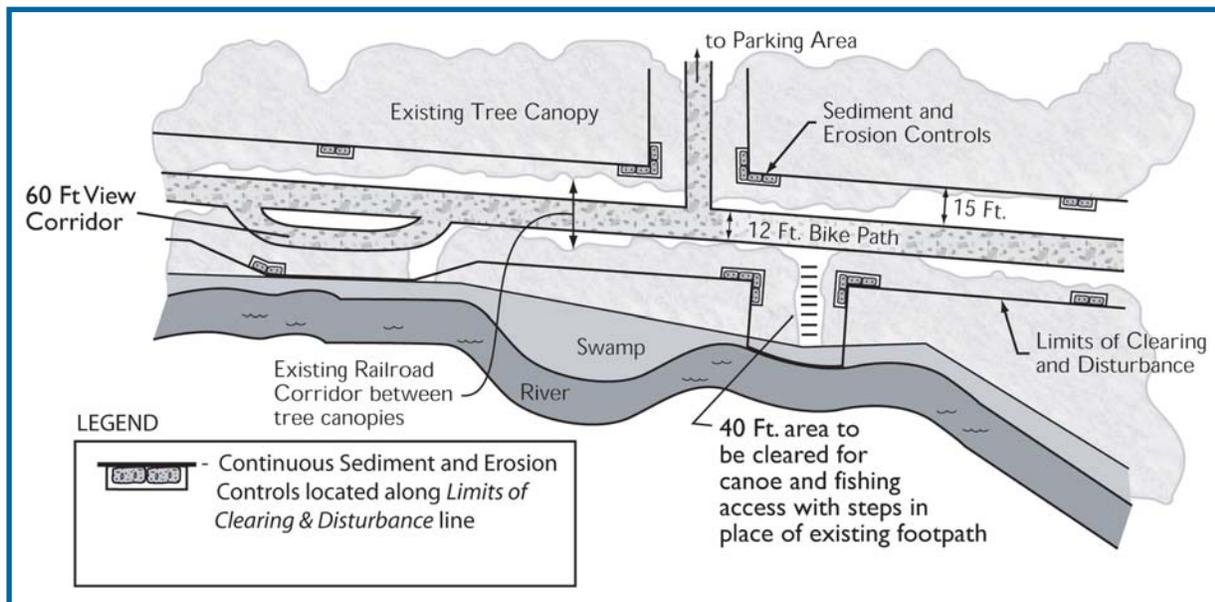
How wetland impacts were minimized:

- ✓ The path and boardwalk crossing are very narrow - only 4 feet across.
- ✓ The existing tree canopy was maintained, and only a small area of ground cover was cleared for the path.
- ✓ The boardwalk was placed on raised timber piles to maintain ground cover and to allow the passage of small mammals underneath.
- ✓ The slats were spaced a half inch apart to allow light to penetrate underneath.
- ✓ The boardwalk was built in sections, starting from one end, while working from above.

Example 20a: View Corridors and Access Areas

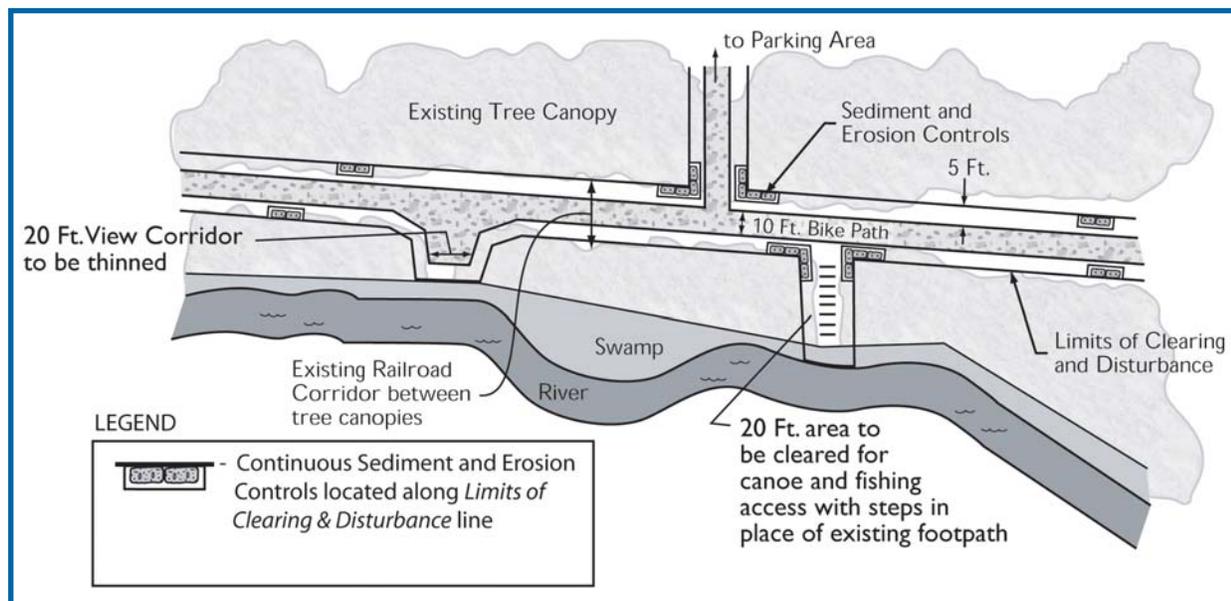
Viewing and recreational access areas are very popular features to incorporate along bike trails and foot paths. It's important to keep in mind that, while these features are acceptable, their placement, width and number should be carefully considered and designed. These corridors often encroach directly into regulated wetlands and may add to the disturbance and degradation of wildlife habitat and wetland quality.

This example illustrates a section of bike path along an abandoned railroad bed. There is existing buffer vegetation on either side of the railroad corridor, although some sections are sparse. A small footpath exists in the location where the canoe and fishing access is proposed to be widened to 40 feet. There is an additional view corridor 140 feet away that overlooks the River and is 60 feet wide. The 12-foot bike path was designed to cut through portions of the existing buffer.



Example 20a

Example 20b: Revised Design A

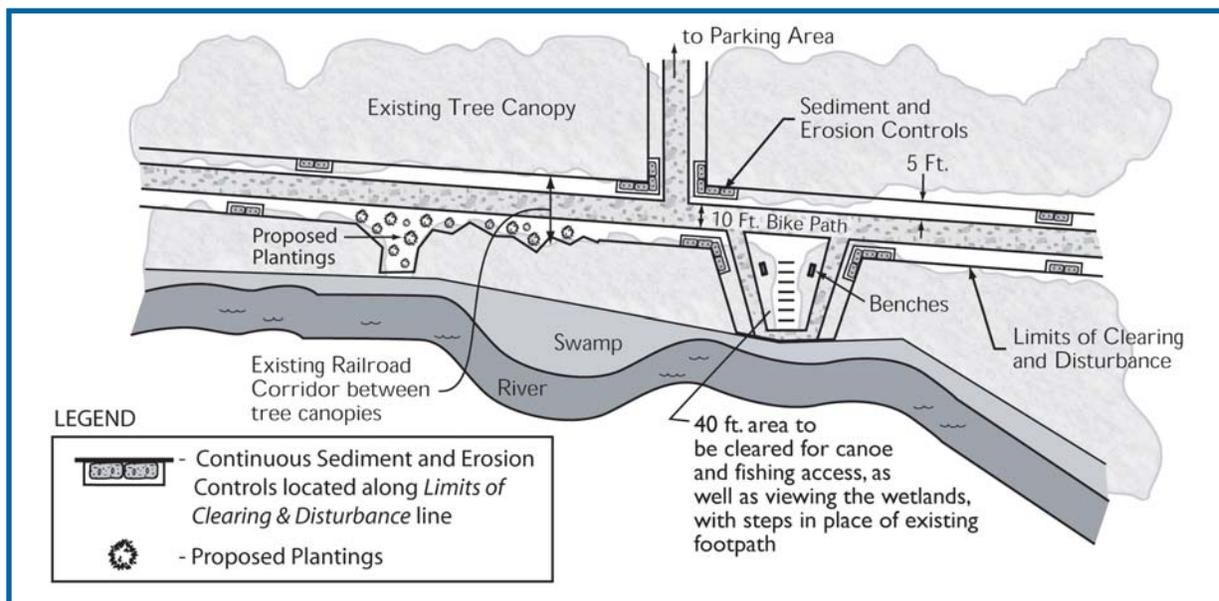


Example 20b

How wetland impacts were minimized (Design A):

- ✓ The canoe and fishing access area was narrowed, as these activities do not require more than 20 feet.
- ✓ The view corridor was narrowed to 20 feet.
- ✓ The bike path was relocated and narrowed to 10 feet in the wetland area to maintain the vegetative buffer on either side.
- ✓ The Limits of Clearing and Disturbance were narrowed on both sides of the path to five feet.

Example 20c: Revised Design B



Example 20c

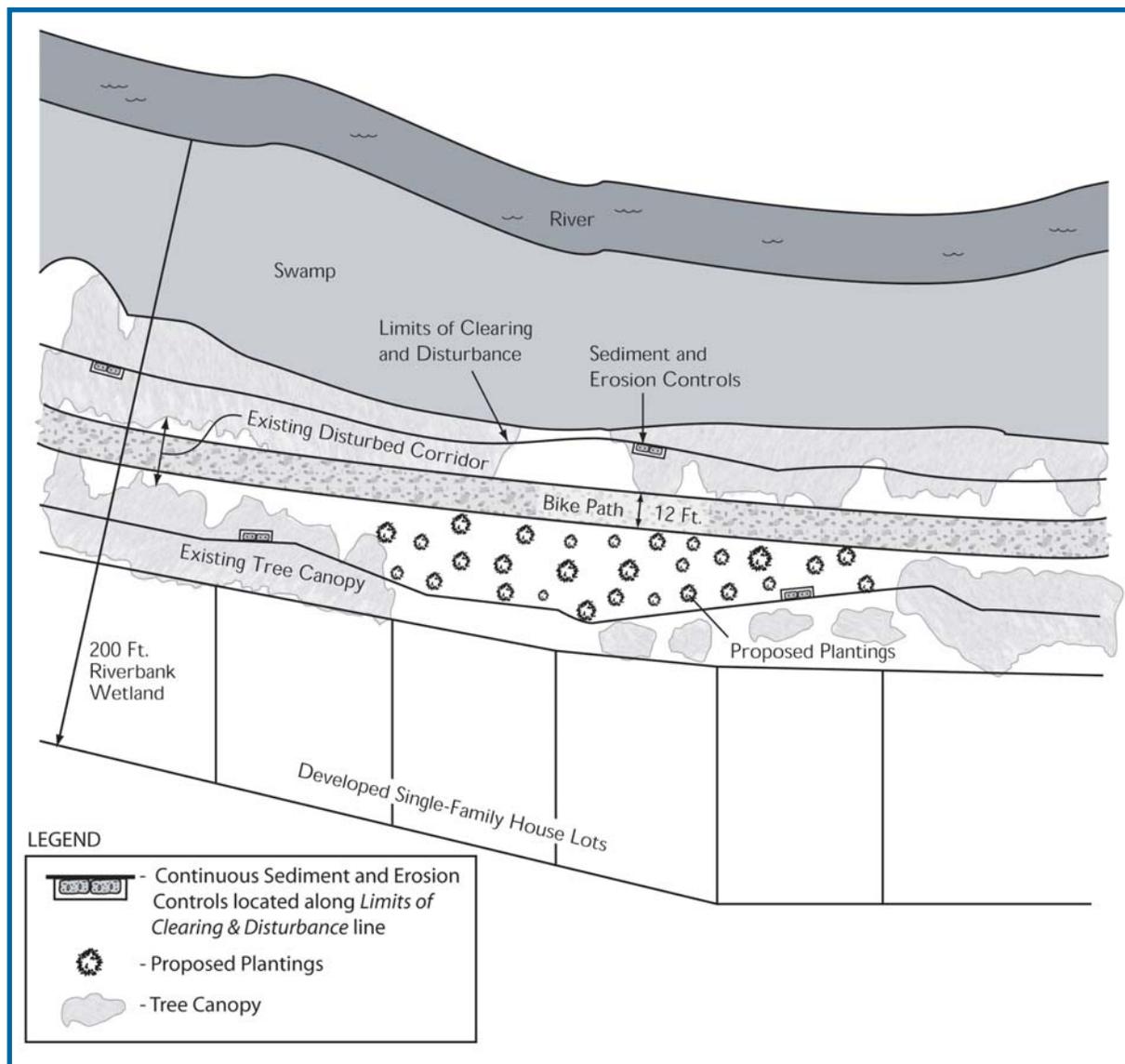
How wetland impacts were further minimized (Design B):

- ✓ The view corridor was incorporated into the canoe and fishing access area, thereby limiting human disturbance to one 40-foot area instead of two separate 20-foot areas.
- ✓ The habitat remains unfragmented and intact.
- ✓ Buffer plantings were added in areas where the existing vegetation was sparse.

Example 21a: Original Planting Design

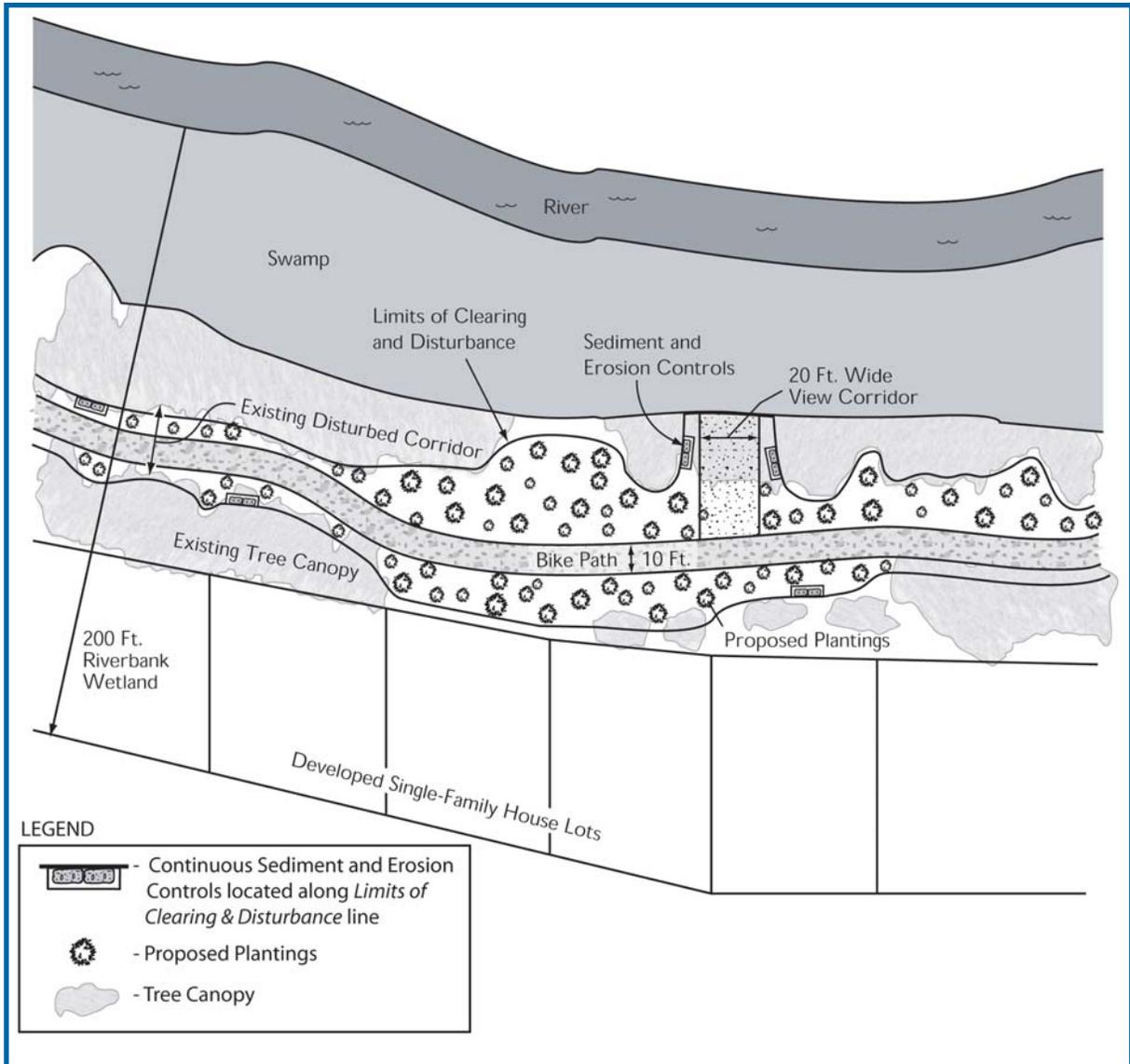
Plantings are an integral part of path and trail design, especially in urban and suburban areas which may have less vegetation than in rural areas. It's important to remember that not only will trail users and nearby residents and businesses enjoy a path more if development is screened, but the wetland itself will attract more wildlife and may improve water quality if the vegetative buffer is enhanced. This may mean it will be necessary to increase native plantings on both sides of the trail. The users' clear view to the wetland may be best achieved through properly located and designed view corridors.

This proposed design illustrates a 12-foot bike path through an urban area on a previously disturbed railroad bed and utility easement area. Due to development, much of the original vegetated buffer had been removed from the edge of the Swamp. Plantings were to be installed only on the side of the path where the tree canopy was thin.



Example 21a

Example 21b: Revised Planting Design



Example 21b

How wetland impacts were minimized:

- ✓ Plantings were installed on both sides of the path, which was reduced to 10 feet wide in the regulated area. The plantings are especially thick where there was no tree canopy to provide wildlife habitat.
- ✓ The existing tree canopy was preserved by moving the path farther away from the River and Swamp.
- ✓ A view corridor was added to allow users to see the wetlands without encroaching upon it. The corridor has sparse vegetation which allows a clear view without severely diminishing habitat values.

Construction

Due to the proximity of many paths and trails to wetlands, it is extremely important to use environmentally sound construction practices in order to protect the natural resources. The following are some tips especially important for trail construction. (See also Chapter 11 on Construction and Maintenance Tips.)

- Properly install and maintain sediment and erosion controls.
- Limit construction activities within watercourses, vegetated wetlands, and flowing and standing water wetlands to within the low flow period of July - October.
- Restrict construction activities to outside the breeding season/migratory seasons of wildlife that will utilize the area.
- Preserve the existing tree canopy, and use selective clearing to keep vegetative removal to a minimum.
- Replant disturbed soils, and restore the area to its original topography and hydrology.

Maintenance Tips

- Minimize or eliminate the use of pesticides, fertilizers and other chemical applications near wetlands.
- Propose limited mowing, especially near wetland areas.
- Utilize native grass species, which will require little or no watering yet will provide adequate soil stabilization.

References

This list provides additional sources for information on paths and trails. See Chapter 12 for complete citations arranged by author.

- *Assessing the Cumulative Effects of Linear Recreation Routes on Wildlife Habitats on the Okanogan and Wenatchee National Forests* by W.L. Gaines et al. (2003)
- *Designing Sidewalks and Trails for Access: Part I of Best Practices Design Guide* by J.B. Kirschbaum et al. (1999)
- *Designing Sidewalks and Trails for Access: Part II of Best Practices Design Guide* by J.B. Kirschbaum et al. (2001)
- *Effects of Non-Consumptive Recreation on Wildlife: A Review* by S.A. Boyle and F.B. Samson (1985)
- *Managing Degraded Off-Highway Vehicle Trails in Wet, Unstable, and Sensitive Environments* by K.G. Meyer (2002)
- *Trails for the Twenty-First Century: Planning, Design, and Management Manual for Multi-Use Trails* by C.A. Flink and P. Lagewey (1993)