

3.19 Wetland



Urban Wetland, First Street, South of Cornhusker Highway, Lincoln

<p><b>Description</b></p>	<p>Stormwater wetlands are shallow marsh systems planted with emergent vegetation that are designed to treat stormwater runoff. While they are one of the best BMPs for pollutant removal, stormwater wetlands can also mitigate peak rates and even reduce runoff volume to a certain degree. They also can provide considerable aesthetic and wildlife benefits. Wetlands use a relatively large amount of space and require an adequate source of inflow to maintain the permanent water surface. Like detention basins and wet ponds, stormwater wetlands may be used in connection with other BMP components, such as forebays and micropools.</p>
<p><b>Effectiveness</b></p>	<p>Properly designed wetlands can remove significant amounts of nitrogen and phosphorus, suspended solids, and other pollutants from urban environments. The relative amounts of pollutant and suspended solid removal is similar to other BMPs, however, with removal rates ranging from 40 to 80 percent. Wetlands are very effective for reducing runoff volume and velocity.</p>
<p><b>Advantages</b></p>	<ul style="list-style-type: none"> <li>• Improvements in downstream water quality.</li> <li>• Settlement of particulates.</li> <li>• Removal of pollutants.</li> <li>• Flood attenuation and reduction of peak discharge.</li> <li>• Enhancement of biological diversity and wildlife habitat in urban areas.</li> <li>• Aesthetic enhancement and valuable addition to community green space.</li> <li>• Relatively low maintenance costs.</li> </ul>

<p><b>Disadvantages</b></p>	<ul style="list-style-type: none"> <li>• May be difficult to maintain vegetation under a variety of flow conditions.</li> <li>• May require larger land requirements than other BMPs.</li> <li>• Pollutant removal efficiencies may be low until vegetation is established.</li> <li>• Relatively high construction costs.</li> <li>• If not designed properly, wetlands may not receive favorable community attention.</li> </ul>
<p><b>Implementation Considerations</b></p>	<ul style="list-style-type: none"> <li>• Site must have adequate water flow and appropriate underlying soils.</li> <li>• Baseflow must be sufficient to maintain a shallow pool in the wetland.</li> <li>• Underlying soils should allow only allow small infiltration losses.</li> </ul>
<p><b>Cost</b></p>	<p>The costs of constructed wetlands are estimated to range from \$0.75 to \$1.60 per cubic foot. Costs will vary based on plant selection and density of plantings, and if plantings are from live stems or from seed.</p>
<p><b>Main Design Components</b></p>	<ul style="list-style-type: none"> <li>• Sediment forebays are recommended to decrease the velocity and sediment loading to the wetland.</li> <li>• The wetland design should include a buffer to separate the wetland from surrounding land.</li> <li>• Above-ground berms or marsh wedges should be placed at approximately 50 foot intervals to increase the dry weather flow path within the wetland.</li> <li>• Before the outlet, a four- to six-foot micropool should be included in the design to prevent the outlet from clogging. The micropool should hold at least 10 percent of the total treatment volume.</li> <li>• The outlet from the micropool should be at least one foot below the normal pool surface.</li> <li>• Install a bottom drain pipe with inverted elbow to prevent sediment clogging in order to drain the wetland in case of emergencies or for routine maintenance.</li> <li>• As the wetland-to-watershed ratio increases, the average runoff residence time increases and the effectiveness of the wetland for pollutant removal also increases.</li> <li>• The stormwater wetland's effectiveness for removing pollutants depends on the residence time of water in the wetland.</li> <li>• Vegetation can be established by allowing volunteer vegetation to become established, or, from planting nursery stock.</li> </ul>

**Main Design Components**

- Give priority to species that have already been used successfully in constructed wetlands.
- Lincoln has unique saline wetlands that are home to the threatened and endangered Salt Creek Tiger Beetle at some locations. Special care must be taken when designing wetlands near or around these sensitive environments.

