Stormwater Best Management Practice

Preserving Natural or Existing Vegetation

Minimum Measure: Construction Site Stormwater Runoff Control
Subcategory: Construction Site Planning and Management

Description

Preserving natural or existing vegetation is the practice of protecting desirable trees, vines, bushes and grasses from damage during project development. This practice has benefits during and after construction because natural, existing or established vegetation generally:

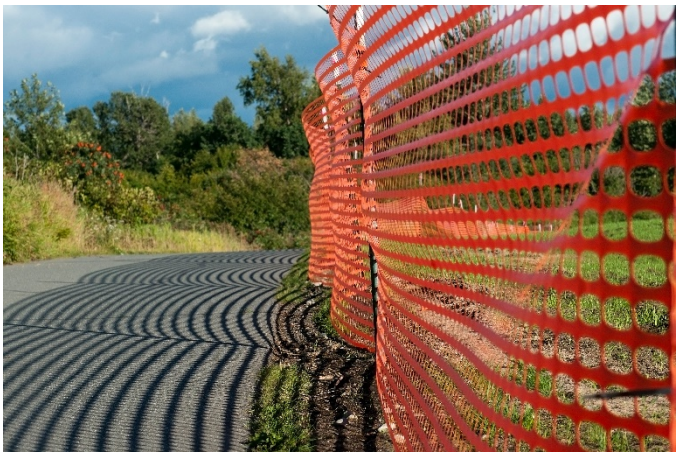
- Can withstand greater quantities of stormwater flow than newly seeded areas.
- Does not require time to establish.
- Has a higher infiltration capacity than newly planted vegetation due to a more developed and deeper root structure.
- Reduces stormwater discharge through greater interception and evapotranspiration.
- Buffers and screens against noise and visual disturbance.
- Provides habitat for wildlife.
- Improves air quality.
- Usually requires less maintenance (e.g., irrigation, fertilizer) than planting new vegetation.
- Enhances aesthetics.

Applicability

Construction staff can preserve natural or existing vegetation at any construction site where vegetation exists in the predevelopment condition. This practice can be particularly beneficial for floodplains, wetlands, perennial and intermittent streams, environmentally sensitive areas, steep slopes, and other areas where erosion controls would be difficult to establish, install or maintain (SPU, 2017).

Siting and Design Considerations

As part of the project planning phase, design engineers should visit the site to identify and map site features that may influence natural or existing vegetation stabilization measures such as drainage ways, highly erodible soils and steep slopes (MDE, NRCS, & MASCD, 2011). They should prepare a site map with the location and extent of trees, environmentally sensitive areas, and buffer zones to be preserved. They should also plan the locations of roads, buildings and other structures to avoid sensitive areas. Before clearing activities begin, construction staff should clearly mark the vegetation and other natural features that are to be preserved. Successfully preserving natural or existing vegetation requires careful site design and construction management to minimize the impact of construction activities on existing vegetation.



A construction safety fence preserves existing grass near a paved area.

Direct contact and adjacent compaction, filling or excavation activities can damage trees and other vegetation (SPU, 2017). Therefore, construction staff should protect large trees near construction zones, as damage during construction could result in reduced vigor or death after construction ends. It is important to extend and mark the boundaries around contiguous natural areas and tree drip lines to protect the root zone from damage. Construction staff should clearly set limits using orange safety fence and signs spaced 100 feet apart (WES, 2008). Design engineers should consult local regulation and design standards for buffer zone width requirements near streams and other environmentally sensitive areas.

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A certified arborist can help inform the choice of which trees to preserve, offering information on the following sorts of factors:

- *Tree vigor.* Preserve healthy trees that are less susceptible to damage, disease and insects. Indicators of poor vigor include dead branch tips, stunted leaf growth, sparse foliage and pale foliage color. Hollow, rotten, split, cracked or leaning trees also have a lesser chance of survival.
- *Tree age.* Choose older trees because they are more aesthetically pleasing as long as they are healthy.
- *Tree species.* Preserve species that are well suited to present and future site conditions. Keeping a mixture of evergreens and hardwoods can help conserve energy—specifically, keep evergreens on the northern side of the site to protect against cold winter winds and keep deciduous trees on the southern side to provide shade in the summer and sunshine in the winter.
- *Wildlife and aquatic species benefits.* Choose trees that wildlife prefer for food, cover and nesting. Protect low-hanging trees, bushes and grasses, which provide habitat for fish in streams.

Other considerations include following natural contours and maintaining preconstruction drainage patterns. Altered hydrology may no longer meet the environmental needs of preserved vegetation, which could lead to its death (SPU, 2017).

The following are best practices for preserving natural or existing vegetation:

- Do not nail boards to trees during building operations.
- Do not cut tree roots inside the tree drip line.
- Use barriers to prevent equipment from approaching protected areas.
- Keep equipment, construction materials, topsoil and fill dirt outside the limit of preserved areas.
- Keep the duff layer (partially decomposed organic matter), native topsoil and natural vegetation undisturbed to the maximum extent practicable (SPU, 2017).
- Consider assigning a monetary value for trees or vegetated areas and visibly post this value on fencing (SPU, 2017).
- If construction activities damage a tree or shrub marked for preservation, remove and replace it with a tree of the same or similar species with a 2-inch or larger caliper width from balled and burlap nursery stock when construction is complete.
- During final site cleanup, remove barriers from around preserved areas and trees.

Limitations

Several factors can limit the practicality of preserving natural or existing vegetation throughout the development process. First, the practice is only suitable for sites with ample existing stands of healthy vegetation. In many urban areas, existing vegetation may be patchy and unhealthy, providing little overall benefit to site hydrology or aesthetics. In these cases, new vegetation may provide greater benefit. During planning, design engineers should consider the footprint of proposed structures relative to the total footprint of the site; for high-density development or where land prices are high, preserving existing vegetation may not be cost-effective. During construction, staff may need to remove existing vegetation that would interfere with the maneuverability of construction equipment.

Maintenance Considerations

Even if workers take precautions, some damage to protected areas might occur. If this happens, construction staff should repair or replace damaged vegetation immediately to maintain the integrity of the natural system. They should also consider enhancing the preserved area (e.g., removing invasive species). If fertilization is needed, construction staff should minimize adverse water quality effects by using the following practices (MPCA, 2019):

- Apply fertilizers to the minimum area needed.
- Apply fertilizer in lower amounts and more often if necessary.
- Work the fertilizer deeply into the soil (without harming root structures) to reduce nutrients' exposure to stormwater.
- Limit hydroseeding (i.e., simultaneously applying lime and fertilizers).

- Ensure that erosion and sediment control practices are in place to prevent stormwater from transporting fertilizers and sediments off-site.
- Inspect fencing and signs to ensure they are secure and undamaged.
- Do not mow protected areas.

Effectiveness

Preserving natural or existing vegetation can provide water quality benefits by reducing the quantity and improving the quality of stormwater discharge that a construction site generates. The overall effectiveness varies depending on the size of the area preserved, the type of vegetation and the amount of stormwater directed to the preserved area. Table 1 lists load reductions from several practices that are similar to the conservation of natural or existing vegetation. Although they are specific to the Chesapeake Bay region, they provide an approximation of the range of effectiveness that could be achieved by these practices in other locations.

Table 1. Range in annual load reductions provided by natural vegetation buffers.

Buffer Practice	Units	Total Nitrogen	Total Phosphorus	Total Suspended Solids
Forest buffer	lb/acre of buffer	5.9–12	0.36–1.5	120–1,500
Conservation landscaping practices	lb/acre treated	2.2–4.8	0.070–0.23	NA
Filter strip	lb/acre treated	1.1–2.5	0.15–0.49	68–900

Source: CPB, 2018

Cost Considerations

When implemented successfully, preserving natural or existing vegetation is a low-cost practice. Damaging existing vegetation (and needing to replace it) can increase costs. Preserving natural or existing vegetation can also require additional labor costs to maneuver around trees or protected areas.

Additional Information

Additional information on related practices and the Phase II MS4 program can be found at EPA's National Menu of Best Management Practices (BMPs) for Stormwater website

References

Chesapeake Bay Program (CBP). (2018). *Cost effectiveness of BMPs.*

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Seattle Public Utilities (SPU). (2017). *City of Seattle stormwater manual* (Vol. 2).

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