

LID ELEMENT #12: STORMWATER USE OF LANDSCAPING

OBJECTIVE

Increase water quality treatment and infiltration in landscaped areas, particularly parking areas.

CONSIDERATIONS

For this memorandum, it was assumed that landscaping areas used for stormwater management could be bioretention, biofiltration, or simple infiltration areas.

TRADITIONAL LANDSCAPING TECHNIQUES

Landscaping is an important component of traditional site design. Landscaped islands (raised vegetated areas with vertical curbs) are typically interspersed throughout parking lots to provide visual relief and shade or to otherwise soften the appearance of the development. Perimeter landscaping is also used to buffer developments from adjacent sites, add visual interest and create barriers when screening is needed. Landscaping has not traditionally been used as areas for stormwater management, and landscaping codes often discourage this practice because landscaping placed within stormwater management areas often doesn't count toward required landscape area minimums. Code requirements for trees and vegetation, the placement and frequency of use, and preferred type and species can also discourage using landscape areas for stormwater management, as certain types of landscaping are not compatible with inundation of stormwater.

“Concave vegetated surfaces need not be very deep to make a significant contributor to overall surface storage capacity and stormwater quality.”

City of Olympia Drainage Design and Erosion Control Manual Volume 5, BMP T5.33 Concave Vegetated Surfaces 2009

CODES AND STANDARDS REVIEWED

Olympia Municipal Code (OMC) Sections 18.36.060 (general landscaping standards), 18.36.180 (parking lot landscaping), and 18.38 (parking lot standards)
Drainage Design and Erosion Control Manual (DDECM) Volume 3&5

BENEFITS OF USING LANDSCAPING FOR STORMWATER MANAGEMENT

A key component of low impact design is to mimic the pre-disturbance hydrologic process of infiltration, filtration and storage. For sites with infiltrative soils, LID techniques can result in infiltration across the site similar to the pre-disturbance conditions. Using landscaping areas for stormwater management provides opportunities for treatment and infiltration throughout the developed site. This decentralized approach is a better approximation of pre-disturbance hydrology than the standard approach of conveying all stormwater to a single facility. The practice of using landscaping areas for stormwater management also allows for dual function of code required landscaping areas.

OLYMPIA CODE ANALYSIS

Landscaping standards are generally addressed in the OMC Section 18.36. Per Section 18.36.180.C.2, Landscaping Islands (Design), parking lot landscape islands are allowed to accommodate stormwater treatment/conveyance practices. Perimeter screening landscape areas may also be used for stormwater management as long as the goals and requirements of the perimeter screening landscape are met. Unfortunately, the planting requirements, especially as they relate to trees, are difficult to meet when combined with stormwater infiltration unless these landscaping areas are larger than would ordinarily be required.



Concave landscape islands can serve dual purposes: visual relief and stormwater infiltration

OMC Section 18.36.100 allows for alternative landscape plans that do not follow the prescriptive requirements of the landscape code. Developers are allowed to vary from the code for reasons such as environmental protection. Development of an alternative plan has more risk to a developer as the City may not approve of the prepared plan. Because of this risk, few developers have attempted use of alternative landscaping plans.

Stormwater use of landscaping is currently allowed in the DDECM. Volume 5 of the DDECM includes Best Management Practice (BMP) T5.33 Concave Vegetated Surfaces. This BMP allows for a landscape surface to have a slightly concave slope to collect stormwater and promote vegetation. This BMP is typically used in conjunction with other BMP's, such as bioretention and biofiltration.

Landscaping of stormwater ponds is also addressed in Section 3.2 (Detention Facilities) of Volume 3 of the DDECM. Per this section, native plants are encouraged. This section also promotes planting trees in naturally-appearing groups rather than evenly-spaced rows. However, grouping of trees may not provide the visual screening desired for perimeter landscaping as per OMC 18.36.

HURDLES TO IMPLEMENTING LID

Encouraging or requiring widespread use of landscape areas for stormwater management could present the following challenges:

Conflicting Goals – Typical landscape areas include:

- **Parking Lots:** The goal of parking lot island landscaping is to improve the aesthetic aspects of the parking lot and to provide shade through required tree plantings.
- **Site Perimeters:** The goal of perimeter landscaping varies by type but generally provides visual barriers or separations between uses, especially uses that are not complementary such as residential and commercial.
- **Open Space:** One of the goals of open space is to provide space for public use. Another is to provide space for long-term growth of vegetation including trees.

Inundation of any of these areas with standing water can create conflict with these goals. Most trees suitable for parking lot islands do not thrive in wet conditions. If plantings for stormwater facilities require grouping of trees, this arrangement might not provide sufficient visual screening required for perimeter landscape areas, nor the envisioned parking lot shading or canopy. In order to use landscape areas for stormwater management, some of the goals and expectations for design of these areas may need adjustment.

Construction Challenges – Areas proposed for infiltration need to be protected from compaction and sediment-laden runoff during construction. As infiltration areas increase within a development, the complexity of construction also increases. Increasing the amount of areas for infiltration could present erosion control and site access challenges.

Specialized Design Needs – Current landscaping standards were not drafted with stormwater management in mind. To accommodate stormwater runoff and infiltration in landscape areas would require a substantial change in design approach. For example, engineered soils could allow for combination of parking lot tree islands with stormwater infiltration without increasing the size of the island, but only if each island is carefully designed to meet the needs of selected trees. Because of the specialized designs that would be needed, training of both landscape designers and city staff (reviewers and inspectors) would be needed.

Increased/Modified Maintenance Needs – Typical maintenance of site landscaping typically consists of mowing, trimming, fertilizing and weed management. Because the landscape areas will also be stormwater facilities, these maintenance activities also need to include:

- Removal of decomposing vegetation. Decomposing vegetation can release pollutants and clog storm filters or drains.
- Removal of sediments to preserve infiltration capabilities and remove potential contaminants that may be present.
- Protection of trees during maintenance.
- Replacement of any vegetation removed or damaged during maintenance.
- Periodic infiltration testing to ensure continued functionality of facility. Should the infiltration tests show that design rates are not achieved, soil replacement would likely be needed. Replacement of the soil could result in the removal of the existing vegetation.



Areas proposed for infiltration need to be protected from compaction and sediment-laden runoff during construction

In addition, fertilizer and pesticide usage would have to be modified given the usage of the landscape area for infiltration to groundwater.

Pedestrian Access – Landscaping areas designed to capture and infiltration stormwater in parking and other vegetated areas will limit convenient pedestrian access. Landscaping areas that are designed to capture water creates the potential for ponded areas to be present during rainstorms – site design needs to incorporate pedestrian crossing facilities across the infiltration areas.

Other Considerations – Landscape areas have many benefits including visual screens, recreation, wildlife habitat, and aesthetic enhancement. Landscaping for stormwater management may not be seen as visually pleasing as standard landscaping, and depending on the depth of water when full, could pose a safety hazard. However, examples of well designed, constructed, and maintained stormwater infiltration areas that are also aesthetically pleasing are available.

OPTIONS CONSIDERED

The options considered are as follows:

- Option 1: Continue to allow the use of landscaping for stormwater per current codes (no change).
- Option 2: Remove barriers within existing codes to use landscaping areas for stormwater management. This would include an update of the landscaping code to include prescriptive requirements for landscaping areas that are to be used for stormwater management. The requirements specified in the landscaping code would be coordinated with landscaping requirements specified in the DDECM (including possible updates to the DDECM to align with new requirements in landscaping code).
- Option 3: Amend landscaping standards to require that a percentage of landscaping areas be used for stormwater management. (This option would also assume that Option 2 is implemented.)

ANALYSIS

Sites are required to have areas set aside for landscaping. Allowing these landscape areas to have a dual purpose as stormwater management facilities is a key element to successful implementation of low impact design. This practice will allow for decentralized management of stormwater and provide for rainfall interception and evapotranspiration by the vegetation. However, in most cases, traditional stormwater facilities such as ponds will still be needed.



Landscape areas used for stormwater management will have increased maintenance requirements.

Option 1 (no change) would keep the status quo. Landscaping is allowed to be used as stormwater management facilities with specific requirements provided by the DDECM. As no code changes are proposed, there will continue to be potential conflicts between landscaping code requirements and the use of landscape areas for stormwater. These conflicts would often lead to developers opting not to use landscape areas for stormwater management.

Implementation of Option 2 (remove barriers) to align the landscaping and stormwater codes would require updates to OMC 18.36. Alternative design options would be needed for specific landscape areas (parking lot islands, perimeter landscaping, etc.) to accommodate their use as stormwater management facilities. This could include use of engineered soils, increases to required square footages or dimensions, or other changes to allow both stormwater and landscaping needs to be met. Some modification might also be needed to DDECM Volume 3 regarding planting of stormwater ponds. If the landscape areas are designed as stormwater facilities, without the additional guidance in modified design requirements, there could be higher potential for plant mortality or failure of the stormwater management component. This option would not include any required use of landscaping for stormwater, but removes some of the barriers that make it difficult.

Alternative design options will be needed for specific landscape areas to accommodate their use as stormwater management facilities.



For Option 3 (require stormwater use of landscaping), it is assumed that Option 2 would also be implemented. Option 3 will require the addition of guidance to OMC 18.36 requiring that a percentage of landscaping area be used for stormwater management. The chosen percentage will be specified and the site designer could choose which areas of landscaping to use for stormwater management. The percentage could vary depending on the zone, development size, or other predetermined threshold. This option will achieve the goal of having at least a portion of the site landscaping used for stormwater management while giving a project the flexibility to determine where to implement it. Some sites would be challenged to provide meaningful stormwater-based landscaping.

RECOMMENDATION

Staff recommends Option 2. The landscaping code does not include guidance on landscaping for areas planned to be inundated with stormwater, which creates barriers to implementation. This option removes code conflicts that make it difficult to design landscape areas to accommodate stormwater while still meeting requirements of OMC 18.36.

