

5.0 Storm Water Landscape Guidance Introduction

Landscaping is a critical element to improve both the function and appearance of storm water management practices. Integrated storm water landscapes can provide many benefits such as construction cost savings, reduced maintenance, aesthetic enhancement, and the improved long-term functionality. A well-designed and established landscape will also prevent post-construction soil erosion. Additionally, these approaches can help mitigate urban heat island effects, improve air quality, and reduce atmospheric carbon levels. These benefits only exist if the right tree and plant are selected for the right place and properly maintained.

Vegetated storm water management systems are a preferred practice. Storm water management practices can be integrated within planned landscape areas, with minor modifications to conventional landscape design. It is essential that impervious surfaces be graded toward the vegetated areas that are used as the storm water management facility and that these facilities are depressed to allow for flow and/or surface ponding. Guidance for the design of inlets to vegetated storm water management practices can be found in Section 4.9: Inlet and Outlet Controls. Since these design approaches are still new to many construction contractors it is advisable to clearly show these details in cross section and plan view drawings.

This section provides landscaping and plant selection guidance for effective storm water management and is organized as follows: **Section 5.1:** Planting Guidance contains general guidance that should be considered when landscaping any storm water management practice. **Section 5.2:** Storm water management Specific Landscaping Requirements includes specific planting and site preparation information for selected design. **Section 5.3:** Native and Recommended Non-invasive Plant lists appropriate plants for use in storm water management practices in the Midwest. Table 5.3.2 provides a comprehensive list of plants that was reviewed and revised by two local native plant nurseries. Key information useful for the selection of plant material for storm water landscaping is presented, including National Wetland Indicator Status, preferred hydrologic zones, and aesthetic considerations.

5.1. Planting Recommendations / Guidelines

General guidance for all storm water management plantings:

Planting selection and arrangement

- Existing native and non-invasive vegetation should be preserved where possible.
- Noxious weeds and invasive species shall not be specified or used.
- Selection and placement of trees is important for the long
- Plant stream and water buffers with trees, shrubs, ornamental grasses, and herbaceous materials where possible, to stabilize banks and provide shade. This will help to reduce thermal warming, reduce erosion, increase roughness and protect habitat.
- Avoid plantings that will require routine or intensive chemical applications (i.e. turf area). Use low maintenance ground cover as an alternative to turf.

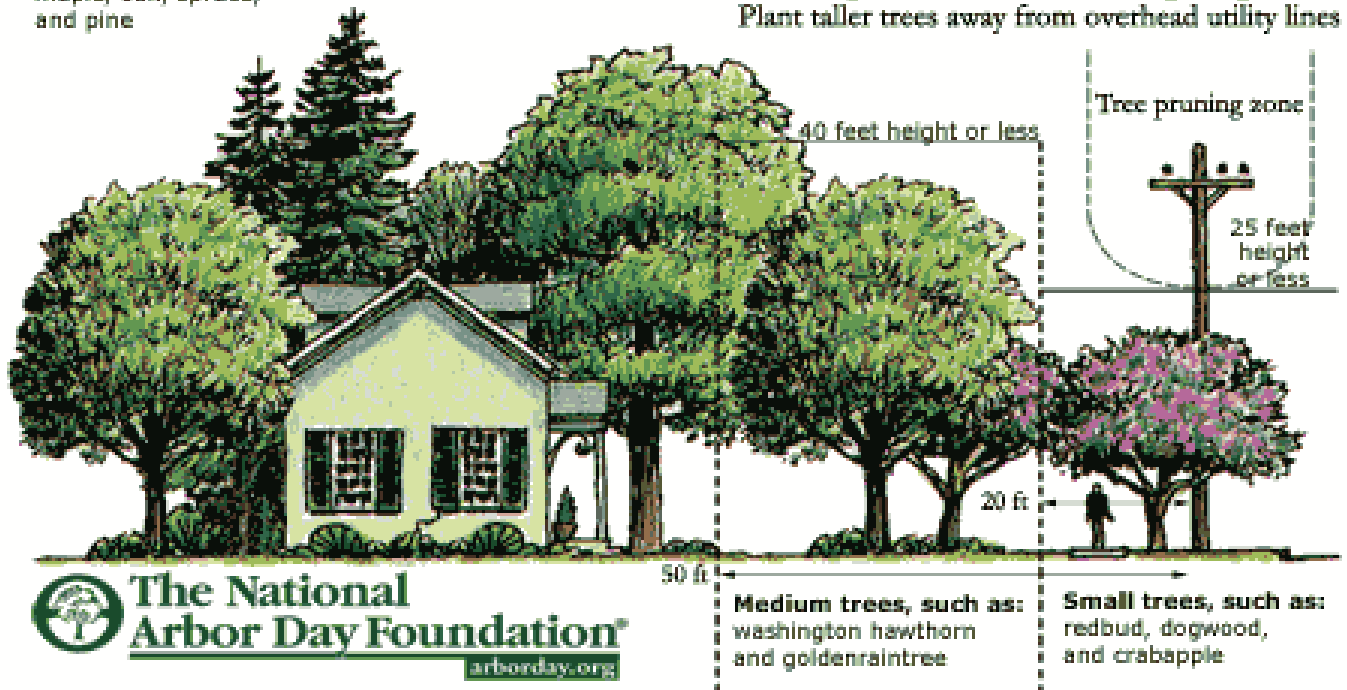
- Stressors (e.g. wind, exposure, exposure to deicing salt, insects, drought and inundation tolerance, and disease), micro-climates, and sunlight conditions should also be considered when laying out the planting plan.
- Aesthetics and visual characteristics should be a prime consideration. Plant form, texture, color, bloom time and fragrance are important to the overall feel of the site. Plants can be used to enhance and frame desirable views or screen undesirable views. Care should be taken to not block views at entrances, exits, or along difficult road curves.
- Trees and shrubs should be placed in a manner that restricts pedestrian access to steep pools or slopes without blocking maintenance access.
- Existing and proposed utilities must be identified and considered. Large trees next to utility lines must be avoided. Refer to *Right Tree Right Place*, provided by the National Arbor Day Foundation for more information.



Plant the right tree in the right place

Plant taller trees away from overhead utility lines

Tall trees, such as:
maple, oak, spruce,
and pine



Maintenance considerations

- The designer should carefully consider the long-term vegetation management strategy for the storm water management practice, keeping in mind the maintenance legacy for future owners. The storm water management maintenance agreement must include requirements to ensure vegetation cover in perpetuity.
- Provide signage to help educate the public about storm water management practices and to designate limits of mowing (wildflower areas, meadows, etc.)

Embankments, spillways, dams, and orifices

- Planting of trees, shrubs, and/or any type of woody vegetation is not allowed on structural embankments.
- All emergency spillways should be stabilized with plant material that can withstand strong flows. Root material should be fibrous and substantial but lack a taproot.
- Trees or shrubs known to have long taproots should not be planted within the vicinity of an earthen dam or subsurface drainage facilities.
- Plant trees and shrubs at least 25 feet away from a principal spillway structures.
- Plant trees and shrubs at least 15 feet away from the toe of slope of a dam.

Soils

Storm water management practice soils should provide adequate infiltration rates and be suitable for healthy tree and vegetation growth. Soil analysis should be conducted within the storm water management area to determine appropriate levels and types of soil amendments.

If topsoil exists on site and is stockpiled for re-use, appropriate erosion control measures as required by the Indiana Department of Environmental Management (IDEM) shall be used.

Site Selection, Preparation and Grading

When selecting a location for the storm water management practice, take into consideration the physical variables of the site and the effects they will have on the design. Some variables to consider include amount of sunlight received and solar orientation, wind speed and direction, temperature gain and surface characteristics. For example: sites facing northeast receive morning sun and tend to be cooler and wetter than those facing southwest; runoff from asphalt will be hotter than that from concrete; etc. Combinations of these variables create different micro-climates and should be taken into account when placing the storm water management practice and selecting plants.

Unwanted vegetation in the storm water management practice area shall be removed during site preparation with equipment appropriate for the type of material encountered and site conditions. It is recommended that the maximum amount of pre-existing native vegetation be retained and protected.

No material storage or heavy equipment is allowed within the storm water management practice design area after site cleaning and grading has been completed, except to excavate and grade as needed to build the system. No compaction of infiltration areas should occur during this excavation.

After the storm water management practice area is cleared and graded, any necessary soil amendments should be added and tilled into the existing soil to the depth specified for each stormwater management practice. No tilling shall occur within the drip line of existing trees. After tilling is complete, no other construction traffic shall be allowed in the area, except for planting and related work. Where topsoil is needed, (for example swales and dry detention basins) it should be spread to a depth of 4-8 inches and lightly compacted to minimum thickness of 4 inches. This provides organic matter and important nutrients for the plant material. The use of topsoil allows vegetation to become established faster and roots to penetrate deeper. This ensures quicker and more complete stabilization, making it less likely that the plants will wash out during a heavy storm.

Mulch

The mulch layer helps maintain soil moisture and avoid surface sealing which reduces permeability. Mulch helps prevent erosion, and provides a micro-environment suitable for soil biota at the mulch/soil interface. It also serves as a pretreatment layer, trapping the finer sediments which remain suspended after the primary pretreatment. Mulch shall not be mounded around the base of trees; this can cause the trunks to rot. Approved mulching materials include organic materials such as compost, bark mulch, leaves, as well as small river gravel, pumice, or other inert materials. Grass clippings should not be used as mulch. For ground cover plantings, the mulch shall be applied to cover all soil between plants. Care should be exercised to use the appropriate amount of mulch - any more than 3-4 inches can negatively impact growing conditions and cause excessive nutrients to leach into the storm water management area. Mulch shall be weed-free. Manure mulching and high-fertilizer hydroseeding are prohibited in a storm water management practice area during and after construction.

Irrigation

Newly installed plant material requires water in order to recover from the shock of being transplanted. Be sure that some source of water is provided during establishment of the storm water management practice, especially during dry periods. This will reduce plant loss and provide the new plant materials with a chance to establish root growth.

Permanent irrigation systems are allowed, but designers are encouraged to minimize the need for permanent irrigation. Innovative methods for watering vegetation are encouraged, such as the use of cisterns.

Storm water Management Practice Screening

Storm water management practice elements such as chain link fences, concrete bulkheads, outfalls, rip-rap, gabions, large steel grates, steep side slopes, manhole covers/vault lids, berm embankments planted only with grasses, exposed pipe, banks, retaining walls greater than 2 feet high, and access roads are generally not aesthetically pleasing. When these elements face public right-of-way or other private property, it is recommended that they be screened with plant materials. Designers are strongly encouraged to integrate aesthetically pleasing landscape design with storm water management practices.

Pollution Prevention

Storm water pollution prevention practices related to landscaping can be categorized into two broad categories: Toxic Substances Use Reduction and Pollutant Source Reduction.

Toxic Substance Use Reduction

Projects shall be designed to minimize the need for toxic or potentially polluting materials such as herbicides, pesticides, fertilizers, or petroleum based fuels within the storm water management area before, during, and after construction. Use of these materials creates the risk of spills, misuse, and future draining or leaching of pollutants into facilities or the surrounding area.

Pollutant Source Reduction

Materials that could leach pollutants or pose a hazard to people and wildlife shall not be used as components of a storm water management practice. Some examples of these materials are chemically treated railroad ties and lumber and galvanized metals. Many alternatives to these materials are available.

Storm Water Management Area Establishment and Maintenance

Establishment procedures should include: control of invasive weeds, prevention of damage from animals and vandals, use of erosion control mats and fabrics in channels, temporary diversion of flows from seeded areas until stabilized, mulching, re-staking, watering, and mesh or tube protection replacement, to the extent needed to ensure plant survival. To ensure landscape plant survival and overall storm water facility functional success, the design and construction documents must include elements that help achieve these results. Construction specifications and details need to include staking, irrigation schedule, soil amendments, and plant protection.

Table 5.1.1: Planting Specifications

Specification Element	Elements
Sequence of Construction	Describe site preparation activities, soil amendments, etc.; address erosion and sediment control procedures; specify step-by-step procedure for plant installation through site clean-up.
Contractor's Responsibilities	Specify the contractors responsibilities, such as watering, care of plant material during transport, timeliness of installation, repairs due to vandalism, etc.
Planting Schedule and Specifications	Specify the materials to be installed, the type of materials (e.g., B&B bare root, containerized); time of year of installations, sequence of installation of types of plants; fertilization, stabilization seeding, if required; watering and general care.
Maintenance	Specify inspection periods; mulching frequency (annual mulching is most common); removal and replacement of dead and diseased vegetation; treatment of diseased trees; watering amount and schedule after initial installation (once per day for 14 days is common); repair and replacement of staking and wires.
Warranty	All systems shall contain a 2 year warranty. Specifications should contain the warranty period, the required survival rate, and expected condition of plant species at the end of the warranty period.

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