



1.1 Originator

The Director of the Bureau of Highway Maintenance (BHM) is the originator of this chapter.

1.2 Objective

Science, technology, sound engineering, and landscape architecture must all be incorporated to create functional, economical, safe, environmentally compatible, and aesthetically pleasing transportation facilities. This chapter provides guidance about when and how to incorporate the principles of landscape architecture into the facilities development process.

1.3 Overview

WisDOT employs landscape architects and landscape architect consultants to address vegetation management and aesthetic concerns related to transportation facilities.

Landscape architecture is more than placing vegetation on the land for aesthetic or functional purposes. The American Society of Landscape Architects defines landscape architecture as the application of “artistic and scientific principles to the research, planning, design, and management of both the natural and built environments. Practitioners of this profession apply creative and technical skills and scientific, cultural, and political knowledge in the planned arrangement of natural and constructed elements on the land with a concern for the stewardship and conservation of natural, constructed and human resources. The resulting environments shall serve useful, aesthetic, safe, and enjoyable purposes.”

Chapter 443.01 (3r) of the Wisconsin Statutes further defines the role of this profession as the “. . . planning of a road, bridge or other structure with respect to the aesthetic requirements of the area on which it will be constructed.” WisDOT landscape architects make design recommendations regarding corridor selection, alignment, grading, and structure details. They also recommend mitigation measures for any negative impacts that construction may have on the landscape, and address vegetation preservation and restoration.

1.4 Management Strategies

WisDOT manages the highway landscape from planning to maintenance, through two interrelated strategies.

- Vegetation management deals with existing and planted vegetation on highway rights-of-way.
- Aesthetic design deals with visual quality or aesthetics. It provides a more pleasurable experience for the traveler, as well as for those who view the highway corridor from adjacent lands.

These strategies stem from philosophical bases WisDOT has adopted and are implemented in accordance with various federal and state laws involving the highway landscape (see [FDM 27-1-15](#)). The actual tools, techniques and policies related to landscape architectural design and the two strategies can be found in this manual and in the following documents.

Document	Source
Standard Specifications for Highway and Structure Construction Construction & Materials Manual	Landscape Architect Contact (LAC) in the Bureau of Highway Maintenance (BHM).
Highway Maintenance Manual Transportation Landscape Design Handbook	Landscape Architect Contact (LAC) in the Bureau of Highway Maintenance (BHM).

LIST OF ATTACHMENTS

[Attachment 1.1](#) Glossary

FDM 27-1-5 Aesthetic Design

April 23, 1999

5.1 Philosophy

Aesthetic design principles are applied to land within and affected by transportation corridors. The goal is to integrate transportation facilities into their surroundings while preserving visual quality and protecting the environment. In an ideal transportation corridor, designers take advantage of opportunities to enhance the surroundings and mitigate negative impacts on those who use the highway and those who use adjacent lands.

Designers should consider both the view from and the view of the facility, respecting the contrast between highway scale and human scale. A quality design is appropriate to the site, its functions and environs, and contributes to motorist safety, comfort and enjoyment. To meet these goals, the principles of landscape architecture must be considered at the beginning of the development process.

5.2 Elements of Design

The following elements of design are important to apply during landscape plan development:

5.2.1 Color

Color is a very powerful design tool and most people would identify it as having the greatest impact on aesthetics. It is very complex because it is related to light reflection, absorption, and superposition. Color affects feelings and distance perception. Red, for example, is perceived more quickly than other colors and therefore appears to advance. In contrast, blue, green and violet colors seem to recede. Color is related to texture, which affects how it is perceived. Color is also perceived differently under varying light conditions and may change as the sun advances throughout the day.

5.2.2 Texture

Texture is a surface characteristic of materials that varies from fine to coarse. The perception of texture differs depending on whether a surface is viewed alone or with other surfaces, such as leaves on a tree. Texture is tactile, affecting the sense of touch as well as sight. Much like color, texture also has the ability to alter depth perception. Coarse textures make objects appear closer than they really are; fine textures make objects appear farther away.

Texture has been called the “fourth dimension of color” because surface characteristics determine whether light is absorbed or reflected. Texture in design has the potential to improve the quality of what is built.

5.2.3 Form

Form is the bulk or volume of an object or a group of unified objects. A mass of closely spaced trees viewed from a distance appears as a long, low form, whereas individual trees have an entirely different form when seen in close proximity. Plantings must also be large in form to be noticeable to drivers moving at highway speeds. The larger the individual plant, the fewer plants are needed to produce a sufficiently large form.

5.2.4 Line

Line is a very important element in design. It can define the edges of forms or direct the eye to a distant point.

Plants in the landscape may be seen as either horizontal lines and vertical lines, depending on the viewing distance. From a distance of several hundred feet, a long row of tall, narrow-growing trees planted closely together on the right-of-way may appear as a mass forming a horizontal line. However, as the viewer approaches, the mass transforms into individual trees, appearing as a row of vertical lines.

5.2.5 Additional Design Elements

Scale - Scale refers to the size of humans relative to their environment, or objects in the environment relative to each other.

Movement - Movement incorporates highway distance and speed with scale. Spaces and distances are perceived differently depending on the speed of travel. A driver traveling at 10 mph will not experience distance and scale in the same way as a driver traveling at 60 mph.

Rhythm - Rhythm is created by elements that repeat at regular intervals. Evenly spaced street trees or fence posts in a field create different rhythms. Vertical lines heighten the sense of speed, so drivers may believe they

are traveling faster than they actually are. This concept is sometimes used to slow traffic down in critical areas.

Contrast - Contrast is a comparative measure of differences in color, texture, or form. Contrast also compares differences between elements and their environment.

Proportion - Proportion concerns the sizes or numbers of objects as related to each other. If elements are too far out of proportion with each other the visual effect is likely to be unbalanced.

Balance - Balance is related to objects or space in the landscape. It can be attained through the use of numbers of objects, proportions of objects, texture and perceived or physical weights of objects.

Variety - Variety in the landscape can increase driver alertness. It can be achieved by using diverse vegetation and varying road alignment. However, too much variety can be confusing or distracting for drivers, so moderation is best for maintaining balance in the landscape.

5.3 Design Considerations

Aesthetic design combines visual aspects of the highway such as corridor selection, alignment, terrain fit, right-of-way, erosion control, utilities, and clearing limits. It also incorporates the visual aspects of structures such as buildings, bridges, retaining walls, utilities, signs, planters, and site furniture.

5.3.1 Corridor Selection

The ideal transportation corridor balances:

- Transportation goals
- Public needs and desires
- Environmental impacts
- Terrain fit
- Project cost

Government regulations require that an Environmental Impact Statement (EIS) be filed for projects that will have a significant effect on the surrounding natural or cultural environment. When an EIS is required, predicted visual impacts on the environment must be explored and documented. This may occur in one of several formats, ranging from a general statement of predicted effects to a more rigorous process such as a Visual Impact Assessment. [FDM 20-30](#) details which situations require an EIS.

5.3.2 Alignment

Transportation facility alignment is both an art and a science. The following factors are important to apply to corridor alignment:

- Terrain fit
- Driver safety
- Visual variety
 - Scenic views and visual resources
 - Adjacent land uses and user groups

Highway alignment must comply with the standards found in Chapter 11 of this manual, which regulates vertical and horizontal curves, independent roadways and terrain fit. Ideally, corridor alignment

- Follows existing topography
- Preserves scenic views, thereby enhancing visual resources
- Avoids environmentally sensitive areas
- Heightens driver awareness by providing visual and directional variety
- Enhances existing visual resources
- Blends into the local contexts of adjacent land uses and users

5.3.3 Terrain Fit

Transportation facilities should be integrated with topographic features in natural and built settings. Variations in terrain can enhance the corridor but they may pose challenges for designers. Designers should look for opportunities to use contours and cross sections to create interesting views and directional or elevation patterns. They also evaluate the potential for erosion and runoff problems in proposed project locations and develop solutions for those problems.

5.3.4 Context

If the selected corridor requires structures such as bridges, information centers or restroom facilities, these structures should be appropriate to the environmental context, whether urban or rural. They should be designed to be compatible visually and structurally with adjacent land use, and provide a unifying element in the project area

5.3.5 Right-of-Way

Right-of-Way aesthetic design issues include:

- Adjacent land uses
- Protection or enhancement of existing views
- Screening of unpleasant views
- Vegetation preservation

Designers should consider adjacent land use early in the design process. For example, if an apple orchard borders the right-of-way, landscape plantings should not include red cedar junipers or other species that act as the alternate host for the fungal disease cedar-apple rust.

Existing scenic views should be preserved and if possible, enhanced. Right-of-way plantings can be used to frame a scenic view or screen an unpleasant view. Retaining desirable existing vegetation preserves the integrity of the setting and saves the cost of re-vegetating later.

5.3.6 Erosion Control

Erosion control is a very significant consideration in grading and terrain fit issues. Practical solutions for drainage and runoff problems that are aesthetically pleasing, cost effective, and environmentally sound are vital to a project's success. Failure to properly address erosion or runoff problems can lead to severe and expensive problems in the future. See Chapter 10 for a detailed description of erosion control practices.

5.3.7 Utilities

Although utilities have crucial functions they can detract from the visual quality of transportation corridors. Designers should mitigate adverse visual impacts caused by existing utilities and plan for the long-term impact of new utilities (see Chapter 18). This may be accomplished by burying the utility or siting it in a location that is not so visible to the traveling public or screening the utility. Sometimes, negotiation with relevant utility companies may produce a mutually beneficial compromise.

5.3.8 Clearing Limits

Sufficient space must remain after clearing for grading activities such as rounding slopes for good drainage, erosion control and naturalized contouring which blends into the existing topography.

Desirable vegetation of good quality should be preserved where possible for aesthetic and functional reasons. Retaining these plants can help absorb extra runoff, provide wildlife habitat and prevent erosion. Clearing edges should be irregular for a natural appearance.

FDM 27-1-10 Vegetation Management

November 15, 2022

Vegetation management is a series of activities that all promote the establishment and long-term viability of a plant community. These activities include but are not limited to:

- preservation of valuable existing vegetation,
- selecting and planting new vegetation,
- maintaining the vegetation (watering, fertilizing, pruning, etc.)

Roadside vegetation is an integral part of transportation systems. Since roadsides lie within the motorist's field of view, they should complement or enhance, not compete with, what lies beyond the edge of the right-of-way. Roadsides should also provide a smooth, gradual transition between the roadway and the environment beyond the right-of-way.

Vegetative cover on the roadside consists of living plants that require careful, regular, and well-timed management. Vegetation management plans are developed for new planting projects as part of the project design. Any important existing plantings or plant communities must be incorporated into these plans.

Planning and programming of landscape planting projects ensures that they are evenly distributed and prioritized throughout the state, so the right thing is done in the right place at the right time. Projects are

evaluated and prioritized based on the function of the proposed planting, but they are also designed to enhance the aesthetics of the highway. This requires cooperation between the Bureau of Highway Maintenance (BHM) landscape architects and the region staff.

Vegetation management programs compete with other programs for funding in the transportation budget. Limited budgets and priorities within the system determine the amount of funding allocated to vegetation-related design, construction and maintenance activities. Partly to defray costs, the WisDOT encourages partnerships with entities such as local municipalities or civic organizations to help in developing planting projects and providing long-term maintenance. Vegetation management dollars must be expended effectively to ensure that investments in new landscape plantings and vegetation management are protected.

10.1 Vegetation Management Mission

The Comprehensive Roadside Vegetation Management Plan Statement of Vision, Mission and Objectives states that the Vegetation Management mission is to utilize an integrated vegetation management system to foster sustainable, ecologically sound and visually pleasing roadside vegetation in a cost-effective manner.

10.2 Natural Roadsides Philosophy

"The most reliable natural indications of the . . . capabilities of a district are to be found in its native vegetation. The natural flora may be regarded as the result of nature's experiments in crop raising through the thousands of years that have elapsed since the region became covered with vegetation. If we set aside the inherent nature of the several plants, the native vegetation may be regarded as the natural correlation of the combined . . . influences of soil, climate, topography, drainage and underlying formations and their effect upon it. The native vegetation therefore merits a careful consideration, none the less so because it is rapidly disappearing and a record of it will be valuable historically."

T.C. Chamberlin (1877)

For over three decades highway landscape management has been guided by the Natural Roadsides philosophy. This philosophy recognizes advantages that native and (in some cases) naturalized species provide over non-native plants, as well as benefits provided by maintaining the topographical and geological character of the landscape.

WisDOT is committed to the Natural Roadsides philosophy and has adopted policies and procedures that encourage the preservation and regeneration of native plants and native plant communities. Policy 07-01-01 of the highway Maintenance Manual states that plant species planted along state highways shall be native to that area. Also, 23 CFR Part 752.11 (b) requires that at least .25% of funds expended on federally funded landscaping projects be used to plant native wildflowers (see [FDM 27-25-15](#)).

In keeping with these goals, some areas are intentionally left un-mowed, and native plants are normally used in landscape plantings. Landscape plantings are designed and installed to look as though they exist as a result of natural processes.

Native species are defined as those existing in the area prior to settlement, ca 1848. Naturalized species are those that are not native but have escaped cultivation or have been accidentally introduced to an area and adapted to the local environment, occurring abundantly in non-cultivated situations. WisDOT prefers to use native species, but when this is not possible, naturalized species may be an option. The variety of species present in natural roadsides offers a rich aesthetic landscape, full of forms, textures and colors enhanced by seasonal changes.

The Natural Roadsides concept also applies to the topography and geology of an area. Maintaining the visual character of an area is important in project design and can be accomplished through both preservation and mitigation.

Although the Natural Roadsides philosophy generally applies to all WisDOT vegetation management, it is understood that projects in an urban environment may require a more formal planting concept.

10.3 Benefits of Using Native Species

Native species require minimal maintenance. While they cannot be completely neglected, these species do not require intense management.

Native species reflect the natural vegetation of the surrounding environment. An example of a plant community adapted to the southern half of Wisconsin is the prairie. Prairie plants usually possess the following qualities:

- Drought tolerance due to their thick deep roots

- Erosion prevention particularly on poor, droughty soils
- The ability to compete well against invasive species
- The ability to provide wildlife habitat, such as nesting grounds for birds

The Natural Roadsides program also preserves rare and endangered native species and encourages their regeneration, thereby promoting ecological integrity and Wisconsin's natural heritage.

10.4 Strategies

The following strategies help WisDOT meet its vegetation management and aesthetic design implementation goals.

- All development and maintenance activities will comply with federal and state legislative mandates and will be consistent with WisDOT policies, procedures and directives.
- The Natural Roadsides philosophy will continue to be emphasized through management practices and facility designs that complement the natural environment.
- BHM Landscape Architect Contacts (LACs) and region staff will work cooperatively in planning and programming landscape planting projects.
- BHM LACs and region staff will work together in incorporating aesthetic design into improvement projects.
- A structured approach to the planning and programming of landscape planting projects will ensure that those projects are evenly distributed and prioritized throughout the state--in essence a "widely and wisely" approach. Factors that will be considered in this approach are:
 - Relative size of projects - Regions will be encouraged to use their allotted landscape planting spending authority on several small- to medium-sized projects rather than on projects which require large budgets. (Note: Size refers to the amount of dollars spent, not to amount of area covered by the project.)
 - Average Daily Traffic (ADT) volume - Projects on highways with higher ADTs will receive higher priority than those with lower ADTs.
 - Stand-alone vs. Incorporated projects - Planting projects can either stand alone or be incorporated into a larger highway construction project. Regions will be encouraged to develop stand-alone projects.
- Planting projects will be evaluated and prioritized based on the function of the proposed planting. Functions in order of priority are:
 1. Revegetation - Providing replacement plantings where existing plants were removed as the result of a highway construction project.
 2. Safety - Providing plantings which make the highway environment safer.
 3. Aesthetics - Providing plantings which reduce the negative impacts of the highway for the users of adjacent land.
- Plantings installed strictly for the purpose of improving aesthetics will be allowed only when funds for construction and long-term maintenance are provided exclusively from federal and/or local sources.
- Landscape planting projects will be designed to require minimal maintenance.
- Vegetation management plans will be developed as part of project design development and will be included as part of the end product along with the Plans, Specifications and Estimates (PS&E).
- Management plans will also be developed for important existing plantings or plant communities, such as prairie remnants or special seeding areas.
- Region Operations personnel will commit to funding the appropriate level of follow-up maintenance to plantings before the project is let.
- Partnerships or pilot projects with other entities such as local municipalities, civic organizations, private industry or other agencies will be encouraged in order to achieve common vegetation management goals.

FDM 27-1-15 Authority

April 23, 1999

Numerous state and federal laws, rules and policies, support using the principles of landscape architecture in transportation facility development. Some of these are presented below.

To uphold these laws and policies, WisDOT incorporates landscape architectural design throughout the facilities development process, from inception to construction. The assumption that landscape architecture issues can be dealt with late in the design process only leads to expensive add-on solutions as well as missed opportunities to enhance the safety, pleasure and enjoyment of the traveling public.

Authority

- Wisconsin Statute 84.04 defines roadside improvement as "...the application of the principles of landscape architecture to highway planning, design, location and construction."
- Chapter 443.01 (3r) of the Wisconsin Statutes states that the role of landscape architects includes the "...planning of a road, bridge or other structure with respect to the aesthetic requirements of the area on which it will be constructed."
- The National Environmental Policy Act (NEPA) and the Wisconsin Environmental Policy Act (WEPA) both state that it is the government's responsibility "to use all practicable means to assure for all Americans safe, healthful, productive, and aesthetically pleasing surroundings."
- United States Code, Title 23, Section 109 (h) reads as follows: "... the Secretary ... shall ... promulgate guidelines designed to assure that possible adverse economic, social, and environmental effects relating to any proposed project on any Federal-aid system have been fully considered ... taking into consideration ... the costs of eliminating or minimizing such adverse effects and the following: ... 2) destruction or disruption of ... aesthetic values ..."
- United States Code, Title 23, Section 319 calls for the "... acquisition of interests in and improvement of strips of land necessary for the restoration, preservation, and enhancement of scenic beauty adjacent to such highways."
- 23 CFR Part 752.11 (b) requires that at least .25% of funds expended on federally funded landscaping projects be used to plant native wildflowers.
- Section 752.2 (a) of 23 Code of Federal Regulations states that "highway aesthetics is a most important consideration in the Federal-aid highway program. Highways must not only blend with our natural, social and cultural environment, but also provide pleasure and satisfaction in their use."
- The purpose of Trans 280 is to "... establish uniform procedures for increasing the number of hardy and aesthetically pleasing trees planted on highway rights-of-way ...". The goals of Trans 280 include the following: "(1) plant trees to enhance roadside aesthetics, maximize oxygen production and improve air quality. (2) Promote the ecological integrity of the state's natural heritage through the planting of native trees on state highway roadsides. (3) Tree planting should be consistent with a vegetation management plan to ... (a) preserve and encourage the regeneration of native vegetation on roadsides." Trans 280 also calls for the identification and classification of vegetation and other roadside features for "... potential enhancements, including reforestation, aesthetic improvement opportunities, erosion control prevention and native vegetation opportunities." Finally, Trans 280 requires the Department to "develop roadside tree planting plans based on the principles of landscape architecture as applied to highway design in accordance with American Association of State Highway and Transportation Officials (AASHTO) guidelines, the Department's Facilities Development Manual, and Highway Maintenance Manual."

FDM 27-1-20 Organization Relationships

November 15, 2022

20.1 Background

The planning, programming, design, construction and maintenance of landscape plantings and aesthetic design work require cooperation between region personnel and Bureau of Highway Maintenance (BHM) landscape architects. Consultant landscape architects, either through the master contract process or standard contracting methods, may also assist in design and construction-related activities.

20.2 Landscape Architect Contacts (LACs)

Since landscape architecture is so specialized, and the landscape planting and aesthetics program should receive a statewide focus, the BHM LACs must be directly involved in various aspects of program development, design, construction and maintenance. Specifically, the BHM LACs will be responsible for:

- Developing, updating and interpreting policy, procedures and guidelines related to landscape planting and aesthetics.
- Monitoring compliance with policy, procedures and guidelines related to landscape planting and aesthetics.

- Providing guidance and assistance to regions and landscape architectural consultants.
- Providing training for issues related to landscape planting and aesthetics.
- Maintaining a list of pre-qualified landscape architectural consultants for region use.
- Selecting landscape architectural consultants for master contracts to be administered through the BHM.
- Aiding the regions in selecting landscape architectural consultants for design, construction and maintenance activities and rating their performance.
- Determining fiscal year landscape planting program budget limits.
- Determining, in conjunction with the regions, which projects will be considered for landscape planting, and establishing priorities through the Landscape Planting Project Selection Process.
- Determining, in conjunction with the regions, which improvement projects may benefit from an emphasis on aesthetic design (see [FDM 27-1-5](#), and [FDM 27-20-5](#)).
- Aiding in the planting plan development process (see [FDM 27-20-1](#)).
- Monitoring landscape planting expenditures to ensure that spending is within established caps.
- Aiding the project construction phase by providing guidance and hands-on field expertise when necessary, such as reviewing staking of plant locations, inspecting plants and planting techniques, and monitoring plant care and survival during the plant establishment period (see CMM 10-14).
- Aiding in maintaining plantings by providing guidance and hands-on field expertise when necessary for activities such as pruning, mulching, watering, weeding and removing stakes, wires and rodent control devices.
- Monitoring compliance with maintenance plans.

20.3 Region Personnel

Region staff are responsible for:

- Following and enforcing policies, procedures and guidelines related to landscape planting and aesthetics.
- Selecting landscape architectural consultants for design, construction and maintenance activities and rating their performance.
- Determining, in conjunction with the BHM LACs, which projects will be considered for landscape planting and establishing priorities through the Landscape Planting Project Selection.
- Determining, in conjunction with the BHM LACs, which improvement projects may benefit from an emphasis on aesthetic design (see [FDM 27-1-5](#), [FDM 27-20-1](#) and [FDM 27-20-5](#)).
- Managing the planting plan development process (see [FDM 27-20-1](#)).
- Monitoring landscape planting expenditures to ensure that spending is within project limits.
- Administering planting plan construction projects.
- Implementing landscape maintenance plans.

20.4 Consultants/Master Contracts

Landscape architectural consultants can be contracted directly by the regions or through the BHM Master Contracts. Landscape architectural consultants can perform a variety of functions such as:

- Developing planting plans.
- Providing guidance on aesthetic design.
- Providing construction administration/supervision.
- Developing Visual Impact Assessments.
- Developing maintenance plans.
- Developing environmental mitigation designs.

The regions and the BHM should use landscape architecture master contracts for small, low-cost projects or projects that must begin on short notice.

Use the following process when employing a master contract landscape architectural consultant:

1. The region develops a scope of work and cost estimates and forwards them to the appropriate LAC for review. See [FDM 27-1-1](#) for specific contacts for each region.

2. If the LAC determines that a master contract consultant is appropriate, the region will direct a master contract consultant to develop a draft work order.
3. The region will negotiate and approve the draft work order in accordance with [FDM 8-20-1](#).
4. When the draft work order has been approved, the region directs the consultant to prepare the final version and send two signed originals and three copies to the region.
5. After receiving the signed work orders from the consultant, the region will review, sign, and keep one copy, and distribute the originals and remaining copies as follows:
 - original to the consultant
 - original to WisDOT Highways Central Files
 - copy to the Bureau of Financial Services Expenditure Accounting
 - copy to the LAC
6. When the work specified in the work order is completed, the region will close out the project and notify the LAC who, in turn, will notify the Landscape Development Program Manager.

A change in scope, time or payment is sometimes required. When this occurs, the following process is used:

1. The region or consultant (the entity requesting the change) prepares the proposed amendment which the region forwards to its LAC for review.
2. The region negotiates the final language of the proposed amendment.
3. The region directs the consultant to prepare the final version of the amendment and send two signed originals and three copies to the region.
4. After receiving the signed amendments, the region will review, sign, and keep one copy, sending the originals and copies as per #5 above:

Master contracts may also be used by various other sections within the department that may need the services of a landscape architect. In such a case, these sections would follow the two processes as outlined above, taking on the region's usual responsibilities. The appropriate LAC for the project should be contacted.