FDM 27-25-1 Woody Plant Materials

November 15, 2022

1.1 Overview

This procedure will address the preservation of existing woody plants and the selection of the new ones. There is often desirable vegetation at a proposed project site. Plants may be desirable because they:

- have an attractive form or color
- are located in a strategic place
- have historical or cultural significance

It is best to preserve plants in place if it can be done without damaging them during construction and they will not interfere with construction. A second option is to transplant the plants into a new location on the site if their size is suitable for tree-transplanting machines.

The Bureau of Highway Maintenance (BHM) conducted a partial inventory of roadside vegetation along various sections of the state trunk highway system. If the inventory is complete for the section of highway being considered, it may assist in identifying existing plant communities and individual species in preliminary investigations. However, a detailed field inventory will still be necessary later to select individual woody plants for preservation.

The roadside vegetation inventory information is available from the region offices or the BHM Landscape Architect Contacts (LACs). The BHM LAC telephone and email numbers are listed in FDM 27-1-1.

1.2 Plant Preservation Criteria

Some of the criteria used to evaluate potential candidates for preservation are:

1.2.1 Species

A stately oak tree with sturdy, wide spreading branches and an expected life span of 150 to 200 years or more warrants preservation, whereas a silver maple of the same size might not because it is inherently weak-wooded and has a much shorter life span.

Attachment 1.1 lists tree species that often warrant preservation. Though it is not all-inclusive, these plant species, both native and non-native, perform well along Wisconsin's roadsides. This list should be used as a guide only, since other factors such as condition, age, size and location must also be considered.

Shrubs are generally not preserved unless they are performing a particular function related to highway safety.

1.2.2 Condition

A plant’s condition can often be determined by casual observation. A healthy plant has normal-sized leaves with normal coloration, very few dead branches, and no evidence of decay or rotting. If any of these symptoms are apparent, consult with the BHM LACs.

1.2.3 Age

In general, long-lived trees warrant preservation more than short-lived trees. Short-lived trees tend to grow rapidly and be more weak-wooded. In contrast, trees with a longer life span tend to grow more slowly and have stronger wood.

1.2.4 Size

Plants of any size should be preserved in place if it can be accomplished without budgetary or logistical problems. Large specimen trees may be particularly worthy of extra effort.

1.2.5 Location

All plants beyond the grading limits should be preserved unless there is some overriding reason to eliminate them. Include a notation in the Special Provisions requiring the contractor's employees and project administration staff to stay out of and protect designated sensitive areas during construction. When feasible, include plan sheets showing these areas and provide for exclusionary fencing around these sensitive areas.

Preserve individual plants within the grading limits that serve a functional purpose such as headlight screening or snowdrift control. Plants within the grading limits that are of specimen quality should also be preserved in place if possible. Otherwise, consider transplanting them to another location.

Remember: It is better to preserve existing vegetation than to try to re-establish it once it is gone.

1.3 Preserve In Place

If a plant is to be preserved in place, do not disturb the ground within the drip line. If this is not possible, tree wells or retaining walls can be built to accommodate grade changes. SDD 14A1 illustrates these procedures. Remember that the greater the number of roots removed when the grade is lowered and the greater the amount of fill added when the grade is raised, the less likely the plant's chances of survival.

1.4 Transplant Existing Vegetation

Tree transplanting is a viable and valuable option, particularly if there is an appropriate site within the project limits where trees can be relocated. Shrubs have a faster growth rate and a relatively short life span, so they are less appropriate for transplanting unless they are particularly valuable specimens.

A general rule to apply when transplanting trees is that the smaller the tree and the larger the ball of earth removed with it, the more likely it is to withstand the shock of transplanting.

Standard spec 632.2.2.9.6 and standard spec 632.3.7 describe transplanting trees with a machine. SDD 14A2 also contains a detail illustrating machine tree transplanting.

1.4.1 Identifying Trees to be Transplanted

Species: Attachment 1.2 is a guide for determining whether a given species is considered feasible for transplanting.

Size: Trees of any caliper (trunk diameter) up to eight inches may reasonably be considered for transplanting. However, transplanting trees smaller in caliper than approximately 1½ or 2 inches is usually not cost effective, since nursery stock of the same species and size is usually less expensive and less risky in terms of plant survival. Consult the BHM LACs for assistance in evaluating the potential of moving trees.

While it is possible to transplant very large trees (well over 12 inches in caliper), the process is extremely expensive. Tree-transplanting machines large enough to perform this work are not generally available, so it must be done by hand and by machines not designed for that purpose. Therefore, trees over 12 inches in caliper generally should not be considered for transplanting.

Condition: Trees in poor condition, either structurally or from a health standpoint, should not be transplanted. Structural deformity may be caused by poor health, age, vandalism, storm damage, or poor pruning techniques. It is usually obvious but check for broken branches and splits in crotches that might not be visible to the casual observer. Poor health is manifested as decay, dead or dying branches or leaves, foliage discoloration, and loose or split bark. Usually, a tree in poor condition should not be considered for preservation or transplanting.

Location: Evaluate quality trees within the grading limits for transplanting potential. Trees outside the grading limits should be preserved in place. Trees selected for transplanting must be growing in a fairly flat location since tree-transplanting machines are mounted on trucks or trailers and have limited capability to maneuver the digging blades on slopes so that the tree will remain plumb when planted in its new location.

Trees in a forested location are usually not desirable for transplanting. They are often tall and spindly, and not typical of their species in structure and form. Trees accustomed to growing in shade but transplanted into direct sun will usually be stressed and suffer damage or simply die.

Lone Tree vs Groups: - Trees growing close together in groups must be evaluated for shape as well as location. They often lack space to develop normally and consequently, their form may be unsatisfactory.

Also, it is difficult to position the digging blades of tree-transplanting machines around trees that are growing close together, or those that have stout branches near the ground. Low-growing branches must be tied up so the blades can be properly positioned. Branches that are too stout to be bent must be cut off or they will be broken. Retain low-growing branches on evergreen trees to preserve their natural character.

1.4.2 Selecting Destination Site

Accessibility: The destination site must be fairly flat and machine-accessible.

Distance: While tree-transplanting machines are capable of hauling trees a long distance over the highway, the greater the distance, the greater the chance that the roots will loosen from the surrounding soil and affect the tree's chances for survival. Distance also increases the cost per tree.

1.4.3 Transplanting Protocols

Root pruning: If time and other factors allow, root prune trees being considered for transplanting about one year prior to the actual transplanting time. Bring the tree-transplanting machine to the site and position the digging

blades around the tree as if for transplanting. Plunging the blades into the soil and removing them (without lifting the tree) effectively prunes the roots. This is standard practice in the nursery industry for initiating further rooting in the volume of soil that surrounds and travels with the root ball when the tree is transplanted.

Orientation Marking: Prior to digging, unobtrusively mark each tree so personnel can orient it in the same direction at its new site. Tie a piece of plastic ribbon (do not use paint) onto a branch on the north side of the tree so the tree is planted with the ribboned side facing north in its new location.

Holding Areas: Ideally, trees are transplanted directly from their old location to their new location. Occasionally, this is not possible because work must begin at the old location before the new location is prepared. In that case, transplant the trees into a holding area until their new location is ready. The techniques specified in standard spec 632 must be used during both transplanting operations.

1.5 Plant Selection

There are four variables to consider when selecting plant material. These factors heavily influence the plant's long-term survival:

- Species
- Root zone mode (root treatment used for transplanting)
- Size
- Environment into which the plant will be placed

1.5.1 Species

Natural Roadsides Policy: The species that can be used in a project are partly dictated by the Department's Natural Roadsides Policy as defined in Policy 74.05 of the Highway Maintenance Manual. This policy mandates that species planted along state highways be native to the area. In this context 'native' means the species existed in the area prior to settlement in 1848. The native species requirement may be relaxed somewhat in urban and transitional areas if non-native species or cultivars (improved varieties) will better tolerate certain site-specific conditions. Resources to help identify native plants include:

- "The Vegetation of Wisconsin" by John T. Curtis
- "Original Vegetation Cover of Wisconsin" map by Robert W. Finley
- "Early Vegetation of Wisconsin" map published by the Geological and Natural History Survey.
- Native Trees, Shrubs and Vines for Urban and Rural America" by Gary Heightshoe

Attachment 1.3 is a list of plants that are used for roadside planting in Wisconsin.

Consulting with vegetation specialists familiar with local flora will also provide valuable information, as will field observations.

Cultivars: Cultivars of native species are generally accepted. These varieties have been selected in the nursery trade because of some outstanding characteristic such as: improved branching structure (e.g. 'Marshall's Seedless' green ash)

- exceptional autumn leaf color (e.g. 'Red Sunset' red maple)
- lack of thorns on species that have thorns (e.g. 'Skyline' honey locust)
- a particular form (e.g. Boulevard American Linden)
- Improved hardiness

Avoid gaudy horticultural varieties with variegated or unusually colored leaves that would look artificial in a natural setting.

Availability: Some native species may be hard to find in the nursery trade, especially in large quantities. Check several sources within the acceptable geographic area to make sure the intended species are readily available. Be certain that sources are available before putting the species on the plan.

It is advisable to let contracts no later than October for planting the following spring. If planting is to take place in fall, the contract should be let no later than June. If planting is allowed either in fall or the following spring at the contractor's option, the contract may be let after the month of June. However, the later it is let, the less likely it is that the contractor will be able to gather materials in time to do much fall planting.

Salt Tolerance: Different species vary in their tolerance of airborne salt spray and salt in the soil. See FDM 27-20 Attachment 5.12 for a list of commonly used woody plants and their degree of salt tolerance. Due to the variety of factors that can affect salt tolerance (soil type, soil moisture level, age of the tree, time of year, temperature, etc.) these ratings should be used only as very general guidelines. Call the BHM LACs for more information concerning the mechanisms of salt injury.

Extremely sensitive plants should be avoided. However, moderately sensitive plants may be used under certain conditions. They can be planted on the upwind side of the roadway where they are less likely to receive airborne salt spray than the downwind side. They might also be used where the right-of-way can accommodate planting at least 80 to 100 feet away from the roadway, such as in the central section of a large interchange area. Still, the best option is to select more tolerant species.

Pollution Tolerance: Pollution tolerance has not been well-studied. Consult the BHM LACs regarding the tolerance of specific species.

Susceptibility to Pests: Most plants are hosts for a variety of insect pests and diseases. Some species are more susceptible to certain pests than others, and some pests attack only certain species. Where a certain pest is a serious problem, highly susceptible species should not be planted. For example, Dutch elm disease is so widespread that it has greatly limited the planting of American elm trees in this country. Some cultivars of American elm have been developed that are resistant to the disease, but there is a possibility that the disease may change in time and overcome that resistance. Emerald ash borer has been discovered in Michigan and some sites in other states. This pest has the potential to destroy the ash population of infested areas. Therefore, minimize the use of ash species and cultivars especially in the eastern part of the state.

Some pests are cyclical in nature. While they may be a major problem in certain years, they will not be a constant problem. For instance, spider mites attack a wide variety of plant species, but their populations and damage are most noticeable in hot dry conditions, such as during a drought. Although these types of pests are certainly a factor to consider, they are not sufficient cause to eliminate a species entirely from the plan.

Some pests need two specific species of plants to act as alternate hosts. Cedar-apple rust needs eastern red cedar and apple, crabapple or hawthorn trees to complete its life cycle. To break the life cycle, eliminate one of the species from the design and be sure it is not growing anywhere in the vicinity, whether on or off the right-of-way. For example, if eastern red cedar is to be planted or is already growing in the vicinity, don't plant apple, crabapple or hawthorn.

Diversity: Where large numbers of plants are required for a particular function (such as live snow fencing), several species should be used. Diversity has practical benefits, along with aesthetic appeal. If a pest attacks one species, the others may survive, and the overall effect of the damaged plants is less noticeable. The surviving species will eventually replace the species destroyed by the pest.

Adjacent Land Use: Adjacent land uses may affect the selection of species The Department should not create problems for neighboring landowners. For instance, if there is an apple orchard just off the right-of-way, eastern red cedar should not be planted. Where the landscape on the abutting property is intensively managed, plantings on the right-of-way should complement the style on adjacent land, both in design and in species selected.

1.5.2 Root Zone Mode

Plants are generally provided in one of four ways:

Bare-root (BR) - plants have no soil surrounding the roots after the plant is dug and while it is being stored and transported. BR plants are the least expensive option and are generally very acceptable if there is sufficient quality control during planting time. They are usually dug in the fall after losing their leaves and entering dormancy. They are kept in cold storage and high humidity over the winter. Many species, such as ash trees and maples, may be furnished bare root, at least in the smaller sizes (up to about two inches in caliper).

Balled and Burlapped (B&B) - The more sensitive species, such as oaks and hawthorns, must be furnished B&B so the soil around the root ball in the nursery is dug and shipped along with the plant. B&B plants are the most expensive because it takes extra labor to dig them, prepare the ball, handle and ship them. They are dug as needed, usually while dormant during late fall or early spring. They may be stored over the summer, but extreme care must be taken to prevent injury.

Balled and Potted (B&P) - This is equivalent to B&B, except that the root ball of a B&P plant is dug and placed in a pot rather than wrapped in burlap.

Container-Grown (CG) - Shrubs, and occasionally trees, may also be furnished as container-grown plants. An advantage of this method is that the roots and growing medium remain undisturbed until planting time. CG plants are more expensive than BR plants but are usually less expensive than B&B or B&P plants. Specify CG plants if planting must be done during the summer months that are not normally considered to be part of the spring or fall planting seasons as defined in standard spec 632.

See Attachment 1.4 for American Association of Nurserymen standards on BR, B&B, B&P, and CG plants.

1.5.3 Size

There are two considerations regarding plant sizes that must be made during planting plan development. The first is the mature height and spread of the plant; the second is the size when planted under contract.

Mature Size - Do not select plant species that will out-grow the available space or eventually interfere with other structures such as utility lines or signs. Do select plants that will be large enough at maturity to perform their intended function at highway scale. Small plants have no significant visual impact at highway speeds unless planted in large masses. Low-growing plants may be lost in surrounding tall growing grasses and forbs. Do not use them except in special circumstances such as in mulched beds where the mulch will be maintained.

Size When Planted - When considering sizes of nursery stock to specify, remember that smaller sizes generally withstand the shock of transplanting better than larger sizes and often surpass the size of a tree furnished at a larger size within a few years. This is particularly true for evergreen trees. Smaller sizes are physically easier to handle, especially if balled and burlapped; the larger the plant, the larger the ball. Larger balls are heavier and harder to maneuver without damaging the plant. Thorny plants are also more easily handled in smaller sizes.

Plants must be small enough to be handled easily but large enough to compete against and not be hidden by existing vegetation. The contractor must be able to locate them in order to maintain them properly and the project engineer must have access to them to make the appropriate inspections during the plant establishment period.

Generally, deciduous trees should be specified in the 8-foot height to 2-inch caliper range, evergreen trees in the 2½- to 5-foot height range and shrubs in the 15-inch to 3-foot height range. Evergreen shrubs specified by spread rather than height should be in the 15-inch to 24-inch range.

When there are many large-growing deciduous and evergreen trees in an area, such as in a major interchange, it may be desirable to specify that a few of each type be furnished in a larger size than the rest for immediate visual interest. Larger sizes may also be specified if there is a need for immediate functional purposes, such as a headlight screen.

1.5.4 Environment

Just as different species vary in their tolerance of pollutants, they also vary in their tolerance of soil types, moisture regimes and shade conditions. Many nursery catalogs and green industry publications list plant species that tolerate environmental conditions such as sandy soils, drought, shade, salt, etc. These, along with practical experience, should be used to aid in selecting appropriate species. The BHM LACs are also available as a resource.

The following environmental factors will influence plant species selected:

Soils: Plant species vary in their tolerance of different soil types. Therefore, the soils at the planting site must be considered when selecting species. As part of the site inspection, designers can obtain soils data from the local office of the Natural Resources Conservation Service.

Moisture: Evaluate the species' tolerance of droughty and excessively moist conditions when selecting plants. Factors to consider include:

- The moisture-holding capacity of the soil
- Moisture available from natural and artificial sources
- Moisture requirement of the species

In general, do not place plants in situations where they will not receive enough natural moisture to survive in good condition. Little if any maintenance (including watering) will be devoted to plantings after the plant establishment period expires.

Temperature: Plants also vary in their tolerance of temperature extremes. Each species has upper and lower temperature limits which, when exceeded, will cause injury or death. There may be intermediate temperatures that damage only part of the plant. For example, flowering dogwood for the most part will live in southern Wisconsin, but the flower buds will not survive most Wisconsin winters. Another example is autumn olive which survives undamaged most winters, but above-ground stems die back during harsh winters.

Hardiness: Plant hardiness is affected by the plant's tolerance of temperature and moisture conditions. The US Department of Agriculture publishes Miscellaneous Publication Number 1475, the "USDA Plant Hardiness Zone Map". This publication shows the locations of the different hardiness zones and is the standard reference to be used in determining whether various species are adapted to survive in particular areas. Nursery catalogs also list this information.

Sun and Shade: Most plants will tolerate some variation in the amount of sun and/or shade they receive.

However, extreme conditions such as heavy, constant shade or full, intense sun for most of the day requires plants that are adapted for those conditions. Also, the growth habit or form of some species may be affected by the amount of sunlight they receive. For instance, a particular species may be taller and more "leggy" in shady conditions than in sunny situations.

It should be noted that plant stress caused by sunlight and heat is accentuated by reflective surfaces such as retaining walls and noise barriers.

Slope Aspect: While slope direction may not have a direct bearing on plant survival, in combination with other factors it will have an effect, especially on steep slopes. For example, smooth sumac generally fares better on south-facing slopes than on north-facing slopes. To a certain extent, this is probably a function of the species' tolerance to sun and shade. Slope aspect may also affect soil moisture and a plant's ability to tolerate various pollutants and wind conditions.

1.6 Contractor Qualifications/Experience

Generally, all landscape contractors have experience planting nursery stock. There may be times when the use of pre-qualified landscape contractor for installation and maintenance of woody vegetation nursery stock would be beneficial. Consider the use of a pre-qualified landscape contractor for woody vegetation in following situations.

- Planting for functional purposes as listed in FDM 27-20-5.5.4, especially snow drift control and/or living snow fence projects
- Planting of bare root woody vegetation material is specified
- Consideration for high profile and mega projects as defined in FDM 2-1-1.1.3 Project Organization
- Recommendation by BHM LACs

For details on the list of pre-qualified landscape contractors and recommended special provision language, see FDM 27-25-5.5.7.

LIST OF ATTACHMENTS

Attachment 1.1 Tree Species Preservation Guide

Attachment 1.2 Tree Transplanting Guide

Attachment 1.3 Plants Used for Roadside Planting in Wisconsin

Attachment 1.4 Balling and Burlapping Specifications

FDM 27-25-5 Herbaceous Plant Materials

November 15, 2022

5.1 Overview

This procedure will address the preservation of desirable existing herbaceous plant materials and the selection of appropriate species for new plantings. Herbaceous plants are made up of grasses and broadleaved annuals, biennials and non-woody perennials.

It is best to preserve plants in place by protecting them from damage during construction. A second option is to arrange for a "plant rescue" in which plants are salvaged and transplanted to another location.

The Bureau of Highway Maintenance (BHM) conducted a roadside vegetation inventory along various sections of the state trunk highway system (See FDM 27-25-1). If available, consult this inventory to identify existing valuable plant species and communities. This inventory was conducted several years ago, so designers should field review the project site to confirm the inventory's accuracy.

Traditionally, disturbed areas on the roadside have been seeded with Eurasian grasses along with a few agricultural crop species. This has provided adequate cover in most cases except where the soil is poor or draughty.

The benefits of native species are that, once established, they will provide more substantial cover and better erosion control (especially on poor, draughty soils to which they have adapted over time); they will out-compete invasive weedy species; and they provide an ever-changing variety of colors and textures which enhances the driving experience for motorists.

5.2 Goals

1. Preserve native forbs (wild flowers) and grasses on roadsides and encourage their regeneration.
2. Preserve rare and endangered species and encourage their regeneration.

3. Promote ecological integrity and Wisconsin's natural heritage by planting native grasses and forbs in appropriate places on state transportation facilities.
4. Provide roadside vegetation of an intermediate height to affect a smooth transition from the roadway to taller vegetation at the edge of the highway right-of-way.
5. Provide wildlife habitat.
6. Plant desirable species that will out-compete invasive weedy species.
7. Plant desirable species for erosion control.
8. Meet the requirements 23 CFR Part 752.11(b) that at least 0.25 percent of federal funds expended for landscape planting projects be used to plant native wildflower seeds or plants. This may be accomplished through the wildflower banking system agreement with FHWA initiated by the department in 1998.

5.3 Preservation Criteria

Criteria used to evaluate potential candidates for preservation are:

- Areas that have a history of previous preservation or restoration/renovation efforts.
- Plants that have cultural or historical significance.
- Plants that have environmental or functional significance.
- Rare, endangered or threatened species.
- Plants that significantly enhance the aesthetic character of the area.

5.3.1 Species

Generally speaking, only native species are considered for preservation. Care must be taken to distinguish between native species and naturalized species. Native species are species that existed in the area prior to European settlement, ca. 1848. Resources to help identify native plants can be found in FDM 27-25-1. In addition to those resources listed, catalogs from native seed vendors and field guides such as "A Field Guide to Wildflowers of Northeastern and Northcentral North America" by Roger Tory Peterson and Margaret McKenny are helpful.

Some species are listed on either the state or the federal Endangered and Threatened Species lists. The plants on these lists are protected. A compendium of plants on both the state and federal Endangered and Threatened Species lists can be found at http://dnr.wi.gov/topic/EndangeredResources/.

Naturalized species may or may not be desirable. While they may be attractive, they may also be invasive and have the capability to displace native species. For this reason, it is rarely advisable to preserve naturalized or other non-native species.

5.3.2 Plant Communities

Plant communities are groups of plants that grow together because of their similar habitat requirements. Some of these plant communities were so prevalent in their historical context that they were given names, e.g. prairie, savanna, sedge meadow, etc. With the advent of European settlement, these native plant communities began to disappear as the land was converted to other uses. For instance, the southwestern half of the state was once covered by over 2 million acres of tall-grass prairie and over 7 million acres of oak savanna. Today less than 0.1% of the original prairie and less than 0.01% of the original savanna still exist. Most of these remaining remnants are found in old cemeteries and on older roadsides, particularly where there is a railroad corridor running parallel and in close proximity to the roadway. These remnants should be preserved as part of our natural heritage and because some of the species contained in them could disappear from the state if they are destroyed.

5.3.3 Quality/Condition

Some of these remnant plant communities are still quite high in quality while others exist in a more or less degraded condition. Some of the factors contributing to this degradation are the invasion of non-native weedy species; the inappropriate or careless use of herbicides; the use of motorized vehicles such as ATV's, dirt bikes or snowmobiles within the right-of-way; and unauthorized mowing. The BHM inventory identified several of the high-quality sites. In areas that have not yet been inventoried, a qualified vegetation specialist should determine whether an in-depth inventory should be performed. If there are only a few native species on-site, it is generally not worth preserving, unless an Endangered or Threatened species is encountered. However, if the vegetation is native and fairly diverse, strong consideration should be given to preserving or even enhancing the site.

5.3.4 Location

If a remnant is high in quality, it should be preserved regardless of location. If it is in a degraded condition, reasonable efforts should be made to preserve it if it is still diverse and attractive because of its colors and textures and located where it is visible and can be enjoyed by travelers.

5.4 Preservation Methods

A memorandum from FHWA dated January 24, 2002 states “Context-Sensitive Design (CSD) is an approach that places preservation of historic, scenic, natural environment, and other community values on an equal basis with mobility, safety and economics.” (Emphasis added) Part of the process of determining if a site can be preserved is to apply the principles of Context (or Community) Sensitive Design as explained in FDM 11-3-1 and FDM 11-3-5.

It is also important to delineate on the plan sheets the boundaries of important areas to be preserved. The special provisions should include requirements directed at both the contractor’s personnel and project administration staff that no traffic, equipment or material storage will be allowed within those boundaries. If possible, a physical barrier such as a snow fence should be installed along the perimeter of the area to delineate the area in the field.

5.5 Plant Rescue

If it is not possible to preserve plants on-site as described above, consider carefully removing and relocating them to a different location on the right-of-way which has characteristics similar to the site from which they are to be removed. A tree-moving machine may be used to transplant large chunks of “sod” when a high-quality site with few invasive species is involved. If individual plants are being moved, they may be hand-dug at appropriate times and transplanted to a safe place on the right-of-way or placed in pots.

If an appropriate site for transplanting cannot be found within the right-of-way, the plants may be offered to non-profit volunteer interest groups, such as The Wild Ones http://www.for-wild.org/aboutsit.htm or The Prairie Enthusiasts http://www.theprairieenthusiasts.org/ for use at another public location such as a park or school grounds. Only as a last resort should they be allowed to be used on private property. Under no circumstances should a group or individual be allowed to rescue plants for resale unless the department receives just compensation. If someone other than a contractor performing work for the department removes the plants, they should work with the Region Permit Coordinator who will issue a permit for the work via Form DT1812, Application/Permit to work on Highway Right-of-Way.

5.6 Planting at New Sites

The primary objective for the use of herbaceous plants on highway rights-of-way is to control erosion. However, aesthetics is an important secondary objective.

The seed mixes found in Standard Spec 630 contain both native species and non-native, or Eurasian, species. The native species tend to be bunch-type species that have very deep root systems, but which do not form sod; rather, they remain as individual plants. Many of the Eurasian species are more shallow-rooted and they tend to form sod. In the long run, the native species are more effective at controlling erosion. In fact, because of their deep root systems, they are highly effective at promoting infiltration. The Eurasian species are effective for short-term erosion control because they germinate fairly quickly and produce more above-ground biomass earlier than the native species.

Fertilizer should not be used in conjunction with seeding of native grasses and forbs. They do not normally need the additional nutrients and the fertilizer encourages the growth of invasive, weedy species.

Where seed mixes 70 and 70A are used and where mulching is required, certified weed-free mulch should be specified. Certification is provided by the Wisconsin Crop Improvement Association and a certification tag is attached to each bale of mulch material. Certified weed-free mulch may also be desirable where seed mixes 75 and 80 are specified, particularly where they are used near natural areas or remnants of native plant communities.

5.6.1 Site Selection

Seed mixes containing Eurasian grass or broadleaved species may be used wherever there is bare ground that needs to have cover to control erosion. However, in some areas a seed mix containing native species may be more desirable because many of the natives are more adapted to poor, draughty soils. An example would be the central plain where soils are very sandy.

A seed mix containing both native and Eurasian grasses (i.e. standard seed mix 75 or 80) should be chosen where erosion control is the main issue but where native species are desired. The Eurasian species will germinate quickly and provide short-term erosion control while the native species will give good long-term

erosion control, although they are slower to become established.

Native seed mixes (i.e. standard seed mix 70 or 70A) should be used where there are remnants of native prairie or related plant communities nearby or where DNR personnel prescribe native seeding as part of project mitigation measures. Sites selected for seeding of native grasses and forbs should be visible, where travelers can enjoy the colors and textures provided by the stems, leaves and flowers. In general, wide, fairly flat or gently sloping areas in the right-of-way with good visibility should be selected. Long, narrow sites provide more "edge" for weedy species to invade into the seeded area over time; therefore, they should be avoided.

5.6.2 Standard Seed Mixes

Seed mixes 10 through 80 are each designed for specific uses as noted in Standard Spec 630.2.1.5.1.2.

Seed Mixes 10, 20 and 30 as found in Standard Spec 630 are primarily intended for erosion control in rural areas. Seed mix 40 is most suited for urban areas where a lawn-type sod is desired. Seed Mix 60 is intended to provide cover in wet areas until other appropriate species can be introduced, either through interseeding, planting or natural processes.

Seed Mixes 70 and 70A were designed to be used where native prairie grasses and forbs are desired for aesthetic reasons or are required as part of an agreement with the DNR or local citizens.

Seed mix 75 consists primarily of native grasses with a couple of easy-to-grow forbs included for color. Because the number of forb species is reduced from those listed in seed mixes 70 and 70A, the cost will be significantly reduced. This seed mix is intended for use for erosion control where native grasses are desirable or required but the more expensive forb component is not needed because the areas to be seeded are not particularly visible from the roadway or neighboring development.

Seed mix 80 consists of a combination of native grasses and salt-tolerant non-aggressive, non-native grasses. This seed mix is intended for use on inslopes in areas where native species are desirable or required. For example, the DNR might request that native species be seeded where a highway construction project goes through a state natural area.

The species that make up seed mixes 70, 70A, 75 and 80 are primarily warm-season species, meaning they require the soil temperature to be above about 50 degrees Fahrenheit in order to germinate. The best time to sow these seeds, particularly the forb seed, is in late fall after dormancy has set in since many of them require exposure to a prolonged period of cold temperatures before they will germinate. Seed mixes 70 and 70A should not be sown in the heat of summer or in early fall, between about July 1 and October 15. While not ideal, seed mixes 75 and 80 may be sown during the summer months.

The native species in these mixes tend to spend their first year after germination developing a strong root system so not much above-ground growth will be evident. They will require a certain amount of management until they are established, usually for the first couple of years. This management will normally consist of controlling volunteer weeds, usually by mowing at appropriate times, but possibly by the use of herbicides, hand-pulling or hand-cutting.

5.6.3 Special Seed Mixes

The intent is that seed mixes 70, 70A, 75 and 80 be used to standardize the department's native grass and wildflower seeding activities. They should be adequate for most conditions; however, there may be situations when a special, site-specific seed mix is appropriate such as where perpetually moist or other unusual conditions are encountered. In these instances, ensure that the species selected for the seed mix are native to the area where the site is located and that environmental requirements such as soil type, moisture regime, light requirements, etc. are taken into account. Following is a list of several sources which can help determine what type of plant community existed in a particular area at the time of settlement (ca. 1848) and/or if a certain species is native:

Web sites

- Wisconsin Botanical Information System http://www.botany.wisc.edu/wisflora/search.asp
- Wisconsin State Herbarium http://www.botany.wisc.edu/herbarium/info/psatlas.asp

Books

- Roadside Use of Native Plants, FHWA Office of Natural Environment, 1999
- The Vegetation of Wisconsin, John T. Curtis, University of Wisconsin Press, 1959
- Natures Heartland: Native Plant Communities of the Great Plains, Bill Boon and Harlen Groe, Iowa State University Press, 1990

Maps

- Original Vegetation Cover of Wisconsin, Robert W. Finley, USDA, 1976
- Early Vegetation of Wisconsin, Grant Cottam and O. L. Loucks, University of Wisconsin Extension, 1965

Catalogs - from native seed/plant producers (the endorsement of products from these companies is not implied)

- Agrecol, Madison, Wisconsin
- Oak Prairie Farm, Pardeeville, Wisconsin
- Prairie Nursery, Westfield, Wisconsin
- Prairie Moon Nursery, Winona, Minnesota

There are many cultivars (cultivated varieties) of native species on the market. These cultivars have been selected for some specific trait or traits that make them more desirable in the gardening market, such as flower color, form, etc. However, the environmental community believes that introducing the specialized genes that produce these traits pollutes the gene pool. Therefore, for the purposes of a native seed mix to be used on roadsides, they are not desirable and should not be allowed.

For the same reason, native seeds should be grown or collected relatively near the site to be seeded. Standard Spec 630.2.1.5.1.1 lists areas where acceptable seed must be grown. Care must be taken not to accept seed from outside of this area. A more restrictive area may be specified for a specific project if desired.

Take care to specify only species that are readily available in the native seed trade. Those that are readily available are usually the easiest to grow so are most appropriate for a highway project. This also helps avoid the necessity of choosing substitutes for species that are not available. In addition, they are normally more reasonably priced than the harder-to-grow species.

5.6.4 Roadside Sites

Roadside sites such as safety rest areas, waysides, scenic overlooks, etc. typically have areas that are developed in lawn-type turf around picnic tables, play areas and other areas where pedestrian traffic is likely to be heavy. Often there are other large areas that need not be mowed if they are not infested with invasive weeds. These areas are candidates for native seeding.

In addition, particularly in safety rest areas, there are plaza areas that contain special plantings that highlight the building, provide shade for visitors and contribute to the aesthetics of the site. While there are many native plants that can be used to enhance these areas, the plant palette need not be restricted entirely to native plants. Garden annuals and perennials, as well as ornamental shrubs and small trees, may be used in plaza planter areas.

5.7 Contractor Qualifications/Experience

While most landscape contractors have experience with seeding WisDOT standard seed mixes and planting nursery stock, their work force may not have received training in the proper handling of seed or plant materials. Seeding with native grasses and forbs especially requires specialized knowledge and equipment.

Recommendation is to use a pre-qualified contractor for native seed projects over one acre in size or it's been recommended by BHM LACs.

To help identify and pre-qualify landscape contractors BHM LACs developed a list of pre-qualified landscape contractors through a request for qualifications process. There is a pre-qualified list for three specialized landscape categories: native seed installation and maintenance, woody vegetation installation and maintenance and living snow fence installation and maintenance. These lists can be found on WisDOT's Highway Construction Contract Information (HCCI) webpage, Wisconsin Department of Transportation Highway Construction Contract Information (wisconsindot.gov).

The use of this list should be included in special provisions. Therefore, the special provisions for this work should include a paragraph describing the special qualifications expected of the contractor or subcontractor and their workers. A sample special provision is as follows:

Notice to Contractor, Subcontractor Pre-Certification.

Pre-certification is required for native prairie seeding and/or tree/shrub and/or living snow fence installation (pick one or all that apply).

Subcontractors from each of the pre-certified lists titled “native seed installation and maintenance”, “woody vegetation installation and maintenance” and “living snow fence installation and maintenance” shall perform the work associated with the pertinent items listed further in this article. The same subcontractor is allowed if that subcontractor is on both lists.

The pre-certified lists are located on the department’s Highway Construction Contract Information (HCCI) web site.

Subcontractors or entities not on the department list are not permitted to perform the work.

Native Seed Installation and Restoration Management pre-certification is required for the following pay items:

SPV.XXXX.XXX (Fill in type)

Woody Vegetation Installation and Restoration Management pre-certification is required for the following pay items:

632.XXX Trees (example only)

SPV.XXXX.XXX (Fill in type)

At the preconstruction meeting or 14 days prior to the start of construction, whichever date is earlier, submit the names, positions, experience, and qualifications of any personnel to be used on this project that were not listed in the Request for Qualifications. Any new personnel must be approved by the department before vegetation management work begins.

5.8 Establishment Period

As with trees and shrubs, a two-growing-season Plant Establishment Period should accompany the planting of native or garden perennial plants. Although annuals, by nature, will need to be replanted each spring, the establishment period requirements should provide for the replacement of any that die during the course of the growing season.

Native seeding should also be provided with a modified establishment period as shown in Standard Spec 630.3.3.6 This does not require reseeding but does require periodic mowing and the eradication of certain invasive, weedy species. Without such an establishment period, the native seeding may be crowded out by these weeds and others that come in voluntarily and establish themselves before the native plants can produce enough biomass to compete well with the weeds.

The establishment period may be waived if the contract is for such a short duration that it would serve no purpose.

5.9 Long-term Management

After the contractor’s responsibilities have concluded there may still be a need for continued management, at least on a periodic basis. Care for ornamental plantings in roadside sites will primarily be the responsibility of the crew that maintains the rest of the facility. However, they do not have the training or the equipment needed to properly manage a native seeding.

Management of areas seeded with native species will primarily entail periodic removal of weedy top growth to enhance the growing conditions for the native species, allowing them to out-compete invasive species. In order for the project to be successful, regional operations staff must be willing to provide the necessary management after the contractor has completed his responsibilities until the seeding is well established.

The most effective means of removing the weedy top growth is with prescribed burns. However, if the site is situated such that prescribed burns cannot be safely or effectively accomplished, the area may be mowed, and

the resulting litter removed. Research done for the Minnesota Department of Transportation has shown that mowing without removing the litter is no more effective in accomplishing this goal than not mowing.

If invasive weedy species are encroaching on the areas, it may be necessary to eradicate the weeds by the use of appropriate herbicides. A partial list of invasive species of concern can be found in Standard Spec 630.3.3.6. There may be situations where it is necessary to add species to this list, such as purple loosestrife or reed canary grass which can show up just about anywhere but are especially problematic in wetter areas.

FDM 27-25-10 Plant Establishment Period (PEP) *May 13, 2009*

10.1 Overview

A plant establishment period (PEP) is typically required for all landscape planting projects in accordance with Standard Spec 632.18.1. The PEP normally does not apply to any seeding done as part of a landscape planting contract.

10.2 Two Year (PEP)

Standard Spec 632.18.1.2 states that a two-year PEP will be required for all landscape planting contracts unless otherwise specified. This ensures that new plantings are adequately cared for while they become established. The plants should be able to develop a root system sufficient for survival (with minimal care) after two growing seasons.

When a two-year PEP is in force, original plantings may be installed in the fall of one year and/or the spring of the following year. After installation is complete, the contractor is responsible for the plantings for two growing seasons. As an example, if plantings were installed during the fall of 2008 and/or spring of 2009, the contractor would be responsible for their care during the 2009 and 2010 growing seasons. As part of the process, all plant material installed during the fall of 2008 would be inspected in late April or early May 2009. Replacements would be made in spring 2009 along with plant installation not completed the previous fall. All planting would be inspected in the fall of 2009 and again in spring 2010 with replacements made during the respective planting seasons. The final inspection would be made in the fall of 2010 with replacements made during the fall planting season. All work would be complete by the time the ground freezes in 2010.

The two-year PEP is the norm and other alternatives are to be specified only when circumstances clearly preclude the two-year period.

10.3 One Year (PEP)

Occasionally, a one-year PEP may be specified by special provision if it is in the Department's best interest. This may be done if:

- The project is small (20 plants or less)
- The project is located in a remote area
- The project is part of a larger construction contract which would have to be held open for an inordinate amount of time in order to accommodate a two-year PEP.

In these examples the additional cost of providing the extra year, both in terms of the contractor's time and the Department's administrative time, may outweigh the benefits of the second year. The one-year PEP would progress in the same fashion as the two-year PEP, except all work would be complete by the time the ground freezes in 2009 instead of 2010 in the example above.

10.4 Landscape Planting Surveillance and Care Cycles

The item Landscaping Planting Surveillance and Care Cycles is included on all contracts that include plantings. Under this item the landscape contractor is required to properly care for plants from time of planting until final acceptance of the work. Required activities consist of:

- Replacing all plants that die or show evidence of dying at the next planting season
- Disposing of all plants that die during the course of the plant establishment period as their dead condition becomes evident
- Watering the plants periodically
- Pruning
- Weeding around the plantings (especially in mulched areas)
- Controlling insects and diseases, keeping plants in a healthy condition
- Cultivating
- Keeping the plants plumb
- Maintaining accessories (such as bracing and guying stakes and straps, tree wrap and mulch)

- Completing miscellaneous activities needed to keep the plantings healthy and looking well-kept
- Removing and disposing of all bracing and guying materials after the final inspection.

As specified in Standard Spec 632.3.19.2 the department will assess damages in the amount the special provisions specify to cover the cost of performing the work with other forces. Daily damages specified in the special provision should be dependent upon the value of planting items in the contract, as shown in Table 10.1.

Table 10.1 Daily Damages Assessed for Failure to Preform Landscape Planting Surveillance

Value of Planting Items	Daily Damage Assessment
Less than $25,000	$200
$25,000 to $100,000	$500
$100,000 to $250,000	$800
Greater than $250,000	$1,000

For estimating purposes, the number of cycles is typically figured on the basis of 1 cycle in late May, 2 cycles each month from June through September and 1 cycle in early October. The actual number of cycles may vary depending on whether adequate rainfall or drought occurs.

10.5 Waiver

On very rare occasions the PEP may be waived entirely. This occurs only when:

- A few trees are planted as part of a larger construction project
- Neighboring landowners have agreed to care for the plants
- Plants are installed via easement or agreement on private property and it can reasonably be expected that the landowner will care for the plants.

FDM 27-25-15 Native Wildflower Banking *November 15, 2022*

15.1 Program

Section 130 of the 1987 Surface Transportation and Uniform Relocation Assistance Act requires that native wildflowers be planted on landscape projects requiring work code Y003 as reported on form FHWA-37. This act requires that at least 0.25% of federal funds spent on landscaping projects must be expended on native wildflower seeds and/or seedlings unless a waiver has been granted.

Native grass seeds or plants do not fulfill this requirement. If the landscape work is funded exclusively by the state or local entities (no federal funds) this requirement does not apply.

15.2 Exceptions

In some instances, the Wisconsin Department of Transportation (WisDOT) has found that native wildflower planting is not practical. In these situations, a waiver from the Federal Highway Administration (FHWA) may be granted. Examples include:

- Projects in some urban areas
- Rights-of-way that are too narrow to effectively maintain the seeded area
- Projects where landscape expenditures are minimal and the impact of native
- wildflower planting (at 0.25% of a small budget) would likewise be insignificant.

WisDOT Bureau of Highway Maintenance (BHM) Landscape Architect Contacts (LACs) administer the FHWA Native Wildflower Banking program. Its purpose is to allow greater flexibility in complying with the intent of the federal mandate regarding native wildflower planting. The program sets aside the required 0.25% of the budget for sites where it is not practical to plant native wildflowers and keeps it in the “bank” as “credit” to be used on sites where wildflower plantings are appropriate.

The “bank balance” is reflected in dollars; at times the balance will be positive, at other times negative. If the balance is positive, there is “credit” available to do additional work; if negative, WisDOT has exceeded its federal obligation. The program prescribes planting on appropriate sites, resulting in more effective long-term maintenance. Consolidating plantings on fewer sites allows the concentration of maintenance efforts, increases

planting successes and makes more effective use of funding available for vegetation management.

15.3 Banking Process

1. Each October the LACs calculate the amount (dollars) of native wildflower planting needed based on approved projects in the Landscape Planting Project Selection Process.
2. The LACs work with the regions to determine which projects are best suited for native wildflower planting, and which locations within each project are suitable for native wildflower seed and/or seedlings.
3. The LACs will track program funds.