

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
WINDBREAK/SHELTERBELT ESTABLISHMENT

(Feet)

Code 380

DEFINITION

Linear plantings of single or multiple rows of trees or shrubs or sets of linear plantings.

height of the tallest row of trees or shrubs at age 20 for the given site.

PURPOSES

- to reduce soil erosion from wind
- to protect plants from wind related damage
- to alter the microenvironment for enhancing plant growth.
- to manage snow deposition
- to provide shelter for structures, livestock, and recreational areas
- to enhance wildlife habitat by providing travel corridors
- to provide living noise screens
- to provide living visual screens
- to provide living barriers against airborne chemical drift.
- to delineate property and field boundaries
- to improve irrigation efficiency
- to enhance aesthetics
- to increase carbon storage

Species must be adapted to the soils, climate and site conditions. Refer to the Expected 20-Year Tree Heights in Section II of the North Dakota Field Office Technical Guide (FOTG), for suitability of each species for planting on particular soils, expected heights at 20 years, and identification of plants considered native to North Dakota.

Species shall be suited for the planned practice purpose(s).

Site preparation shall be sufficient for establishment and growth of selected species, not contribute to erosion, and be appropriate for the site.

Only viable, high quality and adapted planting stock or seed will be used.

The planting shall be done at a time and manner to ensure survival and growth of selected species.

Spacing between individual plants shall be based on the needed growing space for plant type and species, the accommodation of maintenance equipment, and the desired characteristics of the stem(s), branches and canopy as required for a specific purpose.

For optimal carbon storage, select plants that are adapted to the site to assure strong health and vigor and plant the full stocking rate for the site.

Avoid planting trees or shrubs where they will interfere with structures and above or below ground utilities such as power lines, gas lines, water lines or septic lines.

CONDITIONS WHERE PRACTICE APPLIES

On any areas where linear plantings of woody plants are desired and suited.

CRITERIA

General Criteria Applicable to All Purposes

The location, layout and density of the planting will accomplish the purpose and function intended within a 20-year period.

The maximum design height (H) for the windbreak or shelterbelt shall be the expected

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resource Conservation Service.
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Avoid planting trees or shrubs where they may be in conflict with County, State, Federal or International prohibitions such as set back distances from roads, section lines or international boundaries, legal drains etc.

Moisture conservation or supplemental watering shall be provided for plant establishment where natural precipitation is too undependable for the selected species. Refer to FOTG Standard 441, Irrigation System, Microirrigation, for details on designing a drip irrigation system. Supplemental watering will not be used to permit inappropriate species to be planted.

To minimize loss of function due to species-specific pests, no more than two rows of any windbreak/shelterbelt system shall be the same species unless site conditions limit selection.

Additional Criteria to Reduce Wind Erosion: Protect Growing Plants

The windbreak will be oriented as close to perpendicular to the troublesome wind as possible.

The interval between windbreaks shall be determined using current, approved, wind erosion technology. Interval widths shall not exceed that permitted by the soil loss tolerance (T), or other planned soil loss objective. Calculations shall account for the effects of other practices in the conservation management system.

For wind erosion control, temporary measures will be installed to supplement the windbreak until it is fully functional.

Sites, fields, and plants are protected within an area 10 times the design height (H) on the leeward side and 2 times the design height (H) on the windward side of the windbreak.

Additional Criteria to Manage Snow Deposition

The windbreak will be oriented as close to perpendicular to the snow-bearing wind as possible.

For snow distribution across a field, the windbreak density (during expected snow-producing months) shall not be less than 25 percent nor greater than 50 percent. The interval between barriers will not exceed 20H.

For snow accumulation, the minimum barrier density, during expected snow-producing months, will be 50 percent.

Windbreaks will be located so that snow deposition will not pose a health or safety problem or obstruct human, livestock, or vehicular traffic.

Where water erosion and/or runoff from melting snow is a hazard, it shall be controlled by supporting practices.

Additional Criteria to Provide Shelter for Structures, Livestock, and Recreational Areas

The planting will be oriented as close to perpendicular to the troublesome wind as possible.

For wind protection, the minimum barrier density will be 65 percent during the months of most troublesome wind and the area to be protected will fall within a leeward distance of 10H.

Drainage of snowmelt from the windbreak shall not flow across the livestock area.

Drainage of livestock waste from the livestock area shall not flow into the windbreak.

Additional Criteria for Noise Screens

Noise screens shall be at least 65 percent dense during all times of the year, as tall as, and as close to the noise source as practicable.

The length of the noise screen shall be twice as long as the distance from the noise source to the receiver.

For high-speed traffic noise, the barrier shall not be less than 65 feet wide. For moderate speed traffic noise, the barrier width shall not be less than 20 feet wide.

Species selected will be tolerant to noxious emissions, sand, and gravel depositions or salt spray from traffic areas.

Additional Criteria for Visual Screens

Visual screens shall be located where needed, with a density, height and width to sufficiently block the view.

Additional Criteria for Providing or Enhancing Wildlife Habitat or Travel Corridors

Plant species selection shall benefit targeted wildlife species, where compatible with other windbreak/shelterbelt purposes.

Design dimensions of the planting shall be adequate for targeted wildlife species.

For greater detail on designing for wildlife, refer to Upland Wildlife Habitat Management and Wetland Wildlife Habitat Management standards found in Section IV of the North Dakota FOTG.

Additional Criteria for Improving Irrigation Efficiency

For sprinkler irrigation systems, the windbreak shall be as tall as the sprinkler heads.

The barrier shall not interfere with the operation of the irrigation system.

Species shall be compatible with the management, moisture regime and fertilizers and pesticides that may be applied through the irrigation equipment.

CONSIDERATIONS

To enhance aesthetics include evergreen species or species with features such as showy flowers, brilliant fall foliage, or persistent colorful fruits.

Selection of plants for use in windbreaks should favor species or varieties tolerant to herbicides used in the area.

Plants that may be alternate hosts to undesirable pests should be avoided.

All plantings should complement natural features, where not in conflict with conservation needs and/or landowner objectives.

Tree or shrub rows should be oriented on or near the contour where water erosion and/or runoff is a concern. Where water erosion and/or runoff from melting snow is a hazard, it should be controlled by supporting practices.

Wildlife should be considered when selecting tree or shrub species. Species diversity, including use of native species, should be considered to avoid loss of function due to species-specific pests.

Consideration should be given to adverse offsite effects.

Plants established in cropping systems should have root systems that do not affect crop growth and/or spread from root sprouts.

Screens for noise control can be more effective when combined with properly sited earth mounds and/or solid board fences.

Evaluate plant's potential to spread and reproduce offsite.

Consider adding additional tree rows periodically to establish a diversity of age classes and extend the long-term effectiveness of the windbreak/shelterbelt.

For increased carbon storage consider eliminating tillage and planting native grasses once the windbreak is established, within limitations of the site.

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation.

OPERATION AND MAINTENANCE

The following actions shall be carried out to ensure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance):

Replacement of dead trees or shrubs will be continued until the barrier is functional.

Supplemental water will be provided as needed.

Thin or prune the windbreak/ shelterbelt, as needed, to maintain its function.

Inspect trees and shrubs periodically and protect from adverse impacts including insects, diseases or competing vegetation. The trees or shrubs will also be protected from fire and damage from livestock and wildlife.

Periodic applications of nutrients may be needed to maintain plant vigor.