

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

WINDBREAK/SHELTERBELT ESTABLISHMENT

(Feet)

CODE 380

DEFINITION

Windbreaks or shelterbelts are single or multiple rows of trees or shrubs in linear configurations.

PURPOSES

- Reduce soil erosion from wind
- Protect plants from wind related damage
- Alter the microenvironment for enhancing plant growth
- Manage snow deposition
- Provide shelter for structures, animals, and people
- Enhance wildlife habitat
- Provide noise screens
- Provide visual screens
- Improve air quality by reducing and intercepting air borne particulate matter, chemicals, and odors
- Delineate property and field boundaries
- Improve irrigation efficiency
- Increase carbon storage in biomass and soils

CONDITIONS WHERE PRACTICE APPLIES

Apply this practice on any area where linear plantings of trees and shrubs are desired and suited for controlling wind, noise, and visual resources. Use other tree/shrub practices when wind, noise, and visual problems are not concerns.

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

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.

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

The length of the windbreak will be sufficient to protect the site including consideration for the "end effect" and changes in wind direction.

Avoid planting trees or shrubs where they will interfere with structures and above or below ground utilities.

Moisture conservation or supplemental watering shall be provided for plant establishment and growth where natural precipitation is too low for the selected species.

Refer to Kansas Forestry Technical Note KS-9 for further guidance on planting trees and shrubs. Comply with applicable laws and regulations.

Additional Criteria to Reduce Wind Erosion; Protect Growing Plants

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(s). Calculations shall account for the effects of other practices in the conservation management system.

The wind erosion control system should consider temporary measures to supplement the windbreak until it is fully functional.

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

Select species that are taller than the crops being protected.

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 or greater than 50 percent. The interval between barriers will not exceed 20H.

For snow accumulation, the minimum barrier density, during the snow-producing months, shall be greater than 50 percent.

The length of the windbreak will extend beyond the area being protected to allow for end drifts.

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

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

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

For wind protection, the barrier density will be at least 50 percent during the months of most troublesome wind.

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 80 percent dense during the time of the year when noise is a

problem, as tall as, and as close to the noise source as practicable.

The length of the noise screen should 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 emission, sand, gravel depositions or salt spray from traffic areas.

Additional Criteria for Visual Screens

Visual screens shall be located as close to the observer as possible with a density, height and width to sufficiently block the view between the area of concern and the sensitive area.

Additional Criteria Improve Air Quality by Reducing and Intercepting Airborne Particulate Matter, Chemicals, and Odors.

The windbreak interval shall be less than or equal to 10H depending on site conditions and related supporting conservation practices.

Windbreak density on the windward side of the problem source, (i.e., particulate, chemical, or odor) shall be greater than 50 percent to reduce the airflow into the source area.

Windbreak density on the leeward side of the problem source, and windward on the area to be protected, shall be approximately 60 percent.

Select and maintain tree and shrub species with foliar and structural characteristics to optimize interception, adsorption, and airborne chemicals or odors.

Additional Criteria for Increasing Carbon Storage in Biomass and Soils

Maximize width and length of the windbreak to fit the site.

Plant and manage the appropriate plant spacing for the site that will maximize above and below ground biomass production.

Additional Criteria for Providing or Enhancing Wildlife Habitat or Travel Corridors

Plant species selection shall benefit targeted wildlife species.

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

Additional Criteria for Improving Irrigation Efficiency

For sprinkler irrigation systems, the windbreak shall be taller than the spray height.

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

CONSIDERATIONS

Consider enhancing aesthetics by using evergreen species or species with features such as showy flowers, brilliant fall foliage, or persistent colorful fruits.

When designing the location of a windbreak or shelterbelt, consider the impact upon the landowner's or public's view of the landscape.

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 landscape features.

Tree or shrub rows should be oriented on or near the contour where water erosion is a concern. Where water erosion 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.

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Windbreaks for odor and chemical control increase in effectiveness as the amount of foliage available for intercept increases. Multiple rows and wide plantings offer greater interception potential than do smaller plantings.

When using trees and shrubs for greenhouse gas reductions, prediction of carbon sequestration rates should be made using current, approved, carbon sequestration modeling technology.

A shelterbelt can be used as a travel corridor to connect existing patches of wildlife habitat.

In cropping systems, select windbreak and shelterbelt species that minimize adverse effects to crop growth (e.g., shade, allelopathy, competing root systems or root sprouts).

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 windbreak/shelterbelt is functional.

Supplemental water will be provided as needed.

Thin or prune the windbreak/shelterbelt to maintain its health.

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.

Noxious plants will be controlled in accordance with state law.