

# Windbreak Design Clipboard

## 1 Determine landowner primary and secondary windbreak objectives

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

## 2 Consider the applicable density to meet windbreak objective(s)

- Crop & soil protection – 40-60%
- Snow distribution – 25-50%
- Snow accumulation – at least 50%
- Protection of structures, livestock and people – at least 65%
- Air quality – at least 50% on the windward side of the source area and, for windbreaks on the downwind side of the source area, at least 65%
- Density for other purposes is generally no less than 50%
- Noise screens – at least 65%

### 25–50% density

- 1-row – deciduous shrub
- 2-row – deciduous tree and deciduous shrub



### 50–65% density

- Twin-row – deciduous shrub
- 1-row – small evergreen tree
- 2-row – evergreen tree and deciduous tree
- 3-row – combination of deciduous trees and deciduous shrubs



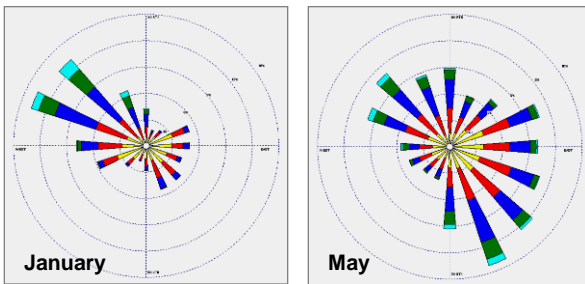
### 65+% density

- Twin-row – small evergreen tree
- 3 or more row – combination of evergreen trees, deciduous trees, and shrubs



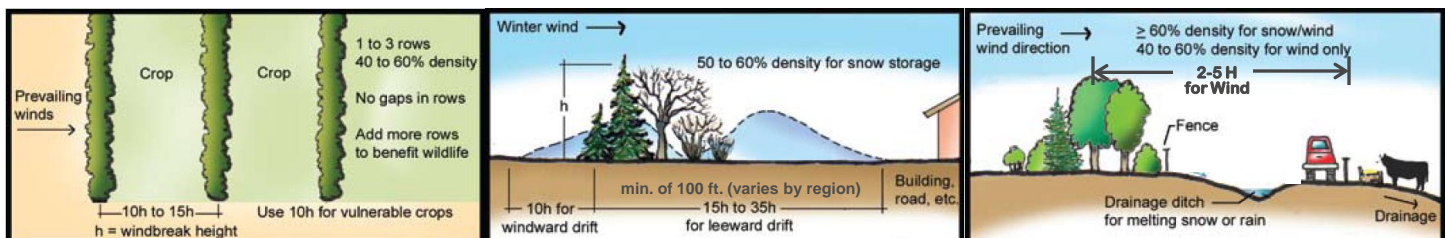
## 3 Determine troublesome wind direction

Refer to local weather records for monthly wind rose data. See <http://www.wcc.nrcs.usda.gov/climate/windrose.html>



Position the windbreak as close to perpendicular to the most troublesome wind direction

## 4 Locating the windbreak



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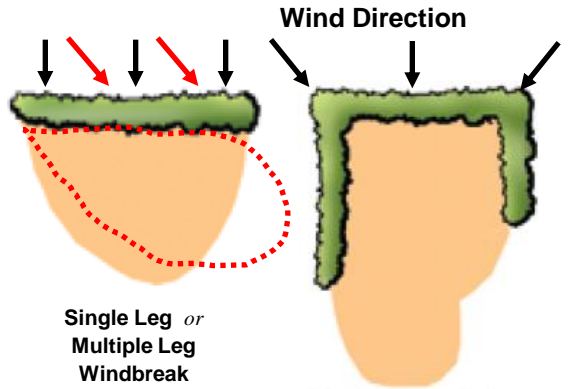
### Additional site considerations

- Inventory the soils paying close attention to inclusions of difficult soils such as high/low pH or restrictive layers.
- Begin a starter list of species adapted to the soils
- Locate property lines and overhead/underground utilities
- Will access roads/lanes cross the windbreak?
- Determine water drainage pattern into or away from windbreak

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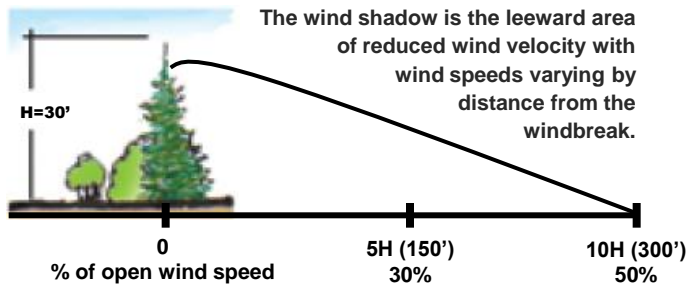
### Consider windbreak length

- The windbreak length needs to be at least ten times the 20 year height of the windbreak
- The windbreak should extend at least 100 feet beyond the desired area of protection
- A “two-leg” (or more) windbreak is needed when troublesome winds deviate throughout the windy season

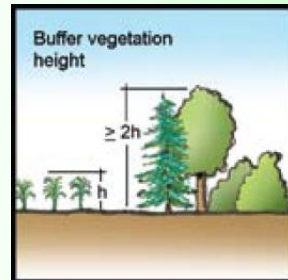


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### Consider windbreak height



Windbreak height is referred to as 'H'. The area protected is a direct proportion to the height.

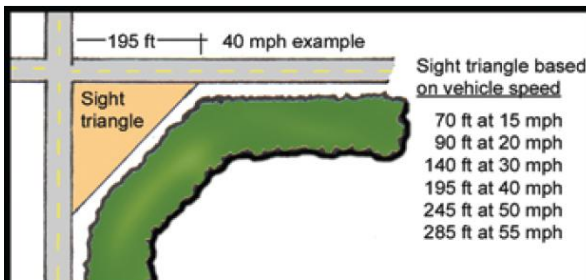


Windbreak needs to be twice as tall as the crop or structure being protected.

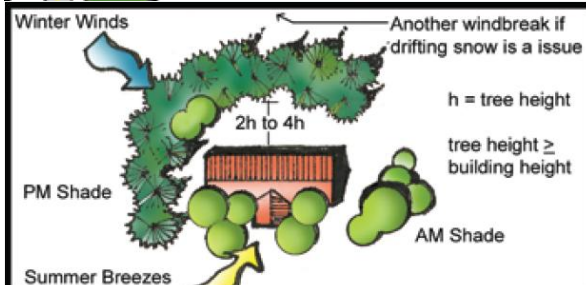
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### Special situations

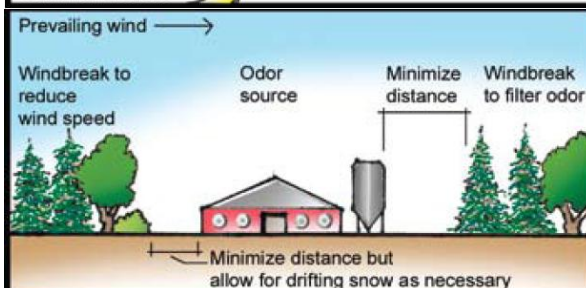
Check local ordinances for specific setback distances



Energy conservation design considerations



Design considerations for odor concerns



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### Tree & shrub species selection & spacing

- Adapted to soils
- Use approved species determined by NRCS or State Forestry Agency
- At least one species provides optimal height for the site
- Favorable for wildlife food and cover
- Diverse mix of species
- Consider seasonal variation of foliage
- Adjacent species should have similar growth form
- Choose within/between-row spacing suited to species growth and vigor
- Row spacing needs to accommodate maintenance equipment

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### Operation & maintenance

- Weed control
- Watering/irrigation
- Protection from pests
- Maintain required fencing
- Replacement of dead plants

*O&M is important!*