United States Department of Agriculture

NRCS Natural Resources Conservation Service

Hedgerow Planting - 422

Trees and Shrubs for Poultry Houses

Conservation Practice Job Sheet ***August 2012***

INTRODUCTION

Trees and shrubs can be planted around poultry houses to provide shelter from winter winds; reduce particulates, ammonia, and other odors from ventilation fans; create visual screens; and provide shade to reduce extreme summer heat.

This job sheet provides instructions for planting and maintaining trees and shrubs in good condition so that they can serve their intended purpose. Using proper planting and management techniques, especially during the establishment years, will significantly improve plant health and survival.

SITE PREPARATION

Site conditions, including soil quality and the type and density of existing vegetation, will determine how much site preparation you will need before planting. Around buildings and other structures, soil may be heavily compacted or contaminated with construction debris, gravel, and other fill material that can severely hinder plant rooting and survival.

If grasses or weeds are tall, you should mow or brush hog the planting strips. It is recommended that the planting strips either be tilled up or treated before planting with a non-selective herbicide such as glyphosate (for example, Roundup, KleenUp), following all label directions. Then plant the trees and shrubs.

PLANTING

Trees and shrubs that are planted correctly will grow faster and will be more likely to survive.

Always check for utility lines (gas, water, cable, electricity) before planting. Don't plant on top of buried utility lines or below overhead lines.

Planting Design

Every poultry house will differ as to the location of ventilation fans, access roads, drainage ditches, etc., so each planting design will need to accommodate these features. The closer the hedgerow is located to the poultry house, the more effectively the odor, dust, and ammonia will be trapped and dispersed. Particulate

trapping efficiencies may be significantly reduced beyond 100 feet, depending on height of trees, wind speed/direction, and atmospheric conditions. Proximity of the plants for trapping efficiency must be balanced with plant survival, which decreases the closer the plants are to the ventilation fans.

For plant survival in fan impact areas, the nearest row of tree/shrub plantings must be set back from the fans by a distance that is at least 10 times the exhaust fan diameter. (For example, if the ventilation fan has a diameter of 4 feet, then the first line of plants needs to be planted at least 40 feet away.) In those cases where multiple fans are used in one location, this planting distance formula may be increased a minimum of 5 feet for each fan, depending on the number of fans that are likely to be running at the same time (e.g., Bank of two 4-ft. diameter fans may need a 50-foot setback, four fans may need a 60-foot setback, etc.). Consider using two rows of warm-season grasses in front of the tree/shrub planting to provide an initial filter for fan emissions, slowing wind speed, and providing shelter for the subsequent rows of shrubs and trees.

Where vehicle access is needed, locate the planting a minimum of 50 feet from the sidewall and 80 feet from the end of the house. If the house does not have tunnel ventilation and has a south or west exposure, the minimum setback is 100 feet to provide for air

Land owners and managers please note: *If you received cost-sharing for your hedgerow, be sure to check with your funding agency/organization for specific management requirements.*

movement.

If the hedgerow is planted in front of ventilation or tunnel fans, plant at least two rows of trees and/or shrubs. For the first row (nearest the fans), select deciduous trees or shrubs, or a waxy-leaf evergreen shrub, such as an evergreen holly (*Ilex* sp.). (Alternatively, two rows of stiff-stemmed warm season grasses may be substituted for the first row of trees/shrubs where space is limited. Refer to the Delaware NRCS job sheet *Warm-Season Grasses for Poultry Houses* for additional information.) The second row of woody plants shall be evergreen or deciduous trees that are tolerant of ammonia and particulates vented from ventilation fans. 1- to 2-gallon container plants are recommended because they generally have better survival rates in fan impact areas than seedlings or balled-and-burlapped plants.

For all other purposes, a single row of trees or shrubs can be utilized, but it is recommended that a minimum of two rows be planted, especially for a visual screen. If the hedgerow is one row, plant evergreens. If two rows are planted, they can either be two rows of evergreens or one row of evergreens and one row of deciduous.

See Table 2 for additional information concerning recommended species.

Plant Availability and Planting Dates

Containerized and balled-and-burlapped plants are usually available throughout the year. The preferred planting times are in the fall or early spring. Do not plant during the summer months when high temperatures and lack of rainfall will make survival very difficult or in the winter if the ground is frozen. In ventilation fan impact areas, planting 1- to 2-gallon container stock in the spring, along with irrigation and good weed control, has generally produced the best results for plant survival and growth. To obtain recommended planting dates for the different types of woody plant materials, contact your local NRCS Field Service Center.

Storing and Planting Techniques

Containerized and balled-and-burlapped stock can be stored for extended periods if they are protected. Store the plants in partial to full shade and water as needed to keep moist. Lift and carry the plant by the container or rootball, never by the branches or trunk.

These plant materials can be planted either by hand or by machine, depending on site conditions and available equipment. Larger stock is typically used when it is not feasible to wait for smaller plants to reach a desired size (such as for landscaping, visual screens, or particulate barriers). Because larger stock is more difficult for most people to handle, installation by a professional landscaping contractor is recommended. See Figure 1 for instructions on hand planting smaller containerized stock.

Instructions for hand planting balled-and-burlapped plants are essentially the same as for planting containerized stock Prepare a planting hole and gently set the plant in the hole. Cut away any wire or twine from around the trunk. If the root ball is contained in a wire basket, some nurseries and arborists recommend leaving it on while others say it should be removed.

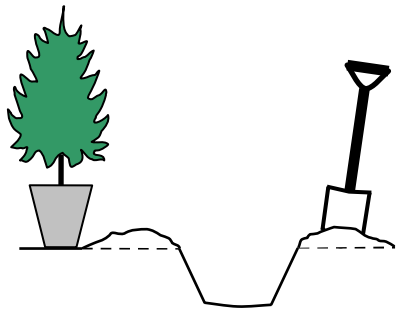
Most experts recommend cutting and removing as much of the wire basket as possible, *provided you can do so without breaking up the root ball*. Avoid buying plants that have a plastic liner, because the liner must be removed and you will probably have to remove the basket to reach it.

For very large trees, it is best to leave the basket in place if there is no liner. Just remove any wire from around the trunk. Improper removal of a wire basket can result in serious damage to the root system that may outweigh any benefits derived from removal of it.

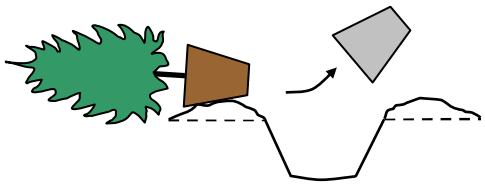
For burlap-wrapped plants, remove natural burlap and fasteners from at least the top half of the root ball, again being careful not to damage the roots. Avoid purchasing plants wrapped in plastic or synthetic fabrics. These must be completely removed because they can severely restrict the roots if left in place.

Adding sand, peat, compost, or other materials to a planting hole is generally not recommended unless the soil is excessively compacted or otherwise has very poor quality. Trees and shrubs planted in natural soil without soil amendments are more likely to develop root systems that extend well beyond the planting hole. If planted in improved soil, roots will tend to remain confined in the original hole for a longer period of time.

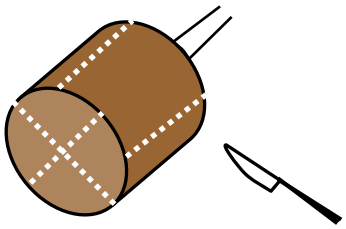
If soil amendments are needed, the best approach is to rip or deep-till a wide planting strip and add the materials to the entire strip. If this is not feasible, then dig a wide planting hole (at least two or three times the diameter of the root ball) and mix the excavated material with the soil amendments. A mixture of three parts soil to one part compost is recommended for each prepared hole.



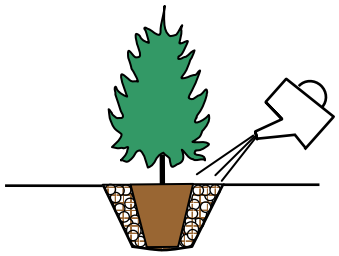
1. Dig a hole that is the same depth and at least 2 times wider than the root ball. Digging a deeper hole is not necessary, and may result in death of the plant.



2. Remove the container from the plant, even if the container is paper or peat. Lay the plant on its side, and tap the container sharply to loosen it from the root ball. If necessary, use snips to cut away the container.



3. Roots of containerized plants often completely circle the root ball. Use a sharp knife to make 3 or 4 vertical cuts on the sides of the ball, just deep enough to cut the net of roots. Also, make a criss-cross cut across the bottom of the ball. Gently pull roots away from the ball and spread them out.



4. Set the plant in the hole. Backfill the hole with soil up to the original ground surface. Do not add sand, peat, compost, or other materials to the backfill. Tamp the soil gently with your feet, but don't pack the soil or break the plant's roots. Thoroughly water the root ball and soil, then add more soil if settling occurs.

AML

Figure 1. Hand planting containerized trees and shrubs.

Staking

Trees may need to be staked if they have dense crowns, are more than 5 feet tall, have slender stems, or will be planted in windy locations. Use guy lines that won't damage the bark. Leave some slack in the lines so that trees will have slight amount of flex. Remove all stakes and guying materials after one year.

Lime and Fertilizer

Newly planted trees and shrubs should not be limed and fertilized, unless soil tests show that pH and nutrients are extremely low. For most sites, it's best to allow the root systems of new plantings to become established before applying lime and fertilizer.

Irrigation

Installation of a trickle or emitter irrigation system is highly recommended for all plantings and is a requirement if receiving cost share. For the irrigation line, use ½-inch polypropylene with ½-gallon per hour emitters placed at each tree and shrub.

Contact your local NRCS Field Service Center for a list of suppliers or irrigation companies. Be careful where you tap into your water system. Many integrators meter the water consumption for each poultry house.

Weed Control Barriers

The use of plastic landscape fabric or black polyethylene (6 mil) is recommended to provide an effective, long-lasting weed barrier. Black poly is generally cheaper than landscape fabric and works well if trickle or emitter irrigation is also implemented. (Took out statement on required for cost share)

Wood mulch can also be used around trees and shrubs, but will not provide long-term weed control unless more mulch is periodically added. If using mulch, spread a layer of well-aged bark mulch (shredded, chipped, or nuggets) 2 to 3 inches thick around new plantings, but not within 3 inches of the trunk. A minimum 3-foot diameter circle of mulch is recommended around each plant.

Treatment of the site with a pre- and post-emergent herbicide before planting is also helpful for controlling weed growth.

ESTABLISHING AND MAINTAINING THE PLANTING

Establishing the Planting

Planting year. After planting, keep plants watered during dry periods. It can take up to 5 years before a tree or shrub develops a root system extensive enough

to sustain itself, especially in harsh conditions. Sufficient moisture during this period is important for plant survival and overall plant health.

On well-drained loamy soils, new plantings usually need at least 1 inch of water per week from rainfall or irrigation in summer and fall and also during the spring if there is little rainfall. On sandy soils, plants may need at least 2 inches of water per week, preferably in two separate 1-inch waterings. On heavier soils or wet sites, plants may need less water. Watering should be sufficient to moisten the soil to the depth of the root ball—usually 1 to 2 feet deep.

Control weeds around plants by mowing, hand pulling, or treating with an appropriate herbicide. Weed control is extremely important to the establishment and longevity of hedgerows. For hedgerows that will be maintained with mowing, consider that plant spacing will need to accommodate mowing equipment. Mowing should be done with extreme caution to avoid damaging the stems or bark of plantings.

Pre- and post-emergent herbicides may also be used if weeds are abundant. Herbicides can be spot-sprayed around plantings or applied to the planting strip. Follow specific label instructions to reduce or eliminate damage to trees and shrubs. Do not apply herbicides when ventilation fans are active or on windy days because spray drift can damage nearby plantings.

Control noxious weeds at all times according to Delaware state law. Noxious weeds are Johnsongrass, burcucumber, Canada thistle, and gaint ragweed. For more information about controlling specific weeds in tree and shrub plantings, contact your local office of the University of Delaware Extension or the Delaware Department of Agriculture, Plant Industries.

For hedgerows that are planted to reduce particulates from ventilation fans, a build-up of particulates on leaves may threaten to smother and kill the plants. If feasible, periodically remove the accumulated particulate matter from the leaves by hosing the plants with water. Excessive accumulation of particulates may require installation of additional barriers such as fencing or netting to protect the plants. Unlike dust, particulates from chick down and feathers do not wash off easily, so the planting distance and type of plant materials opposite fans is critical.

Second year after planting. Continue to water plants, as needed. Control weeds by mowing, hand pulling, or treating with an herbicide. Always avoid damaging the plantings during mowing and herbicide application. If using mulch around plants, do not exceed a total thickness of 3 inches (new mulch, plus any remaining old mulch). Replace any dead trees and shrubs until the barrier is functional.

Maintaining the Planting

By the third year, the trees and shrubs should be adjusting to the site and becoming well-established. Continue to water plants as needed, and monitor the planting for any problems that need to be treated. See Table 3 for a monthly summary of maintenance activities.

Table 1: Recommended Spacing of Trees and Shrubs within and between Rows [1/]

Plant Type	**Spacing (feet) Within Rows:**		**Spacing (feet) Between Rows**
	Single Row	*Multiple Rows*	
Small Shrubs (4 – 12 feet tall)	2 - 4	4 - 6	10 - 15
Large Shrubs and Small Deciduous Trees (12 – 30 feet tall)	6 - 8	8 - 10	10 - 20
Large Deciduous Trees (more than 30 feet tall)	10 - 12	12 - 14	15 - 20
Evergreen Trees (columnar form)	6 - 8	8 - 10	10 - 20
Evergreen Trees (conical and broad forms)	8 - 10	10 - 14	15 - 20

Note:

1. Use spacings at or near the lower end of the range to create a dense barrier in a shorter period of time. Spacing between rows shall be at least four feet wider than the mechanized maintenance equipment used and may be increased beyond what is shown in this table to accommodate the equipment.

Table 2. Recommended Trees and Shrubs for Odor Control and Screening around Poultry Houses.

Plant Names	**Height at 20 Years**	**Growth Rate** [1/]	**Density** [2/] **- Summer**	**Density - Winter**	**Remarks**
DECIDUOUS TREES					
CYPRESS, BALD *Taxodium distichum*	30 ft.	Fast	Medium to High	Low	Naturally occurring on streambanks and in swamps.
HAZELNUT *Corylus americana*	20 ft.	Moderate	Low to Medium	Low	Native shrub/small tree. Resistant to most diseases and pests. Monoecious flowers (needs male and female plants to produce nuts).
HONEYLOCUST *Gleditsia triacanthos* var. *inermis*	40 ft.	Fast	Low to Medium	Very Low	Proven effective for odor control (passive ammonia absorption). Can be planted near poultry house ventilation fans.
POPLAR, HYBRID *Populus deltoides x nigra* (var. 'Spike')	40 ft.	Fast	Medium	Low	Sterile hybrid. Proven effective for odor control (passive ammonia absorption). Can be planted near poultry house ventilation fans.
WILLOW, 'AUSTREE' HYBRID *Salix matsudana x alba*	60 ft.	Very Fast	Medium to High	Low	Sterile hybrid. Due to its extremely fast growth (>3 ft/yr), can provide visual screen in 1 – 2 years. Proven effective for odor control (passive ammonia absorption). Can be planted near poultry house ventilation fans.
WILLOW, PURPLEOSIER 'STREAMCO' *Salix purpurea*	20 ft.	Fast	Medium to High	Low	Non-invasive shrub/small tree. 'Streamco' is a male clone, does not root sucker, and does not spread readily beyond the planting site. Proven effective for odor control (passive ammonia absorption). Can be planted near poultry house ventilation fans.
EVERGREEN TREES					
ARBORVITAE *Thuja occidentalis*	25 ft.	Slow	Very High	Very High	Frequently planted statewide as an ornamental. Prefers moist, well-drained soil, but tolerates a wide range of conditions. Prone to bagworms. Can be planted near poultry house ventilation fans.

Plant Names	Height at 20 Years	Growth Rate [1/]	Density [2/] - Summer	Density - Winter	Remarks
ARBORVITAE, 'GREEN GIANT' *Thuja plicata x standishii*	40 ft.	Fast	Very High	Very High	Prefers well-drained soil, but tolerates a wide range of conditions. No serious pest or disease problems. Proven effective for odor control (passive ammonia absorption). Can be planted near poultry house ventilation fans.
CEDAR, EASTERN RED *Juniperus virginiana*	20 ft.	Moderate	Very High	Very High	Should not be planted near apple orchards; alternate host of cedar-apple rust. Proven effective for odor control (passive ammonia absorption). Can be planted near poultry house ventilation fans.
HOLLY, AMERICAN *Ilex opaca*	20 ft.	Slow	High	High	Need male and female plants for fruit production. Shade tolerant. Can be planted near poultry house ventilation fans, but is very slow-growing. May be suitable for use in Row 1 to reduce wind velocity from fans, but should be backed by a fine-leaved evergreen to trap particulates. Proven effective for odor control (passive ammonia absorption).
JUNIPER, CHINESE *Juniperus chinensis*	30 ft.	Slow	High	High	Height varies with cultivar. Cultivars with similar shapes and heights include Hetzii, Hetzii columnaris, Pyrimidalis, Fairview, Keteleen, Mountbatten, Spartan, Torulosa, (Hollywood juniper) and Robusta Green. In cool, wet springs, Chinese juniper is susceptible to blights that can cause severe damage.,
SPRUCE, NORWAY *Picea abies*	35 ft.	Fast	High	High	Fast growth rate when young, slows down with age. Prefers moderately moist, well-drained soil. Proven effective for odor control (passive ammonia absorption). Can be planted near poultry house ventilation fans.
SHRUBS					
ABELIA, GLOSSY *Abelia x grandiflora*	6 ft.	Fast	High	Moderate	Semi-evergreen foliage. No serious pests or diseases. Stems may be killed to the ground in cold winters.
BAYBERRY, NORTHERN *Morella pensylvanica* (formerly *Myrica pensylvanica)*	10 ft.	Moderate	Medium	Low	Need male and female plants for fruit production. Salt tolerant (0-20 ppt.) Suckers to form colonies. Can be planted near poultry house ventilation fans.
EUONYMUS, MANHATTAN *Euonymus kiautschovicus*	6 ft.	Moderate	High	Medium	Semi-evergreen foliage that may be damaged in cold winters. Not as susceptible to scale as other Euonymus.
HOLLY, JAPANESE *Ilex crenata* (var. 'Steeds')	8 ft.	Fast	High	High	Evergreen. Need male and female plants for fruit production. Tolerates partial shade. Excellent for high pollutant areas; can be planted near poultry house ventilation fans. Proven effective for odor control (passive ammonia absorption).
HOLLY, 'NELLIE STEVENS' *Ilex cornuta x aquifolium* (var. 'Nellie Stevens')	15 ft.	Fast	High	High	Evergreen. Need male and female plants for fruit production. Tolerates partial shade. Can be planted near poultry house ventilation fans. Proven effective for odor control (passive ammonia absorption).
WAXMYRTLE, SOUTHERN *Myrica cerifera*	10 ft.	Moderate	Medium	Medium	Evergreen. Need male and female plants for fruit production. Salt tolerant (0-10 ppt). Can be planted near poultry house ventilation fans.

Notes:

1. **Growth Rate:** Slow = less than 1 ft/year; Moderate = 1–2 ft/year; Fast = 2-3 ft/year; Very Fast = more than 3 ft/year.

2. Density: For an individual plant species, defined as the amount of space that is occupied by foliage, twigs, and branches and can be estimated by the amount of light that can be seen through the plant. Low density – 25-35% of space occupied by plant material (with 65-75% open space through which air can travel); Medium density – 40-60% of space occupied by plant material; High density - 60-80% of space occupied by plant material; Very High – more than 80% of space occupied by plant material. The overall density of a hedgerow is affected by the species selected, number of rows, and spacing between plants.

Table 3. Tree and Shrub Planting, Maintenance, Monitoring, and Evaluation Calendar. [1/]

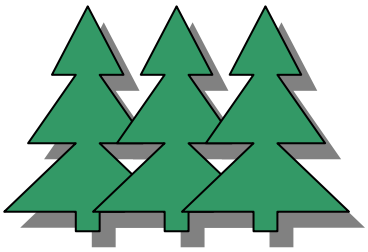
Activity	Recommended Time of Year											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Planting												
Seedlings (bareroot)												
Large Trees (containers)												
Maintenance												
Mulching												
Watering												
Monitoring [2/]												
Evaluation [3/]												

Notes:

1/ **Activities –** allowed during the time of year shaded in green.

2/ **Monitoring** – Pay special attention during these months to mulching and watering needs, weeds to be mowed/sprayed, disease or insect infestations that need treatment, or animal damage (e.g., deer browsing, vole or beaver cutting) that may be controllable. Monitor for a minimum of the first three growing seasons. Frequent monitoring will help you to identify problems early, before damage becomes extensive.

3/ **Evaluation** – Assess survival of the plants in the spring and the fall, and determine the need for replanting.



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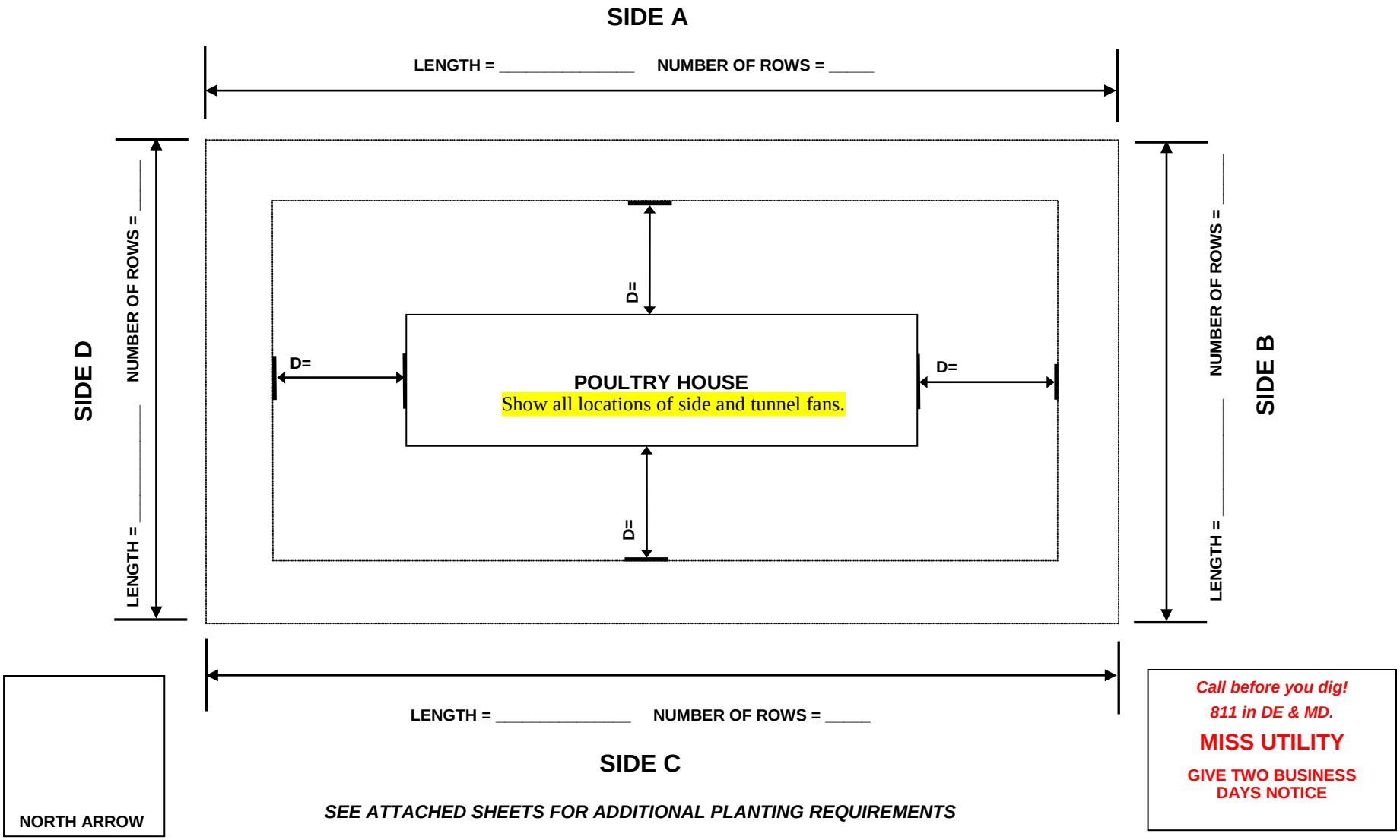
HEDGEROWS for POULTRY HOUSES
PLANTING PLAN

Name:	**Farm No.:**	**Tax Map:**
	Tract No.:	**Parcel:**
Address:	**Primary Purpose(s):**	**Recommended Planting Date(s):**
	☐ **Trapping Particulates**	
	☐ **Visual Screening**	
Assisted by:	☐ **Climate Control (wind/shading)**	
Date:		

Planting Location (identify by poultry house number & side)	Row No.	Row Length (LF)	Plant Species (list cultivar, if needed)	Spacing (LF) Between Plants Within Each Row	Spacing (LF) Between Rows	Total Quantities Needed

Additional Recommendations/Notes:

HEDGEROWS for POULTRY HOUSES PLAN VIEW			
Landowner Name:	**Poultry House No.:**	**Assisted By:**	**Date:**



SEE ATTACHED SHEETS FOR ADDITIONAL PLANTING REQUIREMENTS