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JUL 12 2004

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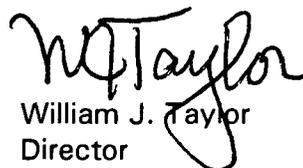
Dear Mr. Saric, Mr. Schneider, and Mr. Kurey:

**TRANSMITTAL OF THE DRAFT PADDYS RUN EAST NATURAL RESOURCE RESTORATION DESIGN PLAN**

Enclosed is the Draft Paddys Run East Natural Resource Restoration Design Plan (NRRDP). The NRRDP provides detailed design and specifications for conducting restoration activities within the Paddys Run East Project area. The Paddys Run East Project is scheduled to start after October 1, 2004.

Please contact Johnny Reising at (513) 648-3139 with any questions regarding this matter.

Sincerely,

  
William J. Taylor  
Director

FCP:Reising

Enclosure: As Stated



Mr. James A. Saric  
Mr. Tom Schneider  
Mr. Bill Kurey

cc w/enclosure:

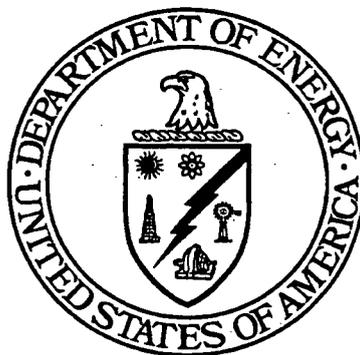
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**PADDYS RUN EAST  
NATURAL RESOURCE  
RESTORATION DESIGN PLAN**

**FERNALD CLOSURE PROJECT  
FERNALD, OHIO**



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**JULY 2004**

**U.S. DEPARTMENT OF ENERGY**

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## TABLE OF CONTENTS

	<u>Page</u>
Acronym List.....	iii
List of Figures .....	ii
List of Tables.....	ii
 <u>Sections</u>	
1.0 Introduction .....	1-1
2.0 Site Description .....	2-1
2.1 A2PII Forested Area .....	2-1
2.2 South Pine Plantation.....	2-1
2.3 A2PIII .....	2-2
3.0 Components of Restoration.....	3-1
3.1 A2PII Forested Area .....	3-1
3.2 South Pine Plantation.....	3-1
3.3 A2PIII .....	3-2
4.0 Field Implementation .....	4-1
4.1 Site Prep.....	4-1
4.1.1 Construction Area Boundaries, Access Points, and Staging Areas.....	4-1
4.1.2 Vegetation Clearing.....	4-2
4.1.2.1 Invasive Species Removal.....	4-2
4.1.2.2 Tree Chipping.....	4-2
4.1.2.3 Herbicide Application .....	4-3
4.1.3 Soil Amendments .....	4-3
4.2 Grading Activities.....	4-3
4.3 Vegetation Installation.....	4-3
4.3.1 Woody Vegetation.....	4-4
4.3.2 Seeding.....	4-4
4.3.3 Herbaceous Vegetation .....	4-5
4.4 Maintenance Activities .....	4-5
4.4.1 Watering.....	4-5
4.4.2 Deer Control.....	4-6
4.4.3 Invasive Species .....	4-6
5.0 Monitoring.....	5-1
6.0 Schedule .....	6-1
 References .....	 R-1

## APPENDICES

Appendix A	Planting Patch Pages
Appendix B	Planting Specifications
Appendix C	Seeding Specifications

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**LIST OF TABLES**

Table 3-1	Paddys Run East Master Plant List
Table 3-2	Paddys Run East Seedling Quantities
Table 3-3	Paddys Run East Master Seed List
Table 3-4	South Pine Plantation Herbaceous Plant List
Table 6-1	Paddys Run East Restoration Schedule

**LIST OF FIGURES**

Figure 1-1	Paddys Run East Restoration Area
Figure 2-1	Area 2, Phase II Forested Area & South Pine Plantation Restoration Areas
Figure 2-2	Area 2, Phase III Restoration Area
Figure 3-1	Area 2, Phase II Forested Area Planting plan
Figure 3-2	Area 2, Phase II South Pine Plantation Clearing and Planting Plan
Figure 3-3	Area 2, Phase III Planting & Seeding Plan

## ACRONYM LIST

A2PII	Area 2, Phase II Certification Area
A2PII	Area 2, Phase III Certification Area
LM	Legacy Management
NRRDP	Natural Resource Restoration Design Plan
NRT	Natural Resource Trustees
PPDD	Pilot Plant Drainage Ditch
SSOD	Storm Sewer Outfall Ditch
SWU	Southern Waste Units

## 1.0 INTRODUCTION

Paddys Run East is one of 11 ecological restoration projects implemented or planned at the Fernald Closure Project (FCP). Ecological restoration activities at the FCP are included as part of a tentative agreement for resolution of natural resource damage liability under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This Natural Resource Restoration Design Plan (NRRDP) provides the detailed design and specifications for conducting restoration activities within Paddys Run East.

The Paddys Run East project covers the majority of Area 2, Phase II (A2PII) and Area 2, Phase III (A2PIII). It primarily involves the area east of Paddys Run and south of the Pilot Plant Drainage Ditch, including the South Pine Plantation and the riparian corridor along the Storm Sewer Outfall Ditch (Figure 1-1). In addition to the planted pine plantation, the restoration area includes early to mid-successional forest, riparian communities, and former grazed pasture.

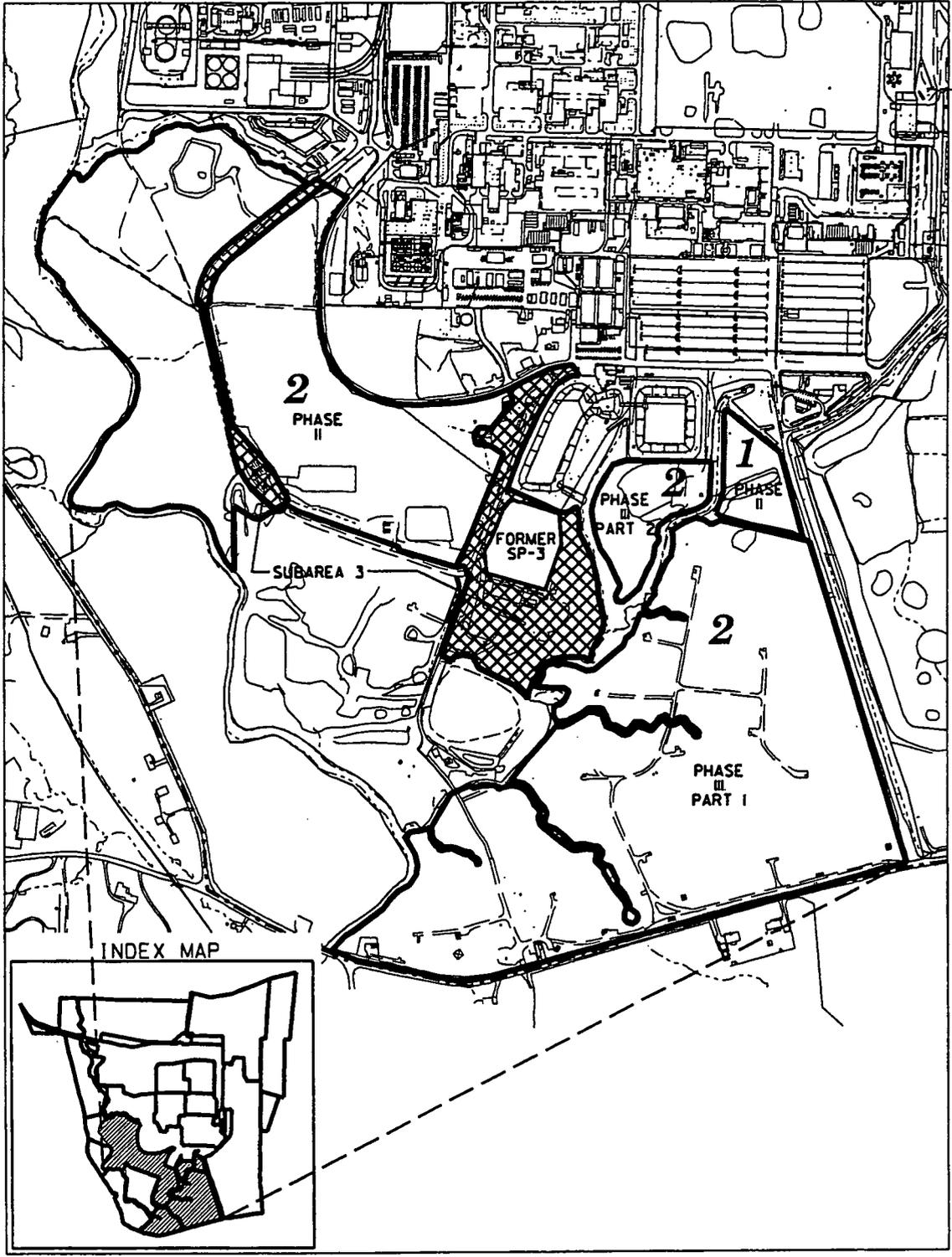
This project is consistent with the sitewide restoration goals set forth in the Natural Resource Restoration Plan (DOE 2002a). Restoration goals include the establishment of pre-settlement native communities, the establishment of native wildlife habitat, and the resolution of substantive regulatory-driven mitigation requirements. To achieve these goals, a conceptual restoration plan was developed in the NRRP and then refined and submitted as the Paddys Run East Natural Resource Conceptual Design Plan (DOE 2004). The conceptual design consists of removing the Southern Waste Units (SWU) haul road and wheel wash facility, utilizing graded and existing topography to create open water and wetland communities when possible, enhancing existing forest communities, clearing a portion of the South Pine Plantation and converting the area to deciduous forest, establishing several prairie communities east of the South Pines and along Willey Road, and expanding the riparian corridor along the Storm Sewer Outfall Ditch. Each of these efforts is discussed in more detail below.

It should be noted that several components of the conceptual restoration design will not be addressed in this NRRDP, due to revised remediation scheduling and implementation. First, the restoration of the Pilot Plant Drainage Ditch, if needed, will be conducted later as part of the Silos restoration effort. Second, clearing for the Silos Truck Staging Area is no longer needed. Lastly, A2PII Subarea 3 will not be remediated at this time. Therefore, the SWU haul road, wheel wash facility, the site shipping and receiving area, and a portion of the open area east of the South Pines will be delayed until existing infrastructure is removed and A2PII Subarea 3 is certified. These items are shown on Figure 1-1. They will be addressed in later designs or as a supplement to this NRRDP.

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STATE PLANNING COORDINATE SYSTEM 1983

380ATESS



LEGEND:

----- FEMP BOUNDARY

DRAFT

FIGURE 1-1. PADDYS RUN EAST RESTORATION AREA

## 2.0 SITE DESCRIPTION

As stated above, the Paddys Run East restoration project is divided into three main components; the A2PII forested area, the South Pine Plantation, and A2PIII. Each of these areas is discussed in more detail below.

### 2.1 A2PII Forested Area

A2PII occupies approximately 28 acres between Paddys Run and the South Pine Plantation (Figure 2-1). The area is primarily an undisturbed wooded corridor, with remedial activities limited to several "hot spot" excavations in 2003. The topography of A2PII represents an historic floodplain terrace. Portions of A2PII were floodplain communities at one time. However, Paddys Run has incised to the point that the stream is disconnected from its floodplain.

Vegetation within A2PII consists primarily of mid-successional forest. Typical overstory tree species include box elder (*Acer negundo*), hackberry (*Celtis occidentalis*), black cherry (*Prunus serotina*), sugar maple (*Acer saccharum*), red oak (*Quercus rubra*), red cedar (*Juniperus virginiana*), white ash (*Fraxinus Americana*), and sycamore (*Platanus occidentalis*). A portion of the South Pine Plantation is also found within A2PII. The understory and shrub layer is sparse, except where honeysuckle is invading. Other understory species include redbud (*Cercis Canadensis*) and Ohio buckeye (*Aesculus glabra*). The herbaceous layer is dominated by a variety of grasses and garlic mustard in some areas. Other species of note include mayapple (*Podophyllum peltatum*) and cutleaf toothwort (*Cardamine concatenata*). Grape vines (*Vitis sp.*) are common as well.

A Phase I cultural resource survey was conducted for A2PII in 1995. As a result, a prehistoric site was delineated and is shown on Figure 2-1. Restoration activities should avoid impacts to this area, since additional disturbance of the area could require further characterization and data recovery.

### 2.2 South Pine Plantation

The South Pine Plantation is also located in A2PII (Figure 2-1). The Pine Plantation is a monoculture stand of 33-year old Austrian (*Pinus nigra*) and white pine (*Pinus strobus*). The two species were planted in alternating blocks of rows, with 12-foot grass firebreaks in between each block. The present stand of trees is approximately 14 acres in size. The South Pine Plantation was originally larger, but a number of trees were cleared in the 1990s in order to maintain the site meteorological tower and to build the SWU haul road. The Austrian pines are slowly dying from *Diplodia* tip blight, which has infected onsite trees for some time. There is little understory or shrub layer within the blocks of white pines, as the dense coniferous canopy prevents the establishment of volunteer species. In the blocks of Austrian pines, the canopy gaps created from *Diplodia* infections have resulted in substantial understory growth in some areas, primarily honeysuckle (*Lonicera sp.*), grape vine, and multiflora rose (*Rosa multiflora*). The

herbaceous layer within the South Pines has not been characterized, but is expected to be similar to the North Pine Plantation, which was characterized in 2001. The relative frequency of native herbaceous species in the North Pines was approximately 75 percent. No single species dominated the herbaceous layer, but white snakeroot (*Eupatorium rugosum*) and Virginia creeper (*Parthenocissus cuneifolia*) were most common, with relative frequencies of 12.3 percent and 11.4 percent respectively (DOE 2003).

Several other communities are present in addition to the planted conifers. A six-acre open area east of the South Pines consists primarily of fescue (*Festuca sp.*) and other typical pasture grasses. Also, a 0.7-acre shallow open water basin is present in the southeast corner of the project area. This area originally contained the footprint for the SWU Non-Impacted Material Stockpile No. 2. After remediation was completed and the basin liner removed, the area was seeded with native grasses and forbs.

### 2.3 A2PIII

The portion of A2PIII to be restored occupies about 27 acres east and south of the SSOD (Figure 2-2). Remedial activities within the area have been limited to the installation of several groundwater extraction wells and a number of monitoring wells. The majority of this aquifer remediation infrastructure will remain after site closure, so ecological restoration activities within A2PIII will ensure that access to these wells.

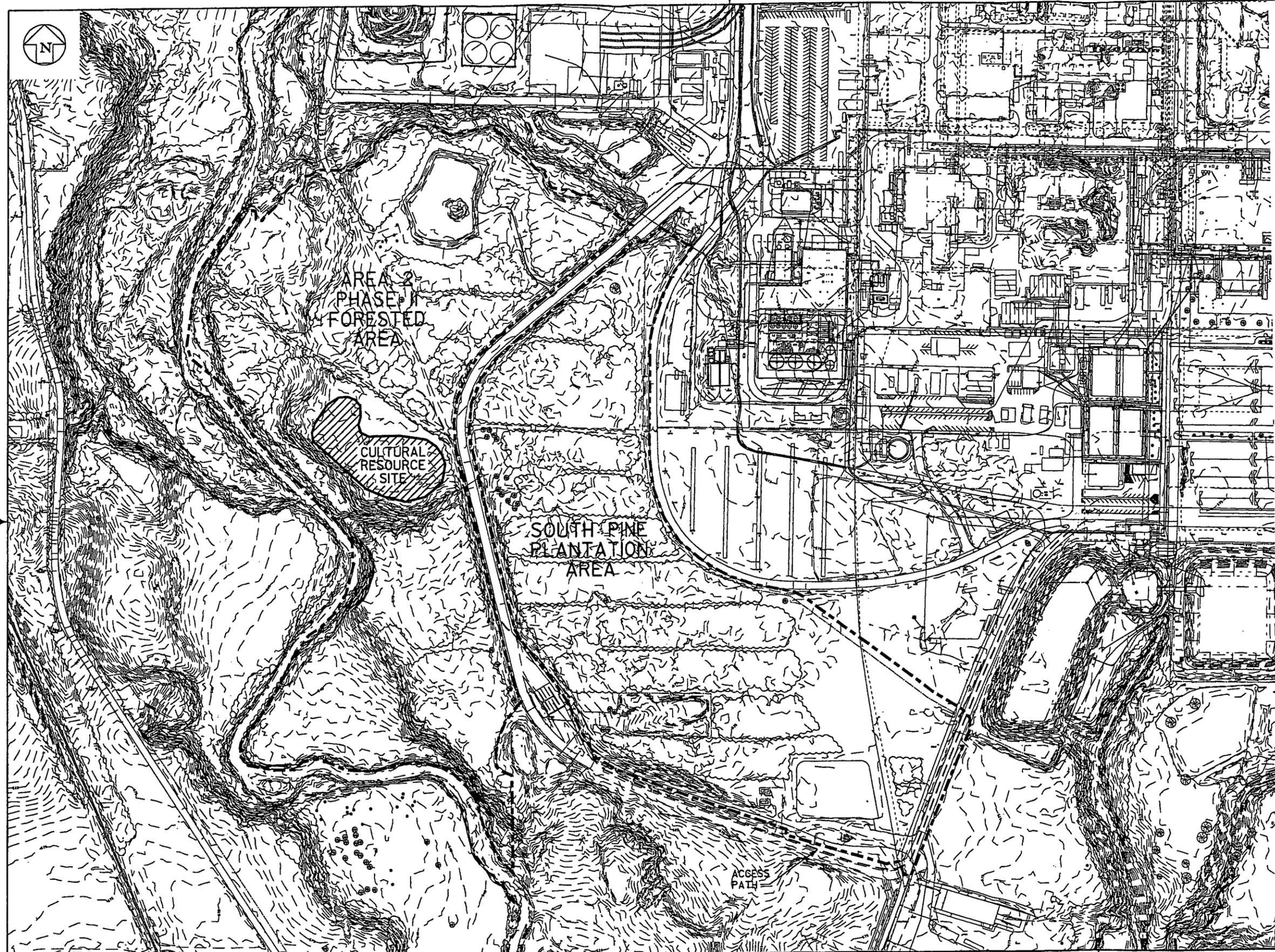
Vegetation within A2PIII consists primarily of former pasture, with an herbaceous layer of fescue grasses and weeds. Spring beauties (*Claytonia virginica*) and blue violet (*Viola sororia*) are present sporadically across the area.

A wooded corridor exists along the SSOD and several other smaller tributaries. Typical tree species include sycamore, walnut (*Juglans nigra*), Ohio buckeye, boxelder, sugar maple, bitternut hickory (*Carya cordiformis*), and American elm (*Ulmus Americana*). Several very large white oak (*Quercus alba*), tulip poplar (*Liriodendron tulipifera*), and shellbark hickory (*Carya laciniosa*) are present within the wooded corridor.

Since soil remediation was not required within A2PIII, the majority of the area has intact topsoil. Also, pH measurements across the area ranged from 6.5 to 7.0. Therefore, no soil amendments will be needed.

Some small areas within the former pasture appear poorly drained. These areas can probably be attributed to altered topography associated with several abandoned soil stockpiles. The stockpiles were generated during the installation of extraction wells and associated infrastructure across A2PIII. The soil piles have since revegetated and will be incorporated into the planting plan for the area.

Figure 2-1 OSD/F3 lnd8392 Friday May 14 2004 10:20:37 AM EDT



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Fernald Closure Project

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U.S. DEPARTMENT OF ENERGY

AREA 2, PHASE II  
FORESTED AREA & SOUTH PINE PLANTATIO  
RESTORATION AREAS

FIGURE 2-1

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Figure 2-2 OSD/F3 lind8392 Thursday May 20 2004 01:09:18 PM EDT



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CHECKED BY: RALPH LINDSEY  
DATE: 05/12/04

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Fernald Closure Project  
**FLUOR FERNALD, INC.**  
U.S. DEPARTMENT OF ENERGY

AREA 2, PHASE III  
RESTORATION AREA  
FIGURE 2-2  
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### 3.0 COMPONENTS OF RESTORATION

The Paddys Run East Natural Resource Conceptual Design Plan described the restoration plans for A2PII, A2PIII, and the South Pine Plantation (DOE 2004). This section provides the additional details necessary to implement ecological restoration in these areas.

#### 3.1 A2PII Forested Area

As stated in Section 2.1 above, the majority of A2PII consists of mid-successional forest. Therefore, restoration will involve enhancing the existing forest community. This will be accomplished in several ways. First, invasive species will be controlled throughout A2PII. Honeysuckle, multiflora rose, and grape vines will be removed mechanically and/or chemically. Cleared brush will be chipped and reused as woodchip mulch.

The second enhancement activity involves planting woody vegetation within and adjacent to the existing forest. Tables 3-1 and 3-2 list the plants to be installed within A2PII. The species list represents a mosaic of the beech-maple and oak-hickory forest templates that have been used at the FCP in previous restoration projects. The A8PII NRRDP provides a discussion regarding the development of these vegetation templates (DOE 2000). Since an intact canopy is present across much of A2PII, consideration will be given to the extent of species' shade tolerance when placing plants. Figure 3-1 shows the planting plan for the A2PII Forested Area.

Seeding activities will be limited to areas of disturbance and heavy invasives infestation, where the remaining herbaceous layer has been completely shaded out. In these areas, the forested seed mix listed in Table 3-3 will be used to re-establish herbaceous vegetation.

Several wildlife amenities will be installed across A2PII, in order to promote wildlife use of the area. Amenities will consist of multi-use wildlife boxes, which will provide nesting habitat for a variety of birds and mammals. Brush piles will also be constructed to provide small mammal cover.

#### 3.2 South Pine Plantation

Restoration of the South Pine Plantation will look very similar to the restoration of the North Pine Plantation (DOE 2002b). Figure 3-2 shows the extent of clearing that will be conducted in the South Pine Plantation. About one half of the existing pines will be cleared, and the area will be replanted in deciduous forest. Approximately 2.9 acres of white pine "islands" will be left in place. The remaining portion of the South Pines (approximately 3.9 acres) will be selectively thinned through removal and

girdling. In addition, all honeysuckle, multiflora rose, and grape vines will be removed from both thinned areas and the remaining stands of white pine. Also, vernal pools will be established where possible, and tallgrass prairie grasses and wildflowers will be established adjacent to and within portions of the South Pines.

Once all clearing and thinning activities are completed, the South Pine Plantation will be planted with native woody vegetation. Figure 3-2 lays out the planting patches for the South Pines. Tables 3-1 and 3-2 list the species and quantities that will be planted within each patch. Again, the beech-maple/oak-hickory forest template will be used for the South Pines. Shade tolerant species will be placed within thinned areas.

Where possible, several vernal pools will be graded in the South Pines. Site topography and soil conditions will be observed after tree clearing is complete. If sufficient clay and drainage is present, vernal pools will be created pursuant to the guidelines established by Biebighauser (2004). Table 3-4 lists the herbaceous plants that will be installed within vernal pools and other wetlands within the South Pines.

Figure 3-2 shows the location of a restored tallgrass prairie within the South Pine Plantation. The remainder of the area will be seeded following certification of the Subcontractor Area. Table 3-3 lists the grasses and forbs to be seeded. This list is consistent with the On-Site Disposal Facility (OSDF) seeding specification. Planting areas within the South Pines will be seeded with the OSDF interim mix or with the woodland mix, where applicable (Table 3-3).

Like A2PII, wildlife amenities will be installed at several locations within the South Pines. In addition to multi-use wildlife boxes and brush piles, wood duck boxes may be placed adjacent to vernal pools.

### 3.3 A2PIII

Restoration of A2PIII will primarily involve expanding the wooded corridor along the SSOD and establishing tallgrass prairie across a portion of the former pasture area. Figure 3-3 shows the location of planting patches and seeding areas. Tables 3-1 and 3-2 list the plant species and quantities to be planted in each patch. The site beech-maple/oak-hickory templates will be used for A2PIII. Planting activities will be conducted in order to avoid impacts to aquifer restoration wells and associated infrastructure. Table 3-3 lists the species to be seeded within A2PIII. The majority of the area will be seeded into mesic tallgrass prairie. A wet prairie mix may also be used in several small areas. Existing bluebird boxes will be maintained or relocated within A2PIII in order to maximize positioning around prairie areas.

Table 3-1  
Paddys Run East Master Plant List

ID	Species	Common Name	Form	Function	Coefficient of Wetness	Shade Tolerance	Quantities		
							A2PII Forested Area	South Pines	A2PIII
A	<i>Acer nigrum</i>	Black Maple	canopy	cover	0	low	44	67	0
B	<i>Acer rubrum</i>	Red Maple	canopy	cover	0	high	0	0	63
C	<i>Acer saccharinum</i>	Silver Maple	canopy	cover	-3	intermediate	4	7	10
D	<i>Acer saccharum</i>	Sugar Maple	canopy	cover, mast	4	high	223	342	485
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	cover	2	low	70	105	91
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	cover, mast	0	high	79	119	106
G	<i>Carya ovata</i>	Shagbark Hickory	canopy	cover, mast	4	intermediate	9	14	15
H	<i>Fagus grandifolia</i>	Beech	canopy	cover, mast	3	high	79	121	169
I	<i>Fraxinus americana</i>	White Ash	canopy	cover	3	low	48	73	70
J	<i>Fraxinus pennsylvanicum</i>	Green Ash	canopy	cover	-3	high	11	17	18
K	<i>Fraxinus quadrangulata</i>	Blue Ash	canopy	cover, diversity	ni	na	3	5	5
L	<i>Juglans cinerea</i>	Butternut	canopy	diversity	2	low	7	11	7
M	<i>Juglans nigra</i>	Black Walnut	canopy	diversity, mast	3	low	36	55	37
N	<i>Linodendron tulipifera</i>	Tulip Poplar	canopy	cover, aesthetics	3	low	7	11	12
O	<i>Platanus occidentalis</i>	Sycamore	canopy	cover, aesthetics	-2	intermediate	0	0	14
P	<i>Populus deltoides</i>	Cottonwood	canopy	cover, erosion	0	low	0	0	9
Q	<i>Prunus serotina</i>	Black Cherry	canopy	fruit	3	low	24	37	40
R	<i>Quercus alba</i>	White Oak	canopy	cover, mast	4	intermediate	71	108	109
S	<i>Quercus bicolor</i>	Swamp White Oak	canopy	cover, mast	-4	intermediate	2	2	13
T	<i>Quercus coccinea</i>	Scarlet Oak	canopy	cover, mast	ni	low	5	8	11
U	<i>Quercus inbricaria</i>	Shingle Oak	canopy	diversity, mast	0	na	10	14	13
V	<i>Quercus macrocarpa</i>	Bur Oak	canopy	diversity, mast	1	intermediate	1	1	62
W	<i>Quercus muehlenbergii</i>	Chingapin Oak	canopy	diversity, mast	ni	low	10	16	15
X	<i>Quercus palustris</i>	Pin Oak	canopy	cover	-3	low	1	1	2
Y	<i>Quercus prinus</i>	Chestnut Oak	canopy	diversity	5	intermediate	4	7	1
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	cover, mast	4	intermediate	70	105	118
AA	<i>Quercus shumardii</i>	Shumard Oak	canopy	diversity, mast	-1	low	0	0	26
AB	<i>Quercus velutina</i>	Black Oak	canopy	cover, mast	ni	intermediate	19	28	22
AC	<i>Tilia americana</i>	Basswood	canopy	cover, aesthetics	3	high	23	36	28
AD	<i>Ulmus rubra</i>	Slippery Elm	canopy	cover	0	high	3	5	3
AE	<i>Aesculus glabra</i>	Ohio Buckeye	understory	diversity	2	high	4	6	7
AF	<i>Asimina triloba</i>	Pawpaw	understory	fruit, diversity	2	high	7	11	4
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	diversity, mast	0	high	22	38	21
AH	<i>Cercis canadensis</i>	Redbud	understory	cover, aesthetics, edge	4	high	15	23	13
AI	<i>Cornus alternifolia</i>	Alternate-leaf dogwood	understory	diversity	ni	high	2	3	0
AJ	<i>Cornus drummondii</i>	Roughleaf Dogwood	understory	cover, edge	0	intermediate	3	5	2
AK	<i>Cornus florida</i>	Flowering Dogwood	understory	aesthetics	4	high	9	13	11
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	cover	ni	high	22	35	20
AM	<i>Crataegus crus-galli</i>	Cockspur Hawthorne	understory	cover, diversity	ni	low	4	8	18
AN	<i>Crataegus mollis</i>	Downy Hawthorne	understory	cover	3	na	11	18	18
AO	<i>Euonymus atropurpureus</i>	Eastern Wahoo	understory	aesthetics, diversity	3	na	10	18	0

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Table 3-1  
Paddys Run East Master Plant List

ID	Species	Common Name	Form	Function	Coefficient of Wetness	Shade Tolerance	Quantities		
							A2PII Forested Area	South Pines	A2PIII
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	diversity	4	high	22	38	21
AQ	<i>Prunus americana</i>	American Plum	understory	diversity	4	low	13	22	17
AR	<i>Sassafras albidium</i>	Sassafras	understory	diversity	4	low	2	3	2
AS	<i>Alnus serrulata</i>	Smooth Alder	shrub	erosion	-5	low	2	6	15
AT	<i>Amelanchier arborea</i>	Downy Serviceberry	shrub	fruit, aesthetics	1	high	15	25	12
AU	<i>Ceanothus americanus</i>	New Jersey Tea	shrub	diversity	ni	high	2	3	2
AV	<i>Celastrus scandens</i>	Bittersweet	shrub	diversity	4	high	7	11	8
AW	<i>Cephalanthus occidentalis</i>	Buttombush	shrub	cover, erosion	-5	high	12	20	0
AX	<i>Cornus amomum</i>	Silky Dogwood	shrub	cover, erosion	-3	intermediate	11	19	27
AY	<i>Corylus americana</i>	Hazelnut	shrub	diversity	4	intermediate	3	5	34
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	cover	1	intermediate	24	42	85
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	diversity	3	intermediate	9	15	56
BB	<i>Ilex verticillata</i>	Winterberry	shrub	aesthetics	-4	intermediate	6	11	0
BC	<i>Lindera benzoin</i>	Spicebush	shrub	cover	-2	intermediate	17	30	60
BD	<i>Physocarpus opulifolius</i>	Ninebark	shrub	diversity, edge	-2	low	6	10	25
BE	<i>Rhus aromatica</i>	Fragrant Sumac	shrub	cover, aesthetics	ni	na	6	11	19
BF	<i>Rhus glabra</i>	Smooth Sumac	shrub	aesthetics, edge	ni	low	6	11	22
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	aesthetics	ni	intermediate	26	48	38
BH	<i>Rosa carolina</i>	Carolina Rose	shrub	aesthetics	5	na	10	17	10
BI	<i>Rosa palustris</i>	Swamp Rose	shrub	aesthetics	-5	high	5	10	0
BJ	<i>Rosa setigera</i>	Prairie Rose	shrub	diversity	3	low	28	49	38
BK	<i>Rubus occidentalis</i>	Black Raspberry	shrub	fruit, edge	ni	intermediate	9	15	25
BL	<i>Salix discolor</i>	Pussy Willow	shrub	cover, edge	-3	high	7	13	29
BM	<i>Sambucus canadensis</i>	Elderberry	shrub	erosion, fruit	-2	low	37	63	44
BN	<i>Spiraea alba</i>	Meadowsweet	shrub	diversity	-4	intermediate	7	13	0
BO	<i>Staphylea trifolia</i>	Bladdernut	shrub	diversity	0	na	10	17	11
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	diversity	5	intermediate	27	46	33
BQ	<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	shrub	diversity, edge	5	high	14	25	16
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	cover	3	high	25	43	54
BS	<i>Zanthoxylum americanum</i>	Prickly Ash	shrub	diversity, edge	ni	na	2	3	7
BT	<i>Campsis radicans</i>	Trumpet Creeper	vine	aesthetics, edge	0	low	8	13	11
Totals:							1,350	2,150	2,409

Coefficient of Wetness and Shade Tolerance evaluations were obtained from the U.S. Department of Agriculture Plants Database (USDA 2004)

ni = no indicator  
na = not available

Table 3-2  
Paddys Run East Seedling Quantities

Species	Common Name	Quantities		
		A2PII Forested Area	South Pines	A2PIII
<i>Acer rubrum</i>	Red Maple	24	40	0
<i>Acer saccharinum</i>	Silver Maple	24	72	240
<i>Acer saccharum</i>	Sugar Maple	336	552	1,664
<i>Carya cordiformis</i>	Bitternut Hickory	120	168	160
<i>Carya laciniosa</i>	Shellbark Hickory	120	168	160
<i>Carya ovata</i>	Shagbark Hickory	120	168	160
<i>Cercis canadensis</i>	Redbud	24	24	0
<i>Fagus grandifolia</i>	Beech	336	440	816
<i>Fraxinus americana</i>	White Ash	240	312	336
<i>Juglans nigra</i>	Black Walnut	0	312	432
<i>Juglans nigra</i>	Black Walnut	240	96	0
<i>Liriodendron tulipifera</i>	Tulip Poplar	48	0	160
<i>Prunus serotina</i>	Black Cherry	80	160	160
<i>Quercus alba</i>	White Oak	144	288	456
<i>Quercus rubra</i>	Northern Red Oak	200	336	456
<i>Tilia americana</i>	American basswood	144	264	0

Table 3-3  
Paddys Run East Master Seed List

Species	Common Name	Coefficient of Wetness	Mesic	Wet	Forest	Interim
<b>Graminoids (lb/ac unless otherwise noted)</b>						
<i>Andropogon gerardi</i>	big bluestem	1	3	3		
<i>Andropogon scoparius</i>	little bluestem	4	2			
<i>Bouteloua curtipendula</i>	side-oats grama	5	0.5			
<i>Calamagrostis canadensis</i>	blue joint grass	-5		0.5		
<i>Carex hystericina</i>	porcupine sedge	-5		1 oz/ac		
<i>Carex vulpinoidea</i>	fox sedge	-5		1 oz/ac		
<i>Elymus canadensis</i>	Canada wild rye	2	25	25		20
<i>Elymus riparius</i>	riverbank wild rye	-3			0.75	
<i>Elymus virginicus</i>	Virginia wild rye	-2		5	6.75	
<i>Lolium multiflorum</i>	annual rye	ni				20
<i>Panicum virgatum</i>	switchgrass	-1	0.5	0.5		
<i>Phleum pratense</i>	Timothy	3				5
<i>Scirpus atrovirens</i>	dark green bulrush	-5		1 oz/ac		
<i>Sorghastrum nutans</i>	indian grass	2	2			
<i>Spartina pectinata</i>	prairie cordgrass	-4		1		
<i>na</i>	Regreen	ni	5	5		40
<b>Forbs (1.5 lb/ac uniform mix unless otherwise noted)</b>						
<i>Anemone virginiana</i>	thimbleweed	ni			10 oz/ac	
<i>Aquilegia canadensis</i>	eastern columbine	0			1 oz/ac	
<i>Asclepias incarnata</i>	swamp milkweed	-5		x		
<i>Asclepias tuberosa</i>	butterflyweed	5	x			
<i>Aster cordifolius</i>	blue wood aster	ni			4 oz/ac	
<i>Aster divaricatus</i>	white wood aster	ni			2 oz/ac	
<i>Aster laevis</i>	smooth aster	5	x		1.2 lb/ac	
<i>Aster macrophyllus</i>	bigleaf aster	ni			5 oz/ac	
<i>Aster novae-angliae</i>	New England aster	-3		x		
<i>Baptisia australis</i>	blue false indigo	5	x			
<i>Cassia fasciculata</i>	partridge pea	4	x			2 oz/ac
<i>Cassia hebecarpa</i>	wild senna	-3		x		
<i>Caulophyllum thalictoides</i>	blue cohosh	ni			7 oz/ac	
<i>Cimicifuga racemosa</i>	black cohosh	ni			7 oz/ac	
<i>Echinacea purpurea</i>	purple coneflower	5	x			
<i>Eryngium yuccifolium</i>	rattlesnake master	-1	x			
<i>Eupatorium maculatum</i>	spotted Joe pye weed	-5		x		
<i>Eupatorium purpureum</i>	sweet Joe pye-weed	0	x			
<i>Eupatorium rugosum</i>	white snakeroot	4			2 oz/ac	
<i>Geum laciniatum</i>	rough avens	-1			1.5 lb/ac	
<i>Helianthus grosseserratus</i>	sawtooth sunflower	ni				
<i>Heliopsis helianthoides</i>	Ox-eye sunflower	5	x		1 lb/ac	
<i>Lespedeza capitata</i>	round-headed bush clover	3	x			
<i>Lobelia cardinalis</i>	cardinal flower	-5		x		
<i>Lobelia siphilitica</i>	great blue lobelia	-4		x		
<i>Monarda fistulosa</i>	bergamot	3	x			
<i>Penstemon grandiflorus</i>	beardtongue	5	x			
<i>Ratibida pinnata</i>	yellow coneflower	5	x	x		
<i>Rudbeckia hirta</i>	black-eyed Susan	3	x			2 oz/ac
<i>Smilacina racemosa</i>	false Solomon's seal	4			1.4 lb/ac	
<i>Solidago caesia</i>	blue-stemmed goldenrod	3			2 oz/ac	
<i>Solidago rigida</i>	stiff goldenrod	4	x			
<i>Tradescantia ohioensis</i>	spiderwort	2	x			
<i>Verbena hastata</i>	blue vervain	-4		x		
<i>Verbena stricta</i>	hoary vervain	5	x			

Coefficient of Wetness values were obtained from the U.S. Department of Agriculture Plants Database (USDA 2004)

ni = no indicator

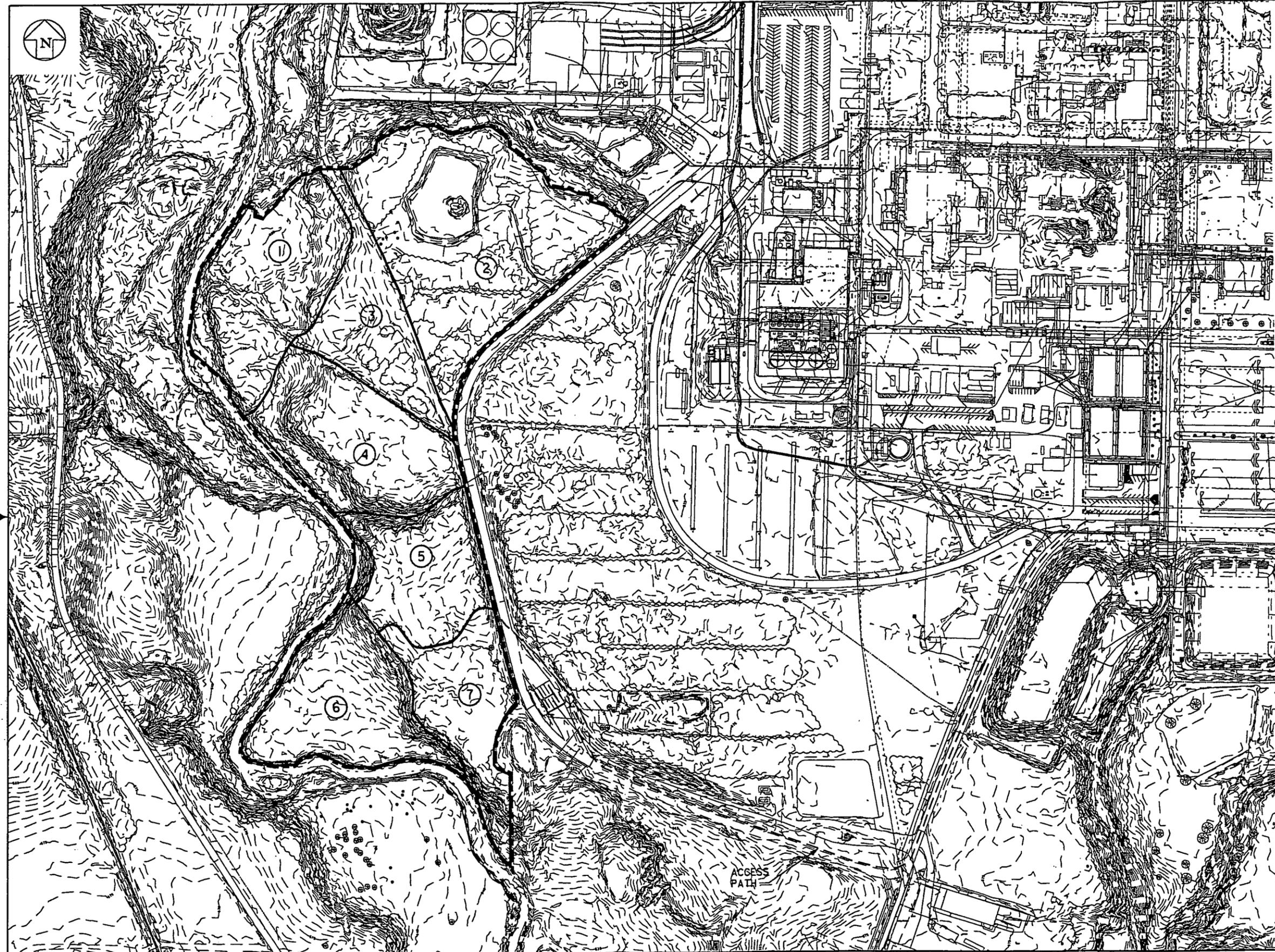
000016

**Table 3-4**  
**South Pine Plantation Herbaceous Plant List**

Species	Common Name	Form	Quantity
<i>Carex comosa</i>	bristly sedge	graminoid	49
<i>Carex lacustris</i>	lake sedge	graminoid	49
<i>Carex lurida</i>	lurid sedge	graminoid	49
<i>Carex vulpinoidea</i>	fox sedge	graminoid	49
<i>Schoenoplectus acutus</i>	hardstem bulrush	graminoid	49
<i>Schoenoplectus tabernaemontanii</i>	softstem bulrush	graminoid	49
<i>Scirpus atrovirens</i>	dark green bulrush	graminoid	49
<i>Scirpus cyperinus</i>	woolgrass	graminoid	49
<i>Spartina pectinata</i>	prairie cordgrass	graminoid	49
<i>Acorus calamus</i>	sweet flag	forb	49
<i>Asclepias incarnata</i>	swamp milkweed	forb	49
<i>Helianthus grosseserratus</i>	sawtooth sunflower	forb	49
<i>Lobelia cardinalis</i>	cardinal flower	forb	49
<i>Lobelia siphilitica</i>	great blue lobelia	forb	49
<i>Sparganium eurycarpum</i>	giant burreed	forb	49

Total: 735

Figure3-1 OSD/F3 lnd8392 Thursday May 13 2004 11:03:45 AM EDT



PLANTING PLAN TABLE	
PLANTING AREA	ACRES
①	4.07 ACRES
②	7.34 ACRES
③	2.68 ACRES
④	4.04 ACRES
⑤	2.99 ACRES
⑥	3.67 ACRES
⑦	2.64 ACRES

**PRELIMINARY**  
**000018**

NO.	REVISIONS	DATE	DRN. BY	APPD. NO.	REVISIONS	DATE	DWL BY	APPD.	REF. DWG. NO.

NOTE:  
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MANAGEMENT  
DRAWING

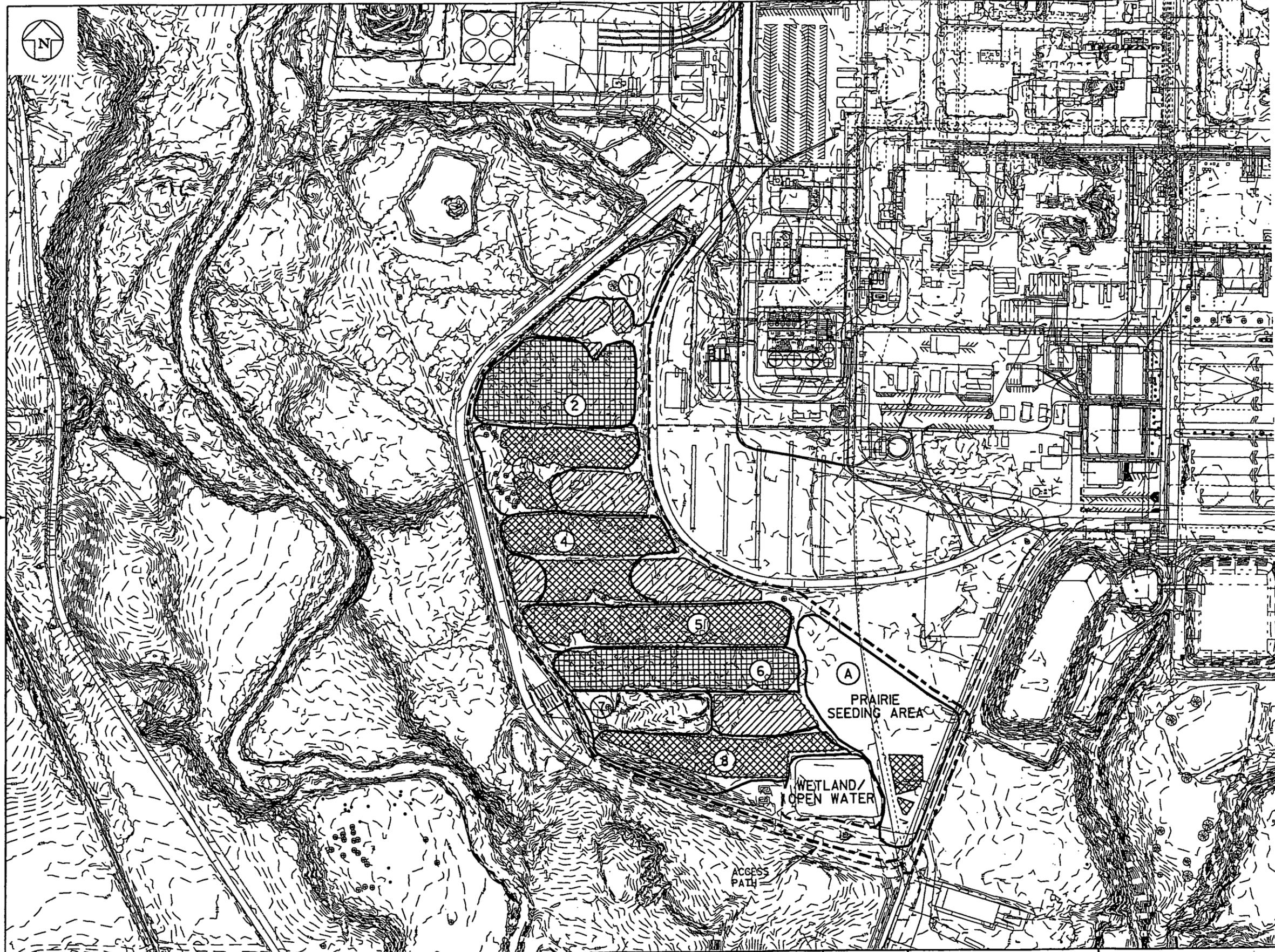
APPROVALS	
CIVIL & STR.	SAFETY ENG.
ELECTRICAL	MAINTENANCE
ENGINEER	USE PROTECT.
INSTRUMENTAL	WASTE MANAG.
MECHANICAL	SECURITY
	PROJECTS
CHECKED	
APPROVED	

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**FLUOR FERNALD, INC.**  
U.S. DEPARTMENT OF ENERGY

AREA 2, PHASE II  
FORESTED AREA PLANTING PLAN

FIGURE 3-1

Figure 3-2 OSD/F3 lnd8392 Friday May 14 2004 02:51:25 PM EDT



SEEDING ONLY TABLE	
SEEDING AREA	ACRES
(A)	3.16 ACRES

PLANTING PLAN TABLE	
PLANTING AREA	ACRES
①	0.83 ACRES
②	2.31 ACRES
③	1.75 ACRES
④	2.12 ACRES
⑤	2.06 ACRES
⑥	1.91 ACRES
⑦	0.97 ACRES
⑧	1.81 ACRES

**LEGEND**

- PINES TO REMAIN
- PINES TO BE CLEARED
- PINES TO BE SELECTIVELY THINNED/GIRDLED

PINES TO REMAIN  
2.90 ACRES

REMOVED PINES  
5.98 ACRES

SELECTIVE THINNING  
3.91 ACRES

**PRELIMINARY**  
**000019**

NO.		REVISIONS		DATE/DWN. BY/APPD. NO.		REVISIONS		DATE/DWN. BY/APPD. REF. DWG. NO.	
NOTE: FLUOR FERNALD CAD/DRAWING DO NOT REVISE MANUALLY.									
CONFIGURATION DRAWING					APPROVALS				
CIVIL & STR. ELECTRICAL ENGINEER INSTRUMENT MECHANICAL					SAFETY ENG. MAINTENANCE FIRE PROTECT. WASTE MANAG. SECURITY PROJECTS				
CHECKED APPROVED					DATE				

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AREA 2, PHASE II  
SOUTH PINE PLANTATION  
CLEARING AND PLANTING PLAN

FIGURE 3-2

FILE NAME: osdf/Poddy's Run/Fig3-2.dgn



SEEDING ONLY TABLE	
SEEDING AREA	ACRES
(A)	7.33 ACRES
(B)	10.00 ACRES

PLANTING PLAN TABLE	
PLANTING AREA	ACRES
(1)	1.26 ACRES
(2)	1.55 ACRES
(3)	1.80 ACRES
(4)	.74 ACRES
(5)	1.07 ACRES
(6)	1.21 ACRES
(7)	1.31 ACRES
(8)	.65 ACRES

**PRELIMINARY**  
000020

NO.	REVISIONS	DATE	DRN. BY	APPD. NO.	REVISIONS	DATE	DRN. BY	APPD. NO.	REF. DWG. NO.

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CONFIGURATION  
DRAWING  
DATE: 05/12/04  
DRAWN BY: LINDSEY

APPROVALS	
CIVIL & STR.	SAFETY ENG.
ELECTRICAL	MAINTENANCE
ENGINEER	TRAC PROTECT.
INSTRUMENT	WASTE MANAG.
MECHANICAL	SECURITY
CHECKED	PROJECTS
APPROVED	

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U.S. DEPARTMENT OF ENERGY

AREA 2, PHASE III  
PLANTING & SEEDING PLAN  
FIGURE 3-3

## 4.0 FIELD IMPLEMENTATION

This section describes the activities that will be undertaken to implement the ecological restoration components discussed above. There are four main phases of implementation; site prep, grading activities, vegetation installation, and maintenance activities. At this time, only minimal grading activities are required. Once A2PII Subarea 3 is certified, grading will be needed to construct an open water basin within the footprint of the SWU wheel wash facility and haul road. However, these activities are outside the scope of this NRRDP. An addendum to this NRRDP will be submitted that details restoration of A2PII Subarea 3 once certification is complete.

Field work (except South Pines clearing and chipping) will be conducted by Fluor Fernald Building Trade personnel. All activities will be undertaken in accordance with Module 1 and 2 of the Soils Excavation and Onsite Disposal Facility Construction Work Activities Traveler. This document describes the health and safety requirements for all restoration activities at the FCP. Field personnel will be briefed on the Traveler modules as well as this NRRDP prior to commencement of field activities. The project Restoration Ecologist will provide technical direction and oversight of field personnel.

### 4.1 Site Prep

Site prep involves all the activities necessary to prepare restoration areas for plant installation. Activities include the establishment of construction boundaries, access points, and staging areas, clearing vegetation, and the addition of soil amendments. Each of these items is discussed in more detail below.

#### 4.1.1 Construction Area Boundaries, Access Points, and Staging Areas

Figures 3-1 through 3-3 show the location of construction area boundaries, access points, and staging areas. The main access into all three restoration areas will be the South Field Access Road. The SWU haul road is currently only open to one way traffic heading south from the Silos Area. During restoration, field personnel will be permitted to travel northbound on the haul road in order to access portions of A2PII and the South Pine Plantation.

Staging areas for material and equipment will be established in several locations. Staging areas for the SWU restoration effort may be reused for Paddys Run East. The SWU woodchip stockpile area is an ideal location for South Pines chipping activities. However, to avoid double handling woodchips, several additional satellite storage areas may be used as well. Containerized and bare root plant nursery stock will not be staged within the Paddys Run East restoration area. In fall 2004, four separate restoration projects will be underway. A central plant staging area will be established near T-139. Daily planting

assignments for the various restoration projects will be distributed from this central staging area. Other materials, such as mulch, fencing, etc. will usually be stored at the restoration jobsite. Seed will be stored in a sealed Sea/Land container adjacent to the Restoration equipment shed on the old North Access Road.

#### 4.1.2 Vegetation Clearing

Clearing activities are an important component of restoration within Paddys Run East. Each of the three restoration areas will require some form of clearing prior to vegetation establishment. In the A2PII Forested Area, invasive species will be removed. Restoration of the South Pines involves the clearing of approximately 50 percent of all existing pines. Cool season grasses across A2PIII will need to be eliminated before prairie seeding is undertaken. Each of these activities is discussed in more detail below.

##### 4.1.2.1 Invasive Species Removal

As stated above, honeysuckle, multiflora rose, and grape vine will be removed within A2PII. Accessible areas will be cleared with a "Tree Terminator" skid steer attachment. The Tree Terminator shears vegetation close to the ground and immediately applies Garlon herbicide to prevent resprouting. Most areas within A2PII will be accessible to a skid steer loader. Inaccessible areas and the cultural resource site will be cleared by hand using the "lop and squirt" method. If clearing occurs when plants are dormant, glyphosate herbicide will be applied to foliage following reprot. Care will be taken to minimize disturbance to existing soil conditions. Only low ground pressure equipment will be used within the project area. Cleared vegetation will be consolidated and removed from A2PII by hand or with a grappler attachment on a skid steer loader.

##### 4.1.2.2 Tree Chipping

Figure 3-2 shows the extent of clearing that will be conducted in the South Pine Plantation. About six acres of pines will be cleared. Most of the trees to be cleared are Austrian pines, which are already stressed due to the *Diplodia* tip blight. Subcontract personnel will be used to conduct clearing activities. All cleared vegetation will be mechanically removed with a feller/buncher. Downed trees will then be consolidated and chipped at least one central location within A2PII. The resulting woodchips will be reused as mulch around planted vegetation. For thinning areas, a feller/buncher will be used to clear accessible trees. Inaccessible areas will have a select umber of trees girdled. Girdling is a process of killing woody vegetation by removing a band of bark completely around the tree or shrub. Approximately 50 percent of the trees within thinning areas will be cleared or girdled.

#### 4.1.2.3 Herbicide Application

About 17 acres of former pasture will be converted to prairie within A2PIII (Figure 3-3). Another six acres will be established east of the South Pines (Figure 3-2). The presence of cool season grasses and weeds will be minimized prior to seeding. Glyphosate herbicide (Roundup or equivalent) is the primary method for eliminating herbaceous vegetation at the FCP. Field personnel will spray several applications of glyphosate herbicide in the growing season prior to seeding. To prepare for the first application of herbicide, existing vegetation will be mowed and, if necessary, raked. Glyphosate herbicide will be applied at a rate of one quart per acre. Ammonia sulfate may be added to the herbicide mixture in order to increase its efficiency (IDNR 2004).

#### 4.1.3 Soil Amendments

The need for soil amendments is limited within Paddys Run East. Very little remediation has taken place, so topsoil is intact across the area. Measurements of pH across the project area demonstrate that soil conditions are neutral. Soil cores were taken at each pH sampling location. Sufficient topsoil was observed at all locations. Also, since little remediation took place, soil compaction is negligible.

#### 4.2 Grading Activities

As stated above, current grading activities for Paddys Run East are minimal. Several small vernal pools will be established within the South Pine Plantation. The size and location of the vernal pools will be determined in the field following clearing activities. The design and construction guidelines set forth by Biebighauser (2004) will be used. These methods call for the establishment of a shallow (one to three foot deep), irregularly shaped basin with a very gradual slope (at least a 10 to one). Such design requirements result in vernal pools that will range in size from 20 to 60 feet in diameter. An attempt will be made to place vernal pools within shaded areas. Construction involves building a dam at a downgradient location and compacting clay subsoil to ensure water retention. Topsoil is then placed back on top of the clay.

#### 4.3 Vegetation Installation

The establishment of native vegetation is a primary goal of this NRRDP. This will be accomplished in several ways. Container grown and bare root trees and shrubs will be planted. Native grasses and wildflowers will be seeded across prepared seedbeds. Lastly, herbaceous wetland plants will be installed within vernal pools and around existing wetland features. Implementation of these three methods is discussed in more detail below.

#### 4.3.1 Woody Vegetation

Planting activities involve the establishment of trees and shrubs across the project area. All revegetation activities will be conducted pursuant to the densities documented in the NRRP (DOE 2002a). Densities for areas amenable to planting include 160 trees/acre, 90 shrubs/acre, and 400 seedlings/acre. In some areas where existing overstory vegetation is already present, such as A2PII and the thinned areas of the South Pines, these densities will be roughly cut in half.

Woody plants will be installed in the same manner as other ecological restoration projects at the FCP. Each restoration area will be divided into smaller planting patches (Appendix A). Each planting patch will be laid out in the field and color-coded. The plants themselves will be staged at a central location and tagged with a corresponding colored patch code. Field personnel will then simply match the plant/patch codes and install the plant pursuant to the planting specifications in Appendix B. This "random patch" method allows the restoration ecologist to strategically place specific species based on its habitat requirements, distribution patterns, exposure, topography, deer pressure, hydrology, soils, etc.

Bare-root seedlings will not be individually "flagged and tagged." Instead, the restoration ecologist will group the seedlings by patch and instruct field personnel to randomly distribute the seedlings within the patch area. Seedlings will also be installed pursuant to the specifications in Appendix B.

All plant material will be procured from local sources, if possible. All trees shall be at least one-gallon container size, grown in "spin out" containers to prevent root binding. Shrubs must also be grown in spin out containers, and must be at least 1 foot tall. Seedlings may be container-grown or bare root. Certain species may not be available locally, if at all. The restoration ecologist will determine the appropriate substitution for a plant. The function of the tree as listed in Table 3-1 will be used as a guide to determining substitutions.

#### 4.3.2 Seeding

All prairie areas will be seeded pursuant to the seeding specification (Appendix C). As stated in Section 4.1.2.3 above, areas will be seeded following several applications of glyphosate herbicide. Prairie areas will be seeded in an upland mesic grass and forb mix, with the exception of several small wet areas within A2PIII. A wet prairie grass and forb mix will be seeded within these areas. The wet mix will also be used in and around constructed vernal pools in the South Pines.

If necessary, forest areas will be seeded following clearing of invasives. Field personnel will seed disturbed areas within A2PII and the South Pines with the woodland seed mix in Table 3-3. A seed drill

will be used where possible. Areas inaccessible to the seed drill will be hand broadcast. Open planting patches across Paddys Run East will be seeded with the site interim mix, where applicable (Table 3-3).

#### 4.3.3 Herbaceous Vegetation

The use of herbaceous plants will be limited to vernal pools and existing wetland features within the South Pines. Table 3-4 lists the herbaceous plants that are to be installed. Plants will be delivered to the site in 2.375-inch square open-bottom pots. These plants must be staged by placing in water immediately upon arrival at the site. Herbaceous plant installation will be conducted using a dibble bar or shovel. Plants will be carefully removed from their pot and placed into the planting hole, keeping the root mass and soil ball intact. The plant is then gently pressed into place by hand. Field personnel should make sure that no roots are exposed. In addition, donor vegetation may be imported into the South Pines from other restoration projects. Field personnel will use a round point shovel to transplant root wads from established stands of bur reed (*Sparganium eurycarpum*), arrowhead (*Sagittaria spp.*), and other desirable wetland species. These plants rapidly spread via root sprouting, thus accelerating the establishment of native wetland vegetation. In addition, the soil and organic matter that accompanies the transplants serves to inoculate created wetlands with desirable mycorrhizae and macroinvertebrates.

#### 4.4 Maintenance Activities

Maintenance is critical to restoration success. Activities that will be required for Paddys Run East restoration include watering, deer control, and invasive species control. These activities are discussed in more detail below.

##### 4.4.1 Watering

Each plant will be watered at the time of installation. Pursuant to the attached specification (Appendix B), DOE will ensure that each plant receives an adequate amount of water each week, for the first six weeks after planting. Water is accessible from the SWU Wheel Wash facility and from mobile water trucks and tanks. Watering will be carried out either directly via hose, tree gator and/or bucket, or remotely via water cannon. Water may be carried out during the second growing season if significant drought conditions occur similar to the summer of 1999. Under normal rainfall conditions, watering after the initial planting period will not be necessary.

For seeded areas, the planting window restrictions in the attached seeding specification (Appendix C) help to ensure that sufficient soil moisture exists for germination and survival of seeds. Weather patterns will be a contributing factor in timing seed application.

#### 4.4.2 Deer Control

Installed trees and shrubs must be protected from deer browsing and rubbing in order for forest restoration efforts to be successful. Experience from past restoration projects at the FCP show that enclosure fencing is the most effective means of protection. The restoration ecologist will clump shrub plantings and some tree plantings in order to maximize the effectiveness of fencing. Field personnel will then install welded wire or deer enclosure fencing around a good portion of plant material.

#### 4.4.3 Invasive Species

The forest restoration concept developed in the NRRP depends on ecological succession as primary component. Without adequate control, invasive species may impede succession and alter the intended course of maturation for restored areas. The majority of invasive species should be removed prior to plant installation as part of site prep activities. In addition, the Paddys Run East project will be periodically monitored until site closure. Any honeysuckle, multiflora rose, or grape vine resprouts or new recruits will be removed.

For seeded areas, mowing will be used to control invasives. Weeds and cool season grasses will be mowed before they go to seed. Typically, this will require cutting vegetation when it reaches 18 inches in height. The mower deck will be set to cut at six inches. In this way, native grass and forb seedlings will not be cut, and will not be shaded out by faster-growing invasives.

## 5.0 MONITORING

Implementation monitoring parameters for Paddys Run East restoration will consist of plant survival and herbaceous cover. Mortality counts will be conducted at the end of the first growing season following completion of each phase of restoration. (The A2PII Forested Area and seeded areas within A2PIII will not be included in Implementation Phase Monitoring, since the growing season following installation is beyond site closure.) For Implementation Monitoring of seeded areas, herbaceous cover will be evaluated pursuant to the process and criteria set forth in the 2002 Consolidated Monitoring Report (DOE 2003). Functional monitoring will not be conducted, since project completion is too close to site closure.

**6.0 SCHEDULE**

The schedule of activities for Paddys Run East restoration is shown in Table 6-1. Activities will be accelerated when possible. An addendum to this NRRDP will be submitted following certification of A2PII Subarea 3.

**TABLE 6-1**  
**PADDYS RUN EAST RESTORATION SCHEDULE**

<b>Activity</b>	<b>Month of Implementation</b>
<b>Site Prep</b>	
Establish construction area boundaries	September 2004
Initiate invasive species removal	January 2005
Initiate tree chipping operations	January 2005
Apply herbicide to prairie areas	April, June, September 2005
<b>Grading</b>	
Construct vernal pools	February 2005
<b>Planting</b>	
A2PIII	October 2004
South Pines	April 2005
A2PII	October 2005
<b>Seeding and installation of Wildlife Amenities</b>	
A2PII	September 2004
South Pines	May 2005
A2PIII	September 2005

000028

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**APPENDIX A**  
**PLANTING PATCH PAGES**

5564  
5564

# A2P2-1

Size	4.07 acres
Flag/tag color	

	Planned	Installed
Saplings	165	
Shrubs	44	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	20			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	23			
G	<i>Carya ovata</i>	Shagbark Hickory	canopy	4-ft. min.	3			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	29			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	3			
K	<i>Fraxinus quadrangulata</i>	Blue Ash	canopy	4-ft. min.	1			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	15			
U	<i>Quercus inbricaria</i>	Shingle Oak	canopy	4-ft. min.	3			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	20			
AB	<i>Quercus velutina</i>	Black Oak	canopy	4-ft. min.	5			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	5			
AF	<i>Asimina triloba</i>	Pawpaw	understory	4-ft. min.	4			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	7			
AH	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	3			
AJ	<i>Cornus drummondii</i>	Roughleaf Dogwood	understory	4-ft. min.	3			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	8			
AN	<i>Crataegus mollis</i>	Downy Hawthorne	understory	4-ft. min.	3			
AO	<i>Euonymus atropurpureus</i>	Eastern Wahoo	understory	4-ft. min.	5			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	5			
AT	<i>Amelanchier arborea</i>	Downy Serviceberry	shrub	1-ft. min.	5			
AU	<i>Ceanothus americanus</i>	New Jersey Tea	shrub	1-ft. min.	2			
AV	<i>Celastrus scandens</i>	Bittersweet	shrub	1-ft. min.	3			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	5			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	3			
BC	<i>Lindera benzoin</i>	Spicebush	shrub	1-ft. min.	4			
BO	<i>Staphylea trifolia</i>	Bladdernut	shrub	1-ft. min.	5			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	7			
BQ	<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	shrub	1-ft. min.	5			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	5			

Notes:

000031

## A2P2-2

Size	7.34 acres
Flag/tag color	

	Planned	Installed
Saplings	234	
Shrubs	98	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
A	<i>Acer nigrum</i>	Black Maple	canopy	4-ft. min.	24			
C	<i>Acer saccharinum</i>	Silver Maple	canopy	4-ft. min.	4			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	35			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	40			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	20			
J	<i>Fraxinus pennsylvanicum</i>	Green Ash	canopy	4-ft. min.	6			
L	<i>Juglans cinerea</i>	Butternut	canopy	4-ft. min.	3			
M	<i>Juglans nigra</i>	Black Walnut	canopy	4-ft. min.	20			
N	<i>Liriodendron tulipifera</i>	Tulip Poplar	canopy	4-ft. min.	3			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	18			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	10			
S	<i>Quercus bicolor</i>	Swamp White Oak	canopy	4-ft. min.	1			
T	<i>Quercus coccinea</i>	Scarlet Oak	canopy	4-ft. min.	3			
W	<i>Quercus muehlenbergii</i>	Chinquapin Oak	canopy	4-ft. min.	6			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	10			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	10			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	2			
AH	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	3			
AI	<i>Cornus alternifolia</i>	Alternate-leaf dogwood	understory	4-ft. min.	2			
AM	<i>Crataegus crus-galli</i>	Cockspur Hawthorne	understory	4-ft. min.	2			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	3			
AQ	<i>Prunus americana</i>	American Plum	understory	4-ft. min.	7			
AR	<i>Sassafras albidum</i>	Sassafras	understory	4-ft. min.	2			
AW	<i>Cephalanthus occidentalis</i>	Buttonbush	shrub	1-ft. min.	9			
AX	<i>Cornus amomum</i>	Silky Dogwood	shrub	1-ft. min.	5			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	5			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	3			
BB	<i>Ilex verticillata</i>	Winterberry	shrub	1-ft. min.	3			
BD	<i>Physocarpus opulifolius</i>	Ninebark	shrub	1-ft. min.	3			
BF	<i>Rhus glabra</i>	Smooth Sumac	shrub	1-ft. min.	3			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	9			
BH	<i>Rosa carolina</i>	Carolina Rose	shrub	1-ft. min.	5			
BI	<i>Rosa palustris</i>	Swamp Rose	shrub	1-ft. min.	3			
BJ	<i>Rosa setigera</i>	Prairie Rose	shrub	1-ft. min.	14			
BK	<i>Rubus occidentalis</i>	Black Raspberry	shrub	1-ft. min.	5			
BM	<i>Sambucus canadensis</i>	Elderberry	shrub	1-ft. min.	20			
BN	<i>Spiraea alba</i>	Meadowsweet	shrub	1-ft. min.	4			
BS	<i>Zanthoxylum americanum</i>	Prickly Ash	shrub	1-ft. min.	2			
BT	<i>Campsis radicans</i>	Trumpet Creeper	vine	1-ft. min.	5			

Notes:

000032

## A2P2-3

Size	2.68 acres
Flag/tag color	

	Planned	Installed
Saplings	91	
Shrubs	71	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
A	<i>Acer nigrum</i>	Black Maple	canopy	4-ft. min.	10			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	10			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	20			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	10			
J	<i>Fraxinus pennsylvanicum</i>	Green Ash	canopy	4-ft. min.	3			
L	<i>Juglans cinerea</i>	Butternut	canopy	4-ft. min.	2			
M	<i>Juglans nigra</i>	Black Walnut	canopy	4-ft. min.	8			
N	<i>Liriodendron tulipifera</i>	Tulip Poplar	canopy	4-ft. min.	2			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	6			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	3			
S	<i>Quercus bicolor</i>	Swamp White Oak	canopy	4-ft. min.	1			
T	<i>Quercus coccinea</i>	Scarlet Oak	canopy	4-ft. min.	2			
W	<i>Quercus muehlenbergii</i>	Chinquapin Oak	canopy	4-ft. min.	2			
X	<i>Quercus palustris</i>	Pin Oak	canopy	4-ft. min.	1			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	5			
AM	<i>Crataegus crus-galli</i>	Cockspur Hawthorne	understory	4-ft. min.	2			
AQ	<i>Prunus americana</i>	American Plum	understory	4-ft. min.	4			
AS	<i>Alnus serrulata</i>	Smooth Alder	shrub	1-ft. min.	2			
AW	<i>Cephalanthus occidentalis</i>	Buttonbush	shrub	1-ft. min.	3			
AX	<i>Cornus amomum</i>	Silky Dogwood	shrub	1-ft. min.	6			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	3			
BB	<i>Ilex verticillata</i>	Winterberry	shrub	1-ft. min.	3			
BD	<i>Physocarpus opulifolius</i>	Ninebark	shrub	1-ft. min.	3			
BE	<i>Rhus aromatica</i>	Fragrant Sumac	shrub	1-ft. min.	3			
BF	<i>Rhus glabra</i>	Smooth Sumac	shrub	1-ft. min.	3			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	8			
BH	<i>Rosa carolina</i>	Carolina Rose	shrub	1-ft. min.	2			
BI	<i>Rosa palustris</i>	Swamp Rose	shrub	1-ft. min.	2			
BJ	<i>Rosa setigera</i>	Prairie Rose	shrub	1-ft. min.	10			
BM	<i>Sambucus canadensis</i>	Elderberry	shrub	1-ft. min.	17			
BN	<i>Spiraea alba</i>	Meadowsweet	shrub	1-ft. min.	3			
BT	<i>Campsis radicans</i>	Trumpet Creeper	vine	1-ft. min.	3			

Notes:

## A2P2-4

Size	4.04 acres
Flag/tag color	

	Planned	Installed
Saplings	178	
Shrubs	32	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	45			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	21			
G	<i>Carya ovata</i>	Shagbark Hickory	canopy	4-ft. min.	3			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	15			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	3			
K	<i>Fraxinus quadrangulata</i>	Blue Ash	canopy	4-ft. min.	1			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	20			
U	<i>Quercus inbricaria</i>	Shingle Oak	canopy	4-ft. min.	3			
V	<i>Quercus macrocarpa</i>	Bur Oak	canopy	4-ft. min.	1			
Y	<i>Quercus prinus</i>	Chestnut Oak	canopy	4-ft. min.	2			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	20			
AB	<i>Quercus velutina</i>	Black Oak	canopy	4-ft. min.	5			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	3			
AF	<i>Asimina triloba</i>	Pawpaw	understory	4-ft. min.	3			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	7			
AH	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	3			
AK	<i>Cornus florida</i>	Flowering Dogwood	understory	4-ft. min.	5			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	7			
AN	<i>Crataegus mollis</i>	Downy Hawthorne	understory	4-ft. min.	3			
AO	<i>Euonymus atropurpureus</i>	Eastern Wahoo	understory	4-ft. min.	3			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	5			
AT	<i>Amelanchier arborea</i>	Downy Serviceberry	shrub	1-ft. min.	5			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	4			
BC	<i>Lindera benzoin</i>	Spicebush	shrub	1-ft. min.	4			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	3			
BL	<i>Salix discolor</i>	Pussy Willow	shrub	1-ft. min.	2			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	6			
BQ	<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	shrub	1-ft. min.	3			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	5			

Notes:

## A2P2-5

Size	2.99 acres
Flag/tag color	

	Planned	Installed
Saplings	118	
Shrubs	31	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	35			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	15			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	15			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	2			
K	<i>Fraxinus quadrangulata</i>	Blue Ash	canopy	4-ft. min.	1			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	10			
U	<i>Quercus inbricaria</i>	Shingle Oak	canopy	4-ft. min.	2			
Y	<i>Quercus prinus</i>	Chestnut Oak	canopy	4-ft. min.	2			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	5			
AB	<i>Quercus velutina</i>	Black Oak	canopy	4-ft. min.	4			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	2			
AE	<i>Aesculus glabra</i>	Ohio Buckeye	understory	4-ft. min.	2			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	2			
AH	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	3			
AK	<i>Cornus florida</i>	Flowering Dogwood	understory	4-ft. min.	4			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	7			
AN	<i>Crataegus mollis</i>	Downy Hawthorne	understory	4-ft. min.	2			
AO	<i>Euonymus atropurpureus</i>	Eastern Wahoo	understory	4-ft. min.	2			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	3			
AV	<i>Celastrus scandens</i>	Bittersweet	shrub	1-ft. min.	2			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	3			
BC	<i>Lindera benzoin</i>	Spicebush	shrub	1-ft. min.	3			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	3			
BK	<i>Rubus occidentalis</i>	Black Raspberry	shrub	1-ft. min.	4			
BL	<i>Salix discolor</i>	Pussy Willow	shrub	1-ft. min.	2			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	6			
BQ	<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	shrub	1-ft. min.	3			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	5			

Notes:

# A2P2-6

Size	3.67 acres
Flag/tag color	

	Planned	Installed
Saplings	131	
Shrubs	36	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	53			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	15			
G	<i>Carya ovata</i>	Shagbark Hickory	canopy	4-ft. min.	3			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	15			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	2			
J	<i>Fraxinus pennsylvanicum</i>	Green Ash	canopy	4-ft. min.	2			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	10			
U	<i>Quercus inbricaria</i>	Shingle Oak	canopy	4-ft. min.	2			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	5			
AB	<i>Quercus velutina</i>	Black Oak	canopy	4-ft. min.	5			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	3			
AD	<i>Ulmus rubra</i>	Slippery Elm	canopy	4-ft. min.	3			
AE	<i>Aesculus glabra</i>	Ohio Buckeye	understory	4-ft. min.	2			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	2			
AH	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	3			
AN	<i>Crataegus mollis</i>	Downy Hawthorne	understory	4-ft. min.	3			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	3			
AT	<i>Amelanchier arborea</i>	Downy Serviceberry	shrub	1-ft. min.	5			
AV	<i>Celastrus scandens</i>	Bittersweet	shrub	1-ft. min.	2			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	4			
BC	<i>Lindera benzoin</i>	Spicebush	shrub	1-ft. min.	3			
BL	<i>Salix discolor</i>	Pussy Willow	shrub	1-ft. min.	3			
BO	<i>Staphylea trifolia</i>	Bladdernut	shrub	1-ft. min.	5			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	6			
BQ	<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	shrub	1-ft. min.	3			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	5			

Notes:

## A2P2-7

Size	2.64 acres
Flag/tag color	

	Planned	Installed
Saplings	92	
Shrubs	29	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
A	<i>Acer nigrum</i>	Black Maple	canopy	4-ft. min.	10			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	25			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	10			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	5			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	5			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	8			
L	<i>Juglans cinerea</i>	Butternut	canopy	4-ft. min.	2			
M	<i>Juglans nigra</i>	Black Walnut	canopy	4-ft. min.	8			
N	<i>Liriodendron tulipifera</i>	Tulip Poplar	canopy	4-ft. min.	2			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	3			
W	<i>Quercus muehlenbergii</i>	Chinquapin Oak	canopy	4-ft. min.	2			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	5			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	2			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	3			
AQ	<i>Prunus americana</i>	American Plum	understory	4-ft. min.	2			
AY	<i>Corylus americana</i>	Hazelnut	shrub	1-ft. min.	3			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	3			
BC	<i>Lindera benzoin</i>	Spicebush	shrub	1-ft. min.	3			
BE	<i>Rhus aromatica</i>	Fragrant Sumac	shrub	1-ft. min.	3			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	3			
BH	<i>Rosa carolina</i>	Carolina Rose	shrub	1-ft. min.	3			
BJ	<i>Rosa setigera</i>	Prairie Rose	shrub	1-ft. min.	4			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	2			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	5			

Notes:

## SP-1

Size	0.83 acres
Flag/tag color	

	Planned	Installed
Saplings	53	
Shrubs	27	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	17			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	10			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	10			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	3			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	3			
AH	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	3			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	5			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	2			
BE	<i>Rhus aromatica</i>	Fragrant Sumac	shrub	1-ft. min.	5			
BF	<i>Rhus glabra</i>	Smooth Sumac	shrub	1-ft. min.	5			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	5			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	6			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	3			
BT	<i>Campsis radicans</i>	Trumpet Creeper	vine	1-ft. min.	3			

Notes:

## SP-2

Size	2.31 acres
Flag/tag color	

	Planned	Installed
Saplings	116	
Shrubs	68	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	30			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	20			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	20			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	6			
AD	<i>Ulmus rubra</i>	Slippery Elm	canopy	4-ft. min.	3			
AE	<i>Aesculus glabra</i>	Ohio Buckeye	understory	4-ft. min.	3			
AF	<i>Asimina triloba</i>	Pawpaw	understory	4-ft. min.	4			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	6			
AI	<i>Cornus alternifolia</i>	Alternate-leaf dogwood	understory	4-ft. min.	3			
AJ	<i>Cornus drummondii</i>	Roughleaf Dogwood	understory	4-ft. min.	3			
AK	<i>Cornus florida</i>	Flowering Dogwood	understory	4-ft. min.	3			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	5			
AO	<i>Euonymus atropurpureus</i>	Eastern Wahoo	understory	4-ft. min.	2			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	8			
AT	<i>Amelanchier arborea</i>	Downy Serviceberry	shrub	1-ft. min.	5			
AU	<i>Ceanothus americanus</i>	New Jersey Tea	shrub	1-ft. min.	3			
AV	<i>Celastrus scandens</i>	Bittersweet	shrub	1-ft. min.	6			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	10			
BC	<i>Lindera benzoin</i>	Spicebush	shrub	1-ft. min.	15			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	4			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	5			
BQ	<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	shrub	1-ft. min.	10			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	10			

Notes:

## SP-3

Size	1.75 acres
Flag/tag color	

	Planned	Installed
Saplings	262	
Shrubs	77	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
A	<i>Acer nigrum</i>	Black Maple	canopy	4-ft. min.	18			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	65			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	20			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	15			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	15			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	13			
L	<i>Juglans cinerea</i>	Butternut	canopy	4-ft. min.	3			
M	<i>Juglans nigra</i>	Black Walnut	canopy	4-ft. min.	15			
N	<i>Liriodendron tulipifera</i>	Tulip Poplar	canopy	4-ft. min.	3			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	5			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	20			
T	<i>Quercus coccinea</i>	Scarlet Oak	canopy	4-ft. min.	2			
U	<i>Quercus inbricaria</i>	Shingle Oak	canopy	4-ft. min.	4			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	20			
AB	<i>Quercus velutina</i>	Black Oak	canopy	4-ft. min.	8			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	3			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	4			
AH	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	5			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	5			
AN	<i>Crataegus mollis</i>	Downy Hawthorne	understory	4-ft. min.	6			
AO	<i>Euonymus atropurpureus</i>	Eastern Wahoo	understory	4-ft. min.	4			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	4			
AQ	<i>Prunus americana</i>	American Plum	understory	4-ft. min.	5			
AT	<i>Amelanchier arborea</i>	Downy Serviceberry	shrub	1-ft. min.	5			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	5			
BD	<i>Physocarpus opulifolius</i>	Ninebark	shrub	1-ft. min.	5			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	10			
BH	<i>Rosa carolina</i>	Carolina Rose	shrub	1-ft. min.	2			
BJ	<i>Rosa setigera</i>	Prairie Rose	shrub	1-ft. min.	15			
BK	<i>Rubus occidentalis</i>	Black Raspberry	shrub	1-ft. min.	5			
BM	<i>Sambucus canadensis</i>	Elderberry	shrub	1-ft. min.	10			
BO	<i>Staphylea trifolia</i>	Bladdernut	shrub	1-ft. min.	5			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	10			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	5			

Notes:

## SP-4

Size	2.12 acres
Flag/tag color	

	Planned	Installed
Saplings	341	
Shrubs	131	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
A	<i>Acer nigrum</i>	Black Maple	canopy	4-ft. min.	18			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	75			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	25			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	15			
G	<i>Carya ovata</i>	Shagbark Hickory	canopy	4-ft. min.	4			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	15			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	20			
L	<i>Juglans cinerea</i>	Butternut	canopy	4-ft. min.	3			
M	<i>Juglans nigra</i>	Black Walnut	canopy	4-ft. min.	20			
N	<i>Liriodendron tulipifera</i>	Tulip Poplar	canopy	4-ft. min.	4			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	10			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	30			
T	<i>Quercus coccinea</i>	Scarlet Oak	canopy	4-ft. min.	3			
U	<i>Quercus inbricaria</i>	Shingle Oak	canopy	4-ft. min.	5			
W	<i>Quercus muehlenbergii</i>	Chinquapin Oak	canopy	4-ft. min.	5			
Y	<i>Quercus prinus</i>	Chestnut Oak	canopy	4-ft. min.	2			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	25			
AB	<i>Quercus velutina</i>	Black Oak	canopy	4-ft. min.	10			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	6			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	6			
AH	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	5			
AK	<i>Cornus florida</i>	Flowering Dogwood	understory	4-ft. min.	4			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	5			
AM	<i>Crataegus crus-galli</i>	Cockspur Hawthorne	understory	4-ft. min.	5			
AN	<i>Crataegus mollis</i>	Downy Hawthorne	understory	4-ft. min.	6			
AO	<i>Euonymus atropurpureus</i>	Eastern Wahoo	understory	4-ft. min.	5			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	4			
AQ	<i>Prunus americana</i>	American Plum	understory	4-ft. min.	6			
AT	<i>Amelanchier arborea</i>	Downy Serviceberry	shrub	1-ft. min.	5			
AX	<i>Cornus amomum</i>	Silky Dogwood	shrub	1-ft. min.	5			
AY	<i>Corylus americana</i>	Hazelnut	shrub	1-ft. min.	3			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	12			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	5			
BD	<i>Physocarpus opulifolius</i>	Ninebark	shrub	1-ft. min.	5			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	10			
BH	<i>Rosa carolina</i>	Carolina Rose	shrub	1-ft. min.	7			
BJ	<i>Rosa setigera</i>	Prairie Rose	shrub	1-ft. min.	15			
BK	<i>Rubus occidentalis</i>	Black Raspberry	shrub	1-ft. min.	5			
BL	<i>Salix discolor</i>	Pussy Willow	shrub	1-ft. min.	4			
BM	<i>Sambucus canadensis</i>	Elderberry	shrub	1-ft. min.	15			
BO	<i>Staphylea trifolia</i>	Bladdernut	shrub	1-ft. min.	7			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	10			
BQ	<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	shrub	1-ft. min.	5			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	10			
BS	<i>Zanthoxylum americanum</i>	Prickly Ash	shrub	1-ft. min.	3			
BT	<i>Campsis radicans</i>	Trumpet Creeper	vine	1-ft. min.	5			

Notes:

000041

## SP-5

Size	2.06 acres
Flag/tag color	

	Planned	Installed
Saplings	331	
Shrubs	98	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
A	<i>Acer nigrum</i>	Black Maple	canopy	4-ft. min.	18			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	75			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	25			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	15			
G	<i>Carya ovata</i>	Shagbark Hickory	canopy	4-ft. min.	3			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	15			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	20			
L	<i>Juglans cinerea</i>	Butternut	canopy	4-ft. min.	3			
M	<i>Juglans nigra</i>	Black Walnut	canopy	4-ft. min.	20			
N	<i>Liriodendron tulipifera</i>	Tulip Poplar	canopy	4-ft. min.	4			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	10			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	30			
T	<i>Quercus coccinea</i>	Scarlet Oak	canopy	4-ft. min.	3			
U	<i>Quercus inbricaria</i>	Shingle Oak	canopy	4-ft. min.	5			
W	<i>Quercus muehlenbergii</i>	Chinquapin Oak	canopy	4-ft. min.	5			
Y	<i>Quercus prinus</i>	Chestnut Oak	canopy	4-ft. min.	2			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	25			
AB	<i>Quercus velutina</i>	Black Oak	canopy	4-ft. min.	10			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	6			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	6			
AH	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	5			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	5			
AN	<i>Crataegus mollis</i>	Downy Hawthorne	understory	4-ft. min.	6			
AO	<i>Euonymus atropurpureus</i>	Eastern Wahoo	understory	4-ft. min.	5			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	4			
AQ	<i>Prunus americana</i>	American Plum	understory	4-ft. min.	6			
AT	<i>Amelanchier arborea</i>	Downy Serviceberry	shrub	1-ft. min.	5			
AY	<i>Corylus americana</i>	Hazelnut	shrub	1-ft. min.	2			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	10			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	5			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	10			
BH	<i>Rosa carolina</i>	Carolina Rose	shrub	1-ft. min.	3			
BJ	<i>Rosa setigera</i>	Prairie Rose	shrub	1-ft. min.	15			
BK	<i>Rubus occidentalis</i>	Black Raspberry	shrub	1-ft. min.	5			
BL	<i>Salix discolor</i>	Pussy Willow	shrub	1-ft. min.	3			
BM	<i>Sambucus canadensis</i>	Elderberry	shrub	1-ft. min.	15			
BO	<i>Staphylea trifolia</i>	Bladdernut	shrub	1-ft. min.	5			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	10			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	5			
BT	<i>Campsis radicans</i>	Trumpet Creeper	vine	1-ft. min.	5			

Notes:

000042

## SP-6

Size	1.91 acres
Flag/tag color	

	Planned	Installed
Saplings	103	
Shrubs	64	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	30			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	20			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	20			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	6			
AD	<i>Ulmus rubra</i>	Slippery Elm	canopy	4-ft. min.	2			
AE	<i>Aesculus glabra</i>	Ohio Buckeye	understory	4-ft. min.	3			
AF	<i>Asimina triloba</i>	Pawpaw	understory	4-ft. min.	4			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	6			
AH	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	3			
AJ	<i>Cornus drummondii</i>	Roughleaf Dogwood	understory	4-ft. min.	2			
AK	<i>Cornus florida</i>	Flowering Dogwood	understory	4-ft. min.	3			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	4			
AT	<i>Amelanchier arborea</i>	Downy Serviceberry	shrub	1-ft. min.	5			
AV	<i>Celastrus scandens</i>	Bittersweet	shrub	1-ft. min.	5			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	10			
BC	<i>Lindera benzoin</i>	Spicebush	shrub	1-ft. min.	15			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	4			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	5			
BQ	<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	shrub	1-ft. min.	10			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	10			

Notes:

## SP-7

Size	0.97 acres
Flag/tag color	

	Planned	Installed
Saplings	187	
Shrubs	49	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
A	<i>Acer nigrum</i>	Black Maple	canopy	4-ft. min.	6			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	25			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	13			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	20			
G	<i>Carya ovata</i>	Shagbark Hickory	canopy	4-ft. min.	7			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	11			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	10			
K	<i>Fraxinus quadrangulata</i>	Blue Ash	canopy	4-ft. min.	5			
L	<i>Juglans cinerea</i>	Butternut	canopy	4-ft. min.	2			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	7			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	18			
V	<i>Quercus macrocarpa</i>	Bur Oak	canopy	4-ft. min.	1			
W	<i>Quercus muehlenbergii</i>	Chinquapin Oak	canopy	4-ft. min.	6			
Y	<i>Quercus prinus</i>	Chestnut Oak	canopy	4-ft. min.	3			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	15			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	3			
AF	<i>Asimina triloba</i>	Pawpaw	understory	4-ft. min.	3			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	3			
AK	<i>Cornus florida</i>	Flowering Dogwood	understory	4-ft. min.	3			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	5			
AM	<i>Crataegus crus-galli</i>	Cockspur Hawthorne	understory	4-ft. min.	3			
AO	<i>Euonymus atropurpureus</i>	Eastern Wahoo	understory	4-ft. min.	2			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	8			
AQ	<i>Prunus americana</i>	American Plum	understory	4-ft. min.	5			
AR	<i>Sassafras albidum</i>	Sassafras	understory	4-ft. min.	3			
AW	<i>Cephalanthus occidentalis</i>	Buttonbush	shrub	1-ft. min.	5			
AX	<i>Cornus amomum</i>	Silky Dogwood	shrub	1-ft. min.	5			
BB	<i>Ilex verticillata</i>	Winterberry	shrub	1-ft. min.	5			
BE	<i>Rhus aromatica</i>	Fragrant Sumac	shrub	1-ft. min.	6			
BF	<i>Rhus glabra</i>	Smooth Sumac	shrub	1-ft. min.	3			
BH	<i>Rosa carolina</i>	Carolina Rose	shrub	1-ft. min.	5			
BJ	<i>Rosa setigera</i>	Prairie Rose	shrub	1-ft. min.	4			
BL	<i>Salix discolor</i>	Pussy Willow	shrub	1-ft. min.	3			
BM	<i>Sambucus canadensis</i>	Elderberry	shrub	1-ft. min.	10			
BN	<i>Spiraea alba</i>	Meadowsweet	shrub	1-ft. min.	3			

Notes:

## SP-8

Size	1.81 acres
Flag/tag color	

	Planned	Installed
Saplings	163	
Shrubs	80	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
A	<i>Acer nigrum</i>	Black Maple	canopy	4-ft. min.	7			
C	<i>Acer saccharinum</i>	Silver Maple	canopy	4-ft. min.	7			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	25			
E	<i>Carya cordiformis</i>	Bittemut Hickory	canopy	4-ft. min.	12			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	14			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	15			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	10			
J	<i>Fraxinus pennsylvanicum</i>	Green Ash	canopy	4-ft. min.	17			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	5			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	10			
S	<i>Quercus bicolor</i>	Swamp White Oak	canopy	4-ft. min.	2			
X	<i>Quercus palustris</i>	Pin Oak	canopy	4-ft. min.	1			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	20			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	3			
AG	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	4			
AH	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	2			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	5			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	4			
AS	<i>Alnus serrulata</i>	Smooth Alder	shrub	1-ft. min.	6			
AW	<i>Cephalanthus occidentalis</i>	Buttonbush	shrub	1-ft. min.	15			
AX	<i>Cornus amomum</i>	Silky Dogwood	shrub	1-ft. min.	9			
BB	<i>Ilex verticillata</i>	Winterberry	shrub	1-ft. min.	6			
BF	<i>Rhus glabra</i>	Smooth Sumac	shrub	1-ft. min.	3			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	5			
BI	<i>Rosa palustris</i>	Swamp Rose	shrub	1-ft. min.	10			
BL	<i>Salix discolor</i>	Pussy Willow	shrub	1-ft. min.	3			
BM	<i>Sambucus canadensis</i>	Elderberry	shrub	1-ft. min.	13			
BN	<i>Spiraea alba</i>	Meadowsweet	shrub	1-ft. min.	10			

Notes:

000045

## A2P3-1

Size	1.26 acres
Flag/tag color	

	Planned	Installed
Saplings	212	
Shrubs	87	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
B	<i>Acer rubrum</i>	Red Maple	canopy	4-ft. min.	8			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	60			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	11			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	13			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	24			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	8			
L	<i>Juglans cinerea</i>	Butternut	canopy	4-ft. min.	7			
M	<i>Juglans nigra</i>	Black Walnut	canopy	4-ft. min.	10			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	8			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	15			
T	<i>Quercus coccinea</i>	Scarlet Oak	canopy	4-ft. min.	6			
V	<i>Quercus macrocarpa</i>	Bur Oak	canopy	4-ft. min.	8			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	14			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	3			
AI	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	6			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	5			
AM	<i>Crataegus crus-galli</i>	Cockspur Hawthorne	understory	4-ft. min.	3			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	3			
AY	<i>Corylus americana</i>	Hazelnut	shrub	1-ft. min.	11			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	10			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	7			
BE	<i>Rhus aromatica</i>	Fragrant Sumac	shrub	1-ft. min.	9			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	8			
BJ	<i>Rosa setigera</i>	Prairie Rose	shrub	1-ft. min.	8			
BL	<i>Salix discolor</i>	Pussy Willow	shrub	1-ft. min.	10			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	11			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	13			

Notes:

## A2P3-2

Size	1.55 acres
Flag/tag color	

	Planned	Installed
Saplings	264	
Shrubs	119	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
B	<i>Acer rubrum</i>	Red Maple	canopy	4-ft. min.	12			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	70			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	12			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	15			
G	<i>Carya ovata</i>	Shagbark Hickory	canopy	4-ft. min.	8			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	22			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	10			
K	<i>Fraxinus quadrangulata</i>	Blue Ash	canopy	4-ft. min.	5			
M	<i>Juglans nigra</i>	Black Walnut	canopy	4-ft. min.	17			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	10			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	15			
T	<i>Quercus coccinea</i>	Scarlet Oak	canopy	4-ft. min.	5			
V	<i>Quercus macrocarpa</i>	Bur Oak	canopy	4-ft. min.	8			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	18			
AB	<i>Quercus velutina</i>	Black Oak	canopy	4-ft. min.	11			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	4			
AH	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	7			
AI	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	4			
AM	<i>Crataegus crus-galli</i>	Cockspur Hawthorne	understory	4-ft. min.	5			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	4			
AR	<i>Sassafras albidium</i>	Sassafras	understory	4-ft. min.	2			
AY	<i>Corylus americana</i>	Hazelnut	shrub	1-ft. min.	12			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	15			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	7			
BE	<i>Rhus aromatica</i>	Fragrant Sumac	shrub	1-ft. min.	10			
BF	<i>Rhus glabra</i>	Smooth Sumac	shrub	1-ft. min.	11			
BH	<i>Rosa carolina</i>	Carolina Rose	shrub	1-ft. min.	5			
BJ	<i>Rosa setigera</i>	Prairie Rose	shrub	1-ft. min.	15			
BL	<i>Salix discolor</i>	Pussy Willow	shrub	1-ft. min.	9			
BM	<i>Sambucus canadensis</i>	Elderberry	shrub	1-ft. min.	11			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	11			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	13			

Notes:

000047

5564  
A2P3-3

Size	1.80 acres
Flag/tag color	

	Planned	Installed
Saplings	322	
Shrubs	110	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
B	<i>Acer rubrum</i>	Red Maple	canopy	4-ft. min.	12			
C	<i>Acer saccharinum</i>	Silver Maple	canopy	4-ft. min.	7			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	80			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	15			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	17			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	29			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	12			
J	<i>Fraxinus pennsylvanicum</i>	Green Ash	canopy	4-ft. min.	18			
M	<i>Juglans nigra</i>	Black Walnut	canopy	4-ft. min.	10			
O	<i>Platanus occidentalis</i>	Sycamore	canopy	4-ft. min.	7			
P	<i>Populus deltoides</i>	Cottonwood	canopy	4-ft. min.	9			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	17			
S	<i>Quercus bicolor</i>	Swamp White Oak	canopy	4-ft. min.	10			
V	<i>Quercus macrocarpa</i>	Bur Oak	canopy	4-ft. min.	8			
W	<i>Quercus muehlenbergii</i>	Chinquapin Oak	canopy	4-ft. min.	5			
X	<i>Quercus palustris</i>	Pin Oak	canopy	4-ft. min.	2			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	18			
AB	<i>Quercus velutina</i>	Black Oak	canopy	4-ft. min.	11			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	4			
AD	<i>Ulmus rubra</i>	Slippery Elm	canopy	4-ft. min.	3			
AE	<i>Aesculus glabra</i>	Ohio Buckeye	understory	4-ft. min.	3			
AG	<i>Asimina triloba</i>	Pawpaw	understory	4-ft. min.	4			
AK	<i>Cornus florida</i>	Flowering Dogwood	understory	4-ft. min.	6			
AM	<i>Crataegus crus-galli</i>	Cockspur Hawthorne	understory	4-ft. min.	5			
AN	<i>Crataegus mollis</i>	Downy Hawthorne	understory	4-ft. min.	3			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	7			
AS	<i>Alnus serrulata</i>	Smooth Alder	shrub	1-ft. min.	10			
AT	<i>Amelanchier arborea</i>	Downy Serviceberry	shrub	1-ft. min.	6			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	7			
BC	<i>Lindera benzoin</i>	Spicebush	shrub	1-ft. min.	25			
BF	<i>Rhus glabra</i>	Smooth Sumac	shrub	1-ft. min.	11			
BJ	<i>Rosa setigera</i>	Prairie Rose	shrub	1-ft. min.	15			
BM	<i>Sambucus canadensis</i>	Elderberry	shrub	1-ft. min.	11			
BO	<i>Staphylea trifolia</i>	Bladdernut	shrub	1-ft. min.	11			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	14			

Notes:

000048

## A2P3-4

Size	0.74 acres
Flag/tag color	

	Planned	Installed
Saplings	142	
Shrubs	55	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
B	<i>Acer rubrum</i>	Red Maple	canopy	4-ft. min.	5			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	40			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	8			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	10			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	15			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	6			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	5			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	10			
V	<i>Quercus macrocarpa</i>	Bur Oak	canopy	4-ft. min.	8			
W	<i>Quercus muehlenbergii</i>	Chinquapin Oak	canopy	4-ft. min.	5			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	12			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	3			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	5			
AN	<i>Crataegus mollis</i>	Downy Hawthorne	understory	4-ft. min.	5			
AQ	<i>Prunus americana</i>	American Plum	understory	4-ft. min.	5			
AX	<i>Cornus amomum</i>	Silky Dogwood	shrub	1-ft. min.	8			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	10			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	7			
BC	<i>Lindera benzoin</i>	Spicebush	shrub	1-ft. min.	15			
BH	<i>Rosa carolina</i>	Carolina Rose	shrub	1-ft. min.	5			
BK	<i>Rubus occidentalis</i>	Black Raspberry	shrub	1-ft. min.	10			

Notes:

Size	1.07 acres
Flag/tag color	

	Planned	Installed
Saplings	196	
Shrubs	87	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
B	<i>Acer rubrum</i>	Red Maple	canopy	4-ft. min.	8			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	60			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	11			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	13			
G	<i>Carya ovata</i>	Shagbark Hickory	canopy	4-ft. min.	7			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	20			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	8			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	8			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	12			
U	<i>Quercus inbricaria</i>	Shingle Oak	canopy	4-ft. min.	3			
V	<i>Quercus macrocarpa</i>	Bur Oak	canopy	4-ft. min.	8			
W	<i>Quercus muehlenbergii</i>	Chinquapin Oak	canopy	4-ft. min.	5			
Y	<i>Quercus prinus</i>	Chestnut Oak	canopy	4-ft. min.	1			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	14			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	3			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	5			
AN	<i>Crataegus mollis</i>	Downy Hawthorne	understory	4-ft. min.	5			
AQ	<i>Prunus americana</i>	American Plum	understory	4-ft. min.	5			
AU	<i>Ceanothus americanus</i>	New Jersey Tea	shrub	1-ft. min.	2			
AV	<i>Celastrus scandens</i>	Bittersweet	shrub	1-ft. min.	8			
AX	<i>Cornus amomum</i>	Silky Dogwood	shrub	1-ft. min.	9			
AY	<i>Corylus americana</i>	Hazelnut	shrub	1-ft. min.	11			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	10			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	7			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	15			
BK	<i>Rubus occidentalis</i>	Black Raspberry	shrub	1-ft. min.	15			
BQ	<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	shrub	1-ft. min.	10			

Notes:

## A2P3-6

Size	1.21 acres
Flag/tag color	

	Planned	Installed
Saplings	231	
Shrubs	84	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
B	<i>Acer rubrum</i>	Red Maple	canopy	4-ft. min.	7			
C	<i>Acer saccharinum</i>	Silver Maple	canopy	4-ft. min.	3			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	60			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	11			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	15			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	24			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	10			
N	<i>Liriodendron tulipifera</i>	Tulip Poplar	canopy	4-ft. min.	5			
O	<i>Platanus occidentalis</i>	Sycamore	canopy	4-ft. min.	7			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	4			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	15			
S	<i>Quercus bicolor</i>	Swamp White Oak	canopy	4-ft. min.	3			
U	<i>Quercus inbricaria</i>	Shingle Oak	canopy	4-ft. min.	5			
V	<i>Quercus macrocarpa</i>	Bur Oak	canopy	4-ft. min.	8			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	16			
AA	<i>Quercus shumardii</i>	Shumard Oak	canopy	4-ft. min.	10			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	4			
AH	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	7			
AL	<i>Cornus racemosa</i>	Gray Dogwood	understory	4-ft. min.	5			
AN	<i>Crataegus mollis</i>	Downy Hawthorne	understory	4-ft. min.	5			
AQ	<i>Prunus americana</i>	American Plum	understory	4-ft. min.	7			
AS	<i>Alnus serrulata</i>	Smooth Alder	shrub	1-ft. min.	5			
AX	<i>Cornus amomum</i>	Silky Dogwood	shrub	1-ft. min.	10			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	15			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	7			
BD	<i>Physocarpus opulifolius</i>	Ninebark	shrub	1-ft. min.	15			
BG	<i>Rhus typhina</i>	Staghorn Sumac	shrub	1-ft. min.	15			
BM	<i>Sambucus canadensis</i>	Elderberry	shrub	1-ft. min.	11			
BQ	<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	shrub	1-ft. min.	6			

Notes:

Size	1.31 acres
Flag/tag color	

	Planned	Installed
Saplings	248	
Shrubs	89	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
B	<i>Acer rubrum</i>	Red Maple	canopy	4-ft. min.	8			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	85			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	15			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	15			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	20			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	10			
N	<i>Liriodendron tulipifera</i>	Tulip Poplar	canopy	4-ft. min.	7			
Q	<i>Prunus serotina</i>	Black Cherry	canopy	4-ft. min.	5			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	15			
U	<i>Quercus inbricaria</i>	Shingle Oak	canopy	4-ft. min.	5			
V	<i>Quercus macrocarpa</i>	Bur Oak	canopy	4-ft. min.	8			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	16			
AA	<i>Quercus shumardii</i>	Shumard Oak	canopy	4-ft. min.	10			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	4			
AE	<i>Aesculus glabra</i>	Ohio Buckeye	understory	4-ft. min.	4			
AH	<i>Carpinus caroliniana</i>	American Hornbeam	understory	4-ft. min.	7			
AK	<i>Cornus florida</i>	Flowering Dogwood	understory	4-ft. min.	5			
AM	<i>Crataegus crus-galli</i>	Cockspur Hawthorne	understory	4-ft. min.	5			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	4			
AT	<i>Amelanchier arborea</i>	Downy Serviceberry	shrub	1-ft. min.	6			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	10			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	7			
BC	<i>Lindera benzoin</i>	Spicebush	shrub	1-ft. min.	20			
BL	<i>Salix discolor</i>	Pussy Willow	shrub	1-ft. min.	10			
BM	<i>Sambucus canadensis</i>	Elderberry	shrub	1-ft. min.	11			
BR	<i>Viburnum prunifolium</i>	Blackhaw Viburnum	shrub	1-ft. min.	14			
BT	<i>Campsis radicans</i>	Trumpet Creeper	vine	1-ft. min.	11			

Notes:

## A2P3-8

Size	0.65 acres
Flag/tag color	

	Planned	Installed
Saplings	113	
Shrubs	50	

ID	Scientific Name	Common Name	Form	Size	Qty.	Installed	Protected	Mulched
B	<i>Acer rubrum</i>	Red Maple	canopy	4-ft. min.	3			
D	<i>Acer saccharum</i>	Sugar Maple	canopy	4-ft. min.	30			
E	<i>Carya cordiformis</i>	Bitternut Hickory	canopy	4-ft. min.	8			
F	<i>Carya laciniosa</i>	Shellbark Hickory	canopy	4-ft. min.	8			
H	<i>Fagus grandifolia</i>	Beech	canopy	4-ft. min.	15			
I	<i>Fraxinus americana</i>	White Ash	canopy	4-ft. min.	6			
R	<i>Quercus alba</i>	White Oak	canopy	4-ft. min.	10			
V	<i>Quercus macrocarpa</i>	Bur Oak	canopy	4-ft. min.	6			
Z	<i>Quercus rubra</i>	Northern Red Oak	canopy	4-ft. min.	10			
AA	<i>Quercus shumardii</i>	Shumard Oak	canopy	4-ft. min.	6			
AC	<i>Tilia americana</i>	Basswood	canopy	4-ft. min.	3			
AI	<i>Cercis canadensis</i>	Redbud	understory	4-ft. min.	3			
AJ	<i>Cornus drummondii</i>	Roughleaf Dogwood	understory	4-ft. min.	2			
AP	<i>Ostrya virginiana</i>	Hop-Hornbeam	understory	4-ft. min.	3			
AZ	<i>Hamamelis virginiana</i>	Witch Hazel	shrub	1-ft. min.	15			
BA	<i>Hypericum prolificum</i>	Shrubby St. John's Wort	shrub	1-ft. min.	7			
BD	<i>Physocarpus opulifolius</i>	Ninebark	shrub	1-ft. min.	10			
BP	<i>Symphoricarpos orbiculatus</i>	Coralberry	shrub	1-ft. min.	11			
BS	<i>Zanthoxylum americanum</i>	Prickly Ash	shrub	1-ft. min.	7			

Notes:

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**APPENDIX B**  
**PLANTING SPECIFICATIONS**

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**SECTION 02940  
PLANTING****PART 1 GENERAL****1.1 SCOPE**

- A. This Section includes the requirements for planting trees, shrubs, and herbaceous potted plants as shown on the Construction Drawings.

**1.2 RELATED SECTIONS AND DOCUMENTS**

- A. Section 02930 - Vegetation.

**PART 2 PRODUCTS****2.1 MATERIALS**

- A. Container grown trees shall be a minimum of 6 feet in height, grown in "spin-out" containers and acquired from a local seed source if possible. Potting material shall be pre-inoculated with mycorrhizae.
- B. Container-grown shrubs shall be a minimum of 1 foot in height, grown in "spin-out" containers and acquired from a local seed source if possible. Potting material shall be pre-inoculated with mycorrhizae.
- C. Bareroot seedlings shall be pre-inoculated with ecto-mycorrhizae and shall not be exposed to the air any longer than possible prior to planting.
- D. Herbaceous potted plants shall be grown in open bottom, minimum 2-inch square and 3-inch deep containers. Potting material shall be inoculated with ecto-mycorrhizae.
- E. Fertilizer shall be slow-release tablet form, and not exceed a N-P-K mix of 22-5-10. Fertilizer shall contain not less than 1 percent added sulfur and not more than 8 percent added iron, or an approved equal.
- F. Mulch shall be an aged hardwood mulch, free of clay, stone, foreign substances, and free of weeds.
- G. Wooden stakes for staking trees as needed shall be nominal 2 inch square, approximately 18-inches in length.

**2.2 EQUIPMENT**

- A. Equipment for performing work in this section shall be low ground pressure equipment that will not compact amended soils.

**PART 3 EXECUTION**

**3.1 GENERAL**

- A. Planting locations will be flagged in the field by the Restoration Ecologist. The Restoration Ecologist is the Fluor Fernald contact responsible for identifying locations of all plant material installation, verifying acceptance of delivered plant material, and ensuring proper installation.
- B. Unless otherwise approved by the Restoration Ecologist, all plant installation shall take place between October 1 and December 15 or February 15 and May 15.
- C. The Restoration Ecologist may restrict planting activities based on field conditions (e.g., droughts, unseasonable freezes).
- D. No plant installation may take place while the soil surface is frozen.
- E. Plant material delivered to the project site that will not be planted within 24 hours shall have their containers completely covered with woodchip mulch and kept moist with periodic watering.
- F. The Construction Manager will provide a source of water sufficient to support all field activities specified in this Section.

**3.2 INSTALLATION OF CONTAINER-GROWN TREES AND SHRUBS (DETAIL A-1)**

- A. Excavate planting pit to a depth such that the top of the ball, when planted, extends 1 to 2 inches above ground surface.
- B. Excavate the planting pit so that it is wider than the root ball by 9 inches on all sides.
- C. Scarify the sides of the planting pit using a shovel.
- D. Remove the plant from the container by carefully inverting the plant and loosening the root ball from the container, cutting the container if necessary. Keep the root ball as intact as possible. Handle the plant by the root ball only. Do not pull the plant from the container by the trunk of the tree or shrub.
- E. Add a slow-release fertilizer tablet or packet (e.g., Osmocote, Agriform or similar) around the ball per manufacturers recommendations.
- F. Set trees and shrubs such that the top of the ball extends 1 to 2 inches above the ground surface and that the trunk is vertical. Trunks shall have no appreciable lean, at the discretion of the Restoration Ecologist.
- G. Backfill around the root ball with a mixture of the topsoil and subsoil removed from the pit. Gently tamp the backfill as it is placed into the pit.
- H. Water the tree/shrub immediately after planting to saturate the upper 12 inches of soil.

- I. Remove any tags, labels, strings or wires from the plant, unless otherwise directed by the Restoration Ecologist.

### 3.3 INSTALLATION OF BAREROOT PLANTS (DETAIL A-2)

- A. Carry bareroot plants in a bucket of water (or moist sand or other moist medium) in the field to keep the roots from drying out. Bareroot plants shall not be stored in water for more than 6 hours at a time. Bareroot plants that require overnight storage shall have their root balls covered completely with moist hardwood mulch and kept moist with periodic watering.
- B. Excavate the planting pit by hand using a dibble bar or spade. The pit shall be only broad enough to accommodate the roots when fully extended and only deep enough such that the uppermost roots will be just below ground surface.
- C. Set the plant and spread the roots in a natural pattern such that the roots are fully extended without touching the sides of the planting pit and that the uppermost roots are just below ground surface.
- D. Carefully work backfill (mix of topsoil and subsoil removed from the planting pit) through the fully spread root systems and water while backfilling.
- E. Firmly tamp backfill with the heel of the shoe when complete.
- F. Remove any tags, labels, and strings from the plant, unless otherwise directed by the Restoration Ecologist.

### 3.4 INSTALLATION OF HERBACEOUS POTTED PLANTS

- A. Place potted plant flats in standing water immediately upon delivery to the project site. Keep flats in water until installation.
- B. Excavate the planting pit by hand using a dibble bar or spade. The pit shall be only broad enough to accommodate the roots when fully extended and only deep enough such that the uppermost roots will be just below ground surface.
- C. Set the plant and spread the roots in a natural pattern such that the roots are fully extended without touching the sides of the planting pit and that the uppermost roots are just below ground surface.
- D. Carefully work backfill (mix of topsoil and subsoil removed from the planting pit) through the fully spread root systems and water while backfilling.
- E. Firmly tamp backfill with the heel of the shoe when complete.
- F. Remove any tags, labels, and strings from the plant, unless otherwise directed by the Restoration Ecologist.

**3.5 PRUNING**

- A. Once trees and shrubs are planted, prune off any dead or damaged limbs.
- B. All pruning shall involve removal of limbs back to a lateral branch or bud.
- C. Perform additional pruning at the request of the Restoration Ecologist.

**3.6 MULCHING**

- A. Apply a 4-inch layer of hardwood mulch over a circular area 4 feet in diameter surrounding balled and burlapped and container grown trees and shrubs. At the discretion of the Restoration Ecologist, straw may be used as a substitute for hardwood mulch.
- B. Apply a 4-inch layer of hardwood mulch over a circular area 2 feet in diameter surrounding each bare root or potted plant. At the discretion of the Restoration Ecologist, straw may be used as a substitute for hardwood mulch.
- C. Mulch shall be placed so as to not physically contact the plants.

**3.7 WATERING**

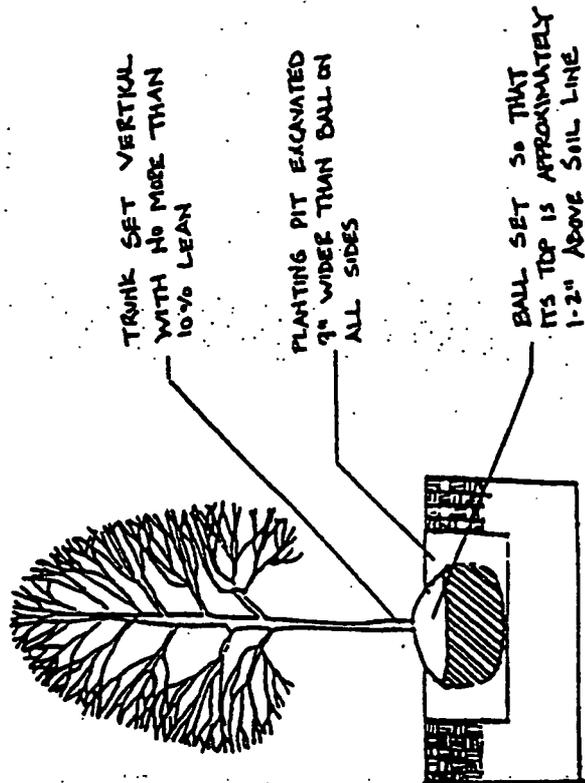
- A. Water all planted material weekly for 6 weeks following installation, unless otherwise directed by the Restoration Ecologist. Watering shall be sufficient to saturate the entire root ball. This typically requires the slow release of approximately 10 gallons of water for each plant.

**3.8 STAKING AND GUYING**

- A. Stake and guy trees only at the request of the Restoration Ecologist.

END OF SECTION

Detail A-1: Installation of Balled and Burlapped and Container-Grown Trees and Shrubs



SHRUB SET VERTICAL WITH NO MORE THAN 10% LEAN

BALL SET SO THAT ITS TOP IS APPROX. 1-2" ABOVE SOIL LINE

PLANTING PIT EXCAVATED 9" WIDER THAN BALL ON ALL SIDES

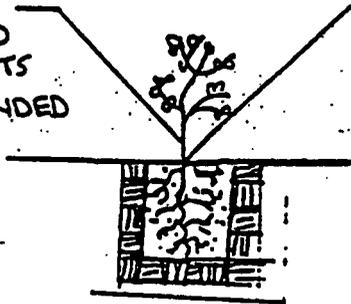
TRUNK SET VERTICAL WITH NO MORE THAN 10% LEAN

PLANTING PIT EXCAVATED 9" WIDER THAN BALL ON ALL SIDES

BALL SET SO THAT ITS TOP IS APPROXIMATELY 1-2" ABOVE SOIL LINE

Detail A-2: Installation of Bareroot Plants

PLANTING POT  
LARGE ENOUGH TO  
ACCOMMODATE ROOTS  
IN A FULLY EXTENDED  
POSITION



SET PLANT SUCH  
THAT UPPER MOST  
ROOTS ARE JUST  
BELOW THE SOIL  
SURFACE

**APPENDIX C**  
**SEEDING SPECIFICATIONS**

**SECTION 02930****VEGETATION****PART 1 GENERAL****1.01 SCOPE**

- A. This Section includes soil stabilization, which includes application of crusting agent and establishing vegetation by seeding. The work in this Section includes, but is not limited to; soil preparation, interim vegetation, permanent vegetation, application of fertilizer, application of mulches, and application of crusting agent.

**1.02 RELATED SECTIONS AND PLANS**

- A. Section 02200 - Earthwork
- B. Section 02270 - Surface-Water Management and Erosion Control
- C. Part 6 - Statement of Work
- D. Part 8 - Environmental Health & Safety/Training Requirements
- E. Part 9 - Quality Assurance Requirements

**1.03 REFERENCES**

- A. Latest version of Ohio Department of Natural Resources (ODNR) Rainwater and Land Development Standards (ODNR Rainwater and Land Development Standards).
- B. "*Identification and Listing of Hazardous Waste*", Title 40, Code of Federal Regulations (CFR), Part 261, Subpart E.C.
- C. "*Federal Hazardous Material Transportation Law*", U.S. Department of Transportation [U.S. DOT, 1994].

**1.04 SUBMITTALS**

- A. Submit the following to the Construction Manager for review at least 15 calendar days from Notice to Proceed:
  - 1. Proposed mixes and application rates for seed, mulch, fertilizers, and crusting agents;

2. Manufacturer's product data and recommended methods of application for seed, mulches, fertilizer, and crusting agents;
  3. Product data for fertilizer shall also include chemical analysis including uranium analysis to assure there is no resultant or derived uranium from fertilizer use, unless waived by Construction Manager;
  4. Material safety data sheet (MSDS) for fertilizer, mulch binder and crusting agent; and
  5. Inoculant information for the permanent seed mixes.
- B. Submit the following to the Construction Manager for review at least 30 calendar days before seeding:
1. Certificate stating seed mixture, guaranteed percentages of purity, weed content, germination of seed, name of seller, test date for the seed, and the net weight and date of shipment;
  2. Manufacturer's certificate stating the available nutrients contained in the proposed fertilizer;
  3. Manufacturer's certificate stating that the fiber matrix (wood fibers) meets the requirements of this Section;
  4. Manufacturer's certificate stating the mulch binder meets the requirements of this Section;
  5. Manufacturer's certificate stating the crusting agent meets the requirements of this Section; and
  6. Documentation of the straw to be used for mulch; this documentation shall verify that the straw is weed free in accordance with the requirements of this Section.
- C. Submit to the Construction Manager for review at least 10 calendar days before seeding a plan showing seeding area and a written statement of application rate of seed mix and/or associated materials (i.e., fertilizer, mulch, and mulch binder). Choice of seeding type shall follow the site seeding requirements and as approved by the Construction Manager.
- D. Provide a list of equipment, description of construction methods, and other required information for vegetation and application of crusting agent in the Contractor's Earthwork Work Plan specified in Section 02200.

## 1.05 HEALTH AND SAFETY REQUIREMENTS

- A. Environmental health & safety/training requirements shall be in accordance with Part 8 of the Contract Documents.

**1.06 CONTRACTOR'S QUALITY ASSURANCE**

- A. Contractor's quality assurance requirements shall be in accordance with Part 9 of the Contract Documents.

**PART 2 PRODUCTS****2.01 MATERIALS**

- A. Furnish seed labeled in accordance with U.S. Department of Agriculture (USDA) Rules and Regulations under the Federal Seed Act and applicable State seed laws. Furnish seed in sealed bags or containers bearing the date of expiration. Do not use seed after its date of expiration. Each variety of seed shall have a purity of not less than 90 percent by weight, a percentage of germination not less than 80 percent by weight, and a weed to seed content of not more than 0.75 percent by weight and contain no noxious weeds. Furnish seed mixtures having seed proportioned by weight in accordance with Tables 02930-1A, 02930-1B, 02930-1C, 02930-1D, and 02930-2. Any stabilization using crusting agent shall be followed by fall application of the appropriate permanent seed mix.
- B. Permanent seed mixes or areas to be seeded shall be treated with fungal (Mycorrhizae) inoculant and bacterial (Rhyzobium) inoculants. The specified legumes must be inoculated with the appropriate Rhizobial strains.
- C. Furnish mulch meeting the following requirements:
1. Mulch shall be straw or wood cellulose fiber, free of clay, stone, foreign substances, and free of weeds.
  2. Straw should not contain sticks larger than ¼-inch diameter or other materials that may prevent matting down during application. Use straw that is free from mold and other objectionable material for placing with mulch blower equipment or other equipment as approved by the Construction Manager. Straw shall be generally 6 inches or more in length.
  3. Straw shall be:
    - a. weed free straw from the Minnesota Crop Improvement Association or other certified weed free straw vendors;
    - b. straw that has been inspected and determined to be weed free by Central Ohio Seed Testing;
    - c. native prairie grass mulch; or
    - d. equivalent substitute as approved by the Construction Manager.
  4. Mulch applied by hydrospraying shall be a bonded fiber matrix containing wood fibers held together with a hydrocolloid-based binder, which upon drying becomes

insoluble and non-dispersible. The fibers shall be composed of 100 percent wood or wood by-products and shall be 100 percent biodegradable. Use a bonded fiber matrix containing a green dye that will provide for easy visual inspection for uniformity of slurry spread. The bonded fiber matrix, including dye, shall contain no growth or germination inhibiting properties. The wood cellulose fiber shall be manufactured in such a manner that, after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous material. When sprayed on the ground, the material shall allow absorption and percolation of moisture. The wood cellulose fiber shall meet the following requirements:

<u>Item</u>	<u>Specification Limit</u>
Particle Length	0.4 inch (maximum)
Particle Thickness	0.047 inch (maximum)
PH	4.0 to 8.5
Ash Content	1.6 % (maximum)
Water Holding Capacity (based on fiber dry weight)	500 % (minimum)
Moisture Content	12 % $\pm$ 3 % (by weight)

- D. Mulch binder agent shall be as approved by the Construction Manager and shall meet the following requirements:
1. The mulch binder shall be hydrocolloid base (guar gum) and shall not dissolve or disperse upon rewetting.
  2. The mulch binder shall not have hazardous characteristics of ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR Part 261, Subpart C, for a hazardous waste in either its pre-applied or cured states.
  3. The mulch binder shall have a flash point greater than 200°F. The mulch binder shall be neither a flammable nor combustible liquid per United States (US) Department of Transportation definition [U. S. DOT, 1994]. The mulch binder must not be susceptible to significant deterioration from exposure to the elements, including sunlight.
  4. The mulch binder shall be provided in concentrated solution and prepared so that it will not change in transportation or storage.
- E. The crusting agent shall be as approved by the Construction Manager and shall meet the following criteria:
1. Pine sap emulsion comprised of a 100 percent organic emulsion produced from naturally occurring resins (pine sap); or a mixture of Conwed Fiber's Enviroblend hydraulic mulch and Finn Corporation's A-500 Hydro-Stik tacking agent (mulch binder); or an approved equal;

2. Not comprised of chloride, lignosulfonate, petroleum, or asphaltic-type emulsions;
3. Provide dust suppression and surface stability for exposed soils, both disturbed and undisturbed soils, and exposed coal fired ash (fly ash);
4. Compatible with application via a hydro seeder, and must not require intense cleaning of equipment after application;
5. Non-tracking (i.e., will not stick to boots or tires) once cured;
6. Not have hazardous characteristics of ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR Part 261, Subpart C, for a hazardous waste in either its pre-applied or cured states;
7. Have a flash point greater than 200 °F;
8. Be neither a flammable nor combustible liquid per DOT definition; and
9. Not be susceptible to significant deterioration from exposure to the elements, including sunlight.

F. Erosion mat shall be in accordance with Section 02270.

G. Fertilizer:

1. Furnish commercial grade fertilizer, uniform in composition that meets the requirements of all State and Federal regulations and standards of the Association of Agricultural Chemists.
2. Fertilizer shall be slow release complete fertilizer.
3. Two types of fertilizer mixes shall be used. Fertilizer for application within the Southern Waste Units and the Former Production Area shall be 34-0-10; other fertilizers may be approved by the Construction Manager for the former production area, but they must not contain phosphorous. Fertilizer for other areas shall be 22-5-10. Fertilizers shall contain not less than 1 percent added sulfur and not more than 8 percent added iron, or an approved equal.
4. Fertilizer must have MSDS submitted in accordance with this Section.
5. Fertilizer shall be used for interim seeding only, unless otherwise approved by the Construction Manager.

H. Construction water shall be obtained from the on-site water source shown on the Construction Drawings.

## 2.02 EQUIPMENT

A. Provide equipment of size and type to perform work specified in this Section.

**PART 3 EXECUTION****3.01 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver containerized materials in uniform packages bearing the name of the manufacturer, the net weight and a statement of content. Deliver containerized materials to the site in original, properly labeled, unopened, clean containers each showing the manufacturer's guaranteed analysis conforming to applicable regulations and standards.
- B. Store materials in a dry area in a manner to prevent physical damage.

**3.02 GENERAL**

- A. Stabilization of disturbed areas by vegetation or by use of a crusting agent shall be performed at completion of excavation and stockpiles or within 7 calendar days of knowing a disturbed area will be idle for more than 45 calendar days, whichever is sooner.
- B. Crusting agents may be used as temporary measures prior to placement of interim vegetation after approval for the area by the Construction Manager.
- C. Interim vegetation, as specified in this Section, is required for all areas except OSDF final cover system and soil stockpiles, which are scheduled to be disturbed in future. Interim vegetation shall also be used to establish cover within forest patches planted in Site Restoration Projects. Fertilizer shall be used for interim vegetation as specified in this Section.
- D. Permanent vegetation is required as specified. Fertilizer generally shall not be used with permanent vegetation as specified in this Section. Fertilizer use may be determined appropriate by the Restoration Ecologist depending on specific field conditions.
- E. Disturbed areas which are scheduled to be disturbed after initial stabilization and/or need effective erosion control immediately, are to be stabilized with the interim seed mix rate specified in this Section. Disturbed areas which are not scheduled to be disturbed again are to be stabilized with the permanent seed mix rate specified in this Section. Soil piles, which require effective erosion control immediately, are to be stabilized with the interim seed mix rate or a crusting agent as specified in this Section.
- F. Stabilization of permanent slopes between 2H:1V and 3H:1V (horizontal to vertical) shall utilize an erosion mat as specified in Section 02270 after application of seed mixture. Erosion mat (i.e., Jute or approved equivalent) shall also be used on each OSDF Cap after seeding has occurred.

- G. Area(s) to be seeded shall be generally free of debris, rock, root material, and other objects that may impede soil preparation and seeding activities. Perform soil preparation by tilling/cultivating, to a depth of approximately 2 inches, to eliminate uneven areas and low spots. Maintain lines, levels and contours.
- H. Repeat cultivation in areas where equipment used for hauling and spreading has compacted the area(s) to be seeded.

### 3.03 APPLICATION

- A. The seeding season, for interim vegetation specified in this Section, is year round. However, if seeding is contemplated during the winter months of December through March, then field conditions should be assessed for ability to provide soil to seed contact. If field conditions do not support the ability to provide soil to seed contact then the area can be stabilized with a crusting agent followed by seeding during conditions conducive to adequate soil to seed contact.
- B. The seeding seasons for permanent seeding in wet and dry areas are Spring Season between April 1 and June 30 and Fall Season between September 15 and December 31. Seeding during the winter months is also acceptable if weather and field conditions are determined appropriate by the Restoration Ecologist and Construction Manager.
- C. Apply fertilizer, seed, and mulch to disturbed areas and areas excavated and graded under this Contract requiring seeding unless otherwise directed by the Construction Manager. Apply mulch within 24 hours of seeding; do not seed areas in excess of that which can be mulched within 24 hours. Winter application of seed and related materials are subject to adjustment as directed by the Construction Manager.
- D. Apply seed using either the drilling, broadcasting, or hydroseeding method, as described below:
  - 1. Seed drilling method:
    - a. This method shall be used for applying the permanent seed mix in accessible areas unless otherwise approved by the Construction Manager. The method may also be used for interim vegetation.
    - b. Prepare area to be seeded by loosening the soil to a minimum depth of 3 inches.
    - c. Apply commercial grade, slow release complete fertilizer, for all interim vegetation and permanent vegetation as determined appropriate, at a rate of 150 lbs/acre at the time of preparing the seedbed for seeding.
    - d. Install seed with a seed drill to obtain a final planting depth of ¼ to ½ inch using the seed rates indicated in Tables 02930-1A, 02930-1B, 02930-1C, 02930-1D,

and 02930-2. All seed drilling should be done perpendicular to the direction of surface-water flow to the degree possible.

2. **Broadcast Seeding Method:**

- a. This method may be used for interim vegetation, and can be performed with the use of mechanical "cyclone" seeders, by hand seeding or by any other method which scatters seed over the soil surface.
- b. This method may also be used for permanent seeding in areas that are not accessible with the seed drill (i.e., sloped areas) as approved by the Construction Manager and the Restoration Ecologist.
- c. If Broadcast Method is used to apply permanent seed mix in sloped areas (3H:1V slope or steeper), seeding application rates in Tables 02930-1A and 02930-1B, 02930-1C, 02930-1D should be doubled.
- d. Prepare the area to be seeded by loosening the soil to a minimum depth of 3 inches. This is critical to allow seeds to filter into the soil to avoid washout from runoff.
- e. Apply commercial grade, slow release complete fertilizer as needed at a rate of 150 lbs/acre at the time of preparing the seedbed for seeding.
- f. Install seed by broadcasting evenly over the entire site using the seed rates indicated in Table 02930-2.
- g. Rake the area after seeding.
- h. Lightly compact the seeded area with a roller or equivalent to ensure proper soil to seed contact.
- i. Mulch and disc-anchor using weed free mulch at a rate of 2.0 tons per acre. Spread straw mulch, either by hand or by blowing method, at the rate of 2 air-dried tons per acre. During June through September, increase straw mulch application rate to 3 air-dried tons per acre. Application of straw mulch by the blowing method is exempt from the dust control requirements specified in Part 6 of the Contract Documents.

3. **Hydroseeding Method:**

- a. This method may be used for interim vegetation only. Hydroseeding shall be a two-step process. The seed shall be applied first, followed by a separate application of the mulch. This is to ensure soil to seed contact.
- b. The mixture tank shall be cleaned prior to use to ensure remnant seed is not introduced to the proposed seed mixture.
- c. Prepare area to be seeded by loosening the soil to a minimum depth of 3 inches. This is critical to allow seeds to filter into the soil to avoid washout from runoff.

- d. Apply commercial grade, slow release complete fertilizer, for interim vegetation only, at a rate of 150 lbs/acre. The fertilizer is to be mixed and applied with the mulch.
- e. Install seed by hydroseeding evenly over the entire area using the seed rates indicated in Table 02930-2. Use a fan-type nozzle with approximately 500 gallons of water per acre to ensure even distribution.
- f. Rake the area where accessible following seeding.
- g. Apply sprayed mulch at a net dry weight of 2,000 pounds per acre minimum and 100 percent continuous coverage. Mix the mulch with water at a ratio of 50 pounds of mulch per 100 gallons of water.

E. Application of Crusting Agent:

1. Apply crusting agent in accordance with manufacturer's directions.
2. Unless otherwise specified by the manufacturer, dilute concentrated pine sap emulsion to ratio of 4 parts water to 1 part concentrate. Apply diluted pine sap emulsion at a rate of 2,500 gallons per acre.
3. Apply a mixture of Conwed Fiber's Enviroblend hydraulic mulch and Finn Corporation's A-500 Hydro-Stik mulch binder, using the hydroseeder, at the rate of 1,000 lbs/acre on flat surfaces; and 1,125 lbs/acre on slopes greater than 3H:1V. The mixture rate for each product shall be 20 lbs/acre on flat surfaces and 30 lbs/acre on greater than 3H:1V slopes for the hydraulic mulch; and 20 lbs/acre on flat surfaces and 30 lbs/acre on slopes greater than 3H:1V for the Hydro-Stik mulch binder.

### 3.05 MAINTENANCE

- A. Maintain the vegetated areas in satisfactory condition until acceptance of the vegetation by the Construction Manager. Maintenance of the vegetated areas includes repairing eroded areas, revegetating when necessary, watering, and mowing (if applicable). A satisfactory condition of vegetated area is defined as follows:
  1. An area shall have a predominant stand of the seeded vegetation;
  2. Within 3 weeks, germination must occur over 90 percent of the area with no single bare area greater than 3 square feet; and
  3. Within 3 months, 90 percent of the area must be covered with mature vegetation.
- B. The above timeframes for germination and coverage requirements are to be delayed during the dormant season between November 1 and March 15 application of the seed. The performance criteria shall be measured at the beginning of the growing season (April 1) for seed applied during the previous dormant season.

- C. Areas that fail to meet these requirements shall be repaired or reseeded as necessary to produce an acceptable stand of vegetation, as specified in this Section.
- D. The acceptance inspection will be performed by the Construction Manager who will determine whether repair of vegetated areas or revegetation is required.
- E. Maintain areas with a crusting agent to ensure proper erosion control. The crusting agent shall be reapplied to eroded and bare areas as necessary.

### **3.06 WARRANTY**

- A. Vegetated areas shall be subject to a warranty period of not less than 12 months from initial establishment of vegetation over 100 percent of the areas seeded.
- B. At the end of the warranty period, the Construction Manager and Restoration Ecologist will perform an inspection of the area. Seeded areas not demonstrating satisfactory condition of vegetation as specified in this Section, shall be repaired, reseeded, and maintained to meet requirements as specified in this Section at the Contractor's expense.

### **3.07 ACCEPTANCE**

- A. The vegetated areas shall be accepted at the end of the warranty period if a satisfactory condition exists as defined in this Section.
- B. After disturbed areas are stabilized and all necessary corrective work has been completed, the Construction Manager will certify in writing the final acceptance of the vegetated areas.

### **3.08 CONSTRUCTION QUALITY REQUIREMENTS**

- A. CQC Consultant will monitor vegetation and crusting agent application in accordance with this Section and Construction Quality Assurance (CQA) Plan.

TABLE 02930-1A

## SEED MIX IN UPLAND AREAS FOR PERMANENT VEGETATION

Species	Pounds Per Acre (lb/ac)
Big Bluestem ( <i>Andropogon gerardi</i> )	3
Little Bluestem ( <i>Andropogon scopariu</i> )	2
Side-Oats Grama ( <i>Bouteloua curtipendula</i> )	0.5
Indian Grass ( <i>Sorghastrum nutans</i> )	2
Canada Wild-Rye ( <i>Elymus canadensis</i> )	25
Switch grass ( <i>Panicum virgatum</i> )	0.5
ReGreen ( <i>n/a</i> )	5
Wildflowers, uniform mix of the following:	1.5
Butterflyweed ( <i>Asclepias tuberosa</i> )	
Smooth Aster ( <i>Aster laevis</i> )	
Ox-eye Sunflower ( <i>Heliopsis helianthoides</i> )	
Bergamot ( <i>Monarda fistulosa</i> )	
Purple Coneflower ( <i>Echinacea purpurea</i> )	
Yellow Coneflower ( <i>Ratibida pinnata</i> )	
Black-Eyed Susan ( <i>Rudbeckia hirta</i> )	
Spiderwort ( <i>Tradescantia ohioensis</i> )	
Hoary Vervain ( <i>Verbena stricta</i> )	
Beardtongue ( <i>Penstemon grandiflorus</i> )	
Sweet Joe Pye-Weed ( <i>Eupatorium purpureum</i> )	
Blue False Indigo ( <i>Baptisia australis</i> )	
Partridge Pea ( <i>Cassia fasciculata</i> )	
Round-headed Bush Clover ( <i>Lespedea Capitata</i> )	
Rattlesnake Master ( <i>Eryngium yuccifolium</i> )	
Stiff Goldenrod ( <i>Solidago risida</i> )	

000072

TABLE 02930-1B

## SEED MIX IN WET AREAS FOR PERMANENT VEGETATION

Species	Pounds Per Acre (lb/ac)
Big Bluestem ( <i>Andropogon gerardi</i> )	3.0
Canada Wild-Rye ( <i>Elymus canadensis</i> )	25
Virginia Wild-Rye ( <i>Elymus virginicus</i> )	5.0
Switch Grass ( <i>Panicum virgatum</i> )	0.5
Blue Joint Grass ( <i>Calamagrostis canadensis</i> )	0.5
Porcupine Sedge ( <i>Carex hystericina</i> )	1 ounce per acre (oz/ac)
Fox Sedge ( <i>Carex vulpinoidea</i> )	1 ounce per acre (oz/ac)
Dark Green Bulrush ( <i>Scirpus atrovirens</i> )	1 ounce per acre (oz/ac)
ReGreen ( <i>n/a</i> )	5.0
Prairie Cordgrass ( <i>Spartina pectinata</i> )	1.0
Wildflowers, uniform mix of the following:	1.5
Red Milkweed ( <i>Asclepias incarnata</i> )	
New England Aster ( <i>Aster novae-angliae</i> )	
Wild Senna ( <i>Cassia hebecarpa</i> )	
Great Blue Lobelia ( <i>Lobelia siphilitica</i> )	
Yellow Coneflower ( <i>Ratibida pinnata</i> )	
Blue Vervain ( <i>Verbena hastata</i> )	
Spotted Joe-Rye Weed ( <i>Eupatorium maculatum</i> )	
Cardinal Flower ( <i>Lobelia cardinalis</i> )	
Sawtooth sunflower ( <i>Helianthus grosseserratus</i> )	

000073

TABLE 02930-1C

## SEED MIX IN SANDY DRY AREAS FOR PERMANENT VEGETATION

Species	Pounds Per Acre (lb/ac)
Big Bluestem ( <i>Andropogon gerardi</i> )	0.5
Little Bluestem ( <i>Andropogon scopariu</i> )	3.0
Side-Oats Grama ( <i>Panicum virgatum</i> )	5.0
Canada Wild-Rye ( <i>Elymus canadensis</i> )	25
Annual Rye ( <i>Lolium multiflorum</i> )	5.0
Indian Grass ( <i>Sorghastrum nutans</i> )	0.5
Prairie Dropseed ( <i>Sporobulus heterolepis</i> )	1.5
Wildflowers, uniform mix of the following:	(ounces per acre)
Butterflyweed ( <i>Asclepias tuberosa</i> )	5.0
Smooth Aster ( <i>Aster laevis</i> )	0.25
Blue False Indigo ( <i>Baptisia australis</i> )	4.0
White False Indigo ( <i>Baptisia leucantha</i> )	4.0
Partridge Pea ( <i>Cassia fasciculata</i> )	3.0
Purple Coneflower ( <i>Echinacea purpurea</i> )	3.0
Ox-eye Sunflower ( <i>Heliopsis helianthoides</i> )	1.75
Lupine ( <i>Lupinus perennis</i> )	7.0
Bergamot ( <i>Monadara fistulosa</i> )	0.25
Beardtongue ( <i>Penstemon grandiflorus</i> )	1.0
Yellow Coneflower ( <i>Ratibida pinnata</i> )	0.25
Black-Eyed Susan ( <i>Rudbeckia hirta</i> )	0.25
Stiff Goldenrod ( <i>Solidago risida</i> )	0.25
Hoary Vervain ( <i>Verbena stricta</i> )	0.5

000074

TABLE 02930-1D

## SEED MIX FOR PERMANENT VEGETATION ON OSDF CAP

Species	Pounds Per Acre (lb/ac)
Little Bluestem ( <i>Andropogon scoparius</i> )	3.0
Side-Oats Grama ( <i>Bouteloua curtipendula</i> )	5.0
Canada Wild-Rye ( <i>Elymus canadensis</i> )	25
Switch grass ( <i>Panicum virgatum</i> )	1.0
Prairie Dropseed ( <i>Sporobolus heterolepis</i> )	1.5
Buffalo Grass ( <i>Buchloe dactyloides</i> )	1.0
Annual Rye ( <i>Lolium multiflorum</i> )	10
Wildflowers, uniform mix of the following:	(ounces per acre)
Butterflyweed ( <i>Asclepias tuberosa</i> )	3.0
Smooth Aster ( <i>Aster laevis</i> )	0.25
Blue False Indigo ( <i>Baptisia australis</i> )	3.5
Partridge Pea ( <i>Cassia fasciculata</i> )	2.0
Purple Coneflower ( <i>Echinacea purpurea</i> )	2.0
Ox-eye Sunflower ( <i>Heliopsis helianthoides</i> )	1.75
Bergamot ( <i>Monarda fistulosa</i> )	0.25
Beardtongue ( <i>Penstemon grandiflorus</i> )	1.00
Yellow Coneflower ( <i>Ratibida pinnata</i> )	0.375
Black-Eyed Susan ( <i>Rudbeckia hirta</i> )	0.125
Stiff Goldenrod ( <i>Solidago risida</i> )	0.750
Spiderwort ( <i>Tradescantia ohioensis</i> )	1.0
Hoary Vervain ( <i>Verbena stricta</i> )	0.50

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**TABLE 02930-2**  
**SEED MIX FOR INTERIM VEGETATION**

Species	Pounds Per Acre (lb/ac)
ReGreen (n/a)	40
Annual Rye Grass ( <i>Lolium multiflorum</i> )	20
Canada Wild Rye ( <i>Elymus canadensis</i> )	20
Partridge Pea ( <i>Cassia fasciculata</i> )	2 oz./Acre
Black-Eyed Susan ( <i>Rudbeckia hirta</i> )	2 oz./Acre

[END OF SECTION]