A. Invasive Plant Guidelines:

1. Pre-construction Inventory and Mapping

   1.1 Licensee may elect to perform a pre-construction inventory of invasive plants present on the portion of the right-of-way premises where construction is planned to determine appropriate prevention methods, predict control needs, and assess its level of responsibility for management of invasive species and populations. The inventory objective is to locate established invasive plant species populations.

   1.2 If Licensee elects to undertake an inventory as described in Section 1.1, all areas which may be disturbed by the planned construction activity should be inventoried for the plant species listed in DCNR’s Invasive Plants brochure during the growing season from May through September by a qualified botanist.

   1.3 Inventory data should be collected from the entire area of the planned construction on state forest land and any buffer areas that may be appropriate, in grid cells no greater than 150’ x 150’ in size. The established grid should be digitized into a GIS layer and printed on maps that will be used for field data accumulation. Standard information including date, surveyor name, and grid cell number should always be recorded prior to beginning the actual survey. During the field study the center of each grid cell should be located using GPS, and an inventory created by noting the presence of any invasive plant species or the complete absence of any invasive species within the specified grid cell and a note of the dominant species per plant type (e.g., herbaceous, shrub, tree) should be recorded. For each invasive species occurrence, the cover class within each grid cell should be recorded as trace, low, moderate, or high, according to the Montana Noxious Weed Survey and Mapping System. All trace and low occurrence locations should be located by GPS to aid in relocation and treatment. For each invasive species in each grid cell, the average growth stage should be recorded as seedling, bolt, bud, flower, seed set, or mature, according to the Montana Noxious Weed Survey and Mapping System.

   1.4 If Licensee elects to forego the above described pre-construction survey for invasive species, Licensee shall be responsible for all occurrences of post-construction infestations of invasive species that may be found in the construction area regardless of origin or amount and will be required to perform management and control activity as described in Section 3 below.
2. Prevention

2.1 Where no invasive plants are detected, Licensee should use only PA Department of Agriculture certified seed and weed free soil, dirt, and mulch whenever feasible. If materials certified as weed free cannot readily be obtained, the source of materials being used shall be inspected for invasive plants during the growing season by a qualified botanist and used only if deemed weed-free.

2.2 Mulching with straw rather than hay is recommended to reduce the possibility of introducing invasive species propagules.

2.3 Where heavy infestations of Japanese stiltgrass (*Microstegium vimineum*) are detected during pre-construction surveys, a seed mix of Autumn bentgrass (*Agrostis perrenans*) and deer tongue (*Dichanthelium clandestinum*) should be planted as aggressive competition against the seed-banked invasive Japanese stiltgrass. Seeding specifications will be provided by the District Forester. As an alternative, application of herbicide to large patches of Japanese stiltgrass during the summer with a 2% glyphosate solution in water mixed with surfactant may be utilized at the direction of the District Forester.

2.4 Licensee at its option may, prior to bringing equipment into un-invaded areas or onto state forest land, clean its equipment in an appropriate manner (see http://www.fs.fed.us/eng/pubs/pdf/05511203.pdf) to remove plant parts such as rhizomes and seeds that might be carried on tires and the equipment undercarriage, which may help prevent the spread of invasive species onto adjacent lands.

2.5 Pre-treatment of identified invasive species infestations of herbaceous species or species that reproduce prolifically from rhizome/root segments with herbicides prior to construction may be performed at the direction of the District Forester.

3. Management

3.1 Management and control of established invasive plant populations shall be planned on a species-by-species basis to determine the best method of control. Licensee and its consultant shall submit a “Management and Control Plan” to District Forester no fewer than three (3) months after the conclusion of all construction activity.

3.2 Licensee shall include a post-construction invasive survey report with the same survey parameters as described in Section 1 above, in the Management and Control Plan. The District Forester and Ecological Services Section will assist Licensee in the development of appropriate management methods by species and/or invasive occurrence.

-D2
3.3 Post-construction invasive species surveys along access roads shall be limited to areas where gravel was placed or the existing road was widened for Licensee use. After a period of two growing seasons, any new invasive populations will be assumed to be the result of sources other than the Licensee’s construction materials and equipment. Control and monitoring of invasive species found along access roads within two growing seasons post-construction will continue until populations are eradicated.

3.4 Licensee and the Bureau of Forestry will coordinate with the other jurisdictional agencies about species of special concern and the potential impacts invasive species management activity may produce.

4. Monitoring

4.1 Licensee shall make provisions to monitor for invasive species within the area(s) disturbed by the construction activity for a period of five (5) years following construction or until invasive species are not observed on-site for two consecutive years, whichever is longer.

4.2 Licensee shall perform an annual survey for the presence of invasive species within the construction area, as described in 4.1 above, following major construction. The annual survey should follow the same methods as the pre-construction survey method described in Section 1. The only exception to the method described in Section 1 is the grid cell boundaries only need to be checked occasionally with the GPS to ensure that monitoring alignment is consistent with the original inventory alignment.

5. Reporting

5.1 The results of all Licensee annual invasive surveys shall be summarized into a report, which shall include the following elements: methods, a summary of invasive species detected, abundance of each species, number of new populations per species, number of eradicated populations by species, and management recommendations for management and control. Report and raw electronic observation data shall be submitted to District Forester and Ecological Services within 60 days following completion of the report. Submission of any electronic data should occur simultaneously with the written report submission. Data recording and management should be consistent year-to-year so data can easily be compared by grid cell number. The Department reserves the right to audit the findings of the Licensee’s reports and as a result of any audit, Department may require alternate methods of management and control.

5.2 Department may publish reports, raw data, or articles summarizing invasive species management and monitoring efforts from time to time. Licensee will be consulted prior to publication of any reports or raw data for comment.
B. Revegetation Guidelines:

Right of Way (ROW) projects across lands managed by DCNR have the potential to disturb sizable acreage. The revegetation goals of this disturbed acreage are erosion and sedimentation control, wildlife habitat and aesthetics. The following revegetation plan provided by DCNR will address the revegetation goals.

There are four vegetative components to the plan: native and non-native mix of grasses and legumes mix in the disturbed pipeline ROW, clumps of shrubs within the pipeline and work area, a native mix of grasses and herbs (district request) and a non-native legume mix (district request).

In addition, basking areas and habitat for the Timber Rattlesnake and the Allegheny Woodrat will be created where appropriate throughout the pipeline corridor whenever materials are available, and at the discretion of the onsite biologist and the District Forester/Park Manager or their designee. For timber rattlesnakes, the available rocks will be piled on the disturbed side of the ROW or on the south side if both sides are disturbed. In order to create basking habitat, the rocks should be placed in piles, with large flat rocks laid horizontally. The crevices created will allow the snakes to thermo-regulate, or to retreat if threatened. Conifers should not be planted near these created basking areas to avoid shading the rocks. Elsewhere throughout the pipeline corridor, wood rat habitat can be created by placing the rock material adjacent to existing, forested rock areas found next to the temporary workspace. Some conifers can be planted near the created woodrat habitat, but deciduous, mast-producing trees such as chestnut oak are more desirable. Additional tree and shrub species suitable for wood rat restoration will be provided by the Ecological Section of PA Bureau of Forestry.

DISTURBED ROW
revegetation strategy

The native and non-native grass mix is the main component of the revegetation plan and will be used for cover and stabilization in the disturbed ROW.

In order to establish a quick cover for stabilization and reduce the chance for invasive species to establish, a cover crop will be mixed in with the native and non-native grass mix. The cover crop will either be oats if the seeding takes place in the Spring (i.e., prior to June 15th) or grain rye if the seeding takes place in the Fall (after June 15th). This can be applied at the same time with the mix below and can be done with the hydro seeder. The cover crop be applied at one (1) bushel/acre. Seeding needs to be completed as soon as possible. Optimum seeding times are before mid-April or after mid-September, if possible, for the best chance of successful established cover. No permanent seeding should be conducted between June 30th and August 31st unless agreed to by the District Forester/Park Manager or their designee. District Forester/Park Manager or designee may substitute annual rye grass for cover crop.
**Native/Non Native Grass and Legume Mix**

**Areas with Less Than 15% Slope**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lime</td>
<td>3 tons per acre</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>500 pounds per acre</td>
</tr>
<tr>
<td>Orchard Grass</td>
<td>3 pounds per acre</td>
</tr>
<tr>
<td>Little Blue Stem</td>
<td>2 pounds per acre</td>
</tr>
<tr>
<td>Purple Top</td>
<td>2 pounds per acre (Tridens flavus)</td>
</tr>
<tr>
<td>White Clover</td>
<td>8 pounds per acre</td>
</tr>
<tr>
<td>Timothy</td>
<td>4 pounds per acre</td>
</tr>
<tr>
<td>Canadian Wild Rye</td>
<td>2 pounds per acre</td>
</tr>
<tr>
<td>Deer Tongue</td>
<td>5 pounds per acre</td>
</tr>
<tr>
<td>Partridge Pea</td>
<td>0.5 pounds per acre</td>
</tr>
<tr>
<td>Black-eyed Susan</td>
<td>0.5 pounds per acre (Rudbeckia hirta)</td>
</tr>
<tr>
<td>Annual Rye Grass</td>
<td>5 pounds per acre (delete if using spring oats or grain rye)</td>
</tr>
</tbody>
</table>

**Areas with Greater Than 15% Slope**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lime</td>
<td>3 tons per acre</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>500 pounds per acre</td>
</tr>
<tr>
<td>Orchard Grass</td>
<td>6 pounds per acre</td>
</tr>
<tr>
<td>Indian Grass</td>
<td>3 pounds per acre</td>
</tr>
<tr>
<td>Purple Top</td>
<td>3 pounds per acre</td>
</tr>
<tr>
<td>Switch Grass</td>
<td>2.5 pounds per acre (Blackwell Variety)</td>
</tr>
<tr>
<td>River Bank Rye</td>
<td>1.5 pounds per acre</td>
</tr>
<tr>
<td>White Clover</td>
<td>8 pounds per acre</td>
</tr>
<tr>
<td>Timothy</td>
<td>5 pounds per acre</td>
</tr>
<tr>
<td>Deer Tongue</td>
<td>8 pounds per acre</td>
</tr>
<tr>
<td>Black-eyed Susan</td>
<td>0.5 pounds per acre (Rudbeckia Hirta)</td>
</tr>
<tr>
<td>Partridge Pea</td>
<td>0.5 pounds per acre</td>
</tr>
<tr>
<td>Annual Rye Grass</td>
<td>10 pounds per acre (delete if using spring oats or grain rye)</td>
</tr>
</tbody>
</table>

**TEMPORARY WORK AREA REVEGETATION STRATEGY**

The temporarily disturbed work area will be revegetated with conifers and pockets of shrubs. The conifer species include white pine (*Pinus strobus*), pitch pine (*Pinus rigida*), Virginia pine (*Pinus virginiana*) (south of route 80) and red pine (*Pinus resinosa*) (north of route 80). Conifers will be planted on the disturbed side of the ROW when it parallels an existing ROW and on both sides when the ROW does not parallel an existing pipeline. The conifers will be planted in a staggered fashion at approximately 6’ by 6’ spacing.
Pockets of shrubs will be planted approximately every 200 feet on the side of the ROW where disturbance has taken place. These plantings will comprise approximately 200 square feet (10’ X 20’). Each pocket will be planted with 10 -15 shrubs using seedlings. Shrub Group Plantings will be alternated along the right of way. These plantings will need to be fenced to protect from damage by browsing herbivores. Fencing will consist of 8’ woven wire fence. Posts, fencing, other materials, seedlings and labor will be provided by the company constructing the pipeline. Fencing requirement may be waived by the District Forester/Park Manager or designee.

**Shrub Groups**

**Group 1**  
**Hawthorn/Crabapple group**
- Washington Hawthorn (Crataegus phaenopyrum)
- American Sweet Crabapple (Malus coronaria)
- Cockspur Hawthorn (Crataegus crus-galli)
- Large-seed Hawthorn (Crataegus macrosperma)
- Frosted Hawthorn (Crataegus pruinosa)
- Dotted or White Hawthorn (Crataegus punctata)
- Sargents Crabapple (Malus sargentii)
- Toringo Crabapple (Malus toringo)

**Group 2**  
**Serviceberry Group**
- Shadbush (Amelanchier arborea)
- Smooth Shadbush /Allegheny Amelanchier laevis)
- Low Shadbush (Amelanchier stolonifera)

**Group 3**  
**Mast Producing Group**
- Black Locust (Robinia psuedoacacia)
- American Mountain Ash (Sorbus Americana)
- Black Haw Viburnum (Viburnum prunifolium)
- American Hazelnut (Corylus Americana)
- Dwarf Chinquapin Oak (Quercus prinoides)
- Scrub Oak (Quercus ilicifolia)

**Group 4**  
**Blackberry/Raspberry Group**
- Rubus allegheniensis
- Rubus argutus
- Rubus Canadensis
- Rubus occidentalis
- Rubus strigosus
**Group 5 Host Group**

- Black-haw (*Viburnum prunifolium*)
- Nannyberry (*Viburnum lentago*)
- Highbush blueberry (*Vaccinium corymbosum*)
- New Jersey Tea (*Ceanothus americanus*)
- Black chokeberry (*Photinia melanocarpa*)
- Bush Honeysuckle (*Diervilla lonicera*)
- Pinxter-flower (*Rhodendron periclymenoides*)
- Staghorn sumac (*Rhus typhina*)

Shrubs groups will be alternated along the length of the ROW. Species within each group will be selected by the District Forester/Park Manager or his designee from the above lists.

The Bureau of Forestry expects a minimum of 75% survival rate for the first year for tree and shrub seedlings. Replacements will be planted the following spring of the year. Attached are tree planting notes that will help to ensure success.

**RIGHT-OF-WAY ACCESS POINTS**

Where the ROW crosses public use roads or other access points a barricade of boulders or a fence constructed of material approved by the District Forester/Park Manager or their designee will be placed on both sides of the access edge. This barricade will consist of boulders and rocks of sufficient size, piled to deter the use of the ROW by ATVs and other motorized vehicles. A coniferous screen of red pine, white pine, pitch pine and Virginia pine will be planted behind this barricade. The screen will be approximately 20 feet in width and will constitute three rows of trees with staggered plantings at approximately a 6’ by 6’ spacing. This screen will actually be an extension of the ROW edge plantings.

**NON-NATIVE LEGUME MIX FOOD PLOTS**

A non-native legume mix or native grass and herb mix can be used as areas of revegetation in the disturbed ROW. These areas are to be located at the discretion of the Forest District or State Park. The Non–Native legume plots should be three (3) – five (5) acres in size and not to exceed one plot per 8 miles of ROW.
Non-Native Grass and Legume Mix for Herbivores

Ladino Clover 2lbs/acre
White Dutch Clover 2 lbs/acre
Alskie Clover 2 lbs/acre
Birdsfoot trefoil (norcen variety) 9 lbs/acre
Oats or wheat 2 bushels/acre
Use oats in spring and wheat in the fall
Lime at 3 tons per acre
Fertilize with 10-20-20 at 500 pounds per acre

Native Grass and Herb Mix

20% Little Bluestem PA ecotype (Andropogon scoparius)
10% Big Bluestem variety “Niagra” (Andropogon gerardii) (genetic origin is NY)
15% Virginia Wild Rye PA ecotype (Elymus virginicus)
10% Indiangrass PA ecotype (Sorghastrum nutans)
10% Deertongue variety “Tioga” (Panicum clandestinum)
5% Switchgrass variety “Shelter” (Panicum virgatum) (genetic origin is WV)
5% Partridge Pea PA ecotype (Chamaecrista fasciculata)
3% Showy Tick Trefoil PA ecotype (Desmodium canadense)
5% Ox-eye sunflower PA ecotype (Heliopsis helianthoides)
2% Autumn bentgrass PA ecotype (Agrostis perennans)
2% Woolgrass PA ecotype (Scirpus cyperinus)
3% Soft Rush PA ecotype (Juncus effusus)
5% Pennsylvania smartweed PA ecotype (Polygonum pensylvanicum)
5% Common Milkweed PA ecotype (Asclepias syriaca)

The recommended seeding rate is 15 lb/acre.

Native grass and herb plots should be one acre (1) in size and located so that erosion and sedimentation is not a concern. These plots should not exceed one for every eight miles of right of way.

ADDITIONAL NOTES FOR REVEGETATION STRATEGY

Access roads to the ROW will originate outside of the ROW within the adjacent forest. Metal gates painted black and yellow will be installed and follow Bureau of Forestry’s specifications.

Only weed-free seed, dirt, gravel, and mulch should be used on the state forest land section of the pipeline.

Prior to bringing equipment onto state forest land and prior to moving equipment from heavily invaded areas (identified during the pre-construction inventory) into un-invaded areas, equipment should be cleaned in an appropriate manner to remove plant parts such as rhizomes and seeds that might be carried on tires, equipment undercarriage, etc.

-D8-
STREAM CROSSINGS

As part of the PA DEP permit process, specific streams impacted by the construction of a natural gas pipeline ROW will be planted for canopy coverage with trees and shrubs or just shrubs. A list of streams will be provided at the start of the project. Plant material will be from stock native to the Allegheny Ridge and Valley Region (central Pennsylvania), the Allegheny Plateau Region (western Pennsylvania). These plantings need to be protected from browsing herbivores with an eight (8) foot woven wire fence. This fencing requirement may be waived by the District Forester or designee. The use of tree shelters is prohibited unless approved by the District Forester/Park Manager.

Planting Stock for Stream Crossings

<table>
<thead>
<tr>
<th>Tree Species</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Willow</td>
<td>Salix nigra</td>
</tr>
<tr>
<td>Black Chokeberry</td>
<td>Aronia melanocarpa</td>
</tr>
<tr>
<td>Winterberry</td>
<td>Ilex Verticilata</td>
</tr>
<tr>
<td>Silky Dogwood</td>
<td>Comus amomun</td>
</tr>
<tr>
<td>Red Maple</td>
<td>Acer Rubrum</td>
</tr>
<tr>
<td>Yellow Birch</td>
<td>Betula alleghaniensis</td>
</tr>
<tr>
<td>White Oak</td>
<td>Quercus Alba</td>
</tr>
<tr>
<td>Tulip Poplar</td>
<td>Liriodendron tulipifera</td>
</tr>
<tr>
<td>Easter Hemlock</td>
<td>Tsuga Canadensis</td>
</tr>
</tbody>
</table>

WETLANDS

Wetlands impacted by the construction of the natural gas pipeline right of way will not be reseeded. Topsoil from the wetland will be stock piled until construction is completed. Topsoil will be replaced on the disturbed area an allowed to reseed naturally.

* A copy of the Erosion and Control Plan must be submitted to DCNR. DCNR does not approve E&S plans. This copy is for DCNR’s information only.