Plant Protection BMPs

- Limit removal of vegetation to that necessary for construction of the project.
- Extreme precautions shall be taken within riparian areas to prevent unnecessary removal of vegetation during construction. Areas cleared of vegetation must be stabilized with appropriate seed mix within three days of the completion of the disturbance.
- Planting with woody shrub species must take place at the next available and appropriate season following construction.
- Limit tree clearing to the minimum required width to meet safety clearances, leave root systems in place, except over underground installations or where other earthwork must be conducted. Leave herbaceous and shrub vegetation intact wherever practicable.
- Where practicable, fell trees parallel to and within the ROW to minimize the potential for off-ROW vegetation damage.
- Control the spread of invasive plants:
    - Precautions shall be taken to prevent import or transport of soil or seed stock containing nuisance or invasive species such as Purple Loosestrife, Knotweed, or Phragmites. The contractor responsible for work shall appropriately address invasive species in accordance with the NHDOT Best Management Practices for Roadside Invasive Plants (2008).
    - Control invasive plant species such as Purple loosestrife (Lythrum salicaria) and Common reed (Phragmites) by measures agreed upon by the DES Wetlands Program if any such species is found in the stabilization areas during construction or during the early stages of vegetative establishment.
    - Environmental monitors (EMs) will identify existing invasive species in the work area.
    - Train construction contractors responsible for vegetation removal to identify common invasive plant species.
    - Perform regular inspection and cleaning of construction equipment and vehicles on the right-of-way as appropriate where invasive species are present.
    - If invasive species are removed due to construction activity, cut when dormant or prior to seed set to the extent practicable, and dispose of in a manner and location that precludes spread.
    - Use soil from local sources. To the extent possible, match soil texture with soil texture found in impacted habitat. Only weed-free soil fill or topsoil, as determined by the supplier, will be brought on site.
    - Use weed-free/invasive-free straw bales, wattles, and mulch for erosion and sediment control.
    - Re-vegetate disturbed areas quickly using specified native seed mixes that are devoid of invasive species in accordance with New Hampshire Department of Agriculture regulations.
- Follow specified erosion control BMPs during construction. Depending on the site, BMPs may include installation of silt fence, straw wattles, mulch/stump grinding berms, straw bales, or check dams, and covering bare soils with mulch, blown straw, bonded fiber matrix or fiber rolls to protect drainage ways and streams from sediment runoff.
- Use BMPs for minimizing soil rutting and compaction.

Threatened and Endangered Plants

- Locations of known rare plants will be resurveyed and flagged with coded flagging by a qualified botanist prior to clearing and site preparation.
- Fence sensitive areas adjacent to impact areas as needed to prevent impacts beyond the work zone, and install signs along construction access roads to mark areas of resource sensitivity.
- The EM will discuss threatened and endangered plant issues at the morning tailboard meetings with Contractors for all clearing, site preparation and construction work taking place in sensitive areas.
- A contractor training program will be developed prior to clearing, site preparation or construction activities to familiarize the crews with the locations and species that will require special consideration. This will be the responsibility of the EM or a qualified botanist.
- In addition to the general avoidance measures listed above for all resource areas, the following practices will be instituted to avoid impacts to rare species and communities wherever practicable.
    - Clear and conduct site preparation activities in sensitive plant locations when the ground is frozen and snow cover is present, to the extent practicable.
    - If clearing and site preparation takes place when the ground is not frozen, use construction matting to cover the ground in the areas of perennial RTE plants to minimize impacts.
    - If project constraints require clearing and site preparation to be performed during the growing season, perform work after the plant in question has set seed, especially if the plant is an annual, to the extent practicable. If the RTE plant to be impacted is a perennial, perform construction as late in the growing season as possible.
    - Use BMPs to avoid and minimize compaction of surficial soil. At the conclusion of construction, restore the native topsoil that was

Vegetated Pathways

- Avoid and minimize all clearing and site preparation activities in nine locations identified as "Vegetated Pathways" to the minimum necessary for project construction. These locations will be managed to allow the growth of taller, woody vegetation to provide cover for wildlife species to move across the ROW.

Town	Location by Structure*	Begin	End
Pittsburg	DC 14 -15	71+00	74+50
Clarksville	DC 29 - 30	161+00	163+50
Stewartstown	DC 135 - 136	404+00	406+00
Dixville	DC 172 - 173	630+00	637+00
Millsfield	DC 256 - 257	1103+00	1104+25
Hill	DC 1213-1214	6762+00	6767+00
Franklin	DC 1237 - 1238	6895+00	6897+50
Canterbury	3132 26 - 27	147+00	151+50
Canterbury	3132 29 - 32	166+50	188+00

*Locations are towards the middle of the span created by the two structures noted.

Restoration BMPs

- Seed and stabilize disturbed areas in or adjacent to wetlands or surface waters within 3 days once construction is complete in specific areas. All other areas will be stabilized within 7 days of construction completion, or earlier, if precipitation is in the forecast.
- Consult with NH NHB regarding restoration activities in RTE plant locations. Allow RTE plant locations to reseed naturally without seed mix, unless directed by NH NHB to collect seed from adjacent (unimpacted plants) for use during restoration.
- When restoring impact areas without RTE plant species, use seed mix containing only native plants. Seed mix should be selected based on conditions (e.g., upland vs wetland) and should contain common native species associated with the impacted habitat. Provide NH NHB with a description of the proposed seed mix prior to use in the project area.
- Carry out any necessary revegetation within the White Mountain National Forest in a manner that is consistent with the 2005 or superseding White Mountain National Forest Land and Resource Management Plan.
- Restoration of temporary wetland impact areas shall have at least 75% successful establishment of wetlands vegetation after two (2) growing seasons, or they shall be replanted and re-established until a functional wetland is replicated in a manner satisfactory to the DES Wetlands Program.
- Perform post-construction inspection or monitoring in restored sensitive plant locations for a period of two years following completion of construction activities in that location.

Operational BMPs

Operational best management practices for plant and wildlife protection address regular and emergency vegetation management activities, line maintenance and repair, inspection activities, and ground line treatment programs.

These operations and maintenance activities will be conducted within the Northern Pass ROW in compliance with Best Management Practices Manual for Utility Maintenance In and Adjacent to Wetlands and Waterbodies in New Hampshire (Interim January 2010).

The New Hampshire Wetlands Bureau Utility Maintenance Notification (UMN) form and fee will be submitted as necessary and appropriate.

In compliance with the Utility Maintenance Notification, the utility will coordinate with the Department of Resources and Economic Development's Natural Heritage Bureau (NHB) and NH Fish and Game Department, as appropriate, regarding the potential effects of the maintenance activities on rare, threatened and endangered species. Specific agreements regarding vegetation maintenance practices in locations were the Karner blue butterfly is known to be present will be followed.

To minimize the impact of vegetation maintenance activities on sensitive reptile species, the following mowing practices will be followed.

- Mow after September 15 to the extent practicable.
- Minimum mowing height should be 7-12 inches above the ground.
- Mow with brontosaurus-type equipment and minimize the amount of area which is driven on.
- Mow from the center of the ROW towards the edge, so animals responding to the noise/vibration of mowing can escape towards area that will not be mowed.
- If a stream is present choose a mowing pattern that will let animals escape towards the stream and its buffer.
- If a road is present, choose a mowing pattern that will not push animals escaping the mowing into the road.

THE NORTHERN PASS

STATE OF NEW HAMPSHIRE
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CERTIFIED WETLAND SCIENTIST
1/19/16

NHDES Wetlands & US Army Corps of Engineers Section 404/10 Permit Application Plans

THE NORTHERN PASS PROPOSED ROUTE

Plant Protection, Restoration and Operational BMPs

Date: 1/24/2017

Restoration Notes

A. Typical Stream Crossing Restoration without Existing Trail/Road

1. Following the removal of equipment bridges, timber mats, and construction debris, waterbody banks will be restored to preconstruction contours.

2. In all areas of ground disturbance a permanent cover crop of native annual and perennial seed mixes will be used to establish immediate soil stabilization. All seed mixes must be approved by the NH Natural Heritage Bureau.

3. Following seeding, a layer of weed-free straw mulch will be applied to all seeded areas. Mulch will be anchored to prevent displacement by surface water flow or wind erosion. No hay will be permitted.

4. Temporary erosion control blankets and silt fence will be used on and at the base of slopes greater than 8 percent. Permanent slope breakers and water diversions will also be installed and maintained.

5. Live stakes will be installed in late fall or early spring during the dormant season (following September 15 or before June 1) at a rate of 500 shrubs per acre along restored stream banks as shown on the detail sheets (to be developed).

6. Riverbank and stream bank stabilization areas shall have at least 75% successful establishment of wetlands vegetation after two (2) growing seasons, or shall be replanted and re-established in a manner satisfactory to DES.

7. Temporary erosion control materials will be removed following vegetation establishment.

B. Typical Stream Crossing Restoration with Existing Trail/Road

1. For stream crossings in areas with existing improved and unimproved roads that the landowner intends to retain, all road surfaces will be re-contoured to pre-construction grades, with all ruts and potholes filled and smoothed. Where necessary, road fill will be compacted in 6-inch lifts to established pre-construction contours. If requested by the landowner, existing access roads may be removed, and original stream bed and bank contours restored.

2. In all areas where ground disturbance has occurred, final grading, seeding, mulching, and planting will occur as outlined in Section A. above.

C. Typical Depressional Wetland Crossing Restoration

1. Following the removal of timber mats and construction debris, wetland contours, including microtopographic relief, will be restored to preconstruction conditions.

2. Establishment of preconstruction contours may require soil de-compaction through tilling in areas where the use of timber mats and machinery result in soil compaction during the construction phase. In areas of severe soil compaction, or in areas where topsoil and subsoil separation was not achieved, the use of a wetland soil mix may be required to establish pre-construction contours and soil organic content.

3. Additionally, coarse wood debris will be preserved in the wetland or replaced during the restoration process as long as it will not interfere with ROW maintenance.

4. In all areas of ground disturbance, a permanent cover crop of native annual and perennial seed mixes will be used to establish immediate soil stabilization. All seed mixes must be approved by the NH Natural Heritage Bureau.

5. Following seeding a layer of straw mulch will be applied to all seeded areas. Use of hay will not be permitted. Mulch will be anchored to prevent displacement by surface water flow or wind erosion. Temporary erosion control blankets and silt fence will be used on and at the base of slopes greater than 8 percent, and where determined to be necessary. Permanent slope breakers and water diversions will also be installed and maintained. Live stakes of native shrubs will be installed in late fall or early spring during the dormant season (following September 15 or prior to June 1) at a rate of 100 shrubs per acre along restored wetland edges and within wetlands, when feasible.

6. Wetland restoration areas shall have at least 75% successful establishment of wetlands vegetation after two (2) growing seasons, or shall be replanted and re-established in a manner satisfactory to DES.

D. Seepage Slope Wetland Crossing Restoration

1. Where seepage slope wetlands are crossed, the path will be restored by adding (or replacing stockpiled) wetland soil mix to the disturbed area so it matches the surrounding topography and pre-construction contours.

2. Newly placed wetland soil will be seeded with a wetland seed mix approved by the NH Natural Heritage Bureau.

3. Erosion control blankets will be placed over the disturbed and seeded area to hold soil in place until vegetation has become established.

4. Restoration areas shall have at least 75% successful establishment of wetlands vegetation after two (2) growing seasons, or they shall be replanted and re-established until a functional wetland is replicated in a manner satisfactory to the DES Wetlands Program.

E. Wetland Swale Crossing Restoration

1. Following the removal of equipment bridges, timber mats, and construction debris, wetland swale bed and banks will be restored to preconstruction contours.

2. In all areas of ground disturbance a permanent cover crop of native annual and perennial seed mixes will be used to establish immediate soil stabilization. All seed mixes must be approved by the NH Natural Heritage Bureau.

3. Following seeding a layer of straw mulch will be applied to all seeded areas. Use of hay will not be permitted. Mulch will be anchored to prevent displacement by surface water flow or wind erosion. Temporary erosion control blankets and silt fence will be used on and at the base of slopes greater than 8 percent.

4. Restoration of temporary impact areas shall have at least 75% successful establishment of wetlands vegetation after two (2) growing seasons, or they shall be replanted and re-established until a functional wetland is replicated in a manner satisfactory to the DES Wetlands Program.

5. Temporary erosion control materials will be removed following vegetation establishment.

F. Wetland Crossing Restoration with Existing Trail/Road

1. For wetland crossings in areas with existing improved and unimproved roads all road surfaces will be re-contoured to pre-construction grades, with all ruts and potholes filled and smoothed.

2. If requested by the landowner, existing access roads may be removed, and wetland contours restored to grades and microtopograpy similar to portions of the wetland not previously impacted by anthropogenic disturbances.

3. In all areas where ground disturbance has occurred, final grading, seeding, mulching, and planting will occur as outlined in Section C. above.

Restoration Table

Common Name	Genus	Species	Status	Spacing	Installation Method	Alignement
Speckled alder	*Alnus*	*incana*	FACW	3-6 feet	Live stake or cutting	N/S
Black chokeberry	*Aronia*	*melanocarpa*	FAC	3-6 feet	Cutting	N/S
Common buttonbush	*Cephalanthus*	*occidentalis*	OBL	3-6 feet	Live state or Live Pole	N/S
Heart-leaved willow	*Salix*	*eriocephala*	FACW	3-6 feet	Live stake or Live Pole	N/S
Long-beaked willow	*Salix*	*bebbiana*	FACW	3-6 feet	Live stake or Live Pole	N/S
Black willow	*Salix*	*nigra*	OBL	3-6 feet	Live stake or Live Pole	N/S
Silky willow	*Salix*	*sericea*	OBL	3-6 feet	Live stake or Live Pole	N/S
Black elderberry	*Sambucus*	*nigra*	FACW	2-8 feet	Live stake or cutting	N/S
White meadowsweet	*Spiraea*	*alba*	FACW	2-8 feet	Live stake or cutting	N/S
Steeplebush	*Spiraea*	*tomentosa*	FACW	2-8 feet	Live stake or cutting	N/S
Red-osier dogwood	*Swida*	*sericea*	FACW	3-6 feet	Live stake or Live Pole	N
Silky dogwood	*Swida*	*amomum*	FACW	3-6 feet	Live stake or Live Pole	S
Gray dogwood	*Swida*	*racemosa*	FAC	3-6 feet	Live stake or Live Pole	S
Smooth arrowwood	*Viburnum*	*dentatum*	FAC	2-8 feet	Live stake or cutting	N/S
Nannyberry	*Viburnum*	*lentago*	FAC	2-8 feet	Live stake or cutting	N/S
Highbush-cranberry	*Viburnum*	*opulus*	FACW	2-8 feet	Live stake or cutting	N/S
Riparian Seed Mix (per approval by NHNHB; seed at supplier spec. rate)					hydro-seed, mech. spreader, broadcast	N/S
Wetland Seed Mix (per approval by NHNHB; seed at supplier spec. rate)					hydro-seed, mech. spreader, broadcast	N/S
Permanent Upland Seed Mix (per approval by NHNHB; seed at supplier spec. rate)					hydro-seed, mech. spreader, broadcast	N/S
Temporary Upland Seed Mix					hydro-seed, mech. spreader, broadcast	N/S

Note 1: N refers to WMNF and points north; S refers to south of the WMNF

Standing Water Construction Notes

- The contractor will evaluate opportunities to access pond construction locations from public roads on opposite sides of the waterbody to reduce impacts, where safety, weather, seasonal conditions, schedule and structure type allow.
- Work in ponds will take place in winter under frozen conditions to the extent that the construction schedule allows. As necessary, the contractor will enhance frozen conditions by:
  - Removal (plowing) of insulating snowpack from underlying ice;
  - Application of water to plowed icy areas to strengthen ice; and
  - Use of timber matting over ice or deep snow.
- Access in or through ponded locations will follow existing access road and/or ORV trail crossing sites that have been previously disturbed and may have hardened bottoms where possible.
- Access and construction pads in ponded locations may include bridging, stacking timber matting in shallow water to achieve the stability needed, and shallow water work barges where needed.
- If stacking timber mats in ponds, they will be stacked in a manner that includes gaps for movement of aquatic animals through the mats.

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Wetland Restoration Notes/Standing Water Construction Notes

Date: 1/24/2017