

9. STABILIZATION AND REHABILITATION

A Stabilization, Rehabilitation, and Restoration Plan will be developed to address rehabilitation and restoration of all ground-disturbed areas associated with the pipeline construction, including the construction right-of-way (ROW), material sites, camp sites, temporary access roads, ice roads and pads and temporary use areas.

The plan will include specific requirements for restoration activities for each section of the pipeline prior to construction, including site preparation, monitoring, and performance standards. It will address the following topics:

- Soil replacement and stabilization
- Seeding
- Fertilizing
- Control of non-native invasive plants (NIPs)
- Limiting access to the ROW
- Reclaiming constructed roads

The plan identifies sensitive areas along the ROW or in temporary use areas that may require special attention such as erosion-prone areas. A range of engineering controls or maintenance measures will be identified to address the potential problem.

9.1 SOIL REPLACEMENT AND STABILIZATION

9.1.1 Ditch Backfilling

Once a large section of pipeline is ready for placement in the ditch, the soil or bedding material will be placed on the bottom of the ditch and the ditch will be prepared for the pipeline to be placed on top. The pipeline will be placed within the ditch, and the remaining portion of the ditch will be filled as described in Section 7.6.8.

During construction, soil will be replaced as soon as practicable after the pipeline section is laid down. This is particularly important during winter construction to reduce the introduction of snow or other precipitation into the ditch. In areas of concern (such as wetlands where the native vegetated mat was side-cast during ditch excavation), it will be placed as the top portion of trench backfill in the ditch, providing the vegetative mat can be salvaged during removal. The backfilled ditch vegetation will be monitored after construction to ensure that the vegetated mat grows in and erosion of the fill above the pipe does not occur.

9.1.2 Cleanup

Following pipe installation, ditch backfilling, and hydrotesting (discussed in Section 10.2.1), crews will perform cleanup, including leveling of the pipeline ROW and shaping of a crown over the pipeline ditch, as required. Crews will dispose of any remaining scrap materials, timber, or other debris. Wood debris will be disposed of as identified in Section 7.4.2, and scrap materials and rubbish will be hauled to a designated, permitted landfill for disposal. Crews will be equipped with dozers, front-end loaders, and dump trucks to facilitate clearing and construction ROW cleanup.

In addition, material sites, camp sites, ice roads and pads, temporary use areas, and temporary access roads will be re-contoured and restored to an acceptable condition as required by applicable permits. Generally, revegetation of disturbed areas is planned for long-term stabilization.

Snow pad areas will require a summer cleanup check to verify that all construction materials have been removed from the construction ROW. Any remaining debris will be removed utilizing low-ground-pressure vehicles to minimize disturbance to surface vegetation.

9.1.3 Ditch Stabilization

Stabilization of the backfilled ditch may be a multi-year process in some areas, particularly areas with fine-grained, ice-rich soils. The pipeline ditch may intercept overland flow that may erode backfill material from the pipeline ditch and could potentially serve to channel for water into nearby waterways and wetlands. The interception of stream flow and wetland cross drainage could pose significant problems, particularly in areas of continuous and discontinuous permafrost in rolling or mountainous terrain. Rehabilitation, especially in ice-rich soils, may require extensive, repeated ditch maintenance and long-term thermal stabilization activities before the habitat can return to its former stability and productivity.

The Stabilization, Rehabilitation, and Restoration Plan will include techniques developed to address rehabilitation and restoration of all ground-disturbed areas associated with the pipeline construction, including the construction ROW, material sites, camp sites, temporary access roads, ice roads and pads, and temporary use areas.

9.1.4 Erosion Control

The Stabilization, Rehabilitation, and Restoration Plan, the Erosion Control Plan, and final design plans will include best management practices (BMPs) and storm drainage design to control surface flow along the crowned ditch and the project. Along the construction ROW in areas where ice roads and construction pads are not used, the construction pad will be left in place and erosion control BMPs will take into account the wider construction width, not just the crowned ditch.

These plans will also address the fact that the crown will likely not remain one or two years after the annual freeze-thaw cycle results in some settlement. Temporary and permanent erosion and

sediment control BMPs and drainage controls will be designed to work in concert to provide an acceptable erosion and sediment control for the project.

Erosion control measures for ditch excavations performed through stream beds and banks as identified in the Erosion Control Plan will be applied as soon as the backfill is placed into the ditch to complete pipe coverage. Specific materials to use for erosion control of the bed and banks will be determined on a case-by-case basis and identified in the construction plans for each crossing.

The project designers will develop appropriate methods to respond to local conditions based on existing terrain, geology, hydrology, slope, disturbed area, thermal regime, climate, and other factors in the final design and relevant plans. Options available to direct flow from the crowned ditch line include:

- Installation of wattles at an angle and at predetermined spacing along the crowned ditch line based on slope angle to direct flow away from the ditch line.
- Installation of temporary flexible piping to carry off-site and upgradient water across the ditch line to vegetated downslope areas.
- Periodic installation of flow breaks in the crowned section to transfer water from one side of the ditch line to the other for storm drainage.
- Use of native fill berms to direct flow away from the crowned ditch at specified intervals based on slope.
- Construction of drainage channels to direct flow from the construction area.
- Installation of permanent culverts in some areas.
- Development of earthen ditch blocks used to retain or direct water.

9.2 SEEDING SPECIFICATIONS

Seeding of the disturbed corridor will be conducted in consultation with the BLM and State of Alaska, and will adhere to the Alaska Department of Natural Resources (ADNR) *Plant Materials Center Revegetation Manual for Alaska* (Wright 2009). The methods and procedures outlined in the manual provide specific regional information for revegetation of disturbed areas with native plants to limit the potential for colonization by invasive species. The NIP Prevention Plan will also be consulted to limit the potential for colonization by invasive species.

Seed mixes will be developed for different geographic areas and fertilizers applied at an optimum rate per acre. Hand methods, hydro-seeding, and aerial seeding will be employed to rehabilitate surfaces as required and will be identified in the Stabilization, Rehabilitation, and Restoration Plan.

9.3 FERTILIZER

Application of fertilizer will be conducted in consultation with the Bureau of Land Management (BLM) and State of Alaska. Standard practices and planning will be followed to ensure that adequate volume, type, and quality of fertilizer are used where needed. Fertilizing ground-disturbed

areas will be performed as construction progresses. Erosion control measures will be applied on top of the seed and fertilizer application. As project development proceeds, specific uses will be determined.

9.4 CONTROL OF NON-NATIVE INVASIVE PLANTS

Procedures will be developed to control the introduction and spread of NIPs as part of pre-construction, construction, and rehabilitation and restoration activities. NIPs can be introduced and spread into an area from the use of airports (particularly at gravel airstrips), material sites, and temporary use areas such as laydown yards and camps.

Control of NIPs will also be addressed as part of restoration of cleared areas. Leaving cleared areas un-restored may present an opportunity for NIPs to establish a foothold without competition from local species.

9.5 LIMITING ACCESS TO THE RIGHT-OF-WAY

Large boulders, berms, or fencing will be used to limit access to the project ROW and project facilities with the intent of maintaining both project security and public safety.

9.6 POTENTIAL RECLAMATION OF CONSTRUCTED ROADS

The need for reclamation activities of constructed roads will be mitigated largely by clearing the ROW and constructing the pipeline in winter when soils are frozen. However, a large number of temporary gravel access roads will be constructed for ASAP (Attachment 5). Land owners will be consulted about the reclamation of constructed roads during the planning phase.