


ALASKA PipelineProject	ALASKA PIPELINE PROJECT PRELIMINARY DRAFT RESOURCE REPORT 1	USAG-UR-SGREG-000002 APRIL 2011

**APPENDIX 1G: RATIONALE FOR THE WIDTH OF THE
CONSTRUCTION RIGHT-OF-WAY**

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RATIONALE FOR THE WIDTH OF THE ALASKA PIPELINE PROJECT CONSTRUCTION RIGHT-OF-WAY

The proposed project will be constructed under various seasonal and construction conditions. The proposed construction right-of-way widths for the proposed project are the minimum widths required to effectively, efficiently and safely construct a 48-inch-diameter pipeline. Construction right-of-way widths will be further refined as the route centerline is updated and established, additional geotechnical data is developed, and the construction execution plan is finalized. There will likely be hybrids of each of the proposed construction right-of-way sketches that may require modified construction right-of-way widths. The currently proposed cases represent a majority of the expected construction scenarios. It is also expected that the final centerline will pass through some restricted areas requiring reduced construction right-of-way widths.

Listed below are the three construction scenarios for the proposed project:

- Winter construction - south of the tree line;
- Summer construction - south of the tree line; and
- Winter construction - north of the tree line.

The construction right-of-way for the proposed project is divided into four main areas and a number of subareas, depending on the specific construction situation.

- 1) Spoil area:
 - Topsoil and loose surface material storage area;
 - Cut slope;
 - Bypass lane; and
 - Trench spoil.
- 2) Trench area:
 - Trench excavation and ripping.
- 3) Work area:
 - Pipe make-up; and
 - Primary work area.
- 4) Travel area:
 - Secondary work lane;
 - Travel lane;
 - Safety buffer; and
 - Fill slope.

Each configuration and their areas are described in detail below.

G-1 WINTER CONSTRUCTION - SOUTH OF THE TREE LINE (WIDTH: 160 FEET)

The right-of-way for winter construction south of the tree line will be made up of four areas: Spoil area (60 feet), trench area (20 feet), work area (40 feet), and travel area (40 feet) (refer to Figure G-1). Justifications for the four areas are discussed below.

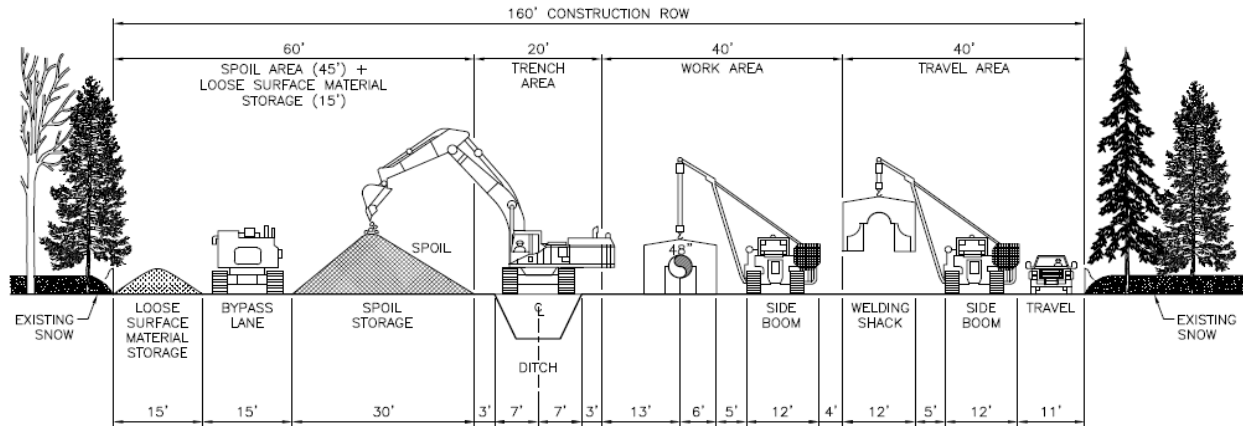


FIGURE G-1. Right-of-way Configuration for Winter Construction - South of the Tree Line

G-1.1 SPOIL AREA (WIDTH: 60 FEET)

The spoil storage area will comprise a 15-foot area for loose surface materials, 15-foot bypass lane and a 30-foot area for trench spoil.

G-1.1.1 Bypass Lane and Loose Surface Material Storage (WIDTH: 30 FEET)


Any snow and loose surface materials will be bladed over the proposed trench location to form an insulating trench line roach (mound). The base of the insulating roach will be approximately 20 feet in width. Just prior to trench excavation, this material will be bladed to the storage sides.

In the spoil area, the loose surface material will be mounded up 15 feet from the bottom of the spoil storage pile to make way for a bypass lane used to “leap frog” trenching equipment on the work side of the right-of-way alongside of the spoil pile. Additionally, should the pipe be welded in strings at the time of trench excavation, it is difficult to move trenching equipment to the work side of the right-of-way with the pipe strings in place.

During reclamation, the stored surface soil will be re-spread over the finished graded slopes and workspaces.

G-1.1.2 Spoil storage (WIDTH: 30 FEET)

The volume of trench spoil generated is dependent on the type of in-situ material in which the trench is excavated, the shape of the trench, and the type of equipment used to excavate the trench. The spoil generated in surficial materials, such as glacial till, will bulk at approximately 20 to 30 percent, whereas the spoil generated in bedrock will bulk at approximately 40 to 60 percent or more, depending on rock sizes generated by excavation. The spoil volumes generated by a wheel-trencher or chain-trencher will typically be less than the spoil generated by a tracked excavator track-hoe. Trencher-excavated trench shape is very consistent, however, track-hoe excavated trench shape varies depending on the materials being excavated,

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back slope requirements, and to a lesser degree, the individual operator skill/preferences. The spoil generated by a wheel-trencher or chain-trencher in surficial materials will bulk at approximately 20 percent, a lower percentage range because the spoil created during excavation is of a smaller size and is more granular, whereas the spoil generated by a track-hoe will bulk at approximately 20 percent larger because it has larger soil aggregates because the displaced soils are excavated with a large bucket. A placement factor is also built into the spoil storage calculation. A placement factor of 10 percent is used for spoil placed by a wheel-trencher or chain-trencher because the spoil is placed by the machine. A consistent 3-foot setback from the trench can typically be maintained. A 30 percent placement factor is used for spoil placed by a track-hoe, since the spoil is placed under the control of the equipment operator and the setback can vary by a few feet from the desired 3-foot setback.

The slope of the spoil windrow is assumed to be at the angle of repose, which is approximately 1.5:1 (33 degrees); therefore, the calculation of the base width or how much space it takes up on the right-of-way is a factor of this angle. The bulking and placement factors are taken into account for this for determining the required spoil pile width.

G-1.2 TRENCH AREA (WIDTH: 20 FEET)

The trench area width is based on a 7-foot-deep trench with trench walls at a 1:0.5 back slope that yields an open trench width of 14 feet. There is a 3-foot-wide buffer on either side of the trench to reduce trench wall collapse due to external loading of equipment and or spoil pile.

G-1.3 WORK AREA (WIDTH: 40 FEET)

The work area comprises a 19-foot pipe make-up area and a 21-foot primary work area for safe sideboom operation.

G-1.3.1 Pipe Make-Up Area (Width: 19 FEET)

The pipe make-up area is dedicated to stringing, welding, and coating of the pipe before lowering in. The pipe must be set back from the trench to make room for safe maneuverability of trenching equipment, which includes wheel-trenchers, excavators, and dozers equipped with rippers. This trenching and ripping equipment must be able to work without the likelihood of damaging the welded pipe strings (refer to Figure G-2).

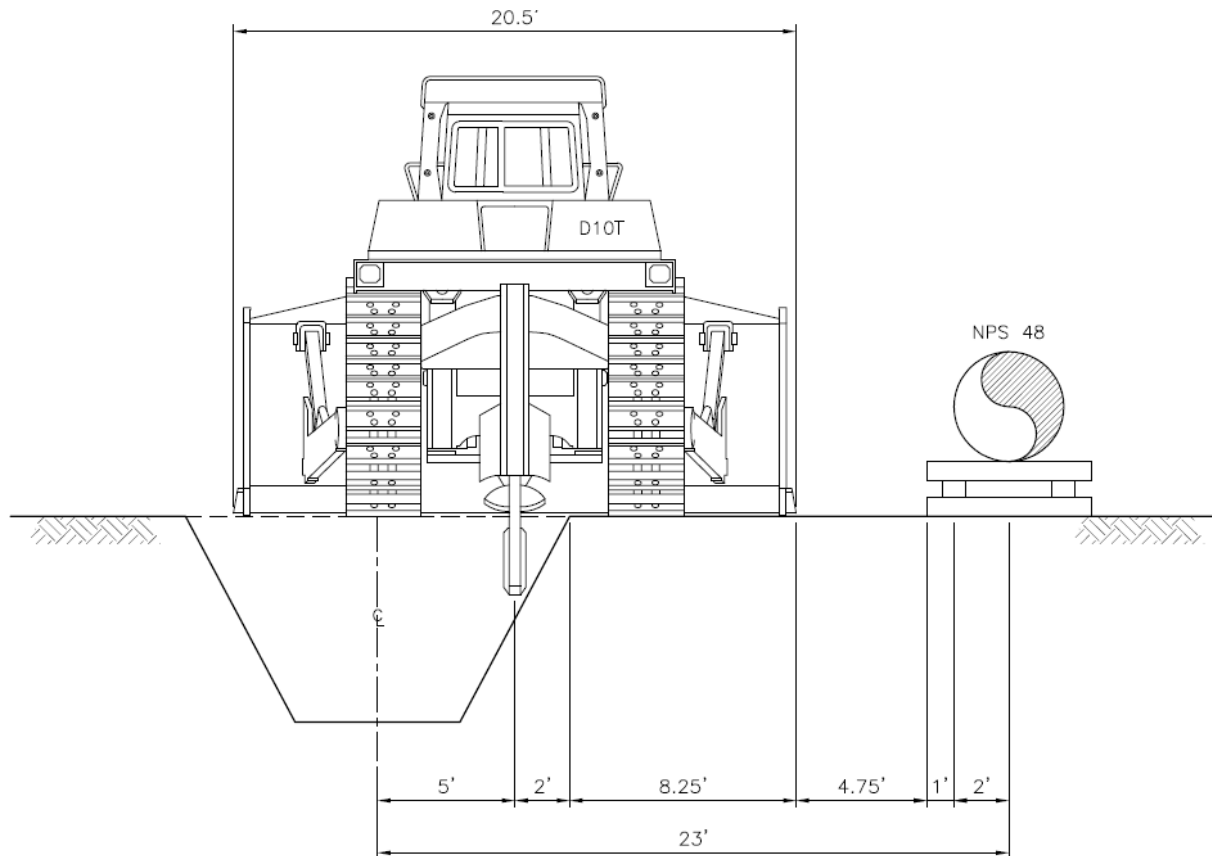


FIGURE G-2. Dozer With Single Shank Ripper

When ripping the trench line with a dozer, the single tooth ripper will require sufficient space between ripping lanes to efficiently rip the full width of the trench. The spacing must be wide enough to prevent the tracks of the dozer from getting bogged down in the previously loose ripped soil.

The width of the ripping lane offset combined with the 19-foot width of the dozer blade will leave a safety buffer between the blade and the pipe and skids of 6.5 feet. The ripper will also need to have the option to rip the trench on an angle for ripping efficiency.

The pipe make-up area also accommodates the welding shack (12-foot-wide) maneuverability and provides a safe work area around the welding shack.

G-1.3.2 Primary Work Area (Width: 21 feet)

The primary work lane will accommodate offloading of stringing trucks, welding, joint coating, and lowering-in operations. In the stringing phase, the space will be occupied by stringing trucks and strung pipe.

In the welding phase, the space will be used for sidebooms and welding shacks, the welded pipe string and sidebooms with extended counter weights during lowering-in operations.

The sideboom will take up 29-feet from the outside of the extended counterweights to the centerline of the suspended pipe with the boom in its neutral position. This distance will increase as the pipe is lowered into the trench during lowering-in operations.

G-1.4 TRAVEL AREA (WIDTH: 40 FEET)

The travel area comprises a 29-foot secondary work lane and an 11-foot travel lane.

G-1.4.1 Secondary Work Lane (Width: 29 feet)

The secondary work lane is dedicated as a passing zone for moving equipment and materials up and down the construction right-of-way, such as welding shacks, maintenance vehicles, rock trucks, and fuel trucks. Sidebooms with welding shacks will require 29-feet of room while leap frogging around other welding shacks during welding operations.

G-1.4.2 Travel Lane (Width: 11 feet)

The travel lane is required for safe and efficient movement of the hundreds of daily pipe stringings and haulers, rock trucks, personnel, inspection staff, and other construction support vehicles. The lane will also be used for an emergency vehicle lane. The travel lane must remain unobstructed by sidebooms and other pipeline equipment so the large volume of traffic can move along the right-of-way in a timely manner.

G-2 SUMMER CONSTRUCTION - SOUTH OF THE TREE LINE (WIDTH: 175 FEET)

The right-of-way for summer construction south of the tree line will be made up of four areas: Spoil area (60 feet), trench area (20 feet), work area (40 feet), and travel area (55 feet) (refer to Figure G-3). Justifications for the four areas are discussed below.

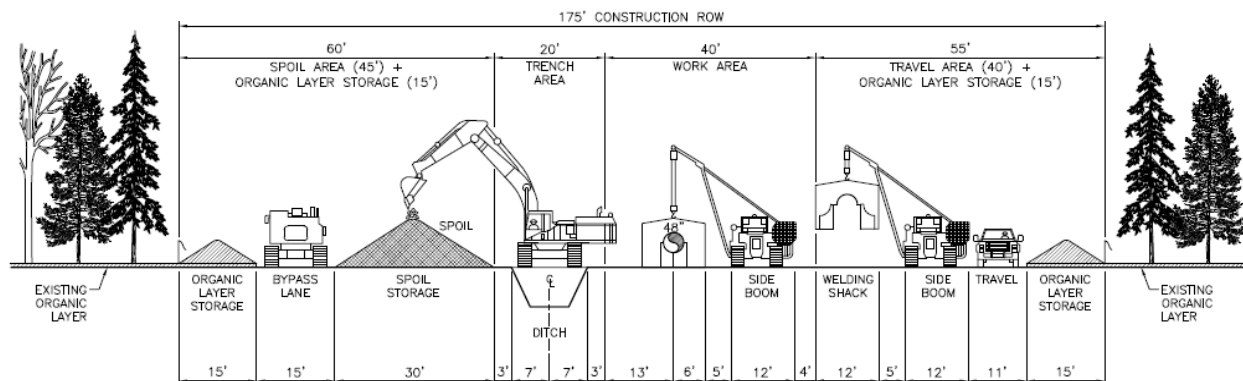



FIGURE G-3. Right-of-Way Configuration for Summer Construction - South of the Tree Line

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G-2.1 SPOIL AREA (WIDTH: 60 FEET)

The spoil storage area comprises a 15-foot area for organic layer storage, a 15-foot area for a bypass lane and a 30-foot area for trench spoil.

G-2.1.1 Organic Layer Storage (Width: 15 feet)

In thaw-stable areas during summer construction, the loose surface organics (duff) are stored and used as a resource for reclamation purposes. In agricultural land topsoil will be stripped from all or only part of the ROW depending on circumstances. This reclamation material is windrowed to both sides of the proposed construction right-of-way for later use during reclamation. The volume of this material will vary depending on the type of vegetation cover and terrain.

During reclamation, the stored surface material will be re-spread over the finished graded slopes and workspaces.

G-2.1.2 Bypass Lane (Width: 15 feet)

This is a dedicated lane required to leap frog trenching equipment on the work side of the right-of-way alongside of the spoil pile. Unlike the loose surface material pile in winter construction, the organic pile cannot be flattened down and driven on by heavy equipment.

Travel on the organic pile must be prohibited to prevent the change that occurs in the soils composition from heavy traffic.

During reclamation, the organic layer will be re-spread over the finished graded slopes and workspaces.

G-2.1.3 Spoil Storage (Width: 30 feet)

This is the same as for spoil storage for winter construction south of the tree line in Section G-1.1.2.

G-2.2 TRENCH AREA (WIDTH: 20 FEET)

This is the same as for the trench area for construction south of the tree line in Section G-1.2.

G-2.3 WORK AREA (WIDTH: 40 FEET)

This is the same as for the work area for construction south of the tree line in Section G-1.3.

G-2.4 TRAVEL AREA (WIDTH: 55 FEET)

The travel area in summer construction is similar to the winter construction right-of-way with a 29-foot secondary work area and an 11-foot travel lane, but has an additional 15 feet for organic layer storage.

G-3 WINTER CONSTRUCTION - NORTH OF THE TREE LINE (WIDTH: 145 FEET)

The right-of-way for winter construction north of the tree line will be made up of four areas: Spoil area (45 feet), trench area (20 feet), work area (40 feet), and travel area (40 feet) (refer to Figure G-4).

This right-of-way configuration is essentially the same as winter construction south of the tree line, except in this case the right-of-way is built up with a snow and ice pad

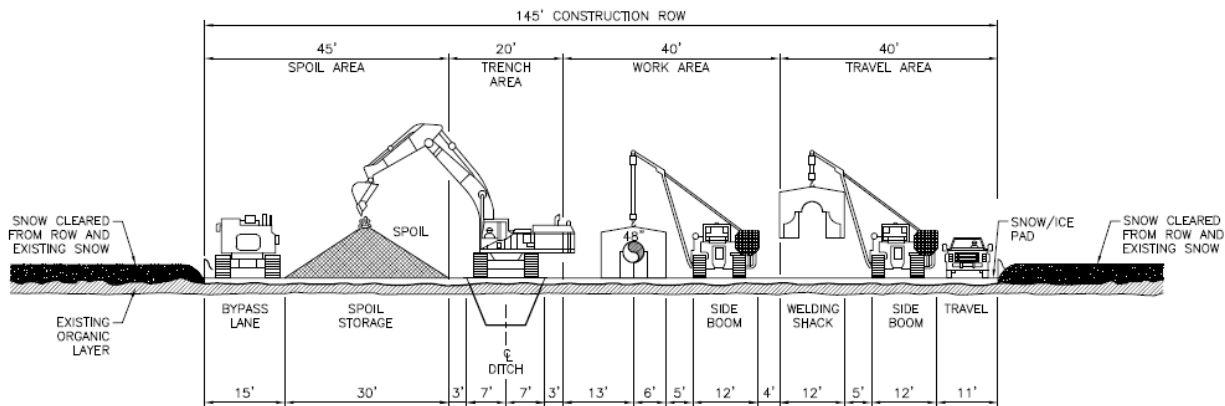


FIGURE G-4. Right-of-Way Configuration for Winter Construction - North of the Tree Line

G-4 WINTER CONSTRUCTION POINT THOMSON GAS PIPELINE (145 FEET)

The right-of-way for winter construction north of the tree line will be made up of four areas: Spoil area (39 feet), trench area (17 feet), work area (40 feet), and travel area (49 feet) (refer to Figure G-5).

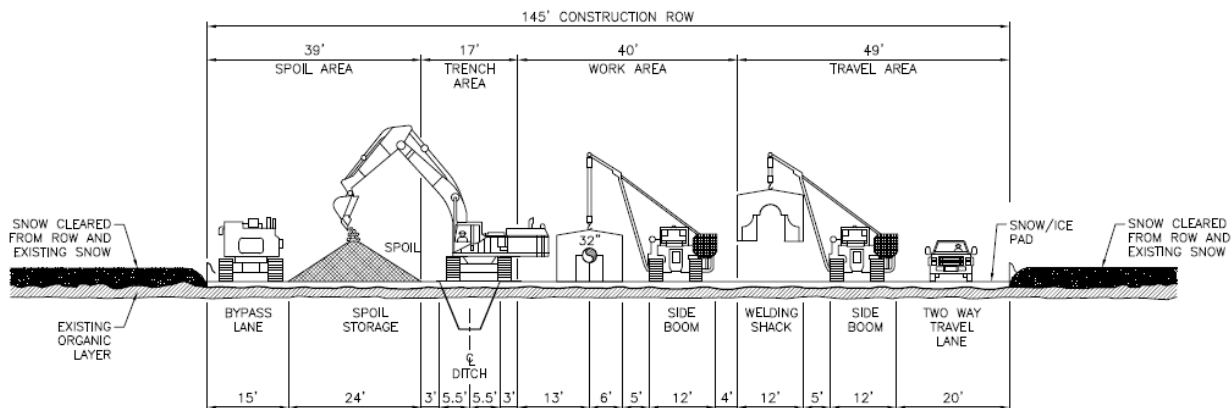



FIGURE G-5. Right-of-Way Configuration for the Point Thomson Gas Pipeline

G-4.1 SPOIL AREA (WIDTH: 39 FEET)

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G-4.1 SPOIL AREA (WIDTH: 39 FEET)

The spoil storage area will is comprised of a 15-foot bypass lane and a 24-foot area for trench spoil.

G-4.1.1 Bypass Lane (Width: 15 feet)

Same as winter construction discussed above.

G-4.1.2 Spoil Storage (Width: 24 feet)

The spoil storage for this pipeline takes into account the factors mentioned above, however, due to the significant reduction in size of the pipeline trench, the spoil storage pile will consume just 24-feet of right-of-way.

G-4.2 TRENCH AREA (WIDTH: 17 FEET)

The trench area width is based on a 5-foot-deep trench with trench walls at a 1:0.5 back slope, which yields an open trench width of 11 feet. There is a 3-foot-buffer on either side of the trench to reduce trench wall collapse due to external loading of equipment and/or spoil pile.

G-4.3 WORK AREA (WIDTH: 40 FEET)

Same as winter construction discussed above.

G-4.4 TRAVEL AREA (WIDTH: 49 FEET)

The travel area is comprised of a 29-foot secondary work area and a 20-foot travel lane.

G-4.4.1 Secondary Work Lane (Width: 29 feet)

Same as winter construction discussed above.

G-4.4.2 Travel Lane (Width: 20 feet)

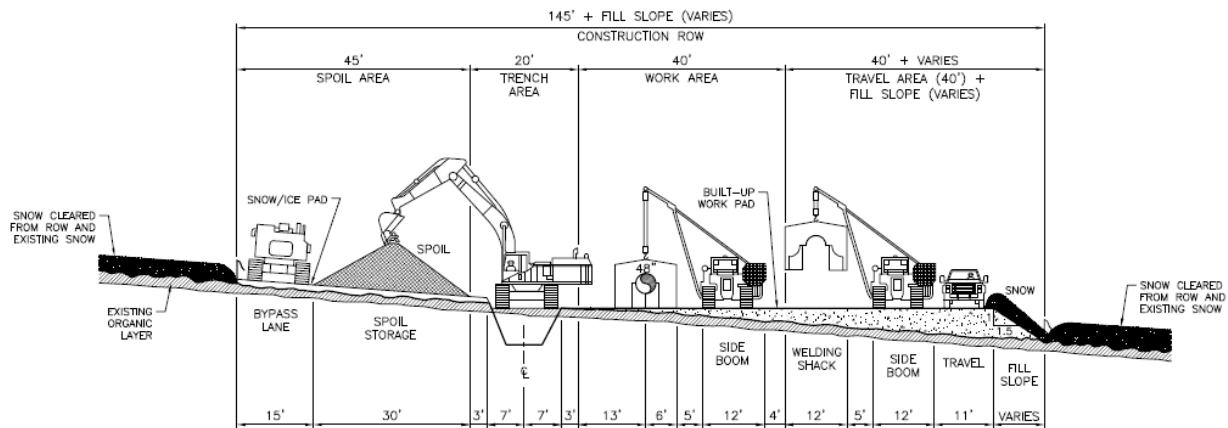
The travel lane is required for safe and efficient movement of the pipe stringing and haulers, rock trucks, personnel, inspection staff, and other construction support vehicles, as in the cases mentioned above, however, there are no accesses to intermediate points along the Point Thomson Gas Pipeline right-of-way and as a result, the right-of-way is the only access available to construct the pipeline.

The travel lane must be wide enough to accommodate two vehicles traveling in opposite directions during construction.

G-5 SIDE SLOPES NORTH OF TREE LINE

The right-of-way for winter construction north of the tree line on side slopes will be made up of four areas: Spoil area (45 feet), trench area (20 feet), work area (40 feet), and travel area (40 feet but varies) (refer to Figure G-6).

The right-of-way width north of the tree line will be required to be 145-feet-wide, however, where side slopes occur, the width of the right-of-way will vary based on the degree of the side slope



NOTES:

1. GEOTEXTILE AND GEGRID REINFORCEMENT MAY BE PLACED AT BASE OF BUILT-UP WORK PAD TO REDUCE DISTURBANCE OF THE TUNDRA PERMAFROST.
2. NOMINAL CONFIGURATION FOR MAXIMUM OF 10% CROSS SLOPE.

FIGURE G-6. Right-of-way Configuration for a Side Slope for Winter Construction - North of the Tree Line.

G-6 SIDE SLOPES SOUTH OF TREE LINE

The right-of-way for winter construction north of the tree line on side slopes will be made up of four areas: Spoil area (60 feet but varies.), trench area (20 feet), work area (40 feet), and travel area (40 feet but varies) (refer to Figure G-7).

The right-of-way width south of the tree line will be required to be 160-feet-wide, however, where side slopes occur and cut and fill is required, the width of the right-of-way will vary based on the degree of side slope and soil characteristics.

For cross slopes 10 percent and greater, a safety buffer from the edge of the travel lane to the edge of the fill slope will be used. The safety buffer is required for potential soft-shoulder conditions on the edge of the fill slope. The allocated buffer zone will be based on the actual material used for the fill slope and specific cross slope angle.

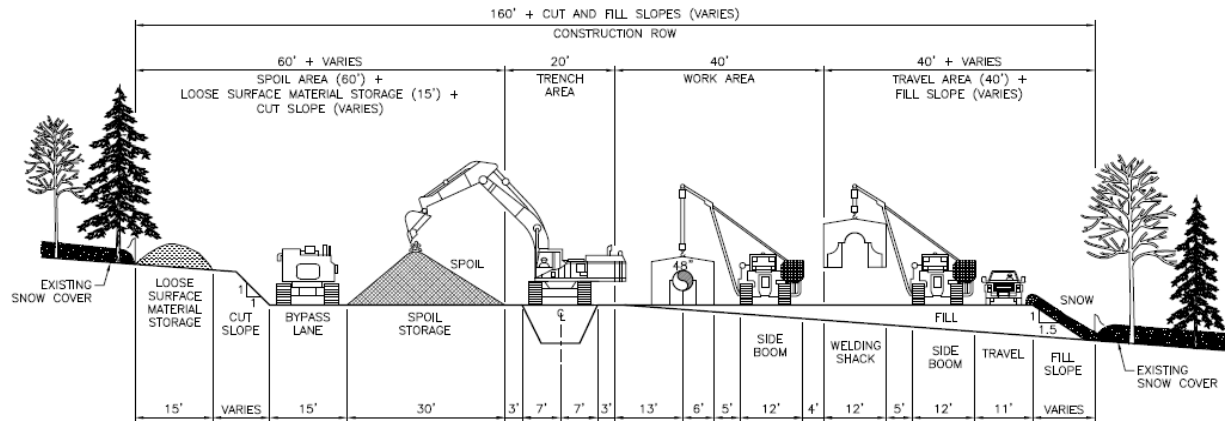


FIGURE G-7. Right-of-Way Configuration for a Side Slope for Winter Construction - South of the Tree Line.