

## APPENDIX 6A

### PIPELINE CONSTRUCTION AND RECLAMATION PLAN

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## **1.0 CONSTRUCTION AND RECLAMATION PLAN**

### **1.1 Scope**

The Construction and Reclamation Plan is designed to complement the mitigative measures identified in Section 6.0 of this EA. Mitigative measures and criteria for their implementation are provided with a sufficient level of flexibility to ensure that the most appropriate mitigative measures are implemented during the construction and reclamation phases of the pipeline portion of the Provident Pipeline Project. Further site-specific mitigative measure to be developed upon completion of supplemental field surveys.

The measures identified in Section 6.0 of this EA and the Construction and Reclamation Plan will be used in conjunction with the Construction Plans by Provident's inspection staff and contractor personnel during construction, clean-up and reclamation of the Project.

The measures and other work described in the Construction and Reclamation Plan will apply primarily to the Project at specific locations, however, in some cases, to the overall Project in general. Implementation of some measures included in the Construction and Reclamation Plan may commence prior to the construction phase and continue into the operations phase. Post-construction monitoring programs have been developed to ensure that the measures, activities and other works identified in the Construction and Reclamation Plan were effective (see Section 8.0 of the EA).

### **1.2 Reclamation Plan Objectives and Goals**

Environmental protection and reclamation measures have been specified in consideration of the existing land use and biophysical conditions along the route with the objective of returning the right-of-way as near to preconstruction conditions as feasible within a practical time frame. On agricultural lands, reclamation objectives emphasize controlling surface erosion and conserving soil quality for agricultural purposes. On native grasslands and riparian areas where the species composition of natural plant communities may be difficult to restore following disturbance, emphasis is placed on reducing the total area of disturbance and providing a reclaimed condition that will facilitate restoration of the native plant populations and communities.

### **1.3 Construction and Reclamation Plan Details**

The following outlines the applicable Details for the construction of the pipeline, including watercourses, and weed control as well as measures to minimize the disturbance and promote restoration of special features like rare plants and areas potentially difficult to reclaim such as sandy areas.

#### Topsoil Stripping

The objectives of topsoil salvaging are to minimize impacts to topsoil capability, surface drainage patterns, land use and wildlife habitat. Criteria for topsoil salvage procedures during nonfrozen soil conditions are identified by specific circumstances and include:

- trench and spoil area topsoil salvage (Detail 6A-1);
- blade width topsoil salvage (Detail 6A-2);
- full right-of-way topsoil salvage (Detail 6A-3);
- trench and work lane topsoil salvage (Detail 6A-4);
- reduced width topsoil salvage (Detail 6A-5);
- three-lift soils handling on well-sodded land (Detail 6A-6);
- three-lift soils handling on cultivated land (Detail 6A-7); and
- trench, spoil and work lane topsoil salvage (Detail 6A-8).

Figure 6A-1  
Criteria for Topsoil Salvage Procedures

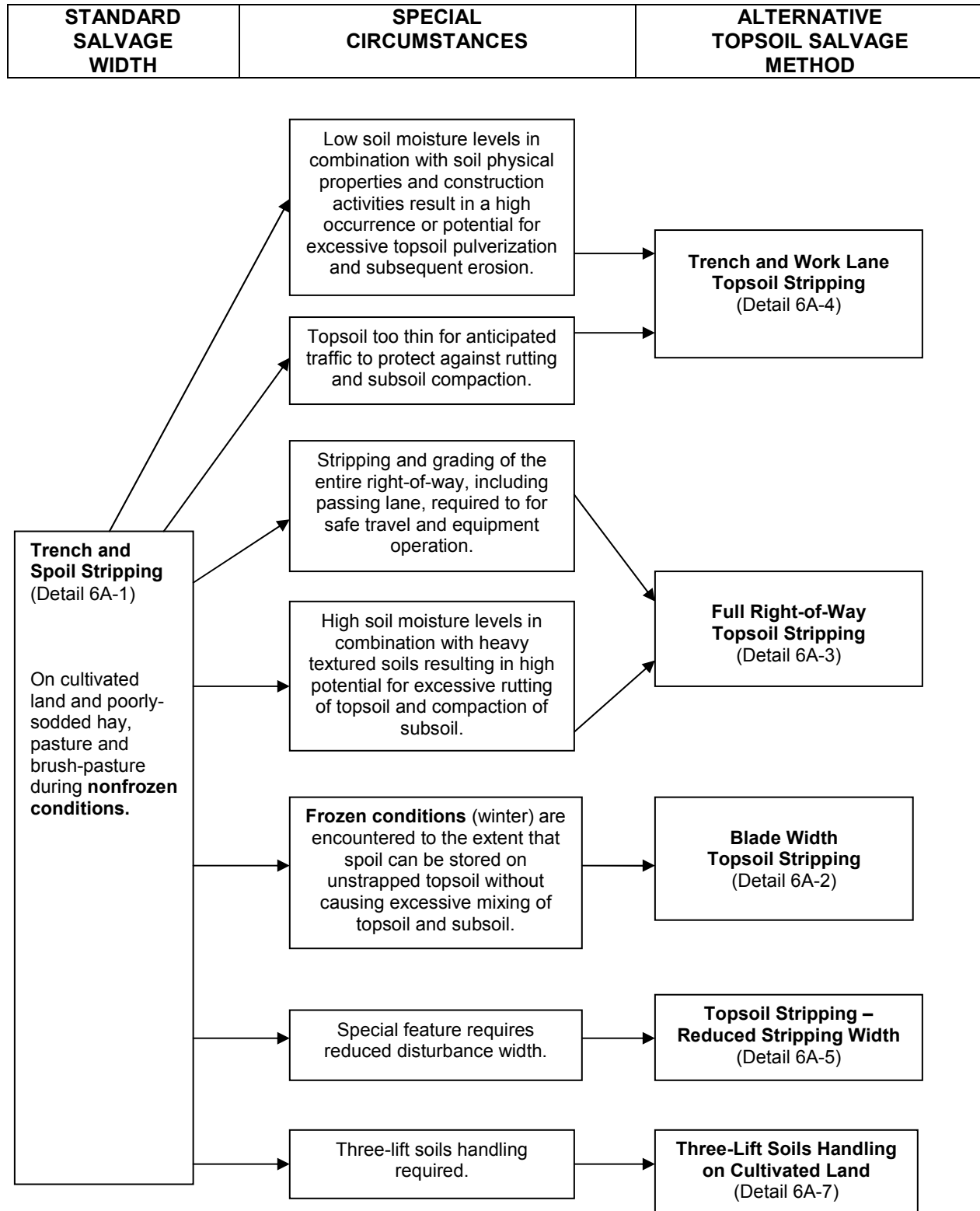
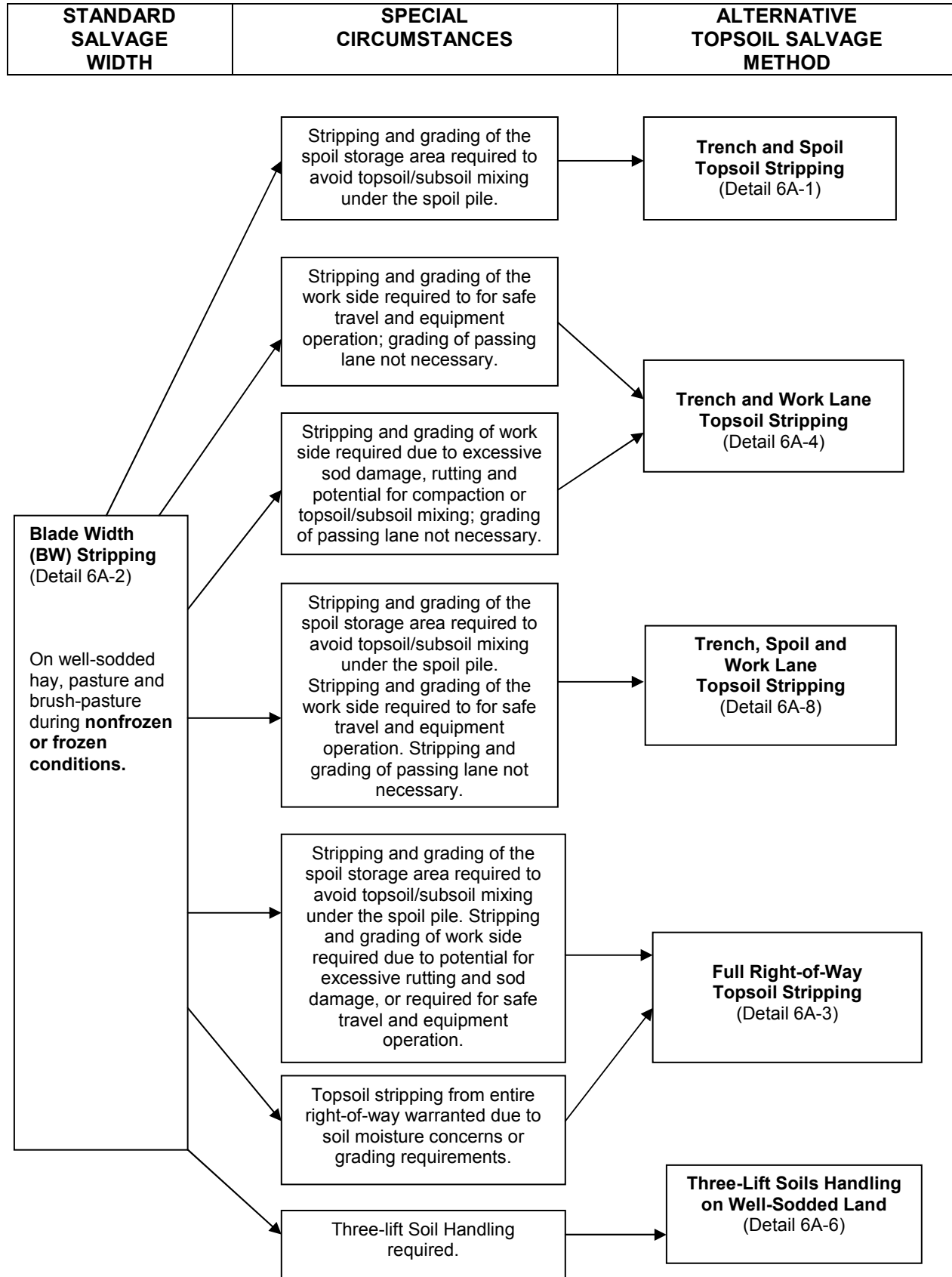


Figure 6A-1 (Cont'd)



In addition, Detail 6A-9 includes protection measures from soil erosion for delayed grade or topsoil replacement due to construction schedule considerations.

#### Vehicle Crossing Structures

One vehicle crossing structure is proposed during the construction of the proposed pipeline:

- typical swamp mat ford (Detail 6A-11);

#### Watercourse Crossing Construction

Watercourses along the route range consist of small non-fish bearing watercourses. Procedures for watercourse crossings include:

- trenchless: bore / punch (Detail 6A-12);

#### Rare Plants

Rare plant surveys will be conducted in the spring/summer of 2011. General mitigation strategies have been developed for this Project to accomplish effective protection of any rare plant populations and communities that are found during the surveys (see Plant Species of Concern Discovery Contingency Plan in Appendix 6B of this EA). These measures include:

- narrowing down the right-of-way and flagging or fencing-off the feature of concern to avoid impact during construction (Detail 6A-13);
- salvaging and transplanting individual rare vascular plant species, when they are located in a position on the right-of-way that cannot be avoided (Detail 6A-14);
- placing protective structures or snow and ice work pads over the plants of concern where site-specific conditions, plant species characteristics and timing of construction allow for effective protection (Detail 6A-15); and
- collecting seed from mature vascular plants that are poor candidates for transplant and in a position on the right-of-way where disturbance cannot be avoided (Detail 6A-16).

#### Soil Erosion Control

Some areas of the right-of-way are susceptible to wind and/or water erosion. Detail 6A-10 includes measures to minimize wind erosion of the topsoil windrow during construction. Measures related to general right-of-way revegetation also address soil erosion control.

Numerous methods are proposed for revegetation of the right-of-way and a number of special measures will be implemented depending on site-specific conditions. These measures include:

- salvaging shrubs, native seeds and rare plants for transplant onto the right-of-way following construction (Detail 6A-14);
- collecting native seed from local species that cannot be obtained from other sources (Detail 6A-16);
- seeding with seed mixes compatible with surrounding vegetation species (by drill or broadcast seeding (Detail 6A-17, Detail 6A-18, Detail 6A-19);
- seeding with a cover crop (Detail 6A-20);

Wildlife

Wildlife surveys will be conducted in spring/early summer 2011 on non-cultivated/native vegetation segments of the route to identify site-specific features associated with sensitive wildlife species in the vicinity of the proposed route. General mitigation strategies have been developed for this Project to accomplish effective protection of critical or key wildlife habitat that are found during the surveys.

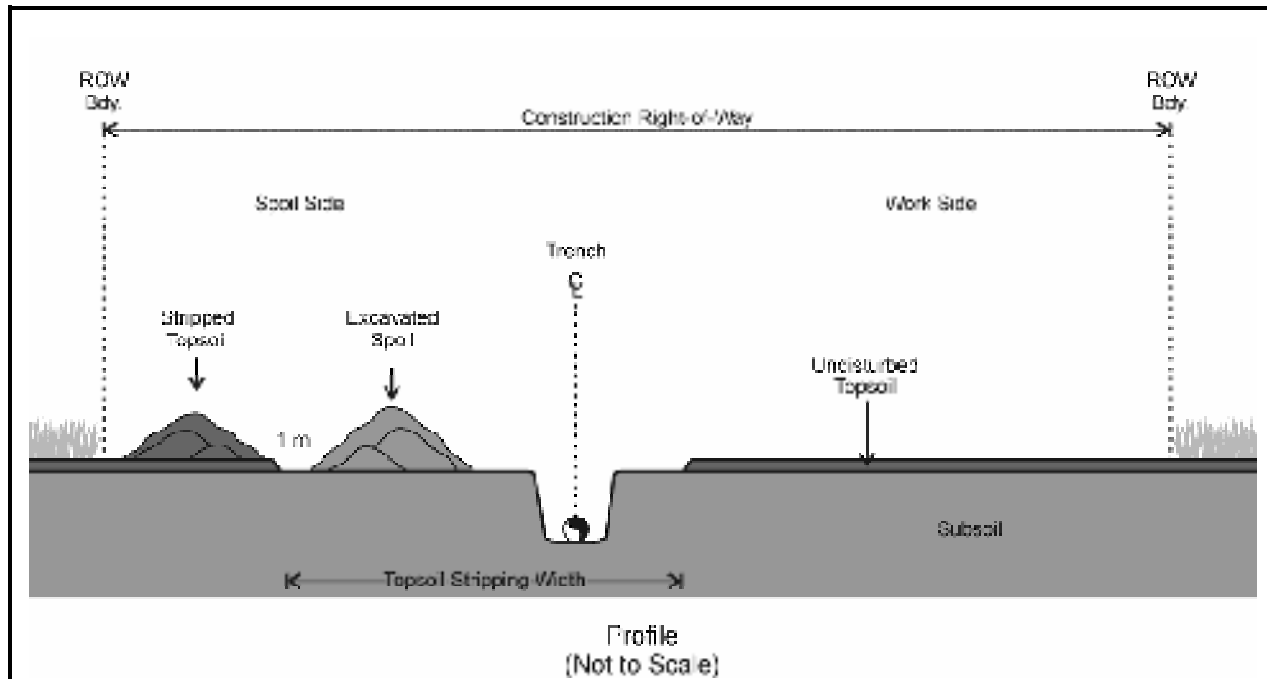
Avoid construction within the April 1 to July 31 peak nesting period along segments of the route that traverse lands associated for bird use (*i.e.* non-cultivated/native vegetation areas). If construction cannot be completed outside of April 1 to July 31, pre-clear and pre-mow the right-of-way prior to April 1 to discourage nesting. If pre-clearing and pre-mowing is not practical, a nesting bird survey will be completed prior to construction to identify nest locations along the right-of-way. Construction activities in the vicinity of nest locations on or adjacent to the right-of-way will be postponed until nestlings have fledged. Maintain water levels in wetlands.

Weed and Invasive Species Control

Management of invasive plant species is essential to maintaining the ecological integrity of lands supporting native vegetation and equivalent land capability for agricultural lands. Measures to reduce the spread of weeds are provided in Detail 6A-21.

Details

Construction and Reclamation Plan Details

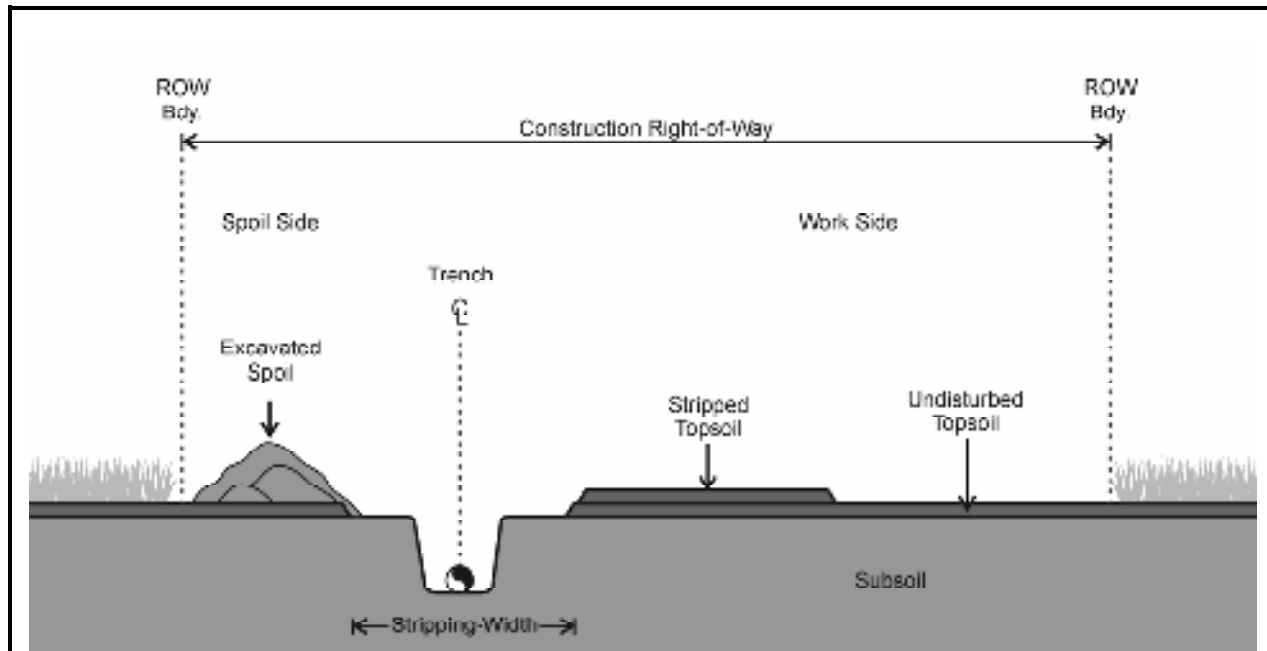


#### **DETAIL 6A-1 TOPSOIL SALVAGE – TRENCH AND SPOIL AREA**

##### **Activity:**

1. Strip and Stockpile Topsoil
  - Conduct trench and spoil pile area topsoil stripping on cultivated lands during nonfrozen conditions. Strip the trench and spoil area on other land uses such as native prairie, hay, pasture, bush-pasture and bush lands as field circumstances dictate using Figure 6A-1 as a guide.
  - Topsoil stripping requires accurate depth control of a grader or equivalent machine to ensure that subsoils and topsoils are accurately separated. Multiple passes are preferred to a single pass.
  - Store topsoil on edge of spoil side of right-of-way. Storing topsoil on the work side and flattening it down to set pipe on is acceptable provided there is no mixing.
  - Suspend stripping during periods of high winds or when soils are excessively wet.
  - Leave breaks in the topsoil windrow at obvious drainage courses.
2. Excavate Trench and Stockpile
  - Maintain at least 1 m separation between topsoil and subsoil.
3. Backfill Trench
  - Backfill and compact trench. Crown the trench to allow for settlement. Leave breaks in the crown at obvious drainages.
  - Avoid mixing subsoil with topsoil.
4. Replace Topsoil and Clean-up
  - Pick rocks and debris from the trench area equivalent to the surrounding subsoil prior to topsoil replacement on agricultural lands.
  - Evenly replace topsoil with grader or equivalent machine.
  - Suspend replacement activities during periods of high winds if soil drifting begins to occur or when soils are excessively wet.
  - Pick rocks and debris equivalent to the surrounding topsoil.





### **DETAIL 6A-2 TOPSOIL SALVAGE - BLADE WIDTH**

#### **Activity:**

#### **1. Strip and Stockpile Topsoil**

- Blade width topsoil stripping is to be conducted on well-sodded hay land, pasture, native prairie, bush pasture and bush lands during non-frozen.
- Salvage topsoil from a strip approximately three times the width of the trench centred over the trench line. Area stripped should be sufficiently wide to accommodate the track of the ditcher.
- Increase topsoil stripping width at locations where trench sloughing may occur; stockpile topsoil a greater distance from the trench at these sites.
- Stockpile topsoil on work side and flatten to allow set-up of pipe. Windrowing of salvaged topsoil material on the spoil side is also acceptable.
- Topsoil stripping requires accurate depth control of a road grader or equivalent machine to ensure that subsoils and topsoils are accurately separated. Strip topsoil to colour change.
- Limit topsoil stripping activities during frozen conditions to specialized equipment capable of accurately separating topsoil from subsoil.
- Suspend stripping during periods of high winds if soil drifting begins to occur or during excessively wet conditions.
- Leave breaks in the topsoil windrow at obvious drainage courses.

#### **2. Excavate Trench and Stockpile**

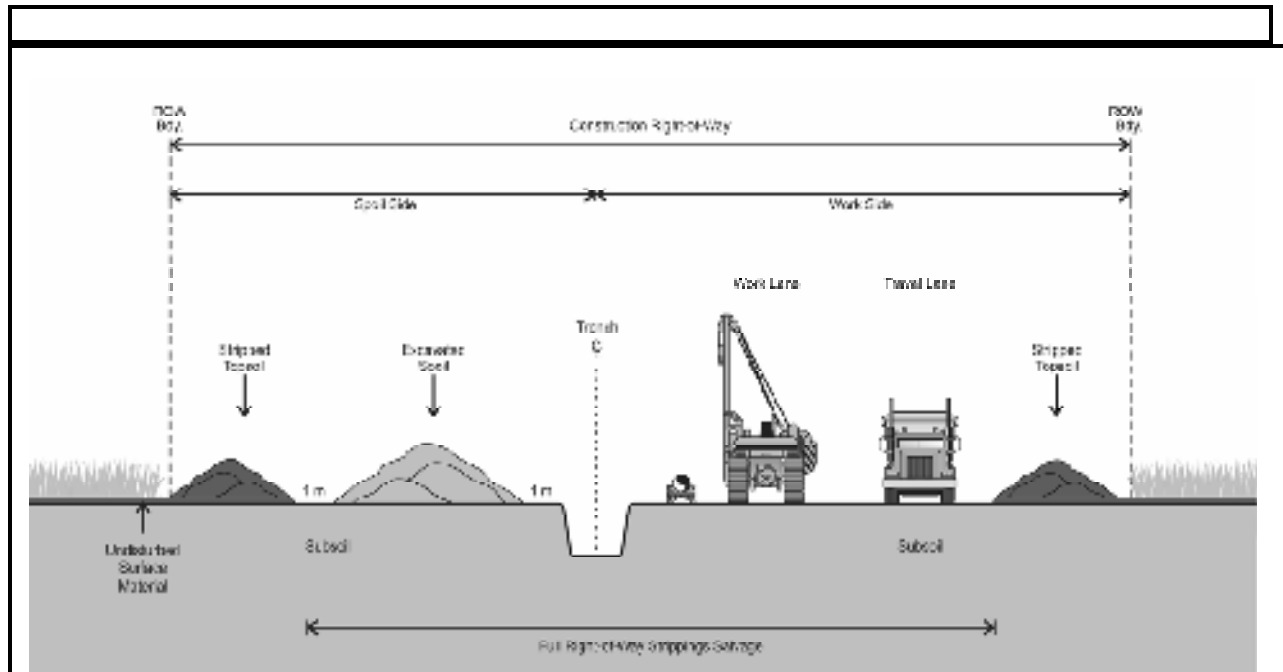
- Place spoil on the spoil side of the trench. Maintain at least 1 m separation between topsoil and subsoil.

#### **3. Backfill Trench**

- Backfill and compact trench. Crown the trench, as warranted, to allow for settlement.
- Avoid mixing subsoil with topsoil. Also avoid scalping sod layer by using a Prairie Protector, if necessary, or other piece of equipment capable of fine depth control.
- Pick stones and debris from the trench area equivalent to the surrounding subsoil.

#### **4. Replace Topsoil and Clean-up**

- Evenly replace topsoil with grader or equivalent machine. Avoid scalping sod layer on native prairie if scalping is excessive.
- Suspend replacement activities during periods of high winds if soil drifting begins to occur or during excessively wet conditions.
- Pick stones equivalent to the surrounding topsoil.

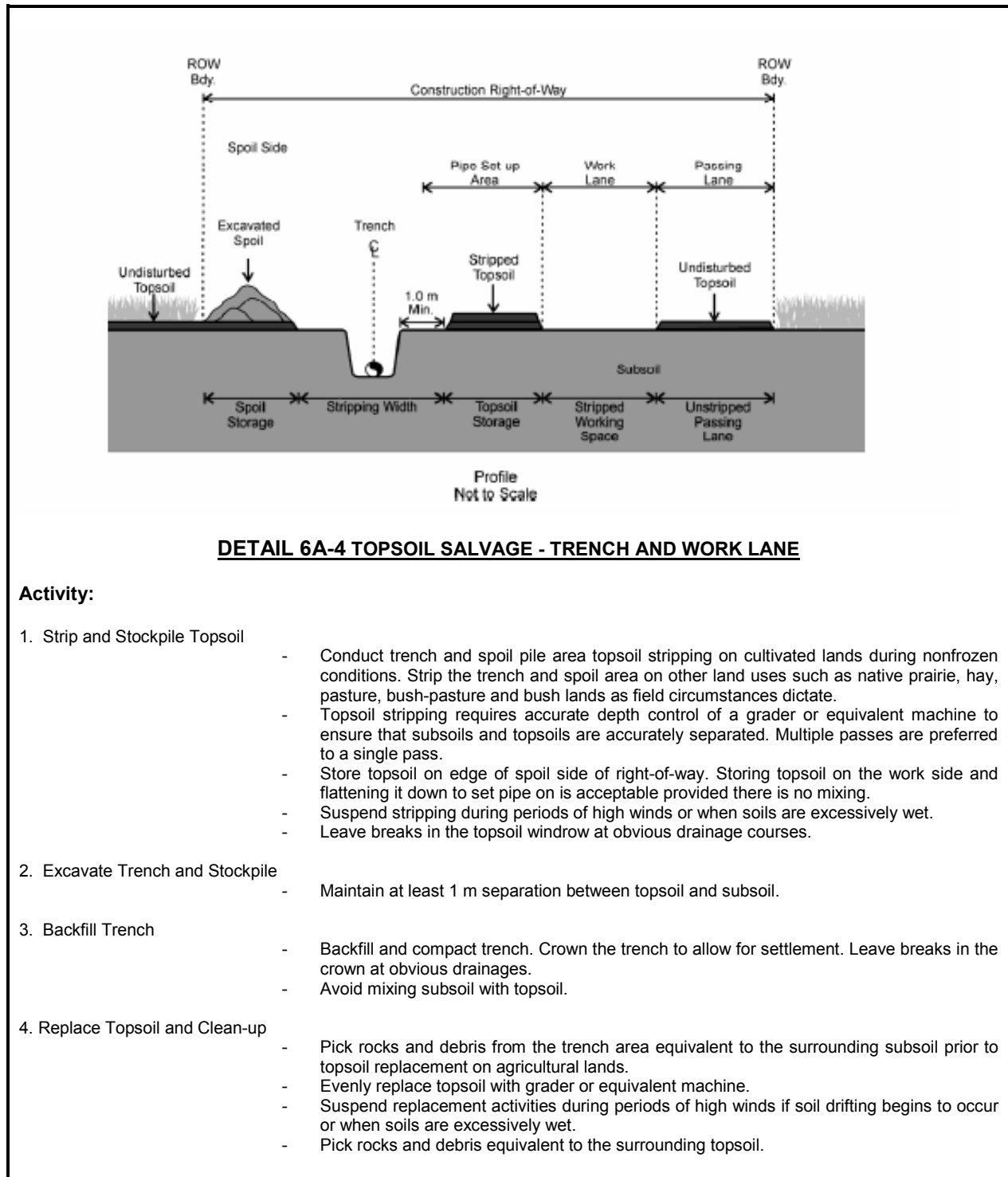


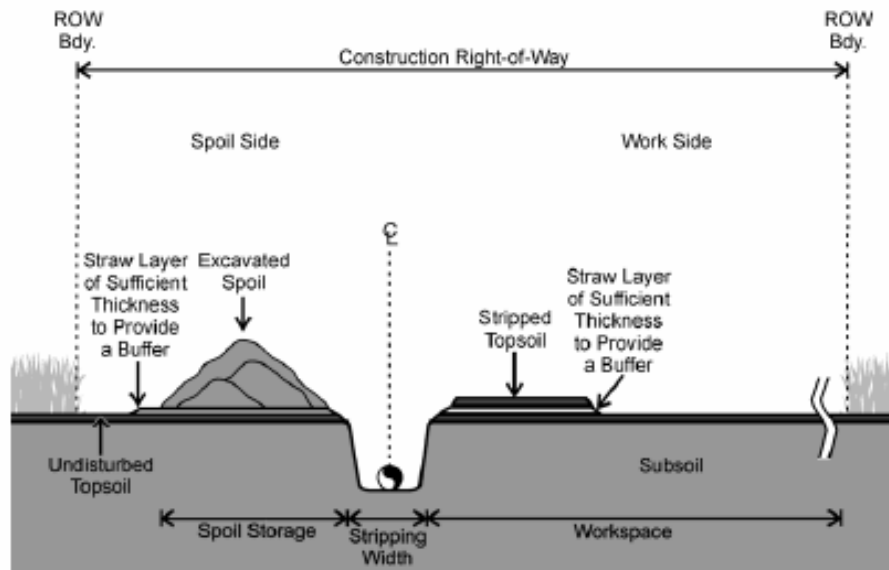
Profile  
(Not to Scale)

**DETAIL 6A-3 TOPSOIL SALVAGE – FULL RIGHT-OF-WAY**

**Activity:**

- |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Strip and Stockpile Topsoil</li> </ol>   | <ul style="list-style-type: none"> <li>▪ Salvage topsoil from over the proposed trench, spoil storage and work areas as field circumstances dictate using Figure 6A-1 as a guide. Topsoil storage on both sides of the right-of-way adjacent to the stripped area, as shown is preferred, however, storage of all salvaged topsoil on one side of the right-of-way is also acceptable.</li> <li>▪ Topsoil stripping requires accurate depth control of a grader or equivalent machine to ensure that subsoils and topsoils are accurately separated.</li> <li>▪ Suspend stripping during periods of high winds or during excessively wet conditions when soils are saturated.</li> <li>▪ Leave breaks in the topsoil windrow at obvious drainage courses.</li> </ul> |
| <ol style="list-style-type: none"> <li>2. Excavate Trench and Stockpile</li> </ol> | <ul style="list-style-type: none"> <li>▪ Maintain at least 1 m separation between topsoil and subsoil piles.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <ol style="list-style-type: none"> <li>3. Backfill Trench</li> </ol>               | <ul style="list-style-type: none"> <li>▪ Backfill and compact trench. Crown the trench to allow for settlement. Leave breaks in the crown at obvious drainages.</li> <li>▪ Avoid mixing subsoil with topsoil.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <ol style="list-style-type: none"> <li>4. Replace Topsoil and Clean-up</li> </ol>  | <ul style="list-style-type: none"> <li>▪ Rip compacted subsoils, if present, prior to topsoil replacement.</li> <li>▪ Ensure ripper teeth are of equal length. Disc subsoil if very lumpy prior to topsoil replacement.</li> <li>▪ Pick rocks and debris from the trench area equivalent to the surrounding subsoil prior to topsoil replacement on agricultural lands.</li> <li>▪ Evenly replace topsoil with grader or equivalent machine.</li> <li>▪ Suspend replacement activities during periods of high winds if soil drifting begins to occur or during excessively wet conditions when soils are saturated.</li> <li>▪ Pick rocks and debris equivalent to the surrounding topsoil.</li> </ul>                                                               |





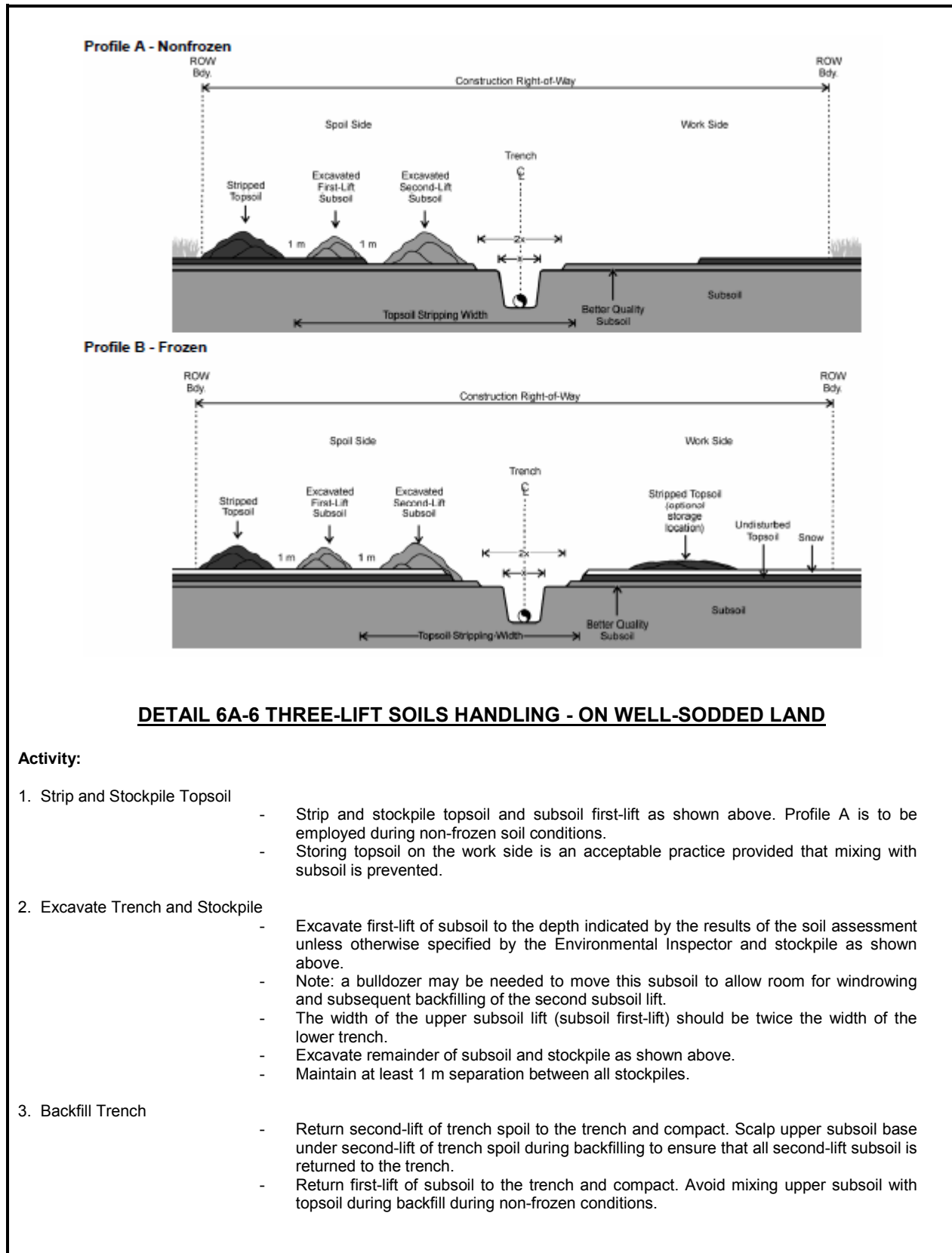
**DETAIL 6A-5 TOPSOIL SALVAGE – REDUCED SALVAGE WIDTH**

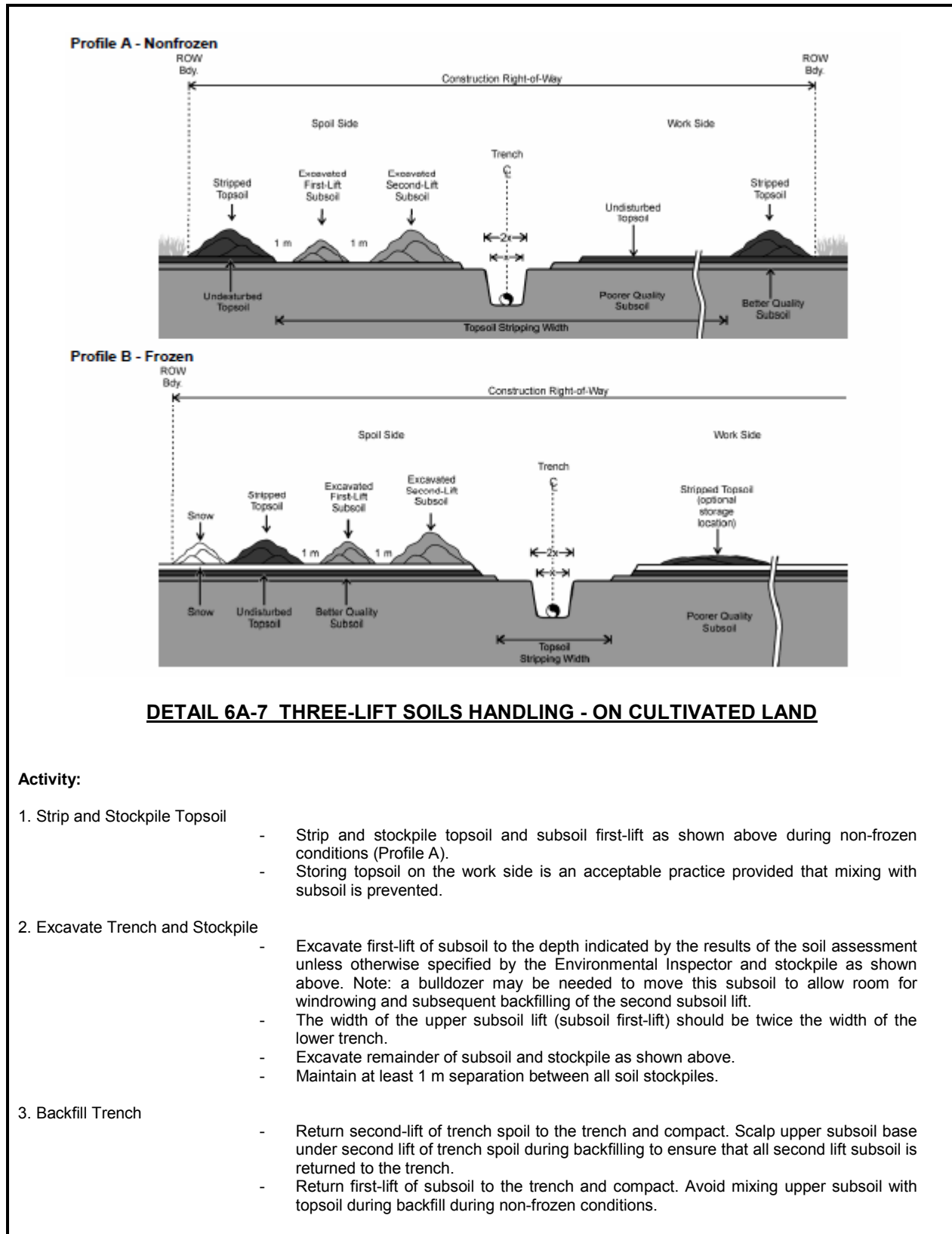
#### CRITERIA FOR IMPLEMENTATION

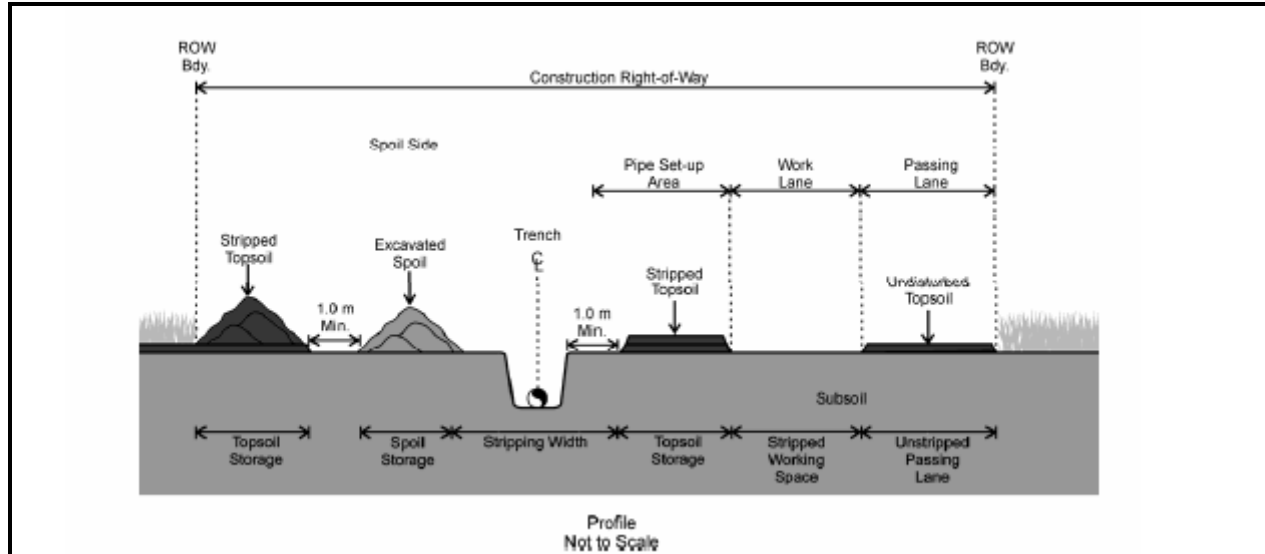
Reduced stripping width procedures will be employed in localized sensitive areas during frozen or nonfrozen conditions.

#### Notes:

1. Minimize traffic in the localized sensitive area.
2. Spread straw on the topsoil storage area to a sufficient thickness to minimize the risk of disturbance to the sod layer during topsoil replacement.
3. Salvage topsoil from the trenchline only. The work side topsoil pile may be flattened down to allow pipe to be set up on the salvaged topsoil. Stripping depth should be 15 cm, to colour change or as guided by the Environmental Inspector.
4. Spread straw under the spoil pile area to a sufficient thickness to minimize the risk of disturbance to the sod layer during backfilling. Ensure that straw is free of weeds.
5. Excavate trench subsoil and store on straw that has been spread on the spoil side adjacent to the trench.
6. Complete lowering-in activities.
7. Backfill and compact trench to avoid having to feather excess spoil. Crown the trench, if warranted, to allow for settlement. Avoid mixing subsoil with topsoil and avoid scalping the sod layer. Leave remaining straw on undisturbed sod layer.
8. Evenly replace topsoil over the stripped area. Leave remaining straw and avoid scalping the sod layer.







### **DETAIL 6A-8 TOPSOIL SALVAGE – TRENCH, SPOIL AND WORK LANE**

#### **Activity:**

1. Strip and Stockpile Topsoil
  - Trench, spoil and work lane topsoil stripping is to be conducted on well-sodded hay and pasture lands, bush and native prairie as described in Figure 6A-1.
  - Increase topsoil stripping width at locations where trench sloughing may occur, stockpile topsoil a greater distance from the trench at these sites.
  - Stockpile topsoil from the trench and spoil area on the spoil side. Salvage topsoil from the work/travel lane and store in the pipe set-up area or on the passing lane side.
  - Topsoil stripping requires accurate depth control of a road grader or equivalent machine to ensure that subsoils and topsoils are accurately separated. Multiple passes are preferred to a single pass. Strip topsoil to colour change.
  - Suspend stripping during periods of high winds if soil drifting begins to occur or soils are excessively wet.
  - Leave breaks in topsoil pile at obvious drainage courses.
2. Excavate Trench and Stockpile
  - Place spoil on the spoil side of the trench. Maintain at least 1 m separation between topsoil and subsoil.
3. Backfill Trench
  - Backfill and pack trench. Crown trench as required to allow for settlement of fill.
  - Avoid mixing subsoil with topsoil. Also avoid scalping sod layer.
  - Pick stones and debris from the trench area equivalent to the surrounding subsoil.
4. Replace Topsoil and Clean-up
  - Evenly replace topsoil with grader or equivalent machine. Avoid scalping sod layer.
  - Suspend replacement activities during periods of high winds if soil drifting begins to occur or soils are excessively wet.
  - Cultivate disturbed part of the right-of-way.
  - Pick stones equivalent to the surrounding topsoil.

**DETAIL 6A-9 DELAYED GRADE / TOPSOIL REPLACEMENT - PROTECTION FROM SOIL EROSION**

Where right-of-way recontouring and topsoil replacement are delayed until after spring break-up, the following measures will be implemented, as directed by the Environmental Inspector.

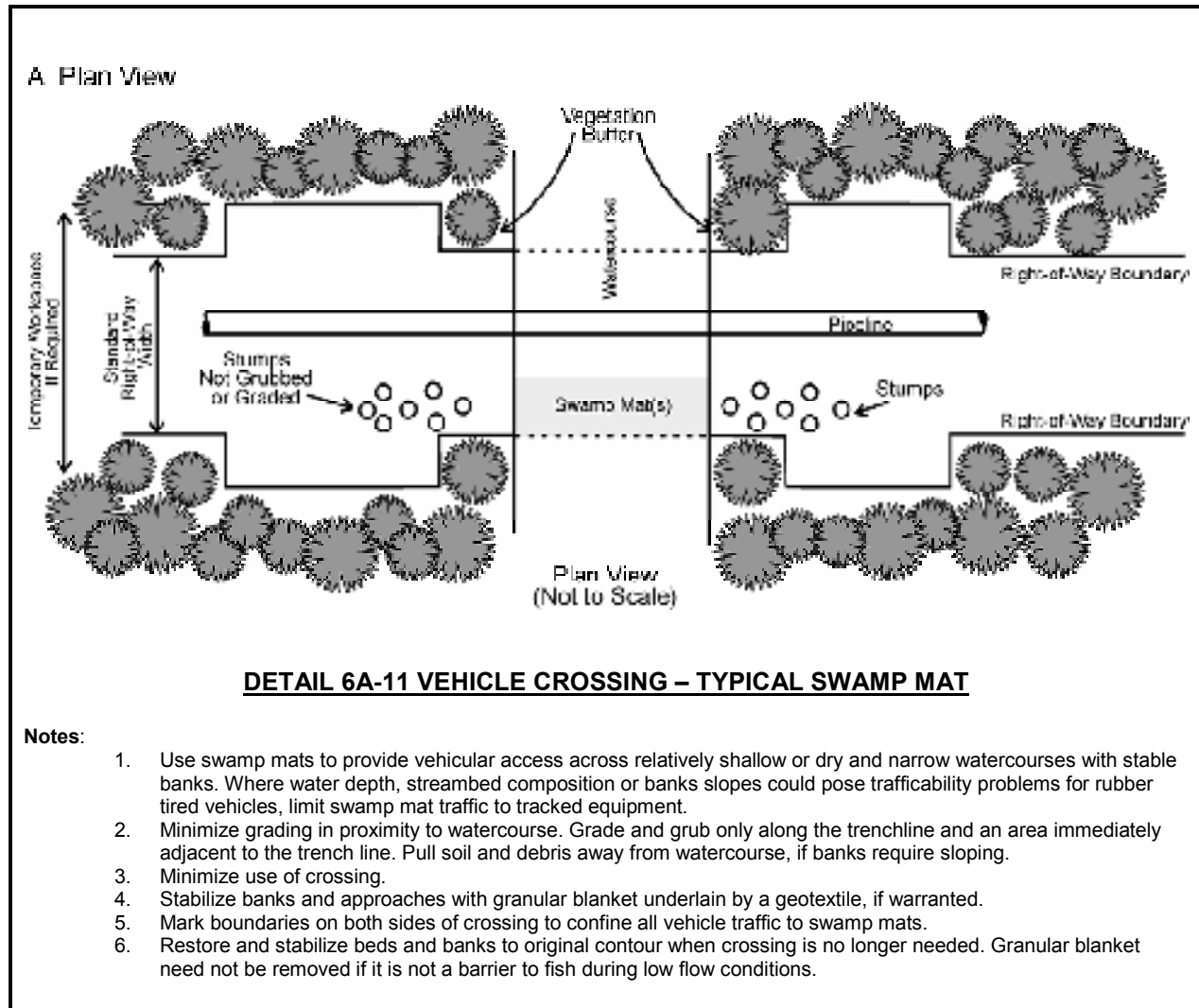
1. Identify locations where cross drainage is needed. If feasible, consult with landowners to confirm locations where cross-drainage is needed.
2. Ensure grade material is well packed into its present position.
3. Create frequent breaks in the topsoil windrow at low areas, mid-slope and at obvious cross-drainage swales.
4. Compact the trench backfill downslope of the windrow breaks for a distance of at least 10 m using a compaction wheel or backhoe bucket. Install a temporary berm across the trench to minimize the channeling of any surface water flow.
5. Lay geotextile matting across the right-of-way through the windrow break. Ensure the matting provides drainage onto, across and off the work area.
6. Stake geotextile in place according to manufacturer's instructions.
7. Apply tackifier to the topsoil windrow.

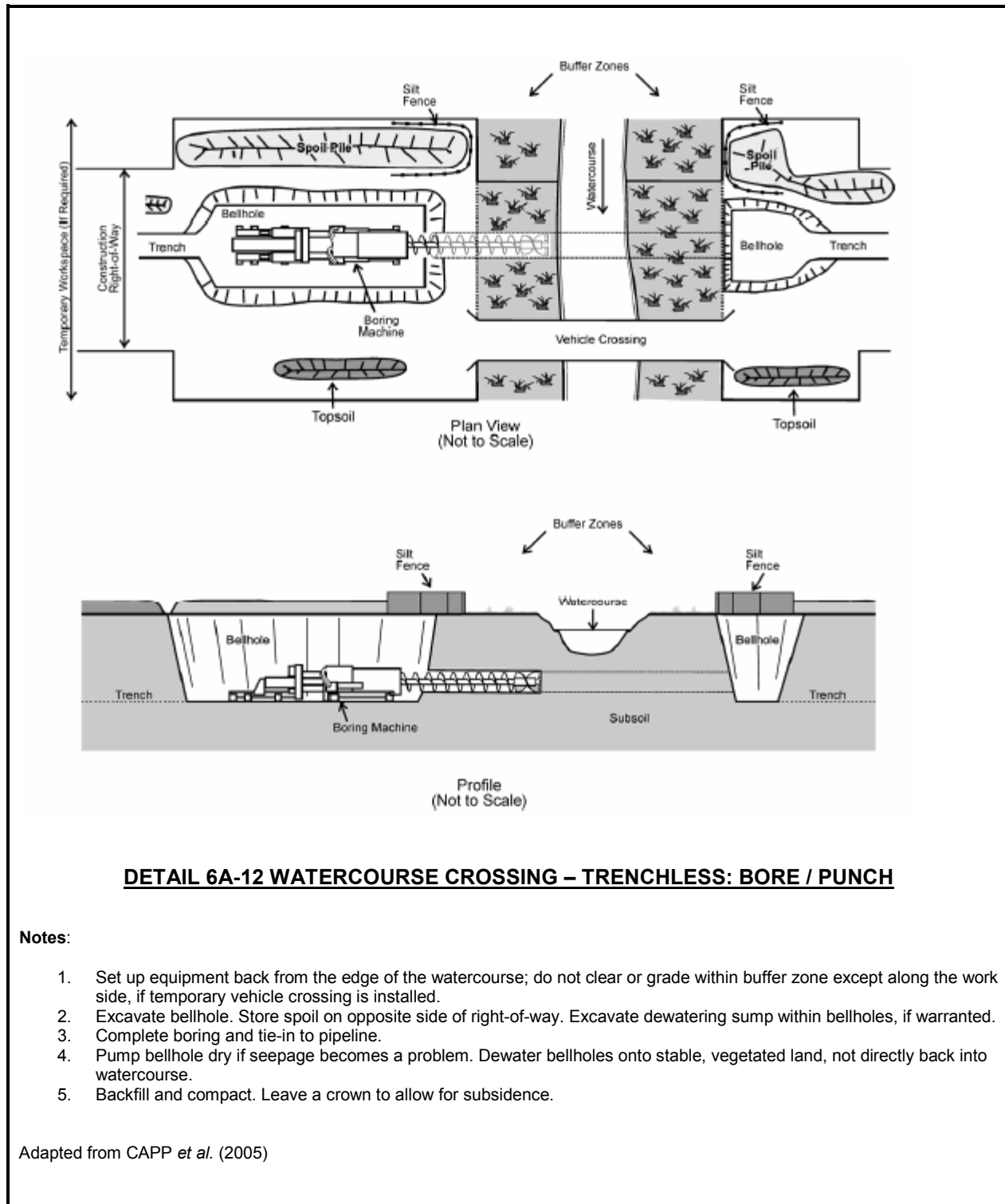
**DETAIL 6A-10 TACKIFY TOPSOIL WINDROW**

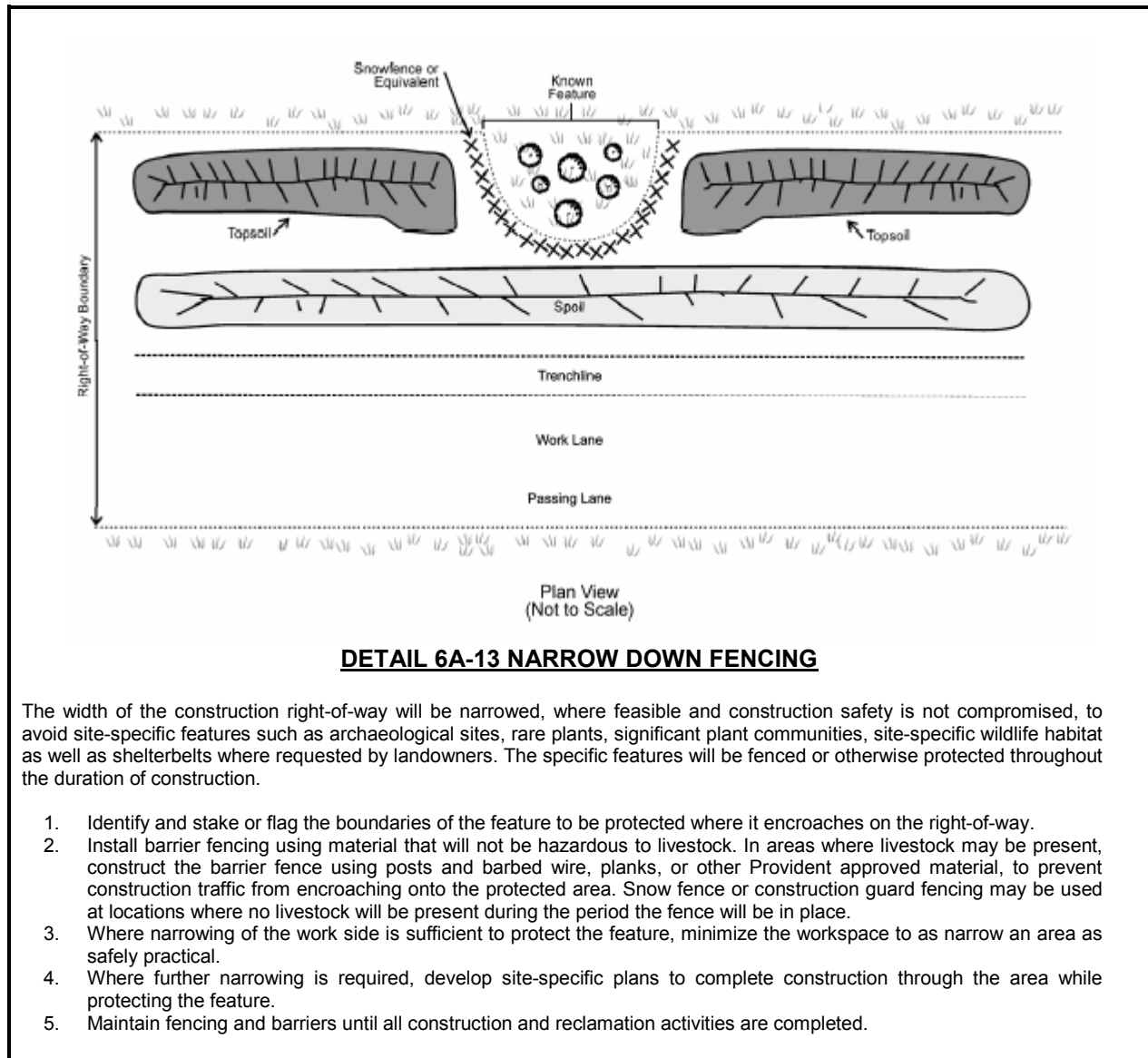
The topsoil windrow will be tackified on wind erodible soils, where other erosion control measures (such as storing topsoil in low profile windrows and packing or the application of snow or water) are not feasible or effective. Locations where tackifier will be used will be determined during construction by the Environmental Inspector.

1. Tackifier will be applied as specified by Provident Environmental Inspector.
2. Tackifier will be biodegradable and non-toxic.
3. Apply tackifier on topsoil windrow immediately following stripping or immediately after identification of wind erosion potential.
4. Apply tackifier at the manufacturer's recommended rate using a boom sprayer or cannon sprayer capable of providing even surface coverage of the entire topsoil windrow.
5. Avoid disturbance to the topsoil windrow after tackifier has been applied.
6. Reapply tackifier if disturbance of the topsoil windrow occurs and the potential for wind erosion reoccurs.







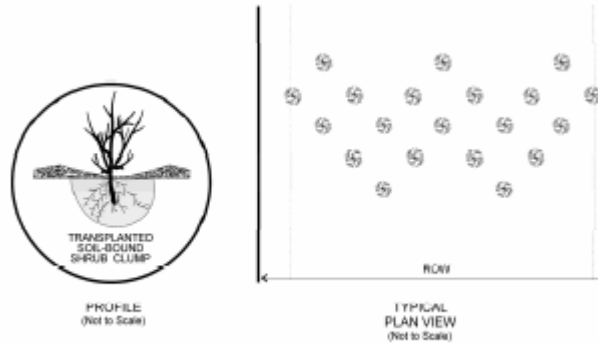


**CRITERIA FOR IMPLEMENTATION**

Live plant material salvage will generally consist of two types of salvage:

- salvage of shrubs with rootball; and
- salvage and transplant of rare plants.

All collection, salvage and transportation of live plant material will be done following approval by the appropriate authority.

**Detail 6A-14 LIVE PLANT SALVAGE AND TRANSPLANT****SALVAGE OF SHRUBS WITH ROOTBALL**

Shrubs for salvage will be selected by qualified personnel and flagged prior to construction activities in that area.

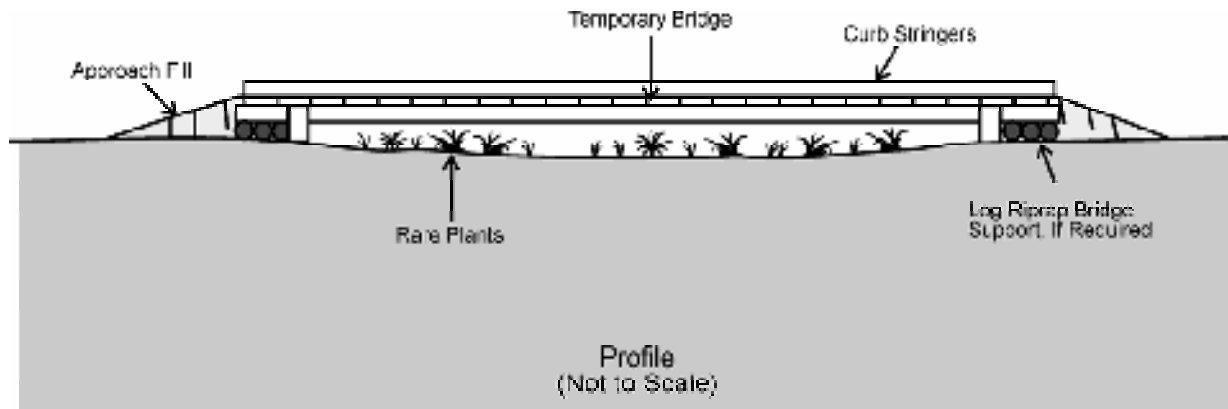
1. To the extent possible, shrub salvage will be done during dormancy (mid September to bud break).
2. Shrub salvage will be timed to minimize period between salvage and restoration planting.
3. Prior to salvage, prune back shrub top growth as directed by qualified personnel. Salvage shrubs using a backhoe. Remove as large a rootball as feasible.
4. Cover the rootball of the salvaged plants with burlap or geotextile. Keep the covered rootball slightly moist (but not saturated) until the plants are replanted.

**RARE PLANTS**

1. The rare plants along the right-of-way that require transplanting have been identified by a qualified botanical expert and will be flagged prior to clearing.
2. A qualified botanical expert will select a suitable receiving site for the plant. The receiving site should be adjacent to the construction right-of-way, in an area having a similar microsite to where the rare plant had been growing.
3. Delay salvaging activities until immediately prior to construction. Cut back or prune plants to be salvaged as directed by the Environmental Inspector in consultation with the botanical expert. Salvage designated plants using a shovel or backhoe. Remove as large a rootball as feasible. Cover the rootball of the salvaged plants with burlap or geotextile. Keep the covered rootball slightly moist (but not saturated) until the plants are replanted.
4. Replant the salvaged plant in the receiving site as soon as possible following salvage.

**CRITERIA FOR IMPLEMENTATION - TEMPORARY BRIDGE**

This procedure will be used when the rare plants are located on the work side of the right-of-way in an area that does not require topsoil salvage.

**DETAIL 6A-15 TEMPORARY BRIDGE OR DIRT RAMP OVER RARE PLANTS**

This procedure will be utilized on a trial basis at selected sites where narrowing down is insufficient as a mitigative measure for the protection of rare plant communities on the right-of-way. The decision to implement this procedure will be based on plant species, construction timing (e.g., early or late summer) and suitability of other protection measures as determined by the Environmental Inspector and botanical expert.

1. Narrow down right-of-way to eliminate passing lane and fence off the feature of concern until ready to construct ramp.
2. Immediately prior to construction of this section, remove the mats, place geotextile pads, flexnet or swamp mats on work side and spoil side, as required, to protect rare plant population.
3. Strip topsoil from the trench area and place on geotextile on opposite side of trench from pipe lay-up and work lane.
4. Excavate trench spoil and place on geotextile on the work side. Spread spoil over the width of the geotextile-covered work lane to provide a work and travel area.
5. Avoid scalping vegetated ground surface when backfilling spoil, replacing topsoil and removing pads.

**Detail 6A-16 RARE PLANT SEED COLLECTION****NATIVE SEED COLLECTION****CRITERIA FOR IMPLEMENTATION**

Native seed will be collected from areas of undisturbed native vegetation, either on the right-of-way or at suitable locations off the right-of-way with the approval of the landowner and occupant, and appropriate government agency prior to construction. Seeds of select species will be collected and stored.

1. Potential locations where native seed will be collected from the right-of-way will be determined from the results of field surveys.
2. Potential sites will be inspected in the field to assess for contamination with undesirable species and the presence of target desirable species.
3. Seed will be collected by a qualified botanical expert using an appropriate method. Collections will be conducted numerous times throughout the growing season, if feasible, in order to collect seed from as many species as possible.
4. All phases of native seed collection work will be documented for tracking, including: species collected; location; date; amounts; and storage location.
5. The seed will be processed and cleaned under the supervision of a botanical expert. Viability and weed content tests will be conducted.
6. The seed will be stored in appropriate facilities under the supervision of a botanical expert.
7. Seeding operations will be supervised by the Environmental Inspector. Seeding procedures, areas and rates will be determined by a botanical advisor based on site-specific conditions.

**RARE PLANT SEED COLLECTION****CRITERIA FOR IMPLEMENTATION**

Rare plant seed will be collected from rare plants along the right-of-way that cannot be avoided or protected during construction.

1. Potential locations where rare plant seed will be collected from the right-of-way will be determined from the results of field surveys.
2. Seed will be collected by a qualified botanical expert using an appropriate method.
3. All phases of rare plant seed collection work will be documented for tracking, including: species collected; location; date; amounts; and storage location.
4. The seed will be processed, cleaned and stored in appropriate facilities under the supervision of a botanical expert.
5. Collected rare plant seed will be seeded at selected areas under the direct supervision of a botanical expert. Seeding operations will be supervised by the Environmental Inspector. Seeding procedures, areas and rates will be determined by a botanical expert based on site-specific conditions.

**Detail 6A-17 SEED MIXES**

1. Seed mixes will be determined and seeded at locations indicated by the Environmental Inspector.
2. Species cultivars, where applicable, will be determined at the time of procurement based on availability and suitability as determined by Provident.
3. Native seed species will be obtained from local sources to the extent feasible.
4. All seed mixes must have certificates of analysis for weed and undesirable species content, and germination tests for each lot of each species in the mix.
5. Certificates of analysis for all seed lots will be reviewed by Provident prior to purchase. Any lot with unacceptable weed contamination or viability will be rejected.
6. An annual or biennial cover crop will be seeded in addition to the specified seed mix as directed by the Environmental Inspector. Cover crops are to be seeded at a rate of 20-30 kg/ha if drill seeded and 40-60 kg/ha if broadcast seeded. Cover crop species may include annual ryegrass, winter wheat, fall rye, slender/awned wheatgrass, Canada wild rye, hairy wild rye or triticale.
7. Road ditches will be seeded with the seed mix sown on the adjacent lands. In ditches adjacent to cultivated lands, use the appropriate non-native seed mix. See Detail 6A-18 for procedures related to drill seeding and see Detail 6A-19 for broadcast application procedures.

**CRITERIA FOR IMPLEMENTATION**

1. Drill seeding will be used on all segments to be seeded with the exception of the following areas:
  - slopes which are too steep to safely operate the tractor and seed drill;
  - areas too wet to access with a tractor and seed drill without causing rutting and poor seed placement;
  - stony areas which could cause damage to the equipment or impede the ability of the drill to properly place the seed;
  - any areas which cannot be feasibly reached with the seed drill.

**Detail 6A-18 DRILL SEEDING**

1. All seed drills will be calibrated for each seed mix using the manufacturer's recommended procedures; alternate calibration procedures may be used if approved by the Environmental Inspector.
2. The seeding contractor will develop and have approved by the Environmental Inspector, appropriate seeding procedures to ensure even distribution of all species in each seed mix. This may involve, but not be limited to:
  - using seed box agitators to prevent stratification of large and small seeds;
  - seeding large and small seed species from separate seed boxes, or in separate passes with the seeder; or
  - using an inert filler agent with the seed mix.
3. Seeding depth will be 1-2 cm in fine textured soils and 1-3 cm in sandy soils.
4. Only the stripped or cultivated width of the construction right-of-way will be seeded with minimal overlap onto undisturbed areas. Swing-out passes will be made to seed scalped areas adjacent to the stripped portion as needed.
5. Complete coverage of the stripped area will be ensured by using a sufficient number of passes. Damage to the native sod adjacent to the disturbed portion of the right-of-way will be avoided.

**Detail 6A-19 BROADCAST SEEDING**

Broadcast seeding will be used on non-cultivated lands where drill seeding cannot be conducted.

1. All broadcast seeders will be calibrated on site using the manufacturer's recommended procedures; alternate calibration procedures may be used if approved by the Environmental Inspector(s).
2. The seeding contractor will develop and have approved by the Environmental Inspector(s), appropriate seeding procedures to ensure even distribution of all species in each seed mix. This may involve, but not be limited to:
  - using seed box agitators to prevent stratification of large and small seeds;
  - seeding large and small seed species from separate seed boxes, or in separate passes with the seeder; or
  - using an inert filler agent with the seed mix.
3. Only the stripped or cultivated width of the construction right-of-way will be seeded unless otherwise directed by the Environmental Inspector.
4. Broadcast seeding will be delayed during high wind conditions, as directed by the Environmental Inspector.
5. Where site and safety conditions allow, seed will be harrowed into a depth of 1-3 cm, using standard agricultural harrows or other approved equipment.
6. Harrowing will be conducted immediately following broadcasting. Steep slopes that cannot be safely harrowed will be hand raked, if feasible, to incorporate seed if feasible.

**CRITERIA FOR IMPLEMENTATION****Detail 6A-20 COVER CROP**

Cover crop seeding may be used, if warranted, for faster vegetative cover on erosion-prone areas such as moderate to steep slopes, exposed windy areas and areas with coarse textured soils.

A cover crop is a fast-growing annual or biennial species that is seeded to control erosion and limit weed growth while pre-disturbance vegetation is restored. Potential cover crop species include annual ryegrass, winter wheat, fall rye, slender/awned wheat grass, Canada wild rye, hairy wild rye and triticale. Monitoring during subsequent years will be conducted to ensure the cover crop does not become permanently established and provide excessive competition to the desired species. If the cover crop is found to be persistent, it will be mowed prior to heading and seed set.

**DETAIL 6A-21 WEED MANAGEMENT**

Management of invasive plant species is of paramount concern to Provident. The goal of invasive species management for the Provident Pipeline Project is to prevent the introduction and spread of non-native plants and to eliminate or control them, as practical within the project area. To help achieve this goal, the following measures will be implemented during restoration.

1. All equipment shall arrive for work in a clean condition to minimize the risk of weed introduction. Any equipment which arrives in a dirty condition will not be allowed to work until it has been cleaned off at a suitable location.
2. Equipment passing through areas identified as having a weed problem will be shovel and compressed air cleaned prior to continuing work on the right-of-way.
3. Control the growth of noxious or nuisance weeds on topsoil storage piles by hand cultivating, brushing, moving or if necessary using selective, non-persistent herbicides. Control will be initiated before weedy species mature – produce seed.
4. Weed growth will be monitored during restoration activities, and weed control measures applied on a site-specific basis.
5. The pipeline project area will be monitored for weed infestations as a part of the Post-Construction Monitoring Program.
6. Areas of poor plant cover will be reseeded and weed control measures will be applied if warranted.
7. Weed species of concern that are identified at the sites will be treated. Manual removal of plants or chemical treatment will occur. If weeds are manually removed when in flower, the weed material will be disposed of in an approved land-fill facility.
8. Record all weed treatment and monitoring records.
9. Pull out or mow the plants from heavily infested areas and dispose of as directed by the Environmental Inspector.
10. Salvage topsoil from the full width of the right-of-way in areas of heavy infestations, as directed by the Environmental Inspector.
11. Store topsoil from the affected area separately.
12. Clean all topsoil handling equipment once past the area.
13. Record infestation areas and monitor during post-construction monitoring.
14. Clean all equipment with shovels, compressed air, or high pressure water.
15. Record location of clean-off site for future monitoring and, if warranted, weed control.