CERTIFICATION OF MINERAL SOIL PADS IN THE BOREAL REGION – DECISION FRAMEWORK AND SUPPORT TOOLS: 2022 UPDATE

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REPORT PREPARED FOR
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Reclamation Remediation Research Committee

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EXECUTIVE SUMMARY

In 2018, the Petroleum Technology Alliance Canada (PTAC) put out a request for proposals entitled *Reclamation Practices on Upland and Peatland Well Sites*. The project was established in response to challenges experienced by practitioners, regulators and industry related to reclamation certification of legacy sites. The specific sites in question are those that were constructed using imported mineral soil pads in peatland. The **goal of the overall project** is to provide recommendations for an acceptable framework/decision support tool(s) to assist industry and regulators in making decisions around appropriate management and certification of these sites that ensures that functioning ecosystems are developed and that there is a process that outlines eligibility for reclamation certification.

A draft report, *Certification of Mineral Soil Pads in the Boreal Region – Decision Framework and Support Tools*, was released in October 2020 to provide opportunities for industry, practitioners, and government to review and comment on the document and to set the stage for a field verification trial of the Decision Framework and Support Tools in 2021. The goal of the reviews and field verification trial were to ensure the Decision Framework and Support Tools added value in making decisions on whether to leave a mineral soil pad in a peatland.

PTAC held a Knowledge Transfer webinar June 7, 2021, with presentations by Dean MacKenzie, Vertex Professional Services Ltd., and Bonnie Drozdowski, InnoTech Alberta. The goal of the Knowledge Transfer webinar was to increase awareness of the Decision Support Tools report and to request industry and practitioner participation in a field verification trial in 2021. A second online webinar was held in June 2021 for industry and practitioners interested in conducting the field verification trial. The goal of the second webinar was to familiarize people with the purpose, process, and expectations of the field verification trial.

The results of the stakeholder reviews and field verification trial are summarized in a separate PTAC report. This 2022 Update is a revision of the original Decision Framework and Support Tools report based on the feedback and field verification trial.

The following significant changes have been made in this 2022 Update:

- General
    - Changed language in the Decision Support Tools for consistency and clarity.
    - Changed the tables supporting each Decision Support Tool to clarify that the purpose of the tables is help practitioners decide how to answer Yes or No to the statements in specific decision nodes.
- Section 2.0
    - Added a section that describes the decision framework, defines the key terms used in the framework, sets out caveats for use of the framework, and provides a screening tool to determine if the Decision Framework and Support Tools should be used.
- Section 7.0
    - Clarified that when there is a tie arising from use of the modifications to the initial site rating the site is deemed to be a Candidate for Peatland Reclamation.
- Table 8 (previously Table 7)
    - Clarified that **all** rows in the Table must have an answer.

- Removed several Factors that were already accounted for in the individual DSTs to reduce "double counting"
- Changed the Table so that each factor can change the Peatland Rating or Upland Rating
- Added new Factors

- Section 8.0
  - Added a section to describe recommended information to provide as backup documentation for the change in land use request to Alberta Environment and Parks.

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GLOSSARY

General terms are defined here. Wetland definitions were taken from the AEP *Directive for Reclamation Certificate Site Assessments for Pits and Quarries (Forested Lands) (draft)*, with some modifications. There are additional terms defined in various sections of the report.

Bog

Ombrogenous peatlands which receive water and nutrient inputs only from precipitation (rainfall and snow with low concentrations of dissolved minerals) and the live growing surface is isolated from mineral rich water. The surface waters of bogs are strongly acid and the upper peat layers are generally nutrient poor. The vegetation community is usually dominated by oligotrophic species of cushion forming peat mosses (genus *Sphagnum*), ericaceous shrubs and black spruce trees.

Change in Land Use

For the purposes of this report, it is a change from a site where the Peatland criteria apply to a site where the Forested Land criteria apply.

Decision Framework

A set of four Decision Support Tools and a rating system to determine the end land use recommendation for the pad and/or access road as either a Candidate for Peatland Reclamation or a Candidate for Upland Reclamation.

Decision Support Tool

A flowchart with multiple Yes/No oval decision nodes that leads the practitioner to an end land use recommendation indicating whether the site is a Candidate for Peatland Reclamation or a Candidate for Upland Reclamation.

Fen

Minerogenous peatlands supplied with waters that contain dissolved ions derived from mineral soils of the surrounding areas or underlying parent material. The vegetation in fens usually reflects the water source and nutrient availability. Based on vegetation, fens can be broadly grouped into: graminoid fens without trees or shrubs, shrub fens, and treed fens. Dominant plants include black spruce, tamarack, sedges, grasses, and various true mosses.

Forested Land Criteria

The 2010 Reclamation Criteria for Wellsites and Associated Facilities for Forested Lands (Updated July 2013).

Marsh

Marshes are wetlands that are periodically inundated by standing or slowly moving water and hence are rich in nutrients. Marshes are mainly wet, mineral-soil areas, but shallow, well-decomposed peat may be present. Marshes are subject to a gravitational water table, but water remains within the rooting zone of plants for most of the growing season. They are characterized by an emergent vegetation of reeds, rushes or sedges and the absence of woody vegetation.

Mineral Soil Pad

A well pad or access road that is constructed in a peatland, consisting of mineral soils, usually clay-based. Geotextile or corduroy (logs) are typically placed on the surface of the wetland prior to the addition of the mineral soil fill; these are also left in place below the fill.

Peatland

An area on the landscape covered by a minimal depth of 40 cm of peat, which is a deposit of plant and animal remains accumulated through incomplete decomposition under saturated conditions.

Peatland Criteria

The Reclamation Criteria for Wellsites and Associated Facilities for Peatlands.

Peatland Site

A site located in a peatland.

Shallow Open Water Wetland

Shallow open water wetlands, also known as ponds or sloughs, are relatively small bodies of standing water, representing a transition stage between lakes and marshes. The surface waters impart an open aspect, free of emergent vegetation, but floating, rooted, aquatic macrophytes may be present. The depth of water is usually less than 2 m in mid-summer.

Site

An upstream oil and gas wellsite and the associated facilities requiring reclamation to meet Alberta's reclamation criteria for peatland and/or forested sites.

Swamp

A mineral wetland with water levels near, at or above the ground surface for variable periods during the year which contains either more than 25% tree cover of a variety of species or more than 25% shrub cover.

ACRONYMS

AEP	Alberta Environment and Parks
AER	Alberta Energy Regulator
DST	Decision Support Tool
PTAC	Petroleum Technology Alliance Canada

1.0 BACKGROUND

1.1 PROJECT OVERVIEW

In 2018, the Petroleum Technology Alliance Canada (PTAC) put out a request for proposals entitled *Reclamation Practices on Upland and Peatland Well Sites*. The project was established in response to challenges experienced by practitioners, regulators and industry related to reclamation certification of legacy sites. The specific sites in question are those that were constructed using imported mineral soil pads in peatlands, and upland sites that that have had natural vegetation encroachment. These sites generally present one or more reclamation deficiencies according to the applicable wellsite criteria and cannot receive a reclamation certificate without additional scrutiny and justification under current regulatory criteria and policies. The **goal of the overall project** was to provide recommendations for an acceptable framework/decision support tool(s) to assist industry and regulators in making decisions around appropriate management and certification of these sites that ensures that functioning ecosystems are developed and that there is a process that outlines eligibility for reclamation certification.

When dealing with peatland sites, the question arises of whether to remove mineral soil pads in peatlands. Historically, industry and regulators have agreed that in certain site-specific circumstances, sites with mineral pads in peatlands can be certified without the removal of the pad or with partial removal of the pad. There has been a recognition that sites can be deemed to be on a trajectory towards developing a sustainable plant community from an ecological perspective, and to not be causing off-site impacts, without further disturbance/reclamation. A consistent and standard method to define and address these circumstances has been difficult to discern within the current regulatory and policy framework.

1.2 DECISION FRAMEWORK AND SUPPORT TOOLS DEVELOPMENT

Stage 1 of the project identified that there is limited guidance on how decisions are being made to accept or reject requests for a change in land use and that there are misperceptions associated with why requests are being made (from the government/regulator perspective) and how the requests are being evaluated (from the industry/practitioner perspective) (Tokay et al., 2019). It was determined that these perceptions must be addressed before meaningful change can occur. Stage 1 also identified the key factors to consider when assessing the ecological implications of a change in land use request (hydrology, cumulative effects and regional considerations, upland function, status of the borrow pit, site location, and land use considerations) and several knowledge gaps which should be addressed to confirm the effectiveness of a decision support tool and framework. However, consultation with Alberta Environment and Parks (AEP) and the Alberta Energy Regulator (AER) regarding the findings from Stage 1 was recommended before developing a framework and research project to address the knowledge gaps to ensure resources are allocated appropriately.

Preliminary Decision Support Tools (DSTs) were presented at a working session in December 2019 to facilitate a discussion involving industry (oil and gas and practitioners) and government (AEP and AER) related to change in land use requests. A summary of the working session and recommendations for changes to the preliminary DSTs is provided in Drozdowski et al. (2020a).

PTAC released a draft report, *Certification of Mineral Soil Pads in the Boreal Region – Decision Framework and Support Tools*, in October 2020 (Drozdowski et al., 2020b) to provide opportunities for industry, practitioners, and government to review and comment on the document and to set the stage for a field verification trial of the Decision Framework and Support Tools in 2021. The goal of the reviews and field

verification trial were to ensure the Decision Framework and Support Tools added value in making decisions on whether to leave a mineral soil pad in a peatland.

PTAC held a Knowledge Transfer webinar June 7, 2021, with presentations by Dean MacKenzie, Vertex Professional Services Ltd., and Bonnie Drozdowski, InnoTech Alberta (Mackenzie and Drozdowski, 2021)[1]. The goal of the Knowledge Transfer webinar was to increase awareness of the draft report and to request industry and practitioner participation in a field verification trial in 2021; 131 people viewed the presentation on YouTube as of April 5, 2022.

A second online webinar was held in June 2021 for industry and practitioners interested in conducting the field verification trial (webinar slides available in Powter et al. (2022))[2]. The goal of the second webinar was to familiarize people with the purpose, process, and expectations of the field verification trial.

The results of the stakeholder reviews and field verification trial are summarized in Powter et al. (2022). This 2022 Update is a revision of the original Decision Framework and Support Tools report based on the feedback and field verification trial.

1.3 CHANGES IN THE 2022 UPDATE

The following significant changes have been made in this 2022 Update:

- General
    - Changed language in the Decision Support Tools for consistency and clarity.
    - Changed the tables supporting each Decision Support Tool to clarify that the purpose of the tables is help practitioners decide how to answer Yes or No to the statements in specific decision nodes.
- Section 2.0
    - Added a section that describes the decision framework, defines the key terms used in the framework, sets out caveats for use of the framework, and provides a screening tool to determine if the Decision Framework and Support Tools should be used.
- Section 7.0
    - Clarified that when there is a tie arising from use of the modifications to the initial site rating the site is deemed to be a Candidate for Peatland Reclamation.
- Table 8 (previously Table 7)
    - Clarified that **all** rows in the Table must have an answer.
    - Removed several Factors that were already accounted for in the individual DSTs to reduce "double counting"
    - Changed the Table so that each factor can change the Peatland Rating or Upland Rating
    - Added new Factors

[1] The Knowledge Transfer webinar also discussed the *Guide to Variance Justifications for Reclamation Certification of Wellsites and Associated Facilities on Forested Land* (Tokay et al., 2020).
[2] A separate webinar was held to discuss the field verification trial for the *Guide to Variance Justifications for Reclamation Certification of Wellsites and Associated Facilities on Forested Land* (Tokay et al., 2020).

- Section 8.0
    - Added a section to describe recommended information to provide as backup documentation for the change in land use request to AEP.

2.0 DECISION FRAMEWORK OVERVIEW

2.1 PURPOSE

Alberta Environment and Parks must agree to leaving a mineral soil pad (or padded access) in place after reclamation of a wellsite or associated facilities (i.e., approve a change in land use from peatland to upland) (Alberta Environment and Parks, 2017; Drozdowski et al., 2020a). Once written agreement is received, industry may apply to the AER for the reclamation certificate (Alberta Environment and Parks, 2017; Drozdowski et al., 2020a) based on the Forested Land Criteria (Alberta Environment and Sustainable Resource Development, 2013). If the change is land use is rejected, the pad must be removed, the site reclaimed to peatland, and a reclamation certificate submitted to the AER (Alberta Environment and Parks, 2017; Drozdowski et al., 2020a) based on the Peatland Criteria (Alberta Environment and Parks, 2017).

The purpose of the Decision Framework and Support Tools is to provide a process to decide if the pad should remain in place and to provide supporting information for the request to AEP for the change in land use (usually referred to as a justification, or professional judgement; Alberta Environment and Parks, 2017).

2.2 CAVEATS FOR USE OF THE FRAMEWORK

Change in land use applications occur as part of the accepted regulatory framework for wellsite certification[3]. Caron et al. (2022) identified over 7,000 abandoned wellsites with mineral soil pads in peatlands, and the literature review and outreach work done for this project suggest there are over 1,000 mineral soil pads that have had natural vegetation encroachment on the well pad and/or access road (Tokay et al., 2019). The Decision Framework and Support Tools provides a mechanism for practitioners to decide if the change request is appropriate and provides guidance on the supporting information to provide with the application.

Practitioners must consider the following caveats before using the Decision Framework and Support Tools:

1. Change in land use applications should **only be submitted after careful review of reclamation options**. Generally, though, regulatory policies reviewed in Tokay et al. (2019) and referred to in Drozdowski et al. (2020a) imply that AEP's **preferred hierarchy of reclamation strategies** for peatland sites is: reclaim to peatland -> reclaim part of pad/access to peatland -> reclaim to upland. **Practitioners will need to provide detailed justification and documentation for the decision to change the land use**.
2. Practitioners should **consider whether full or partial pad removal will result in a better overall environmental outcome** even if it sets a site back a few years and delays certification (i.e., environmental outcomes should be given a greater weight in the final decision than factors such as ease of access, age of site, and cost).
3. Practitioners should be aware that removal of all or part of a pad may affect the remediation guidelines applicable to the site, because cover depth to contaminants will be decreased (Alberta

[3] For example, of the 121 sites submitted as candidates for the field verification trial (Powter et al., 2022), 99 had been submitted to AEP for a change in land use.

Environment and Parks, 2019a, Alberta Environment and Sustainable Resource Developmen, 2014).

4. Use of the Decision Framework and Support Tools **does not guarantee** acceptance of the application for change in land use by AEP.
5. The designation of a site as a Candidate for Peatland Reclamation or Candidate for Upland Reclamation in each Decision Support Tool, and the designation of the site as a Candidate for Peatland Reclamation or Candidate for Upland Reclamation in the Site End Land Use Recommendation, are **recommendations only**. **AEP will make the final decision** on the proposed change in land use.
6. Once a decision is made to leave a pad in place, the Preparing Variance Justifications for Reclamation Certification of Wellsites and Associated Facilities on Forested Land: 2022 Update (Tokay et al., 2022) may need to be used if the site has deficiencies requiring a variance to meet the Forested Land criteria.
7. The **two AEP documents referenced in the Borrow Decision Support Tool** (*Directive for Reclamation Certificate Site Assessments for Pits and Quarries (Forested and Cultivated Lands)* and *Design Requirements for Mineral Wetlands for Reclamation)* were **still in DRAFT** at the time this document was written. Once they are finalized, the Decision Framework and Support Tools and/or the Borrow Decision Support Tool may need to be revised to reflect the final document requirements. However, since the weight assigned to the Borrow Decision Support Tool is only 1, the impact to the overall Site End Land Use Recommendation is low.
8. Sites that require **exposure control**, as defined in Alberta's *Contaminated Sites Policy Framework* (Government of Alberta 2014), cannot be certified and therefore the Decision Framework and Support Tools does not apply. Sites that **have been remediated** to meet Tier 1 (Alberta Environment and Parks, 2019a) or Tier 2 (Alberta Environment and Parks, 2019b) guidelines may use the Decision Framework and Support Tools. Sites that require **minimal disturbance to remediate** existing contaminant issues may also use the Decision Framework and Support Tools.
9. An approval for a change in land use may include **conditions for additional work**. Examples noted in Powter et al. (2022) include, but are not limited to:
    - Restore drainage.
    - Remove culverts on access.
    - Fill planting to meet Forested Land Criteria.
    - Weed management.
    - Recontouring/pad ripping.
    - Bank stabilization work in the borrow pit.
10. A **site visit/aerial tour** may be required before approval is granted (i.e., not just a paper exercise).
11. Use of the Decision Framework and Support Tools **does not guarantee** issuance of the reclamation certificate by the AER.
12. Use of the Decision Framework and Support Tools **does not change** any existing requirements or processes specified by AEP in the *Reclamation Criteria for Wellsites and Associated Facilities for Peatlands* (Alberta Environment and Parks, 2017) or by the AER in *Specified Enactment Directive*

002 – Application Submission Requirements and Guidance for Reclamation Certificates for Well Sites and Associated Facilities (Alberta Energy Regulator, 2019).

2.3 SCREENING STEP

Before gathering the data necessary to use the Decision Framework and Support Tools, practitioners should determine if a change in land use is likely given larger provincial goals and objectives. For example, AEP recently released two sub-regional plans for Bistcho Lake (Alberta Environment and Parks, 2022a) and Cold Lake (Alberta Environment and Parks, 2022b) that address boreal woodland caribou recovery requirements and revegetation requirements.

Figure 1 provides a simple screening tool to help practitioners make this decision.

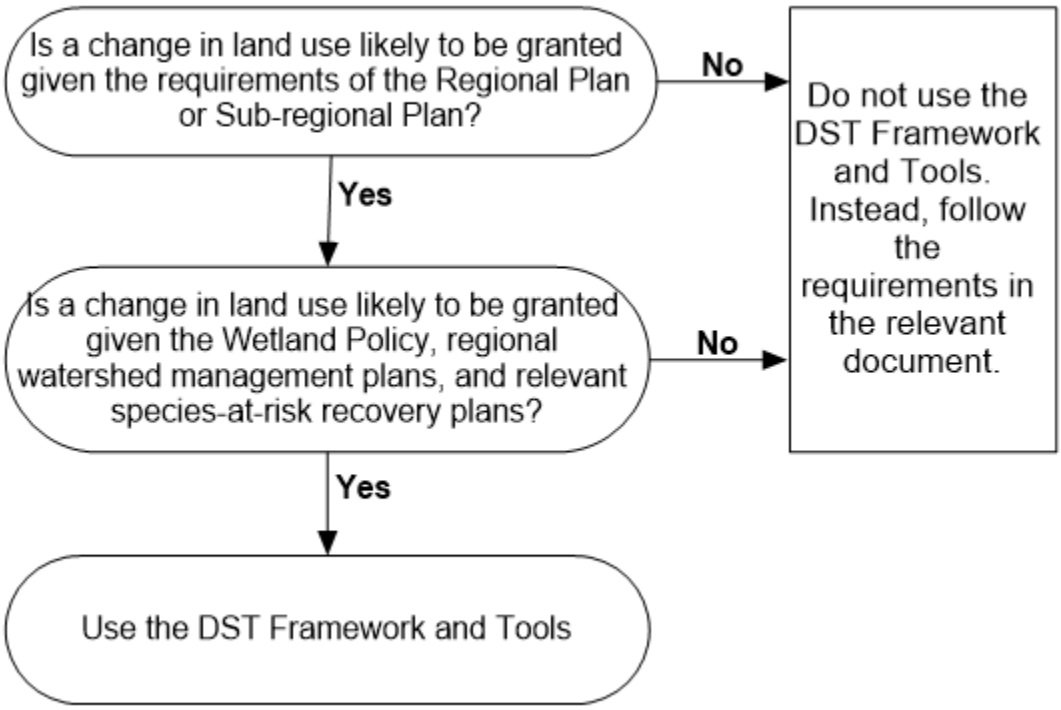

Figure 1. Screening Tool to determine if the Decision Framework and Support Tools should be used.

Where the Screening Tool results in a **No**, practitioners should discuss site reclamation requirements with AEP to determine the preferred reclamation objective and potential options.

Practitioners should also review the original surface disposition, where available, to determine if there were commitments or requirements regarding the end land use for the site. Since the primary focus of the Decision Framework and Support Tools is ecological rather than procedural, changes in land use from original commitments/requirements may be possible but will have to be fully justified.

2.4 DECISION FRAMEWORK

The decision framework consists of four Decision Support Tools (DSTs) and a rating system to determine the end land use recommendation. Figure 2 depicts the framework and Section 7.0 outlines the steps involved.

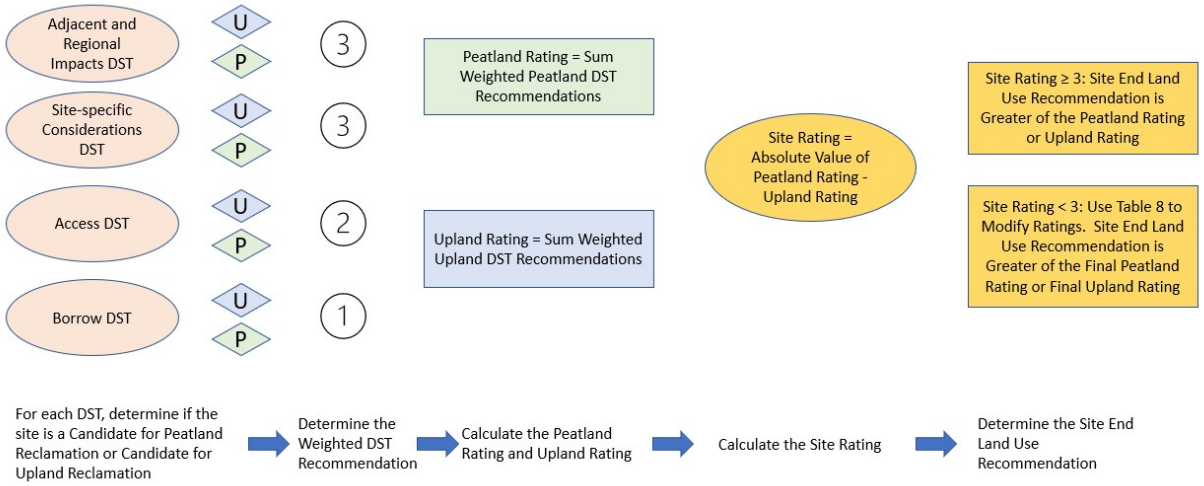

Figure 2. Decision framework for determining site end land use recommendation.

Each DST is assessed to determine an end land use recommendation (Candidate for Peatland Reclamation or Candidate for Upland Reclamation). The four DST recommendations are used to determine the Site End Land Use Recommendation. The four DSTs are:

- Adjacent and Regional Impacts Decision Support Tool (described in Section 3.0)
- Site-specific Decision Support Tool (described in Section 4.0)
- Access Decision Support Tool (described in Section 5.0)
- Borrow Decision Support Tool (described in Section 6.0)

Key terms in each DST are defined and a table provides further information to help practitioners use the DST. Research needs for factors that may influence the recommendation but for which answers are not currently available, are also identified.

2.5 DECISION FRAMEWORK TERMINOLOGY

The following terms are used in this report to describe the decision framework.

Pad

The well pad. The statements in the Decision Nodes and the tables accompanying the DSTs can be applied to the whole pad or to one or more portions of the pad where those portions may be reclaimed to different land uses (i.e., partial pad removal).

Access

The access road to the pad. The statements in the Decision Nodes and the tables accompanying the DSTs can be applied to the whole access or to one or more portions of the access where those portions may be reclaimed to different land uses (i.e., partial access removal).

Decision Node

Each DST is presented as a flowchart with multiple Yes/No oval decision nodes (Figure 3). The practitioner answers the Yes/No node and follows the appropriate response arrow to the next node.

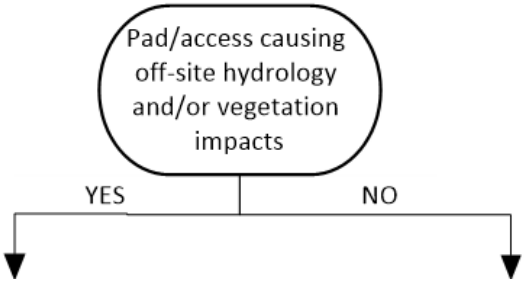

Figure 3. Example decision node in a DST.

End Land Use Recommendation

In each DST, the final decision node leads the practitioner to a diamond end land use recommendation (Figure 4) indicating whether the site is a Candidate for Peatland Reclamation, or a Candidate for Upland Reclamation. As shown in Figure 4, there may be several decision nodes that lead to an end land use recommendation.

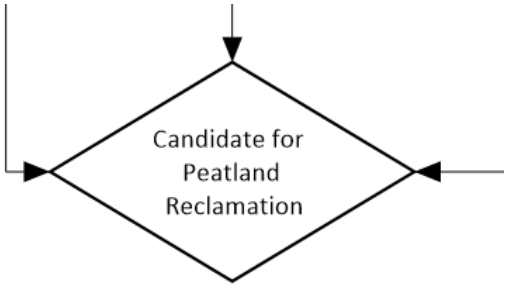

Figure 4. Example end land use recommendation in a DST.

Decision Path

The sequence of decision nodes in a DST that leads to the end land use recommendation. Documenting the decision path allows reviewers to better understand how the practitioner arrived at the end land use recommendation for each DST. For example, a decision path for the Adjacent and Regional Impacts Decision Support Tool might be:

Pad/access causing off-site hydrology and/or vegetation impacts – **No**

↓

Located in an area dominated by upland/peatland complex – **Yes**

↓

Full pad/access removal would cause adverse impacts to peatland – **Yes**

↓

Candidate for Upland Reclamation

To simplify documenting the decision path, the decision nodes have been numbered in the flowcharts. In the above example, the decision path would be: 1, 3, 5, Candidate for Upland Reclamation.

DST Recommendation

The recommendation from each DST as either a Candidate for Peatland Reclamation or Candidate for Upland Reclamation.

Weighted DST Recommendation

Each DST Recommendation has been assigned a weight for input into a calculation of the Site Rating (Table 1). Weights were assigned to each DST based on consultation with industry, AEP, AER and practitioners in Stages 1 and 2 of the project (Drozdowski et al., 2020; Tokay et al., 2019). A higher weight indicates the DST has greater importance in determining the overall site end land use recommendation.

Table 1. Weights assigned to each Decision Support Tool.

Decision Support Tool	DST Weight
Adjacent and Regional Impacts	3
Site-specific Consideration	3
Access	2
Borrow	1

Peatland Rating

The Peatland Rating is the sum of the weighted DST recommendations with an outcome of Candidate for Peatland Reclamation (see examples in Table 2).

Upland Rating

The Upland Rating is the sum of the weighted DST recommendations with an outcome of Candidate for Upland Reclamation (see examples in Table 2).

Site Rating

The absolute difference between the Peatland Rating and the Upland Rating is the Site Rating. For Site 1 in Table 2, the Site Rating is 1:

Site Rating = Peatland Rating – Upland Rating

= 5 – 4

= 1

When the result is a negative value, drop the negative sign (i.e., take the absolute value). For example, the Site Rating for Site 2 in Table 2 is 3 after dropping the negative sign:

Site Rating = Peatland Rating – Upland Rating

= 3 – 6

= -3

= 3

Table 2. Example calculations of Peatland Rating, Upland Rating and Site Rating.

Decision Support Tool*	Candidate for Peatland Reclamation	Candidate for Upland Reclamation	Candidate for Peatland Reclamation	Candidate for Upland Reclamation
	Site 1		Site 2	
Adjacent and Regional Impacts	3		3	
Site-specific Considerations		3		3
Access	2			2
Borrow		1		1
Peatland Rating	5		3	
Upland Rating		4		6
Site Rating [Peatland Rating – Upland Rating]	**1** Result: Apply Site Rating Modifications from Table 8		**3** Result: Candidate for Upland Reclamation	

Site Rating Modifications

When the Site Rating is less than 3, Table 8 is used to modify the Peatland Rating and Upland Rating.

Final Peatland Rating

The Final Peatland Rating is the sum of the initial Peatland Rating plus the sum of the modifications to the Peatland Rating from Table 8.

Final Upland Rating

The Final Upland Rating is the sum of the initial Upland Rating plus the sum of the modifications to the Upland Rating from Table 8.

Site End Land Use Recommendation

Where the Site Rating is ≥3 the site end land use recommendation is the greater of the Peatland Rating or the Upland Rating. Where the Site Rating is <3 the Site Rating Modifications are applied, and the final site end land use recommendation is the greater of the Final Peatland Rating or the Final Upland Rating.

Site End Land Use Recommendation Calculator

An Excel tool is available to calculate the Peatland Rating, Upland Rating, Site Rating, Site Rating Modifications, Final Peatland Rating, Final Upland Rating, and to determine the site end land use recommendation.

3.0 ADJACENT AND REGIONAL IMPACTS DECISION SUPPORT TOOL

The Adjacent and Regional Impacts Decision Support Tool is shown in Figure 5 and a glossary is provided below for terms within the tool that require explanation and/or context.

The Site End Land Use Recommendation Calculator will record a weighted DST recommendation of 3 to either the "Candidate for Peatland Reclamation" or "Candidate for Upland Reclamation" depending on the outcome for the Adjacent and Regional Impacts Decision Support tool.

3.1 GLOSSARY

Alleviated: Off-site hydrology, chemistry and/or vegetation impacts are lessened or eliminated.

Full Pad (Access) Removal: Borrow material and geotextile are removed exposing the peat buried beneath the pad or access road.

Adjacent Area: The area within 100 m of the edge of the access road or the edge of the pad.

Local Area: The area within 500 m of the edge of the access road or the edge of the pad.

Local Peatland Area: The percentage of the local area occupied by peatlands.

Off-site Hydrology Impact: Flooding or low water levels, or changing flow pattern/directions, leading to off-site vegetation impacts in the adjacent area.

Off-site Vegetation Impacts: Includes, but is not limited to, mortality, dieback, discolouration, reduced growth, reduced seed production, changes in species composition and assemblages that may result in long term implications for ecological sustainability.

Partial Access Removal: Portions of the padded access are removed (e.g., by digging a swale) to allow for free flow of water across the access. Often done at existing culvert sites or other low areas.

Partial Pad Removal: Portions of the pad are removed to allow a part of the pad area to be reclaimed as wetland. Partial removal may involve stripping borrow material from the entire pad surface to at or just below the water level or may involve removing the full pad depth on a part of the pad, usually at one edge.

Upland/Peatland Complex: The local area consists of a mixture of uplands and peatlands including transitional areas.

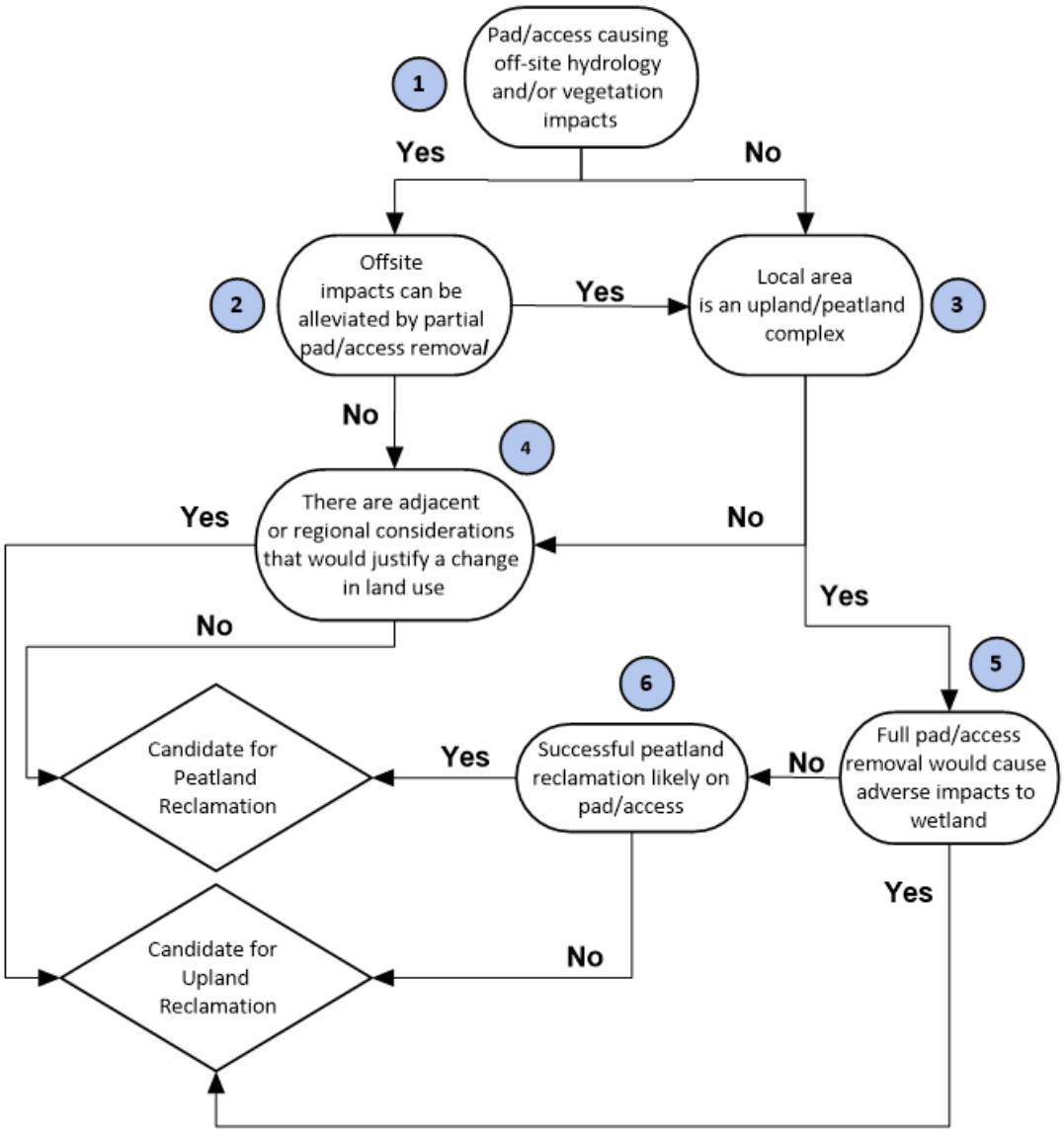

Figure 5. Adjacent and Regional Impacts Decision Support Tool.
Refer to the glossary for definitions of key terms.

3.2 ADJACENT AND REGIONAL IMPACTS DECISION SUPPORT TOOL SUPPORTING INFORMATION

Table 3 provides further information to help practitioners answer decision nodes in the Adjacent and Regional Impacts Decision Support Tool.

Table 3. Factors to consider when answering Yes or No for decision nodes in the Adjacent and Regional Impacts Decision Support Tool.
Numbered dark bars represent a specific decision node.

Factor	Yes	No
1: Is the pad/access causing off-site hydrology and/or vegetation impacts in the adjacent area?		
Cause of peatland vegetation impacts	Unsuitable pad chemistry OR altered hydrology OR major siltation or erosion	No off-site impacts OR minor siltation or erosion
Pad influence on water flow	Pad influencing water flow as evidenced by water ponding or vegetation impacts	Minor influences on water flow or ponding
Access road orientation	Access road is closer to perpendicular than parallel to the wetland flow regime	Access road is closer to parallel than perpendicular to the wetland flow regime
Access road influence on water flow	Access is impeding water flow	Access is not impeding water flow OR water flow can be restored through partial access removal or digging swales across the access
2: Could the offsite impacts be alleviated by partial pad/access removal?		
Level of effort	Minor site work AND/OR small equipment required to alleviate off-site impacts [1]	Major site work AND/OR large equipment required to alleviate off-site impacts
Impacts to peatland	Removal efforts will alleviate impacts OR will only have a short-term negative effect on peatland hydrology or vegetation	Removal efforts will not alleviate impacts OR will have a long-term negative effect on peatland hydrology or vegetation
3: Is the local area in an upland/peatland complex?		
Upland/peatland composition	Local area is a mosaic of upland forests, bogs and fens OR a transitional area between upland and peatland	Local area is a large, continuous fen or bog
4: Are there adjacent/regional considerations that would justify a change in land use?		
Wetland value [2]	Wetland value is C or D	Wetland value is A or B
Site location	Site is on the margins of the wetland	Site is in the interior of the wetland
5: Would full pad/access removal cause adverse impacts to peatland?		
Potential chemical impacts to peatland	Major chemical impacts (e.g., salinity, pH) likely	Minor chemical impacts (e.g., salinity, pH) likely

Factor	Yes	No
Potential siltation impacts to peatland	Major siltation impacts likely	Minor siltation impacts likely
6: Is successful peatland reclamation likely on pad/access?		
Full removal	Sphagnum moss dominated peat under pad/access with minimal changes in physiochemical characteristics	Original peat absent OR highly humified/decomposed OR highly compressed OR true moss, sedge, shrub dominated peat with poor physical strength
Partial removal	Local area is fen with mineral rich water	Local area is bog or swamp
Peatland vegetation donor site	Nearby donor site (Sphagnum and brown mosses) available	No nearby donor sites
Vegetation type	Multiple desirable species present OR likely to develop	Monoculture of cattails or undesireable species present OR likely to develop

[1] **NOTE:** In most cases requiring excavation of padded material, remediation is likely to result in significant peatland disturbance.

[2] As per Guide to the Alberta Wetland Rapid Evaluation Tool - Actual (ABWRET-A) for the Boreal and Foothills Natural Regions (Alberta Environment and Parks, 2016).

3.3 RESEARCH GAPS

The following factors may affect the decision to leave a pad in place but require further research. Research may be planned, underway or nearing completion. Updates to this report should be made as research results are released.

1. Can offsite impacts be alleviated by partial pad/access removal? Specifically:
    a. Does the type of wetland (e.g., fen vs. bog) impact success?
    b. Does the surrounding peatland type and characteristics of that peatland (e.g., peat depth and permeability) affect success?
    c. Does the water flow direction and velocity affect success?
    d. Does the access road length and orientation affect success?
    e. What pad characteristics (e.g., depth, soil chemistry) would affect success?
2. Would successful peatland reclamation be likely after pad removal on the pad/access? Specifically:
    a. Does the type of peatland targeted for reclamation affect success?
    b. Does the surrounding peatland type affect success?
    c. What is the extent of peat compression under the pad and what is the potential for rebound?
    d. What is the impact of donor material type (Sphagnum mosses vs. fen mosses) for revegetation?

e. What is the potential for natural ingress of trees, shrubs, herbs, and mosses from nearby sources?

f. What are the impacts of adjacent invasive species on development of peat forming species?

3. What are the impacts of pads and roads left in place on groundwater, wildlife habitat, wildlife movement, and wildlife use of the landscape?
4. What methods can be used to measure the occurrence and extent of current pad impacts to hydrology, as well as the potential for future impacts?
5. What are the cumulative impacts of multiple pads and roads on local and regional peatland hydrology, chemistry, vegetation and greenhouse gas fluxes, and the threshold at which cumulative impacts degrade overall ecological function of the region?
6. Is there a cumulative effect threshold, based on scientific and geographical approaches, that would allow a proportion of wetland in an area to be “lost” without significant degradation of function of the region?
7. What is the magnitude of carbon emissions released during pad removal (including site access) and associated net environmental “benefit” associated with pad removal vs. leaving the pad in place?

4.0 SITE-SPECIFIC CONSIDERATIONS DECISION SUPPORT TOOL

The Site-specific Considerations Decision Support Tool is shown in Figure 6 and a glossary is provided below for terms within the tool that require explanation and/or context.

The Site End Land Use Recommendation Calculator will record a weighted DST recommendation of 3 to either the "Candidate for Peatland Reclamation" or "Candidate for Upland Reclamation" depending on the outcome for the Site-specific Considerations Decision Support tool.

4.1 GLOSSARY

Mitigated: Landscape, soil, or vegetation limitations or deficiencies are reduced or eliminated by work which will not impact the existing site characteristics that meet the Forested Land Criteria.

Landscape Deficiencies: Reclamation deficiencies that prevent the site from passing Forested Land landscape criteria.

Rooting Restrictions: Physical and/or chemical barriers (e.g., soil compaction, geotextile) that will result in roots being unable to extend to a depth equivalent to control vegetation.

Soil Limitations: Soil characteristics that are likely to impede establishment or growth of desired vegetation (e.g., rooting restrictions due to compaction, drought/flooding, pad material chemistry, presence of shallow geotextile or corduroy).

Vegetation Deficiencies: Reclamation deficiencies that prevent the site from passing Forested Land vegetation criteria.

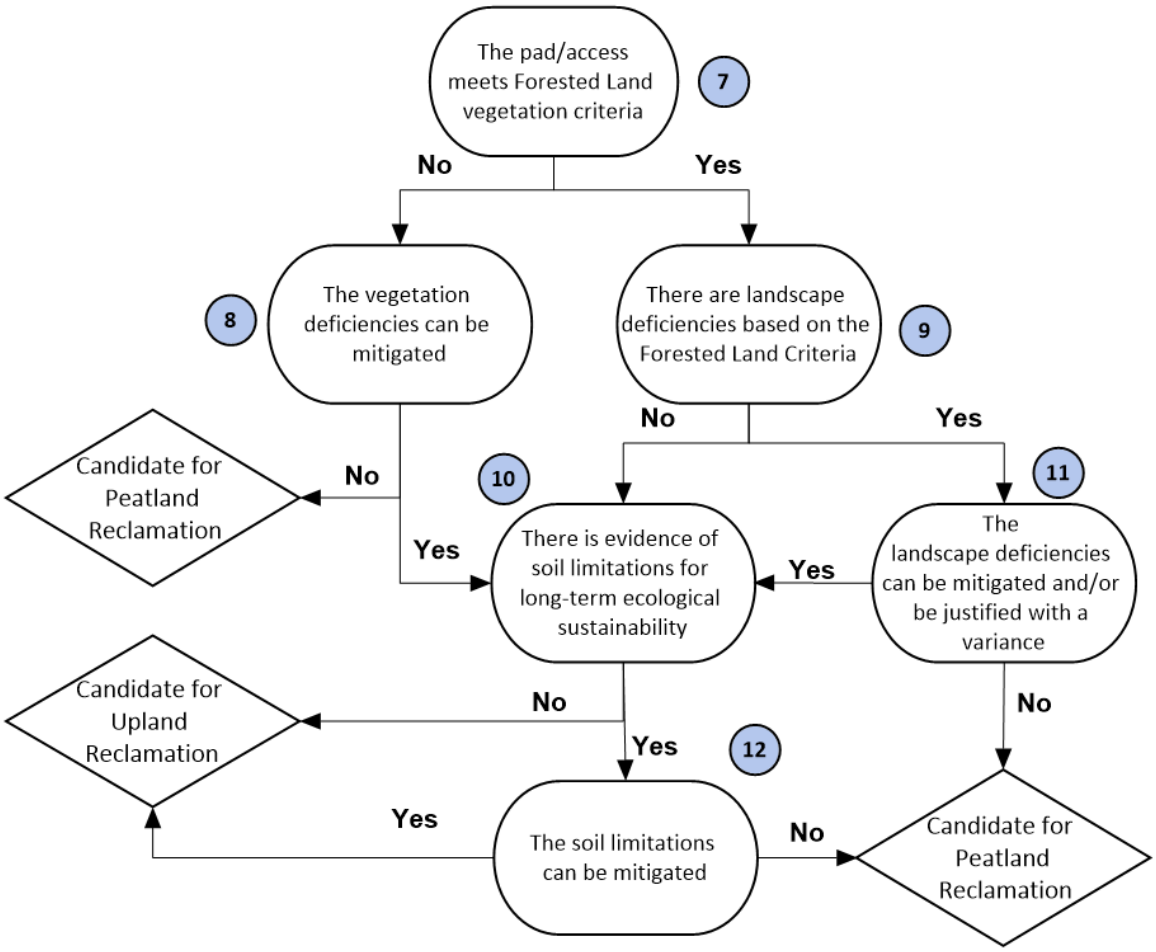

Figure 6. Site-specific Considerations Decision Support Tool
Refer to the glossary for definitions of key terms.

4.2 SITE-SPECIFIC CONSIDERATIONS DECISION SUPPORT TOOL SUPPORTING INFORMATION

Table 4 provides further information to help practitioners answer decision nodes in the Site-specific Considerations Decision Support Tool.

Table 4. Factors to consider when answering Yes or No for decision nodes in the Site-specific Considerations Decision Support Tool.
Numbered dark bars represent a specific decision node.

Factor	Yes	No
7: Does the pad/access meet Forested Land vegetation criteria?		
Vegetation status of pad/access	Pad/access would pass a Detailed Site Assessment using the Forested Land Criteria with or without a vegetation override	Pad/access has peatland vegetation OR has inappropriate or inadequate forested land vegetation OR is dominated by grass species

Factor	Yes	No
8: Can the vegetation deficiencies be mitigated?		
Level of effort	Infill hand planting will address issue	Removal of undesirable species and replanting required
Weeds	No weeds OR only spot spraying or hand-pulling of a few weeds required	Site-wide weed problem
9: Are there landscape deficiencies based on the Forested Land Criteria?		
Presence of landscape deficiencies	Deficiencies in the Forested Land landscape criteria (e.g., bare ground, subsidence, erosion, coarse woody debris, contour) exist on the access road or pad	There are no landscape deficiencies on the site (site will pass Forested Land landscape criteria)
10: Is there evidence of soil limitations for long term ecological sustainability?		
Type and extent of limitations	Limitations such as rooting restrictions, topsoil/organic matter availability, nutrient status, soil chemistry (e.g., pH, sulphate), or waterlogged soil exist	No limitations OR minor limitations OR comparable restrictions to a natural forest that has similar water table depth and fluctuations
Liners	Geotextile liner is within 1 metre of the surface	No liner used OR corduroy liner used OR geotextile liner removed OR geotextile liner deeper than 1 metre from the surface
11: Can the landscape deficiencies be mitigated?		
Level of effort	Minor site work required using small equipment	Major site work AND/OR large equipment required
Impacts to site vegetation	Minimal impacts to existing desirable species; may require infill planting	Significant impacts to existing desirable species will require replanting
12: Can the soil limitations to long-term ecological sustainability be mitigated?		
Level of effort	Minor site work required using small equipment	Major site work AND/OR large equipment required
Impacts to site vegetation	Minimal impacts to existing desirable species; may require infill planting	Significant impacts to existing desirable species will require replanting

4.3 RESEARCH GAPS

The following factors may affect the decision to leave a pad in place but require further research. Research may be planned, underway or nearing completion. Updates to this report should be made as research results are released.

1. What characteristics result in padded sites impacting the surrounding peatland ecosystems in the long term, and affect the extent and severity of these impacts?
2. Are partial reclamation activities effective in alleviating impacts resulting from pads and/or access roads in peatlands?
3. What is the likelihood of success for peatland recovery if the pad is removed?
4. What characteristic determine the success rate of pads left in place in the long term? Specifically:
    a. What is the relative importance of factors that influence successful reforestation of pads (e.g., soil quality, topsoil depth, compaction, dispersal vectors, historical revegetation efforts, time, surrounding peatland type, water quality and levels, etc.)?
    b. What is the potential for the water table to rise into the rootzone over time?
    c. Are upland ecosystems developed on pads left in place resilient over time?

5.0 ACCESS DECISION SUPPORT TOOL

The Access Decision Support Tool is shown in Figure 7 and a glossary is provided below for terms within the tool that require explanation and/or context.

The Site End Land Use Recommendation Calculator will record a weighted DST recommendation of 2 to either the "Candidate for Upland Reclamation" or "Candidate for Peatland Reclamation" depending on the outcome for the Access Decision Support Tool.

5.1 GLOSSARY

Access: Refers to site accessibility and is broader than just the access road. **NOTE**: specific considerations for the impacts caused by the access road are addressed in the "Adjacent and Regional Impacts DST" and considerations related to the reclamation status of the access road are addressed in the "Site-specific Considerations DST".

Limited Access**:** All or part of the site access road is revegetated and would meet Forested Land vegetation criteria on upland portions and Peatland vegetation criteria on peatland portions.

Opportunity to Coordinate Reclamation Work**:** Operator has other sites to be reclaimed in the area and/or the site is in an area designated for the Area-based Closure program.

Restricted Access**:** Site is accessible only by helicopter or amphibious vehicle[4] or boat OR site is accessible only by using other revegetated access roads OR site access requires constructing crossings over critical fish habitat.

[4] Adapted from Alberta Environment and Parks (2017).

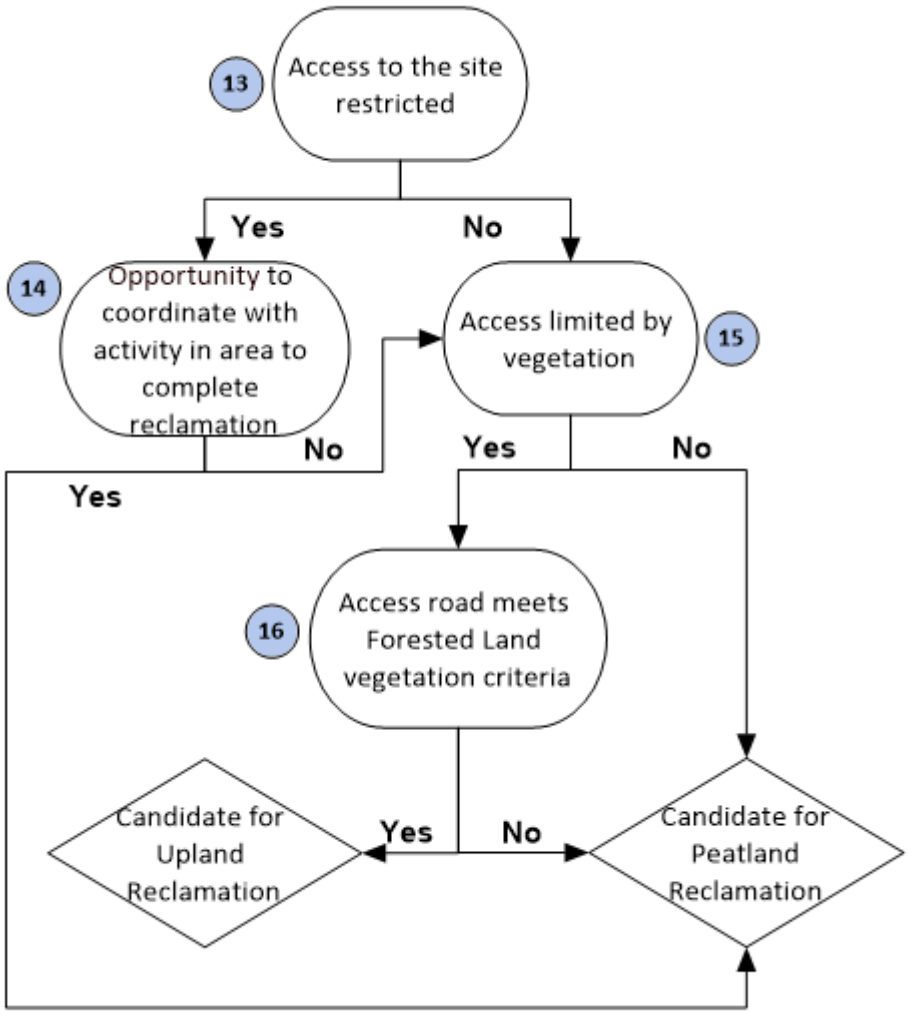

Figure 7. Access Decision Support Tool.
Refer to the glossary for definitions of key terms.

5.2 ACCESS DECISION SUPPORT TOOL SUPPORTING INFORMATION

Table 5 provides further information to help practitioners answer decision nodes in the Access Decision Support Tool.

Table 5. Factors to consider when answering Yes or No for decision nodes in the Access Decision Support Tool.
Numbered dark bars represent a specific decision node.

Factor	Yes	No
13: Is access to the site restricted?		
Site remoteness	Site only accessible in winter	Site accessible by all-weather road

Factor	Yes	No
Access road condition	Road will require full or partial reconstruction to provide access causing significant impacts to site conditions	Road can be used with minimal impact to site conditions OR the site is accessible without an access road
14: Is there an opportunity to coordinate with activity in area to complete reclamation?		
Area-based closure	Site is within a designated Area-based Closure program area	Site is not in a designated Area-based Closure program area
Operator portfolio reclamation timeframe	Operator has other sites in the area that will be reclaimed within 3 years	Operator has no other sites in the area OR the operator's sites in the area will not be reclaimed for more than 3 years
15: Is access limited by vegetation?		
Access road peatland vegetation	Inappropriate or inadequate peatland vegetation present	Appropriate peatland vegetation present
Access road forested land vegetation	Appropriate forested land vegetation present	Inappropriate or inadequate forested land vegetation present

6.0 BORROW DECISION SUPPORT TOOL

The Borrow Decision Support Tool is shown in Figure 8 and a glossary is provided below for terms within the tool that require explanation and/or context.

NOTE 1: The Borrow Decision Support Tool focuses on the borrow as it impacts the decision to remove the pad or padded access or leave the pad or padded access in place. The recommendation arrived at after using the Borrow Decision Support Tool is for the pad or padded access NOT for the borrow.

NOTE 2: Decisions made about reclamation of the pad and access may result in changes to the reclamation criteria used to assess the borrow (e.g., a decision to remove the pad and fill in the borrow changes the borrow criteria to Forested Land).

The Site End Land Use Recommendation Calculator will record a weighted DST recommendation of 1 to either the "Candidate for Peatland Reclamation" or "Candidate for Upland Reclamation" depending on the outcome for the Borrow Decision Support tool.

6.1 GLOSSARY

Dugout Borrow: An excavation made to supply fill and/or construction material for a well pad or access road which, when reclaimed, is designed to hold water for most of the season.

Desirable Species: The presence of species that contribute to the native plant community trajectory. For reclaimed mineral wetlands, they are native hydrophytic species associated with wetland plant communities in the region.

Emergent Zone: The area of shallow standing water dominated by wetland vegetation that is rooted, with leaves and stems that grow above (emerge from) the water surface, growing in water depths ranging between 10 cm and 60 cm. It includes both shallow marsh and deep marsh zones. Common emergent zone vegetation includes genera such as *Schoenoplectus* (bulrushes), *Typha* (cattails), and *Carex* (sedges). Species in this zone tolerate periodic inundation and prolonged root zone saturation.

***Functional Reclaimed Mineral Wetland*:** A mineral wetland area that meets the design requirements set out in *Design Requirements for Mineral Wetlands for Reclamation (draft)*[5]. Wetland function can be evaluated for areas that meet the design requirements based on the metrics described in the *Alberta Wetland Rapid Evaluation Tool* (ABWRET) (Government of Alberta, 2016). A reclaimed mineral wetland may not meet the ABWRET criteria and still be considered functional, if evaluated based on ecological metrics.

***Landscape Borrow*:** An excavation made to supply fill and/or construction material for a well pad or access road which, when reclaimed, does not hold water for most of the season.

Mineral Wetland: A wetland characterized by mineral soils and/or organic layers that has either no accumulation of peat or a peat layer less than 40 cm deep, as defined in the *Alberta Wetland Classification System* (Alberta Environment and Sustainable Resource Development, 2015). The depth of water of a mineral wetland is less than 2 m. Water sources include surface runoff and/or groundwater.

[5] This AEP document was still in Draft when the revised Decision Framework and Support Tools report was produced.

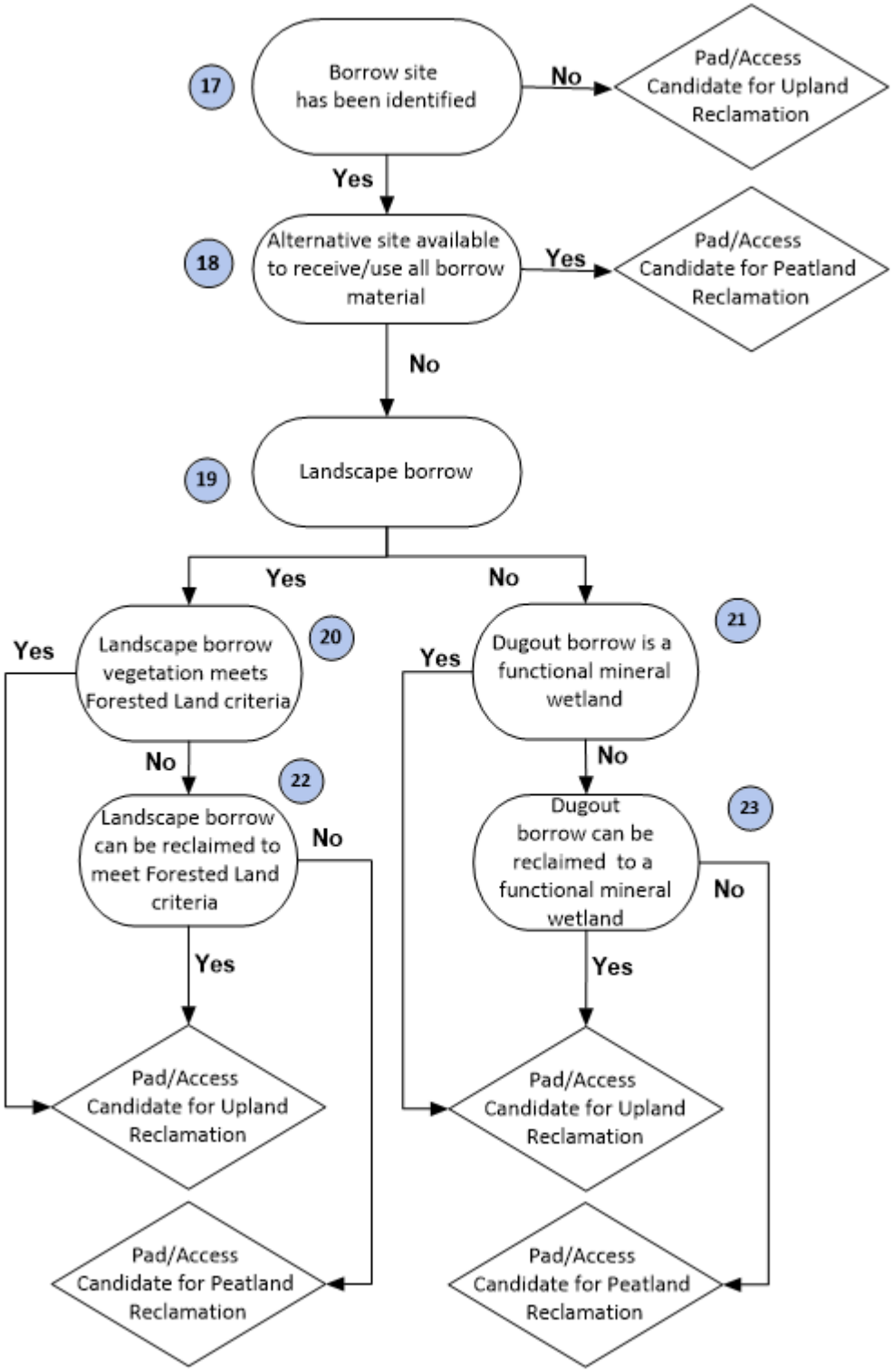

Figure 8. Borrow Decision Support Tool.
Refer to the glossary for definitions of key terms.

Shallow Open Water Zone: An expanse of open, mostly unshaded water in marshes and shallow open waters that typically supports submersed or floating aquatic vegetation. Water levels are less than 2 m deep.

***Vegetated*:** Site will meet the vegetation criteria within the applicable criteria document and/or is on a trajectory to meet the overall objective of equivalent land capability and ecosystem function.

Wetland Attributes: Includes marsh, shallow open water, and swamp classes. Marshes and shallow open water classes are further broken down into zones (shallow open water zone, emergent zone, and wet meadow zone) and swamps are broken down into treed swamps and shrubby swamps (*Directive for Reclamation Certificate Site Assessments for Pits and Quarries (Forested Lands) (draft)* [6]).

Wet Meadow Zone: A wetland plant zone found in some marshes and shallow water wetlands that is dominated by graminoids tolerant of periodically saturated soils and short periods of shallow inundation. Positioned between the emergent marsh zone and upland areas, it often contains the most diversity of all marsh zones.

Wet Transitional Zones: Wet transitional zones are areas not intended to be functional mineral wetlands; they may have slopes that are steeper than recommended for wetlands. Wet transitional zones may contain hydrophytic and/or upland vegetation. Wet transitional zones are reclaimed to native hydrophytic and/or native upland vegetation based on site conditions. Lotic systems (riparian) may also be included in this category (*Directive for Reclamation Certificate Site Assessments for Pits and Quarries (Forested Lands) (draft)*).

6.2 BORROW DECISION SUPPORT TOOL SUPPORTING INFORMATION

Table 6 provides further information to help practitioners answer decision nodes in the Borrow Decision Support Tool.

Table 6. Factors to consider when answering Yes or No for decision nodes in the Borrow Decision Support Tool.
Numbered dark bars represent a specific decision node.

Factor	Yes	No
17: Has the borrow site been identified?		
Original borrow site location [1]	Borrow site location has been identified (onsite or offsite)	Borrow site location unknown OR no borrow site used OR borrow site certified
18: Is there an alternative place available to receive/utilize all borrow material?		
Alternative site [1]	All pad material could be reused OR disposed of in a different location	No potential for reuse OR no site for disposal OR only a portion of borrow material could be reused or disposed of
19: Is the borrow site a landscape borrow?		
Borrow water status	Borrow site does not hold water for most of the season	Borrow site holds water for most of the season

[6] This AEP document was still in Draft when the revised Decision Framework and Tools report was produced.

Factor	Yes	No
21: Is the dugout borrow a functional mineral wetland?		
Dugout borrow hydrology	Full to designed water level	No evidence that site is filling to designed water level
Wetland attributes	Three or more self-sustaining wetland attributes evident	Less than three self-sustaining wetland attributes evident
Slope	Wetland slope(s) sustain desirable plant community	Wetland slope(s) too steep or too shallow to sustain desirable plant community
Wet meadow zone	Present	Absent
Wet transitional zone	Mostly wet (wetland) AND non-erosive and stable	Absent OR unstable and erosive OR mostly dry (upland)
Vegetation	Meets desirable and non-desirable vegetation requirements in *Directive for Reclamation Certificate Site Assessments for Pits and Quarries (Forested Lands) (draft)*	Does not meet desirable and non-desirable vegetation requirements in *Directive for Reclamation Certificate Site Assessments for Pits and Quarries (Forested Lands) (draft)*
22: Can the landscape borrow be reclaimed to meet Forested Land criteria?		
Level of effort	Minor landscape, soil, or vegetation work using small equipment required	Major landscape, soil, or vegetation work AND/OR large equipment required
Impacts to site vegetation	Minimal impacts to existing desirable species; may require infill planting	Significant impacts to existing desirable species will require replanting
23: Can the dugout borrow be reclaimed to a functional wetland?		
Level of effort	Minor work on vegetation, shoreline or borrow contours using small equipment	Major work on vegetation, shoreline or borrow contours AND/OR large equipment required
Impacts to site vegetation	Minimal impacts to existing desirable species; may require infill planting	Significant impacts to existing desirable species will require replanting

[1] Practitioners will need to document efforts to identify borrow site and alternative sites.

[2] As per Guide to the Alberta Wetland Rapid Evaluation Tool - Actual (ABWRET-A) for the Boreal and Foothills Natural Regions (Alberta Environment and Parks, 2016).

7.0 PROCESS DECISION SUPPORT TOOL

Practitioners will take the following steps to determine the final recommendation about whether to apply for a change in land use (reclaim to upland) or to reclaim to peatland (Table 7).

NOTE: The entire process must be viewed together when determining if a site is a Candidate for Peatland Reclamation or a Candidate for Upland Reclamation (i.e., the answer to one DST does not determine the site end land use recommendation).

Table 7. Steps for determining site end land use recommendation.

Step 1	• Use each Decision Support Tool to determine whether the site is a Candidate for Peatland Reclamation or a Candidate for Upland Reclamation. • Document the decision path for each DST.
Step 2	• Assign the appropriate weighted DST rating for each DST: o Adjacent and Regional Impacts = 3 o Site-specific Considerations = 3 o Access = 2 o Borrow = 1
Step 3	• Calculate **Peatland Rating** by summing the weighted DST ratings that identified the site as a Candidate for Peatland Reclamation. • Calculate **Upland Rating** by summing the weighted DST ratings that identified the site as a Candidate for Upland Reclamation.
Step 4	• Calculate the **Site Rating** as the absolute difference between the **Peatland Rating** and **Upland Rating** o Where the Site Rating is ≥3 the final site end land use recommendation is the greater of the Peatland Rating or the Upland Rating. o Apply the Site Rating Modifications in Section 7.1 for Site Ratings <3.

7.1 SITE RATING MODIFICATIONS

When the Site Rating in Step 4 is less than three, the Peatland Rating and Upland Rating are modified based on answers to **all** the factors in Table 8. The Site End Land Use Recommendation Calculator will assign a value of 1 when the answer to the factor is Yes.

The Final Peatland Rating is the sum of the initial Peatland Rating and the sum of the modifications to the Peatland Rating. Similarly, the Final Upland Rating is the sum of the initial Upland Rating and the sum of the modifications to the Upland Rating. Once the modifications are made, the final site end land use recommendation is the greater of the Final Peatland Rating or the Final Upland Rating. Example calculations are provided in Section 7.2 and Table 10.

NOTE: In the case of a tie after the modifications are made, the site is deemed a Candidate for Peatland Reclamation.

Table 8. Modifications to the initial Site Rating to determine the final site end land use recommendation.

Factor [1]	Modification to Peatland Rating	Yes / No [2]	Modification to Upland Rating	Yes / No [3]
Variances	More than two variances will be required for pad/access to be certified under the Forested Land Criteria		No variances OR one variance will be required for pad/access to be certified under the Forested Land Criteria	
Deep water dugout	Majority of the dugout borrow area has a water depth greater than 2 m (i.e., it is not a mineral wetland)		Not a dugout borrow OR majority of the dugout borrow area has a water depth less than 2 m (i.e., it is a mineral wetland)	
Site use	No evidence of use of access/pad by wildlife OR use of access/pad by third parties is affecting site ecological function		Access/pad being used by wildlife OR use of access/pad by third parties is not affecting site ecological function	
Age of woody vegetation	Desirable trees / woody species are less than 8 years old OR not meeting growth expectations		Desirable trees / woody species are at least 8 years old AND meeting growth expectations	

[1] All factors must be assessed.

[2] A value of 1 is assigned to the Peatland Modifications if the answer is Yes.

[3] A value of 1 is assigned to the Upland Modifications if the answer is Yes.

7.2 EXAMPLES

In the first example (Table 9), the Site Rating is 1 therefore Table 8 is used to determine the final site end land use recommendation.

Table 9. Example 1: Modifications to the initial Site Rating required.

Decision Support Tool	Candidate for Peatland Reclamation	Candidate for Upland Reclamation
Adjacent and Regional Impacts	3	
Site-specific Considerations		3
Access	2	
Borrow		1
Peatland Rating	5	
Upland Rating		4
Site Rating [Peatland Rating - Upland Rating]	1	

After applying the modifications (Table 10) the site is deemed to be a Candidate for Peatland Reclamation because the Final Peatland Rating is greater than the Final Upland Rating (7 vs. 6).

Table 10. Modifications to the initial Site Rating for Example 1.

Factor	Modification to Peatland Rating	Yes / No	Modification to Upland Rating	Yes / No
Variances	More than two variances will be required for pad/access to be certified under the Forested Land Criteria	Yes	No variances OR one variance will be required for pad/access to be certified under the Forested Land Criteria	No
Deep water dugout	Majority of the dugout borrow area has a water depth greater than 2 m (i.e., it is not a mineral wetland)	No	Not a dugout borrow OR majority of the dugout borrow area has a water depth less than 2 m (i.e., it is a mineral wetland)	Yes
Site use	No evidence of use of access/pad by wildlife OR use of access/pad by third parties is affecting site ecological function	Yes	Access/pad being used by wildlife OR use of access/pad by third parties is not affecting site ecological function	No
Age of woody vegetation	Desirable trees / woody species are less than 8 years old OR not meeting growth expectations	No	Desirable trees / woody species are at least 8 years old AND meeting growth expectations	Yes

In the second example (Table 11), the Site Rating is 3, therefore modifications are not required, and the final site end land use recommendation is Candidate for Upland Reclamation since the Upland Rating is greater than the Peatland Rating.

Table 11. Example 2: No modifications to the Site Rating required.

Decision Support Tool*	Candidate for Peatland Reclamation	Candidate for Upland Reclamation
Adjacent and Regional Impacts	3	
Site-specific Considerations		3
Access		2
Borrow		1
Peatland Rating	3	
Upland Rating		6
Site Rating [Peatland Rating - Upland Rating]	3	

8.0 RECOMMENDED INFORMATION TO PROVIDE IN SUPPORT OF THE CHANGE IN LAND USE APPLICATION

If the result of using the Decision Framework and Support Tools is a Site End Land Use Recommendation of Upland (i.e., to leave all or part of the pad in place), then a change in land use application is required. This section provides recommendations on which supporting information should be included with the application to support the change in land use request.

NOTE 1: The information list provided here is a suggestion and is not intended to imply these are the minimum requirements nor do they necessarily represent the full suite of information that AEP is looking for.

NOTE 2: Practitioners are encouraged to discuss application content with AEP prior to submission to ensure the appropriate information is provided.

NOTE 3: Practitioners should focus the application on site-specific information rather than broad regional descriptive information that AEP already has.

NOTE 4: Practitioners should provide detailed, ecological information and data to support the change in land use application. A statement of professional judgement without supporting information/data will not be sufficient.

8.1 RATIONALE FOR NOT REMOVING THE PAD MATERIAL

Provide a detailed description of the **ecological** rationale for not undertaking full or partial pad removal. Include information and data on:

- Alternatives examined to leaving the pad in place and why they were rejected
- Ecological impacts (type, nature, and extent) caused by removal and disposal of pad material compared to the ecological benefits of returning the site to a peatland
- How the upland site fits into the local and regional environment
- Ecological benefits of the upland site in the local and regional context

NOTE: Information on cost of removal and disposal may be provided in support of the ecological rationale but will not be accepted as the primary reason.

8.2 SITE BACKGROUND INFORMATION

Provide the basic background information about the site, including:

- Unique well identifier:
- Public land disposition number – pad:
- Public land disposition number – access:
- Public land disposition number – borrow:
- Overlapping land use dispositions/tenures:
- End land use requirement(s) in the public land disposition(s):
- AEP office:
- Spud date:

- Abandonment date:
- Date of last reclamation work:
- Description of reclamation efforts:
- Description of third-party use:
- Summary of discussions with other disposition/tenure holders about leaving the pad in place: Results of the Decision Framework and Support Tools

8.3 RESULTS OF THE DECISION FRAMEWORK AND SUPPORT TOOLS

The Site End Land Use Recommendation Calculator documents the detailed Decision Framework and Support Tools information used to determine the final site end land use recommendation. Appending the Site Results tab data (Table 12) and the DST Decision Path tab data (Table 13) from the Calculator to the application will show how the end land use recommendation was arrived at. Alternatively, the same information can be provided in a different format to show how the recommendation was arrived at.

Table 12. Example Site Results tab data output from the Site End Land Use Recommendation Calculator.

Decision Support Tool	Weight	Candidate for Peatland Reclamation	Candidate for Upland Reclamation
Local and Regional Impacts	3	3	0
Site-specific Considerations	3	0	3
Access	2	2	0
Borrow	1	0	1
Peatland Rating		5	
Upland Rating			4
Site Rating		1	
Site End Land Use Recommendation		Use Table 8 Modifications	
Table 8 Modifications		2	2
Final Peatland Rating		7	
Final Upland Rating			6
Site End Land Use Recommendation		Candidate for Peatland Reclamation	

Table 13. Example DST Decision Path tab data output from the Site End Land Use Recommendation Calculator.

Adjacent and Regional Impacts Decision Support Tool		Decision Path
1	Pad/access causing off-site hydrology and/or vegetation impacts	No

Adjacent and Regional Impacts Decision Support Tool		Decision Path
2	Offsite impacts can be alleviated by partial pad/access removal	
3	Local area is an upland/peatland complex	Yes
4	There are adjacent or regional considerations that would justify a change in land use	
5	Full pad/access removal would cause adverse impacts to wetland	No
6	Successful peatland reclamation likely on pad/access	Yes
	DST Recommendation	**Candidate for Peatland Reclamation**
Site-specific Considerations Decision Support Tool		
7	The pad/access meets Forested Land vegetation criteria	Yes
8	The vegetation deficiencies can be mitigated	
9	There are landscape deficiencies based on the Forested Land Criteria	No
10	There is evidence of limitations for long-term ecological sustainability	No
11	The landscape deficiencies can be mitigated and/or be justified with a variance	
12	The soil limitations can be mitigated	
	DST Recommendation	**Candidate for Upland Reclamation**
Access Decision Support Tool		
13	Access to the site restricted	Yes
14	Opportunity to coordinate with activity in area to complete reclamation	Yes
15	Access limited by vegetation	
16	Access road meets Forested Land vegetation criteria	
	DST Recommendation	**Candidate for Peatland Reclamation**
Borrow Decision Support Tool		
17	Borrow site has been identified	Yes
18	Alternative site available to receive/use all borrow material	No
19	Landscape borrow	Yes
20	Landscape borrow vegetation meets Forested Land vegetation criteria	Yes
21	Dugout borrow site is a functional mineral wetland	
22	Landscape borrow can be reclaimed to meet Forested Land criteria	
23	Dugout borrow can be reclaimed to a functional mineral wetland	
	DST Recommendation	**Candidate for Upland Reclamation**

An alternative (or additional) format for the DST Decision Path table above is to show the decision path for each DST in graphic form (see Figure 9 for an example of one DST decision path).

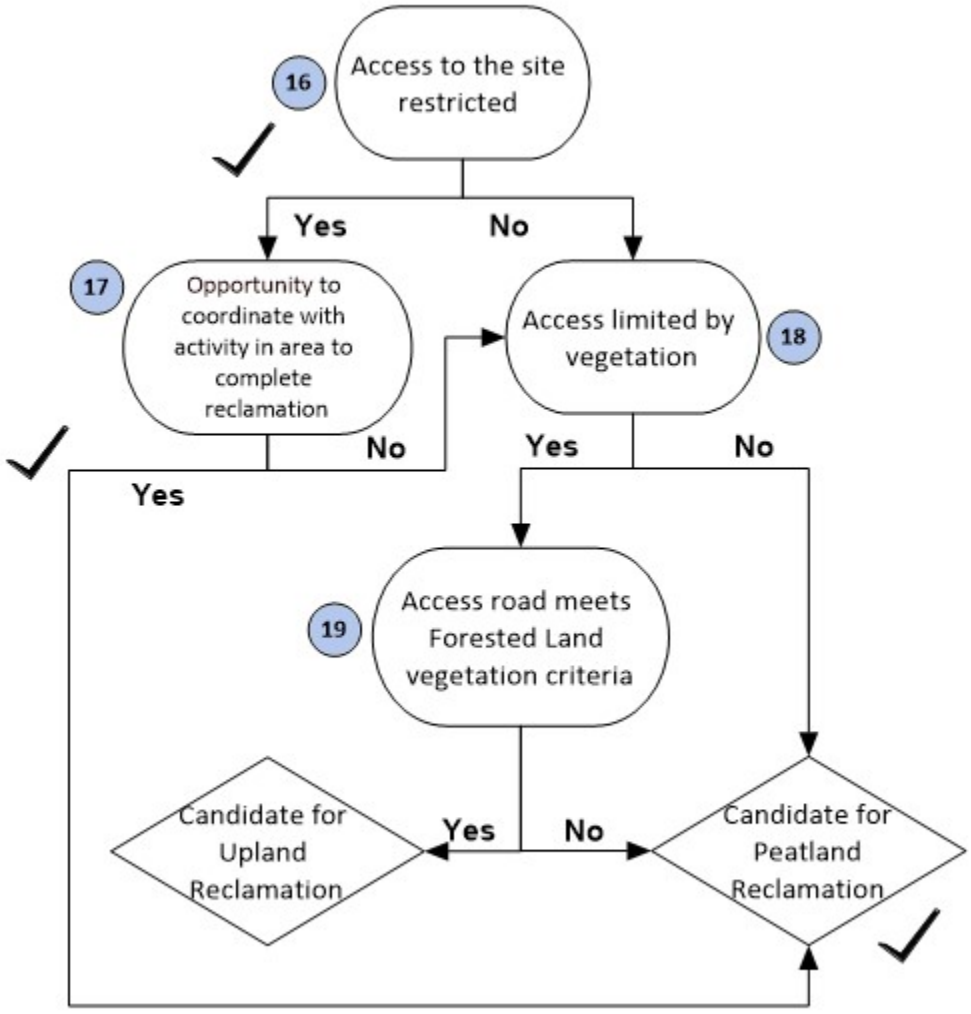

Figure 9. Visual depiction of a decision path.

8.4 ADJACENT AND REGIONAL DST INFORMATION

The following information will help support the results from the Adjacent and Regional DST:

- Percentage of peatland in local area:
- Adjacent wetland type:
- Adjacent wetland value (A, B, C, D):
- Description of off-site impacts:
- Cause of off-site impacts:
- Locations along access where partial or full borrow removal could occur / has occurred or swales have been constructed to allow water flow:

- Part of the pad where partial borrow removal could occur / has occurred:
- Description of the adjacent, local, or regional considerations that would justify a change in land use:

8.5 SITE-SPECIFIC CONSIDERATIONS DST INFORMATION

The following information will help support the results from the Site-specific Considerations DST:

- Pad size (m x m):
- Pad vegetation assessment information – upland areas:
- Pad vegetation assessment information – peatland areas:
- Access vegetation assessment information – upland areas:
- Access vegetation assessment information – peatland areas:
- Description of vegetation deficiency(ies):
- Proposed mitigation strategy(ies) to correct vegetation deficiency(ies):
- Description of landscape deficiency(ies):
- Proposed mitigation strategy(ies) to correct landscape deficiency(ies), or the relevant variance that would be applied for:
- Description of limitations for long-term ecological sustainability:
- Proposed mitigation strategy(ies) to correct limitations:
- Type and depth (m) of liner:

8.6 ACCESS DST INFORMATION

The following information will help support the results from the Access DST:

- Access start location (Qtr – LSD – Sec – Twp – Rng – Mer):
- Access end location (Qtr – LSD – Sec – Twp – Rng – Mer):
- Access length (m):
- Closest all-weather road (name/number):
- Distance to closest all-weather road (km):
- Access construction method(s):
- Length (m) and % of access padded in peatland:
- Number of channels across the access allowing crossflow:
- Vegetation assessment information – upland areas:
- Vegetation assessment information – peatland areas:

8.7 BORROW DST INFORMATION

The following information will help support the results from the Borrow DST:

- Original borrow location (Qtr – LSD – Sec – Twp – Rng – Mer):

- Distance from pad to original borrow (m):
- Borrow type (landscape or dugout):
- Estimated borrow pit volume (m^3):
- Estimated pad borrow volume (m^3):
- Estimated access borrow volume (m^3):
- Dugout borrow wetland type:
- Dugout borrow wetland value (A, B, C, D):
- Borrow vegetation assessment:
- Alternate location(s) where the borrow material may be disposed of:
- Locations where the borrow material may be used and the purpose:

8.8 ADDITIONAL SUPPORTING INFORMATION

The following additional supporting information will help provide context for the Decision Framework and Support Tools recommendation:

- Access and pad surveys
- Site sketch(es) showing drainage direction and existing trails/roads
- Access, pad, and adjacent area contour sketch/map
- Air photos of the access, pad, and adjacent area
- Satellite imagery of the site in a regional context
- Ground and/or drone photos of the pad, access, and borrow showing vegetation

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