



FORESTRY OPERATIONS ON CROWN LAND

A TECHNICAL BULLETIN FOR CONSULTANT ARCHAEOLOGISTS IN ONTARIO

2011



FOREST OPERATIONS ON CROWN LAND

A Technical Bulletin for Consultant Archaeologists in Ontario

2011

Ministry of Tourism and Culture

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Overview

This bulletin is intended to help consultant archaeologists as they follow the *Standards and Guidelines for Consultant Archaeologists (2011)* to carry out archaeological assessments for forest management plans and mitigate impacts to archaeological sites during forest management activities on Crown land.

Forest resource licence holders are required to address a range of possible heritage impacts when conducting forestry operations. This includes ensuring that the *Ontario Heritage Act* is followed so that registered archaeological sites are protected and the disturbance of unidentified archaeological sites as a result of forest operations is minimized.

The *Ontario Heritage Act* sets out priorities, policies, and programs for the conservation of archaeological resources of cultural heritage value. It also provides for the licensing of individuals who wish to carry out archaeological fieldwork. The Ministry of Tourism and Culture's *Standards and Guidelines for Consultant Archaeologists (2011)* defines the practices consultant archaeologists must follow when employed by a proponent to address the archaeological conservation requirements set out in the *Ontario Heritage Act*.

The Standards and Guidelines recognize certain unique features of archaeological assessments carried out in connection with forest operations on Crown Lands. This bulletin expands on the Standards and Guidelines by outlining a process specific to forest operations on Crown land that allows for the identification and subsequent avoidance and protection of areas of archaeological potential and known archaeological sites within forest management units on Crown land.

As an additional source of information, the Ministry of Tourism and Culture's draft bulletin *Engaging Aboriginal Communities in Archaeology* may be helpful to consultant archaeologists working in forestry contexts as it clarifies best practices for engaging Aboriginal communities in the archaeological assessment process.

Archaeological Assessments for Forest Operations on Crown Lands

1 Pre-Stage 1: Determination of areas to be assessed by the consultant archaeologist

The objective of a Stage 1 archaeological assessment is to determine whether there is potential for archaeological sites to be present on a property. The findings of the Stage 1 assessment will support recommendations about the required extent and location of Stage 2 survey.

In general, Stage 1 involves a background study where the consultant archaeologists will review geographic, land use, and historical information for the property and the relevant surrounding area. They will also contact the Ministry of Tourism and Culture to find out whether or not there are any known archaeological sites present on or near the property. The consultant archaeologist has the option of also visiting the property in order to inspect its current condition. One result of a Stage 1 assessment is a map identifying areas of archaeological potential recommended for Stage 2 survey.

For forest operations on Crown land, the Ministry of Natural Resources uses its own screening process to define the areas that will require Stage 2 archaeological assessment within a forest management unit licensed for harvest. This process is described in Section 1.4.3 of the Standards and Guidelines.

From the *Standards and Guidelines for Consultant Archaeologists* (2011) (Section 1.4.3):

The following process applies to all forestry projects on Crown land where the Ministry of Natural Resources uses its screening process to define the areas that will require archaeological assessment within a forest management unit. The screening process includes the following steps:

Step 1

Mapping of archaeological potential, based on a model of potential that gives weight and value to specific landscape elements, including:

- reviewing the locations of registered archaeological sites and other sites with cultural heritage value. Landform types that have stronger associations with such sites are assigned higher values.
- confirmation by the Ministry of Natural Resources of this preliminary model of archaeological potential by reviewing additional information available internally and from the local community, aerial photography, and historical mapping

Areas determined by this mapping to be lacking archaeological potential are at this point exempted from Stage 2 survey.

Step 2

The proponent and the Ministry of Natural Resources use that ministry's *Forest Management Guide for Cultural Heritage Values* (2007) to evaluate the activities planned for the forestry project for their

potential to alter the ground to the point of having an impact on any potential archaeological sites in those areas determined to have potential. Where there are planned impacts, they review best practices for avoiding those alterations or reducing their impact (e.g., changing the location of a water crossing, restricting activities to frozen ground conditions).

Step 3

Stage 2 survey is only required where impacts to areas with archaeological potential cannot be avoided. Note that the alternative strategy for Stage 2 test pitting in northern Ontario and the Canadian Shield outlined in section 2.1.5 will usually apply to forestry projects.

As a result of this screening process, the Ministry of Natural Resources will provide the forest resource licence holder with a map outlining the areas of archaeological potential within the forest management unit that will require Stage 2 archaeological assessment. The licence holder then determines what harvest operations, if any, will occur in these areas, in consultation with the Ministry of Natural Resources. This process is discussed in the Ministry of Natural Resource's *Forest Management Guide for Cultural Heritage Values (2007)*. The consultant archaeologist will likely NOT be involved in the determination process.

If areas of proposed ground disturbance and areas of archaeological potential do not overlap, then no archaeological assessment is required. For areas where archaeological potential has been identified, there are three harvest options available to the forest resource licence holder:

1. No harvest
2. Harvest with less than 5% mineral soil disturbance
3. Harvest with greater than 5% mineral soil disturbance

The last option (Option 3) requires a Stage 2 archaeological assessment by a consultant archaeologist prior to any soil disturbance.

2 Stage 1: Background study and optional property inspection

Section 1.4.3 of the Standards and Guidelines outlines criteria that consultant archaeologists may use to further refine the areas requiring Stage 2 archaeological assessment as determined by the Ministry of Natural Resources' screening process.

From the *Standards and Guidelines for Consultant Archaeologists (2011)* (Section 1.4.3):

Guidelines

In instances where it is suspected that an on-the-ground inspection may quickly determine that there is no archaeological potential despite the results of the potential mapping, it may be useful to conduct a Stage 1 property inspection. For most forest operations projects, however, it may be more practical and efficient to combine on-the-ground evaluations of archaeological potential with the Stage 2 fieldwork.

There are a number of activities a consultant archaeologist may undertake to further refine the areas of confirmed archaeological potential identified during the Ministry of Natural Resources' screening process before visiting the forest management area to carry out a Stage 1 property inspection or Stage 2 assessment. For example: review aerial photographs, topographic maps or forest resource inventory maps; or view the areas from a helicopter. This Stage 1 research results in a map for planned Stage 2 activities. For most assessments carried out in connection to forestry operations, it is practical and efficient to combine a Stage 1 property inspection with Stage 2 fieldwork.

3 Stage 1 Assessments for Forest Operations on the Canadian Shield and in Remote Areas

Management plans for forest operations on Crown land will often involve archaeological assessment of properties on the Canadian Shield or in remote areas. As a result, consultant archaeologists will often be able to use the alternative strategies for the evaluation of archaeological potential on these kinds of properties set out in the Standards and Guidelines and reproduced here in Sections 3.1 and 3.2.

3.1 Canadian Shield

For the purposes of the Standards and Guidelines, the Canadian Shield is defined as the area of Ontario underlain by the Precambrian Shield. If a property to be harvested is located on the Shield, it may be determined that the area requiring Stage 2 survey can be reduced and that some areas requiring Stage 2 survey may be recommended for alternative Stage 2 survey according to the following standards:

From the *Standards and Guidelines for Consultant Archaeologists (2011)* (Section 1.3.3):

Standards

1. The lands to be assessed must be demonstrated to be located on the Canadian Shield.
2. There may be small pockets (e.g., sand plains, clay plains, glacial beach ridges, etc.) that possess a higher degree of potential and differing characteristics from most of the surrounding environment that should still be considered to have potential. Where such areas of higher potential are identified, undertake a complete assessment and systematic surveys.

See Section 4 for a discussion of alternative Stage 2 strategies.

3.2 Remote areas

If Stage 1 evaluations of archaeological potential are being made for areas that are remote and difficult to access and a property inspection is not viable, it is acceptable to make recommendations that remote areas are of low potential and will not require Stage 2 assessment under the following conditions:

From the *Standards and Guidelines for Consultant Archaeologists* (2011) (Section 1.3.4):

Standards

1. The degree of remoteness must be documented in sufficient detail to demonstrate that there are practical obstacles to achieving access. This will be primarily a matter of distance and a lack of available transportation infrastructure (i.e., roads, trails) along with factors of visibility (e.g., forest cover). Factors relating to seasonality (e.g. snow cover, flooding) should not be a factor in demonstrating difficulties of access.
2. Aerial photos, detailed engineering plans or other detailed mapped information may be used to determine that areas are of low potential. This information must be at a scale and of a sufficiently detailed quality that allows for accurate evaluation of the presence and character of features of potential. The characteristics and quality of the sources of information (e.g., scale, source, how recently the information was acquired, general reliability) must be documented in sufficient detail to demonstrate its ability to support accurate evaluations of potential.

4 Stage 2: Property survey

While the Standards and Guidelines set out requirements for Stage 2 assessments for forest operations, there is a strong element of professional judgment on the part of the consultant archaeologist in implementing those requirements. During a Stage 2 property survey, the consultant archaeologist verifies the accuracy of the archaeological potential map produced at the end of the Ministry of Natural Resources screening process and Stage 1 assessment and carries out Stage 2 survey of those areas identified as having archaeological potential. Only areas identified as having archaeological potential require survey.

The archaeological potential map produced at the end of the screening process and Stage 1 assessment may be further refined by the archaeologist upon viewing the property during the Stage 2 survey through field identification of additional areas with no archaeological potential. Section 2.1 of the Standards and Guidelines sets out criteria that the consultant archaeologist can follow to identify areas that do not require Stage 2 survey. These determinations can only be made by the consultant archaeologist on the ground and based on their experience, professional judgment, and the geography of the area. Areas such as those that are permanently wet, steeply sloped or bare rock are exempted from survey.

From the *Standards and Guidelines for Consultant Archaeologists* (2011) (Section 2.1):

Standards

1. Survey the entire property, including lands immediately adjacent to built structures (both intact and ruins).
2. Survey is not required where:
 - a. lands are evaluated as having no or low potential based on the Stage 2 identification of physical features of no or low archaeological potential, including but not limited to:
 - i. permanently wet areas
 - ii. exposed bedrock
 - iii. steep slopes (greater than 20°) except in locations likely to contain pictographs or petroglyphs
 - b. lands are evaluated as having no or low potential based on the Stage 2 identification of extensive and deep land alteration that has severely damaged the integrity of archaeological resources
 - c. lands have been recommended to not require Stage 2 assessment by a Stage 1 report, where the ministry has accepted the Stage 1 report into the report register
 - d. lands are designated for forest management activity without potential for impacts to archaeological sites, as determined through the Stage 1 forest management plans process (see section 1.4.3)
 - e. lands are formally prohibited from alteration such as areas in an environmental easement, restrictive setback, or prohibitive zoning, where the constraint prohibits any form of soil disturbance. (Open space and other designations where allowable uses include land alterations must be surveyed.)
 - f. it has been confirmed that the lands are being transferred to a public land-holding body, e.g., municipality, conservation authority, provincial agency. (This does not apply to lands for which a future transfer is contemplated but not yet confirmed.)

Guidelines

1. When permanent fixed reference landmarks (e.g., Ontario Land Surveyor benchmarks, solid iron bars) are present, it is acceptable to record the locations required by Standard 4 of this section using methods such as total station, transit and tape, or stadia rod. The minimum GPS readings required in section 5 must still be taken.
2. Remote sensing may be used to supplement other methods of property survey, but not as an alternative.
3. If areas are exempt from survey because the lands are formally prohibited from alteration (Standard 2.e) or are being transferred to a public land-holding body (Standard 2.f), but those lands are evaluated as having no or low potential based on the Stage 2 identification of physical features of no or low archaeological potential (Standard 2.a) or of extensive or deep land alteration (Standard 2.b), documentation of the no/low potential evaluation may be submitted in place of documentation related to the exemption criteria.

Stage 2 assessment in the forestry context will usually involve test pit survey. The Standards and Guidelines outline acceptable test pitting methods and strategies. However, forest operations often involve conditions that are different than those of other types of projects. Under the three special circumstances set out below, the consultant archaeologist may make use of alternative strategies designed to address these differences in conditions:

1. Section 2.1.5 of the Standards and Guidelines sets out an alternative strategy for test pit survey in northern Ontario and on Canadian Shield terrain. This strategy recognizes that on the Canadian Shield the areas of high potential for archaeological sites are more restricted than they are in more southerly parts of Ontario. As such, the areas around features of archaeological potential that require test pitting are reduced and the associated requirements for test pitting intervals are also reduced.

For Standard 1 below, a joint study by the Ministry of Tourism and Culture and the Ministry of Natural Resources analysed a large sample of archaeological sites distributed across a wide variety of different regions throughout northern Ontario. That study determined that a high percentage of the sites would have been identified by survey within 50 metres of a modern water source.

For Standard 2, maps of other features indicating archaeological potential are often not as readily available or as comprehensive as those of modern water sources. Ministry consultation with archaeologists raised concern that archaeological sites related to other features of potential may not be discovered because of the greater difficulty of identifying those features (e.g., glacial shorelines) during Stage 1 background research.

As a result of this consultation, a more conservative standard was established. In line with that conservative approach, consultant archaeologists must meet this standard where any feature of potential other than a modern water source is identified. In other words, Standard 2 will prevail over Standard 1 where both classes of features overlap.

From the *Standards and Guidelines for Consultant Archaeologists (2011) (Section 2.1.5)*:

Test pit survey in northern Ontario and on Canadian Shield terrain

Standards

1. Where the identified feature of archaeological potential is a modern water source, test pitting is required between 0 and 50 m from the feature. Space test pits at maximum intervals of 5 m. Survey is not required beyond 50 m.
2. For features of archaeological potential other than modern water sources (e.g., historic water sources such as glacial

Guidelines

1. Clustered test pits may be used to survey small areas of archaeological potential located in areas otherwise determined to be of low archaeological potential.

shorelines), test pitting is required as follows:

- a. space test pits at maximum intervals of 5 m between 0 and 50 m from the feature of archaeological potential
 - b. space test pits at maximum intervals of 10 m between 50 and 150 m from the feature of archaeological potential
 - c. survey is not required beyond 150 m
3. While maintaining standard survey grids as closely as possible, the consultant archaeologist may vary from standard survey grids as necessary, based on professional judgment. Document and explain the rationale for all variations in the Stage 2 report.

2. The alternative strategy for test pit survey in areas with complex combinations of archaeological potential recognizes that, in the course of surveying areas previously identified as having archaeological potential, the consultant archaeologist may determine that an area consists of a complex combination of land conditions resulting in small areas of archaeological potential intermixed with areas of low potential. Examples include small pockets of soil scattered throughout a broader bare limestone plain, or dry areas scattered throughout broader wetlands. These small areas of archaeological potential must be surveyed, but it may not be possible to maintain a regular test pit grid or provide a precise map of all the surveyed areas.

From the *Standards and Guidelines for Consultant Archaeologists (2011)* (Section 2.1.6):

Test pit survey in areas with complex combinations of archaeological potential

Standards

1. Survey all parts of these areas that are determined to have archaeological potential using standard test pit survey intervals.
 - While maintaining standard survey grids as closely as possible, the consultant archaeologist may vary from standard survey grids as necessary, based on professional judgment. Document and explain the rationale for all variations in the Stage 2 report.
2. Record surveyed areas and areas of low potential not surveyed to the greatest degree of precision possible given the available base mapping.
 - Based on professional judgment, the consultant archaeologist may map an area containing complex combinations of conditions as one unit. Where this approach is followed, record the characteristics of the area through photographs and detailed written field notes (e.g., percentages of different physical features and areas of potential, percentages surveyed and not surveyed, degree of variation within the area).

3. There is also an alternative strategy applicable to the special condition of undisturbed forest floors with shallow soils (e.g., combined A and B horizons of less than 5 cm) set out in Section 2.1.9 of the Standards and Guidelines. This strategy has limited application in forest operation areas.

Note that if none of the special conditions listed above apply, the consultant archaeologist is required to follow the general standards and guidelines for test pit surveys set out in sections 2.1.2 and 2.1.3 of the Standards and Guidelines.

Although the general and special condition standards for Stage 2 provide minimum requirements which the consultant archaeologist must satisfy, it is recognized that these standards may not address every situation. It may be necessary in some instances to use other approaches to respond to unusual conditions. However, all consultant archaeologists must discuss any approaches that depart from the Standards and Guidelines with Ministry of Tourism and Culture staff before applying them in the field.

Other approaches are likely to be acceptable to the ministry where they do not conflict with the standards and are consistent with the general goal of the conservation of archaeological sites. Consultant archaeologists who depart from the Standards and Guidelines must clearly describe the rationale for the change in approach, the new strategy and any discussions with the Ministry of Tourism and Culture in the report that is eventually filed for the project (see Section 8 below). Section 2.10 of the bulletin *Project Information Forms (PIFs) and the Archaeological Report Review Process* provides guidance for licensees who are considering alternate fieldwork strategies to those allowable under the Standards and Guidelines.

5 Mitigating impacts to archaeological sites

The outcome of a Stage 2 test pit survey may be the identification of archaeological sites within an area of archaeological potential. When a site is discovered Section 2.1.3 of the Standards and Guidelines provides the option of undertaking additional Stage 2 test pitting in order to determine whether the archaeological site has cultural heritage value or interest based on criteria set out in the Standards and Guidelines and the archaeologist's professional judgment. The outcome of this additional testing is an understanding of whether Stage 3 testing of the site may be necessary.

The acceptable strategies for mitigating impacts to archaeological sites identified during Stage 2 survey and that are of further concern are:

- Following a Stage 2 assessment, the forest resource licence holder may opt to protect the site without the Stage 3 testing that would determine its cultural heritage value or interest and spatial boundaries. If so, a conservative approach to site protection is

necessary and a buffer zone must be established with a radius of at least 200 metres from the estimated center of the site.

- Alternatively, a Stage 3 archaeological assessment may be undertaken to define the spatial boundaries of the site and determine its cultural heritage value or interest, after which a buffer zone of 10 metres from this boundary can be established. Stage 3 assessment may also find that the site has been sufficiently documented and is of no further cultural heritage value or interest and will not require protection.
- Finally, a Stage 4 excavation may be carried out to completely document and remove the site, allowing normal forestry operations to proceed.

If the impacts to an archaeological site are not mitigated through complete excavation of the site, the use of the buffer zone will ensure the protection of the archaeological site during forest operations.

6 Avoidance of archaeological sites during forest operations

Forest resource licence holders will often opt not to harvest in areas where archaeological sites have been identified during Stage 2 archaeological assessment. The sites will be avoided during forestry operations. As a result, many archaeological sites identified during assessments for forest management plans will not require Stage 3 testing as they will be avoided upon identification.

If it is decided that Stage 3 will not be carried out at a site because the site will be avoided, the consultant archaeologist is required to document the results of the Stage 2 assessment in a Stage 2 report. The report must include a description of any archaeological resources that were identified and recommend a strategy to avoid impacts to the identified sites according to the standards described in Section 3.2 of the MNR *Forest Management Guide for Cultural Heritage Values* (2007).

7 Engaging Aboriginal communities in archaeology

Archaeology in Ontario is particularly relevant to Aboriginal communities because it can help to document Aboriginal histories and peoples and to identify sacred sites and ancestral remains. Engaging Aboriginal communities in archaeology adds to the understanding of the impact of a project and enriches the archaeological record. The engagement process demonstrates respect for Aboriginal heritage, recognizes Aboriginal peoples' connection to the land, and allows everyone to gain a better understanding through that process.

The *Standards and Guidelines for Consultant Archaeologists (2011)* includes standards and guidelines for engaging Aboriginal communities during the archaeological assessment and mitigation process, and for reporting on that engagement. The draft bulletin *Engaging Aboriginal Communities in Archaeology* provides additional information and guidance for this important aspect of archaeological practice. Additional direction on collecting historical Aboriginal values in forest management planning is provided in Section 3.5 of the *Forest Management Guide for Cultural Heritage Values (2007)*.

8 Reporting

As a term and condition of their licence, consultant archaeologists must file reports with the Ministry of Tourism and Culture that document their archaeological fieldwork. The Standards and Guidelines outline requirements for reporting on all four stages of archaeological fieldwork. The report is reviewed by the Ministry of Tourism and Culture against the Standards and Guidelines.

If it appears from a report that the consultant archaeologist has met all the requirements under Part VI of the *Ontario Heritage Act* and the *Terms and Conditions for Archaeological Licences*, the Ministry of Tourism and Culture will issue a letter to the consultant archaeologist stating that the report has been accepted into the Ontario Public Register of Archaeological Reports.

If the report does not satisfy all relevant requirements or reveals that the fieldwork was inadequate, the Ministry of Tourism and Culture may advise the consultant archaeologist that the report has not been entered into the register. The report may be returned to the archaeologist with a request for further archaeological fieldwork or revisions to the report. Please refer to *Project Information Forms (PIFs) and the Archaeological Report Review Process, An Administrative Bulletin for Archaeologists in Ontario*, for further information on the ministry's report review process.

9 Other aspects of the forest management planning process

A forest resource licence holder may ask a consultant archaeologist to advise on, or provide services related to, aspects of the forest management planning process which are independent from the archaeological activities governed by the Ontario Heritage Act and for which the consultant archaeologist is licensed. A list of such activities may be found in Section 2.3 of the bulletin *Project Information Forms (PIFs) and the Archaeological Report Review Process*.

Because these activities fall outside of the requirements of the Ontario Heritage Act, the Ministry of Tourism and Culture will neither advise nor comment on any such matters that may come to its attention as it reviews the consultant archaeologist's report. Please note that the fact that the ministry accepts a report into the Ontario Public Register of Archaeological Reports does not signify that the Ministry of Tourism and Culture or the Government of Ontario has in any way approved any past or proposed activities of any forest resource licence holder or of any consultant archaeologist except as they relate to whether or not the consultant's report complies with the requirements under Part VI of the Ontario Heritage Act.

10 Glossary

archaeological assessment

For a defined project area or property, a *survey* undertaken by a licensed archaeologist within those areas determined to have *archaeological potential* in order to identify *archaeological sites*, followed by evaluation of their *cultural heritage value or interest*, and determination of their characteristics. Based on this information, recommendations are made regarding the need for mitigation of impacts and the appropriate means for mitigating those impacts.

archaeological potential

The likelihood that the *property* contains *archaeological resources*.

archaeological resources

In the context of the Standards and Guidelines, objects, materials and physical features identified by licensed archaeologists during a Stage 2 archaeological assessment as possibly possessing *cultural heritage value or interest*. Analysis using the criteria set out in the Standards and Guidelines determines whether those objects, materials and physical features meet the definition of an *archaeological site* under the Ontario Heritage Act and whether Stage 3 archaeological assessment is required. In various planning and development contexts, the term may refer to any or all of *archaeological potential*, *artifacts* and *archaeological sites*.

archaeological site

Defined in Ontario regulation as “any property that contains an *artifact* or any other physical evidence of past human use or activity that is of cultural heritage value or interest”.

archaeological survey

The process followed in order to make initial identifications of *archaeological sites*. This may consist of pedestrian survey of ploughed fields, test pitting, the use of mechanical equipment in specific deeply buried or urbanized situations, or remote sensing. Survey is a part of the overall *archaeological assessment* process.

artifact

Defined in Ontario regulation as “any object, material or substance that is made, modified, used, deposited or affected by human action and is of *cultural heritage value or interest*”.

Canadian Shield (also known as Precambrian Shield)

The part of Canada underlain by ancient, granitic, pre-Cambrian rock that has been largely unaffected by later geological episodes.

consultant archaeologist

An archaeologist who enters into an agreement with a client to carry out or supervise archaeological fieldwork on behalf of the client, produce reports for or on behalf of the client and provide technical advice to the client. A consultant archaeologist must hold a Professional licence issued by the Ministry of Tourism and Culture. (O.Reg. 8/06).

Crown land

Crown land in Ontario is land owned and managed by the province for a range of economic, recreational and social activities. Federal Crown land in Ontario includes national parks, Indian reserves and some harbours and canal systems are under the control of the federal government, and therefore excluded from the lands being under discussion in this Bulletin.

cultural heritage value or interest

For the purposes of the Ontario Heritage Act and its regulations, *archaeological resources* that possess *cultural heritage value or interest* are protected as *archaeological sites* under Section 48 of the act. Where analysis of documented *artifacts* and physical features at a given location meets the

criteria as stated in the Standards and Guidelines, that location is protected as an *archaeological site* and further archaeological assessment may be required.

forest management plan

A plan for management activity within a specific forest management unit that contains a broad management strategy which balances objectives related to forest diversity, socio-economics, forest cover and silviculture, as required under the *Crown Forest Sustainability Act, 1994*.

forest management unit

An area of Crown forest designated under section 7 of the *Crown Forest Sustainability Act, 1994*.

forest operations

The harvesting of a forest resource, the use of a forest resource for a designated purpose, or the renewal or maintenance of a forest resource, including all related activities, such as road building (*Forest Management Planning Manual 2004*).

ground disturbance

Anything greater than a 5% (on average) disturbance of the mineral soil layer beneath the organic soil layer, equivalent to “mineral soil disturbance” in the *Forest Management Guide for Cultural Heritage Values (2007)*.