

# Marshall Creek Agricultural Reserve Project Description

Contact:

David Murray, Agricultural Lands Resource Officer  
Agriculture Branch, Department of Energy, Mines & Resources  
Government of Yukon, P.O. Box 2703, Whitehorse, YT Y1A 2C6

Tel: 667-3699 | Fax 393-6222  
E-mail: david.murray@gov.yk.ca

# Marshall Creek Agricultural Reserve Project Description

## Executive Summary

---

This project involves the conversion of forested land for a rural agricultural subdivision to meet the demand in the Haines Junction area. An initial study area of 1450 ha was identified situated between the Special Forestry Reserve to the east, the Dezadeash River and old Alaska Highway to the south, the community of Haines Junction to the west and the new Alaska Highway to the north. The site was identified by the Kluane Working Group during preparation of the regional land use plan and confirmed as suitable for agriculture by the Government of Yukon Agriculture Branch.

The subdivision plan has been coordinated with forest management planning for the Champagne & Aishihik traditional territory. Specifically, the development planning anticipates the extraction of the remaining merchantable timber values that are quickly being destroyed by the spruce beetle infestation. The Forest Management Branch recently completed a detailed assessment of timber values on a lot-by-lot basis. Based on these findings, a cut-block layout has been developed that will facilitate both timber harvesting, protection of buffer strips along property lines and roads and the development of the agriculture lots in time for disposition in the spring of 2006. The timber salvage plan will include selective logging within buffers to remove beetle-infested trees and retention of pockets of immature trees that are not at risk from infestation to give the property purchaser options for homestead placement etc.

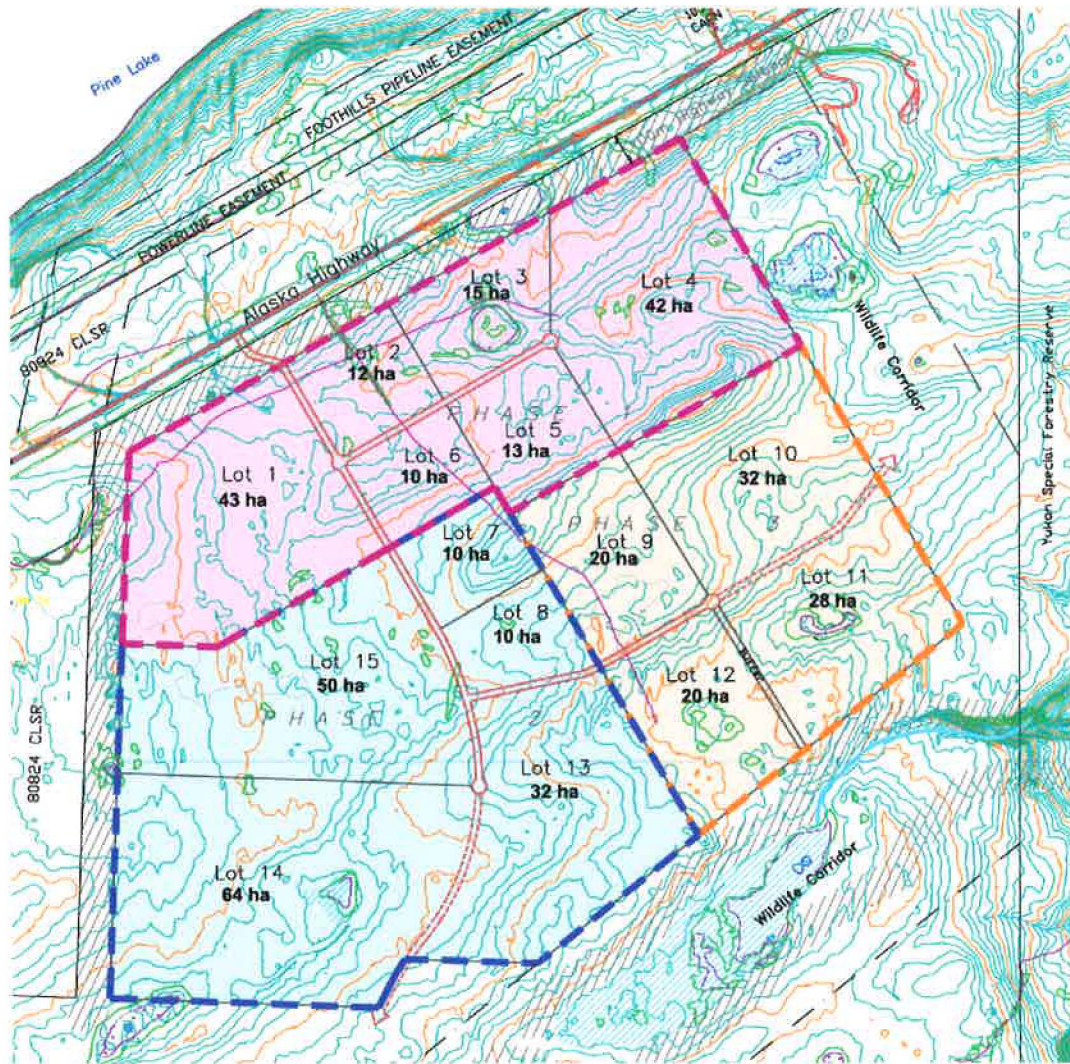
Lot development will be undertaken in stages consistent with demand. Subdivision build-out is anticipated to take at least 10 years. Each phase offers a variety of parcel sizes to satisfy interest in hobby or full time farming. The layout provides opportunities for lot purchasers to acquire additional land in later phases if they wish to expand their existing operations as well as for new entries. The subdivision plan has considered other stakeholder values and concerns such as the need for a visual buffer along the Alaska Highway, the needs of migratory wildlife, a possible future requirement for irrigation from Pine Lake and retention of environmentally sensitive lands.

Planning work has also been coordinated with the Department of Highways & Public Works who are currently rebuilding this stretch of the Alaska Highway. The location of the intersection for the subdivision access road has been set and an access permit obtained. A planned culvert replacement has been oversized near the intersection to allow passage of an irrigation pipe, should future property owners wish to pursue the irrigation option. This will minimize the need for future work in the highway right-of-way and result in development cost savings

This project complements an initiative by the Village of Haines Junction and Government of Yukon to provide a limited agriculture/rural residential option within village boundaries with a maximum lot size of 6 hectares.

Work on this project began in mid 2003 and included an agricultural suitability field inspection, a reconnaissance survey of the extent of the spruce beetle infestation and an examination of possible subdivision layout options for discussion with the Klwane Working Group. Based on the feedback received the present subdivision layout was developed and a lot-by-lot assessment of the timber salvage potential undertaken this summer. This resulted in an agreement between Forest Management and Agriculture Branches to coordinate the land conversion process to capture the remaining forest values as part of the land clearing process and reduce the potential forest fire risk to future agriculture lot purchasers.

In summary, this proposal provides for the orderly development and disposition of land for large lot agriculture purposes outside municipal boundaries on lands identified for this use in the Klwane Land Use Plan.



Subdivision Concept Plan, Marshall Creek Agricultural Reserve

## 1.0 GENERAL ENVIRONMENTAL ASSESSMENT INFORMATION

Project Title:	Marshall Creek Agricultural Reserve Subdivision
Proponent:	Agriculture Branch, Department Energy, Mines & Resources, Government of Yukon, PO Box 2703, Whitehorse, Yukon Y1A 2C6
EA Type:	Level 1 screening
EA Start Date:	August 22, 2005
EA Completion Date:	September 26, 2005

## 2.0 RESPONSIBLE AUTHORITY IDENTIFICATION

Lead Responsible Authority:	Agriculture Branch, Energy Mines & Resources
Responsible Authority Contact(s)	David Murray, Agricultural Lands Resource Officer Tel: 667-3699 Fax 393-6222 E-mail: david.murray@gov.yk.ca
Lead Responsibility Trigger:	Infrastructure development coordination and funding Public land disposition
Lead Type of Approval:	Funding
Other Triggers:	
Other RA Types of Approval:	Highways & Public Works – highway access permit

## 3.0 PROJECT LOCATION

Region:	Kluane
Topographic Map Sheet:	115A (14) 1:50,000
Geographic Location:	South side of Alaska Highway, approximately 10 km east of Haines Junction
Latitude & Longitude:	60° 47' 37" N 137° 24' 49" E
Drainage Region:	Dezadeash River
Watershed:	Alek
Street Name:	Km 1622 – 1625, Alaska Highway
Nearest Community:	Haines Junction
Traditional territory:	Champagne & Aishihik First Nations (CAFN)
Surrounding Land Status	Crown land, abuts CAFN land selection to north, forestry reserve to the east, rural land holdings to the southwest.
Special Designation:	Agricultural reserve

# Haines Junction Area Agricultural Reserve Project Description

## Introduction

---

An agricultural subdivision is proposed for an area east of the municipal boundary of Haines Junction, between the old and new Alaska Highway (**Figure 1**).

This area was identified by the Klauene Working Group (KWG) as suitable for agricultural use. The Klauene Working Group is responsible for updating and implementing the Klauene Region Land Use Plan. The Agriculture Branch confirmed soil suitability.

The site also contains merchantable stands of spruce. The spruce beetle infestation is quickly reducing the remaining timber values surrounding Haines Junction. Forest Management Branch completed a current assessment of the remaining timber values in July 2005. The proposed development strategy involves the collaboration of the Forest Management and Agriculture branches to facilitate salvage of these rapidly disappearing timber values during the transition from forested open space to agriculture.

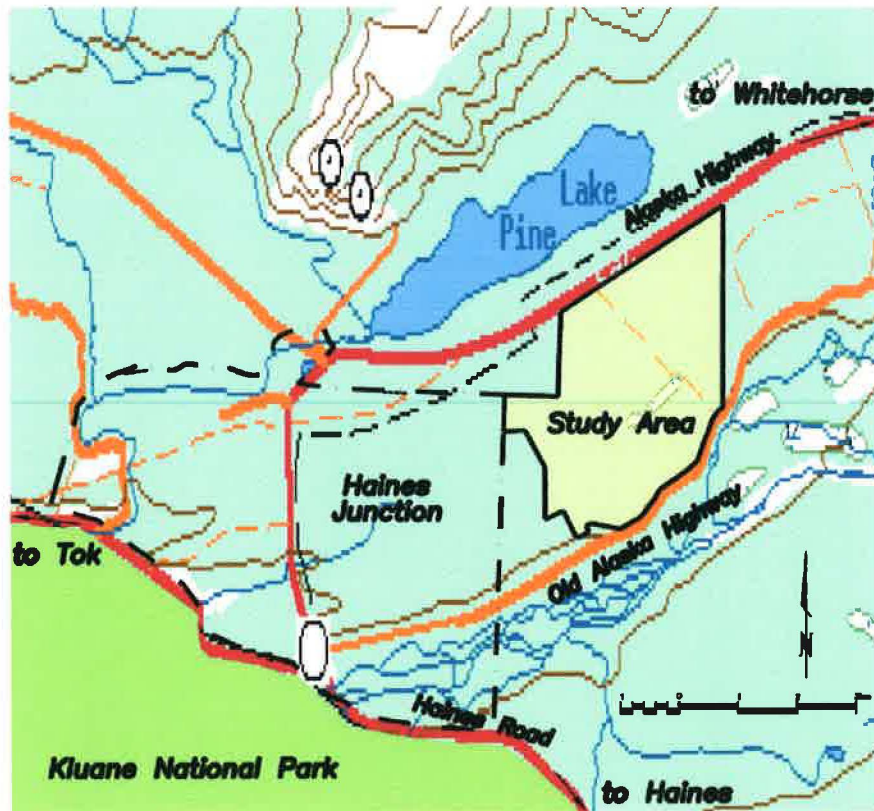


Figure 1: Overview map of study area and surroundings

A Responsible Authority (RA) under the *Yukon Environmental Assessment Act* is defined as a territorial agency when it acts as the project proponent, helps finance the project, disposes of land or an interest in land, or is a regulator for a function that appears in the Law List. When more than one government department is involved in a project, each department is a responsible authority (RA). To co-ordinate efforts and ensure a smooth and efficient process a lead RA manages the environmental assessment.

For the purposes of this project, the Agricultural Branch, Department of Energy, Mines & Resources, Government of Yukon is the lead RA. They are required to conduct the environmental assessment of the subdivision proposal because they are the project proponent. The Agricultural Branch will finance infrastructure construction while the Lands Branch issues the land use permits and manage the land sales in accordance with the *Lands Act*. Highways & Public works is also a responsible authority because they have jurisdiction over access to the Alaska Highway and the Community Development Branch is the subdivision approving authority. The same branch will also be involved in infrastructure installation.

Under the *Environmental Assessment Act*, the environment means the components of the Earth, and includes:

- (a) land, water, and air, including all layers of the atmosphere;
- (b) all organic and inorganic matter and living organisms; and
- (c) the interacting natural systems that include components referred to in (a) and (b) above.

An “environmental effect” means, in respect of a project:

- (a) any change that the project may cause in the environment, including any effects of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site, or thing that is of historical archaeological, palaeontological, or architectural significance; and
- (b) any change to the project that may be caused by the environment.

Environmental assessment under the Yukon *Environmental Assessment Act* can follow different formats depending on the scale and nature of a project and the level of public concern. Environmental assessments may be conducted as screenings, comprehensive studies, mediations and Panel reviews. This project meets the requirements for a screening.

Under a screening the responsible authority is required to consider the following factors in an assessment:

- (a) The environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;
- (b) The significance of the effects referred to in (a);

- (c) Comments from the public that are received in accordance with the *Act* and the *Regulations*;
- (d) Measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project; and
- (e) Any other matter relevant to the screening, such as the need for the project and alternatives to the project that the responsible authority may require to be considered.

An environmental screening involves four stages:

- (a) Preparation and issuance of a project description describing all aspects of the project and associated activities;
- (b) Identifying the type and duration of possible impacts as they relate to the nature of the project and the environment in which the project is situated;
- (c) Assessment of the likelihood and significance of adverse environmental effects; and
- (d) Reporting the findings and outcome of the assessment including any public comment.

Only after an environmental assessment is completed and finds that the project is not likely to cause a significant adverse environmental effect, can government proceed with project development and land disposition.

Consideration of potential environmental impacts is part of the normal subdivision design and planning process. This project started in 2003 when the first feasibility studies were initiated including an assessment of the suitability of the local soils to support agricultural development.

### **The Public Role in this Screening**

The project description is prepared and circulated to all known interested parties. Copies of the project description were also made available for review in the Energy, Mines & Resources offices in Haines Junction and Whitehorse and at the municipal office in Haines Junction. It is a public document.

The project description describes the project intent, which is to convert vacant forested land to a rural agricultural subdivision. It explains the project rationale and describes anticipated impacts including opportunities to reduce or mitigate impacts that are anticipated to occur.

The public has an opportunity to comment on the assessment and suggest modifications to minimize or overcome public concerns about the impacts that development may create. To avoid duplication of consultation effort, the environmental screening and subdivision approval process are being coordinated.

Given the nature of development and location, decommissioning is not an issue.

## Site Inventory

The site is approximately 1450 hectares in size. It is generally flat near the Alaska Highway, with a ridge closer to the old Highway that slopes towards the Dezadeash River. From this ridge some excellent views can be had. The site is mainly in its natural state. There is some evidence of past minor logging activity near the old Alaska Highway and one large patch of aspen in the southwest corner that is an old burn. Terrain features for the area proposed for initial development are shown in more detail in **Figure 4** (next page). Adjacent land uses are compatible, being agricultural and forestry-related in nature (**Figure 2**).



Figure 2: Adjacent agricultural lots, old Alaska Highway



Figure 3: blowdown

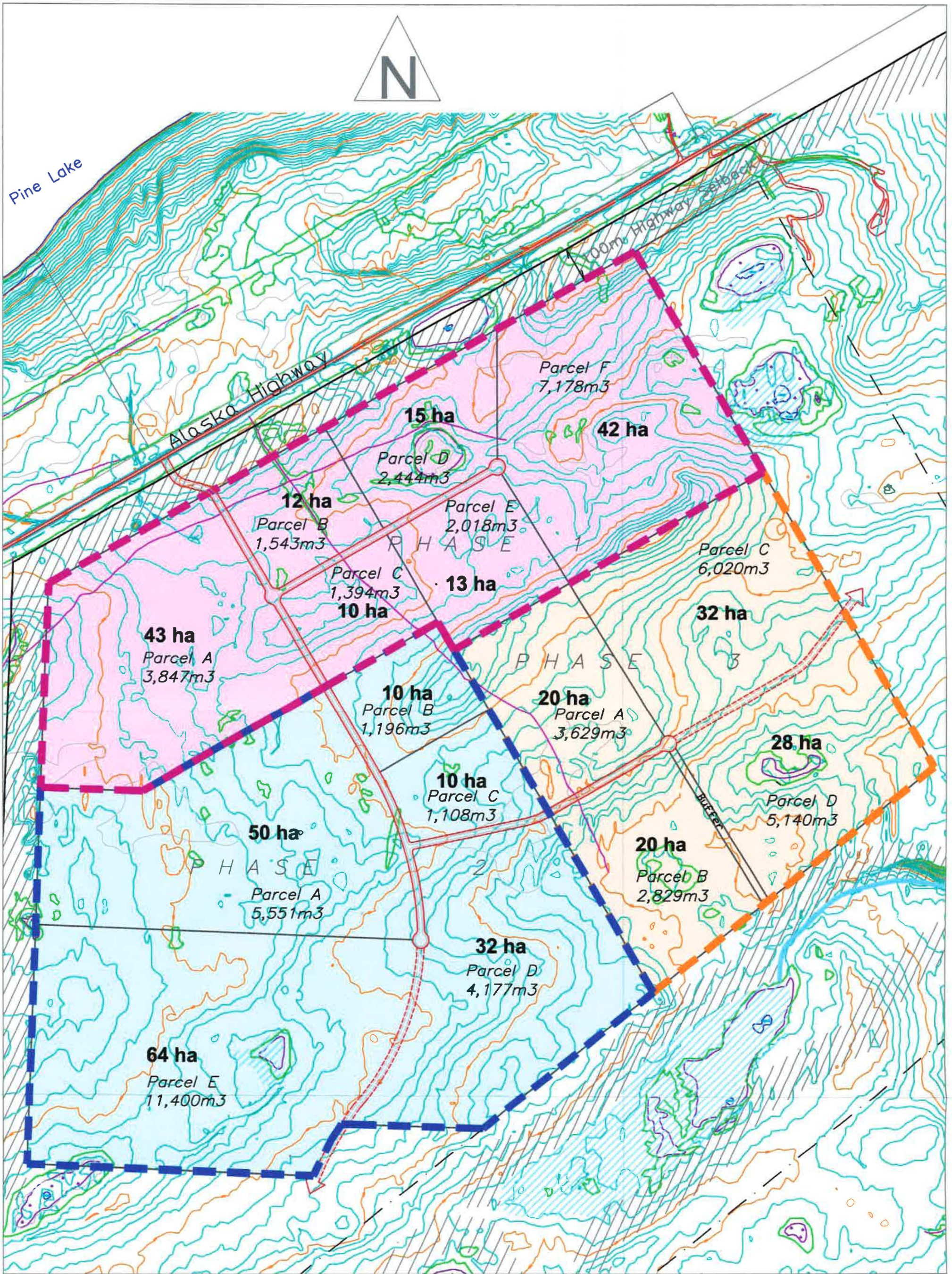
### Forest Values

The site is principally covered in white spruce, with smaller stands of trembling aspen. **Figure 4** shows the remaining merchantable timber volumes for individual subdivision lots. It is based on a recently completed timber cruise by the Forest Management Branch (July 2005).

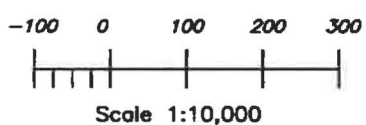
The area has substantial blow-down (**Figure 3**) and is susceptible to wildfire because of numerous trees that have been killed by the spruce beetle infestation. Merchantable stands are limited to specific areas.

YG Forest Management Branch has estimated there is 18,424m<sup>3</sup> of merchantable timber remaining in phase 1, 23,432 m<sup>3</sup> in phase 2 and 17,618 m<sup>3</sup> in phase 3. There is only one small operating sawmill (Dimok) in the region located at Canyon Creek. It has the capacity to absorb these harvest volumes, and given it's close proximity to this site, is likely to be interested in the remaining salvage harvest potential.

The quality of the timber will continue to deteriorate each year. Thus, if harvesting the remaining timber value is a priority, time is of the essence.



Marshall Creek Agricultural Subdivision Plan  
August 2005



**LEGEND**

- Trail
- Study Area Boundary
- 100 Metre Buffer
- Wetland
- Phase 1
- Phase 2
- Phase 3

**REVISIONS**

NO.	DATE	DESCRIPTION
01	28JULY05	TIMBER CRUISE ESTIMATES
02	17AUG05	REVISIONS FMB CALCULATIONS



Figure 4: Subdivision Concept With Timber Values By Parcel

### **Agricultural Suitability**

The majority of the study area was submerged by glacial Lake Alsek several times in the last 8000 years. Lake Alsek was created when a surging Lowell Glacier dammed the Alsek River. During the last major lake phase, which ended sometime between 1857 and 1891, Lake Alsek was 100 kilometres in length and one hundred metres in depth. During these flood events silts and clays of various thickness were deposited on the lakebed creating the surface clay and silt soil textures common throughout the study area.

The depth of the fine textured sediments increases as the length of submersion increases. Rampton (1981) records the underlying landform to be silty morainal material. Near the Dezadeash River the depth of lacustrine clays over till is greater than one metre while the higher elevation sites have as little as 20 cm of clay loam over clayey 'C' horizon with occasional 2cm stones.

The study area is quite homogeneous in terms of agriculture capability with the regional climate as the controlling factor in the Class 5 rating. Soil texture and topography provide for excellent site conditions, but cool summers and short frost free period limit crops to hay and other forages as well as frost hardy vegetables.

Of the twenty-six soil pits, one third ended in a frozen horizon when sampled in mid-July, 2003. Permafrost can be expected in those areas where the frozen horizon occurred in organic material and this usually corresponds with proximity to the wetland components of the area.

The study area also contains pockets of wetlands and sedge meadows areas (**Figure 5**) ranging in size from 1 to 20 hectares. These wetland areas cover approximately 50 hectares of the study area. Wetland areas are avoided in the project design and supplemented with buffers to help guard against runoff contamination and protect wildlife values. Typical leave strips are 30-50m wide from the tree line and their width reflects the nature of the environmental risk and site conditions. In this situation, the principal concern is run-off from adjacent fields. Some of these wetlands also likely reflect a "perched" water table where rainwater and runoff are unable to seep through the underlying clay and silt layers.

Prevailing winds are from the west.

Pine Lake is only 250 metres to the north of the study area, and would provide a possible irrigation source if necessary.



**Figure 5: wet area**

The surface area of Pine Lake is 6.64 km<sup>2</sup>. It is approximately 6km long and 1 km wide. Bathymetric data suggests the lake has a maximum depth of 27.5m with approximately half the surface area over 15m according to the 1986 Lake Management Plan. The plan was prepared in 1986 by a Management Committee representing the Champagne & Aishihik First Nations and Village of Haines Junction. The goal of the plan was to maintain the lake's environmental quality and respect traditional land use activities including a viable fishery. Principal concerns were the growing level of recreational use and demand for cottage lots. The Lake Management Plan did not include any discussion on the possibility of water withdrawals for agricultural production.

Although not anticipated at this time, allowance has been made for future property owners to pursue irrigation from Pine Lake. Agriculture Branch advise that the region has a moisture deficit in the spring and irrigation would be one means to ensure forage crops get a good start. As a rule of thumb, 1,000 m<sup>3</sup> of water/ha is required to offset the spring moisture deficit. Without irrigation, forage yields are reduced and per hectare returns to the farmer are less. Similarly, while irrigation increases production cost, it will improve yields and reduce uncertainty especially in those years that are drier than normal. Since a spring moisture deficit exists, allowance for potential future irrigation from Pine Lake was considered in the location of the access roads in the subdivision layout.

A request for water withdrawal exceeding 300 m<sup>3</sup> would require a license from the Yukon Water Board and trigger an additional environmental screening. An easement across vacant crown land and the Foothills Pipeline Right-of-Way would also be required. A future interest in obtaining Pine Lake water for irrigation purposes can be anticipated given the lake's proximity to the project. For illustrative purposes only, if we assume there might be 75-100 ha of cultivated fields in the development at the end of five years and that each hectare requires 20 cm of water to make up the moisture deficit in this area then the volume of water required would be a minimum of 14,000 m<sup>3</sup>. Given the surface area of Pine Lake, 132,000 m<sup>3</sup> of water would have to be withdrawn to reduce the lake level by 2cm.

As highway reconstruction was underway, it was decided to oversize a culvert near the main access road to make it possible to run irrigation pipe through the culvert without compromising the drainage function. This avoids the future cost of digging up the road surface in the future.

### **Access and Utilities**

The subdivision will be accessed from the new Alaska Highway. An access permit has been obtained and provision for the access road has been considered in the reconstruction of this section of highway, now underway. A 100m buffer has been retained along the highway in keeping with the visual screening guidelines recommended in the Klauene Region Tourism Plan. The buffer also provides escape cover for wildlife crossing the highway.

Provision has also been made for an eventual connection back to the Old Alaska Highway at some future time. The original highway was upgraded in 2003 but receives limited use. Highway maintenance staff cut back brush, completed some minor drainage improvements and re-shaped the gravel surface.



Figure 6: power line easement at northwest corner of site

There is a Yukon Energy 25Kv power line that parallels the new Alaska Highway (Figure 6) from the Aishihik Power Plant to Haines Junction. This line would not have to be stepped down to service the new subdivision.

It could either be accessed directly across from the main access road or at the point where the line crosses the highway just west of the study area.

NorthwestTel is extending fibre optic telephone service to Canyon Creek from Haines Junction. The new line will follow the south side of the highway right-of-way right past the subdivision. Coordinating installation of telephone service with subdivision development would be economically, mutually beneficial.

### **Recreational Use**

There are no signs that this area is currently used for recreational purposes. A few trails are visible but generally peter out. The trail pattern suggests they were probably related to past logging activity. The extensive areas of blow down associated with the spruce beetle infestation limit travel through much of the area either on foot, ski or by all terrain vehicle.

### **Adjacent Land Use**

The site is bounded by the Special Forest Reserve to the east and the Village of Haines Junction boundary and Champagne- Aishihik First Nation land selections to the west. The Alaska Highway corridor and the undeveloped south shore of Pine Lake lie to the north. Portions of the surrounding area have been logged in the past while agricultural land applications have occurred along the old Alaska Highway near the Dezadeash River to the south.

### **Fauna & Avifauna Activity**

The principal species of wildlife concern are bear and moose. Typical signs of sustained wildlife activity (e.g. game trails, browse damage, faeces deposition and footprints) were uncommon. One moose was sighted near the slough in the centre of the site during one field survey. Ravens, eagles and hawks were also observed in the area but no nest sites noted. Ducks were observed in the central slough.

As part of the planning work currently in progress to develop a Sustainable Forest Plan for the Champagne & Aishihik Traditional Territory, resource managers held a workshop March 4<sup>th</sup> 2005 to undertake landscape level mapping from a forest management perspective in this area.

Local resource manager knowledge suggests that moose move from the higher ground north of Pine Lake south around Pine Lake to winter in the Dezadeash River lowlands. They begin to move following the rut and their density seems to be determined by increasing snow depth according to the Klane Region, acting regional biologist. While the most direct route from the higher ground in the northeast is along Marshall Creek, moose that skirt Pine Lake appear to merge near the confluence of the Dezadeash and Kathleen rivers crossing through the subdivision. Bear also move in an east – west direction between the Alsek River and Dezadeash River skirting the community and passing through this area.

Some displacement can be anticipated. While there is no clearly defined corridor, it has been suggested by local wildlife officials that linking the pockets of wetlands and the central slough in a buffer area would be beneficial both to wildlife and be consistent with good agricultural practice. Similarly, some crop depredation can also be anticipated according to area farmers who observe wildlife moving across their land<sup>1</sup>

While moose and bear currently traverse areas used for agriculture and rural residential development, maintenance of wildlife corridors, management of field fencing and retention of perimeter buffer strips around developed fields can minimize conflicts. Retention of hedgerows also provides good habitat for songbirds and small mammals while moderating climate and controlling soil erosion.

### **Heritage Resources**

A review of Heritage Branch records indicates there are no known heritage resource sites in the subdivision area. If heritage resources are present they are most likely to be found in the vicinity of the bluffs overlooking the Dezadeash River. A heritage impact assessment may not be required.

---

<sup>1</sup> Rod Tait, Personal communication May 17, 2005

## **Agriculture Reserve Subdivision Concept**

Preliminary subdivision concepts were reviewed with the Kluane Land Use Plan Working Group (May 17, 2004) at a meeting in Haines Junction open to the public. It is important to remember that the intent of this project is to complement a limited agriculture subdivision being developed within the Village of Haines Junction with maximum lot sizes of 6 ha. This subdivision is intended to provide lands for larger farm holdings and reduce demands for spot land transfers.

Matters that arose during the public discussion included:

- The need to integrate agricultural development and forest management planning
- The importance of maintaining a buffer along the highway right-of-way
- The merits of removing the timber prior to release of the lots
- The nature of the demand for these lots and the need for development phasing

The Village of Haines Junction indicated in correspondence dated May 25<sup>th</sup>, 2005 that they would like to see some lots available for dog mushers.

Considerations taken into account in lot planning include: the local climate, natural drainage, agricultural practice, orderly lot layout, adaptability, and the maximization of remaining timber values. The plan also reflects the public comment received to date and the direction from the Kluane Working Group to coordinate development with forestry. An incremental development approach was also recommended.

The 15-lot subdivision will be developed in 3 phases with a mix of lot sizes. The phases and lot sizes are:

**Table 1: Lot Size & Phasing**

<b>Parcel</b>	<b>Phase 1</b>	<b>Phase 2</b>	<b>Phase 3</b>
A	43 ha	50 ha	20 ha
B	12 ha	10 ha	20 ha
C	10 ha	10 ha	32 ha
D	15 ha	32 ha	28 ha
E	13 ha	64 ha	-
F	42 ha	-	-
<b>Total</b>	<b>135 ha</b>	<b>166 ha</b>	<b>100 ha</b>

Access is from the Alaska Highway at a location agreed to by Highways & Public Works. An access permit has been obtained and the portion of the intersection within the highway right-of-way has been built as part of the highway reconstruction work currently underway. Power is taken from the existing power line along the Alaska Highway at the highway crossing point thus avoiding any conflict with First Nation land selections. Telephone service also follows the Alaska Highway right-of-way.

The subdivision layout reflects the variety of lot sizes requested and anticipates a minimum 10-year build out period. A central spine road is included that could eventually connect through to the old Alaska Highway. Allowance has also been made for a connection eastward into the Forestry Reserve.

A 100m buffer is included along the Alaska Highway and on the west side of the property adjacent to Champagne Aishihik First Nation lands. Development is also set back from the main slough and on the east side of the development as a wildlife movement corridor.

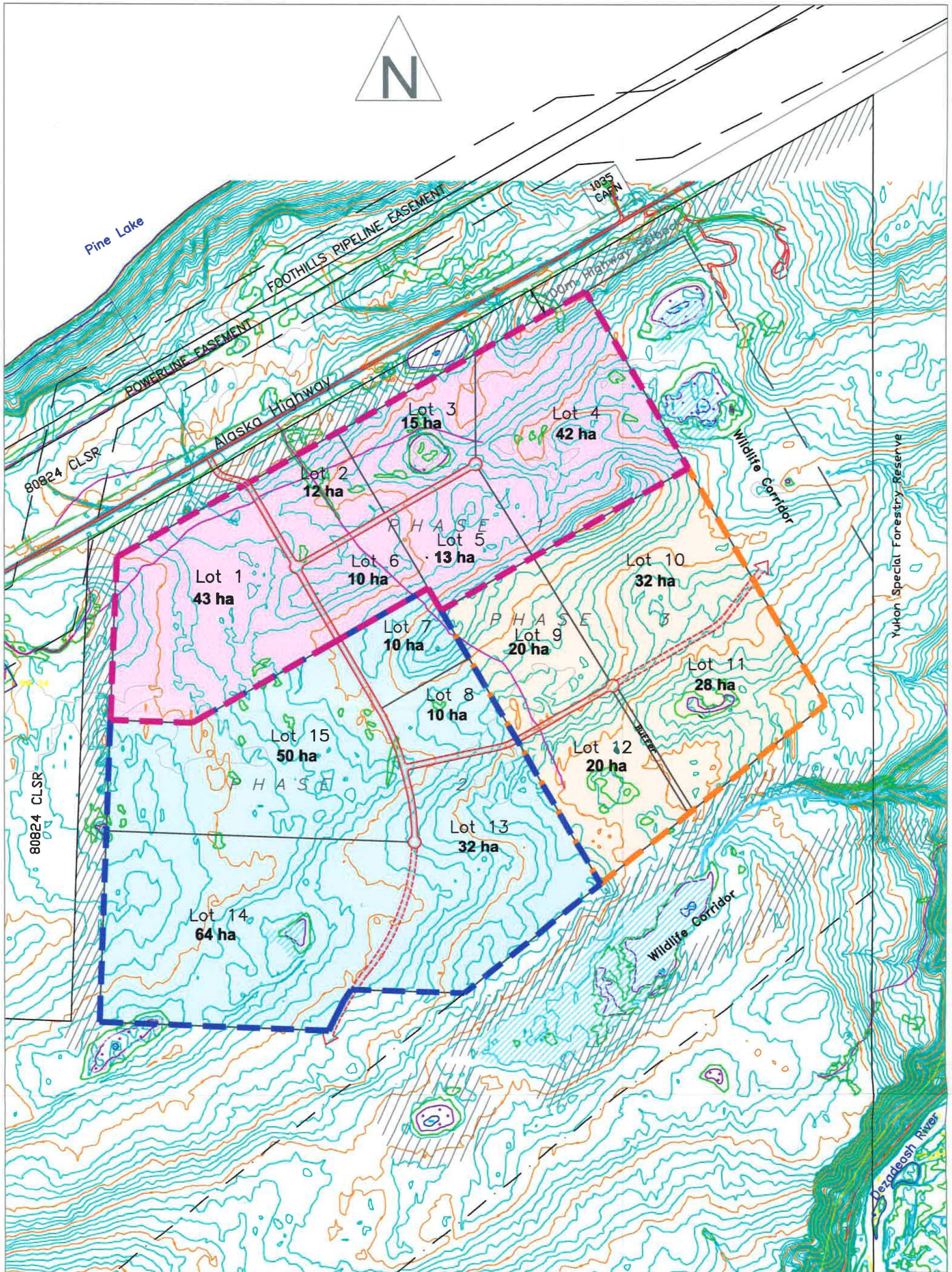
In discussions with Forest Management Branch it was decided that a 15m buffer around the perimeter of each lot would be retained (30m total where lot lines are shared) to provide visual screening, habitat for small mammals and birds, and to provide natural windbreaks. The windbreaks are important for moisture retention because they help moderate field climatic conditions. Selective harvesting of over-storey and diseased trees would occur in these areas to minimize post harvest windthrow and manage any potential fire risk. Timber harvest values have been calculated for each lot with allowances for buffers and the retention of deciduous growth and regeneration to provide future lot purchasers with building site options.

Site-specific harvesting details will be addressed in the forest harvest permit process to ensure logging occurs in an efficient manner and takes the agricultural end use into account. These measures include clearing the eventual road allowances, salvaging fence pole material and limiting equipment use in buffer areas.

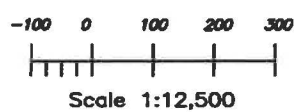
Only agricultural lots have been shown at this stage, but it should be noted that future rural residential or limited agricultural lots overlooking the Dezadeash River might be included in later stages. There are three reasons for this. First the Village of Haines Junction has just completed a similar type of limited agricultural/rural residential lot project within municipal boundaries to meet that need. Second, the cost of extending services to that area at this stage would be prohibitively expensive. The focus for this development is on fulfilling the need for larger lot options for agricultural development. Third, the majority of the remaining timber values and the flattest land is located in the northeast portion of the study area. Rather than forgo the timber salvage opportunities here, it makes sense to concentrate development in the northeast.

In the past, the timber values of land slated for agricultural development have been calculated into the land sale price with the farmer determining the timing and rate of field development. This gives the potential land purchaser the greatest amount of flexibility to determine how they will develop their farm layout.

However, given the severity of the spruce beetle infestation in this area, and the substantial fire hazard risk, it was decided that a prudent resource protection strategy would be to intervene now, before land disposition, to reduce the hazard in a consistent manner while maximizing the remaining timber values.



Marshall Creek Agricultural Subdivision Plan  
August 2005



**LEGEND**

- Trail
- Study Area Boundary
- 100 Metre Buffer
- Wetland
- Phase 1
- Phase 2
- Phase 3

**REVISIONS**

NO.	DATE	DESCRIPTION
01	07JUNE05	CONCEPTUAL DESIGN
02	15JULY05	ENTRANCE ROAD LOCATION
03	22AUG05	SUBMITTED FOR APPROVAL

**Yukon**  
Energy, Mines & Resources  
Agricultural Branch

Figure 7: Subdivision Concept Plan

## Implementation

The environmental screening and subdivision approval process are proceeding in tandem. Assuming the environmental screening is deemed adequate and the project receives subdivision approval, the next step is to complete the registered survey of the lots. Together with Forest Management Branch a call for harvesting proposals would be let with the intent that timber harvesting would begin this winter for at least phase 1. The lots would be available for purchase in the spring of 2006 with road construction and installation of power and telephone occurring as early as possible during the 2006 construction period.

**Table 2: Summary of Potential Environmental Concerns, Mitigation Measures & Outcomes**

Environmental Concern/Issue	Mitigation Measures	Impact Significance After Mitigation
<b>Land Use</b>		
Conversion of forested crown land to agriculture	<ul style="list-style-type: none"> <li>Concentrated subdivision preferable to spot land applications</li> <li>Salvage remaining timber values and optimize public resource values</li> </ul>	Not significant, consistent with Kluane Region Land Use Plan
<b>Terrain, Soils, Climate &amp; Drainage</b>		
Pockets of wetlands present and natural intermittent drainage courses	<ul style="list-style-type: none"> <li>Wetlands retained and buffered from agricultural development</li> <li>15m vegetated buffer retained around perimeter of all lots helps retain moisture and moderate wind impacts</li> <li>Lot layout preserves natural intermittent drainage courses and retains valley trough in natural state</li> </ul>	Not significant
<b>Vegetation</b>		
Spruce beetle infestation and loss of timber values	<ul style="list-style-type: none"> <li>Merchantable timber salvaged before remaining timber values lost to beetle infestation; helps reduce wildfire risk</li> </ul>	Improves present situation
Risk of blow down due to local wind conditions	<ul style="list-style-type: none"> <li>Harvesting plan preserves deciduous and immature trees. Selective removal of over-storey and diseased trees in buffers and along rights-of-way will reduce risk</li> </ul>	Significant, due to local wind conditions but risk can be reduced through forest management practices proposed
Forest fire hazard	<ul style="list-style-type: none"> <li>An integrated forest harvest/agriculture conversion strategy reduces the immediate fire risk as logging is done in a consistent manner during the winter</li> <li>Removal of diseased trees/dead wood in buffer strips and retention of immature and deciduous tree cover will also help</li> </ul>	Reduced but still present

**Table 2: Potential Environmental Concerns, Mitigation Measures & Outcomes  
(Continued)**

Environmental Concern/Issue	Mitigation Measures	Impact Significance After Mitigation
Potential disturbance of rare, sensitive or unique plant species/ communities	<ul style="list-style-type: none"> <li>None identified during site visits</li> </ul>	Not anticipated to be a concern
<b>Wildlife</b>		
Barrier to wildlife movement	<ul style="list-style-type: none"> <li>Development concentrated near Alaska Highway with buffers provided along property lines, and highway to provide escape cover</li> <li>Wetlands linked and incorporated into buffer strips</li> <li>Potential lot purchasers informed of proximity to wildlife movement corridors, and need to follow appropriate farm management and fencing practices to discourage unwelcome wildlife visits, crop predation</li> </ul>	Impact reduced but not eliminated
<b>Heritage &amp; Traditional Land Use</b>		
Archaeological potential unknown	<ul style="list-style-type: none"> <li>Independent heritage impact assessment can be conducted</li> <li>CAFN contacted regarding oral history, prior use</li> </ul>	No conflicts anticipated. Results of a heritage impact assessment would determine impact significance
Presence of new subdivision will restrict hunting on adjacent CAFN land (1km from residence rule)	<ul style="list-style-type: none"> <li>Rule applies equally to all and reduces risk to wildlife moving through the area</li> <li>Other CAFN selections are similarly encumbered so impact largely determined by CAFN's intended future use of adjoining land</li> </ul>	Impact depends on CAFN intentions for adjacent land selection
<b>Irrigation</b>		
Pine Lake as an irrigation source	<ul style="list-style-type: none"> <li>Update 1986 Pine Lake Management Plan to consider this possibility</li> <li>Oversized culvert at Alaska Highway facilitates pipeline installation</li> </ul>	Not included in current project plans. Potential cumulative impact that would trigger separate environmental screening and Water Board license