Fort Liard East, Northwest Territories

Attachment A: Land Use Permit and Water Licence Application Supplement

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1. Project Background

History

Paramount Resources Ltd. (Paramount) is the operator of the Fort Liard East Project (the "Project"). The Project is situated in the NT, roughly 35 km north of the BC / NT Border. From the Fort Liard Project area, Fort Nelson, BC is located approximately 200 km to the south, Trout Lake, NT is located roughly 150 km to the east and Nahanni Butte, NT is located approximately 100 km to the north. The hamlet of Fort Liard, NT is located within the Project area.

The Project encompasses previously approved and existing well sites, access, borrow pits, campsites, and sumps. Planned activities include assessment, monitoring, abandonments, remediation and reclamation relating to seven well sites, and associated infrastructure, located at N-65, O-15, C-76, F-66, J-76, B-41, and C-02. No new drilling, production or other means for potential land disturbance are proposed. This project area has no pipelines and has never produced.

Abandonments will be completed in accordance with the Office of the Regulator of Oil and Gas Operations ("OROGO") *Well Suspension and Abandonment Guidelines and Interpretation Notes*, wellheads will be removed at the time of abandonment via cut and cap. A sign post will be erected to notify land users that an abandoned well is present at the location. Paramount anticipates the project area wells being abandoned within the timeframe of the applied for Land Use Permit (LUP) and Water Licence (WL) terms.

Land Use Permit Application Components

These LUP and WL applications encompasses those sites and activities previously approved under former LUP and WL MV2013A0013 and MV2013L1-0003. No new disturbance of land, drilling or development is proposed. Surface disturbances and activities applied for in these LUP and WL applications are associated with previously approved and constructed wells, for which monitoring, suspensions, abandonments, reclamation, and remediation are anticipated. Project components are listed below (Table 1) and are illustrated in the enclosed project map.

Table 1: Components Applied for in the Application

PROJECT COMPONENT	LOCATION (lat/long)	Status	Anticipated Activity	AREA (hectares)
Existing Projects				
N-65	60°40'N. 122°45'W	Suspended	Abandonment, Reclamation and Monitoring	2.25

0-15	60°30’N, 123°00’W	Suspended	Abandonment, Reclamation and Monitoring	2.25
C-76	60° 20’N, 122° 45’W	Abandoned	Monitoring/reclamation	1.44
F-66	60° 20’N, 122° 45’W	Abandoned	Monitoring/reclamation	2.25
J-76	60° 20’N, 122° 45’W	Abandoned	Monitoring/reclamation	2.25
B-41	60°40’N, 122° 45’W	Suspended	Abandonment, Reclamation and Monitoring	1.96
C-02	60° 40’N, 123° 00’W	Suspended	Abandonment, Reclamation and Monitoring	2.25
Main Access	60° 20 ‘N to 60° 40 ‘N, 122° 45’W to 123° 15’W	Existing	Use for abandonment/reclamation activity	81.4
Access to F-66	60° 20’N. 122° 45’W	Existing	Potential reclamation activity	0.19
Access to J-76	60° 20’N, 122° 45’W	Existing	Potential reclamation activity	0.92
Access to B-41	60°40’N, 122°45’W to 123°00’W	Existing	Use for abandonment/reclamation activity	7.3
Borrow Pit F-66	60° 20’N, 122° 45’W	Existing	Potential reclamation activity	0.24
Borrow Pit K-76	60° 20’N, 122°45’W	Existing	Potential reclamation activity	0.24
Borrow Pit C-02	60° 40’N, 123° 00’W	Existing	Potential reclamation activity	0.48
Camp Site L-65	60° 40’N, 122° 45’W	Existing	Use for abandonment/reclamation activity	0.42
Camp Site I-16	60° 30’N, 123° 00’W	Existing	Use for abandonment/reclamation activity	0.18
Camp Site H-06	60°20’N, 123°00’W	Existing	Use for abandonment/reclamation activity	0.18
Camp Site K-02	60° 40’N, 123° 00’W	Existing	Use for abandonment/reclamation activity	0.24
Sump F-66	60° 20’N, 122° 45’W	Existing	Potential reclamation activity	0.24

Sump J-76	60° 20'N, 122° 45'W	Existing	Potential reclamation activity	0.24
			Total:	106.92

2. ENVIRONMENTAL COMPONENTS, IMPACTS AND MITIGATIONS

The following section summarizes existing environmental components in the Liard East Project area, potential ongoing project effects, and mitigations and best management practices aimed at reducing or eliminating project effects. Key environmental components include land (terrain, soil and permafrost), vegetation, ground and surface water, and wildlife.

Terrain, Soil and Permafrost

The Project area occurs within the Liard Plains MB Ecoregion; immediately to the south and east lies the Liard Upland MB Ecoregion and, further to the west, the Central Mackenzie Plain Boreal Northern Cordilleran (Ecosystem Classification Group 2007). The Project area's local terrain, soils and vegetation are directly representative of the Liard Plains MB Ecoregion, and to varying degrees the adjacent Liard Upland. In general, the Liard Plain MB Ecoregion exhibits one of the warmest climatic conditions in the NT. Productive deciduous, mixed-wood and conifer forests occur on the broad low-lying alluvial terraces of the Liard River (Ecosystem Classification Group 2007). Meander scrolls have developed on the Liard River floodplain, indicating an environment of active deposition and change. East of the Liard River plain are the gently undulating lacustrine deposits and lacustrine veneers of the Trout Uplands.

Soils of the Liard Plain, mainly poorly drained Regosols, are relatively young, due to ongoing deposition by the Liard River. Gleysols and Luvisols occur with lacustrine and till materials, while Organic soils occur under wetlands (Ecosystem Classification Group 2007). Permafrost is uncommon, and is defined as being discontinuous sporadic.

Terrain, soils and permafrost in the Project area have experienced relatively low levels of impacts prior to clearing and development undertaken for previously approved Project components; these include well leases, pipeline right-of-ways, access roads, sumps, camps and other facilities. Typical sources of potential impacts included contamination resulting from spills and/or poorly managed waste; altered, local terrain features (surface topography, site elevation, drainage patterns) resulting from soil movement; soil erosion resulting from the removal of vegetative ground cover; and disruption of permafrost resulting in slumping and erosion.

To mitigate any ongoing risk of impacts to terrain, soil and permafrost, Paramount will continue to employ specific industry best management practices and applicable mitigation measures, previously submitted to the MVLWB. Specific plans include the Liard Spill Contingency Plan and Waste Management Plan. Additional mitigation and best management practices that will be employed include:

- The GNWT, 1993. Environmental guidelines for the construction, maintenance and closure of winter roads in the Northwest Territories (Prepared by Stanley Associates Engineering Ltd., Yellowknife and Sentar Consultants Ltd., Winnipeg Prepared for The Department of Transportation, Yellowknife. 73 pp. + apps.);
- The Liard Area Emergency Response Plan;
- The Spill Contingency Plan Liard, NWT;
- The Operating Guidelines for Permafrost Areas;
- The Waste Management Plan Celibeta, Fort Liard and Pointed Mountain, NWT

Vegetation

Vegetation characteristic of the Liard Plain MB Ecoregion reflects the relatively warm climate and moist, rich site conditions (Ecosystem Classification Group 2007). Willow shrublands occur on recently flooded areas along the Liard River. Drier upland sites on alluvial terraces contain mixed deciduous and mixed wood forest of trembling aspen, balsam poplar and white spruce. Forest understories are often lush, and include species such as low-bush cranberry, prickly rose, red osier dogwood, dwarf red raspberry, meadow-horsetail and other herbs. On low-lying areas, rich willow-sedge fens occur.

The status of rare plant species occurring in the region was reviewed by MacJannet *et al*. (1995). Those that are rare and occur in the Liard Valley are usually associated with riparian habitat and are typically outside the areas of existing development footprints.

Water and Aquatic Species

In the Liard Plain Ecoregion abutting the western boundary of the Project area, water covers only 5% of the total Ecoregion land base. In the immediate area, the Liard River is the dominant aquatic feature, with numerous ponds, channel marshes, and fens occurring (GNWT 2007). In the Boreal Cordillera, encompassing the Liard East Project area, tributaries of the Liard River have developed narrow braided alluvial deposits in response to steeper streambed slopes and higher-energy waterflows. There are few lakes, while wetlands are common in broad valley bottoms. Fisherman Lake is the largest standing water body in the local Project area.

Both ground and surface water have the potential to be impacted through changes in water quality and water volumes. Primary sources of impacts may include spills and/or releases, soil erosion, and water withdrawal from specified lake sources. Water withdrawals, and the effects and management of withdrawals, will continue to be addressed and managed as part of the new Type B Water License, pending approval. To mitigate the ongoing risk of impacts from erosion, spills, and releases, Paramount will continue to employ specific industry best management practices and applicable mitigation measures based upon activities undertaken.

To further mitigate potential impacts to water and aquatic species, Paramount will employ the mitigation measures as presented in the documents listed below:

- Fisheries and Oceans Canada (DFO) Standards and codes of practice

- Canadian Association of Petroleum Producers, Canadian Energy Pipeline Association and Canadian Gas Association. 2005. Pipeline Associated Watercourse Crossings (Prepared by TERA Environmental Consultants and Salmo Consulting Inc. Calgary, AB);

Wildlife

Wildlife species that occur in the region encompassing the Liard West Project area are those adapted generally and/or more specifically with the topography, hydrologic systems and vegetation communities occurring in the Boreal Cordilleran Ecoregion, as well as the adjacent Liard Plain and Liard Upland Ecoregions. Characteristic mammal species of the Cordilleran Ecoregion include moose, black bear, beaver, fox, wolf, lynx, marten, mink, snowshoe hare, wolverine, weasel and red squirrel. To a lesser degree species such as woodland caribou occur throughout the region, and mule deer and elk are known to utilize the area to the southwest of Fort Liard along the border of NT, BC and Yukon. Common bird species include bald eagles, hawks, falcons, chickadees, northern shrike, redpolls, ravens, Canada jays, woodpeckers, sandhill cranes, grouse and owls. Common fish species include northern pike, grayling, walleye, burbot, suckers, whitefish, and a number of species of forage fish (i.e. minnows).

Overall, wildlife species' habitats and populations have been exposed to relatively low levels of impacts from approved developments that comprise the existing Liard West Project. Sources of impacts have included the clearing and construction for well leases, pipeline ROWs, the battery site, access roads, sumps, camps and other facilities. Subsequent facility operations also contribute to ongoing impacts to wildlife in the Project area. The main ways in which industry development can impact wildlife include:

- Loss or alteration of habitat;
- Sensory disturbance;
- Habitat fragmentation; and
- Direct or indirect mortality.

To eliminate and/or mitigate the ongoing risk of impacts to wildlife, Paramount will continue to employ best management practices and applicable mitigation measures, as outlined. Some of the best management practices in place include:

- GNWT. May 2017. Safety in Grizzly and Black Bear Country. Department of Environment and Natural Resources; and the

- Canadian Pipeline Environment Committee. 2004. The pipeline industry and the Migratory Birds Convention Act.

Faunal Species at Risk

Twenty wildlife species with ranges that overlap the Liard Easst Project area have been listed or considered (ECCC and GNWT, 2020). Fourteen of these species are legally protected under the federal *Species at Risk Act* (Table 2). An overview on each species' habitat requirements is

provided below. As for all other wildlife species, residual impacts to these species will continue through the life of the existing project, but these are considered of low magnitude and not significant. No new areas require clearing is expected in future years for the existing approved project.

Table 2 Species at risk with ranges that overlap the Project area

Scientific Name	Common Name	NWT Assessment	COSEWIC Status Rank	SARA Status
Asio flammeus	Short-eared owl	Not assessed	Special Concern	Special Concern on Schedule 1
Bison bison athabascae	Wood bison	Threatened	Threatened	Threatened on Schedule 1
Bombus bohemicus	Gypsy Cuckoo Bumble Bee	Data Deficient	Endangered	Endangered on Schedule 1
Bombus occidentalis mckayi	Western Bumble Bee	Data Deficient	Special Concern	Under Consideration
Bombus suckleyi	Suckley's Cuckoo Bumble Bee	Not assessed	Threatened	Under Consideration
Bufo boreas	Western toad	Threatened	Special Concern	Special Concern on Schedule 1
Chordeiles minor	Common Nighthawk	Not Applicable	Threatened	Threatened on Schedule 1
Coccinella transversoguttata	Transverse Lady Beetle	Not assessed	Special Concern	Under Consideration
Contopus cooperi	Olive-sided Flycatcher	Not Applicable	Threatened	Threatened on Schedule 1
Euphagus carolinus	Rusty Blackbird	No Status	Special Concern	Special Concern on Schedule 1
Gulo gulo	Wolverine	Not at Risk	Special Concern	Special Concern on Schedule 1
Hirundo rustico	Barn Swallow	Not Applicable	Threatened	Threatened on Schedule 1
Myotis lucifugus	Little Brown Myotis	Special Concern	Endangered	Endangered Species on Schedule 1
Myotis septentrionalis	Northern Myotis	Special Concern	Endangered	Endangered Species on Schedule 1
Phalaropus lobatus	Red-necked Phalarope	Not Applicable	Special Concern	Special Concern on Schedule 1

Scientific Name	Common Name	NWT Assessment	COSEWIC Status Rank	SARA Status
Podiceps auritus	Horned Grebe	Not Applicable	Special Concern	Special Concern on Schedule 1
Rangifer tarandus caribou	Boreal woodland caribou	Threatened	Threatened	Threatened on Schedule 1
Riparia riparia	Bank Swallow	Not Applicable	Threatened	Threatened on Schedule 1
Ursus arctos	Grizzly bear	Special Concern	Special Concern	Special Concern on Schedule 1
Wilsonia canadensis	Canada Warbler	Not Applicable	Threatened	Threatened on Schedule 1

Asio flammeus (Short-eared Owl)

Northern populations of short-eared owls are believed to be highly migratory: short-eared owls arrive in the NT during April or May and leave by late October (ECCC & GNWT, 2010). Short-eared owls are birds of open-county, favoring habitats such as grasslands, tundra, bogs, and marshes but opportunistically inhabit areas where small mammals are abundant. Crude ground nests consisting of a scratch lined with grasses and down are not used year after year (NWT 2006a). This species is absent from the Project area during winter. Because no new clearing will occur, impacts to this species from the existing, approved project during spring and summer are considered negligible.

Bison bison athabascae (Wood Bison)

The Fort Liard West Project area overlaps a free ranging herd of wood bison, known as the Nahanni population, which occurs in the Liard Valley between Fort Liard and Nahanni Butte and extending south into British Columbia.

Wood bison use small willow pastures and uplands during summer where they feed on sedges, forbes and willows (NWT 2013). In winter, they move to frozen wet sedge meadows and lakeshores where they feed on sedges. In the fall, they can be found in the forest where they feed on lichens. The main factor limiting recovery of the wood bison in the NWT is disease. This species is resident throughout the Project area; however, disturbance from the existing project operations will be negligible.

Bombus bohemicus

Gypsy Cuckoo Bumble Bee is a medium-sized bumble bee. The upper segment of the hind leg has a convex, densely hairy outer surface and lacks a pollen basket. Females usually have a white-tipped abdomen or at least a white patch on the back of the abdomen. Sides of the thorax

are mostly black in both sexes. The Gypsy Cuckoo Bumble Bee can be distinguished from other cuckoo bumble bees found in the NWT by black hairs on the top of the head.

In the past 20 to 30 years there have been large population declines in eastern Canada and the species has disappeared from many of its former sites. However, Gypsy Cuckoo Bumble Bee can still be found in western Canada. Population size and trend in the NWT is unknown (NWT 2020). Due to the nature of the threats to this species, future impacts to this species from the existing, approved project are considered negligible.

Bombus suckleyi

Suckley's Cuckoo Bumble Bee is a medium-sized bumble bee with a black head. The upper segment of the hind leg has a convex, densely hairy outer surface and lacks a pollen basket. Suckley's Cuckoo Bumble Bee looks similar to the Gypsy Cuckoo Bumble Bee (page 94), but its thorax is mostly yellow on the sides. There are prominent triangular ridges on the underside of the last segment of the abdomen.

Populations of their host species have declined in Canada, therefore Suckley's Cuckoo Bumble Bee populations have probably declined also. Population size and trend in the NWT are unknown (NWT 2020). Due to the nature of the threats to this species, future impacts to this species from the existing, approved project are considered negligible.

Bombus occidentalis mckayi (Western Bumble Bee)

Western Bumble Bee is a medium-sized bumble bee. It has a short head and a band of yellow hair across the thorax in front of the base of the wings. Between the wings there is a black band or a large black central spot. The tip of the abdomen is almost always white. The subspecies found in the NWT is the northern long-haired subspecies mckayi, which has yellow hair behind the wings and on the third segment of the abdomen.

The northern subspecies mckayi of Western Bumble Bee is found in the western mountains of the NWT as well as northern British Columbia, Alaska and Yukon. Recent surveys suggest the northern subspecies is still common. (NWT 2020). Impacts to this species from the existing, approved project are considered negligible.

Bufo boreas (Western Toad)

The Western toad is found in the Dehcho region of the NWT, with known records along the Liard River in the vicinity of the Liard West Project area. In the NT, this species is at the extreme northern limits of its North American distribution. Western Toads are nocturnal and are difficult to locate outside of the spring breeding season when they congregate at breeding ponds (NWT

2013). This species hibernates in the Project area during winter, and disturbance from the existing project operations during the spring and summer months will be negligible.

Chordeiles minor (Common Nighthawk)

Common nighthawks arrive in the NWT in mid-May to early June and leave in mid-August to mid-September (ECCC & GNWT 2010). Common nighthawk breeding habitat includes open habitats where the ground is devoid of vegetation, such as sand dunes, beaches, logged areas, burned-over areas, forest clearings, rocky outcrops, rock barrens, prairies, peatbogs and pastures (Savignac 2007). Eggs are laid directly on the ground (*i.e.* no nest is built). This species is absent from the Project area during winter. Because no new clearing will occur, impacts to this species from the existing, approved project during spring and summer are considered negligible.

Coccinella transversoguttata (Transverse Lady Beetle)

Transverse Lady Beetle is a small, round beetle that can be distinguished from other lady beetles by its colour pattern. Its wing covers are red to orange with black markings: a 'transverse' black band across the front and four elongated black spots toward the back. The head is black with two separate pale spots. The plate behind the head is also black with pale markings on either side.

The Transverse Lady Beetle is still common in the NWT, Yukon and British Columbia where there are fewer non-native lady beetle species. Impacts to this species from the existing, approved project are considered negligible.

Contopus cooperi (Olive-sided Flycatcher)

Olive-sided flycatchers arrive in the NT during late May and early June and leave by late July to early August (ECCC & GNWT 2010). In the boreal zone, the olive-sided flycatcher is most common in open spruce and tamarack muskeg, bogs, and swamps. It is strongly associated with openings and edges in coniferous forest habitats. Thus, it responds favorably to logging and fires if sufficient snags and residual trees remain to provide foraging and singing perches (Boreal Songbird Initiative 2007). This species is absent from the Project area during winter. Because no new clearing will occur, impacts to this species from the existing, approved project during spring and summer are considered negligible.

Euphagus carolinus (Rusty Blackbird)

Preferred rusty blackbird breeding habitat is characterized by forest wetlands, such as slow-moving streams, peat bogs, sedge meadows, marshes, swamps, beaver ponds and pasture edges. The rusty blackbird breeds throughout a range of 7.6 million km^2, which corresponds closely to the boreal forest and includes most Canadian provinces and territories, the state of Alaska, several Great Lakes states and most New England states (ECCC 2006). This species is

absent from the Project area during winter. Because no new clearing will occur, impacts to this species from the existing, approved project during spring and summer are considered negligible.

Gulo gulo (Wolverine)

The wolverine inhabits a diversity of ecozones, including the Boreal Forest and Subalpine regions. Home ranges typically cover hundreds of square kilometers and encompass a variety of habitat types (Petersen 1997; NWT 2006b). Wolverines live in a variety of habitats as long as there is enough game and carrion to supply food (NWT 2013). A wolverine's home range is large, generally covering several hundred square kilometers. Given this species' vast home range requirements, impacts to this species' populations will continue to be non-significant for the existing project.

Hirundo rustico (Barn Swallow)

The barn swallow utilizes open areas to forage and suitable sites for nesting, including buildings, bridges, or other man-made structures. They generally avoid unbroken forest and very dry areas. Barn swallows were previously recorded during wildlife surveys of the Project area. This species is absent from the Project area during winter. Because no new clearing will occur, impacts to this species from the existing, approved project during spring and summer are considered negligible.

Myotis lucifugus (Little Brown Myotis)

The Little Brown Myotis (Myotis lucifugus) (also called Little Brown Bat) is a common, insect-eating bat found throughout much of Canada and the United States. Approximately 50% of its global range is in Canada, and it occurs in every province and territory. The Little Brown Myotis is believed to be the most common bat in Canada. Due to its being relatively common and widespread, limited effort has been made to determine overall population size. Information on overwintering sites (hibernacula) are generally well known in central and eastern Canada, but less so in western Canada.

Small-bodied bat species that winter in caves or mines are dying from White-nose Syndrome (WNS), caused by a fungus, Geomyces destructans (Gd), that is hypothesized to have originated in Europe (Pikula et al. 2012, Turner et al. 2011), and was first detected in North America in 2006 (Lorch et al. 2011) [COSEWIC February 2012]. Future impacts to this species from the existing, approved project are considered negligible.

Myotis septentrionalis (Northern Brown Myotis)

The Northern Myotis is very similar in colour and size to the Little Brown Myotis (page 26), but the ears are longer (extend beyond the nose when pressed forward) and the tragus (fleshy

projection which covers the entrance of the ear) is long, slender and pointed. Sometimes the Northern Myotis and Little Brown Myotis use the same roosts or hibernacula and it is difficult to tell the species apart. (NWT 2020).

Small-bodied bat species that winter in caves or mines are dying from White-nose Syndrome (WNS), caused by a fungus, Geomyces destructans (Gd), that is hypothesized to have originated in Europe (Pikula et al. 2012, Turner et al. 2011), and was first detected in North America in 2006 (Lorch et al. 2011) [COSEWIC February 2012]. Future impacts to this species from the existing, approved project are considered negligible.

Phalaropus lobatus (Red-necked Phalarope)

The Red-necked Phalarope is a small shorebird with a thin, needle-like bill. Both sexes have a dark head with a white spot above the eye, white throat and a dark back with bold, buff-coloured streaking. The bright, chestnut-red stripe that extends down the sides of the neck from behind the ear is distinctive. Females have brighter and bolder colours overall and are slightly larger than males (NWT 2020) Potential threats include direct disturbance at nest sites and habitat degradation due to industrial development. Because no new clearing will occur, impacts to this species from the existing, approved project during spring and summer are considered negligible.

Podiceps auritus (Horned Grebe)

During the breeding season, horned grebes are found primarily on boreal freshwater lakes and marshes. This species' spatial focus on ponds, marshes and lake habitats will largely remove them from proximity to project facilities, thus reducing most sources of potential disturbance from the existing project. This species is absent from the Project area during winter. Future impacts to this species from the existing, approved project are considered negligible.

Rangifer tarandus caribou (Woodland Caribou – boreal population)

The Northern Mountain population is found on the east slopes of the Mackenzie Mountains to the NWT-Yukon Border, and directly overlaps the Boreal Cordilleran Ecoregion within which the Project area occurs. The Boreal population is primarily found in the NWT's boreal forest, and occurs from the Liard River east to the Canadian Shield (NWT 2013). In general, wooded bog is believed to be important caribou habitat (Bradshaw et al. 1995; Stuart-Smith et al. 1997; Brown and Hobson 1998; Anderson et al. 2000; Rettie and Messier 2000 cited in Salmo et al. 2004). Future impacts to this species from the existing, approved project are predicted to be negligible. To ensure this positive outcome continues, Paramount will continue to employ applicable mitigation measures, including:

- Instructing vehicle and equipment operators to maintain appropriate speeds and to be aware of potential encounters with wildlife; and
- Not feeding or harassing wildlife, should an encounter occur, and allowing animals to disperse at their own rates.

Riparia riparia (Bank Swallow)

The Bank Swallow is a small, slender songbird that feeds on flying insects. It can be recognized by its small head, thin wings and long, slender, notched tail. It has pale brown upper-parts and rump, white under-parts and throat, and a well-defined dark band across its chest. Males and females have similar plumage (NWT 2020). Threats include Habitat loss and degradation from human activities. Because no new clearing will occur, impacts to this species from the existing, approved project during spring and summer are considered negligible. Project activities are not expected to cause impacts to this species given their potential threats.

Ursus arctos horribilis (Grizzly Bear)

Grizzly Bears are habitat generalists, and can be found from sea level to high-elevation alpine environments (Government of Canada, 2009). Grizzly bears in the NT primarily occur in open alpine or tundra habitats, but they can also be found in forested areas (NT 2006d). Suitable grizzly habitat must provide an adequate food supply, appropriate denning sites, and isolation from human disturbance (Government of Canada, 2009).

The development of roads, railroads, power lines and other linear features within grizzly bear habitat is a particular threat. Roads themselves pose little harm, but their use by humans, and the avoidance of a buffer zone around the roads, makes large amounts of habitat much less available to the bears. In addition, roads provide access for humans with firearms who, legally or illegally, kill bears that would otherwise be less vulnerable (Government of Canada, 2009). Future impacts to this species from the existing, approved project are predicted to be negligible. To minimize pressure on grizzly bears as a result of hunting, project personnel are forbidden to hunt.

Wilsonia canadensis (Canada Warbler)

The species is found in a variety of forest types, but is most common in moist, mixedwood forest with a well-developed shrub layer. It is also often found in shrub marshes, and black spruce and tamarack bogs (GC 2011). This species is absent from the Project area during winter. Because no new clearing will occur, impacts to this species from the existing, approved project during spring and summer are considered negligible.

3. Heritage Resources

Given that no new clearing is planned or being applied for under the new LUP for Liard East, no impacts on Heritage Resources from the Liard West Project are anticipated. Nonetheless, in the unlikely event that an archaeological specimen is encountered, activities will be suspended and the Prince of Wales Northern Heritage Centre, the responsible authority, will be notified along with Acho Dene Koe First Nation, the Mackenzie Valley Land and Water Board and the Land Use Inspector.

4. Socio-economics

Given the suspended status of the Liard East Project, socio-economic benefits are limited. Periodic monitoring is the only sustained activity associated with the Liard East Project in the current state, which is handled by contractors. However, during the term of the Permit and Licence, a single busier year is expected to facilitate an abandonment and reclamation project. N-65, O-15, C-76, F-66, J-76, B-41, and C-02, fall under the approved Development Plans Paramount has for Liard East with the Government of the Northwest Territories. Prior to devolution, the Federal Government under the Department of Indigenous and Northern Affairs Canada (formerly Aboriginal Affairs and Northern Development Canada and Indian and Northern Affairs Canada) managed Development Plans. Paramount has and continues to report annually on its activity in the area and the goods and services it sources locally.

When activities take place, Paramount looks to source goods and services locally to the extent possible. A list of the northern and/or alliance companies that provided related services to the Projects in the past is provided below.

- Acho Horizon North Camp & Services LP
- Acho Real Estate Limited Partnership
- ADK Formula
- ADK Pipeline
- Beaver Enterprises Limited Partnership
- Beaver Enterprises LP
- Cooper Barging Services Ltd.
- Great Slave Helicopters Ltd.
- Hope's Ventures
- Liard Fuel Centre
- Liard Valley General Store
- North Cariboo Air
- Northwestel Inc.
- RD Trucking
- LWD Enterprises

5. Monitoring, Closure and Restoration

Overview

The fundamental principle governing restoration is that any restored land be equivalent to the adjacent land use. Restoration planning is best done on a site-by-site basis, as site conditions and site-specific regulatory terms and conditions will dictate the plan. Therefore, detailed, project-specific deactivation, decommissioning and abandonment plans will be prepared as required. Along with site conditions and regulatory approvals, the following list of existing guidelines and best management practices pertaining to environmental protection during deactivation, decommissioning and abandonment, as well as assessment, remediation, closure and reclamation, will be considered when preparing detailed, project-specific plans.

- Paramount Resources Pipeline Operating and Maintenance Manual

- GNT (Government of the Northwest Territories). 2003. Environmental Guideline for Contaminated Site Remediation. Environment and Natural Resources. 14pp + apps.

- (CCME) Canadian Council of Ministers of the Environment. 2016. Guidance Manual for Enviromental Site Characterization in Support of Environmental and Human Health Risk Assessment Vol. 1: Guidance Manual.

- (CCME) Canadian Council of Ministers of the Environment. 2008. Canada-Wide Standard for Petroleum Hydrocarbons (PHC) In Soil: User Guidance. 42pp + apps.

Monitoring

Monitoring is repeatedly observing a process or a condition in order to evaluate the process or condition and identify the need for corrective action. Ultimately, monitoring is a tool to evaluate the success with which the Project adheres to plans and approvals.

Paramount has a responsibility to properly maintain its infrastructure while in a deactivated or suspended state. To do so, Paramount must maintain corrosion control, perform appropriate maintenance activities, maintain records and reassess the suitability of the deactivation and maintenance plan periodically.

Paramount is committed to protect the safety and health of our employees and contractors, the public, and the environment. This commitment is captured through our Health, Safety and Environment Policies. These policies are put into practice through a disciplined management framework called the Paramount Operational Excellence Management System (POEMS). POEMS sets out requirements in the form of Operating Expectations and Paramount Practices to provide a systematic way to identify, analyze and control operational risk. Delivering safe, environmentally responsible and reliable operations. POEMS is "how we do business" and through collaborative design, drives functional cooperation and continuous risk reduction across all of our regions.

In practice this means that during operations, site supervisors undertake scheduled checks to ensure that development is undertaken consistent with applicable plans and approvals and is documented.

Abandonment

Paramount's ARO team, is responsible for planning detailed abandonment and obtaining approval from the Office of the Regulator of Oil and Gas Operations (OROGO). Portions of the decommissioning process have been completed and approved. The following measures to mitigate potential adverse environmental effects will continue to be implemented throughout the process:

- Contact identified affected parties and stakeholders to notify them of abandonment and decommissioning plans;
- Determine whether potential safety and environmental hazards and materials or chemicals are present before abandonment operations. Those hazardous materials identified must be handled according to the directions given on the materials WHMIS labels;
- Incorporate specific requirements for removing, handling and disposing of dangerous oilfield wastes as follows, in the site-specific abandonment plan and project Waste Management Plan;
- Ensure that transportation of dangerous oilfield waste is in compliance with all TDG regulations and properly manifested; and
- Store different material types (*e.g.*, metal, concrete) separately to allow for salvage or recycling, where appropriate.

Reclamation

Paramount's ARO department will be responsible for planning detailed reclamation procedures. The following points will be addressed:

- Pits and sumps will be reclaimed using the industry standard mix, bury and cover method and to the satisfaction of the Land Use Inspector;
- Sites will be re-contoured and tied-in with the surrounding landscape;
- Quantity and quality of topsoil will be compared to off-site control samples, with consideration given to construction practices, and replaced accordingly to ensure equivalent land capability;
- Erosion control measures will be established until the area is re-vegetated. This may include berming, spreading and crimping in straw, fencing and/or placing rolled back slash; and
- The site will be monitored using visual inspections to ensure soil stability.

The fundamental principle governing restoration is that any restored land must be brought back to a state that is equivalent to the adjacent land use. Paramount strives for an *objectives-based approach* in reclamation, where there is a clear understanding of reclamation objectives and closure criteria are the foundations for effective reclamation. Criteria are essentially measures that can be either quantitative or qualitative in nature, include empirical and/or professional based judgment, which allow for the assessment of closure and reclamation success.

General closure and reclamation objectives can be achieved through application of three themes: physical stability, chemical stability, and biological integrity (NT 2007). For the Liard West Project, the main goal relating to physical stability will be to ensure that erosion and subsidence are effectively mitigated over the long term. Chemical stability applies to the removal or remediation of any and all wastes to acceptable criteria; these include hydrocarbon spill sites, and sewage and runoff pond constituents. Future land use requires the reclaimed area be compatible with the surrounding lands once reclamation activities have been completed.

A key fundamental will be land equivalency. As noted previously, this refers to the reestablishment of similar or equitable ecosystems as existed prior to development activities.

Following site re-contouring, re-vegetation will commence. Given the remoteness of the Project area and current general absence of invasive species, the desired approach will be to allow and promote natural recovery, with no seeding or planting undertaken. Natural recovery is a favored approach for re-vegetation in this geographic location and context.

6. Equipment

Potential equipment requirements for ongoing operation of the Liard West Project are included in Tables 3 and 4 below.

Table 3:List of Potential Temporary Equipment

Construction Equipment	Weight per unit
Trucks (e.g. vacuum and water)	40,000 lb
Front end loaders with optional attachments	29,000 lb
Graders	45,000 lb
Plough/auger truck	35,000 lb
Pick-up trucks (personnel vehicles)	7000 lb
Bulldozers	36,000 lb
Trackhoe	79,700 lb
Backhoe (rubber-tired)	15,000 lb
Snow cats	18,000 lb
Dump trucks	56,000 lb
Snowmobiles (gasoline)	500 lb
Snow making machines(s) and/or spray ice pump & monitor(s)	40,000 lb
Environmental Rig	2000 lb
Accessory and support equipment (e.g., power generators, light towers, tanks)	6,000 lb (generator) 2,000lb (Light Tower)
Communication systems (e.g., radios)	2 lb

Abandonment/Suspension Equipment	Weight per unit
50 Man Camp	352,000 lb
Service rig	110,000 lb
Catwalk & Pipe Racks	40,000 lb
100 to 150 HP Boilers	44,000 lb
Wellsite Shacks	51,000 lb
Eline/Slick line unit combo unit	66,000 lb
P-Tank unit with flare stack	53,000 lb
Back Hoe for cut cap operation	15,000 lb
Bed Truck for hauling equipment	95,000 lb
Picker Truck for hauling equipment	95,000 lb
Water tank truck for produced Fluid	40,000 lb
Cement Pumpers	75,000 lb
Cement Bulker	32,000 lb
Heated insulated 63.56m3 tanks for fresh water	11,000 lb

Heated insulated 63.56m3 tanks for abandonment/suspension fluid	11,000 lb
Snow mobiles	500 lb
Secondary containment for tanks	4400 lb

Appendix 1 Liard East Project As-Built

123°30'0"W 123°15'0"W 123°0'0"W

60°30'0"N 60°20'0"N

N W E S

WATER SOURCE #2

RABBIT CREEK

BIG ISLAND

ICE BRIDGE

BORROW PIT & STAGING AREA

CAMP

MACKAY LAKES

BORROW PIT & STAGING AREA

RESIDENCE

SDL124

SDL121

SDL129

SDL129

F-56

SUMP

BORROW PIT

N-65

I-75

CAMP

BORROW PIT & SUMP

C-55

J-74

SDL129

SDL098

CAMP

BORROW PIT

C-2

B-41

SDL129

SDL090

CAMP

D-50

Water Source Lake

CAMP

M-35

O-15

O-80

SUMP

M-20

(NOT DRILLED)

N-60

CAMP

K-36

SDL122

BORROW PIT

J-76

SUMP

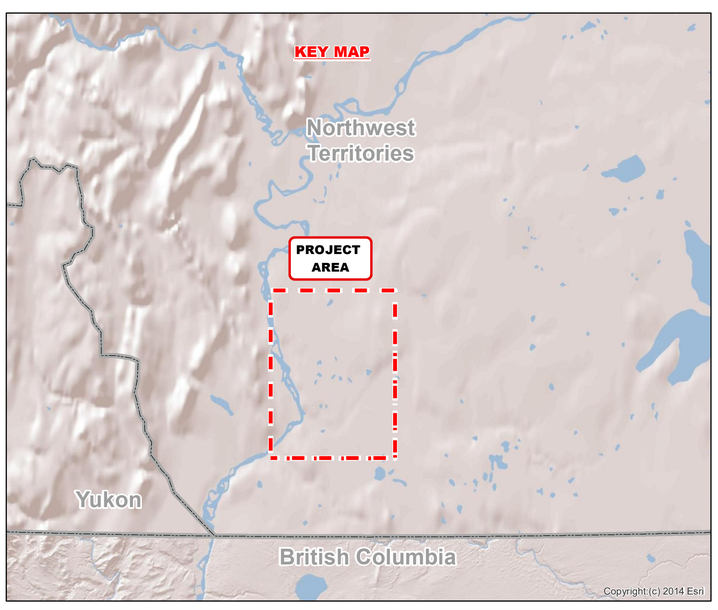
SUMP

C-76

F-66

BORROW PIT

CAMP



Paramount resources ltd.

OVERVIEW MAP SHOWING

FORT LIARD EAST

As-Build June 2009

60°40', 123°15' Sec.78 to 60°20', 122°45' Sec.33

NORTHWEST TERRITORIES

1,000 0 1,000 2,000 3,000 4,000 5,000 m

5,000 2,500 0 5,000 10,000 15,000 Feet

Scale: 1:50,000

Legend

- Seismic
- Airstrip
- Airstrip (Foreign)
- Pipeline R/W
- Pipeline R/W Foreign
- Winter Access Road
- All Season Access Road
- Access Road - (Foreign)
- Fort Liard Highway
- Old Paramount Ice Road
- Road
- Trail
- Significant Discovery Licence
- Contour
- Abandoned
- Built
- Built - Tied-in
- Foreign
- Reclaimed
- Suspended
- Bridge

Job No.: 200056C **MXD No.:** 200056-OM-01.mxd **Coordinate System:** NAD 1983 UTM Zone 10N

REVISION	DESCRIPTION	DRAWN BY	DATE
00	Original Map Created as 050399G01_2009.dng	WGT	2006-06-13
06	Updated Map Title	BPV	2009-06-03
07	Status of J-76 changed to 'Abandoned'	AJB	2020-04-01

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www.ugsc.ca

Appendix 2 Affected Party Involvement Log

Contact	Contact Method	Date	Summary of Discussion
List of Stakeholders identified in the Liard Area Engagement Plan	Email	April 3, 2020	Paramount Resources Ltd. ("Paramount") sent out a notification letter and an updated engagement plan via email to stakeholders to inform them that Paramount would be moving forward with new Land Use Permits and Water Licences amendment for Liard East and West. All emails were successfully delivered.
Megan Bukham, on behalf of Acho Den Koe First Nation Lands and Resource department	Email	April 14, 2020	Meghan Bukham e-mailed Terence Hughes of Paramount thanking him for the notification letter and informing Paramount that she was having issues with the links provided in the notification letter. Paramount responded by sending new links via email.
Meghan Bukham, on behalf of Acho Den Koe First Nation Lands and Resource department	Phone Call and Email	April 21, 2020	Following up on the notification letter Paramount called Meghan and left a voicemail. Paramount also followed up with a email. Meghan called back in the afternoon and a brief discussion took place regarding Liard East and West. Meghan expected Acho Dene Koe ("ADK") to provide a letter in a week or so regarding the information provided
Dhati Tseto, Deh Cho First Nations	Phone Call	April 21, 2020	Following up on the notification letter Paramount called Dahti and left a voicemail. Paramount also sent a follow up email.
Grand Chief Gladys Norwegian, Deh Cho First Nation	Phone Call	April 21, 2020	Following up on the notification letter Paramount called Chief Norwegian and left a voicemail. Paramount also sent a follow up .
Chief Gene Hope	Phone Call and Email	April 21, 2020	Following up on the notification letter Paramount called Chief Hope and had a brief conversation regarding the information. Chief Hope stated that Landmark may have some comments, Paramount indicated they had left a voicemail for Margo.
Chief Jumbo, Sambaa K'e First Nation	Phone Call and Email	April 21, 2020	Paramount called Chief Jumbo and left a message.
Sambaa K'e Development Corporation	Phone Call and Email	April 21, 2010	Paramount tried a series of numbers for the Sambaa K'e Development Corporation all of which were out of service
Chief James Ahnassay, Dene Tha' First Nation	Email	April 21, 2020	Paramount emailed Chief Ahnassay following on the notificaiton package and engagement plan.
Fred Didzena, Dene Tha' First Nation	Phone Call and Email	April 21, 2020	Paramount called Fred, a brief discussion was had about the new permits and licences. The scope was discussed both in terms of the footprint (existing) and potential activities (maintenance, suspension, abandonment, reclamation) Paramount stated it would follow up with an email and CC Chief Ahnassay. Fred responded to the email stating he would like the notification package and engagement plan resent. Paramount resent the documents. Fred confirmed he received them on a follow up phone call.
Senior Administrative Officer John McKee	Email	April 21, 2020	Paramount spoke with John on the phone. John notified Paramount that Council had not met since the notification package and engagement plan had been sent due to Covid. Paramount stated they would follow up with an email as well and was available for question and comments. John stated he would forward the email to the Mayor as well.

Senior Administrative Officer John McKee	Phone Call and Email	April 22, 2020	John emailed Paramount to state the notification packages would be put on the next meeting agenda once Council resumed sitting
Carrie Breneman, Deh Cho First Nations	Email	April 22, 2020	Carrie sent an introduction email to Paramount and requested the notification package and engagement package be sent to her. Paramount replied with two emails providing the information
Lavonne Ingram, Dene Tha' First Nation	Email	April 23, 2020	Lavonne emailed Paramount and stated Dene Tha' First Nation has reviewed the following documents and does not have any concerns with the engagement plan or water licenses or permits at this time. We look forward to the continued updates on Paramount's work in the Liard region.
Dahti Tseto, Deh Cho First Nations	Email	April 29, 2020	Dahti sent an email to Paramount and requested the notification package and engagement package be resent to her. Paramount replied with two emails providing the information
Christine Wenman, Planit North on behalf of the Sambaa K'e Dene Band	Email	May 28, 2020	Christine of Planit North contacted Paramount seeking information and requesting a virtual meeting on behalf of Sambaa K'e First Nation (SKFN) to discuss Celibeta and Paramount's other Liard projects. Paramount responded by providing information and suggested the afternoon of June 5th.
Boyd Clark on behalf of Chief Eugene Hope Acho Dene Koe First Nation	Email	June 1, 2020	ADKFN sent a letter to Paramount regarding the Engagement materials and Paramount's intention to apply for new Permits and Licences at Liard West and East. ADKFN stated they may need additional time to review the applications. ADKFN stated they would not be in favour of the applications being exempt from prelimenary screening. ADKFN stated that 2013 would be a resonable place to understand ADKFN's rights and interests. ADKFN stated they had concerns about the effectiveness of permit conditions. ADKFN stated they did not want to be referred to as a stakeholder. ADKFN requested capacity for Traditional Knowledge and Land Use activities. ADKFN requested ADK Holdings Ltd. be added to the distribution list. ADKFN wanted follow up columns include an openness to face to face and community meetings. ADKFn included an appendix that provided their comments and recommendations on Exisitng Permits and Licences conditions.
Christine Wenman, Planit North on behalf of the Sambaa K'e First Nation	Email	June 3 and June 4 2020	Christine of Planit North contacted Paramount to confirm the meeting and provide an agenda. Following up emails were exchanged to confirm zoom as the medium for the disucssion.
Christine Wenman, Planit North on behalf of the Sambaa K'e Dene Band	Email	June 3 and June 4 2020	Christine of Planit North contacted Paramount to confirm the meeting and provide an agenda. Following up emails were exchanged to confirm zoom as the medium for the disucssion.

Chief Jumbo, Councillor J. Junbo, Councillor T. Jumbo and Ruby Jumbo on behalf of the Sambaa K'e First Nation and Christine Wenman, Planit North	Virtual Meeting	June 5, 2020	SKFN and Paramount held a Zoom meeting. After introductions, Chief Jumbo provided some opening remarks touching on the environment, area of interest and socio-economic opportunities. Paramount provided an overview presentation that gave an update on Celibeta, Liard East, Liard West, Liard South and Pointed Mountain. The presentation provided the current state of the project and the current regulatory approvals. SKFN then asked some questions related SDL 002 (operated by Suncor but Paramount has a working interest), contracting/employment activities, training opportunties, vegetation size on the Celibeta right of way and lease and environmental monitoring. Paramount answered or partially answered the questions and then stated they would follow up on the remaining questions and/or provide additional details. SKFN requested the Celibeta Closure and Reclamation Plan prior to sunmission to the MVLWB, Paramount stated they had a June 30 Deadline and were unsure if the Plan would be completed much before that deadline.
Chief Jumbo, Jessica Jumbo and Ruby Jumbo on behalf of the Sambaa K'e Dene Band and Christine Wenman, Planit North	Email	June 8 2020	Paramount sent an email as follow up from the June 5th call attaching a PDF version of the presentation. Also, the information regarding requirements for labour work was included. Paramount stated it hoped to have the support letter and contracting information later in the week.
Chief Jumbo, Jessica Jumbo and Ruby Jumbo on behalf of the Sambaa K'e First Nation and Christine Wenman, Planit North	Email	June 8 2020	Paramount sent an email as follow up from the June 5th call attaching a PDF version of it's contracting terms and conditions. Also, the information regarding requirements for contractors was included.
Christine Wenman, Planit North on behalf of the Sambaa K'e First Nation	Email	June 9 2020	Ms. Wenman emailed Paramount a letter following up from the virtual meeting signed by Chief Jumbo. It included four requests from SKFN to Paramount: #1. Update and expand SKFN representatives' contact information and use the name Sambaa K'e First nation. #2. Commit to a brief (~2 hour) face to face meeting twine annually, which can be done virually by tele/video conference. #3. Commit to exploring all opportunities to have our Member representatives visit sites during field activities, at least once per field season. #4. Invite an SKFN member to join during helicopter inspections of the Celibeta site,
Christine Wenman, Planit North on behalf of the Sambaa K'e First Nation	Email	June 19 2020	Paramount emailed a letter replying to the June 9th correspondence. Paramount stated it would update the contacts for SKFN, suggested meetings on an as needed basis due to some years having low activity levels an dencouraged SKFN to pursue site visit options with the GNWT and OROGO.

Boyd Clark on behalf of Chief Eugene Hope Acho Dene Koe First Nation	Email	June 19, 2020	Paramount emailed a letter replying to the June 1st correspondence. If ADKFN requires additional time to respond to the applications, Paramount encouraged ADKFN to contact the MVLWB to request an extension. Paramount noted that the project areas were subject to previous screenings and assessment processes, along with numerous licencing and permitting procedures. Paramount stated it would note ADKFN's non-support in its engagement log in support of the applications. Paramount changed stakeholder to affected party in the revised engagement plan. Paramount stated it would not provide capacity for TLKU as the projects do not include new footprint or activities. Paramount added ADK Holdings Ltd. to the updated engagemetn plan. Paramount noted the MVLWB review processes review the effectiveness of Licence and Permit conditions. Paramount stated community meetins are included in the engagement plan under reclamation and remediation planning. Paramount noted its appreciation on receiving ADKFN's comments on the potential LUP an WL conditions.