Langley K-30, Langley E-07 and Kumak I-25 Well Abandonment Program – Project Description

Submission to the Inuvialuit Water Board

Prepared for:
MGM Energy
Calgary, AB

Prepared by:
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Program Number: 123515084

Executive Summary

What is the Proposed Project?

Components

MGM Energy (MGM), a wholly owned subsidiary of Paramount, is applying to conduct Well Abandonments at Langley K-30, Langley E-07 and Kumak I-25 (the Program).

This Project Description (PD) includes several program delivery scenarios. MGM is proposing to carry out the abandonment of K-30 between 2026 and 2031, and the remaining two wells concurrently or separately in subsequent years. All activities, apart from mobilization/demobilization of barges, will occur during winter seasons.

The following Program activities could be carried out each year:

- Barge Mobilization: September to October
- Ice road/ice pad construction: November to mid-April
- Abandonment activities: December to mid-April
- Demobilization (ice roads): mid to late April (prior to break up)
- Demobilization (barges): late June to early July (after spring break-up)
- Monitoring: July to August

Location

The Program's wells are located within the outer Mackenzie Delta within the Inuvialuit Settlement Region (ISR).

- K-30 is located on the northern tip of Langley Island (Latitude: 69.323530°, Longitude: -135.610909°).
- E-07 is located approximately 6 km south of K-30 (Latitude: 69.271768°, Longitude: -135.534208°)
- I-25 is located approximately 20 km southeast of E-07 (Latitude: 69.243447°, Longitude: -135.079542°)

Program activities are proposed to take place on Crown lands with the exception of a barge landing, ice roads and camp site, which are on 7(1)(a) private lands within the ISR. I-25 is located within the Kendall Island Migratory Bird Sanctuary (KIBS).

Proponent

MGM Energy

Why was an Assessment Done?

Environmental Impact Screening Committee

The Environmental Impact Screening Committee (EISC) screens development activities proposed in the ISR for effects that may negatively impact the Inuvialuit or the environment.

Other Approvals

To adhere to regulatory requirements that pertain to the Program, the following permits will be required:

- Class A Land Use Permit from the Government of Northwest Territories (GNWT) Department of Environment and Climate Change (ECC) - Lands and Waters Division
- Type B Water License from the Inuvialuit Water Board
- Approval to Alter Condition of a Well Operations (Canada Energy Regulator (CER))
- Highway Access Permit from the GNWT Department of Infrastructure (INF)
- Benefits Plan from the GNWT Department of Industry, Tourism and Investment
- Land Use Permit from Inuvialuit Land Administration (access to lands within 7(1)(a))
- Access Permit for the KIBS from Environment and Climate Change Canada.

How was the Public Involved?

Purpose of Consultation

In 2018, formal consultation was conducted on June 20 – 22 and August 27 - 28 in Tuktoyaktuk and Inuvik, as well as on September 17 in Aklavik and August 30 in Whitehorse, Yukon, with the Inuvialuit Game Council (IGC).

The objective of the consultation meetings were to discuss the purpose of the Program. Program plans, maps and activities, community concerns and proposed mitigations were presented and discussed. Communities, local organizations and government agencies were notified of the proposed activities, schedules, and the technical details of the Program.

Meetings and Correspondence

Date	Group
20 June, 2018	Joint meeting: • Inuvik Hunters and Trappers Committee (HTC) • Inuvik Community Corporation
	Tuktoyaktuk Hunters and Trappers Committee
	Tuktoyaktuk Community Corporation
	Inuvialuit Regional Corporation
21 June, 2018	Department of Fisheries and Oceans
	GNWT Industry Tourism and Investment, Petroleum Resources Division
22 June, 2018	Inuvialuit Game Council
	GNWT ECC - Lands and Waters Division
27 August, 2018	Joint meeting: • Tuktoyaktuk Hunters and Trappers Committee • Tuktoyaktuk Community Corporation
	Aurora Research Institute
28 August, 2018	Joint meeting: • Inuvik Hunters and Trappers Committee • Inuvik Community Corporation
	Inuvialuit Regional Corporation
	GNWT ECC - Lands and Waters Division
	Department of Fisheries and Oceans
	Industry Tourism and Investment, Petroleum Resources Division
30 August, 2018	Inuvialuit Game Council
17 September, 2018	Joint meeting: • Aklavik Hunters and Trappers Committee • Aklavik Community Corporation

What was Assessed?

Focus of Assessment

Taking into account traditional, local and current knowledge of the Program area, proposed Program components and issues raised by the communities, the assessment focused on potential effects on the following Valued Components (VCs): terrain, soils, and permafrost, vegetation communities (including Species of Management Concern), water quality, fish and fish habitat, migratory birds and habitat, polar bear, grizzly bear, and traditional camps.

Program Effects	Given the Program scope, design features and proposed mitigation, effects on the VCs are expected to be short-term to medium-term, occurring intermittently, seasonal and non-seasonal specific, confined to the Program area, reversible and resulting in negligible residual environmental effects. While the Program has been scheduled to minimize effects to wildlife during sensitive time periods (i.e., migratory bird staging), there is limited potential to interact with Inuvialuit harvesting activities in the ISR.
Cumulative Effects	As detailed in Section 13, there is negligible potential for residual Program specific effects after mitigation measures are applied. Therefore, cumulative effects of the Program and industrial activity in the ISR are considered negligible.

Did the Assessment Find Anything of Concern?

This assessment of potential effects on the environment and renewable resource harvesting did not identify any effects of significant concern on VCs. The following table summarizes the results of the assessment.

Potential Effects on Valued Components	Mitigation
Terrain, Soils and Permafrost	
Disturbance and Erosion • Barge activity, ice road and well pad construction have potential to disturb underlying soils through vehicle and equipment use	• Barge landing sites previously successfully screened by the EISC will be preferentially selected. • Sites will be selected that have stable shorelines and deeper channels for transport. • Equipment will be unloaded using barge ramps or packed snow and ice ramps, which will protect channel banks. • Ice pads will be constructed using low ground pressure vehicles. • Only low ground pressure equipment will be used if there is less than 15 cm of snow. • Other vehicles and equipment will only be used on constructed ice pads which will be a minimum of 15 cm thick. • Rutting will be avoided. Vehicle movements will be suspended if rutting occurs. • Mushroom shoes or boots will be used on bladed equipment.
Reduced permafrost integrity • Flaring may cause local melting of the active layer and permafrost • Accidental release	• Ice flare pads will be constructed to maintain insulating barrier; the size and depth of this ice pad will be designed to avoid thawing surface vegetation or soil. Flaring will adhere to Canada Energy Regulator (CER) Guidelines. • Flaring is not expected unless there is residual gas in the well bores or the plugs are leaking. • If ground disturbance is unavoidable (e.g., in the course of spill clean-up), the surface will be immediately reinsulated using uncontaminated cut vegetation and disturbed soil.

Vegetation Communities (including rare plants and uncommon communities)	
Localized loss or damage of vegetation • Compaction and breakage of stems by vehicles during construction of ice roads and ice pads • Compaction and effects of delayed melting associated with ice pads and roads • Flaring may cause local melting and temporary thawing of frozen vegetation • Damage to vegetation from accidental releases	• Vegetation clearing will be minimized by confining activities to areas being used for ice road construction and staging. • Vegetation clearing will not occur on the ice pads. • On-land Program activities will be confined to winter (frozen ground) conditions. • Ice roads and ice pads of at least 15 cm in thickness will be used to protect surface vegetation and prevent compaction. • The areal extent of on-land ice pads and ice road areas will be minimized. • Vehicles and equipment will only be used if there is a minimum 15 cm of snow/ice on ice pads and overland access roads. • Vegetation will be 'walked down' instead of cut wherever possible. • Proposed overland access will be pre-scouted to select appropriate routing to minimize vegetation disturbance. • Where vegetation removal or damage is necessary (e.g., in the case of spill clean up), the area will be reinsulated with cut organic matter to prevent possible thawing of permafrost and facilitate re-vegetation in the upcoming growing season. • Equipment, other than what is absolutely necessary (ice pad construction equipment), will be offloaded from barges and/or trucks before the construction of ice roads and ice pads to protect surface vegetation. • Reclamation activities using an appropriate seed mix will be completed at each wellsite after abandonment activities take place
Water Quality	
Potential effects to surface water quality • Accidental release	• All on site waste will be stored in approved containers and will be transported to approved disposal sites in accordance with permit requirements • All Program activities will be confined to ice pads or ice roads. This will facilitate containment and clean up of any accidental spills. • Fuel containment and handling procedures will minimize the risk of fuel spills. • In the event of accidental spills, MGM's Spill Contingency Plan included in the Water Licence Application will facilitate containment, thorough clean-up, and proper disposal of spilled material, absorbent materials, and contaminated snow and ice. Evaporators will be used to reduce the volume of contaminated snow and ice. • Prior to demobilization, all working areas will be inspected for contaminant residues and cleaned up as required. • Fuel barges will be inspected bi-weekly for fuel spills
Hydrology	
Potential effects to surface hydrology • Effects to localized surface drainage may occur because of location of ice pads	• Ice pads will be sited on level ground. • An ice berm will be built up-slope from the ice pads to deflect overland meltwater around the ice pads. • Department of Fisheries and Ocean (DFO) protocol for winter water withdrawal from ice-covered waterbodies in the NWT and Nunavut (DFO 2010) will be followed.

Fish and Fish Habitat	
Potential fish entrainment and mortality • Water withdrawal using pumps and hoses (to make ice pads and ice roads) may result in fish kills • Accidental release	• DFO protocol for winter water withdrawal from ice-covered waterbodies in the NWT and Nunavut (DFO 2010) will be followed. • Mitigation will be developed using DFO measures to avoid causing harm to fish and fish habitat (http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html). • Water withdrawal will be from the Mackenzie River, and the Program will also explore location options from previous applications for approval. • Regular inspection of water trucks to ensure compliance. • Fuel containment and handling procedures will minimize the risk of fuel spills. • In the event of accidental release, MGM's Spill Contingency Plan included in the Water Licence Application will ensure containment, thorough clean-up and proper disposal of spill materials, absorbent materials and contaminated snow and ice. Evaporators will be used to reduce the volume of contaminated snow and ice. • Fuel barges will be inspected bi-weekly
Potential alteration of fish habitat • Approaches to shore along the ice road may lead to erosion and increased sedimentation.	• Approaches to the shoreline will be snow filled. • Avoid exposed soil. • Previously used routes, where discernable, will be used and no new winter road alignments will be made. • All Program activities will take place on constructed ice pads or ice roads, which will facilitate thorough clean up of any accidental spills and protect soils from erosion and contamination, which could subsequently affect surface water quality.
Migratory Birds and Habitat	
Temporary sensory disturbance of migratory birds • Demobilization of barges (approximately mid June) may flush birds from preferred nesting locations • Helicopter use associated with the monitoring of barging and barge staging may increase sensory disturbance	• EISC Operating Guidelines and Procedures (2004) will be followed, where applicable. Observed concentrations of migratory birds will be avoided (1000 m vertically, 1500 m horizontally). • Disruptions to migratory birds will be kept to a minimum by removing barges in the shortest possible timeframe. • Wildlife monitors will be consulted during activities. • Demobilization activities and personnel will be confined to the area at the barge staging sites to avoid disturbing inland nesting sites.
Temporary loss of bird habitat on the Program footprint • Equipment used directly on snow covered tundra may affect vegetation used by birds • Equipment used on ice pads may potentially affect vegetation used by birds	• Winter Program activities will be confined to the Program footprint and on ice pads or ice roads. • Low ground pressure equipment will be used if there is less than 15 cm of snow • Other Program equipment and vehicles will only be operated on constructed ice pads with a thickness greater than 15 cm.

Grizzly and Polar Bears	
Disturbance of Denning Bears • Direct disturbance during construction and abandonment activities • Sensory disturbance during construction and abandonment activities • Disturbance of Foraging Bears • Direct and sensory disturbance from barge mobilization/demobilizing • Helicopter use causing sensory disturbance • Bear-human Interactions • Attractants from camps and Program work areas • Safety	• Avoidance will be the primary mitigation. • Coordination with ECC and MGM will occur to obtain the known locations of current and historic grizzly and polar bear dens. • MGM will incorporate the results of ECC identified den location information into Program planning. • Prior to construction, surveys will be conducted to locate active and suspected active bear dens within setback distances of areas scheduled for activity. • Program activities will avoid known den sites by a minimum of 800 m. • If an active den or if a bear is observed during the winter season (October 1 to May 30) within 800 of Program activity, activities will be suspended within the exclusion zone and ECC will be contacted to determine appropriate mitigation. • GNWT-ECC Safety in Polar Bear Country (GNWT-ECC 2024) and GNWT-ECC Safety in Grizzly and Black Bear Country (GNWT-ECC 2018)Proper storage, transportation and disposal of wastes will be carried out to avoid attracting bears to work sites. • Wildlife monitors will be consulted during activities.
Marine Mammals and Habitat	
Disturbance to Beluga Whales and Seals • Direct and sensory disturbance by barge mobilizing/demobilizing	• Avoidance will be the primary mitigation during barge staging activities as staging will take place in late September or October and may overlap with the presence of beluga whales or seals. A wildlife monitor will be present during times where there is an overlap with beluga whale and seal movements. • Avoidance will be the primary mitigation for barge demobilization activities. A wildlife monitor will be present during times where there is an overlap with beluga whale and seal movements.
Traditional Camps	
Disturbance to Traditional Camps • Sensory disturbance by Program activities	• HTCs will be notified of Program activities prior to commencement to minimize interactions with subsistence activities. • EISC Operating Guidelines and Procedures (2004) will be followed, where possible.

Table of Contents

List of Tables

List of Figures

List of Photos

Appendices

Abbreviations

AAQS ..... Ambient Air Quality Standards
AOGS ..... Arctic Oil and Gas Services
ARI ..... Aurora Research Institute
BSP ..... Beaufort Sea Partnership
CC ..... Community Corporations
CCBA ..... Comprehensive Cooperation and Benefits Agreement
CCP ..... Community Conservation Plan
CER ..... Canada Energy Regulator
COSEWIC ..... Committee on the Status of Endangered Wildlife in Canada
CWS ..... Canadian Wildlife Service
DFO ..... Department of Fisheries and Oceans Canada
E-07 ..... Langley E-07 Wellsite
EISC ..... Environmental Impact Screening Committee
ECC ..... Department of Environment and Climate Change
EPP ..... Environmental Protection Plan
FSDMC3 ..... Free Standing Mobile Double Class 3
GNWT ..... Government of Northwest Territories
HTC ..... Hunters and Trappers Committees
I-25 ..... Kumak I-25 Wellsite
IBA ..... Important Bird Area
IDC ..... Inuvialuit Development Corporation
IFA ..... Inuvialuit Final Agreement
IGC ..... Inuvialuit Game Council
ILA ..... Inuvialuit Land Administration
IRC ..... Inuvialuit Regional Corporation
ISR ..... Inuvialuit Settlement Region
ITI ..... Industry Tourism and Investment
K-30 ..... Langley K-30 Wellsite
KIBS ..... Kendall Island Migratory Bird Sanctuary
MGM ..... MGM Energy
MPA ..... Marine Protected Area
MSDS ..... material safety data sheet
NWT ..... Northwest Territories
PD ..... Project Description
RoW ..... right-of-way

SARA ..... *Species at Risk Act*
VC ..... Valued Component
VOC ..... volatile organic compound

1 TITLE

MGM Energy Langley K-30, Langley E-07 and Kumak I-25 Well Abandonment Program (the Program).

2 CONTACT INFORMATION

MGM Energy (MGM) is applying to conduct the Langley K-30, Langley E-07 and Kumak I-25 Well Abandonment Program (the Program). Table 2-1 outlines the contact names and addresses for the Program.

Table 2-1 Contact Names and Addresses

Main Program Contact	Alternate Program Contact
Name: MGM Energy Address: Suite 4700, 888 3rd Street SW Calgary Alberta T2P 5C5	Name: Ian Keir Address: Suite 4700, 888 3rd Street SW Calgary Alberta T2P 5C5
Phone: 403-206-3859 Email: terence.hughes@paramountres.com Website: www.paramountres.com	Phone: (403) 817-5077 Email: ian.keir@paramountres.com Website: www.paramountres.com

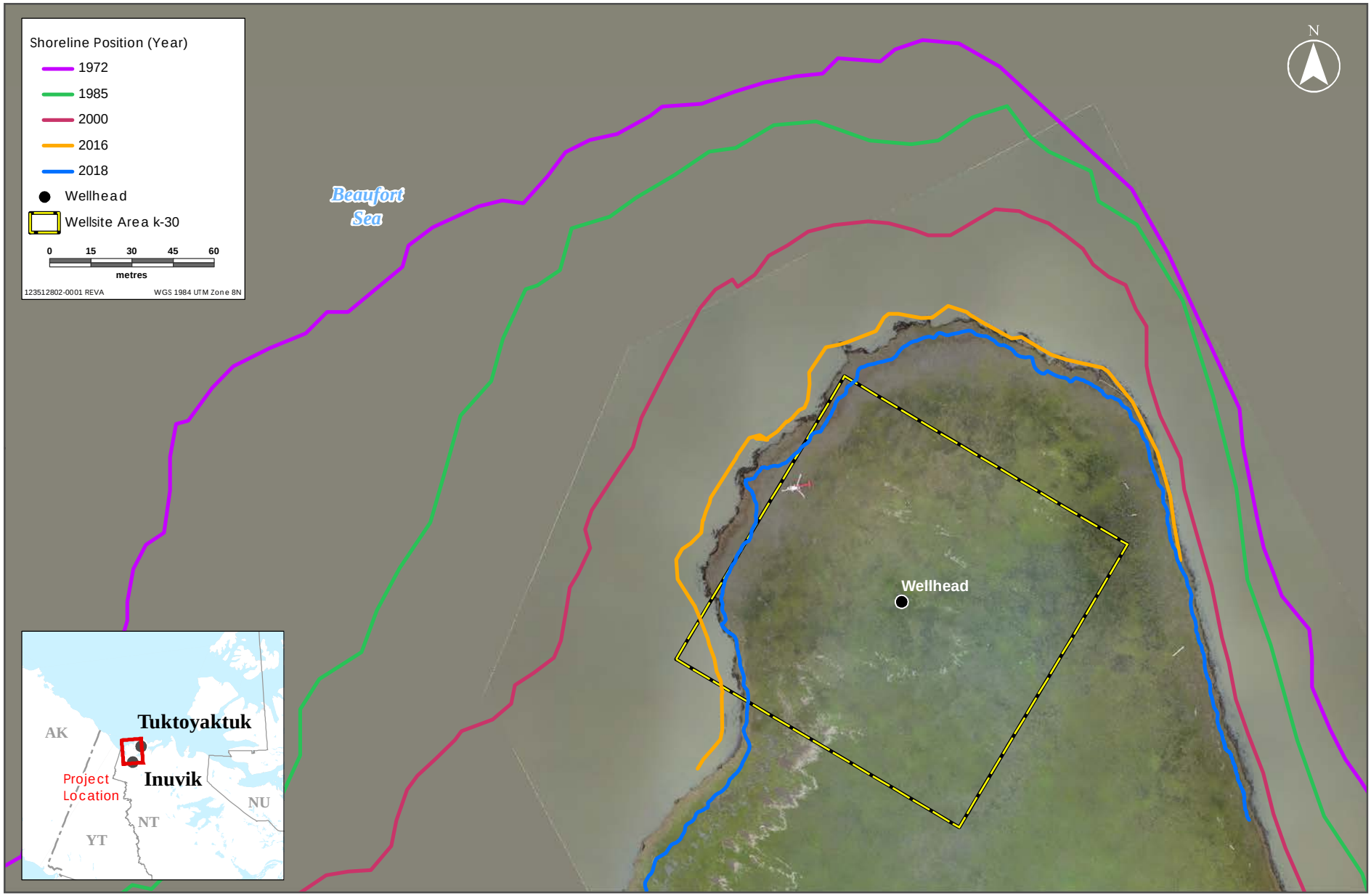
3 PROGRAM OVERVIEW

3.1 Program Context

Between 2003 and 2010, various oil and gas companies conducted hydrocarbon exploration drilling programs in the outer Mackenzie Delta within the Inuvialuit Settlement Region (ISR) of the Northwest Territories (NWT). MGM (a wholly owned subsidiary of Paramount Resources Ltd.) operates 11 wells in the region. As a result of delays in the Mackenzie Gas Pipeline, MGM's wells within the region have not produced and are either in a suspended state or abandoned. MGM has monitored these wells since 2009 and has now decided to begin abandonment of selected wells. This Program relates to three of these wells: Langley K-30 (K-30), Langley E-07 (E-07) and Kumak I-25 (I-25).

3.2 Program Area and Program Footprint

The Program footprint refers to the area of main abandonment activities. The Program footprint includes the existing leases for each well, barge landing and staging areas, camp facilities, airstrips and helicopter pads, as well as ice road alignments within the Mackenzie River and associated channels and overland routes. The Program area refers to the maximum area (25 km buffer from the Program footprint) to be occupied by all Program components and corresponds to a conceptual maximum zone of influence of Program activities on most environmental components (see Figure 3-1).



Sources: Base Data - Natural Earth. Thematic Data - Kavik-Stantec Ltd., Hynes et al. 2014, Hynes et al., 2002, Open File 7685. Shoreline positions from 1972 to 2000 from Hynes et al. 2002 and Open File 7685.
**Note: Baseline imagery captured in August 2017*

Disclaimer: This map is for illustrative purposes to support this Kavik-Stantec project; questions can be directed to the issuing agency.

Langley K-30 Wellsite
Shoreline Erosion

MGM ENERGY

Figure 3-1

4 REGULATORY APPROVALS AND OTHER AUTHORIZATIONS

MGM submitted the Project Description (PD) for screening to the Environmental Impact Screening Committee (EISC) under the terms of the Inuvialuit Final Agreement (IFA), and the EISC decision is included with the Water Licence Application Package. Approvals required for the Program are listed in Table 4-1. MGM will contact the appropriate authorities and submit applications for the required permits.

Table 4-1 Approvals Required for the Proposed Program

Agency	Approval or Authorization Required
Environmental Impact Screening Committee	Approval of the Project Description
Government of the Northwest Territories (ECC - Lands and Waters Division)	Land Use Permit (Class A)
Inuvialuit Water Board	Water Licence (Type B)
Canada Energy Regulator (CER)	Approval to Alter Condition of a Well Operations Authorization
Department of Infrastructure (Government of Northwest Territories)	Access to a Public Highway Permit
Government of the Northwest Territories, Department of Industry, Tourism and Investment	Benefits Plan
Environment and Climate Change Canada - Prairie and Northern Region, Canadian Wildlife Service	Permit to conduct activities in a Migratory Bird Sanctuary
Inuvialuit Land Administration (access to lands within 7(1)(a))	Land Use Permit

5 LOCATION

K-30, E-07 and I-25 are located within the outer Mackenzie Delta of the ISR, NWT (Figure 5-1). The K-30 well is located on the northern tip of Langley Island (Figure 5-2), E-07 is located approximately 6 km south of K-30 (Figure 5-3), and I-25 is located approximately 20 km southeast of E-07 (Figure 5-4). Program activities will take place on Crown land with the exception of a potential barge landing, ice roads and camp site, which are within Inuvialuit 7(1)(a) Private Lands. I-25 is located within the Kendall Island Migratory Bird Sanctuary (KIBS).

Distances from each well to Inuvik, Aklavik and Tuktoyaktuk are provided in Table 5-1.

Table 5-1 Approximate Distances of the Program Wells from Inuvik, Aklavik and Tuktoyaktuk

Well	Latitude	Longitude	Distance from Inuvik (km)	Distance from Aklavik (km)	Distance from Tuktoyaktuk (km)
Langley K-30	69.323530°	-135.610909°	131	126	102
Langley E-07	69.271768°	-135.534208°	125	120	100
Kumak I-25	69.243447°	-135.079542°	112	115	84

Barges may be used to mobilize equipment and materials to the Program footprint for staging as close to the well(s) as possible. If barges are used, they will be originating from locations such as Hay River, Ft. Simpson, or Inuvik. Previous PDs submitted to the EISC by MGM and Chevron Canada Limited (the previous operator of K-30 and I-25) identified suitable, potential advance barge landing sites (KAVIK-AXYS 2006, 2007a, 2008a and 2008b). These locations are being considered for this Program and are identified in Figure 5-1. These locations are preferred since bathymetric surveys and, archaeological and biophysical assessments were previously completed.

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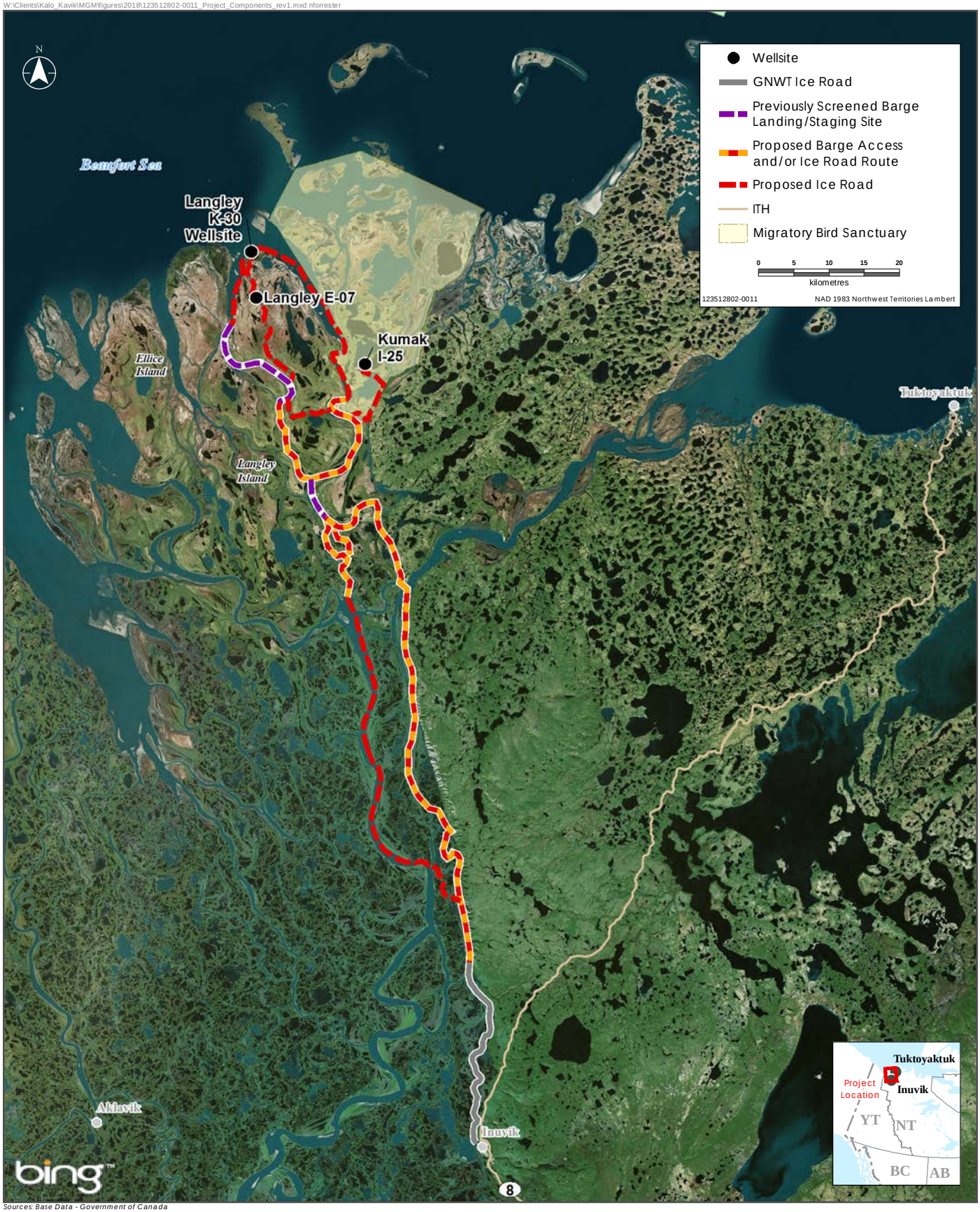

Sources: Base Data - Government of Canada
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Project Overview

KAVIK-STANTEC

MGM ENERGY

Figure 5-1

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K-30 Access Location

KAVIK-STANTEC

MGM ENERGY

Figure 5-2

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E-07 Access Location

KAVIK-STANTEC

MGM ENERGY

Figure 5-3

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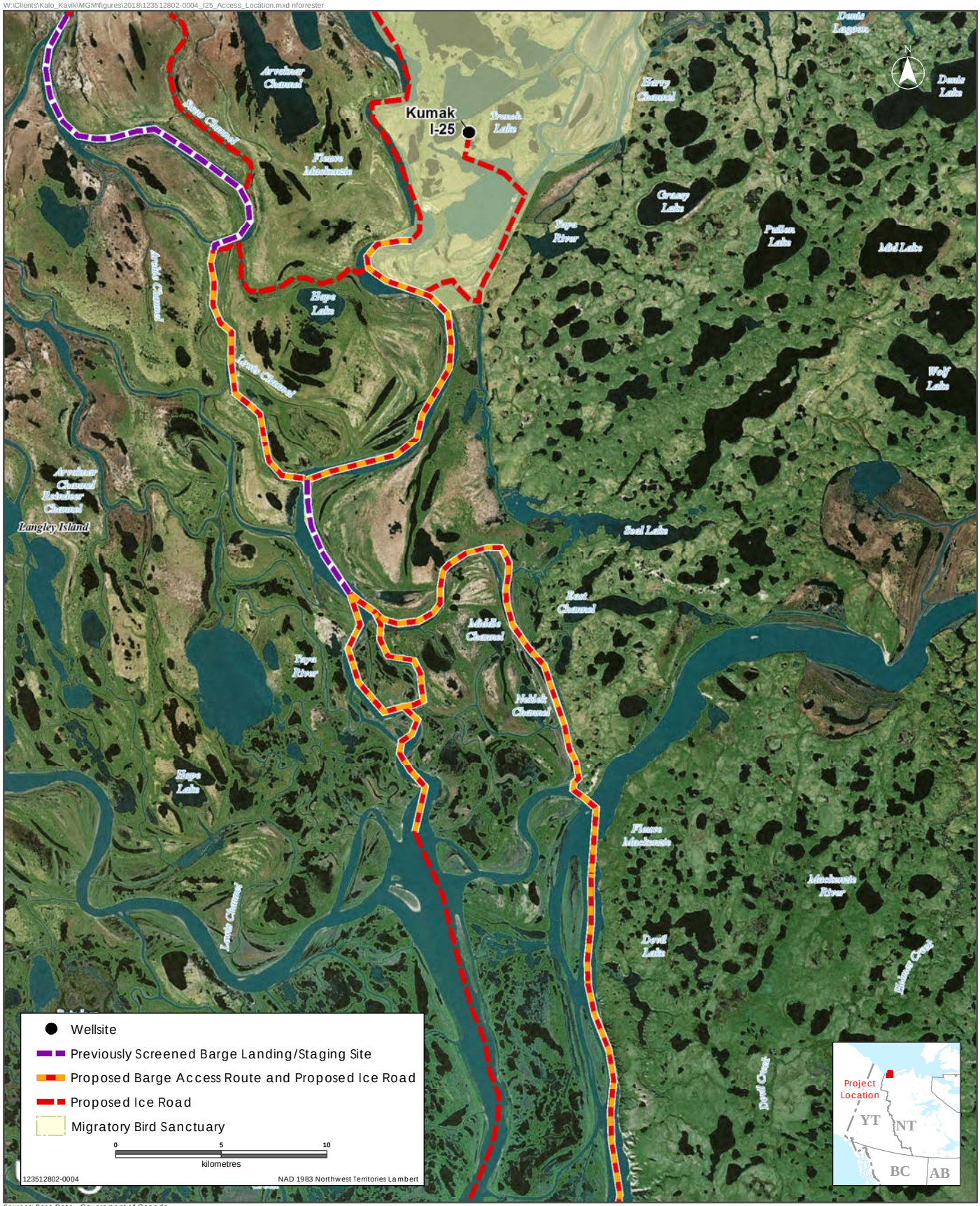

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I-25 Access Location

KAVIK-STANTEC

MGM ENERGY

Figure 5-4

6 PROGRAM DETAILS

6.1 Purpose of the Program

The Program will consist of abandoning one to three wells (K-30, E-07 and I-25). K-30 is the MGM's priority well because active shoreline erosion potentially puts the well at risk of exposure in the foreseeable future.

6.2 Program Scope

There are three scenarios for the Program, as outlined below:

1. Abandonment of all three wells to take place in a single season
2. Abandonment of the priority well, K-30, to take place in a single season, with abandonment of the remaining two wells (E-07 and I-25) in a subsequent year(s)
3. Abandonment of the K-30 and E-07 wells to take place in a single season, and abandonment of I-25 in a subsequent year(s)

The Program will consist of:

- The use of barge landing[1] and staging sites[2] for the storage of equipment and supplies. The chosen barge landing and staging sites will be at, or as close to the well(s) as possible. If advance barge and/or staging is not employed, all equipment and supplies may be mobilized from permanent land bases (i.e., Inuvik) using ice roads.
- Construction of ice roads over land and water for vehicle access to the well(s), campsites, barge landing and staging sites, as well as supplying equipment throughout the Program duration.
- Abandonment of up to three wells (Langley K-30, Langley E-07 and Kumak I-25). This will include the use of a service rig and excavation equipment at the wellhead location.
- Remediation and reclamation of abandonment activities at the well(s) and removal of any on-site materials in subsequent year(s) following abandonment.

MGM is proposing to carry out the abandonment of K-30 between 2026 and 2031, and possibly the remaining two wells in that same timeframe or in subsequent years. All activities, apart from mobilization/demobilization of barges, will occur during the winter season.

[1] A barge landing site means a site where barges are offloaded and/or moored in place and frozen in with the equipment and materials remaining onboard.

[2] A staging site refers to a site where equipment and materials can be off-loaded from barges and/or trucks and stored.

6.3 Program Activities

The Program will need to be executed in multiple stages with each Program activity requiring different equipment and personnel. Table 6-1 provides a summary of the main activities proposed for the Program as well as the section of the PD where additional details can be found for each. Additional information regarding the proposed schedule for the Program can be found in Section 7.

Table 6-1 Proposed Main Activities for the Program

Program Activity	Associated Tasks	Location in the PD
Advance Barging and Staging	Includes the movement of equipment within the Program area by means of such activities as barging to staging areas and off-loading, as well as barging and freezing in.	Section 6.3.1 and 6.4.2
Construction and Operation of Ice Roads and Ice Pads	Includes the construction and maintenance of ice roads and ice pads for barge landings, staging sites, camps, abandonment activities, and other associated infrastructure.	Section 6.4
Abandonment	Includes the abandonment of the well(s).	Section 6.5
Demobilization	Includes demobilization of equipment and material from the barge landing, staging sites, camps and any other associated infrastructure by either ice road or storage on a barge at the end of the season.	Section 6.6
Environmental Monitoring and Reclamation	Includes returning sites to equivalent land use capability and environmental monitoring, as required.	Section 6.7

6.3.1 Advanced Equipment Mobilization

Advanced placement of equipment within close proximity to the Program footprint is required to maximize the winter season for completion of abandonment activities. A variety of equipment is required for completion of the Program, including: construction equipment, water tank trucks, backhoes, support vehicles, and sleigh camps. MGM is currently considering the following options for the advanced mobilization of construction related equipment:

- Loading of a single barge with key equipment, materials, and fuel in the summer where it is then mobilized as close to K-30 as possible and left to freeze-in for use during winter abandonment activities
- Mobilization of equipment, materials, and fuel by truck to a base location (e.g., Inuvik, Tuktoyaktuk, etc.) by an existing road within the NWT
- Mobilization of equipment to the wellsites via NWT winter ice roads and ice roads built for the Program.
- A combination of these options

A list of all proposed equipment for the construction and abandonment activities are provided in Section 0 and 6.5.9, respectively.

MGM is including the locations identified in Figure 5-1 as potential barge landing and staging sites, since they have already been assessed and successfully screened by the EISC for MGM and Chevron Canada activities (KAVIK-AXYS 2006, 2007a, 2008a and 2008b). If MGM chooses to mobilize equipment and material in advance by barging, MGM would be mobilizing the barge from Inuvik up through Middle Channel towards East Channel. The target barge landing area is within Arvoknar Channel to minimise transportation distance between the barge and Program well(s); however, the finalised location will be subject to further review closer to the time of Program activities.

Construction of an ice pad for staging would be required for these sites during the winter.

6.4 Construction

The construction phase of the Program will consist of building ice roads, ice pads, staging areas, air strips and helicopter pads.

6.4.1 Clearing

No new clearing is currently proposed for the program during construction. MGM will utilize existing cleared and linear disturbances from previous activities in the area, where possible, for proposed staging sites, camp locations and ice roads. MGM will complete reconnaissance surveys in the summer and/or fall to identify the Program footprint and routing prior to construction.

6.4.2 Advance Barging and Staging

If MGM chooses to mobilize equipment and material in advance by barging, personnel will be flown to the barge landing by helicopter as soon as conditions are suitable for construction. This is likely to occur in November. An on-land ice pad will be constructed immediately adjacent to the frozen-in barge. The size of ice pad required will be dependent on the orientation of the barge to the channel's edge and the amount of equipment required at the location. In previous EISC submissions for similar activities in the area (KAVIK-STANTEC 2007b, 2008a), MGM applied for staging sites of approximately 80 m x 200 m (1.6 ha) in size. Following ice pad construction, ice road construction from the barge will begin towards to well(s).

To minimize ground disturbance during barge landing and staging site construction, low ground pressure vehicles will be used to pack down the snow, if required. Snow fences and snow making machines may also be used to collect/create snow for building up the ice pad base. Water trucks fitted with a spray bar will apply water to the packed snow, building ice to an approximate thickness of 15 cm. Northern Land Use Guidelines recommend that there is at least 10 cm of packed snow for winter roads to be ready for use by heavy wheeled vehicles (GNWT 2015a).

6.4.3 Ice Roads

Winter access to the well(s), barge landing, staging sites, and camps, from Inuvik will require the construction of ice roads over land and water. Ice roads will be constructed in a way that utilizes annually constructed infrastructure (i.e., GNWT Inuvik to Aklavik ice road), existing seismic trails and other linear disturbances, as well as non-clearing construction techniques (e.g., trimmed, walked down, etc.). Some minimal cutting of larger vegetation that has grown within existing linear disturbances may occur; however, this will only be done where necessary. Figure 5-1 to Figure 5-4 and Figure 13-1 shows MGM's proposed ice road routes for the Program. The routes identified have been assessed and successfully screened by the EISC in previous PDs (KAVIK-AXYS 2006, 2007b, 2008a). Construction is predicted to occur from November to January with maintenance occurring throughout the winter season (approximately mid-late April). Use of ice roads is anticipated for the duration of the winter season but is subject to specific ice conditions meeting use requirements (GNWT 2015b).

To maximize the construction period, two teams will be constructing ice roads within the Program footprint. One crew will be based in Inuvik to build north up the Mackenzie River towards the barge landing/staging site for the Program. The crew will build upon the existing GNWT ice road that is built between Inuvik and Aklavik, approximately 30 km outside of Inuvik on the Mackenzie River. Another construction crew will begin from the barge landing/staging site and work north to construct the ice road to K-30. Depending on the development scenario, once the ice road from K-30 to the barge landing/staging site is constructed, that same construction crew will begin to build the ice road south to meet the other construction crew from Inuvik. Extensions from that main route to the E-07 and I-25 would then be constructed if activities proceed in those locations during the same winter season.

Overland access will be limited to distances required for access to well(s), barge landing, staging sites, and ice roads developed on the Mackenzie River and associated channels. These access roads will be constructed as an ice pad over a snow base. Overland ice roads will be constructed with low ground pressure vehicles by flooding. These roads will be up to 20 m wide, with an additional 50 m snowbelt[3] on each side of the road (a total right-of-way (RoW) of 120 m). During construction, any large obstructions (e.g., surface driftwood) will be pushed off to the edge of the RoW. Overland roads will be built to a minimum of 15 cm as per Northern Land Use Guidelines (GNWT 2015a). The Northern Land Use Guidelines recommend at least 10 cm of snow for winter roads to be ready for use by heavy wheeled vehicles. Where possible the ice roads will be built over lakes to minimize impacts on the land.

Where construction of ice roads over waterbodies is required, ice depth will be profiled using electronic and physical ice profiling methods. Where conditions allow, ice roads constructed over waterbodies will be approximately 30 m wide. Snow ramps will also be constructed to protect banks and associated vegetation. Crossings will be constructed using clean snow and at the end of the season, snow will be removed or v-notched (GNWT 2015a)

[3] The snowbelt protects the travelled portion of the Right-of-Way from excessive snow accumulation.

The minimum ice thickness to ensure safe passage on all ice roads will be calculated and vehicle movement will proceed only when conditions are verified safe for passage. Ice road thickness will also be tested throughout the winter season to maintain safe travel. It is estimated that minimum thickness for overland roads will be 15 cm. Northern Land Use Guidelines (GNWT 2015a) and Guidelines for Safe Ice Construction (GNWT 2015b) will be followed.

Water supply for ice roads will be from a combination of the Mackenzie River and associated channels, as well as suitable waterbodies within the area. MGM will conduct field surveys prior to submission of the Water License to verify appropriate waterbodies for withdrawal. The name and GPS coordinates (OMS) for each water source used for withdrawing water for purposes such as overland ice road construction, ice pad construction, camp setup, etc., will be provided to the IWB prior to the start of the program following the field surveys. Water will be withdrawn in accordance with applicable guidelines and the conditions of the Water Licence received for the Program.

Before beginning, Program maps of known and potential sites and access routes will be provided to the Department of Environment and Climate Change (ECC) and GNWT to identify known bear den locations. Where necessary, road alignments may be modified to avoid important sites.

6.4.4 Camp

Approximately 60 personnel will be required for the construction phase of the Program (two crews of 30 personnel). Personnel will be accommodated at various locations, depending on the progress of ice road construction. If advance barging and staging is completed in the summer, it is likely that the construction crew will be located first at the barge landing (where they would stay on the barge) to begin the ice road. As progress is made and construction of ice pads at the wellsites begin, the crew may also use an additional mobile sleigh camp to limit the distance between the construction location and the camp. Another construction crew will initially be based in Inuvik but use a mobile sleigh camp as they progress north constructing the ice road that connects the barge to Inuvik. The sleigh camp will be moved from one location within the Program area to another as ice roads are constructed.

6.4.5 Solid Waste Management

The solid waste generated during construction will primarily include domestic waste, minor amounts of hazardous wastes and recyclables. All solid waste will be transported back to Inuvik and disposed of at an appropriate facility.

Hazardous waste types will typically include fuel and lubricants. Hazardous waste will be separated from solid waste and hauled to Inuvik for the appropriate treatment and ultimate disposal. The hazardous waste will be either treated and disposed through a working arrangement with the Town of Inuvik or transported for disposal via a licensed carrier and an appropriate manifest to an approved disposal facility outside the NWT.

Recyclable waste will be disposed of through the recycling depot in Inuvik (if the facility is operational).

Any accidental discharges of waste materials or hazardous materials will be managed as per MGM's Spill Contingency Plan included in the Water Licence Application.

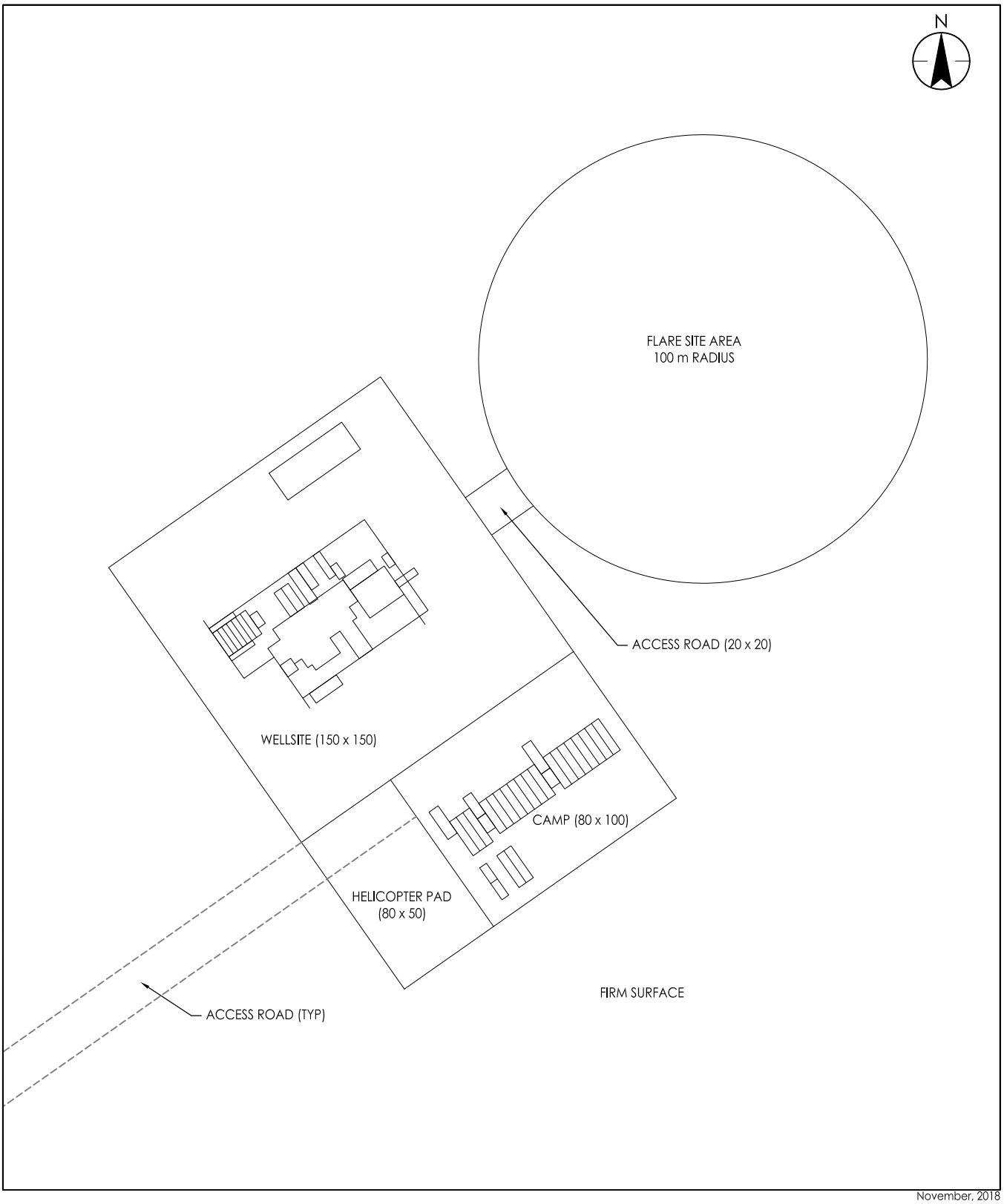
6.4.6 Wellsites

Abandonment activities at the wellsite(s) will occur on ice pads to minimize the need for clearing and to reduce potential disturbance to vegetation and maintain permafrost integrity. There will be no ground disturbance for wellsite levelling. Snow and ice will be used to level the wellsite during ice pad construction. Ice pad construction at the wellsite(s) will be completed in the same manner as at the barging/staging sites (Section 6.4.2). Low ground pressure vehicles will pack snow in the ice pad area. Water trucks fitted with a spray bar will apply water to the packed snow, building ice to a minimal thickness of 15 cm. The approximate total size of the wellsite(s) is 6.64 ha, which will include allowance for all main wellsite components. The main components of the wellsite are described below. Figure 6-1 provides a typical wellsite schematic that would be used for the Program.

- Well pad: The proposed well ice pad will be approximately 150 m x 150 m (2.25 ha). This area will be the designated work area for the service rig and associated equipment for abandonment activities. It should be noted that at the time of this PD submission, a service rig has not been selected for the Program; however, the service rig will likely be a Free Standing Mobile Double Class 3 (FSDMC3) model with a weight of approximately 50 tonnes.
- Flare pad: Flaring is not expected unless there is residual gas in the well bores or the plugs are leaking. As a safety measure, a flare pad will be constructed for K-30, I-25 and E-07. The flare pad will be located in close proximately to the well pad (connected by an access ice road) and have a maximum radius of 100 m (3.14 ha). This area will be designated for the flare stack. During abandonment activities, residual gas from the well will be transported by a temporary flare line, along the access road, to the flare stack. The flare stack structure will be supported by guide wires and piles either frozen into the ice pad or weighted anchors, all of which will be removed at the conclusion of abandonment activities.
- Camp: Should a camp be used at the wellsite (see Section 6.5.3), the camp pad will be located adjacent to the well pad. The camp pad will be approximately 80 m x 100 m (0.80 ha) and will hold approximately 50 people.
- Fuel storage: The ice pad for fuel storage will be approximately 50 m x 50 m (0.25 ha) and will be built directly adjacent to the well pad or located directly adjacent to the camp pad.
- Temporary waste storage: All waste generated during construction will be stored in approved containers on site and later removed from the Program area to be disposed of at an approved facility.

- Snowbelt: A minimum 50 m wide snowbelt will be constructed to surround the wellsite and access roads. The snowbelt will be designed to prevent the accumulation of blowing snow and minimize snow drifts on the well pad. The snowbelt will also be used for the deposition of clean snow removed from the wellsite after storms and heavy snowfalls.
- Airstrip: For safety, one airstrip located in close proximity to K-30 will be constructed. The airstrip will be constructed on a frozen river channel, will be approximately 1,500 m x 75 m (11.25 ha), and meet guidance requirements for visibility and safe operations (EISC 2004). MGM will complete reconnaissance surveys in the summer and/or fall to identify an appropriate location.

Construction of both the ice road and ice pads will be conducted in a manner consistent with current regulatory guidelines (GNWT 2015a and 2015b).



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2018/11/30 12:57 PM By: Loewen, Caroline

November, 2018
123512802

ORIGINAL SHEET - ANSI A - COLOR

Notes:
m - Metres

KAVIK-STANTEC

Client/Project
MGM ENERGY
KAVIK-STANTEC INC.

Figure No.
6.1

Title
Typical Wellsite Schematic

1:2500 0 25 75 125m

Stantec

200 - 325 25th St. SE Calgary, AB T2A 7H8

6.4.7 Water Supply

Water withdrawals from the Mackenzie River, associated channels, and suitable lakes will be required for the construction of ice roads, ice pads, barging/staging sites and camp use. Mitigation will be developed using the Department of Fisheries and Oceans Canada (DFO) measures to avoid causing harm to fish and fish habitat (DFO 2018). Potable water will be supplied from the Town of Inuvik for domestic use in camps. Bottled water may also be provided for consumption purposes (plastic bottles will be kept for disposal or recycling).

Estimated daily water use for construction is provided in Table 6-2. The amount of water withdrawn for a single year is dependent on MGM's ability to complete abandonment activities at each wellsite within a single winter season. To provide a conservative estimate, the water withdrawal volumes provided in Table 6-2 are calculated on the assumption that all ice roads and ice pads proposed for the Program are built in a single season. Total water usage during construction for this assumption is estimated at 5,000 m^3/day. Should MGM not abandon all three wells within a single year, the required water use for subsequent years would be less. After construction is complete, daily water use will be substantially lower (see Section 6.5).

Table 6-2 Estimated Water Volumes for Construction Activities (Full Program Abandonment in a Single Year)

Program Activity	Estimated Maximum Daily Volume (m^3)	Estimated Duration of Use (days)[1]
Ice road / ice pad construction[2]	4,500	151
Construction camps	500	151
Total	5,000	N/A

NOTES:
[1] Days listed are total, not cumulative.
[2] Does not include ice road construction water volumes withdrawn from a Mackenzie River channel for development of roads on channels.

The name and GPS coordinates (OMS) for each water source intake used for withdrawing water will be provided to the IWB prior to the start of the program following the field surveys.

6.4.8 Greywater and Sewage

If advanced barging and staging is completed, effluent will be stored on the barge during the construction phase. Once ice road construction has established a direct connection to Inuvik, effluent will be hauled by vacuum tank truck to the municipal treatment facility in Inuvik for disposal. On-site treatment will not be considered for the Program. This option assumes that authorization is granted by the Town of Inuvik, and sufficient treatment capacity is available. If the access route to Inuvik is restricted (e.g., due to poor weather), treated effluent will be temporarily stored at barge landings or staging locations in heated tanks and hauled to the Inuvik facility when conditions are more favourable.

6.4.9 Air Support

Air support via helicopter and fixed wing aircraft will be required to provide construction support (mobilization of personnel) and emergency evacuation for the Program. One airstrip is proposed for the Program in proximity to the K-30 wellsite. A preferred location is shown on Figure 5-2, but MGM will complete reconnaissance surveys to identify an appropriate location. The airstrip will be constructed on a frozen river channel and will have approximate dimensions of 1,500 m x 75 m (11.25 ha), and will meet guidance requirements for visibility and safe operations (EISC 2004). A helicopter landing pad will also be constructed at the wellsite(s). A helicopter pad will also be available at the barge landing but will not require additional clearing as it is located directly on the barge vessel.

Flights to the sites will originate from Inuvik and/or Tuktoyaktuk. Defined flight paths will be maintained throughout the Program and will be straight lines unless deviations are needed to avoid weather conditions. Additional fuel, if required, will be available at each wellsite. The EISC Operating Guidelines and Procedures (EISC 2004) will be adhered to when safely possible, as will Canadian Wildlife Service (CWS) recommendations (1,000 m vertical distance and 1,500 m horizontal distance from concentrations of birds). Pilots will be briefed on the Program's flight guidelines.

6.4.10 Personnel Requirements

Approximately 60 personnel will be required for the construction phase (two teams of 30 personnel with two, 12-hour shifts of 15 personnel per team). Table 6-3 presents an estimate of personnel requirements for construction. MGM is anticipating two construction crews for completion of the ice roads and ice pads.

Table 6-3 Average Number and Role of Personnel Required for Construction (per shift)

Role	Estimated Number of Personnel
Supervisor	2
Logistics supervisor	1
Equipment operators	20
Camp maintenance	2
Medical	2
Safety Coordinator	1
Environmental Monitor	1
Wildlife Monitor	1

6.4.11 Equipment

Table 6-4 provides a list of the expected equipment for the Program. This list is the best available estimate of equipment needs at the time of completion of this PD and could be subject to change due to equipment availability and final Program description. This equipment list assumes that all three wells are abandoned within a single year (i.e., all ice road and ice pad construction is completed). The list may vary if only one or two wells are abandoned in a given year.

Table 6-4 Equipment for Construction

Type	No.
Trucks (e.g., vacuum water)	4
Front end loaders with optional attachments	4
Graders	4
Plough/auger truck	4
Pick-up trucks (personnel vehicles)	10
Bulldozers	8
Track hoe	2
Backhoe (rubber-tired)	2
Snow cats	6
Dump trucks	4
Snowmobiles (gasoline)	4
Snow making machines(s) and/or spray ice pump & monitor(s)	4
Accessory and support equipment (e.g., power generators, light towers, tanks)	6
Communication systems (e.g., radios)	20

6.4.12 Fuel

A total of 377,000 L of diesel, 2,000 L of jet fuel, 7,500 L of propane and 2,500 L of gasoline is estimated to be required for the Program. This estimate is based on the assumption that all three wells are abandoned within a single year (i.e., all ice road and ice pad construction is completed).

Fuel to support construction activities will be supplied by fuel trucks traveling on the ice roads to storage locations. On site fuel storage will be in double walled Envirotanks complete with secondary containment. The ice pad used for fuel storage will be bermed to contain any spilled fluid in the event of an accidental spill. To minimize the potential for spills, specifically-trained individuals will be tasked with fuel transportation and onsite re-fuelling during the entire Program. Drip pans will be used when vehicles are being fuelled or stationary for more than two hours. All fuel trucks will also be equipped with an emergency spill kit.

Regular inspections will be completed to ensure tank containment integrity and refueling areas are clean. Leaks or spills will be cleaned up immediately, recorded and if required, reported, and the cause of any leak corrected. Spill kits will be strategically placed and maintained in and around refueling areas.

Fuel for the Program will also be stored within storage tanks on the barge vessel. Barges currently being considered by MGM have holding capacities of 377,000 L of diesel and 500,000 L of jet fuel.

A small quantity of gasoline will be stored to operate equipment such as snow machines. This will be in 45 gallon drums. A dozen drums are anticipated. These will be stored in the bermed fuel storage areas at the wellsite(s), barge landing, camps and staging sites.

6.5 Abandonment

Abandonment activities will be conducted at all three wellsites (K-30, I-25 and E-07). Prior to abandonment activities occurring, completion and monitoring documents for each wellbore will be reviewed to develop an abandonment plan. The abandonment plan will then be submitted to the Canada Energy Regulator (CER) for approval. The abandonment plan will be submitted to leave the packer and plug in place and pull the tubing out of the hole. A permanent bridge plug will then be run and pressure tested to isolate the existing perforations. A cement plug is then placed on top of the permanent bridge plug. The wellbore will then be filled with fresh water. A second permanent bridge plug will be run at the base of the permafrost and capped with cement. The wellhead is removed after cutting casings to depth and then welding on caps. Signage is posted on the well centre to identify the well location after the well is capped. Depth of cut and cap will vary but will be a minimum of 1 m below final grade. Lastly, the site is backfilled after the cut and cap operations have been completed.

In summary, a typical abandonment includes the following activities:

- Preparation of the site (e.g., ice pad construction)
- Excavation of the soil around the wellhead to expose the casing string
- Cutting of the casing and removal of the wellhead
- Cutting of the casing string to an appropriate depth approved by the CER
- Capping of the casing string
- Backfilling of the excavated soil

Equipment (Section 6.5.9) and water use associated with abandonment activities are typically less than equipment required for well completion. Fresh water (approximately 22,000 L) is required a part of the abandonment activities. Water will be sourced from the water, where it meets appropriate chemistry criteria (i.e., non-saline), or will be sourced from the Town of Inuvik. Water will be stored in heated tanks and disposed of at an approved facility.

6.5.1 Clearing

During abandonment activities a small amount of vegetation will be removed associated with digging and excavation.

6.5.2 Access

Once the ice roads are constructed (Figure 5-1), abandonment activities will be largely supported by truck and associated equipment, as required.

Ice roads will be monitored and maintained to confirm safe operating conditions and integrity are maintained. Use of the road will cease if the road integrity is insufficient to support Program vehicles.

6.5.3 Camp

Personnel will be accommodated at various locations. The barge will be used as a camp during abandonment. For abandonment activities at K-30, a camp will either be located at the K-30 wellsite (at a previous staging area used for construction) or the barge will be used as a camp (depending on proximity to K-30).

The mobile sleigh camps used for construction will continue to be used to accommodate personnel for the abandonment phase of the Program. As indicated in Section 6.4.4, multiple sleigh camps may be mobilized directly to each wellsite(s) and placed on the camp pad. Should abandonment activities occur at E-07 and I-25 within a single season, the sleigh camp will be moved from K-30 to as close to the wellsite as possible and will serve as the main camp for abandonment personnel. The final locations of camps for abandonment will be determined once construction of the Program footprint is complete.

6.5.4 Water Supply

Water supply will vary during the abandonment phase based on the need for each wellsite. Water use for the abandonment phase of the Program will be substantially less than the construction phase. The amount of water withdrawn for a single year is dependent on MGM's ability to complete abandonment activities at each well within a single winter season. To provide a conservative estimate, the water withdrawal volumes provided in Table 6-5 are calculated on the assumption that all three wells are abandoned within a single year. Should MGM not abandon all three wells within a single year, the required water use for each year would be less.

Table 6-5 Estimated Water Volumes for Program Activities (Full Program Abandonment)

Program Activity	Estimated Maximum Daily Volume (m^3)	Estimated Duration of Use (days)[1]
Ice road and ice pad maintenance	240	151
Abandonment personnel camps	10	150
Abandonment activities	50	90
Total	300	

NOTES:
[1] Number of days listed are total, not cumulative.

The name and GPS coordinates (OMS) of each intake for the water sources from which water is to be withdrawn will be provided to the IWB prior to the start of the program following the field surveys.

6.5.5 Greywater and Sewage

Two to five, 400 barrel (63.6 m^3) heated tanks will be used to store effluent during the abandonment phase at the sleigh camps and wellsite(s) locations. Effluent will also be stored on the barge during the abandonment phase of the Program. These tanks will be stored in the bermed storage areas. Effluent will be hauled by vacuum tank truck to the municipal facility in Inuvik for disposal. On-site treatment will not be considered for the Program. If the access route to Inuvik is restricted (e.g., due to poor weather), treated effluent will remain on-site in heated tanks and hauled to the Inuvik facility when conditions are more favourable.

6.5.6 Solid Waste Management

The solid waste will primarily include domestic waste, minor amounts of hazardous wastes and recyclables. No solid waste will be disposed of to the land. Hazardous waste types will typically include fuel and lubricants. Hazardous waste will be separated from solid waste and hauled to Inuvik for the appropriate treatment and ultimate disposal. The hazardous waste will be either treated and disposed through a working arrangement with the Town of Inuvik or transported for disposal via a licensed carrier to an approved disposal facility outside the NWT.

Combustible materials and food wastes will be incinerated on-site on a daily basis. Incinerator ash will be trucked out and disposed of at an appropriate disposal facility. Beverage containers will be taken to the recycling depot in Inuvik if it is operational.

Contaminated snow will be collected and evaporated in a diesel-fired evaporator.

Any accidental discharges of waste materials or hazardous materials will be managed as per MGM's Spill Contingency Plan included in the Water Licence Application.

6.5.7 Air Support

Infrequent air support via helicopter and fixed wing aircraft will be required during abandonment activities for the mobilization of personnel and emergency evacuation. One airstrip is proposed for the Program in proximity to the K-30 wellsite. A preferred location is shown on Figure 5-2, but MGM will complete reconnaissance surveys in the summer and/or fall to identify an appropriate location. The airstrip will be constructed on a frozen river channel, will have approximate dimensions of 1,500 m x 75 m (11.25 ha), and will meet guidance requirements for visibility and safe operations (EISC 2004). A helicopter landing pad will also be constructed at the and wellsite(s). A helicopter pad will also be available at the barge landing but will not require additional clearing as it is located directly on the barge vessel.

Flights to the sites will originate from Inuvik and Tuktoyaktuk. Defined flight paths will be maintained throughout the Program and will be straight lines unless deviations are needed to avoid weather conditions. Additional emergency fuel, if required, will be available at each wellsite. The EISC Operating

Guidelines and Procedures (EISC 2004) will be adhered to when safely possible, as will CWS recommendations (1,000 m vertical distance and 1,500 m horizontal distance from concentrations of birds). Pilots will be briefed on the Program's flight guidelines.

6.5.8 Personnel Requirements

Approximately 35 personnel are expected to be required for the abandonment phase of the Program. However, the number of personnel within the Program footprint at one time will depend on the activities of the Program. Table 6-6 presents a best available estimate of personnel requirements for the abandonment phase of the Program. Actual personnel requirements are dependent on the final scope of work. MGM may elect to have maintenance crews and security staff at the wellsite(s) as required.

Table 6-6 Average Number and Role of Personnel Required for Abandonment (per shift)

Role	Estimated Number of Personnel
Abandonment supervisors	3
Rig managers	1
Rig personnel	4
Oilfield Trucking	2
Vacuum truck operators	2
Camp maintenance	2
Medical	1
Safety Coordinator	1
Environmental Monitor	1
Wildlife Monitor	1
Water Truck Operators	4
P-Tank-Test Crew	3
Logging/slickline Crew	3
Cement Pumper	3
Cement Bulker	1
Fuel farm attendant	1
Security/access control	1
Fuel truck driver	1

6.5.9 Equipment

Table 6-7 provides a list of the expected equipment for the abandonment phase. This list is the best available estimate of equipment needs at the time of completion of this PD and could be subject to change due to equipment availability and final Program requirements.

Table 6-7 Equipment for Abandonment

Type	No.
Abandonment related equipment	
50 Man Camp	1
Service rig	2
Service Rig Pump and tank	1
Spare Rig Pump	1
Catwalk & Pipe Racks	2
100 to 150 HP Boilers	3
Wellsite Shacks	3
Eline/Slick line unit combo unit	2
P-Tank unit with flare stack	1
Jet Cut equipment for cut and cap operations	1
Backhoe for cut cap operation	1
Bed Truck for hauling equipment	2
Picker Truck for hauling equipment	2
Water tank truck for produced Fluid	2
Potable Water Trucks	2
Hydrovac truck	2
Vacuum Truck	2
Cement Pumpers	2
Cement Bulker	1
Heated insulated 63.56m^3 tanks for fresh water	4
Heated insulated 63.56m^3 tanks for wellbore fluids	2
Methanol Storage 10m^3	1
Secondary containment for tanks	8
Light Towers	10
Flameless Heaters	5
Snowmobiles	2
Vehicles and related equipment	
Diesel Pick-up trucks	15
Front End Loaders	2
Miscellaneous equipment	
Rig mats	40
Pallets of KCl to mix kill fluid	10
Satellite system, Communications System	2
C-Cans to store equipment	4
Liners for storage of materials as required	6
Anchor Blocks	8
50m^3 Double Walled Fuel Tanks	4

6.5.10 Fuel

The amount of fuel required for the abandonment phase will vary, depending on the number of wells MGM is able to abandon in a single winter season. To provide a conservative estimate, fuel estimates provided in Table 6-8 were calculated on the assumption that all three wells are abandoned within a single year. Should all wells not be abandoned within a single year, the fuel requirements for each year would be less. A total of 377,000 L of diesel, 2,000 L of jet fuel, 7,500 L of propane and 2,500 L of gasoline are estimated to be required for the Program. Fuel to support abandonment activities will be stored in 100,000 L double walled Envirotanks, located at either a staging site or wellsite. The ice pad where these tanks are stored will also be bermed to contain any spilled fluid in the event of an incident.

Fuel will also be supplied via fuel truck using ice roads. Specifically-trained individuals will be tasked with transportation of fuel and refuelling during construction to minimize potential spills. Drip pans will be used when vehicles are being fuelled or when stationary for more than two hours. The fuel truck will also be equipped with an emergency spill kit.

Regular inspections will be completed to ensure tank containment integrity and refueling areas are clean. Leaks or spills will be cleaned up immediately, be recorded and, if required, reported, and the cause of leak corrected. Spill kits will be strategically placed and maintained in and around refueling areas.

A small quantity of gasoline will be stored to operate snow machines. This will be in 45 gallon drums. Less than a dozen drums are anticipated. These will be stored in the bermed fuel storage sites at the wellsite, camps and staging sites.

Table 6-8 Estimated Program Fuel Storage Capacities during Abandonment (for a single year)

Requirement	Volume of Diesel Fuel Storage	Storage Location	Containment
Overall Program Use	750,000 L barge	Barge landing, staging sites	• Outer tanks empty • Drip pans for transfer • Dedicated fuel transfer personnel
Abandonment	40,000 to 60,000 L tank	Wellsite	• Built-in secondary containment • Drip pans for transfer • Dedicated fuel transfer personnel
	20,000 L tank	Camp	• Secondary containment
	15,000 to 30,000 L tank	Rig	• Secondary containment

6.6 Demobilization

Options for the demobilization of equipment and materials include:

- Transport directly to Inuvik using the constructed ice roads for the Program prior to the routes being decommissioned for the season
- Transport to and loaded onto a barge where it would remain at the barge landing and be retrieved by the barge operators following spring break-up. Though the exact date is not known, barge demobilization will begin following spring break-up in late June or early July and would follow routes used during mobilization. Regular inspection visits to the barge by helicopter[4] would be conducted during the time between demobilization and remobilization of the subsequent year.

6.7 Monitoring

Should multiple years be required to complete the Program, monitoring will take place during each summer season following winter operations. Once all Program abandonment activities are completed (including any required remediation and reclamation), a summer inspection will be completed to confirm any requirements for site cleanup. Any clean-up work and residual surface disturbance will be completed according to land use permits and in consultation with the appropriate regulatory agencies.

[4] Where helicopter flights are required EISC 2004 guidelines will be used and CWS recommendations (1000 m vertical distance and 1500 m horizontal distance from concentrations of birds), will be adhered to.

7 PROGRAM SCHEDULE

MGM would like to complete abandonment of all three wells before 2029. Figure 7-1 shows the schedule for key phases of the Program that may occur within a given year. MGM anticipates abandonment crews will work around the clock in 12-hour shifts. The amount of time required to complete abandonment at each wellsite will be dependent on the site-specific conditions. Specific Program activities occurring during each phase are described in Sections 6.3 to 6.5.

Key events and approximate timing for each year are:

- Barge Mobilization: September to October
- Ice road/ice pad construction: November to mid-April
- Abandonment activities: December to mid-April
- Demobilization (ice roads): when ice road conditions are no longer safe for travel (likely mid April)
- Demobilization (barge): after spring break-up (late June to early July dependent on breakup timing)
- Monitoring: July to August

Proposed Project Season and Activities

Program Activities	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September
Advanced Equipment Mobilization*																	
Construction																	
Abandonment																	
Demobilization																	
Ice Roads																	
Barges																	
Monitoring																	

Approximate Program Activity Schedule (per Year)

Figure 7-1

8 NEW TECHNOLOGY

The Program will use existing and proven technology. The use of new technology is not anticipated.

9 ALTERNATIVES

There are limited opportunities for use of alternative measures to execute a well abandonment in the region. The Program considers using open water barge staging and construction of winter ice roads for mobilization and demobilization of the construction and abandonment equipment.

The preferred execution of the Program is a combination of summer mobilization and staging and winter abandonment activities. Advanced barging in the summer of key equipment would expedite construction of ice roads and execution of winter abandonment activities in the timeframes required.

10 TRADITIONAL AND OTHER LAND USES

MGM's Program activities are expected to take place during the late fall for advance barge and camp staging of equipment, during the winter for well abandonment activities and during the early summer for demobilization of the camp and barged equipment. The proposed Program activities will be concentrated in the outer Mackenzie Delta in the southern portion of the KIBS, north of Camp Farewell, for I-25 and on Langley island for K-30 and E-07 (Figure 5-1).

10.1 Land Use and Special Management Areas

The Inuvialuit Community Conservation Plans (CPPs) indicate the importance of specific areas and provide recommendations for acceptable land use activities at different times of the year. The CCPs for Tuktoyaktuk (TCCP 2016), Inuvik (ICCP 2016) and Aklavik (ACCP 2016) show that the proposed Program overlaps with 15 Inuvialuit Special Areas (Table 10-1). These include special land use area categories B, C, D and E. The CCPs define these areas as follows:

- Category B: Lands and waters where there are cultural or renewable resources of some significance and sensitivity but where terms and conditions associated with permits and leases shall assure the conservation of these resources.
- Category C: Lands and waters where cultural or renewable resources are of particular significance and are sensitive during specific times of the year. These lands and waters shall be managed to eliminate, to the greatest extent possible, potential damage and disruption.
- Category D: Lands and waters where cultural or renewable resources are of particular significance and are sensitive throughout the year. As with Category C, these areas shall be managed to eliminate, to the greatest extent possible, potential damage and disruption.
- Category E: Lands and waters where cultural or renewable resources are of extreme significance and are sensitive. There shall be no development on these areas. These lands and waters shall be managed to eliminate, to the greatest extent possible, potential damage and disruption. This category recommends the highest degree of protection in this document.

Table 10-1 Inuvialuit Special Management Areas that have Spatial and/or Temporal overlaps with the Program

Site Number	Site Name	Importance	Program area Overlapping	Activity Overlapping	CCP Noting Site as Important
201B	Fall Moose Harvesting Area	Important fall moose harvesting area and important habitat for moose	All areas	Fall staging	Inuvik
202B	Fall/Winter Moose Harvesting Area	Important fall/winter moose harvesting area and important habitat for moose	Transportation corridor to all areas	Fall staging	Inuvik
303B	Spring Moose Harvesting Areas	Area for subsistence hunting of moose	Ice road	Transportation route winter ice road	Tuktoyaktuk
304C	Spring Goose Harvesting Areas	Key area for subsistence hunting of geese in the spring	All areas	Staged equipment	Tuktoyaktuk
312C	Fall Waterfowl Harvesting Areas	Key area for subsistence harvesting of waterfowl during the fall	All areas	Fall staging	Tuktoyaktuk
314C	Winter Wolverine Harvesting Areas	Key area for harvesting wolverine during the winter	Transportation corridor to all areas.	Transportation route winter ice road and I-25	Tuktoyaktuk
316C	Winter Fishing Areas	Key area for subsistence fishing during the winter	Transportation corridor to all areas and I-25	Transportation route winter ice road and I-25	Tuktoyaktuk
322C	Critical Grizzly Bear Denning Areas	Important (from Oct. to May) for denning grizzly bears	Transportation corridor to all areas and I-25	• Transportation route winter ice road and I-25 • I-25 site abandonment activities	Tuktoyaktuk
323C	Mainland Coastal Polar Bear Denning Areas	Important (from Oct. to March) for polar bear denning	All areas	All sites, mobilization, site abandonment activities	Tuktoyaktuk
704C	Fish Lakes and Rivers	Important fish habitat and subsistence harvesting area	Transportation corridor to K-30 and E-07	Transportation corridor for program activities	Tuktoyaktuk Inuvik
706E	Kendall Island Migratory Bird Sanctuary	• Bird breeding season May-August • Important area for polar bear, beluga and caribou	I-25	Demobilization of barges and camp	Tuktoyaktuk Inuvik Aklavik

Table 10-1 Inuvialuit Special Management Areas that have Spatial and/or Temporal overlaps with the Program

Site Number	Site Name	Importance	Program area Overlapping	Activity Overlapping	CCP Noting Site as Important
712C	Beluga Management Plan Zone 2- All Mackenzie Shelf Waters Shallower than 30 Meters	Major Beluga travel corridor	K-30 and E-07	Barge demobilization	Tuktoyaktuk Inuvik Aklavik
715C	Mackenzie River Delta Key Migratory Bird Habitat	Bird nesting and breeding habitat - May to September	All areas	Fall staging and demobilization of barges and camp	Tuktoyaktuk Inuvik Aklavik
718D	Central Mackenzie Estuary	• Concentration area for beluga • Transit area between Shallow and Kugmallit Bays • Fish overwintering and nursing area	Transportation corridor to all areas	• Transportation corridor for all program activities • Water withdrawal activities for camps and ice roads	Tuktoyaktuk Inuvik Aklavik
719C	Inner Mackenzie Delta	• Important habitat for fish, waterfowl, moose and furbearers • Historical, cultural and archeological sites • The Peel, Husky and West Channels are important migration, spawning, feeding, nursing, and overwintering areas for fish	Transportation corridor to all areas	• Transportation corridor for all program activities • Water withdrawal activities for camps and ice roads	Tuktoyaktuk Inuvik Aklavik

10.2 Migratory Birds and Harvesting

The program overlaps with areas that are important for waterfowl habitat, in the outer Mackenzie Delta (715C) including the KIBS (706E). These include areas that are important for subsistence harvesting of waterfowl in the spring (304C) and the fall (312C). The Inuvialuit have reported harvesting waterfowl species in these areas including whitefronted geese *(Anser albifrons),* snow geese *(Anser caerulescens),* canvasback *(Aythya valisineria),* mallard *(Anas platyrhynchos*), pintail *(Anas acuta),* scoter *(Melanitta* sp.), shoveler *(Spatula clypeata),* and wigeon *(Mareca* sp.) (Fabijan et al. 1993). Waterfowl harvesting in the spring takes place primarily during May (Joint Secretariat 2003) and in the fall during September (Joint Secretariat 2003). Program activities (staging and demobilization of barge) during the open water seasons will be confined to the water courses and take place between July to October for staging and late June to July of the following year for demobilizing of barges. The on-land abandonment activities will take place during the winter months and will be concluded by mid-April minimizing the potential overlap with migratory birds nesting activity and spring harvesting activities.

10.3 Fish and Fishing

The outer Mackenzie Delta waterways and lakes include important fish habitat areas and are used for subsistence harvesting of fish (316C, 704C). Program staging, demobilization, and winter road access will take place on waterways identified as important fish overwintering and nursing habitat (718D, 719C) and subsistence harvesting (704C). Inuvialuit have reported harvesting broad whitefish *(Coregonus nasus*), lake whitefish *(Coregonus clupeaformis),* cisco *(Coregonus* sp.), inconnu *(Stenodus nelma),* and pike *(Esox lucius)* in or near the Program area where staging activities will take place (704C). Lake trout *(Salvelinus namaycush)* and loche (*Lota lota)* are also harvested in the Mackenzie Delta (718D, 719C; Fabijan et al., 1993). Fish harvesting generally takes place from May through November (Joint Secretariat 2003). The Program activities will include transportation through the waterways for staging, demobilization, and winter ice road access. Water withdrawal may take place in areas that are important as fish overwintering areas. Equipment used for water withdrawal with employ fish screens.

10.4 Grizzly and Polar Bear

The Tuktoyaktuk CCP (TCCP 2016) notes that the outer Mackenzie Delta (322C, 323C), which overlaps the Program wellsite(s), provides denning habitat that is important to grizzly bears (October to May) and polar bears (October to March). For previous projects in the area (KAVIK-AXYS 2006), communities have recommended that site denning information be obtained from ECC. Previous community consultation and project experience indicate that it is likely polar bears will be present in the Program area (KAVIK-AXYS 2004). To minimize bear conflicts MGM will employ Inuvialuit wildlife monitors during all Program activities.

10.5 Beluga and Beluga Harvesting

Beluga whales migrate through the ISR and are present in the outer Mackenzie Delta waterways during mid-June to early September. The barge staging and demobilization routes overlap with Beluga Management Zone 2 (712C). Open water demobilization activities will overlap with beluga whale movements in the outer Mackenzie Delta. Barge staging will take place in late September or October and will not overlap with the presence of beluga whales.

10.6 Moose, Wolverine and Furbearers

The Mackenzie Delta is important for subsistence harvesting and habitat for moose (303B, 201B, 202B), wolverine (314C) and furbearers in general (719C). Furbearers are harvested primarily during the winter months (Joint Secretariat 2003) from November through to May. Muskrat harvesting takes place from March through June. Moose are harvested throughout the year by hunters from Aklavik, Inuvik and Tuktoyaktuk (Joint Secretariat 2003). Harvesting areas in the Mackenzie Delta overlap with the Program transportation and abandonment activities (Fabijan et. al. 1993). Program transportation activities including staging, spring demobilization, and winter ice road access will overlap with moose and furbearer harvesting activities.

10.7 Effects on Land Use and Special Management Areas

The MGM Program area overlaps with several Special Areas outlined in the Aklavik, Inuvik and Tuktoyaktuk CPPs. There is potential for Program activities to interact with subsistence harvesting activities and wildlife. Mobilization and demobilization activities will be on waterways or over ice. There is potential for interactions with harvesters and wildlife, but these are anticipated to have negligible effects as presence in any given area will be short-term. The Aklavik, Inuvik, and Tuktoyaktuk Hunters and Trappers committees will be informed of Program activities and interaction with harvesters will be avoided. To minimize wildlife disturbance, aircraft flights to the sites will be in accordance with the EISC Operating Guidelines and Procedures (2004). On land activities will not take place during the time periods when migratory birds are present in the area for nesting, rearing, and feeding. No impacts on fish and fish habitat are anticipated. Mitigation will be developed using DFO measures to avoid causing harm to fish and fish habitat (DFO 2018). Activities at the abandonment sites and camps will employ wildlife and environmental monitors to avoid or minimize any potential wildlife interactions and habitat disturbances.

11 COMMUNITY CONSULTATION

11.1 Summary of Public Involvement

Formal consultation meetings for the proposed Program were conducted during two rounds of meetings. Two MGM representatives and one KAVIK-STANTEC representative attended each meeting. Meetings were scheduled with the local Tuktoyaktuk, Inuvik, and Aklavik Hunters and Trappers Committees (HTC) and Community Corporations (CC). MGM also met with the Inuvialuit Game Council (IGC), the Inuvialuit Regional Corporation (IRC), DFO, Aurora Research Institute (ARI), ECC - Lands and Waters Division (GNWT), and the Industry Tourism and Investment, Petroleum Division (ITI). The meeting dates with each group and the number of participants are provided in Table 11-1. Only one round of meetings was conducted in Aklavik as the HTC and CC were not available during the month of June.

The first set of meetings were conducted from June 20 to 22, 2018. The purpose of this round of meetings was to introduce the Program concept and scope, outline the Program area, potential timelines, and receive meeting participants' initial comments, questions, concerns and input to the Program design and execution. A consultation records are provided in Appendix AA.

A second round of consultation meetings were conducted from August 27 to 30, 2018 and during September 17, 2018. The purpose of this round of meetings was to provide more details on the Program execution and timing. This included a listing of Program equipment, personnel, camp requirements, potential barging, and ice road routes, as well as estimated water requirements for the camp usage and ice road construction. An engagement package was e-mailed to the Tuktoyaktuk, Inuvik, and Aklavik Hunters and Trappers Committees and Community Corporations, approximately two weeks in advance of these meetings (Appendix B). The engagement package was provided to the IGC and other groups at the start of the meeting. The presentation handout provide to participants for the second consultation round is provided in Appendix B.

The Program has several options and scenarios. MGM has committed to updating each group on the actual timing and work scope as it is determined and as the Program proceeds.

An engagement package was provided to the previously listed parties on November 21, 2025 titled Stakeholder Engagement Package, Inuvialuit Settlement Region Well Abandonments, November 21, 2025. No responses have been received to date. The engagement package is included in Appendix A.

Table 11-1 Community Consultation Meeting Schedule

Date	Group	# Participants	Location
Meeting Round 1 - Program Introduction			
20 June, 2018	Joint meeting: • Inuvik Hunters and Trappers Committee • Inuvik Community Corporation	 4 Directors 2 Directors	ICC Boardroom, Inuvik
	Tuktoyaktuk Hunters and Trappers Committee	5 Directors	TCC Boardroom, Tuktoyaktuk
	Tuktoyaktuk Community Corporation	5 Directors	TCC Boardroom, Tuktoyaktuk
	Inuvialuit Regional Corporation	4 Representatives	IRC Boardroom, Inuvik
21 June, 2018	Department of Fisheries and Oceans	2 Representatives	DFO, Inuvik
	Industry Tourism and Investment, Petroleum Division		ITI Boardroom Inuvik
22 June, 2018	Inuvialuit Game Council	7 Directors + public	Kitti Hall, Tuktoyaktuk
	GNWT ECC - Lands and Waters Division	3 Representatives	Lands, Inuvik
Meeting Round 2 - Program details			
27 August, 2018	Joint meeting: • Tuktoyaktuk Hunters and Trappers Committee • Tuktoyaktuk Community Corporation	 4 Directors 4 Directors	Youth Center, Tuktoyaktuk
	Aurora Research Institute	3 Representatives	ARI Boardroom, Inuvik
28 August, 2018	Joint meeting: • Inuvik Hunters and Trappers Committee • Inuvik Community Corporation	 3 Directors 1 Director	ICC Boardroom Inuvik
	Inuvialuit Regional Corporation	2 Representatives	IRC, Inuvik
	GNWT ECC - Lands and Waters Division	3 Representatives	Lands, Inuvik
	Department of Fisheries and Oceans	1 Representative	DFO, Inuvik
	Industry Tourism and Investment, Petroleum Division	3 Representatives	ITI Boardroom Inuvik
30 August, 2018	Inuvialuit Game Council	7 Directors + public	Whitehorse
17 September, 2018	Joint meeting: • Aklavik Hunters and Trappers Committee • Aklavik Community Corporation	 6 Directors 6 Directors	Aklavik, ACC office

11.2 Summary of Issues and Concerns

A summary of the consultation discussion is presented here. A detailed summary of questions and responses and the detailed meeting notes are provided in Appendix A. A summary of the consultation discussions are presented in this section under the following categories: General, Environmental, Emergency Response Plan, Monitoring, Benefits, Regulatory, Logistics, K-30 and Closing Comments.

11.2.1 General

General Program questions were asked to clarify presentation points. These are provided in Appendix A.

MGM was asked to explain the abandonment process. MGM explained that the major equipment would include a service rig with wireline equipment, cement trucks and fluid tanks on-site. The service rig used is smaller than a drilling rig. There is a grader and a hoe on-site to move snow and earth. There are a couple of wellsite shacks on-site to provide shelter and warm for personnel. There will be a boiler to keep everything from freezing. The well is inspected to check that there is no pressure and to make sure the well is dead. When drilling, the crew will perforate or open the zone so that the oil and gas can flow out. Cement is put into the zones (i.e., squeeze the zones) so the oil and gas does not flow out. A plug is then put in place with cement and then another plug on top. The pipe is then cut and tested to ensure it is solid and secure. The wellhead is then cut and signage is put in place to identify the location. This is the abandonment process for all of the wells for the proposed Program.

Communities questioned what the reason was for all the options and questioned if it is the intent to abandon all of the wells. MGM explained that the different options provide flexibility in undertaking the Program from a timing and fiscal basis. The expensive part of the Program is building the ice road. The options allow MGM to be in a position to abandon two or all three wells in one winter season. K-30 was chosen as the first well because of its proximity to the ocean and the rate of shoreline erosion. The EISC submission will have a number of different timing scenarios, abandonment options and ice road routes so that in any given year an option could be selected without going to the EISC for an amendment. Options for a two and three-year Program are being submitted. Economically, a one-year Program is preferred. The incremental cost to complete more than one well is minimal compared to rebuilding the ice road in a subsequent year.

Concern was expressed regarding gas leakage from the wellsite after the Program. It was explained that cement is pushed into the formation until it does not go in anymore. During this process, called the squeeze, any gas leakage is checked. A plug is put into the pipe once the squeeze is holding and no gas is detected. The pipe is then capped.

It was suggested that there needs to be an explanation for any chemicals being used in the process. MGM explained that Material Safety Data Sheets (MSDS) forms will be included as an appendix in the Spill Contingency Plan and that a common language description will be used for the chemicals. Chemicals will be used but the Program mostly uses an inhibited water-based system with some additional chemicals.

General comments on the Project include:

- One of the Marine Protected Areas (MPA) is located near the Program. If all MGM is doing is bringing a barge through the channels, then that should not have a negative effect.
- It was noted that the Program maps should include the MPA.
- Suggested that fill material could be obtained from Sandy Hill, which was done for the Ikhill Pipeline and YaYa Lakes. It was also noted that the Inuvialuit Land Administration (ILA) would know where there are good sources of gravel.

Communities asked if MGM would be coming back for consultation if the Program was approved to meet with the committees and the communities. MGM said they would keep communities informed of the Program. Once the Program is approved by the EISC and all the permits are in place MGM has to internally approve a budget. After this, information would be provided on specific Program dates and service and equipment requirements. The HTC's, CC's, IRC, and the IDC will be kept informed about the Program.

11.2.2 Environmental

At the Inuvik meeting it was noted and acknowledged by MGM that it was important for the Program to consider the three basic goals from the IFA:

- To preserve Inuvialuit cultural identity and values within a changing northern society;
- To enable Inuvialuit to be equal and meaningful participants in the northern and national economy and society; and
- To protect and preserve the Arctic wildlife, environment and biological productivity.

The communities noted that storm surges in the shallow outer delta waters make it difficult for vegetation to grow and asked what the process for revegetating Program disturbances would be. MGM will revegetate disturbances and is working with and sponsoring ARI to collect and develop quantities of local native seed stock to apply to these sites including species that will grow in the wet and salty conditions.

The committees noted that:

- The Program area is used for fall geese hunting
- Muskox are hunted in the area
- That there are MPAs around KIBS but there should be no negative effect if staging activities are confined to the Mackenzie Delta channels.
- Whales are coming into the area later than they used to and it is better for the Program to access the area later than July.
- Belugas are primarily present in the area during the summer and September.
- Beluga whales are migrating to the offshore during August and September.

- The Beaufort Sea Partnership (BSP) has information on the number of beluga whales harvested in the area.
- Camps along the river are where most of the fish holes are.
- The river channels are constantly changing and there are shallow spots.
- During early summer this year the water dropped and then it came back up. Water levels were low even though it rained all summer. MGM should obtain water level history to assist in timing for staging activities.
- Noise from the drill activities will not impact whales as this activity is only in the winter.
- Transporting the camp barge through the channels should not have any negative effects.
- Communities should be consulted on barge staging and travel routes

MGM noted that interaction with harvesters and wildlife would be minimal. If barge staging of equipment is undertaken as it would be done as late in the open water season as possible in August, September or October. Project activities will be confined to within the Mackenzie Delta channels outside the MPA and barges will be staged in protected areas in the river channels. The communities will be consulted on appropriate travel routes on the river.

11.2.3 Emergency Response Plan

Communities questioned if there would be a plan in place for malfunctions during abandonment activities and if appropriate equipment would be at the work site. MGM noted that this is being considered and there would be an emergency response plan filed with the EISC submission. There are co-op emergency response kits stored in Inuvik and there may be sea cans, with clean up equipment, on the camp barge during the abandonment activities. Concern was raised about spills being reported. MGM will have a reporting system in place and is experienced and familiar with the NWT spill line reporting requirements and procedures.

11.2.4 Monitoring

The communities asked if and for how long monitoring would take place after the Program was completed. MGM will continue monitoring the sites as long as remediation activities are going on and required by the regulators. The wellheads are currently being monitored annually to ensure there are no gas leaks. After abandonment a separate wellhead gas migration monitoring program will be conducted to ensure there are no gas leaks. This is required by the CER.

11.2.5 Benefits

Communities wanted to know if Inuvialuit businesses would be used for the work, what these opportunities were and if there would be beneficiary training opportunities. MGM noted that it still has a Comprehensive Cooperation and Benefits Agreement (CCBA) plan with IRC and wants to use Inuvialuit businesses as much as possible. MGM provided a list of services required at the meetings and will continue discussions with the IRC, IDC and local service providers to maximize local content and capacity for the Program. If any of the required services do not yet exist there is time for the Inuvialuit to form the appropriate partnerships. For example, the Program requires a service rig and there currently isn't an Inuvialuit business that can provide one. MGM is aware of the Inuvialuit business list and will engage businesses where there is capacity to do so. Several required services were noted including monitors, camp jobs, rig jobs and ice road building. IDC said they would provide MGM with an updated Inuvialuit business list and noted that they now wholly owned the Arctic Oil and Gas Services (AOGS) and wanted to provide the Program camp catering services. The communities and IRC noted that they were now able to provide drone services. MGM noted that they have set aside funds for this Inuvialuit service for next years ongoing monitoring program.

In response to being asked if there would be any work this year and when the Program would start, MGM indicated that the erosion rate at K-30 is the driving force for the Program. There will not be any work this year and it is anticipated that the Program may begin in 2020-2021.

Concern was expressed that most of the work goes to Inuvik and the smaller businesses and communities are not provided with work opportunities. MGM will send out requests for proposals to the companies on the Inuvialuit business list that provide the required services. These companies will have an opportunity to bid on the work. The cost of the entire Program is thought to be between 10 and twenty million dollars.

Small companies have experienced situations on previous projects where they were hired by large companies and their equipment went out to a site but did not get used and they only received standby payment. MGM noted that any equipment brought to the work sites will be used.

11.2.6 Regulatory

Regulatory questions included clarification on terminology, such as "altering the condition of well", who the responsible authority was for abandonment and what is the timing for permitting the Program. MGM explained that currently the wells are called suspended and putting cement in changes the well status to "abandoned" and this process is "altering the condition of the well." The Program Description is submitted to the EISC first then MGM obtains the water licence and land use permits followed by an operations authorization from the CER. Each well would then obtain an authorization to alter the well and this is the abandonment licence. The specific abandonment technical details and engineering are provided to the CER for approval before the Program can proceed. MGM was asked about and noted that the CER determined the depth of the plugs. The CER permit applications are expected to be completed by the first quarter of 2019.

When asked about the Program timing MGM noted that with the rate of shoreline erosion at K-30, estimated at 6 m per year, this wellsite is expected to be abandoned within the next five years. MGM will know in the fall of 2018 if the Program will proceed in 2020-2021.

11.2.7 Logistics

MGM was asked how they would carry out the Program, specifically, what time of year would the work take place, how long the work would take for each well, if there were camps, what type of camps, where they would be, how and when the ice roads would be constructed and what equipment is required for all components of the Program.

In response, MGM noted that the Program could involve fall staging of equipment on barges near the wellsite for winter operations. Local knowledge will be used to determine the exact staging sites and how they will be anchored at the site. Staging would be as late as possible in the season to minimize costs. If the barge was staged in September and can't be retrieved until the following June, MGM would be paying for it's use the entire time. There would not be equipment on the land during the summer. An ice road from Inuvik would be built to the various sites for winter abandonment operations. There might be three camps. The camp barge could be staged and set up half way between wellsites from which crews would move back and forth from the wellsites. There could be a sleigh camp of shacks right on the site for personnel for shelter. There maybe a sleigh camp with the ice road construction crew working from Inuvik. A number of options are being considered and assessed to provide safety for the crews, local contractors, communities and cost. The permitting is going to be broad enough to include a lot of different options so that the best option can be chosen in any given year.

At peak times the camps might have 40 to 60 people. Ice road construction could be done simultaneously from the barge, the camp sites and from Inuvik. It is anticipated that field operation will continue around the clock in two 12-hour shifts. Once the first wellsite is prepared and the abandonment crew is working, the construction crew will continue working towards the second site. The work at each wellsite could be completed in ten to 14 days or six to seven days if everything goes well. This includes four to five days to set-up and a couple of days to move off the site. At the end of each season the sleigh camps and as much equipment as possible could be demobilized to Inuvik to reduce rental costs. The barge would come out during the open water season.

An equipment list was provided during the second-round presentation of the consultation meetings. Participants were informed that all the Program details, including the operation options and an equipment list, would be provided in the EISC submission.

Communities noted that the winters are not as cold as they used to be and the ice is not as thick as it was in the past. It was noted to think about using barges to take the rig out there, freeze it in and take it off in the winter. It was suggested to use ice roads for lighter vehicles and resupply. MGM noted they will consider this and also consider the amount of ice road building water they may need because of it.

MGM was asked what the thickness of the wellsite ice pad would be and to consider this in determining water needs. The water volumes presented at the meetings included water volumes for the ice road and ice pad which would probably be built to a similar thickness as was done for the drilling programs.

In response to a concern that fuel was being used in the pipe, MGM noted that they would be using inhibited water, which is water and some additives but does not contain fuel.

Concern was raised as to what would happen with Program waste materials. The IGC believes in garbage in, garbage out. MGM stated that Program waste materials will be removed and transported to an appropriate facility, in this case in British Columbia or Alberta. The only material that might be disposed of in the NWT is the camp waste and sewage. MGM may talk to Inuvik or Tuktoyaktuk to discuss options for disposal.

When asked if MGM is collaborating with any other companies, MGM noted that they have always let other companies know about their plans and will continue to look for possible collaborations and cost savings. MGM is collaborating with operations in the Liard and Sahtu Regions.

11.2.8 K-30

The K-30 site was specifically discussed and commented on during community consultations.

Participants asked about the K-30 site, height above sea level, wellhead distance from the water, water depth, how much land is required to conduct abandonment activities and why K-30 is being pursued first. MGM reported that the site was about 1 m above sea level, about 60 m from the water as of 2017, and that the local water depth is 1 m to 2 m. MGM explained that the K-30 was being pursued first because the coastline is eroding at about 5 m per year. About 10 m to 20 m on the ocean side of the wellhead is required to operate a service rig and that because of the coastal erosion rate there may only be 5 to 10 years left to conduct this operation.

Questions were asked about what equipment was being used for the Program and what depth the wellhead would be cut to. Because of the erosion at K-30, MGM needs to cut the wellhead 10 m below the ground. The pipe will be cut at 10 m, so the plug may be at 12 or 15 m below ground. MGM has to pull 10 m of the casing out so that one day when the site is below water the casing at 10 m is still safe. The GPS coordinates will be provided to all the communities and regulators. Even when it erodes the pipe will be deeper than the boats being used in the area. Participants noted that the 10 m depth should provide some comfort.

Concern was raised that at some point after abandonment the pipe at K-30 would be exposed because of coastal erosion. MGM noted that it was considering this and indicated that the well would be abandoned about 10 m below ground. A meeting participant noted that this depth would be enough because the water in that area is not very deep and once the area is eroded it is likely to be five to seven meters deep and it would be a long time before that is exposed.

Consultation participant comments on local conditions included:

- People out during the summer at KIBS and Baby Island have had to move their camps because of erosion.
- The coastline is receding further so there are bigger storms.
- The area floods in the spring and with storm surges

- A participant used to go hunt geese in the area in fall.
- From six years ago, there are now islands where there used to be channels.

MGM was asked if they had made any considerations for minimizing the erosion or contributing to it during the abandonment work? MGM noted that the on-land activities would be conducted in the winter on an ice pad and should not have any effect on erosion.

With respect to the length of monitoring this site after abandonment MGM noted that they will record the GPS location but that in 15 years there may not be much to monitor. MGM wants to make sure the well is abandoned correctly to minimize effects to the water.

MGM noted, when asked if there was any research associated with the site, that they were conducting work with ARI on local seeds for the area and Dustin Whelan on erosion. Dustin Whelan was to be on-the site this year to set up some of his monitoring. Dustin is conducting other monitoring in the area and MGM is looking to work with him to include some of MGM's sites

11.2.9 Closing Comments

The communities were appreciative of MGM coming out to consult with them and their commitment to cleanup their wellsite areas. They hoped the Program would go ahead so that there would be work. MGM committed to keeping the communities informed as to the timing of the Program.

12 ENVIRONMENTAL OVERVIEW

12.1 Introduction

This section provides an overview of environmental components of importance in the Program area including:

- air quality
- hydrology and water quality
- aquatic resources
- terrain, soils and permafrost
- vegetation
- wildlife
- archaeological resources

Where available, site-specific information collected through monitoring has been provided in the appropriate sections.

The Program area refers to the maximum area to be occupied by all Program components including mobilization, ice road construction, and demobilization. This area corresponds to a conceptual maximum zone of influence of Program activities for the environmental components listed above. The Program area includes Ellice Island, the northern half of Langley Island, and segments of the Arvoknar and Middle Channels in the western portion of the outer Mackenzie Delta (Figure 13-1). Some environmental overview information is also provided for the wider Mackenzie Delta region where it relates to potential Program-specific effects and cumulative effects (Sections 13 and 14).

The Program footprint refers to the area of main abandonment activities and will be the primary focus of the assessment. The Program footprint includes the existing leases for each well, staging areas, camp facilities, barges landing and ice road alignments within the Mackenzie River and associated channels.

12.2 Air Quality

There is limited baseline information for air quality for the Mackenzie Delta region. Table 12-1 provides the NWT ambient air quality standards (AAQS) used by the GNWT to assess emissions from proposed and existing developments in the region (GNWT 2015c). It is expected that background levels for the parameters listed below for the Program area would be similarly low because of the lack of current development and industrial activity in the region.

Table 12-1 Northwest Territories Ambient Air Quality Standards

Parameter	Concentration (in µg/m^3)[1]	Concentration (in ppbv)[2]
Sulphur Dioxide (SO_2)		
1-hour average	450	172
24-hour average	150	57
Annual arithmetic mean	30	11
Nitrogen Dioxide (NO_2)		
1-hour average	400	213
24-hour average	200	106
Annual arithmetic mean	60	32
Total Suspended Particulate (TSP)		
24-hour average	120	-
Annual geometric mean	60	-
Ground Level Ozone (O_3)		
8-hour running average	126	63
Fine Particulate Matter ($PM_{2.5}$)		
24-hour average	28	-
Annual arithmetic mean	10	-
Carbon Monoxide (CO)		
1-hour average	15,000 (15 mg/m^3)	13,000
8-hour average	6,000 (6 mg/m^3)	5,000
NOTES: [1] Micrograms per cubic metre [2] Parts per billion by volume		
SOURCE: GNWT Air Quality Report 2015 (GNWT 2015c)		

Limited flaring may be required during abandonment activities to remove residual gas from the well. Flaring can result in emissions of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), and particulate matter (PM). However, because of the limited time flaring would occur, the ground-level concentrations of these emissions are predicted to not exceed the NWT AAQS.

12.3 Hydrology and Water Quality

12.3.1 Hydrology

The Program area is located in the outer active portion of the Mackenzie Delta. The major discharge channels from the Mackenzie River to the Beaufort Sea are located further to the west in Shallow Bay and to the east in Kugmallit Bay; however, smaller river channels, such as the Arvoknar and Middle Channels, discharge directly through the Program area. Lakes of various sizes are common throughout the Program area. Most of the lakes found within the Program area are considered shallow as they are less than 10 ha in size and less than 4.0 m deep (Lesack and Marsh 2010). These lakes typically freeze to the bottom during winter. There are larger lakes within the Program area, found mostly on Langley Island. These lakes would be the candidates for water withdrawal for construction of ice roads. MGM will use lakes previously approved in past applications for water withdrawal.

The hydrology of the area is influenced by snow melt and surface run-off from the surrounding areas. Flooding during the spring freshet in late May to early June is an important hydrologic process for waterbodies, watercourses, and islands as it provides nutrients and sediment to the area (Bigras 1990; Marsh et al. 1999). After spring floods, water levels recede over the summer months, with the exception of the occasional rise in water levels because of rainstorms upstream of the Delta (Marsh et al. 1999). Since the area is within a discontinuous permafrost zone, the limited movement of surface water from flood and snow melt also contributes to the hydrology of the numerous lakes across the landscape.

12.4 Water Quality

The Mackenzie River waters are characterized by high concentrations of fine sediments, which diminish along with the river discharge values, through the fall, winter and early spring periods (Carmack and Macdonald 2002). Prior to, and following, the period of landfast ice stabilization in the winter, bottom scouring of the ice can also result in sediment suspension and transport.

Storm events on the Beaufort Sea can cause storm surges that flood low-lying areas of the Mackenzie Delta for kilometers inland. During storm surges, wind action can be strong enough to cause mixing of the freshwater plume with seawater and inundate the area with water having chloride concentrations higher than in the freshwater plume (Lapka 2013), which results in isolated lakes to have water considered brackish (i.e., having salinity ranging from 0.5 ppt to 30 ppt) (NOAA 2017) for an indeterminate period.

Temperature, turbidity, and the presence of metals result in fair to marginal water quality for potability and general human uses in the lower Mackenzie River and delta. Water quality is considered excellent to good under guidelines for protecting aquatic life (CCME 1999).

12.5 Aquatic Resources

The Mackenzie Delta and estuary support a diversity of marine, anadromous and freshwater fish species. They provide critical habitat for spawning, migration and overwintering for a variety of species (ACCP 2016; Sekerak et al. 1992). In many cases, overwintering habitat is a limiting factor for fish populations (Sekerak et al. 1992). The overwintering capability of aquatic habitats in the region is dependent on depth, temperature, salinity and dissolved oxygen. Of these, temperature and salinity are likely the most critical and limiting (Sekerak et al. 1992).

The Program area includes a variety of aquatic environments and fish habitat (Table 12-2). It is probable that most species are resident in the region throughout the year, although individuals may move between habitats on a seasonal basis. The waters surrounding Langley Island lie within the Central Mackenzie Estuary (Site No.718D in the Aklavik CCP (ACCP 2016)). Slaney (1976) reported 27 species of fish caught between 1972 and 1974 summer surveys conducted in eastern Mackenzie Bay.

Some of the more important species likely to be found in the Program area are the coregonids (inconnu, arctic cisco, least cisco, broad whitefish and lake whitefish), burbot and northern pike (Stewart et al. 1993, Crawford 1989). These are important to the domestic fishery, which accounts for the majority of the harvesting in the Mackenzie Delta region (Crawford 1989). Various estuarine species can also be found within the Central Mackenzie Estuary including the estuarine form of the fourhorn sculpin, arctic and starry flounder, and rainbow smelt. During the ice-on period, ice is either bottom fast or frozen near to the bottom for most of the area, thereby preventing fish from utilizing much of the nearshore areas during this period.

Mackenzie River channels, such as Arvoknar Channel and Middle Channel, provide important migratory corridors for coregonids between coastal feeding areas and upstream spawning locations. During break-up, young-of-the-year coregonids are flushed into the outer delta and coast through these channels (Evans et. al 2002). In summer, adult spawners move up Middle Channel and other channels to spawning areas further upstream (Evans et. al 2002). In late fall, spent adults move back down into the outer delta area for overwintering (Evans et. al 2002). Lake trout may be found in deeper lakes in the area. Some marine or estuarine fish species may be present in outer Mackenzie Delta channels, especially at the mouths of these channels or when wind pushes marine water up the channels. Species surrounding the outer extents of Langley Island and the surrounding area could include the estuarine fourhorn sculpin, rainbow smelt, and arctic and starry flounder.

Not all lakes, streams and delta channels provide year-round habitat. Shallower lakes and small streams in the Program area may provide summer feeding or rearing habitat for freshwater fish but not overwintering habitat, while lakes of greater than 4 m depth (Slaney 1976) may provide overwintering habitat.

Table 12-2 List of Potential Freshwater Fish found in the Program Area

Family	Species	Common Name
Esocidae	*Esox lucius*	Northern pike
Salmonidae	*Coregonus sardinella*	Least cisco (big-eye herring)
	C. autumnalis	Arctic cisco
	C. clupeaformis	Lake whitefish (humpack)
	C. nasus	Broad whitefish (whitefish)
	Prosopium cylindraceum	Round whitefish
	Salvelinus namaycush	Lake trout
	Stenodus leucichthys	Inconnu
	Thymallus arcticus	Arctic grayling
Cyprinidae	*Platygobio gracilis*	Flathead Chub
	Couesius plumbeus	Lake Chub
Osmeridae	*Hypomesus olidus*	Pond Smelt
Catostomidae	*Catostomus catostomus*	Longnose sucker
Gadidae	*Lota lota*	Burbot (loche)
Gasterosteidae	*Pungitius pungitius*	Ninespine stickleback
Cottidae	*Cottus cognatus*	Slimy sculpin

12.5.1 Species of Management Concern

Table 12-3 provides information on the conservation status rankings for fish species potentially in the Program area. The freshwater form of the fourhorn sculpin may occur in some deep freshwater lakes within the delta region but there are no confirmed captures of the freshwater form in this area (GOC 2018). The estuarine form of the fourhorn sculpin is not a species of management concern and is widely distributed in estuarine and coastal environments in the region (Slaney 1976; Lawrence et al. 1984) and it likely overwinters in the embayments in the Program area.

Table 12-3 Fish Species of Management Concern that may occur in the Program Area

Species	NWT Species at Status Rank[1]	COSEWIC[2]	SARA[3]
Fourhorn sculpin (freshwater) *Myoxocephalus quadricornis*	Secure	Fresh water (Arctic Islands only) = Data Deficient	Special Concern, Schedule 3

NOTES:
[1] Department Environment and Natural Resources, Government of Northwest Territories (2016)
[2] Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (2018)
[3] *Species at Risk Act* (SARA) (GOC 2018)

12.6 Terrain, Soils and Permafrost

The Program area spans the Tundra Plains Mackenzie Delta Lower Arctic North and Richard Island Coastal Plain Ecoregions (Ecosystem Classification Group 2012). The Mackenzie Delta Ecoregion (location of K-30 and E-07) is a low, wet floodplain with wet alluvial silts and clays and is dominated by numerous channels, lakes, ponds and branches of the Mackenzie River. This area is considered to be the active delta and is continually shaped by a range of geological and fluvial processes, including glaciation, isostatic rebound, marine effects from the Beaufort Sea, flooding from the Mackenzie River, and the influence of underlying permafrost. This area is within the discontinuous permafrost zone (Heginbottom et al.1995). Depending on the location, between 35% and 65% of the land surface may be underlain by permafrost (Heginbottom 2000). Due to active fluvial processes, such as flooding and storm surges, soils tend to be rich in calcium and saline and of a very fine-silty and fine-loamy texture but limited in soil production. Cryosols are the dominant soils in this ecoregion and include Regosolic Static Cryosols, Gleysolic Static Cryosols and Gleyed Cumulic Regosols (Ecosystem Classification Group 2012). Soils in the outer delta vary in relation to permafrost depth, drainage, and frequency of inundation. Where permafrost is deeper than 1.0 m and soils are not frequently flooded (i.e., less than annually), Orthic Regosol soils have developed (Heginbottom 2000).

The Richard Island Coastal Plain Ecoregion (located for I-25) is characterized as a low relief terrain with undulating hummocky till and outwash deposits with several lakes and ponds. The environment is not as influenced by fluvial or marine processes as other nearby ecoregions (e.g. Mackenzie Delta Lower Arctic North). The landscape is characterised by ice-wedge polygons and pingos. The area is within the continuous permafrost zone (Heginbottom et al.1995). Soil in the region generally consists of Turbic Cryosols associated with weakly to moderately calcareous fine clayey and fine loamy glacial till (Ecosystem Classification Group 2012).

12.6.1 Langley K-30

The K-30 wellsite is flat with no aspect or slope and minor ground undulations. The wellsite sits approximately 1.5 m above sea level and is located in the discontinuous permafrost zone.
No permafrost-related features are present at the wellsite; however, pingos are located approximately 5 km west of the wellsite and low-centered polygons are present south of the wellsite. Soil on the wellsite is characterized as peaty organic material mixed with a minor fraction of fine sand and silt (KAVIK-STANTEC 2017). Sections of shoreline within 100 m of the wellhead display signs of natural erosion and slumping.

12.6.2 Langley E-07

The E-07 wellsite is located within a mudflat and has a 1% to 5% grade. The wellsite sits less than 2.0 m above sea level. The E-07 wellsite is also located in an area of extensive discontinuous permafrost where freeze-thaw action is common and a series of low-centered ice-wedge polygons are present. Soil on the wellsite is characterized as fine silt (KAVIK-STANTEC 2016a).

12.6.3 Kumak I-25

The I-25 wellsite is flat (0% to 2% grade) and covered with hummocky peat covering silty soil and lies south of Trench Lake (KAVIK-STANTEC 2016b). The wellsite is located in an area where freeze-thaw action is common, and a network of ice-wedge polygons is present. The wellhead is located just adjacent to an ice-wedge. Soil on the wellsite is characterized as grey silty material (KAVIK-STANTEC 2016b).

12.7 Vegetation

Vegetation communities colonizing the Program area are dominated by wet sedge and cotton-grass species, commonly including water sedge (*Carex aquatilis*), narrow-leaved cotton-grass (*Eriophorum angustifolium*) and fisher dupontia (*Dupontia fisheri*) (KAVIK-STANTEC 2016a, 2016b, 2016c, 2017). Slightly more stable areas of the active delta support more successionally developed vegetation communities characterized by short willows with a sedge understory. These communities typically colonize the slightly more raised habitats and channel levees (created by increased sedimentation of fine sand and silt) and intersperse the wet sedge community type. The northern portion of the Program area (in the vicinity of K-30) is influenced by both marine and freshwater processes, which combine to produce a diverse wetland environment. Within Langley Island, at elevations not as influenced by fluvial or marine processes (in the vicinity of I-25), dwarf/low native shrubs, sedges and grasses dominate the landscape. Characteristic species include felt-leaf willow (*Salix alaxensis*), Richardson's willow (*Salix richardsonii*), horsetail (Equisetum species) and narrow-leaved cotton-grass (*Eriophorum angustifolium*). Low centred polygons dominated by sedges, cotton-grasses and sphagnum mosses may also develop.

12.7.1 Langley K-30

Vegetation cover at the wellsite is approximately 75%, consisting of current year's foliage and plant litter. The K-30 wellsite has had minimal topsoil and vegetation disturbance, which has resulted in the native grass, forb and shrub vegetation re-establishing to 0.1 m to 0.5 m heights (KAVIK-STANTEC 2016c). Vegetation at the wellsite is predominantly bluejoint/bent reed grass (*Calamagrostis canadensis*), sedges (*Carex sp.),* and cottongrass (*Eriophorum sp*.) (Photo 1 and Table 12-4). Overall, vegetation health and condition observed on the wellsite is good. There is no observed evidence of plant disease. Plant foliage is green and robust, based on visual assessments made during annual monitoring. No invasive plant species have been observed at the wellsite (KAVIK-STANTEC 2017).

Photo 1 **K-30 Wellsite Area: Overview showing overall site and vegetation conditions. August 2017.**

Table 12-4 Vegetation Types within the K-30 Wellsite Area

Vegetation Type	% Cover
bluejoint/bent reed grass (*Calamagrostis canadensis*)	15
sedges (*Carex sp.)*	35
cottongrass (*Eriophorum sp.*)	15
Sudetan lousewort (*Pedicularis sudetica*)	5
willow (*Salix sp.)*	5
TOTAL	**75**
SOURCE: KAVIK-STANTEC 2016c	

12.7.2 Langley E-07

Vegetation cover at the wellsite is approximately 70%, consisting of current year's foliage (70% cover) and plant litter (15% cover). The wellsite has had minimal topsoil and vegetation disturbance, since site activities were completed, which has resulted in the growth of native sedge, grass, forb and shrub vegetation of 0.1 m to 0.4 m height heights (KAVIK-STANTEC 2016a). Vegetation on the wellsite consists of foxtail (*Alopecurus sp.*), sedges (*Carex sp.),* hairgrass *(Deschampsia sp.),* tundragrass (*Dupontia fisherii*), cottongrass (*Eriophorum sp.*), Sudetan lousewort (*Pedicularis sudetica*), Jacob's ladder (*Polemonium sp.*) and willow (*Salix sp.*) (Photo 2 and Table 12-5). Overall, vegetation health and condition observed on the wellsite is good. There is no observed evidence of plant disease. Plant foliage is green and robust, based on visual assessments made during annual monitoring. No invasive plant species have been observed at the wellsite (KAVIK-STANTEC 2016a).

Photo 2 E-07 Wellsite Area: Overview showing overall site and vegetation conditions. July 2015.

Table 12-5 Vegetation Types within the E-07 Wellsite Area

Vegetation Type	% Cover
foxtail (*Alopecurus* sp.)	10
sedges (*Carex sp.)*	15
hairgrass (*Deschampsia* sp.)	5
Fisher's tundragrass (*Dupontia fisherii*)	10
tall cottongrass (*Eriophorum angustifolium*)	10
tussock cottongrass (*Eriophorum vaginatum*)	10
Sudetan lousewort (*Pedicularis sudetica*)	<1
Jacob's ladder (*Polemonium* sp.)	<1
willow (*Salix sp.)*	10
TOTAL	**70**
SOURCE: KAVIK-STANTEC 2016a	

12.7.3 Kumak I-25

Vegetation cover at the wellsite is approximately 85%. The area immediately surrounding the wellhead culvert was seeded with native grasses in previous reclamation treatments in 2010 to revegetate bare areas around the wellhead (Priddis 2014).

The wellsite had minimal topsoil and vegetation disturbance from the lease preparation operation, which has resulted in the native grass, forb and shrub vegetation re-establishing to a height of 0.1 m to 0.4 m. Vegetation found on the wellsite includes seeded native grasses, predominantly polargrass (*Arctagrostis latifolia*) and trace amounts of tufted hairgrass (*Deschampsia caespitosa*), dwarf birch (*Betula glandulosa*), and mosses (Photo 3 and Table 12-6). Overall, vegetation health and condition observed on the wellsite is good. There is no observed evidence of plant disease. Plant foliage is green and robust, based on visual assessments made during annual monitoring. No invasive plant species have been observed at the wellsite. (KAVIK-STANTEC 2016b).

Photo 3 **I-25 Wellsite Area: Aerial overview of Wellsite Area showing site and vegetation conditions. August 2017.**

Table 12-6 Vegetation Types within the I-25 Wellsite Area

Vegetation Type	% Cover
green alder (*Alnus viridis*)	5
dwarf birch (*Betula glandulosa*)	10
crowberry (*Empetrum nigrum*)	5
tussock cottongrass (*Eriophorum vaginatum*)	30
northern Labrador tea (*Ledum decumbens*)	5
cloudberry (*Rubus chamaemorus*)	5
net veined willow (*Salix reticulata*)	5
willow (*Salix spp.*)	5
mosses	15
TOTAL	**85**
SOURCE: KAVIK-STANTEC 2016b	

12.7.4 Rare Plant Species

The GNWT Department of Environment and Climate Change has identified three species of plants that are at risk in the NWT (GNWT 2018). Hairy Braya (*Braya pilosa*) is listed as At Risk in the NWT, Mackenzie Hairgrass (*Deschampsia mackenzieana*) is listed as May be at Risk and Nahanni Aster (*Symphyotrichum nahanniense*) is listed as Sensitive based on the NWT General Status Rank. There is a low potential for these species to occur in the Program Area based on conditions suited for growth.

Two rare willows, Arctic seashore willow (*Salix ovalifolia Trautv. var. arctolitoralis [Hult.] Argus*), and wedge leaf willow (*Salix sphenophylla A. Skvortsov*) have been previously observed in delta floodplain habitats characteristic of the active outer delta. There is the potential to find both of these species in the Program area. Arctic seashore willow is ranked May be at Risk (NWT General Status Rank). Wedge leaf willow is a nationally rare species that is endemic to the western arctic coastline (McJannet et al. 1995) and is ranked May be at Risk (NWT General Status Rank).

Whorled Lousewort (*Pedicellaris verticillata L.*), another rare species, was found on Langley Island during field work in 2006 and 2007 (KAVIK-AXYS 2006, 2008a, 2008b).

No rare plants have been identified on the wellsites during annual monitoring conducted since 2015.

12.8 Wildlife

The habitat types within the Program area support a number of wildlife species. There are wildlife species present in the Program area that have special conservation status, both territorially and federally, and are as important subsistence harvest resources for communities (see Section 10). The wildlife information provided in this section is from both desktop and field assessments that includes scientific literature, and previous EISC submissions and assessments completed by KAVIK-STANTEC for the wellsites.

12.8.1 Marine Mammals

Six marine mammal species can be found within the Program area: bowhead whale (*Balaena mysticetus*); beluga whale (*Delphinapterus leucas*); ringed seal (*Pusa hispida*); bearded seal (*Erignathus barbatus*); harbour seal (*Phoca vitulina*); and polar bear (*Ursus maritimus*).

The beluga and bowhead whale are seasonal migrants to the western Arctic, can be found in shallow coastal waters off the Mackenzie Delta, and are important to Indigenous groups in the area for subsistence and cultural purposes. However, as these species are summer residents of the Program area, they are not anticipated to be present during Program activities, except for beluga whales during barge demobilization.

Ringed, bearded, and harbour seals are occasionally found within the Program area, but concentrations of these species are not typically found in the area (Stirling et al. 1981).

Four subpopulations of polar bear occur within the ISR: Southern Beaufort Sea, Northern Beaufort Sea, Viscount Melville Sound, and Arctic Basin. Polar bears found in the Program area are part of the Southern Beaufort Sea subpopulation, with an estimated population of approximately 1,200 to 1,500 individuals (GNWT 2016; Inuvialuit Settlement Region Polar Bear Joint Management Plan (Joint Secretariat 2017)). However, movement of individuals within the ISR does occur, making the subpopulations non-isolating (especially the Northern Beaufort Sea and Southern Beaufort Sea subpopulations; the Inuvialuit consider these two subpopulations to be a single group). The Traditional Knowledge study conducted as part of the Inuvialuit Settlement Region Polar Bear Joint Management Plan (Joint Secretariat 2017) indicated the Southern Beaufort Sea population is viewed to be stable.
The Program area is within areas that provide suitable polar bear denning habitat. Polar bear denning habitat occurs both on the ice and land where relief structures promote the accumulation of snow and are in proximity to feeding grounds. Denning bears often return to specific denning sites every year. Male bears may also den for short periods in the harshest part of winter. However, they are present for most of the winter feeding along the shear zone between pack ice and the leading edge of annual ice in the Beaufort Sea (COSEWIC 2008).

12.8.2 Terrestrial Mammals

The habitat variability found within the Mackenzie Delta allows for the geographic range of many terrestrial mammals to extend within the Program Area. Examples of terrestrial mammals found in the Program area include: grizzly bear (*Ursus arctos*), barren-ground caribou (*Rangifer tarandus groenlandicuse*), wolverine (*Gulo gulo*), moose (*Alces americanus*), beaver (*Castor canadensis*), Arctic fox (*Vulpes lagopus*), grey wolf (*Canis lupus*), Canadian lynx (*Lynx canadensis*), snowshoe hare (*Lepus americanus*), and a large number of small rodents. However, the characteristic low-lying landscape that dominates the Program area is a limiting factor for the occurrence of many of the terrestrial species listed above since frequent flooding of low-lying lands that are typical of the northern portion of the Mackenzie Delta result in relatively low habitat suitability.

Grizzly bears in the Program area are typically active from May to October and den from October to May, with variations that are weather dependent (McLoughlin et al. 2002; ACCP 2016; TCCP 2016, COSEWIC 2012). Grizzly bear have been known to move to low-lying coastal areas in June, then shift to upland habitats following green-up of vegetation as waterfowl colonies along the coast, arctic ground squirrels, and caribou carrion can provide important fall food sources. Denning locations are commonly found along major river drainages, eskers, and steep southerly slopes that are well-drained and contain high shrub cover, such as those found on creek and lake banks and pingos (McLoughlin et al. 2002). Dens generally collapse in the summer and are not typically reused from one year to the next.

Barren-ground caribou typically overwinter in forested areas east, northeast and southeast of Inuvik (Nagy et al 2005; TCCP 2016; ICCP 2016)). Windswept areas that provide feeding opportunities in winter or relief from insects in summer are particularly important. The Cape Bathurst barren-ground caribou herd utilizes the Cape Bathurst and Tuktoyaktuk peninsulas. There have been population declines for both the Cape Bathurst barren-ground caribou herd and the Bluenose-West herd from 1992 to 2006.
The populations have since stabilized between 2006 and 2009 following harvest closure

(Adamczewski et al. 2009). There is the potential for barren-ground caribou from the Cape Bathurst herd to be present in the Program area; however, the core winter range (90% utilization distribution) is outside of the Program area (GNWT 2016).

Wolverines are non-migratory and are active throughout the year (they do not hibernate) (COSEWIC 2003). The females build dens in either rocky slopes, deadfall or snow tunnels to give birth to young between late March to mid-April. Dens used for rearing kits must also be in close proximity to sufficient kit rearing habitat. Caves, rock crevices, fallen logs, and holes in the snow are often used for shelter (ICCP 2016). There are an estimated 15,000 to 19,000 wolverine in Canada (COSEWIC 2003); estimates for the NWT suggest there is a stable but sparsely distributed population numbering in the thousands (GNWT 2016). Densities are likely lower in the Program area compared to taiga and mountainous regions (COSEWIC 2003).

Ungulates, including moose, can occasionally be found in the area; however, these species prefer habitat on the older, more developed Delta, east of Langley Island (Fabijan et al. 1993).

Wildlife habitat assessments conducted in the Program area in July and September 2007 revealed little foraging habitat exists on Langley island in the vicinity of the wellsites for barren-ground caribou or grizzly bear (KAVIK-AXYS 2008). Monitoring of K-30 and I-25 wellsites from 2015 to 2017 by KAVIK-STANTEC confirmed those observations.

12.8.3 Birds

The northern portion of the Program area (including K-30 and E-07 wellsites) is within the Mackenzie River Delta Important Bird Area (IBA) (Bird Studies Canada 2017). The area is an important staging ground from late August to late September for species such as snow geese and tundra swans (Bird Studies Canada 2017). The northwestern portion of the Program area (including I-25 wellsite) is within the KIBS. Over 100 species, including many breeding species of shorebirds, songbirds and waterfowl feed and nest in the sanctuary. Community consultation has also indicated that Program area is used for goose harvesting.

Waterfowl (e.g., geese, ducks, swans) prefer habitat in marshy lowland areas with sedge, grass and horsetail vegetation. Shorebirds (e.g., sandpipers) congregate along areas with wet sedge, patterned ground and moist tundra in close proximity to water. Areas of higher elevation provide suitable habitat for species such as passerines, owls, raptors and grouse. While waterbirds are generally dependent on waterbodies, waterfowl and shorebirds nest on adjacent upland habitat, thus all upland habitat types provide some degree of nesting potential.

Shorebirds, waterfowl and other migratory bird species are particularly sensitive to disturbances through the critical stages of nesting, brood-rearing, moulting and staging (Latour et al. 2008). Migratory birds arrive in the Mackenzie Delta starting in early May and return to southern over-wintering sites beginning in late August. The Program area contains both nesting and staging habitat for shorebirds and waterfowl.

The K-30 wellsite area appears to have low to moderate wildlife use as evidenced by the observations of birds and bird sign within the site boundary; however, they do not appear to be using the area for nesting, as no signs of nesting were observed. Birds were not observed at the E-07 wellsite area on previous visits in 2015; however, signs of use were noted in the form of droppings and bird tracks in the mudflat areas (KAVIK-STANTEC 2016c, 2017).

12.8.4 Species of Management Concern

Wildlife species of management concern in the NWT are defined as wildlife that are protected under federal or territorial legislation, including species:

- listed under Schedule 1 of the *Species at Risk Act* (SARA) as endangered, threatened, or special concern (GOC 2018), or
- listed under the NWT *Species at Risk Act* as endangered, threatened or special concern (GNWT 2016)

This PD also considers a wider group of species of management concern, which includes wildlife species identified in federal or territorial tracking lists including species:

- listed by COSEWIC as endangered, threatened, or special concern (GOC 2018) but not yet listed under SARA
- listed as at risk, may be at risk, or sensitive by the NWT General Status Ranks of Wild Species (GNWT 2016)
- Species important to Indigenous communities

Based on a review of known species distribution ranges, species life histories, and land cover types, there is potential for 31 wildlife species at risk and species of management concern to occur in the Program area, including two marine mammals, three terrestrial mammals, and 26 migratory birds (Table 12-7).

Table 12-7 Wildlife Species of Management Concern which may occur in the Program Area

Species	Latin Name	SARA Status[2]	COSEWIC Status[3]	NWT *Species at Risk Act* Status[1]	NWT General Status Rank[1]
Marine Mammals					
Polar Bear (Southern Beaufort Sea Stock)	*Ursus maritimus*	Special Concern, Schedule 1	Special Concern (2008)	Special Concern	Sensitive
Bowhead whale (Bering-Chukchi-Beaufort population)	*Balaena mysticetus*	Special Concern, Schedule 1	Special Concern (2009)	Not listed	Secure
Terrestrial Mammals					
Wolverine	*Gulo gulo*	Special Concern, Schedule 1	Special concern (2014)	Secure	Sensitive
Barren-ground Caribou	*Rangifer tarandus groenlandicus*	Not Listed	Threatened (2016)	Threatened	Sensitive
Grizzly Bear (north western population)	*Ursus arctos*	Not Listed	Special Concern (2012)	Special Concern	Sensitive
Migratory Birds					
Northern Pintail	*Anas acuta*	Not Listed	Not Listed	Not listed	Sensitive
Ruddy Turnstone	*Arenaria interpres*	Not Listed	Not Listed	Not listed	Sensitive
Short-eared Owl	*Asio flammeus*	Special Concern, Schedule 1	Special Concern (2008)	Not listed	Sensitive
Brant	*Branta bernicla*	Not Listed	Not Listed	Not listed	Sensitive
Sanderling	*Calidris alba*	Not Listed	Not Listed	Not listed	Sensitive
Dunlin	*Calidris alpina*	Not Listed	Not Listed	Not listed	Sensitive
Red Knot	*Calidris canutus islandica subspecies*	Special Concern; Schedule 1	Special concern (2007) (R179 - based on R156)	Not listed	At Risk
	Calidris canutus roselaari type	Threatened; Schedule 1	Threatened (2007; possibly in the NWT)	Not listed	At Risk
	Calidris canutus rufa subspecies	Endangered, Schedule 1	Endangered (2007)	Not listed	At Risk
Semipalmated Sandpiper	*Calidris pusilla*	Not Listed	Not Listed	Not listed	Sensitive
Buff-breasted Sandpiper	*Calidris subruficollis (Tryngites subruficollis)*	Special Concern, Schedule 1	Special Concern (2012)	Not listed	Sensitive
Long-tailed Duck (Oldsquaw)	Clangula hyemalis	Not Listed	Not Listed	Not listed	Sensitive
Rusty Blackbird	*Euphagus carolinus*	Special Concern, Schedule 1	Special Concern-(2006)	Not listed	Sensitive

Table 12-7 Wildlife Species of Management Concern which may occur in the Program Area

Species	Latin Name	SARA Status[2]	COSEWIC Status[3]	NWT *Species at Risk Act* Status[1]	NWT General Status Rank[1]
Peregrine Falcon	*Falco peregrinus anatum/tundrius*	Special Concern, Schedule 1	Special Concern - 2007 (entire NWT)	Not listed	Sensitive
	Falco peregrinus anatum	No Status	Threatened - 2000	Not listed	Sensitive
	Falco peregrinus tundrius	Special Concern, Schedule 3	Special Concern (2000)	Not listed	Sensitive
Yellow-billed Loon	*Gavia adamsii*	Not Listed	Not At Risk (1997)	Not listed	Sensitive
Hudsonian Godwit	*Limosa haemastica*	Not Listed	Not Listed	Not listed	Sensitive
Black Scoter	*Melanitta americana (Melanitta nigra)*	Not Listed	Not Listed	Not listed	Sensitive
White-winged Scoter	*Melanitta fusca*	Not Listed	Not Listed	Not listed	Sensitive
Eskimo Curlew	*Numenius borealis*	Endangered, Schedule 1	Endangered - 1978 (R005), 2000 (R155), 2009 (R205)	Not listed	At Risk
Red-necked Phalarope	*Phalaropus lobatus*	Not Listed	Special Concern (2014)	Not listed	Sensitive
American Golden-Plover	*Pluvialis dominica*	Not Listed	Not Listed	Not listed	Sensitive
Black-bellied Plover	*Pluvialis squatarola*	Not Listed	Not Listed	Not listed	Sensitive
Horned Grebe	*Podiceps auritus*	Special Concern, Schedule 1	Special Concern (2009)	Not listed	Sensitive
Bank Swallow	*Riparia riparia*	Threatened, Schedule 1	Threatened (2013_	Not listed	At Risk
Common Eider	*Somateria mollissima*	Not Listed	Not Listed	Not listed	Sensitive
King Eider	*Somateria spectabilis*	Not Listed	Not Listed	Not listed	Sensitive
Lesser Yellowlegs	*Tringa flavipes*	Not Listed	Not Listed	Not listed	Sensitive
Thick-billed Murre (Brünnich's murre)	*Uria lomvia*	Not Listed	Not Listed	Not listed	Sensitive

SOURCES:
[1] Department Environment and Natural Resources, Government of Northwest Territories (2016)
[2] Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (2018)
[3] *Species at Risk Act* (SARA) (GOC 2018)

12.9 Archaeological Resources

In the NWT, archaeological sites are often found associated with a specific set of landforms (including high areas such as valley edges and knolls, or near water bodies such as rivers and lakes). Cultural landscapes and traditional use sites may also be associated with archaeological site locations.

Pre-contact sites are comprised of artifacts, features and residues of Indigenous and Inuit origin. They predate the arrival of Europeans and are typically characterized by modified bone, worked stone and stone features or structures. Historic sites are characterized by structures, features and objects of European influence. Building and building remains represent the most prominent type of historic site. Traditional use sites are identified through consultation with members of local Indigenous and Inuit communities and may include camping or hunting locales, plant collection locations or areas related to matters of a spiritual nature. Pre-contact archaeological, historical and traditional land use sites represent discrete episodes of past activities, they are non-renewable and are susceptible to alteration or removal by development.

As MGM intends to replicate activities and access areas that were successfully screened by the EISC (KAVIK-AXYS 2006, 2007b, 2008a). In 2007, FMA Heritage Resources Consultants Inc. (now Stantec Consulting) conducted archaeological investigations for the Langley E-07 wellsite and Arvoknar barge landing site as part of MGM's original drilling PD (FMA 2008). Results of the assessment found these locations to be in areas of low potential for the identification of archaeological or cultural sites.

13 ANTICIPATED ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION

13.1 Overview

This section describes the potential effects of Program activities on Valued Components (VCs), identifies mitigation measures to reduce, control or eliminate the effects, and presents the residual effects.

Potential effects were identified through community consultation, traditional knowledge studies, previous PDs completed for K-30, I-22 and E-07 for the well completion programs, review of scientific literature, maps, and professional judgement.

With the implementation of the proposed mitigation measures, all phases of the Program will result in low to negligible residual effect on the VCs and Program activities will not contribute measurably to cumulative effects in the area (Section 14).

13.2 Spatial and Temporal Scope

The Program footprint refers to the area of main abandonment activities and will be the primary focus of the assessment. The Program footprint includes the existing leases for each well, staging areas, camp facilities, barges landing and ice road alignments within the Mackenzie River and associated channels and overland road alignments. The Program area (25 km buffer around Program components) refers to the maximum area to be occupied by all Program components and corresponds to a conceptual maximum zone of influence of Program activities on most environmental components.

The temporal scope of the Program is guided by the schedule of activities outlined in Section 7. The temporal scale is subject to the ability of MGM to complete abandonment activities within a given year. MGM is proposing to carry out the abandonment of K-30 between 2020 and 2024, and the remaining two wells in that same timeframe, or in subsequent years. All activities, apart from mobilization/demobilization of barges, will occur during the winter seasons. Effects potentially lasting beyond the Program schedule were considered. However, since substantial ground disturbance is not anticipated, the potential for long-term effects are limited to the effects of accidents and malfunctions, or residual effects of sensory disturbance.

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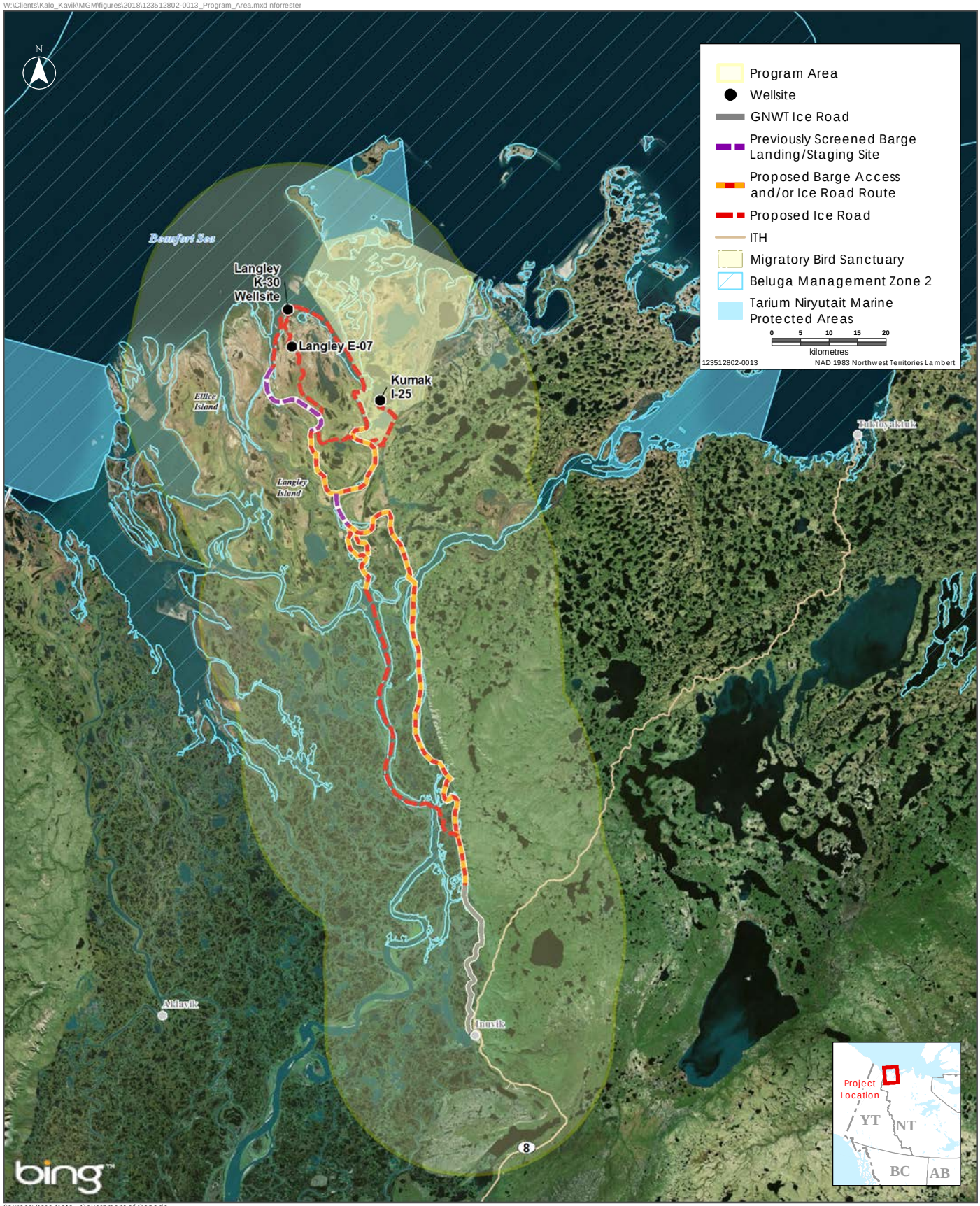

Sources: Base Data - Government of Canada
Service Layer Credits: © 2018 Microsoft Corporation Earthstar Geographics SIO

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Program Area

KAVIK-STANTEC

MGM ENERGY

Figure 13-1

13.3 Valued Components

A Valued Component (VC) is defined as an environmental, social, economic or cultural component that is considered important by local communities, technical specialists and/or government, and the proponent. The assessment of Program effects on VCs provides an indication of Program effects on broader environmental and social conditions. Similarly, mitigation measures for Program effects on VCs provide protection for the broader environmental and social systems they represent.

Candidate VCs in relation to the Program were selected based on:

- sensitivity to Program effects
- importance to local communities and resource users
- territorial, national or international importance (including status under the SARA)
- value as an indicator of effects on related resources and broader systems

Candidate VCs were identified for the Program based on the environmental overview and community consultation. Candidate VCs were screened to select final VCs based on their potential to be affected by Program activities. In this study, candidate VCs were excluded if they did not overlap temporally or spatially with the Program, or if there is no, or negligible, potential for the Program to affect them. Selected VCs and the rationale for selection are provided in Table 13-1. The selected VCs are the subject of further assessment and mitigation planning in Section 13.5.

Table 13-1 Candidate and Selected Valued Components in the Program Area and Rationale for Selection

Candidate VC	Selected VC (yes/no)	Selection Rationale
Air Quality	No	• Emissions will result from a number of continuous and intermittent sources such as the construction equipment, rig engine, generators, barges, vehicles, aircraft and flaring (if required). • Most emission sources are diesel-powered engines. Emissions are temporary in nature and will be rapidly dispersed. These emissions are not expected to exceed NWT Air Quality Guidelines.
Terrain, soil and permafrost	Yes	• There is potential for shoreline and riparian disturbance because of barge staging and overland ice road construction. • On-land Program activities may cause rutting, compression or surface disturbance. • Abandonment activities will involve the removal of soil adjacent to the wellhead. • Spills may cause local effects to surface soil and permafrost. • Flaring (if required) may cause localized thawing of the active layer and permafrost.

Table 13-1 Candidate and Selected Valued Components in the Program Area and Rationale for Selection

Candidate VC	Selected VC (yes/no)	Selection Rationale
Vegetation communities, including rare plants and uncommon communities	Yes	• Abandonment activities will involve the removal of vegetation adjacent to the wellhead. • There is potential for localized disturbance and loss of vegetation (including rare plants and uncommon communities) resulting from Program activities. • Dormant vegetation may be affected by temporary thawing during flaring (if required).
Hydrology	Yes	• Construction of ice pads and on-land ice roads may affect localised surface drainage during spring. • Water for construction and abandonment will be withdrawn from the Mackenzie River, associated channels and previously identified waterbodies.
Water Quality	Yes	• Potential effects to water quality may occur by accidental hydrocarbon spills or other accidental releases of deleterious substances at barge sites, staging locations, camps, wellsites, and along ice roads.
Fish and Fish Habitat	Yes	• Occurrence of important species in the Program area. • Potential water quality effects from accidental releases could affect fish and fish habitat. • Water withdrawal from channels and previously identified waterbodies may cause the entrainment of fish.
Migratory Birds and Habitat	Yes	• Advance equipment mobilization may occur during arrival and nesting season. • The demobilization of barges may occur during nesting season of migratory birds. • Potential sensory disturbance from mobilization and demobilizing as well as advanced equipment mobilization. • Program activities have potential to affect bird habitat (e.g., use of vehicles on tundra, ice pad and winter road construction)
Terrestrial Mammals and Habitat	Yes – Grizzly bear	• The Program area supports potential spring, summer and fall foraging habitat for grizzly bear. • Program activities have the potential to cause sensory disturbance during spring and summer. • Potential disturbance of active dens during winter construction activities.
	No – Barren ground caribou, moose, wolverine	• There is limited temporal and spatial overlap of Program activities with critical habitat for these species (e.g., core winter ranges). • The combination of poor habitat quality and minimal, short-term disturbance from advanced equipment mobilization suggests that Program activities are likely to have negligible effect. • Proposed mitigation for vegetation will limit the potential effects on wildlife habitat.

Table 13-1 Candidate and Selected Valued Components in the Program Area and Rationale for Selection

Candidate VC	Selected VC (yes/no)	Selection Rationale
Marine Mammals and Habitat	Yes – Beluga whale	• Barging staging (advanced equipment mobilization) and demobilization routes overlap with the Beluga Management Zone 2. Open water demobilization activities will overlap with beluga whale and seal movements in the outer Mackenzie Delta. Barge staging will take place in late September or October and will not overlap with the presence of beluga whales. • Proposed mitigation related to surface water quality will limit the potential effects on marine habitat.
	Yes – Ringed seal, harbour seal, bearded seal	• Open water demobilization activities will overlap with seal movements in the outer Mackenzie Delta. • Minimal, short-term disturbance resulting from barge removal in July is likely to have no effect. • Proposed mitigation related to surface water quality will limit the potential effects on marine habitat.
	No – Bowhead whale	• There is limited temporal and spatial overlap of Program activities with critical habitat for bowhead whales.
	Yes – Polar bear	• Coastal polar bears may be denning or foraging in the Program area during construction and abandonment activities. • Potential sensory disturbance from Program activities.
Beluga harvesting	No	• The demobilization of barges in July should have minimal effect on beluga harvesters. HTCs will be informed and operators will follow established shipping routes. • No specific concerns raised during community consultations.
Polar Bear Harvesting	No	• No polar bear harvesting occurs in the Program area. • Polar bears travel and den in the Program area. • No specific concerns raised during community consultations.
Fish Harvesting	No	• Program activities during open water harvesting season are limited to equipment mobilization and limited effects on fish and habitat are predicted. • Community consultation indicated that the area is not used for winter fishing.
Bird Harvesting	No	• Minimal temporal and spatial overlap of Program activities with spring goose hunting. • Community consultations did not indicate a concern about bird harvesting.
Traditional Camps	Yes	• Traditional harvesting camps are located within the Program area and may overlap with harvesters along winter access routes and during advanced equipment mobilization and demobilization.
Archaeological Resources	No	• Screening for the Program footprint and Program Area has been completed as part of past applications. Results of the assessment found these locations to be areas of low potential for the identification or archaeological or cultural sites.

13.4 Program Interactions with the Environment

A summary of potential Program interactions with identified VCs is presented in Table 13-2.

Table 13-2 Program Activity Interaction Matrix with Identified VCs

	Terrain, Soils and Permafrost	Vegetation	Hydrology	Water Quality	Fish and Fish Habitat	Migratory Birds and Habitat	Grizzly Bear	Polar Bear	Marine Mammals and Habitat	Traditional Camps
Advance Barging and Staging	✓			✓	✓	✓	✓		✓	✓
Construction of Ice Roads and Pads	✓	✓	✓	✓	✓	✓	✓	✓		✓
Abandonment Activities	✓	✓		✓	✓			✓		✓
Decommissioning and Demobilization	✓		✓	✓	✓	✓	✓		✓	✓
Inspection Monitoring and Final Reclamation						✓	✓			✓

13.5 Impact Assessment and Mitigation

The mitigation measures provided in Table 13-3 will be implemented for the protection of the VCs selected in Table 13-1. MGM will also apply general mitigation measures outlined in their Environmental Protection Plan (EPP)included in the Water Licence Application.

Table 13-3 Potential Effects and Mitigations for Valued Components

Potential Effects on Valued Components	Mitigation
Terrain, Soils and Permafrost	
Disturbance and Erosion • Barge activity, ice road and well pad construction have potential to disturb underlying soils through vehicle and equipment use	• Barge landing sites that were successfully screened by the EISC for past PDs will be selected from previous applications. Sites will have stable shorelines and deeper channels for transport. • Equipment will be unloaded using barge ramps or packed snow and ice ramps, which will protect channel banks. • Ice pads will be constructed using low ground pressure vehicles. • Only low ground pressure equipment will be used if there is less than 15 cm of snow. • Other vehicles and equipment will only be used on constructed ice pads a minimum of 15 cm thick • Rutting will be avoided. Vehicle movements will be suspended if rutting occurs. • Mushroom shoes or boots will be used on bladed equipment.

Table 13-3 Potential Effects and Mitigations for Valued Components

Potential Effects on Valued Components	Mitigation
Reduced permafrost integrity • Flaring may cause local melting of the active layer and permafrost • Accidental release	• Ice flare pads will be constructed to maintain insulating barrier; the size and depth of this ice pad will be designed to avoid thawing surface vegetation or soil. Flaring will adhere to CER Guidelines. • Flaring is not expected unless there is residual gas in the well bores or the plugs are leaking. • If ground disturbance is unavoidable (e.g., in the course of spill clean-up), the surface will be immediately reinsulated using uncontaminated cut vegetation and disturbed soil.
Vegetation Communities (including rare plants and uncommon communities)	
Localized loss or damage of vegetation • Damage to vegetation from accidental releases • Compaction and breakage of stems by vehicles during construction • Compaction and effects of delayed melting associated with ice pads and roads • Flaring may cause local melting and temporary thawing of frozen vegetation (note that very short term thawing of vegetation is not expected to cause long term vegetation damage or die-back)	• Vegetation clearing will be avoided as much as possible through the use of previous disturbance for ice road and staging. Vegetation clearing will not occur on the ice pads. • On-land Program activities will be confined to winter (frozen ground) conditions. • Ice roads and ice pads of at least 15 cm in thickness will be used to protect surface vegetation and prevent compaction. • The areal extent of on-land ice pads and ice road areas will be minimized. • Vehicles and equipment will only be used if there is a minimum 15 cm of snow/ice on ice pads and overland access roads. • Vegetation will be ‘walked down’ instead of cut, wherever possible. • Proposed overland access will be pre-scouted to select appropriate routing with least likelihood of vegetation disturbance. • Where vegetation removal or damage is necessary (e.g., in the case of spill clean up), the area will be reinsulated with cut organic matter to prevent possible thawing of permafrost and facilitate re-vegetation in the upcoming growing season. • Equipment other than what is absolutely necessary will be placed on-and before the construction of ice roads and ice pads to protect surface vegetation. • Reclamation activities will be completed at each wellsite after abandonment activities take place using appropriate seed mix as necessary.

Table 13-3 Potential Effects and Mitigations for Valued Components

Potential Effects on Valued Components	Mitigation
Water Quality	
Potential effects to surface water quality • Accidental release	• All wastes will be contained and disposed in approved facilities designed for proper containment, treatment and disposal of wastes in accordance with permit requirements. • All Program activities will take place on constructed ice pads or ice roads, which will facilitate thorough clean up of any accidental spills. • Fuel containment and handling procedures will minimize the risk of fuel spills. • Ice pads at the wellsite will facilitate containment and effective clean-up of any accidental spills of wastes during abandonment activities. • In the event of accidental spills, MGM's Spill Contingency Plan included in the Water Licence Application will warrant containment, thorough clean-up and proper disposal of absorbent materials and contaminated snow and ice. Evaporators will be used to reduce the volume of contaminated snow and ice. • Prior to demobilization, all working areas will be inspected for contaminant residues and cleaned up as required. • Fuel barges will be inspected bi-weekly • No sumps will be used during the Program.
Hydrology	
Potential effects to surface hydrology • Effects to localized surface drainage may occur because of location of ice pads	• Ice pads will be sited on level ground. • An ice berm will be built up-slope from the ice pads to deflect overland meltwater around the ice pads. • DFO protocol for winter water withdrawal from ice-covered waterbodies in the NWT and Nunavut (DFO 2010) will be followed.
Fish and Fish Habitat	
Potential fish entrainment and mortality • Water withdrawal using pumps and hoses (necessary to make ice pads and roads) may result in fish kills • Accidental release	• DFO protocol for winter water withdrawal from ice-covered waterbodies in the NWT and Nunavut (DFO 2010) will be followed. • Mitigation will be developed using DFO measures to avoid causing harm to fish and fish habitat (http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html) (DFO 2018). • Water withdrawal will be from the Mackenzie River, and the Program will also explore location options from previous applications for approval. • Regular inspection of water trucks to ensure compliance.

Table 13-3 Potential Effects and Mitigations for Valued Components

Potential Effects on Valued Components	Mitigation
Potential alteration of fish habitat • Approaches to shore along the ice road may lead to erosion and increased sedimentation.	• Approaches to the shoreline will be snow filled. • Avoid exposed soil. • Previously used routes, where discernible, will be used and no new winter road alignments will be made. • All Program activities will take place on constructed ice pads or ice roads, which will facilitate thorough clean up of any accidental spills and protect soils from erosion and contamination, which could subsequently affect surface water quality. • Fuel containment and handling procedures will minimize the risk of fuel spills. • In the event of accidental release, MGM's Spill Contingency Plan included in the Water Licence Application will ensure containment, thorough clean-up and proper disposal of absorbent materials and contaminated snow and ice. Evaporators will be used to reduce the volume of contaminated snow and ice. • Fuel barges will be inspected bi-weekly
Migratory Birds and Habitat	
Temporary sensory disturbance of migratory Birds • Demobilization of barges (approximately mid June) may flush birds from preferred nesting locations • Helicopter use associated with the monitoring of barging and barge staging may increase sensory disturbance	• EISC Operating Guidelines and Procedures (2004) will be followed, where applicable. Observed concentrations of migratory birds will be avoided (1000 m vertically, 1500 m horizontally). • Disruptions to migratory birds will be kept to a minimum by removing barges in the shortest possible timeframe. • Disruptions to migratory birds will be kept to a minimum by removing barges in the shortest possible timeframe. • Wildlife monitors will be consulted during activities.
Temporary loss of bird habitat on the Program footprint • Equipment used directly on snow covered tundra may affect vegetation used by birds • Equipment used on ice pads may potentially affect vegetation used by birds	• Program activities will only occur within the Program footprint and on ice pads or ice roads. • Low ground pressure equipment will be used if there is less than 0.2 m of snow • Other Program equipment and vehicles will only be operated on constructed ice pads with a thickness greater than 15 cm.

Table 13-3 Potential Effects and Mitigations for Valued Components

Potential Effects on Valued Components	Mitigation
Grizzly and Polar Bears	
Disturbance of Denning Bears • Direct disturbance during construction and abandonment activities • Sensory disturbance during construction and abandonment activities **Disturbance of Foraging Bears** • Direct and sensory disturbance from barge mobilization/demobilizing • Helicopter use causing sensory disturbance **Bear-human Interactions** • Attractants from camps and Program work areas • Safety	• Avoidance will be the primary mitigation. Coordination between ECC and MGM will occur to provide location of current and historic grizzly and polar bear den locations and/or conduct a survey prior to Program start-up to allow avoidance by >800 m • MGM will incorporate the results of ECC identified den location information into Program planning. • Prior to construction, surveys will be conducted to locate active and suspected active bear dens within setback distances of areas scheduled for activity. • If an active den or if a bear is observed during the winter season (October 1 to May 30) within 800 of Program activity, activities will be suspended within the exclusion zone and ECC will be contacted to determine appropriate mitigation. • GNWT-ECC Safety in Polar Bear Country (GNWT-ECC 2024) and GNWT-ECC Safety in Grizzly and Black Bear Country (GNWT-ECC 2018)Proper storage, transportation and disposal of wastes will be carried out to avoid attracting bears to work sites. • Wildlife monitors will be on-site at all times.
Marine Mammals and Habitat	
Disturbance to Beluga Whales and Seals • Direct and sensory disturbance by barge mobilizing/demobilizing	• Avoidance will be the primary mitigation during barge staging activities as staging will take place in late September or October and may overlap with the presence of beluga whales or seals. A wildlife monitor will be present during times where there is an overlap with beluga whale and seal movements. • Avoidance will be the primary mitigation for barge demobilization activities. A wildlife monitor will be present during times where there is an overlap with beluga whale and seal movements.
Traditional Camps	
Disturbance to Traditional Camps • Sensory disturbance by Program activities	• HTCs will be notified of Program activities prior to commencement to minimize interactions with traditional camps and harvesters • EISC Operating Guidelines and Procedures (2004) will be, where possible.

13.6 Summary of Residual Environmental Effects

The EISC is required to consider:

- Whether a proposed development could have a significant negative environmental impact (Sections 11(17) and 12(3)(a) of the IFA); and
- Whether any development of consequence that is likely to cause a negative environmental impact could have a significant negative impact on present or future wildlife harvesting (Section 13(7)).

The determination of whether Program residual effects are significant has been based on applicable guidelines or thresholds, Community Conservation Plans, professional judgment and knowledge of the Program area. Generally, potentially significant effects would be those that threaten the long-term sustainability of the VC, so those that are long-term, moderate to high in magnitude and may occur over a regional extent. It is considered there is negligible potential for residual Program specific effects after mitigation measures are applied. The assessment of the significance of residual Program effects is summarized in Table 13-4.

Table 13-4 Summary of Residual Program Effects

Valued Component	Potential Residual Effects	Significance
Terrain, Soil and Permafrost	Medium to long term, occur intermittently, non-season specific, confined to Program area, reversible and **negligible** in magnitude	Not Significant
Vegetation Communities, including SOMC	Medium term to long term, occur intermittently, season specific, confined to Program area, reversible and **negligible** in magnitude	Not Significant
Water Quality	Short term, occur intermittently, non-season specific, confined to the Program area, reversible and **negligible** in magnitude	Not Significant
Fish and Fish Habitat	Short term, occur intermittently, non-season specific, confined to Program area, reversible and **negligible** in magnitude	Not Significant
Migratory Birds and Habitat	Short-term, occur intermittently, season specific, confined to the Program Area, reversible and **negligible** in magnitude	Not Significant
Polar Bear and grizzly Bear	Short-term, intermittent, season-specific, reversible, limited to the Program area, and **negligible** in magnitude	Not Significant
Marine Mammals and Habitat	Short-term, occur intermittently, season specific, confined to the Program Area, reversible and **negligible** in magnitude	Not Significant
Traditional Camps	Short-term, occur intermittently, season specific, confined to the Program Area, reversible and **negligible** in magnitude	Not Significant

13.7 Residual Effects of the Program on the Environment

13.7.1 Assessment of Residual Environmental Effects

Residual environmental effects are those effects to VCs that remain after the application of mitigation. The mitigation to be applied has been summarized in Section 13.5. The classification of residual effects is presented in Table 13-5, and is based on KAVIK-STANTEC criteria (KAVIK-AXYS 2002) for effects assessments within the ISR.

Existing technical information (including information presented in Section 12 and technical appendices), Traditional Knowledge, professional judgment and knowledge of the Program area were used to assess residual environmental effects and their significance. Wherever possible, thresholds and guidelines (e.g., water quality management objectives) were referenced when determining significance.

Table 13-5 Assessment Criteria for Potential Residual Environmental Effects

Criteria	Potential Outcomes			
Duration	**Short-Term:** Effect lasts for duration of Program	**Medium-Term:** Effect lasts for up to 5 years after activity ceases	**Long-Term:** Effect lasts greater than 5 years after activity ceases	
Frequency	**Once:** Effect occurs once	**Intermittent:** Effect occurs intermittently	**Continuous:** Effect occurs continuously	
Seasonal Timing	**Season-Specific:** Effect is restricted to a particular season or season(s)	**Non Season-Specific:** Effect could occur year round		
Geographic Extent	Program footprint or Program area			
Reversibility	Reversible or Irreversible			
Magnitude of effect change relative to VC benchmark (KAVIK-AXYS 2002)	**None/negligible**	**Low** (< 1%) – Class 3 Effect[1]	**Moderate** (1-10% of VC) – Class 2 Effect[2]	**High** (>10%) – Class 1 Effect[3]

NOTES:

1 Class 3 Effect: The predicted trend in the measurable parameter under projected levels of development may result in a decline in the VC in the study area during the life of the Program, but VC levels should recover to baseline after Program closure.

2 Class 2 Effect: The predicted trend in the measurable parameter under projected levels of development will likely result in a decline in the VC to lower than baseline, but stable levels in the study area after Program closure and into the foreseeable future.

3 Class 1 Effect: The predicted trend in the measurable parameter under projected levels of development could threaten the sustainability of the VC in the study area, and should be considered of management concern.

13.7.2 Terrain, Soils and Permafrost

A limited amount of ground disturbance will take place at the wellsites to complete abandonment and progressive reclamation activities. There is also the potential for limited ground disturbance at the barge landing. These disturbances will be limited the to Program footprint. Ground disturbance at the wellsites and barge landings (where possible) will be reclaimed after Program activities are complete. Potential sources of ground disturbance such as vehicle rutting on overland ice roads will be mitigated by measures to be implemented during the Program.

Residual effects are expected to be: medium to long-term, occur intermittently, non-season specific, limited to the Program footprint and are reversible. With the application of the proposed mitigation, the magnitude of the residual effects on terrain, soil and permafrost are expected to be negligible.

13.7.3 Vegetation including Rare Plants and Uncommon Communities

A limited amount of vegetation removal will take place at the wellsites to complete abandonment and progressive reclamation activities. These disturbances will be limited the to Program footprint. Vegetation removal at the wellsites will be reclaimed after Program activities are complete by re-seeding with native seed mix.

The use of vehicles, construction of ice pads and on-land ice roads, melting of ice pads and accidental releases may potentially affect vegetation. These disturbances will be limited the to Program footprint. Effects of ice pads on wet fluvial deposits and associated vegetation typical of the Program area, based on observational studies, are virtually undetectable (McKendrick 2000). Monitoring by KAVIK-STANTEC of the wellsites have found minimal effects from previous ice pad development. Since MGM intends to use equal or better technology for construction than what was completed for past programs, the effects of construction should be minimal provided adequate snow and ice cover is maintained. There is the potential for a limited number of taller shrubs to be within the Program footprint. These shrubs will require to be walked down or trimmed, depending on which results in the least disturbance.

Residual effects are expected to be: medium to long-term, occur intermittently, season specific, limited to the Program area and are reversible. With the application of the proposed mitigation, the magnitude of the residual effects on vegetation are expected to be negligible.

13.7.4 Water Quality

Potential residual effects to water quality are largely related to accidental releases. Measures to avoid, contain and remediate leaks, spills and other accidental releases to waterbodies are described in Section 6. The probability of such events is considered remote. However, a major barge tank failure could have a high magnitude consequence, which is why multiple mitigation measures will be in place to prevent any type of accidental release. The development of ice pads and snow berms will facilitate containment and effective clean-up of any accidental release. In the event of an accidental release, MGM will implement their Spill Contingency Plan,, which will facilitate an effective containment, clean-up and disposal of the contaminated snow and ice.

Water withdrawals for Program construction will occur only from the Mackenzie River, associated channels and approved waterbodies within the Program area. Potential effects to water quality within channels will be negligible where adequate depth and flow is present to ensure sufficient flow is maintained during water withdrawals.

Residual effects are expected to be: short-term, occur intermittently, non-season specific, limited to the Program area and are reversible. With the application of the proposed mitigation, the magnitude of the residual effects on water quality are expected to be negligible.

13.7.5 Fish and Fish Habitat

The only planned activity during abandonment with potential to affect fish habitat is water withdrawals to support construction and operations. During construction, mitigation will be followed using DFO measures to avoid causing harm to fish and fish habitat (DFO 2018).

Potential residual effects to fish and fish habitat are largely related to accidental releases. Measures to avoid, contain and remediate leaks, spills and other accidental releases to waterbodies are described in Section 6. The probability of such events is considered remote. However, a major barge tank failure could have a high magnitude consequence, which is why multiple mitigation measures will be in place to prevent any type of accidental release. In the event of an accidental release, MGM will implement their Spill Contingency Plan included in the Water Licence Application, which will facilitate an effective containment, clean-up and disposal of the contaminated material.

Residual effects are expected to be: short-term, occur intermittently, season specific, limited to the Program area and are reversible. With the application of the proposed mitigation, the magnitude of the residual effects on fish and fish habitat are expected to be negligible.

13.7.6 Migratory Birds and Habitat

Migratory birds are present in the Program area from late May to early October. Within this period, birds appear most sensitive during nesting, when they may abandon their nests because of disturbance. Migratory birds are also sensitive during fall staging when large concentrations of birds gather on the outer coast. Numbers of staging birds decline in late September and most birds have departed the area by early October.

Barging will be helicopter-supported. Helicopter activity during the late fall and early spring will not affect birds, as most species will be absent from the outer delta. Removal of barges during late June or early July will overlap with breeding and nesting activities for many migratory bird species. However, the extensive inundation of the delta lands on the outer Makenzie Delta during this time should result in negligible nest loss (i.e., nests are not expected to be found near shore),

MGM is committed to reducing the effects of the Program on migratory birds. To do so, MGM has adjusted the schedule and activities to the extent possible to avoid overlaps with sensitive life stages, and will mitigate potential effects on vegetation that provides bird habitat. The majority of the Program activities will be conducted on frozen ground in winter, while those scheduled between May and October will occur primarily when most birds are absent from the region (i.e., late September). When overlap with sensitive timing periods is unavoidable (early June), Program activities will be completed quickly with minimal additional noise sources to reduce potential effects on migratory birds, other wildlife and residents. In addition, these activities are typically limited to the water channels and immediate near-shore areas directly adjacent to the barges.

Residual effects are expected to be: short-term, occur intermittently, limited to the Program area and are reversible. With the application of the proposed mitigation, the magnitude of the residual effects on migratory bird and habitat are expected to be negligible.

13.7.7 Grizzly and Polar Bear

Grizzly and polar bears are wide-ranging species that may be present in the Program area during spring, summer, and winter operations. The Program covers the coastline along the western edge of Langley Island and has potential to cause disturbance to both species.

Although the Program is proposed at the southern extent of the range of Southern Beaufort Sea subpopulation, polar bears may be denning in coastal snow banks in the Program area. Although grizzly bear denning habitat is relatively poor in the Program area, grizzly dens may be encountered on upland slopes or alongside access roads in the Program area. Denning bears of both species (particularly pregnant females and young of the year) are vulnerable if they abandon a den in mid-winter. Once disturbed, denning bears are unlikely to return to the den, and may abandon cubs, or may begin traveling with cubs before they are mature enough to leave the den. Active bears of both species may stray into the Program area, possibly as a result of attractants at camps and other facilities. However, as camps will only be occupied in the winter, while bears are in hibernation, these attractants should have minimal effect on the bears in the Program area.

Residual effects are expected to be: short-term, occur intermittently, non-season specific, limited to the Program area and are reversible. With the application of the proposed mitigation, the magnitude of the residual effects on grizzly and polar bear are expected to be negligible.

13.7.8 Marine Mammals and Habitat

There is limited temporal and spatial overlap of Program activities with critical habitat for the beluga whale (e.g., Program activities occur outside of the Beluga Management Zone 1A), bowhead whale and seals (ring, harbour and spotted. However, barge staging (advanced equipment mobilization) and demobilization routes overlap with the Beluga Management Zone 2. Barge staging will take place in late September or October and will not overlap with the presence of beluga whales.

Open water demobilization activities will overlap with beluga whale and seal movements in the outer Mackenzie Delta. A wildlife monitor will be present during times where there is an overlap with beluga whale and seal movements and demobilization activities. Proposed mitigation related to surface water quality will limit the potential effects for marine habitat.

Residual effects are expected to be: short-term, occur intermittently, season specific, limited to the Program area and are reversible. With the application of the proposed mitigation, the magnitude of the residual effects on marine mammals and habitat are expected to be negligible.

13.7.9 Traditional Camps

Areas in the outer Mackenzie Delta are used as travel routes to access the outer islands and traditional camps. Traditional camps are also located along the waterways and planned locations of ice roads in the inner Mackenzie Delta. Interactions between Program activities and harvesting activities are possible but predicted to be minimal.

During summer, helicopter flights will be limited to bi-weekly inspection visits of the barges and monitoring of the Program footprint. A designated flight path will be developed. Flights will avoid areas of open water and coastal areas to minimize disruption to traditional camps and resource harvesting activities. Flight guidelines in the ISR will be followed whenever possible.

Residual effects are expected to be short-term, occur intermittently (should the Program occur over multiple years), season specific, limited to the Program area and are reversible. With the application of the proposed mitigation, the magnitude of the residual effects on traditional camps are expected to be negligible.

13.8 Effects of Accidents and Malfunctions

Accidents and malfunctions can cause environmental harm, compromise personnel safety, damage equipment and affect the Program schedule. Examples of potential events related to this Program may include:

- Fuel tank failure
- Fuel spill during re-fuelling operations
- Hydraulic fuel or other liquid discharge from machinery
- Fire

A Spill Contingency Plan have been prepared for the Program and is included in the Water Licence Application. These plans will outline response protocols and safety procedures specific to the Program. Pre-Program and tailgate safety meetings will be held on a regular basis throughout the Program schedule to minimize accidents and malfunctions in the field.

Specific mitigations intended to prevent and mitigate effects of accidents and malfunctions include:

- Use of secondary containment for all fuel storage vessels such as double-walled tanks, containment trays and berms
- Installing drip pans and drip trays under equipment when not in use
- Re-fuelling will be conducted by designated personnel, specifically trained in proper re-fuelling and spill response procedures
- All equipment used for operations will be in good working order and free of leaks. Equipment will be inspected daily to check for cracked hoses, leaky fittings and other potential areas where hydraulic fluids, antifreeze, oil, fuel or other fluids may be discharged
- All solid waste will be contained and sealed in watertight containers
- An emergency spill kit will be kept on each site in case of fluid leaks or spills from machinery
- All vehicles will be equipped with fire extinguishers

In the event of an accidental release of fuel, oil, or other deleterious substance, spill response procedures will be implemented. Spilled material will be contained with absorbent materials from the Spill Kit and placed in a plastic lined bin, along with any contaminated soil, snow or ice that is removed for disposal. The spill will be reported as required by Regulators to the NWT 24-Hour Spill Report Line (867-920-8130). The spill site will be remediated to the satisfaction of the Regulators.

All incidents will be reported and each incident report will be reviewed to identify measures to avoid future similar incidents. Significant incidents and near-misses will be formally investigated by a trained investigation team.

13.9 Effects of the Environment on the Program

The potential physical and biological changes in the environment that could have implications for the Program are considered in the following subsections; along with their related mitigation measures. These design parameters and construction techniques have taken into consideration the risks of construction over thaw-sensitive permafrost terrain.

13.9.1 Severe Weather

Storm events may potentially affect winter travel (aircraft and ice roads) with consequential effects on safety and provision of supplies. MGM will rely on consultants and contractors with experience conducting Program activities in the western Canadian Arctic during all seasons and will employ journey management protocols to ensure safe travel during Program activities. Winter storms could delay aircraft and ice road travel for up to several days. Any delays in barge staging or provision of supplies due to storms, which are typically of limited duration, can be readily accommodated within the overall Program schedule and storage capacity onsite. No significant effects of weather on the Program are anticipated.

13.9.2 Late Ice Formation/Early Break-up

Frozen conditions are necessary to freeze in barges and for construction and operation of ice roads. The timing of the formation or break up of ice cover on the Mackenzie River could affect the construction and demobilization schedule for the Program. MGM can adapt the Program to suit conditions, such as reducing the number of wells abandoned within a single winter season.

13.9.3 Erosion

Coastal erosion of Langley Island has resulted in an average loss of 6 m/year of shoreline. This poses a significant risk to K-30 and is the basis for the Program. If shoreline erosion continues at the monitored rates, K-30 wellsite is at significant risk for integrity within the next 10 years.

14 CUMULATIVE EFFECTS

14.1 Assessment Approach

The assessment of potential cumulative effects is based on the following four steps (adapted from KAVIK-AXYS 2002):

- Is the Program likely to have negative residual effects on VCs?
- If so, are the residual Program effects (i.e., effects that remain after mitigation) considered low, moderate or high and will they act in a cumulative fashion with the effects of other projects, past, present, or future?
- What is the significance of cumulative effects on the VC and what is the proportional contribution of the Program to these effects?
- If the Program, in combination with other projects in the area, is likely to create a "significant negative cumulative effect," are there further mitigation measures that could reduce or eliminate the Program's contribution to these effects so that the cumulative effect is not significant?

14.2 Spatial and Temporal Overlaps with Other Programs

The purpose of cumulative effects assessment is to determine if the effects of other projects might interact cumulatively, both spatially and temporally, with the Program being screened. The spatial boundary for the cumulative effects assessment is defined in Figure 13-1. Justification for this spatial boundary is based on the need to include the following:

- the Program area (25 km buffer around Program components) including winter access roads and barge routes
- the distribution of recent, present and planned industrial projects in the western outer delta
- habitat similar to that found within the Program area, including low-lying habitat typical of the western outer delta and high ground areas within the eastern part of Richards Island

The temporal boundary of the cumulative effects assessment was based on the likelihood of effects from past, other current projects and reasonably foreseeable projects to combine with similar effects from the proposed Program on environmental resources or resource harvesting.

The Project inclusion list is outlined in Table 14-1. This table lists only those projects within the defined cumulative effects assessment study area that could have the potential to interact with any residual project effects of the Program. There may be a number of other projects planned but not disclosed at the time of writing. There are few current activities occurring in the region during the timing of the proposed Program. Activities that MGM is aware of are limited to annual monitoring of oil and gas lease sites during the summer and fall.

Table 14-1 Cumulative Effects Assessment Program Inclusion List

Proponent	Location	Overlap	Type of Activity	Residual Program Effects
Past Activities (Completed)				
Winter 2005-07	Chevron/BP/MGM	Olivier and Ellice Islands	Ellice/Olivier/Taktuk Drilling Program	Spatial overlap
Winter 2006-08	Chevron Canada Limited	Langley and Farewell	Taktuk, Langley and Farewell Drilling Program	Spatial overlap on access routes and barge landing sites
Winter 2007	Shell Canada Ltd.	Niglintgak Island	Geotechnical study for future site selection	No spatial overlap
Summers and Fall 2007, 2008, 2009	MGM Energy Corp.	Langley, Ellice and Richards Island	2007, 2008 & 2009 Summer Field Assessment and Advance Barging Project. Sump monitoring (three sumps on Richards Island) and re-vegetation investigation (including agreements with Chevron and EnCana).	Spatial overlap of access routes and barge landing sites
Summer	Aurora Research Institute	Richards Island	Mallik long-term sump monitoring. Sump integrity and revegetation monitoring	No spatial overlap
Winter 2007-2008	Aurora Research Institute	Richards Island	Mallik Gas Hydrate Drilling Program (2006 – 2008) Testing of 1 well	No spatial overlap
Summer 2008	Chevron Canada Limited	K-30, and barge access routes	K-30 Sump recontouring and stabilization	Spatial overlap
Summer 2008-2010	Chevron Canada Limited	Langley and Olivier Islands	Long term sump monitoring (Langley I-48 and Olivier H-01)	Spatial overlap
Spring 2007-2009	Canadian Hydraulics Centre	Beaufort Sea	Ice rubble investigation surrounding abandoned drill platforms in the Beaufort Sea	Spatial overlap
Winter 2007-2008, or 2008-2009, or 2009-2010	MGM Energy Corp.	Ellice, Langley and Olivier Islands	Ellice and Olivier 3D Seismic Projects	Spatial overlap
Winter 2007-2008, or 2008-2009, or 2009-2010	MGM Energy Corp.	Ellice, Langley and Olivier Islands	Ellice, Langley and Olivier Drilling, Testing and Completion Project. This Program originally included 9 wells but 3 wells have since been removed from this program.	Spatial overlap
Summer 2008-2009, or 2009-2010, or 2010-2011	MGM Energy Corp.	Ellice, Langley and Olivier Islands	Summer Field Assessment and Advance Barge Project	Spatial overlap

Table 14-1 Cumulative Effects Assessment Program Inclusion List

Proponent	Location	Overlap	Type of Activity	Residual Program Effects
Winter 2008-2009, or 2009-2010, or 2010-2011	MGM Energy Corp	Richards Island	Umiak Drilling, Testing and Completion Project.	Spatial overlap
Winter 2008-2009; or 2009-2010; or 2010-2011	MGM Energy Corp.	Richards Island	Umiak Seismic Project	Spatial overlap
2010	Shell Canada Energy Corp.	Unipkat I22	Sump Remediation	No spatial overlap
2014	Shell Canada Energy Corp.	Camp Farewell	Decommissioning at Camp Farewell	No spatial overlap
2015	Shell Canada Energy Corp.	Camp Farewell	Decommissioning and Soil Assessment at Camp Farewell	No spatial overlap
2016	Shell Canada Energy Corp.	Camp Farewell	Remediation at Camp Farewell	No spatial overlap
Present Activities (Underway or Approved)				
Summer 2019-2024	MGM Energy Corp.	Mackenzie Delta	Annual Monitoring of wellsites and sumps within the Mackenzie Delta	Potential spatial and temporal overlap during advance barging, demobilization and monitoring
2018	Shell Canada Energy Corporation	Camp Farewell	Remediation of Camp Farewell	No spatial overlap

14.3 Assessment of Cumulative Effects

Section 13 (see 13.7 summary) concluded that there is negligible potential for residual Program specific effects on the biophysical environment and wildlife harvesting after mitigation measures are applied. Therefore, the Program has negligible potential to contribute to cumulative effects of industrial activity on the biophysical environment and wildlife harvesting in the region.

14.4 Management of Cumulative Effects

MGM will make every effort to minimize disturbance to wildlife and Inuvialuit harvesting during the Program. MGM will work to coordinate all planned components to minimize the total number and duration of aircraft flights. HTCs will be notified of Program activities prior to commencement to minimize interactions with traditional camps and harvesters. All flights will be operated in accordance with EISC Operating Guidelines and Procedures (2004). In addition, wildlife monitors will accompany the Program crews to provide guidance on additional wildlife mitigation measures, if required.

15 EMERGENCY RESPONSE PLAN

MGM developed a general Emergency Response Plan for winter activities, and it was submitted with their previous Water Licence application (N7L1-1822). It is available on the IWB Electronic Public Register.

16 SPILL CONTINGENCY PLAN

MGM has developed a Spill Contingency Plan to be used for winter activities, and is included in the Water Licence Application.

17 CLEAN-UP, RECLAMATION, DISPOSAL AND/OR DECOMMISSIONING PLANS

Details of final decommissioning and waste clean-up and disposal for the Program is provided in Section 6, Program Details.

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APPENDIX A Consultation Records

Summary of Consultation Issues, Questions, Comments and Responses

Issues, Questions and Comments	Response
GENERAL	
The three sections in your map- what is the order that you will do the work?	Likely central, then west, then east. Central being first because of the erosion.
Are you prioritizing what you are doing first?	-Yes, K-30 is the first well. -It is a matter of budget. We want to be positioned for the other two wells so that if we wanted to abandon three in a winter, we could. -It is expensive to build the ice road so we might want to do 2 or 3 wells at once.
You are looking at closing all the wells?	-Yes eventually. -If there is a pipeline project then we wouldn't. -We want to be prepared if there is a need to abandon the wells. -Some wells may need to be abandoned soon.
What are the methods for abandonment and reclamation?	Abandonment is done using a service rig. You will have wireline equipment, cement trucks, fluid tanks on site and the biggest piece would be a service rig. You will have a grader on site and a hoe and those sorts of things. You will have a couple of wellsite shacks right at the location so guys can go in and get warm. A boiler to keep everything unfrozen. You go in and make sure there is no pressure and make sure the well is dead. When you drilled you perforate or open the zone so that the oil and gas can flow out. Now you are putting the cement in there so the oil and gas does not flow out. You typically go in and squeeze the zones which means you put cement into the zones that were opened or tested to see if they had gas or oil. Then you put in a plug, some cement, another plug, cut the pipe and test that all is really solid and secure. Then you cut well head off and usually leave a sign post.
That's the same process for all the wellsites?	For all the abandonments, yes.
The EISC is what you are initiating right now.	Yes, that is what we are kicking off right now.
You are looking at all the options now.	-Yes. Looking at the Wurmlinger. For these ones (Central region) the work would be in the summer and some of the logistics could be in the summer. -The EISC submission will have all the options in it so that MGM does not have to come back to ask for another option. They will all be considered up front
You will have a GPS location for these sites when you finish the abandonment?	Yes. Normally there is a sign post left that shows that there was an oil and gas well at this location so that people don't dig there. For K-30 we may or may not put up a sign because it looks like it won't be there for very long. We will provide the exact GPS coordinates to all the communities, ILA, the Water Board and regulators so they know there was a well here and how deep it is.
Your map is missing the MPA zones.	We will get that noted on the map.
And this is just for the ones you are plugging up?	Yes, no drilling.
So those are the three you are focusing on right away?(referring to presentation picture of ISR Central)	Yes
One of the MPA sections is up there. If all you are doing is bringing the Wurmlinger or something like it through the channels, it shouldn't have any negative effect.	We will confirm our timing options.

Summary of Consultation Issues, Questions, Comments and Responses

When would you be boating up there?	-August or September. -As late as we can because as soon as we have the equipment we start paying for it. We just need to the channels open and navigable. We will go to earlier if we hear it is better to go then.
Have you been doing this or have you been doing it in partnership with NRCan (Re: presentation slide showing K-30 shore erosion over time)	We have some of the information and we have been partnering with Dustin Whelan. We have equipment in the area and he will work at some of our sites.
You do see yourself continuing with the abandonments and not just doing the high risk ones?	-There is a possibility that we will just do the high risk ones in the shorter term. -The EISC submission will have a number of different timing, abandonment options and possible ice road routes so that in any given year an option could be selected without going to the EISC for an amendment
What are the chances of things coming out where you cut.	-They won't consider it complete until the squeeze is done. -That's the downhole part where you thought the gas was. You push the cement until it the formation does not go in anymore and you get cement coming back up. This is called cement returns. You can check to see if there is gas in the cement. You circulate out and check for gas to see if the squeeze is holding. If the squeeze is holding you put a plug on top of it. Cement returns is the key because if you are not getting returns you know the formation is still taking cement.
This cement will last forever?	Yes.
How do you plan to abandon the well?	With a service rig which is significantly smaller than a drilling rig and needs significantly less ancillary equipment than a drilling rig would.
What is your process for abandoning the well heads?	Down hole work that the NEB regulates and would have to approve. You end up with a plug closer to the formation and one closer to the surface. We are going to cut at 10 meters. So the plug may be at 12 or 15 meters. Then we are going to cap it.
When you are looking at your reclamation you are going to want to define what kind of chemicals you are using. There is probably questions going to come back if they were not explained properly within the EISC or us (Lands). If we see a chemical we don't understand then we could have an information request.	I think we will try to submit the MSDS forms as an appendix but also try to have a common language description. There will be some chemicals but a lot of it is an inhibited water-based system and just some additional chemicals. Most of the stuff we are planning on taking out. For waste streams very little. The only thing that we have been talking about that we know for sure, that we would like to leave in the NWT is the camp waste. We will talk to the town of Inuvik about that. We will have the description because there is always the potential for spills. We want you to understand what we have up here. A lot of the risky material will be our fuel.
What was the reason for your different scenarios?	A lot of it is budget and the timing of the winter. Depends on how much work we could get done and how much money we could get from our management in a given year. Abandonment does not take as long as a drilling project but anytime you go into a well it may take a little more time. It may be a winter that's warmer and we may not have as much time as we planned.so we may only get two wells done and have to come back. Or we may only get budget approval to do K-30 because that's the one that is driving us to do this. The other ones are close by so we might do them.
I don't know but I do know they got a lot from there. They needed sand and that is really the only place you can get that.	Eddie Dillon at our meeting in Tuktoyaktuk last night mentioned that fill for the Ikhill pipeline was obtained from sandy hills. Do you know how they did that?
Why don't you use Ya Ya lakes	They mentioned that to. We need the proper fill.

Summary of Consultation Issues, Questions, Comments and Responses

-ILA would know. -Talk to Charles Klengenberg he is the director of ILA.	-Where do you find fill? We need fill for the abandonment if we excavate or replace impacted soil that we remove to take to a licenced disposal facility. - We are looking for a clean source so we don't need to bring it from down south.
If you want nothing coarse think of Sandy Hill that Ikhill used. They pushed it off the top and they had trucks pick it up. They used it for the bed of the pipeline and covered the pipeline. It's fine sand.	If it is too fine I don't know if permafrost will penetrate it.
Will you have work this year.	-Not this year. -What will trigger it is the erosion at K-30
You will keep us updated anyways?	Yes. We will look at the environmental report and show management and determine which year to do abandonment.
Who else have you been in consultation with so far?	We were in Tuktoyaktuk last night with the HTC and CC. In the first round we met with the IRC, Tuktoyaktuk and Inuvik HTCs and CCs, DFO, GNWT ITI and Lands. Meeting with Lands this afternoon. Met with the IGC and will be meeting with them again on Thursday in Whitehorse. We are working to get a meeting set with the Aklavik HTC and CC.
What is your sense of when the work might start?	Kind of looking like 2020-2021
All four are potential wells or no?	K-30 we have to take out. I don't know the reserves associated with E-07 and Kumak I-25. As long as you have your SDL approved with the NEB you can go abandon your well. And then when you go to develop you can drill a new well. You get your exploration licence. Then you drill your well and test your well. Then you apply for your SDL with an SDD - Significant Discovery Declaration. Once you get your SDL you can abandon that well. The well is your conduit to prove the information you need for the SDL. Without short term potential for production it makes sense to abandon other wells when you are doing one.
Do you see this as a 5 to 7 year project, do you see it as a two year project?	I think it is a one year project. The abandonment of all three wells will take less time than it took to drill one. The monitoring and the reclamation work afterwards will go on for a number of years. We are putting in options for a two and three year abandonment program but from an economics point it is a one year program. The incremental cost to do more than one well is nothing compared to rebuilding the ice road.
You will do it all in the one season?	That is a management decision but the incremental cost of doing more than one well is not that much compared to doing them in another year especially with the cost of building the ice road.
When the project is approved by the EISC you are going to come back to the community and meet with the whole community and let them know what work is out there?	-We are going to provide information on what work is available. I don't want to do that until I know what year it is going to be done and gets approved in our budget. To do the actual work it is a two-part equation for us. One part is to get through the regulatory process with the EISC and get our land use permit and water license. Then it is the year it gets approved in our budget. We don't want people to think there is work coming and then the work does not show up. Once we have the budget approval we would be making information on this and have more specifics on how many days and pieces of equipment and stuff like that. -It will be in lots of time because our budgets are in October and we would start the work in November or December-13 months later. That's the time we would have to let everybody know we are doing the work and exactly what the work is. -In about a month from now I am going to know if we are going to do the work in 2019-2020. I will let you and the other communities HTCs, CCs, IRC, IDC know if it is or is not approved in our budget. So people know well in advance if we are or are not going to do the work in 2019-2020 and I will do the same thing next year. We

Summary of Consultation Issues, Questions, Comments and Responses

	will notify right away and then we'll talk about what consultation and more discussion on the work opportunities.
So once you know when you will do the work, you will come back to the communities?	Yes we will.
And you will meet with just the HTCs and CCs again? Or the whole community/	If there are people in a community that want us to have the bigger community meeting, that's something we can look at.
K-30	
The guys that live out there in the summer at Kendal and Baby Island see it even more so (erosion effects). One guy has had to move his camp twice the last few years because of erosion. The ice is receding further so you get bigger storms. The longer concern is that even if you capped the wellsite at K-30 it is eventually going to be sitting in the water, exposed.	At K-30 we will be abandoning it further down. We are thinking about 10 meters down.
That area floods in the spring?	Yes.
And storm surges?	-Yes. - The good thing about a service rig as apposed to a drilling rig is you don't need as much room. The sites were created for drilling rigs which need more room. We are still able to very easily do the operation right now and we want to get it done while it is still easy and we have shore on either side.
You are doing this site because of the erosion. What about the monitoring of K-30 and for how long.	In 15 years there may not be much to monitor. We want to make sure the well is abandoned correctly and that the site is clean before the erosion gets to it so that we don't impact the water.
Is there a sump on the site too?	The sump is south of the wellsite and more inland.
With the permafrost melting I noticed that our abandoned places where we had pilings they are coming higher. You will be monitoring even if it is underwater?	Yes, because we will have a GPS location. We want to abandon it farther down so that we do not have the same problem you just described. We are looking to go about 10 m below the surface.
That would be sufficient enough because the water in that area is not very deep. Once the area is eroded it is likely to be five to seven meters deep. It would be a long time before that is exposed.	Noted.
What is your time frame?	Hopefully get the EISC application in September - October this year, respond to queries and get an approval early 2019. Then finish off our NEB approval by mid

Summary of Consultation Issues, Questions, Comments and Responses

	2019. So, that if we wanted or need to do the K-30 abandonment in 2019-2020 we would be prepared to do it. It is then dependent on what the environment is doing and our budget. The year that we are doing it we will be back to discuss the program.
Where would you put the barge?	We would put it in a sheltered area and build an ice road to the site.
What is that area? (Regarding site delineation shown on figure)	That is what the surveyed wellsite was and was for a drilling rig. Service rigs don't need that much space. We need about 10-20 meters, on the side of the well head to the ocean, to do the operation.
How far is it from the well head to the ocean?	As of 2017 it was sixty meters.
That's not very far. What happens when all that erodes?	That is why we are going to abandon the well before it erodes. That is why we want to get the permit and licence in place.
You mean remediate it or abandon it.	Abandon it. We are going to plug it and take the well head off. Normally you would cut the well head off a meter and a half below the ground. Because of what's happening here we would cut the well head 10 meters below the ground. We are going to have the plug and cut above it and pull 10 meters of the casing out. So that one day when this is below water that casing is 10 meters below. It will be GPS'ed and we provide that information. It would be deep enough so that it would be safe. The GPS coordinates will be given to all the communities and regulators. Even when it erodes it will be deeper than the boats being used in the area
How far above sea level is this ground right now?	Maybe a meter.
I used to go hunt geese there in the fall. Six years ago there are islands where there used to be channels.	This map really shows how this has moved over time (presentation figure showing erosion)
How shallow is it there (K-30)	-It is only a meter or two shallow. -All the channels up there are really shallow. - The land is about a meter above the water
The box on the figure is for the equipment for the drilling rig? (re:-K-30 erosion figure).	Yes, but for the abandonment you need significantly less space.
When you are doing the work are there any considerations to minimizing the erosion or contributing to it?	We should be alright because we will be there in the winter on an ice pad. We looked at erosion control and it was not an option.
Is there any other research efforts there (K-30)?	We are doing work with Aurora Research Institute on the seed and with Dustin Whelan on erosion. We are going to have Dustin Whelan on the site this year to set up some of his monitoring. Dustin is doing some other monitoring in the area and we are going to get him to include some of our sites
You are going down 10 meters with a service rig (re K-30)	Yes, with a service rig.
When will the water take the sump at K-30.	The well head is about 60 meters from the water. The sump is quite a ways in from that. The priority is to remove the well head at K-30. We will continue to monitor the costal erosion there.
What do you do for the well head? Do you just cement it?	For the abandonment you cement and put a plug and cut down and take the well head off. For K-30 we will go down about 10 meters below because eventually there is going to be water on to so we want a good depth. It will be cut lower than you typically would for an onshore well.

Summary of Consultation Issues, Questions, Comments and Responses

That you are planning to go down deeper should provide some comfort.	For sure.
Have you addressed the erosion at K-30?	We have been monitoring it and we think it is moving from 5 to 10 meters per year. It is at 65 meters from the wellhead. We need about 10 meters. We think if we did it in the third year we would have about 35 meters left. So we plan on abandoning it well before the erosion gets there.
Can you explain, as you did at IGC, how much land you need and why are starting at K-30.	When they drilled this well it was 250 meters away from the coast and now we think we are about 65 meters from the coast. We are losing about 5 meters a year on average. For a service rig we need about 10 meters to put the service rig on. We might have another 5 to 10 years to do this operation but we want to do it sooner than that.
MONITORING	
Once you complete the abandonment will you follow up to check the next year?	Yes, we will continue to monitor them. We are always responsible for them. We never lose the liability but we might lose the monitoring requirement.
How long would you monitor them?	-We will monitor them as long as we are doing reclamation and remediation work. -We want to get the site closed off for us. The inspectors here inspect the site as long as they see fit. -MGM is still responsible for them. -We never lose the liability but we might lose the monitoring requirement.
You will still be monitoring these wells?	-Yes, we have a monitoring program every year checking the well heads making sure they are not leaking. We report these to the NEB. And every year separate from this we have an environmental program where we monitor all our sites. -After the abandonment you come back to do gas migration testing. - You have a sensor to test and make sure there is no gas leaking
This will be checked regularly until it is not checked?	Yes, we have to go back the next year to do a gas migration test. I think for these you will see that the regulator is going to be on site with us. So they will be there when we think the squeeze is successful and the will also agree that it is.
LOGISTICS	
This work is all in winter?	-Yes. We may move equipment by barge in the summer but will be on location in the winter. Some of the other sites may be candidates for a wireline abandonment which can be done with a truck and could possibly be done in the summer. We have not looked into this yet. -There would not be anything on the land in the summer.
Are you planning to haul your service rig out on the ice road? We do not have the same cold winters like we used to and we don't have the same thick ice like we used to. So, I think you guys might have to bring barges with your rig out there and let them freeze in out there. I think that would be the best way. Because if you are hoping on a good ice year, you might not get it. Last winter was so warm the ice was really thin	Yes, for the camp and some of the equipment we were looking at that. That is something we will take back to the team and let them know what we are hearing from the communities. If we are counting on a good thick ice road we might be disappointed. We might not have as much water or time to get it as thick as we need. We will consider that when considering the volume of water we need.

Summary of Consultation Issues, Questions, Comments and Responses

everywhere all winter. Think about using barges to take your rig out there, freeze it in and take it off in the winter. Use ice roads for lighter vehicles, resupply and things like that.	
Do you have an estimated time for each one?	The work on each well is 10 to 14 days. If they go well. We will put in contingency time. Some of them if they go really well you can get done in six or seven days. A couple of days to set up, 4 or 5 days on the well and a couple of days to move off.
Would there be camp work involved there?	Yes, there would be camp work. That's one of the things we are trying to leave open. Do we take a camp. Like E-07 is abandoned already so you could use that site and put a camp there. I-25 and K-30 need to be abandoned. You could put your camp on one of the wells while you abandon the other well.
How about just one stationary camp?	Yes, we are thinking of that, maybe with the Wurmlinger and set it up half way and shuttle the crews back and forth. And put a sleigh camp of shacks right on the site for people to get warm and have lunch and stuff like that. we are thinking of a number of options. We are looking at all our options right now and thinking about what would be the best safety wise for the crews, the local contractors, and what we hear back from the communities and some preferences there. We are looking at what might be the best cost wise as well. Our permit is going to be broad and include a lot of different options. It is a little more work on the front end, but I think it is worth it on the back end. To choose the best option or the given year.
I am just surprised that you would need something of that level for this kind of operation.	-It's the road building and they are thinking about running 24 hours. Two shifts, 12 and 12. -When you get to the first site you are going to need the guys to get the service rig there. When you have the most people there is when you get the first site ready. The service rig can get on there and start doing its work and the construction guys can keep pushing out to the other sites. - They are going to keep coming back to camp. At peak you might be 40 or 60 people.
The other option with Northwind and EGT is that they have sleigh camps as well.	Yes, and our construction guys are probably going to need a sleigh camp. The idea with the Wurmlinger and another barge is to maybe have some of the equipment staged up there and then kick off right from there in the winter and work both sides.
Have you had any indication from any other companies since you are taking the initiative to do this. Are they saying we should consider piggy backing since the resources are going to be in the region? We are pushing the Feds on this issue so it is good to see you guys are stepping up.	If you can piggy back, there is a cost savings for us to. We are continually reaching out and will continue reaching out and let people know what we are doing. We will continue talking to other operators as we go forward with our application and when our on the ground timing firms up. We are doing this in the Sahtu and Liard.
We don't want to see the sumps underwater. We want to update them and determine which ones are high priority and failed sumps as well and get on those.	We don't have any failed ones. We have some that are in positions that are not ideal. We can get you: 1- Map with SDLs 2- Status of our wells - suspended or abandoned 3- Monitoring report summaries

Summary of Consultation Issues, Questions, Comments and Responses

When you make the ice roads are you going to be based out of Inuvik?	With the Wurmlinger and another barge we could work both ways.
What king of equipment are you going to need to make the ice road?	We haven't got that far yet. We will have an equipment list then. Our operations person knows he needs snow cats, water trucks and those things. He is still working through a defined list. We are determining what the local capacity is that is still here and usable.
I can't remember what year it was but we were but all these places are pretty familiar, the west and the central.We were doing a well abandonment program on all these old well heads. I don't know what they were doing but a lot of them they filled up with fuel before they did the final cap. They were starting to rust out. They were changing their caps.	For us, when we go in, we would not use fuel. We would use water with some additives. They would be water based, called inhibited water. If there is gas it keeps the gas down. You make sure the well is dead then you do the cement squeeze and those plugs. We will have a list of equipment the next time we come. It is a lot less equipment than to drill a well.
Where is the material that comes out going to go?	Currently our only option is to move it back to Alberta or British Columbia.
That is what MGM did one time with a drilling program.	Yes, when they drilled they took their stuff home. For this program we are going to take it all home. The only thing that we put in our licence that we might dispose of in the NWT is our camp waste, our sewage. We might talk to Inuvik or Tuktoyaktuk to see if they have room for some extra.
As long as it is put in the proper place I don't see a problem with that.	That is the only kind of waste we are envisioning getting rid of locally. We will investigate other places in the NWT that we could put waste materials such as soils.
Not in the ISR. I don't know what kind of volumes you are talking about.	I could potentially be a business opportunity. Around the wellsites it is a bit of dirt. And some of it just needs a bit of time to attenuate. Other things might be bigger volumes and the will have to leave. Right now we are of the understanding that everything has to go to Alberta and BC. There is a community in the southern NWT that is thinking about creating a land fill for some of this type of material.
I sit on the Game Council and right now the rule of thumb is garbage in garbage out.	Yes, and that's' the approach we are taking, unless there is a change.
What season are you planning on doing this?	The barging to get the equipment out there could be summer or early fall. The abandonment work for the Central wells we think will be in the winter.
Are you going to leave the camp up even after you have done the work?	-The Wurmlinger would be a base camp and the guys working out of Inuvik would have a sleigh camp with them. You could put the camp and the service rig on the same site because the rig does not take much space. We might have three different camps. - At the end of each season you would take out the sleigh camps and what ever else you can because you are paying for the equipment. The Wurmlinger would come out during the open water season. - If we go with the Wurmlinger you are kind of committed for nine months. You stage it in September and can't get it back until the following June.
You said the barges would be left there. No one else wants to use it.	We would bring it back to Inuvik if nobody else had a program the following year. There are other companies that have other sites. Or if we did some of the wells one year and some the next year we might look at leaving it there.
Will this be in the project description?	Yes, it will be in there. Any of our options will be in the EISC project description.

Summary of Consultation Issues, Questions, Comments and Responses

Where is the Wurmlinger going to be?	-Someplace sheltered and where there is deeper water. - We will defer to the local experts as to exactly where to place the barge
Is it just going to be the Wurmlinger there or is there going to be other barges?	There could be potentially another barge or two. We don't know how much equipment we want to leave out and exposed. The Wurmlinger may have enough space and fuel capacity to get it all done there.
How will you tie up the barges?	This is something the Wurmlinger would work out. There would not be anything permanent left out there.
BENEFITS	
Would like to know what you need so we can see if there is companies we can team up with.	We have an idea of what we need and can provide this. This will all also be in the EISC document.
Are you going to be using Inuvialuit and Inuvialuit businesses including wildlife and environmental monitors?	Yes. We met with IRC and IDC today and discussed this. We still have our CCBA with IRC. -I am very familiar with the business list. When we brought MGM back into Paramount we changed environmental companies from a non-Inuvialuit business to Kavik-Stantec. -We are planning on using as much local capacity as we can. - That is why we are here telling what services we need. -We need barging, a service rig, we need abandonment equipment. So if you have partnerships bring them forward or if you want to go out and find partnerships and then bring them forward, that would be great too. - We will need a service rig and right now there is no company with a service rig partnered with the Inuvialuit.
Are there opportunities for Inuvialuit beneficiaries to get training, get work opportunities to build capacity and provide local benefits? On the IBAs we still have companies listed as schedule A that you have to come to.	-Yes of course we are. We want local businesses to be used to build capacity. -We are here to show the opportunities to provide time for the Inuvialuit to create partnerships to take advantage of these opportunities. -We can work with IRC and IDC to show what services are needed and what the opportunities are. - We are very aware that where there is capacity within Inuvialuit businesses and we are going to engage Inuvialuit businesses. - There is a wide variety of services that we will need so there will be a variety of opportunities for businesses and for individuals to get employment under those businesses. For example, there will be monitors, camp jobs, on the rig jobs, ice road building and through companies like Schlumberger that we use as Paramount.
-We started a drone company to offer drone services. - We also have the long-distance ones that work out of site. We need them for our own land use management and shoreline monitoring - We have people that went on training to become licensed drone operators.	-That's something we would be interested in. -We just did our budget and set aside some drone monies for next year.
IDC will get you an updated list for the IBL (Inuvialuit business list) and the companies that IDC has. The list was just updated.	-We want to make sure that Inuvialuit companies have an opportunity and that companies that have partnerships will be evaluated as Inuvialuit businesses. -We are going to be keeping in touch on this throughout leading up to the work.

Summary of Consultation Issues, Questions, Comments and Responses

-We now own 100% of AOGS and they are still active for catering in the regions.	For camp options we are looking at the Wurmlinger, the people working out of Inuvik probably need a sleigh camp and then probably another 40 man camp at K-30.
What is your sense of the cost for this program?	Something between 10 and 20 million. We are trying to get a sense of some of the costs on this trip, by talking to different service providers.
Concerned that most of the work in these kinds of projects goes to Inuvik. Is it possible for the smaller communities to get some of this work?	When the time comes we are going to have requests for proposals and have bids and we are going to use the Inuvialuit business list. Companies on that list with a service we need will get a chance at the work. I can't say they will get the work but we will send it out to the list.
We have had an experience that equipment from a small company went out to a site but did not get used and received only standby pay. The bigger contractors will do that to the smaller people. Any guarantee that the equipment will get used or just get standby pay like the last time?	Our construction guy does not like paying standby. If we bring equipment out we are going to make sure it's working unless we are shut down for weather or something. If we say we need it, it's going to work, and that will be our construction guy's call, not other contractors.
EMERGENCY RESPONSE PLAN	
If there are malfunctions you will you have a backup plan?	-Yes. It is required by the NEB. In remote environments you bring a lot more than you will need in case you have to use it. -We have space in the Allen's yard, in Inuvik, to stockpile equipment. -We are trying to do this as efficiently as possible and as safely as possible. - The EISC document will have an emergency response plan in it.
You will know about the pressures in the wells?	-Yes, people are working on that now. -We have the well records. -That is how you choose the service rig.
You will have blowout preventers there ready to go?	Yes.
If there is the potential for a spill every single piece of equipment for a cleanup has to be there on site.	-We have our spill kit here at Allen services. -We store the Co-op's kits and we have inventories on that. -We could have the sea cans on the Wurmlinger and ship them out there with the equipment. -Definitely stuff we are thinking about.
- Sometimes people don't report spills and then we go out and find where a spill was. - There is a spill reporting protocol. - There are recordable and reportable.	-We are hoping to have our people come in here before the program starts and have those things noted so that when you come out to site and we have the reports and can show you what we did to cleanup any spills. - As Paramount we are used to the NWT Spill Line. We have had it in our ERPs before because we operated in Cameron Hills and Fort Liard but those fields have been shut down for a while so we will definitely have to refamiliarize our people with that process. It is definitely something we will do and be watching for any updates that come along.
REGULATORY	
What do you mean by alter condition of a well.	That is the NEB terminology. For us to abandon a well you get an authorization to alter a well. Right now, these wells are called suspended and we are going to alter

Summary of Consultation Issues, Questions, Comments and Responses

	a well by putting the cement in to make it abandoned. We are changing the status of it.
I believe abandonment would go through NEB as well.	-Yes. We would get our water licence and land use permit and then go to the NEB and first get an operations authorization. Talking about our program as a whole. Then for each well we would have to get an authorization to alter a well. That would be our abandonment licence. - The whole project is going through the EISC first
Will NEB will have someone come up and look at the cut and cap.	-Most likely we are going to have NEB inspectors out there at the time of operations. -The NEB will have to approve our program. We first say this is the service rig, this is our land use permit, this is the water licence, this is the outcome of our EISC application that created our land use permit and water licence. These are the comments the land use inspectors have. We put that all into that operations authorization that we send to the NEB. Then they approve that. Then we give them the specific technical details on how we are going to abandon that well. We have to do all the engineering work. Then the NEB approves that, and we can go ahead.
In your water licence is there the requirement to have a spill contingency plan?	Yes we will have that. The spill contingency plan is part of the EISC project description and also goes to the NEB.
Who decides the depth that you put the plug down to?	The NEB.
We will have to ask NEB if the depth varies depending on the location and circumstance because K-30 is right on the coast and is eroding away. And there is scouring to indicate how far the ice has dug into the bottom in the past.	We think that there was about 6 meters of erosion this year and will have to get the water depth there. We have heard it is only a meter or two there.
You are planning on applying for a land use permit this fall?	Yes, and go through the EISC screening process.
Not knowing if you are going to go out next year if Lands issued the permit in early 2019 for a five year term then you would be good? Then you still have the option of extending it for two years.	-We would be good with that. -With the erosion we think it has to be done within the next five years. -We will know this fall if it is 2019-2020 and we will communicate that either way. We still want to have the permit and licence because that helps us with the NEB process. Fall is our budget time so that gives us time to get the contracting done and the staging started in the fall.
On your service rig. How much ice are you going to need because your water use permit will have to include this water.	Yes, water volumes presented here includes water volumes for ice road and ice pad. We are going to probably build it to a similar thickness that was done for the drilling. We used the drilling rig numbers. So we are going to have it nice and thick. We are not going to be moving as much equipment or have as much equipment on site as for the drilling program.
ENVIRONMENTAL	
I want to read you the goals for the IFA. The basic goals expressed by the Inuvialuit and recognized by Canada in concluding this Agreement are: 1-to preserve Inuvialuit	Noted.

Summary of Consultation Issues, Questions, Comments and Responses

cultural identity and values within a changing northern society; 2-to enable Inuvialuit to be equal and meaningful participants in the northern and national economy and society; and 3-to protect and preserve the Arctic wildlife, environment and biological productivity.	
Is revegetating going to be natural or is that something you are going to bring in?	- we are working to get rid of invasive species on our sites - a problem is that there is not a lot of seed of native plant species. - ARI reviewed our seed to determine what we could use. -our northern seed options are more southern NWT or the natural types of grasses. - there is not good seed for local coastal salt tolerant -There is not a seed bank to access - Working with ARI who have a seed program. We have been sponsoring that and helping with some funding and access to our sites. -We have some NWT seed that we use but it is not as diverse as we would like. -We are trying to create more diversity in the seed that we are able to use by harvesting local plants. -This year ARI will be harvesting seed just off the ITH. Hopefully they will have commercial quantities that can be sold to people like us on our sites or that others could use.
For restoration you are just doing the well capping right?	-we will do re-vegetation. - will not need recontouring because these are mostly ice pads. - If we are going to abandon a well and cap it and we are going to look at the site history and do the remediation and reclamation activities.
-the area is used for geese hunting in the fall -the river channels are constantly changing -there are protected areas around Kendal	
Beluga are there primarily in the summer and September.	-This is close to a beluga management zone. - We are not planning to leave the channel.
-A concern for the whales would be noise. But if you are not leaving the channel and you are using barges this should not be a problem because you are not drilling until winter. - One of the MPA sections is up there. If all you are doing is bringing the Wurmlinger or something like it through the channels, it shouldn't have any negative effect.	-Yes. We may use something like the Wurmlinger and setting it up and freezing it in. -The barge would not be up at the top on the coast but set in a protected area in a channel.

Summary of Consultation Issues, Questions, Comments and Responses

When would you be boating up there? If you are coming August and September, the whales are migrating more offshore then. The whales are coming in later now than they used to. It is better to come later than July. Beaufort Sea Partnership web site has information on beluga harvesting times.	-August or September. As late as we can because as soon as we have the equipment we start paying for it. We just need to the channels open and navigable. We will go to earlier if we hear it is better to go then.
Just consult with the communities on the routes that they take.	Yes
Inuvik hunters might be in the Delta. Here not so much. Talk to Inuvik. People go hunting muskox somewhere up that way. There are muskox all over now.	Does anyone go hunting in that area in the winter? The CCPs do not indicate anything in that area.
The only other thing to watch for if you are taking the Wurmlinger out is the water flow data. Early summer this year the water dropped to nothing and then it came back up. So if you are looking at timing you should get that water history because it is changing so much so quickly. It's low even though we have had rain all summer, on this side of the Delta.	Yes, to see when the best time is. That's a good point.
-There are some shallow spots out there is what I am thinking. -And there is scouring to indicate how far the ice has dug into the bottom in the past. -It is a very gradual slope there. The whole area is eroding so quickly there.	I've heard that.
You say that you do vegetation assessments periodically. Does it make any difference in areas that get storm surges? Nothing is going to grow anyways.	-That is our problem right now. - We are having that issue at I-48. We are getting driftwood all over. - We are working on with the Aurora Research Institute on what will grow in a wet salt environment. - The storm surges make it tough to grow anything.

Summary of Consultation Issues, Questions, Comments and Responses

-You put a pole in a few locations and you are going to see the waterline. - The other thing is where the camps are is where most of the fish holes are.	- We are putting up a camera to see how and when it is coming in
CLOSING COMMENTS ON COMING TO CONSULT	
As a member of the community and a hunter and a trapper that uses the land I am really happy that you guys are taking the initiative to go out and clean up. I just hope other companies could follow suit. Like you said you want to work with other companies to help go out and cleanup what you are leaving behind. I think that is a good step and we are really happy you guys are doing that.	Thank you. I really appreciate you guys making the time for us.
Hopefully it gets approved so we can have work in the Delta.	I appreciate how slow it is up in the Delta. When I know I will let you know one way or another.

KAVIK-AXYS Inc.

DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**20--June-2018**
Time:	**4 pm**
Location:	**Inuvik Hunters and Trappers Committee Office**
Person(s) Involved:	**Hunters and Trappers Committee** • **4 directors** **Community Corporation** • **2 directors** **Project Team** • **Terence Hughes - (MGM)** • **Larry Yoon (MGM)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Responder Name	Response
Abandonment			
General			
1-	You are looking at closing them all up?	Terence Hughes	Yes eventually. If someone decides to build a pipeline, then we wouldn't. We want to be prepared if there is a need to abandon the wells that we are able to. Some of the wells we feel that we may need to abandon them shortly.
2-	Once you complete the abandonment will you follow up to check the next year?	Terence Hughes	Yes, we will continue to monitor them

	3-	You long would you monitor them?	Terence Hughes	As long as we are doing reclamation and remediation work. We want to get the site closed off for us. The inspectors here inspect the site as long as they see fit. MGM is still responsible for it.
	4-	When you go out you will have wildlife monitors?	Terence Hughes	Yes, they are on our monitoring program and with Dick for the wellhead monitoring.
	5-	Are you prioritizing what you are doing first?		Yes, Central first. Probably west second. K-30 is the first well. It is a matter of budget. We want to be positioned for the other two wells in the central region so that if we wanted to abandon three in a winter, we could. And by Terence Hughes having them all under one permit and licence makes it easier. It is expensive to build the ice road so you might want to do 2 or 3 wells at once.
	6-	Are you planning to haul your service rig out on the ice road? We do not have the same cold winters like we used to and we don't have the same thick ice like we used to. So, I think you guys might have to bring barges with your rig out there and let them freeze in out there. I think that would be the best way. Because if you are hoping on a good ice year, you might not get it. Last winter was so warm the ice was really thin everywhere all winter. Think about using barges to take your rig out there, freeze it in and take it off in the winter. Use ice roads for lighter vehicles, resupply and things like that.	Terence Hughes	Yes, for the camp and some of the equipment we were looking at that. That is something we will take back to the team and let them know what we are hearing from the communities. If we are counting on a good thick ice road we might be disappointed. We might not have as much water or time to get it as thick as we need.
		Yes, and frozen to the bottom.	Michael Fabijan	For some of the seismic programs a separate road was built parallel to the public road and flooded to get thicker is.
			Terence	We will consider that when consider the

			Hughes	volume of water we need.
		Last year the ice road to Aklavik it was well past the new year before they were able to bring food supply trucks. It was so thin. And just light vehicles most of the winter.	Terence Hughes	The good news is that these operations don't take as long as drilling operations so you don't need as much time and equipment isn't as heavy. The next time we come we will have a presentation on what the equipment will look like. That is good information to know.
	7-	Are you going to be using Inuvialuit businesses?	Terence Hughes	Yes. We met with IRC and IDC today and also discussed this. I am very much aware of our CCVA with IRC and our community benefits agreement. I am very familiar with the business list. When we brought MGM back into Paramount we changed environmental companies from a non-Inuvialuit business to Kavik. We are very aware of that as MGM and myself personally having worked up here before. We are planning on using as much local capacity as we can.
			Michael Fabijan	One of our roles is to make sure that happens.
			Terence Hughes	That is why we are here telling what services we need. We need barging, a service rig, we need abandonment equipment. So if you have partnerships bring them forward or if you want to go out and find partnerships and then bring them forward, that would be great to.
	8-	Do you have an estimated time for each one?	Terence Hughes	The work on each well is 10 to 14 days. If they go well. We will put in contingency time. Some of them if they go really well you can get done in six or seven days. A couple of days to set up, 4 or 5 days on the well and a couple of days to move off.
	9-	How about just one stationary camp?	Terence Hughes	Yes, we are thinking of that, maybe with the Wurmlinger and set it up half way and shuttle the crews back and forth. And put a sleigh camp of shacks right on the site for people to get warm and have lunch and stuff like that. we are thinking of a number of options. We are going to see the Wurmlinger tomorrow to see what kind of shape it is in and take some pictures for the operations guys. We are looking at all

				our options right now and thinking about what be the best safety wise for the crews, the local contractors and what we hear back from the communities and some preferences there. We are looking at what might be the best cost wise as well. We are just in investigation mode right now. Our permit is going to be broad and include a lot of different options. It is a little more work on the front end, but I think it is worth it on the back end. To choose the best option or the given year.
	10-	If there are malfunctions you will you have a backup plan?	Terence Hughes	Yes. It is required by the NEB. In remote environments you bring a lot more than you will need in case you have to use it. That would be the case here. We have space in the Allen yard to stockpile equipment. We are talking to other companies about our plans so that maybe they can do some work and then we can rely on each other and save some money. We are trying to do this as efficiently as possible and as safely as possible.
			Michael Fabijan	The EISC document will also have an emergency response plan in it.
	11-	You will know about the preasures in the wells?	Terence Hughes	Yes, people are working on that now. We have all of the well records. That is how you choose the service rig.
	12-	You will have blowout preventers there ready to go?	Terence Hughes	Yes.
	13-	Are there training and work opportunities for local benefits?	Terence Hughes	Yes. We can work with IRC and IDC to show what services are needed and what the opportunities are.
	14-	I am talking about the HTC and Community Corporation to have beneficiaries be trained and go out to work on the project to build local capacity and benefit financially.	Terence Hughes	We will definitely have monitors. We have had people come down to train in different area and come back to work. I think there will be those kind of opportunities for instance with Schlumberger that we use as Paramount.
	15-	All beneficiaries should be given opportunities.	Terence Hughes	There is a wide variety of services that we will need so there will be a variety of opportunities for businesses and for individuals to get employment under those businesses. For example, there

			will be camp jobs, on the rig jobs, ice road building
K-30			
1-	You are doing this site because of the erosion what about the monitoring of K-30 for how long.	Terence Hughes	In 15 years there may not be much to monitor. We want to make sure the well is abandoned correctly and that the site is clean before the erosion gets to it so that we don't impact the water.
2-	Is there a sump on the site to?	Terence Hughes	The sump is south of the well site and more inland.
3-	With the permafrost melting I noticed that our abandoned places where we had pilings they are coming higher. You will be monitoring even if it is underwater?	Terence Hughes	Yes because we will have it GPSed. We want to abandon it farther down so that we do not have the same problem you just described. We are looking to go about 10 m below.
	That would be sufficient enough because the water in that area is not very deep. Once the area is eroded it is likely to be five to seven meters deep. It would be a long time before that is exposed.		
4-	What is your time frame?	Terence Hughes	Hopefully get the EISC application in September - October this year, respond to queries and get an approval early 2019. Then finish off our NEB approval by mid 2019. So, that if we wanted or need to do the K-30 abandonment in 2019-2020 we would be prepared to do it. It is then dependent on what the environment is doing and our budget. The year that we are doing it we will be back to discuss the program.
Closing			
1-	As a member of the community and a hunter and a trapper that uses the land I am really happy that you guys are taking the initiative to go out and clean up. I just hope other companies could follow suit. Like you said you want to work with other	Terence Hughes	Thank you.

		companies to help go out and cleanup what you are leaving behind. I think that is a good step and we are really happy you guys are doing that.		
	2-	Ditto (group laughter)	Terence Hughes	Thank you. I know you guys have jobs and other meetings and you are involved in you community so I really appreciate you guys making the time for us today.
	3-	Thanks for coming. We want you guys to go ahead with your program so we want to give you as much information as we can.	Terence Hughes	Thank you. I appreciate that.
Recorded By:	Michael Fabijan			

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DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**20-June-2018**
Time:	**2:30 pm**
Location:	**IRC Board Room - Inuvik**
Person(s) Involved:	**Inuvialuit Regional Corporation representatives** • **4 paritcpants** **Project Team** • **Terence Hughes - (MGM)** • **Larry Yoon (MGM)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Responder Name	Response
Presentation clarification			
1-	Can you clarify the symbols on the map. The different colored symbols (Figure showing well and sump sites)	Terence Hughes	Brown are sump sites. Black are well sites. Some sump sites are very close to the well so the symbols overlay.
2-	What are the methods for abandonment and reclamation?	Terence Hughes	Abandonment is a service rig. The operation is you go in and make sure there is no pressure. You go in and make sure the well is dead. You typically go in and squeeze the zones. You put cement into the zones that were opened up or tested to see if the zones had gas or oil. You are going to squeeze

				there. Then you put a plug, then some cement and then another plug. Then you would cut. Then you would test that all is really solid and secure and then you would cut the well head off. Then you would usually leave a sign post.
			Michael Fabijan	What do you mean by squeeze?
			Terence Hughes	It's a cement squeeze. You are going to go down and push the cement into that zone. You perforate or open the zone so that the oil and gas can flow out. Now you are putting the cement in there so the oil and gas does not flow out. And you are putting a plug on top of that and then another plug so you will have two. You will have wireline equipment, cement trucks, like fluid tanks on site and the biggest piece would be, not a drilling rig but a service rig. A little smaller. You will probably have some rentals. You will have a grader on site and a how and those sorts of things. You will a couple of well site shacks right at the location so guys can go in and get warm. A boiler to keep everything unfrozen. That's kind of the extent of it.
	3-	Would there be camp work involved there?	Terence Hughes	Yes there would be. That's one of the things we are trying to leave open. Do we take a camp. Like E-07 is abandoned already so you could use that site and put a camp there. I-25 and K-30 need to be abandoned. You could put your camp on one of the wells while you abandon the other well. We are going to see the Wurmlinger. So you do you bring that out and sit it in place. Those are the kind of options we are trying to leave open. And do a cost comparison and let the guys get into the numbers and figure out what is safest, what is most cost effective, what will the communities be Ok with.
	4-	When you talk about the Wurmlinger, is that Horizon Norths?	Michael Fabijan	It is part of EGT Grubens' now. We will look at both camp barges and all of their other barges as well.
	5-	I just ask that question because we own AOGS	Terence Hughes	Yes.

		outright now. We don't want to be pushed aside as a business to say that we don't offer that package. Sure use their camp but give us the option to provide the catering		
	6-	I am just surprised that you would need something of that level for this kind of operation.	Terence Hughes	It's the road building and they are thinking about running 24 hours. Two shifts, 12and 12.
			Terence Hughes	When you get to the first site you are going to need the guys to get the service rig there. When you have the most people there is when you get the first site ready. The service rig can get on there and start doing it's work and the construction guys can keep pushing out to the other sites. They are going to keep coming back to camp. At peak you might be 40 or 60 people.
		The other option with Northwind and EGT is that they have sleigh camps as well.	Terence Hughes	Yes and our construction guys are probably going to need a sleigh camp. The idea with the Wurmlinger and another barge is to maybe have some of the equipment staged up there and then kick off right from there in the winter and work both sides.
	7-	What is your time frame on this?	Terence Hughes	We are going to get to that. Mother nature is driving our time line.
	8-	That's the same process for all the well sites?	Terence Hughes	For all the abandonments, yes.
	9-	So, you still have NEB up there. So, which one would you be applying to now?	Terence Hughes	It's still NEB. The Canadian National Energy regulator, but they have not rebranded yet but it will likely be them by the time we apply.
	10-	You should be communicating with Dustin to Mike. (re: erosion on site)	Michael Fabijan	We are.
	11-	Sixty meters it's eroded?	Terence Hughes	We are sixty meters from the coast, the well head.
	12-	That area floods in the spring?	Michael Fabijan	Yes.
		And storm surges?	Michael Fabijan	Yes.
			Terence Hughes	The good thing about a service rig as apposed to a drilling rig is you don't need as much room. The sites were

			created for drilling rigs which need more room. We are still able to very easily do the operation right now and we want to get it done while it is still easy and we have shore on either side.
13-	The EISC is what you are initiating right now.	Terence Hughes	Yes, that is what we are kicking off right now.
14-	Could you refresh us on each of those well heads. Are they all dry?	Terence Hughes	No they are not all dry. A number of them hold SDLs.
15-	Keep in contact with Denny Rogers on the type of services you require. Going back to the IBAs we still have companies listed as schedule A that you have to come to.	Terence Hughes	Yes, for sure. We still have our CCBA with you. One of the biggest changes we made when MGM came back into Paramount was we switched the environmental company to Kavik. There is a joint venture there and they won the bid.
		Michael Fabijan	One of our rolls is to make sure all the Inuvialuit companies are used.
16-	We acquired all the assets of AOGS. So we still have full camp catering services here. Based in Inuvik.	Terence Hughes	Yes.
17-	MGM has probably been one of the most if not the most proactive with working with us in this region. We have always appreciated that. Mr. Sykes has always been good to IRC.	Terence Hughes	We plan on continuing on in that same way.
18-	We just started a new Drone company to offer Drone services.	Terence Hughes	Excellent
	We also have the long distance ones that work out of site. We need it for our own land use management and shoreline especially.	Michael Fabijan	We have been using the smaller ones for the sump and well sites.
		Terence Hughes	That's something we would be interested in.
19-	The guys that live out there in the summer at Kendal and Baby island see it even more so (erosion effects). One guy has had to move his camp twice the last few	Terence Hughes	At K-30 we will be abandoning it further down. We are thinking about 10 meters down.

		years because of erosion. The ice is receding further so you get bigger storms. The longer concern is that even if you capped the well site at K-30 it is eventually going to be sitting in the water, exposed.		
		When you are in the communities it would be helpful if you point that out.	Terence Hughes	Yes.
	20-	The three sections in your map. What is the order of attack?	Terence Hughes	If I was to say it would be central, then west then east. Central being first because of the erosion. We can provide the wells in a list and what their current state is, suspended or abandoned.
	21-	A lot of them young guys don't know the difference between reindeer and caribou.	Michael Fabijan	There might be the odd caribou on Richards Island but mostly it is reindeer.
			Terence Hughes	Thanks for making time with us. You will be seeing us again before the end of the summer.
	22-	Have you had any indication from any other companies since you are taking the initiative to do this. Are they saying we should consider piggy backing since the resources are going to be in the region?	Terence Hughes	If you can piggy back, there is a cost savings for us to. We are continually reaching out and will continue reaching out and let people know what we are doing. You can't make them come. We will continue talking to other operators as we go forward with our application and when our on the ground timing firms up. We are doing this in the Sahtu and Liard.
		We are pushing the Feds on this issue so it is good to see you guys are stepping up.		
		We don't want to see the sumps underwater. We want to update them and determine which ones are high priority and failed sumps as well and get on those.	Terence Hughes	We don't have any failed ones. We have some that are in positions that are not ideal. We can get you: 1- Map with SDLs 2- Status of our wells - suspended or abandoned 3- Monitoring report summaries
	23-	Would like to know what you need so we can see if	Terence Hughes	We have an idea of what we need and can provide this.

		there is companies we can team up with.		
			Michael Fabijan	This will all also be in the EISC document.
Recorded By:	Michael Fabijan			

KAVIK-AXYS Inc.

DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**20--June-2018**
Time:	**7 pm**
Location:	**Tuktoyaktuk - Tuktoyaktuk Community Corporation boardroom**
Person(s) Involved:	**Tuktoyaktuk Community Corporation** • **5 directors** **Project Team** • **Terence Hughes - (MGM)** • **Larry Yoon (MGM)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Respond er Name	Response
K-30 AND ABANDONMENT			
1-	So, this work is all in winter?	Terence Hughes	Yes. We may move equipment by barge in the summer but will be on location in the winter. Some of the other sites may be candidates for a wireline abandonment which can be done with a truck and could possibly be done in the summer. We have not looked into this yet.
		Michael Fabijan	There would not be anything on the land in the summer. Just the barges.
2-	You are looking at all the options now.	Terence Hughes	Yes. Looking at the Wurmlinger. For these ones (Central region) the work would be in the summer and some of the logistics could be in the summer.
		Michael	The EISC submission will have all the

			Fabijan	options in it so that MGM does not have to come back to ask for another option. They will all be considered up front.
			Terence Hughes	During our next consultation we will show these before they go to the EISC. This round we wanted to introduce why we are doing the work, introduce ourselves so you have contacts to ask questions about MGM, abandonment, our environmental program, and any feedback you may have now.
	3-	It is good to see the presentation and what you plan to do. One of the things we react to is a land use permit. That gives us the ability to go through ILA and put down what kind of work is going to be done, who is going to gain from the employment, and the business opportunities. Mike is pretty aware of how our system works and with IRC.	Michael Fabijan	We met with IRC this afternnon
		I remember.	Terence Hughes	I have met you. I used to work with Devon and have been here a couple of times with Pete and Bill with the Paktoa well. I am very familiar with IRC and making clear what the business opportunities are. We spoke a bit today with IRC about that. When MGM came back into Paramount we changed one of the main contracts from an outside company to an Inuvialuit company and we brought in Kavik. We are very aware that where there is capacity within Inuvialuit business we are going to engage Inuvialuit businesses.
		There is a business list in IRC.	Terence Hughes	Yes we talked to IRC about business opportunities with old and new business relationships for this work. For example we will need a service rig and right now there is no company with a service rig partnered with the Inuvialuit. We are using as many Inuvialuit businesses as we can for example Canadian and Kavik.
			Michael Fabijan	Part of Kaviks' role is to make sure MGM knows about business that have

				services needed by MGM.
	4-	You will have a GPS location for these sites when you finish the abandonment?	Terence Hughes	Yes. Normally there is a sign post left that shows that there was an oil and gas well at this location so that people don't dig there. For K-30 we may or may not put up a sign because it looks like it won't be there for very long. We will provide the exact GPS coordinates to all the communities, ILA, the water board and regulators so they know there was a well here and how deep it is.
	GENERAL			
	CLOSURE			
	5-	We are glad you came up it was good information. Thank you for bringing them Mike	Terence Hughes	Thank you. We will be back in August with more information.
	6-	Thank you for bringing them Mike	Michael Fabijan	My pleasure.
Recorded By:	Michael Fabijan			

KAVIK-AXYS Inc.

DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**20--June-2018**
Time:	**8 pm**
Location:	**Tuktoyaktuk - Tuktoyaktuk Community Corporation boardroom**
Person(s) Involved:	**Tuktoyaktuk Hunters and Trappers Committee** • **5 directors** **Project Team** • **Terence Hughes - (MGM)** • **Larry Yoon (MGM)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Responder Name	Response
General			
1-	When you make the ice roads are you going to be based out of Inuvik?	Terence Hughes	With the Wurmlinger and another barge we could work both ways.
2-	What king of equipment are you going to need to make the ice road?	Michael Fabijan	We haven't got that far yet. We will back here in August with a better idea.
		Terence Hughes	We will have an equipment list then. Our operations person knows he needs snow cats, water trucks and those things. He is still working through a defined list. We are determining what the local capacity is that is still here and usable.
3-	What do you mean by alter condition of a well.	Terence Hughes	That is the NEB terminology. For us to abandon a well you get an authorization

				to alter a well. Right now, these wells are called suspended and we are going to alter a well by putting the cement in to make it abandoned. We are changing the status of it.
	4-	I can't remember what year it was but we were but all these places are pretty familiar, the west and the central, Might have been for Shell but I can't remember. Were doing a well abandonment program on all these old well heads. I don't know what they were doing but a lot of them they filled up with fuel before they did the final cap. They were starting to rust out. They were changing their caps.	Michael Fabijan	Was this for the old ones or this current round?
		Old ones.		
			Terence Hughes	For use, when we go in, we would not use fuel. We would use water with some additives. They would be water based, called inhibited water. If there is gas it keeps the gas down. You make sure the well is dead then you do the cement squeeze and those plugs. We will have a list of equipment the next time we come. It is a lot less equipment than to drill a well.
		At the time we were using a smaller service rig.	Terence Hughes	That is what we would be using.
	5-	Where is the material that comes out going to go?	Terence Hughes	Currently our only option is to move it back to Alberta or British Columbia.
		That is what MGM did one time with a drilling program.	Terence Hughes	Yes, when they drilled they took their stuff home. For this program we are going to take it all home. The only thing that we put in our licence that we might dispose of in the NWT is our camp waste, our sewage. We might talk to Inuvik or Tuktoyaktuk to see if they have room for some extra.
		As long as it is put in the proper place I don't see a problem with that.	Terence Hughes	That is the only kind of waste we are envisioning getting rid of locally. We will investigate other places in the NWT that we could put waste materials such as soils.

		Not in the ISR. I don't know what kind of volumes you are talking about.	Terence Hughes	I could potentially be a business opportunity. Around the well sites it is a bit of dirt. And some of it just needs a bit of time to attenuate. Other things might be bigger volumes and the will have to leave. Right now we are of the understanding that everything has to go to Alberta and BC. There is a community in the southern NWT that is thinking about creating a land fill for some of this type of material.
		I sit on the Game Council and right now the rule of thumb is garbage in garbage out.	Terence Hughes	Yes, and that's' the approach we are taking, unless there is a change.
		That is good to hear.	Terence Hughes	We are not working with the assumption that we are going to be able to do something hasn't been done in the past.
	6-	Is revegetating going to be natural or is that something you are going to bring in?	Terence Hughes	That is one of the things on our sites, is that we are getting rid of the invasive species. One of the problems we and all the operators run into is that there is not a lot of seed of native plant species. So our northern seed options are more southern NWT or the natural types of grasses. There is not good salt based seed for plants that you have on the coast here. There is not a seed bank that we can go get to plant on our sites. We are working with ARI. They have a seed program. We have been sponsoring that and helping with some funding and access to our sites. We have some NWT seed that we use but it is not as diverse as we would like. We are trying to create more diversity in the seed that we are able to use by harvesting local plants. This year ARI will be harvesting seed just off the ITH. Hopefully they will have commercial quantities that can be sold to people like us on our sites or that others could use.
			Larry Yoon	We reported our seeds to ARI and they reviewed and said certain ones were not considered invasive and we could use them. There were some that we pulled out.
			Terence	We are trying to create a greater diversity of seed that we can use.

		Hughes	
7-	Your map is missing the MPA zones.	Terence Hughes	We will get that noted on our map.
		Michael Fabijan	These used to be the beluga management zones.
K-30			
8-	Where would you put the barge? The area close is exposed.	Terence Hughes	We would put it in a sheltered area and build an ice road to the site.
9-	What is that area? (Regarding site delineation shown on figure)	Terence Hughes	That is what the surveyed well site was. That was for a drilling rig. Service rigs don't need that much space. We need about 10-20 meters on the side of the well head to the ocean to do the operation.
10-	How far is it from the well head to the ocean?	Terence Hughes	Sixty meters.
	That's not very far. What happens when all that erodes?	Terence Hughes	That is why we are going to abandon the well before it erodes. That is why we want to get the permit and licence in place.
11-	You mean remediate it or abandon it.	Terence Hughes	Abandon it. We are going to plug it and take the well head off. Normally you would cut the well head off a meter and a half below the ground. Because of what's happening here we would cut the well head 10 meters below the ground. We are going to have the plug and cut above it and pull 10 meters of the casing out. So that one day when this is below water that casing is 10 meters below. It will be GPS'ed and we provide that information. It would be deep enough so that it would be safe.
12-	How far above sea level is this ground right now?	Larry Yoon	Maybe a meter.
13-	I used to go hunt geese there in the fall. Six years ago there are islands where there used to be channels.	Terence Hughes	This map really shows it how this has moved over time (presentation figure showing erosion)
14-	Next time we have a lot more questions because we will see what kind of project description you will have.	Terence Hughes	Before we come we would like to provide a 4-5 page executive summary of what's going in the project description and send it to you a couple of weeks before the meeting. And then come and talk about it.
15-	The IGC meeting is August 29 to September 1 in	Michael Fabijan	We are thinking of doing the next round of consultations with the HTCs and CCs

		Whitehorse. The IGC is going to Edmonton for August 6 to 10. For meetings with Inupiat. We meet on 7th 8th and 9th .		just prior to the IGC meeting. We will be at the IGC meeting.
		You will have to ask the office.	Terence Hughes	Is your agenda in Edmonton full?
			Michael Fabijan	I will ask Jenn. It would be really easy for Terence and Larry to come to Edmonton for a meeting.
	16-	Mike can check into the protected areas around Kendal	Michael Fabijan	Yes, I know where they are.
	17-		Terence Hughes	Any questions between now and the next meeting feel free to call myself or Michael.
Recorded By:	Michael Fabijan			

KAVIK-AXYS Inc.

DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**21-June-2018**
Time:	**8:45 am**
Location:	**DFO board room, Inuvik**
Person(s) Involved:	**DFO Inuvik** • **2 participants** **Project Team** • **Terence Hughes - (MGM)** • **Larry Yoon (MGM)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Responder Name	Response
1-	What season are you planning on doing this?	Terence Hughes	The barging to get the equipment out there could be summer or early fall. The abandonment work for the Central wells we think will be in the winter. The work takes less time than drilling. The abandonment work can be as short as five days to as long as 14 days. The three wells could take be as little as 25 days and as long as 40 days.
2-	Beluga are there primarily in the summer and September.	Larry Yoon	This is close to a beluga management zone. What would the timing restrictions be?
		Terence Hughes	We are not planning to leave the channel.
3-	A concern for the whales	Terence	Yes. We may use something like the

		would be noise. But if you are not leaving the channel and you are using barges this should not be a problem because you are not drilling until winter.	Hughes	Wurmlinger and setting it up and freezing it in.
			Michael Fabijan	The barge would not be up at the top on the coast but set in a protected area in a channel.
	4-	And this is just for the ones you are plugging up?	Terence Hughes	Yes, no drilling.
	5-	So those are the three you are focusing on right away?(referring to presentation picture of ISR Central)	Terence Hughes	Yes
	6-	What are the orange dots on the map?	Terence Hughes	Those are sump sites.
	7-	One of the MPA sections is up there. If all you are doing is bringing the Wurmlinger or something like it through the channels, it shouldn't have any negative effect.	Terence Hughes	We will confirm our timing options on the next round.
	8-	When would you be boating up there?	Michael Fabijan	August or September.
			Terence Hughes	As late as we can because as soon as we have the equipment we start paying for it. We just need to the channels open and navigable. We will go to earlier if we hear it is better to go then.
		If you are coming August and September, the whales are migrating more offshore then. The whales are coming in later now than they used to. It is better to come later than July.		
	9-	Once the wells are abandoned then what? Do still have some responsibilities?	Terence Hughes	The will be checked and we are always responsible for them. We never loose the liability but we might loose the monitoring requirement.
	10-	Have you been doing this or have you been doing it in partnership with NRCan (Re presentation slide showing K-30 shore	Terence Hughes	We have some of the information and we have been partnering with Dustin Whelan. We have equipment in the area and he will work at some of our sites.

	erosion over time)		
11-	How shallow is it there (K-30)	Larry Yoon	It is only a meter or two shallow.
		Michael Fabijan	All the channels up there are really shallow.
		Terence Hughes	The land is about a meter above the water.
12-	We are interested in the effect of the sediment on migration.		
13-	The box on the figure is for the equipment for the drilling rig? (RE-K-30 erosion figure.	Terence Hughes	Yes but for the abandonment you need significantly less space.
14-	When you are doing the work are there any considerations to minimizing the erosion or contributing to it?	Terence Hughes	We should be alright because we will be there in the winter on an ice pad. We looked at erosion control and it was not an option.
15-	If and when that erodes completely?	Terence Hughes	We would be going 10 meters below the ground to cut and plug. The GPS coordinates will be given to all the communities and regulators
		Michael Fabijan	Even when it erodes it will be deeper than the boats being used in the area.
16-	You do see yourself continuing with the abandonments and not just doing the high risk ones?	Terence Hughes	There is a possibility that we will just do the high risk ones in the shorter term.
		Michael Fabijan	The EISC submission will have a number of different timing, abandonment options and possible ice road routes so that in any given year an option could be selected without going to the EISC for an amendment.
		Terence Hughes	We will be back in August to show these.
17-	Not from an Oceans DFO perspective. I can't speak for the people from our more regulatory side.	Michael Fabijan	Is there any concerns with travel in the channels?
18-	Just consult with the communities on the routes that they take.	Michael Fabijan	Yes, we are working on that. On the next round we will have a better idea.
19-	If this is going through EISC we will have an opportunity to comment and have input. We can	Terence Hughes	We are planning to produce about a 4 page executive summary of the project to pass around the before the next meeting. It will have things like the

		certainly share information with our partners at Fisheries protection.		route options, equipment list, timing for the very options. Plan to send out about a week before the next meeting around the next IGC meeting.
			Michael Fabijan	We are planning the next round of meetings just before the next IGC meeting.
			Terence Hughes	We are trying to be proactive on this work.
	20-	That you are planning to go down deeper should provide some comfort.	Terence Hughes	For sure.
	21-	What are the chances of things coming out where you cut.	Larry Yoon	They won't consider it complete until the squeeze is done.
			Terence Hughes	That's the downhole part where you thought the gas was. You push the cement until it the formation does not go in anymore and you get cement coming back up. This is called cement returns. You can check to see if there is gas in the cement. You circulate out and check for gas to see if the squeeze is holding. If the squeeze is holding you put a plug on top of it. Cement returns is the key because if you are not getting returns you know the formation is still taking cement.
	22-	This cement will last forever?	Terence Hughes	Yes.
	23-	This will be checked regularly until it is not checked?	Terence Hughes	Yes, we have to go back the next year to do a gas migration test. I think for these you will see that the regulator is going to be on site with us. So they will be there when we think the squeeze is successful and the will also agree that it is.
	24-	Suggest that you highlight the monitoring that is going to happen. This will be a community concern.	Terence Hughes	Yes. Will have to see how this will be marked. Do not see that there is value on leaving a marker that will become waste when the land erodes. You will have the coordinates.
			Michael Fabijan	Please let us know if know if there are things we should consider fisheries wise..
			Terence Hughes	You know if your colleagues know things about certain channels.
	25-	I will talk to Larry Dow to see if he wants us to look in	Terence Hughes	Yes. That is why we are leaving the presentation and our cards. Call with

		to this. Are you ok with us sharing this information?		any questions or concerns even if you or your colleagues just have a question about a term or anything we are saying about oil and gas activity.
	26-	We have a regulatory group that has and oil and gas branch or division.	Terence Hughes	The more questions the earlier the better.
	27-	The same thing with FJMC although if you are going to IGC they will get pulled in there.	Terence Hughes	One of the Inuvik HTC directors is also on FJMC. Jerry Inglangasuk.
			Michael Fabijan	He was at the meeting yesterday.
	28-	We have the pamphlets on the web site.	Michael Fabijan	Do you have a write up of the MPA regulations?
	29-	The annual reports are on the Beaufort Sea Partnership web site. They highlight the research that is going on. It will get you the harvesting times.		
Recorded By:	Michael Fabijan			

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DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**22--June-2018**
Time:	**9 am**
Location:	**Tuktoyaktuk - Kitti Hall**
Person(s) Involved:	**Inuvialuit Game Council** • **7 directors** **Project Team** • **Terence Hughes - (MGM)** • **Larry Yoon (MGM)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Responder Name	Response
1-	Does it say which site that is? (Referring to presentation slide showing erosion over time)	Terence Hughes	That is K-30. (Pointed out on Map)
2-	Is there any other research efforts there (K-30)?	Terence Hughes	We are doing work with Aurora Research Institute on the seed and Dustin Whelan on erosion. We are going to have Dustin Whelan on the site this year to set up some of his monitoring.
3-	So he is going to come and you are hiring him directly?	Terence Hughes	I think he is doing some other monitoring in the area and we are going to get him to include some of our sites.
		Michael Fabijan	He does the coastal monitoring.
4-	We have asked him to train	Michael	We were talking to the Community

		more of our beneficiaries. I want to make sure this is happening. Especially on a project like this.	Fabijan	Corporation and there are people going out to training programs right now to become licensed drone users. I will talk to them as soon as they get somebody back from that program.
	5-	Thank you for Coming	Terence Hughes	Thank you for seeing us first thing in the morning.
Recorded By:	Michael Fabijan			

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DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**22-June-2018**
Time:	**11:30 am**
Location:	**Inuvik, Department of Lands boardroom**
Person(s) Involved:	**Department of Lands - GNWT - Inuvik** • **3 participants** **Project Team** • **Terence Hughes (MGM)** • **Larry Yoon (MGM)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Responder Name	Response
1-	How do you plan to abandon the well	Terence Hughes	With a service rig which is significantly smaller than a drilling rig and needs significantly less ancillary equipment than a drilling rig would.
2-	I believe abandonment would go through NEB as well.	Terence Hughes	Yes. We would get our water licence and land use permit and then go to the NEB and first get an operations authorization. Talking about our program as a whole. Then for each well we would have to get an authorization to alter a well. That would be our abandonment licence.
		Michael Fabijan	The. whole project is going through the EISC first
3-	Although we do our own screening, 99% of the time	Terence Hughes	Yes.

		we follow the EISC. We wait on their decision before we make our decision.		
	4-	You are going down 10 meters with a service rig (re K-30)	Terence Hughes	Yes with a service rig.
	5-	What is your process for abandoning the well heads?	Terence Hughes	Down hole work that the NEB regulates and would have to approve. You end up with a plug closer to the formation and one closer to the surface. We are going to cut at 10 meters. So the plug may be at 12 or 15 meters. Then we are going to cap it.
		How they do that is all under NEB control. Ours is just the land use permit, just inspecting and making sure everything is good on the land use side of things. The abandoning and capping is NEB stuff.	Terence Hughes	You make sure we fill in the excavation properly because we do have to do some excavation to do the cut and the cap.
		NEB will have someone come up and look at the cut and cap.	Terence Hughes	For sure. The NEB will have to approve our program. We first say this is the service rig, this is our land use permit, this is the water licence, this is the outcome of our EISC application that created our land use permit and water licence. These are the comments the land use inspectors have. We put that all into that operations authorization that we send to the NEB. Then they approve that. Then we give them the specific technical details on how we are going to abandon that well. We have to all the engineering work. Then the NEB approve that and we can go ahead. Then like Donald said, most likely we are going to have NEB inspectors out there at the time of operations.
	6-	If you are following your original Project descriptions for the drilling program it will more than likely all be under the same scope of work. It is just a matter of reclamation. All we will be concentrating on is how you propose to do it. So we will be looking at	Terence Hughes	We will have more on the timing aspects like do we start the ice road at both ends and stuff like that. You will see that the timing of operations will be a little shorter.

		what you are bringing up and how it's done. We know NEB is going to be involved and we know you are following the process for screening. In short, it will look like it's a new permit. It's actually more than likely going to be staying within your existing land use permit. We would still like to see how it is going to be dealt with.		
	7-	The screenings might be cut short if say for example you already had a description on reclaiming the site within your original application.	Michael Fabijan	There isn't.
		Then it will take the same amount of time.	Michael Fabijan	Yes, we are counting on that.
	8-		Terence Hughes	We are counting on that. I think abandonment was in most of the screenings because there is always the possibility when you drill a well that you don't find any thing and you would abandon right at the time. Like Michael said they are a little light on the reclamation remediation. We have the feed back from you on an annual basis and we are going to use that and that is going to help say the things we are going to address because they have been identified to us. We have our own environmental program and we know what some of the issues are on the sites and what we need to address.
	9-	When you are looking at your reclamation you are going to want to define what kind of chemicals you are using. There is probably questions going to come back if they were not explained properly within the EISC or us (Lands). If we see a chemical we don't understand then we could have an information request.	Terence Hughes	I think we will try to submit the MSDS forms as an appendix but also try to have a common language description. There will be some chemicals but a lot of it is an inhibited water-based system and just some additional chemicals. Most of the stuff we are planning on taking out. For waste streams very little. The only thing that we have been talking about that we know for sure, that we would like to leave in the NWT is the camp waste. We will talk to the town of Inuvik about that. We will have

				the description because there is always the potential for spills. We want you to understand what we have up here. A lot of the risky material will be our fuel.
	10-	If there is the potential for a spill every single piece of equipment for a cleanup has to be there on site.	Terence Hughes	We have our spill kit here at Allen services. We also store the Co-ops kits and we have inventories on that. And the additional stuff we would need for sure. We could have the sea cans on the Wurmlinger and ship them out there with the equipment. Definitely stuff we are thinking about.
		In the last couple of years we are starting to crack down on the spill response.	Terence Hughes	Good to know.
		Sometimes people don't report spills to us and then we go out and find where a spill was.		
	11-	Within the spill report line there is a reporting protocal. I think if it is above 100 liters it has to be reported, if it is below it has to be noted.	Larry Yoon	Do you have spill triggers?
			Terence Hughes	We are hoping to have our people come in here before the program starts and have those things noted so that when you come out to site and have the reports and show you what we did to cleanup any spills.
		You have recordable and reportable.	Terence Hughes	Yes, as Paramount we are used to the NWT spill line. We have had it in our ERPs before because we operated in Cameron hills and Fort Liard but those fields have been shut down for a while so we will definitely have to refamiliarize our people with that process. It is definitely something we will do and be watching for any updates that come along.
		We are hooked up to the spill line so any spills that are reported we get an e-mail with the locations and quantities etc.	Terence Hughes	Yes.
	12-	For restoration you are just doing the well capping right?	Terence Hughes	I think we will put in the re-vegetation. I don't think we will have any recontouring because these are mostly

				ice pads. I think there will be some stuff on revegetation. If we are going to abandon a well and cap it we are going to look at the site history and do the remediation and reclamation activities. They are going to be in the project description to close it off. So, try to get to the point to close it off. Understanding that it is not going to happen the year we abandon it. We are going to have the following steps that are required to close it off.
Recorded By:	Michael Fabijan			

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DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**27-Aug-2018**
Time:	**7 pm**
Location:	**Tuktoyaktuk - Tuktoyaktuk Youth Centre**
Person(s) Involved:	**Tuktoyaktuk Hunters and Trappers Committee** • **4 directors** **Tuktoyaktuk Community Corporation** • **4 directors** **Project Team** • **Terence Hughes - (MGM)** • **Larry Yoon (MGM)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Responder Name	Response
General			
1-	What was the reason for your different scenarios?	Terence Hughes	A lot of it is budget and the timing of the winter. Depends on how much work we could get done and how much money we could get from our management in a given year. Abandonment does not take as long as a drilling project but anytime you go into a well it may take a little more time. It may be a winter that's warmer and we may not have as much time as we planned.so we may only get two wells don and have to come back. Or we may only get budget approval to do K-30

			because that's the one that is driving us to do this. The other ones are close by so we might to them.
2-	In your water licence there is the requirement to have a spill contingency.	Terence Hughes	Yes we will have that. The spill contingency plan is part of the screening and also goes to the NEB.
3-	We have two people that went on training to operate drones. There are two certified done pilots. And one more going through it this week or next.	Larry Yoon	I just did my budget and set aside some drone monies for next year.
		Michael Fabijan	Send me their names.
4-	Stanley Felix and Brett went in June and Candace is going this week or next. They will be part of the community based monitoring program		
5-		Terence Hughes	Where do you find fill? We need fill for the abandonment if we excavate or replace impacted soil that we remove to take to a licenced disposal facility.
	ILA would know.		
	Talk to Charles Klengenberg he is the director of ILA.		
	If you want nothing course think of Sandy hill that Ikhill used. They pushed it off the top and they had trucks pick it up. They used it for the bed of the pipeline and covered the pipeline. It's fine sand.	Larry Yoon	If it is too fine I don't know if permafrost will penetrate it.
		Terence Hughes	We are looking for a clean source so we don't need to bring it from down south.
	Grubens	Michael Fabijan	Eddie who would know about this and how they collected the material?
6-	Inuvik hunters might in the Delta. Here not so much. Talk to Inuvik.	Michael Fabijan	Does anyone go hunting in that area in the winter? The CCPs do not indicate anything in that area.
	Here not so much. Talk to Inuvik.		
	People go hunting muskox somewhere up that way.		

		There are muskox all over now.		
	7-	Will you have work this year.	Terence Hughes	Not this year.
			Larry Yoon	What will trigger it is the erosion at K-30.
	8-	You will keep us updated anyways?	Terence Hughes	Yes. We will look at the environmental report and show management and determine which year to do abandonment. The ice road and camp work is what takes the time. The abandonment work could be done in 20 days if things go well. It is not a lot of service rig work.
	9-	Are you going to leave the camp up even after you have done the work?	Terence Hughes	The Wurmlinger would be a base camp and the guys working out of Inuvik would have a sleigh camp with them. You could put the camp and the service rig on the same site because the rig does not take much space. We might have three different camps.
			Michael Fabijan	At the end of each season you would take out the sleigh camps and what ever else you can because you are paying for the equipment. The Wurmlinger would come out during the open water season.
			Terence Hughes	If we go with the Wurmlinger you are kind of committed for nine months. You stage it in September and can't get it back until the following June.
	10-	You will still be monitoring these wells.	Terence Hughes	Yes we have a monitoring program every year checking the well heads making sure they are not leaking. We report these to the NEB. And every year separate from this we have an environmental program where we monitor all our sites. After the abandonment you come back to do gas migration testing.
			Larry Yoon	You have a sensor to test and make sure there is no gas leaking
	11-	Thank you for coming.		
Recorded By:	Michael Fabijan			

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DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**28-Aug-2018**
Time:	**12 pm**
Location:	**Inuvik, Inuvik Community Corporation boardroom**
Person(s) Involved:	**Hunters and Trappers Committee** • **3 directors** **Community Corporation** • **1 director** **Project Team** • **Terence Hughes - (MGM)** • **Larry Yoon (MGM)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Responder Name	Response
1-	When will the water take the sump at K-30.	Terence Hughes	The well head is about 60 meters from the water. The sump is quite a ways in from that. The priority is to remove the well head at K-30. We will continue to monitor the costal erosion there.
2-	What do you do for the well head? Do you just cement it?	Terence Hughes	For the abandonment you cement and put a plug and cut down and take the well head off. For K-30 we will go down about 10 meters below because eventually there is going to be water on to so we want a good depth. It will be cut lower than you typically would for an onshore well.
3-	I am with FJMC also.	Terence	Everything shown on the map in the

		When I look it this I see the bird sanctuary. I see the TNMPA right above it. Another protected ground. Are these areas on the map yours.	Hughes	presentation is operated by MGM. We have partners for some of them but we are responsible. We do the environmental program and the wellhead inspections.
	4-	I want to read you the goals for the IFA. The basic goals expressed by the Inuvialuit and recognized by Canada in concluding this Agreement are: 1-to preserve Inuvialuit cultural identity and values within a changing northern society; 2-to enable Inuvialuit to be equal and meaningful participants in the northern and national economy and society; and 3-to protect and preserve the Arctic wildlife, environment and biological productivity.		
	5-	Are you going to be hiring Inuvialuit and Inuvialuit businesses including WLM and environmental monitors?	Terence Hughes	Yes of course we are. Later in the presentation shows the employment and business opportunities. We use Inuvialuit businesses such as Kavik. We want local businesses to be used to build capacity. We are here to show the opportunities to provide time for the Inuvialuit to create partnerships to take advantage of these opportunities. Some of the joint ventures that previously existed have not been maintained. We are providing this to IRC and IDC and are staying in contact with them with information on the project requirements.
	6-	Know sites were the land around a well head is yellow and where sumps are leaking. We are glad you are here and trying to fix the problem.	Terence Hughes	Thank you.

	7-	Who else have you been in consultation with so far?	Terence Hughes	We were in Tuktoyaktuk last night with the HTC and CC. In the first round we met with the IRC, Tuktoyaktuk and Inuvik HTCs and CCs, DFO, GNWT ITI and Lands. Meeting with lands this afternoon. Met with the IGC and will be meeting with them again on Thursday in Whitehorse. We are working to get a meeting set with the Aklavik HTC and CC.
	8-	I know that no one has been administering the Inuvialuit business list.	Terence Hughes	The only real thing we have done yet is with the environmental work and those companies are still current. We have asked Denny and Duane to let us know if there are any deficiencies in the business list to let us know. We are going to be keeping in touch on this throughout leading up to the work. When we get to doing the work we will want to make sure we have an up to date business list.
	9-	Thank you for your presentation	Terence Hughes	Your welcome
Recorded By:	Michael Fabijan			

KAVIK-AXYS Inc.

DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**28-August-2018**
Time:	**4.00 pm**
Location:	**IRC Board Room - Inuvik**
Person(s) Involved:	**Inuvialuit Regional Corporation representatives** • **2 Participants** **Project Team** • **Terence Hughes - (MGM)** • **Larry Yoon (MGM)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Responder Name	Response
1-	What is your sense of when the work might start?	Terence Hughes	Kind of looking like 2020-2021
2-	All four are potential wells or no?	Terence Hughes	K-30 we have to take out. I don't know the reserves associated with E-07 and Kumak I-25. As long as you have your SDL approved with the NEB you can go abandon your well. And then when you go to develop you can drill a new well. You get your exploration licence. Then you drill your well and test your well. Then you apply for your SDL with an SDD - Significant Discovery Declaration. Once you get your SDL you can abandon that well. The well is

				your conduit to prove the information you need for the SDL. Without short term potential for production it makes sense to abandon other wells when you are doing one.
	3-	Do you see this as a 5 to 7 year project, do you see it as a two year project?	Terence Hughes	I think it is a one year project. The abandonment of all three wells will take less time than it took to drill one. The monitoring and the reclamation work afterwards will go on for a number of years. We are putting in options for a two and three year abandonment program but from an economics point it is a one year program. The incremental cost to do more than one well is nothing compared to rebuilding the ice road.
	4-	The only other thing to watch for if you are taking the Wurmlinger out is the water flow data. Early summer this year the water dropped to nothing and then it came back up. So if you are looking at timing you should get that water history because it is changing so much so quickly. It's low event though we have had rain all summer, on this side of the delta.	Terence Hughes	Yes, to see when the best time is. That's a good point.
		There are some shallow spots out there is what I am thinking.	Terence Hughes	I've heard that.
	5-	I will get you an updated list for the IBL (Inuvialuit business list) and the companies that IDC has.	Terence Hughes	Want to make sure that Inuvialuit companies have an opportunity and that companies that have partnerships will be evaluated as Inuvialuit businesses. I am familiar with the list from before but want to make sure we don't miss anyone.
		You are familiar with Schlumberger. I will send you the new contact.	Terence Hughes	I am familiar with the A list companies it is the others that we need an update on.
		We now own 100% of AOGS and they are still active for catering in the regions.	Terence Hughes	For camp options we are looking at the Wurmlinger, the people working out of Inuvik probably need a sleigh camp and then probably another 40 manish camp

			at K-30.
	The business list was provide to the board just last week.		
6-	What is your sense of the cost for this program?	Terence Hughes	Something between 10 and 20 million. We are trying to get a sense of some of the cost on this trip by talking different service providers.
7-	Who decides the depth that you put the plug down to?	Terence Hughes	The NEB.
	We will have to ask them if it varies depending on the location and circumstance because K-30 is right on the coast and is eroding away. And there is scouring to indicate how far the ice has dug into the bottom in the past.	Terence Hughes	We think that there was about 6meters of erosion this year and will have to get the water depth there. We have heard it is only a meter or two there.
	It is a very gradual slope there. The whole area is eroding so quickly there.	Terence Hughes	Our working assumption going into it at K-30 is capping it at 10 meters depth down. They will look at the information for the site and determine from there.
8-	You say that you do vegetation assessments periodically. Does it make any difference in areas that get storm surges? Nothing is going to grow anyways.	Larry Yoon	That is our problem right now.
		Terence Hughes	We are having that issue at I-48.
		Larry Yoon	We are getting driftwood all over.
		Terence Hughes	We tried Jutte netting. We tried plugs. Feel that we are fighting a loosing battle.
		Larry Yoon	That is one of the things we are working on with the Aurora Research Institute is what will grow in a wet salt environment.
		Terence Hughes	We don't have as much erosion on that side but the storm surges make it tough to grow anything.
		Larry Yoon	We are putting up a camera to see how and when it is coming in.
	You just have to put in a pole. Anywhere in the delta	Terence Hughes	Yes.

		you can walk around and you will see on the trees where the water line is and that's where you know it will flood. You put a pole in a few locations and you are going to see the waterline. The other thing is where the camps are is where most of the fish holes are. DFO spent a few hundred thousand years ago trying to find where the fish over winter. An elder named Billy Day said we could have told you that and saved you all that money. Look on the bank that's why the camps are there. They are where the fish holes are. Yah learn the hard way.		
	9-	Thank you for coming.	Terence Hughes	Thank you for making time to meet with us.
Recorded By:	Michael Fabijan			

KAVIK-AXYS Inc.

DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**28-August-2018**
Time:	**2.00 pm**
Location:	**Department of Lands- Inuvik**
Person(s) Involved:	**Department of Lands** • **3 participants** **Project Team** • **Terence Hughes - (MGM)** • **Larry Yoon (MGM)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Responder Name	Response
1-	Where is the Wurmlinger going to be?	Michael Fabijan	Someplace sheltered and where there is deeper water.
		Terence Hughes	We will differ to the local experts as to exactly where to place the barge.
2-	Is it just going to be the Wurmlinger there or is there going to be other barges?	Terence Hughes	There could be potentially another barge or two. We don't know how much equipment we want to leave out and exposed. The Wurmlinger may have enough space and fuel capacity to get it all done there.
3-	How will you tie up the barges?	Michael Fabijan	This is something the Wurmlinger would work out. There would not be anything permanent left out there.
4-	You are planning on	Terence	Yes and go through screening.

		applying for a permit this fall?	Hughes	
		So not knowing if you are going to go out next year if we issued the permit in early 2019 for a five year term then you would be good.	Terence Hughes	We would be good with that.
		Then you still have the option of extending it for two years.	Terence Hughes	With the erosion with think it has to be done within the next five years. We will know this fall if it is 2019-2020 and we will communicate that either way. We still want to have the permit and licence because that helps us with the NEB process. Fall is our budget time so that gives us time to get the contracting done and the staging started in the fall.
			Michael Fabijan	The project description will be done by the EISC before Christmas. All of the options will be in the project description submitted to the EISC
			Terence Hughes	I don't want to come back with an amendment.
	5-	You will do it all in the one season?	Terence Hughes	That is a management decision but the incremental cost of doing more than one well is not that much compared to doing them in another year especially with the cost of building the ice road.
	6-	I don't know but I do know they got a lot from there. They needed sand and that is really the only place you can get that.	Michael Fabijan	Eddie Dillon at our meeting in Tuktoyaktuk last night mentioned that fill for the Ikhill pipeline was obtained from sandy hills. Do you know how they did that?
		Why don't you use Ya Ya lakes	Terence Hughes	They mentioned that to. We need the proper fill.
Recorded By:	Michael Fabijan			

KAVIK-AXYS Inc.

DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**30-Aug-2018**
Time:	**11 am**
Location:	**Yukon Inn, Whitehorse**
Person(s) Involved:	**Inuvialuit Game Council** • **7-Directors** **Project Team** • **Terence Hughes - (MGM)** • **Larry Yoon (MGM)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Responder Name	Response
1-	Have you addressed the erosion at K-30?	Terence Hughes	We have been monitoring it and we think it is moving from 5 to 10 meters per year. It is at 65 meters from the wellhead. We need about 10 meters. We think if we did it in the third year we would have about 35 meters left. So we plan on abandoning it well before the erosion gets there.
2-	You said the barges would be left there. No one else wants to use it.	Terence Hughes	We would bring it back to Inuvik if nobody else had a program the following year. There are other companies that have other sites. Or if we did some of the wells one year and some the next year we might look at leaving it there.
3-	Will this be in the project	Terence	Yes, it will be in there. Any of our

		description?	Hughes	options will be in the EISC project description.
	4-	You said you did consultations in the communities?	Terence Hughes	Yes we did Inuvik and Tuktoyaktuk. We tried to get to Aklavik, but the timing didn't work for them. We will set up another time for the meeting that works better for them.
Recorded By:	Michael Fabijan			

KAVIK-AXYS Inc.

DRAFT RECORD OF CONSULTATION OR CONTACT

Meeting: X **Telephone: ☐**

Project #: **Client Name:**

Title/ Topic:	**MGM - Well Abandonments in the Inuvialuit Settlement Region**
Date:	**17-Sep-2018**
Time:	**12 pm**
Location:	**Aklavik - Aklavik Community Corporation office**
Person(s) Involved:	**Hunters and Trappers Committee (HTC) and Community Corporation (CC)** • **1 HTC Director** • **1- CC Director** • **5- Directors that were members of both HTC and CC** • **7 participants total** **Project Team** • **Terence Hughes - (MGM-via phone)** • **Larry Yoon (MGM-via phone)** • **Michael Fabijan (KAVIK-STANTEC)**
Meeting Notes:	**NOTE:** **Notes are not verbatim transcripts of the meeting, the questions and answers are summaries of what was said at the meeting and are intended to capture the intent of what was said.** **Q: Question/comment from meeting participants** **A: Answer/ response from proponent project team**

Questioner Name	Question/ Concern	Responder Name	Response
1-	Concerned that most of the work in these kinds of projects goes to Inuvik. Is it possible for the smaller communities to get some of this work?	Terence Hughes	I appreciate that. When the time comes we are going to have Requests for proposals and have bids and we are going to use the Inuvialuit business list. Companies on that list with a service we need will get a chance at the work. I can't say they will get the work but we will send it out to the list.
2-	When you send it out and you bring the equipment from a small company and they don't use it. That was the same rig	Terence Hughes	Our construction guy does not like paying standby. If we bring equipment out we are going to make sure it's working unless we are shut down for weather or something. We would not

		you are abandoning right now. Some equipment went out and they never used it. The bigger contractors will do that to the smaller people. Any guarantee that the equipment will get used or just get standby pay like the last time?		plan or bring equipment out just to sit around. If we say we need it, it's going to work, and that will be our construction guys call, not other contractors.
	3-	Can you explain, as you did at IGC, how much land you need and why are starting at K-30.	Terence Hughes	It was on the first presentation. We will get some copies to you. When they drilled this well it was 250 meters away from the coast and now we think we are about 65 meters from the coast. We are losing about 5 meters a year on average. For a service rig we need about 10 meters to put the service rig on. We might have another 5 to 10 years to do this operation but we want to do it sooner than that.
	4-	On your service rig. How much ice are you going to need because your water use permit will have to include this water.	Terence Hughes	Yes, water volumes on the presentation water use slide includes water volumes for ice road and ice pad. We are going to probably build it to a similar thickness that was done for the drilling. We used the drilling rig numbers. So we are going to have it nice and thick. We are not going to be moving as much equipment or have as much equipment on site as for the drilling program.
	5-	The plan is to get all this started this fall?	Terence Hughes	The plan is to get the regulatory process started this fall. We are still working on the application with Michael's company. We would like to have a document in for screening later this month or in October.
	6-	When are you planning on doing your community consultation, you are just meeting with the HTC and community Corporation? You have to have a community consultation. You don't just meet with the boards.	Michael Fabijan	We have just gone with the HTCs and Community Corporations.
		Ok, then you have to do a community consultation. Isn't that the process.	Michael Fabijan	All you need is the Community Corporations and the HTCs. The Inuvik and Tuktoyaktuk HTCs and CCs were

		You don't do the community consultation after the project is approved.		fine with the process we are using now. In the EISC guidelines the direction is to meet with the committees. This consultation is the consultation. When the bids go out the will go to all the communities.
		When are you going to do the community consultation? When do the communities get their say?	Michael Fabijan	This is the community consultation with the HTCs and the CCs are elected to represent the communities.
		If it goes to the EIRB it goes to a public hearing.	Michael Fabijan	Yes and that is a large process with public hearings.
	7-	When the project is approved by the EISC you are going to come back to the community and meet with the whole community and let them know what work is out there?	Terence Hughes	We are going to provide information on what work is available. I don't want to do that until I know what year it is going to be done and get's approved in our budget. To do the actual work it is a two-part equation for us. One part is to get through the regulatory process with the EISC and get our land use permit and water license. Then it is the year it get's approved in our budget. We don't want people to think there is work coming and then the work does not show up. Once we have the budget approval we would be making information on this and have more specifics on how many days and pieces of equipment and stuff like that. It will be in lots of time because our budgets are in, in October and we would start the work in November December 13 months later. That's the time we would have to let everybody know we are doing the work and exactly what the work is.
		So once you hit that stage you will come back to the communities?	Terence Hughes	Yes we will.
		And you will meet with just the HTCs and CCs again? Or the whole community/	Terence Hughes	If there are people in a community that want us to have the bigger community meeting, that's something we can look at.
		Going to have to bring 200 pieces of chicken next time (group laughter)	Terence Hughes	I'll leave that on Michael
	8-		Michael	The earliest any activity will happen is

			Fabijan	next year staging in the fall time and if it doesn't happen then it will be the following year. There is lots of time between now and then.
	9-		Terence Hughes	In about a month from now I am going to know if we are going to do the work in 2019-2020. I will let you and the other communities HTCs, CCs, IRC, IDC know if it is or is not approved in our budget. So people know well in advance if we are or are not going to do the work in 2019-2020 and I will do the same thing next year. We will notify right away and then we'll talk about what consultation and more discussion on the work opportunities.
			Terence Hughes	If you have any other questions you can contact Michael or me and I will get my contact information to you. When we come to do the work I will make sure that I make it over and we can talk then.
			Michael Fabijan	Any other questions.
			Terence Hughes	Thank your for making time for us today.
	10-	We'll see you in October when you get your budget approved (group laughter)	Terence Hughes	You know something I don't.
		Hopefully it gets approved so we can have work in the Delta.	Terence Hughes	I appreciate how slow it is up in the Delta. When I know I will let you know one way or another.
		Thank you very much	Terence Hughes	OK. Thank you.
Summary concerns and commitments				
Recorded By:	Michael Fabijan			

Stakeholder Engagement Package

Inuvialuit Settlement Region Well Abandonments

November
2025

Background and Regulatory Update

In June 2018, MGM Energy ("MGM") undertook a first round of stakeholder's meetings in support of applying for a new Land Use Permit ("LUP") and Water Licence ("WL") to facilitate potential well abandonments and reclamation activities at Langley K-30, Langley E-07 and Kumak I-25. MGM distributed further information in August of 2018 and had follow up meetings in late August of 2018 to provide greater detail on the project.

Following engagement with stakeholders MGM went through the regulatory process, specifically submitting a Project Description ("PD") to the Environmental Impact Screening Committee ("EISC"). On March 21, 2019 the EISC issued an 11(17)(b) decision:

"The development, if authorized subject to the environmental terms and conditions recommended by the Screening Committee, will have no such significant negative impact and may proceed without environmental impact assessment and review under Inuvialuit Final Agreement [IFA s. 11. (17)(b)]."

MGM requested the EISC amend the decision, the original activity period was 2020 to 2024, the amendment request was approved and extended the activity term to 2027. Activity was delayed by the COVID 19 pandemic. No other changes to the project screening were requested.

Following the EISC decision, MGM submitted a LUP application and a PD to the Government of the Northwest Territories ("GNWT"). On March 20, 2020 the GNWT issued LUP N2019A0001 to MGM. Paramount applied for a Water Licence in 2023 and received feedback from the Inuvialuit Water Board, it will submit an updated application in the coming days.

In 2020 and 2021 MGM undertook engagement activities related to obtaining a Migratory Bird Sanctuary Permit for the Kendall Island Migratory Bird Sanctuary as the access for and the location I-25 are in the sanctuary. The permit was granted on August 1st ,2022 and was valid until December 31, 2024. Paramount will be applying for a new permit in the coming the weeks.

Project Location

A map of the Project can be found in Appendix 1. Distances from Inuvik, Aklavik and Tuktoyaktuk are summarized in the table below.

Well	Distance from Inuvik (km)	Distance from Aklavik (km)	Distance from Tuktoyaktuk (km)
Langley K-30	131	126	102
Langley E-07	125	120	100
Kumak I-25	112	115	84

Project Scenarios

MGM is proposing to carry out the abandonment of K-30 between 2026and 2029, and the remaining two wells in that same timeframe or in subsequent years. MGM has the opportunity to utilize access from another operator in the winter of 2026 or winter of 2027 and those are MGM's preferred activity years. The work associated with Unipkat M-45 could be done in any of the three scenarios below. All activities, apart from mobilization/demobilization of barges (if used), will occur during the winter season. A single season is defined as mobilization in one summer through demobilization the following summer. There are several scenarios for the Project:

- abandonment of the priority well, K-30, to take place in a single season, with the abandonment of the remaining two wells (E-07 and I-25) in subsequent year(s)
- abandonment of the priority well, K-30, to take place in a single season, with the abandonment of the remaining two wells (E-07 and I-25) in subsequent year(s)
- abandonment of the K-30 and E-07 wells to take place in a single season, and the abandonment of the I-25 in subsequent year(s)

The first scenario is the most likely and potentially could occur in the winter of 2026-or 2027. For activity to occur in 2026 or-2024 MGM would need:

#1. To obtain a Water Licence for the project.

#2. For other area operators to move forward with their planned projects for 2026or 2027

#3. To have the project budget approved internally, this would occur in the fall of 2024.

Project Activities and Equipment

The Project will need to be executed in multiple stages with each main activity requiring different equipment and personnel requirements. If the other operator moves forward with their operations, MGM will not use barging. The table below provides a summary of the main activities and equipment for the proposed project.

Program Activity	Associated Tasks	Equipment
Advance Barging and Staging *if required	Includes the movement of equipment within the Program Area by means of such activities as barging to staging areas and off-loading, as well as barging and freezing in.	Barges and Tugs
Construction and Operation of Ice Roads and Ice Pads	Includes the construction and maintenance of ice roads and ice pads for barge landings, staging sites, camps, abandonment activities, and other associated infrastructure.	Vac and water trucks, loaders, snow cats, pick-up trucks, bulldozers, plough, snow making machines, support equipment (lights, generators, etc.), communication equipment and sleigh camps.

Abandonment	Includes the abandonment of the well(s).	Camp, service rig, wellsite shacks, boilers, slick line unit, picker trucks, bed trucks, tanks, water trucks, vac truck, cement pumpers, P-tank unit cement bulkers, light towers, loader, pick up trucks, rig mats

Demobilization *Barging would only occur if required.	Includes demobilization of equipment and material from barge landing, staging sites, camps and any other associated infrastructure by either ice road or storage in a barge at the end of the season.	Barges, tugs, bed trucks, picker trucks and pickup trucks
Monitoring and Final Reclamation	Includes final clean-up of all areas of activity and monitoring of the lease, as required.	Helicopter, small heli-portable equipment

Personnel Requirements

Approximately 60 personnel will be required for the construction phase of the project, MGM is anticipating using two crews for the completion of the ice roads and ice pads. Approximately 40 personnel are expected to be required for the abandonment phase of the project.

Water Supply and Use

Water withdrawals from the Mackenzie River and associated channels, as well as suitable waterbodies (lakes) will be required for the construction of ice pads (staging sites, wellsite(s)), ice roads, and camp use. Fish screens meeting Department of Fisheries and Oceans Canada (DFO) Interim code of practice: *End -of-pipe fish protection screens for small water intakes in freshwater*. Potable water will be supplied from the Town of Inuvik for domestic use in camps. Bottled water may also be provided for consumption purposes (plastic bottles will be kept for disposal or recycling).

Estimated daily water use for construction is provide in the table below. The amount of water withdrawn for a single year is dependent on MGM's ability to complete abandonment activities at each wellsite within a single winter season and if it constructs a portion of the access or all of the access. To provide a conservative estimation, the water withdrawal estimates provided in the table are calculated on the assumption that all ice roads and ice pads proposed for the Program are built by MGM in a single season.

Estimated Water Volumes for Construction Activities (Full Program Abandonment in a Single Year)

Program Activity	Estimated Maximum Daily Volume (m^3)	Estimated Duration of Use (days)[1]
Ice road / ice pad construction[2]	4,500	50
Construction camps	500	120
Total	5,000	N/A

NOTES:

[1] Days listed are total, not cumulative.

[2] Does not include ice road construction water volumes withdrawn from a Mackenzie River channel for development of roads on channels.

Estimated Water Volumes for Program Activities (Full Program Abandonment)

Program Activity	**Estimated Maximum Daily Volume (m^3)**	**Estimated Duration of Use (days)[1]**
Ice road and ice pad maintenance	240	90
Abandonment personnel camps	10	90
Abandonment activities	50	90
Total	300	

NOTES:

[1] Days listed are total, not cumulative.

Next Steps

MGM will be submitting information to the Inuvialuit Water Board to support a Water Licence application. MGM will also be applying fora renewal application for the Migratory Bird Sanctuary Permit that expired at the end of 2024. Lastly, MGM will be sending out further updates as to our potential activity timing, as information is finalized.

If you have any questions regarding the information contained in this notification package or about the Project generally, please contact either MGM. MGM can be reached via email at terence.hughes@paramountres.com or via phone at 403-206-3859.

Appendix 1: Project Maps

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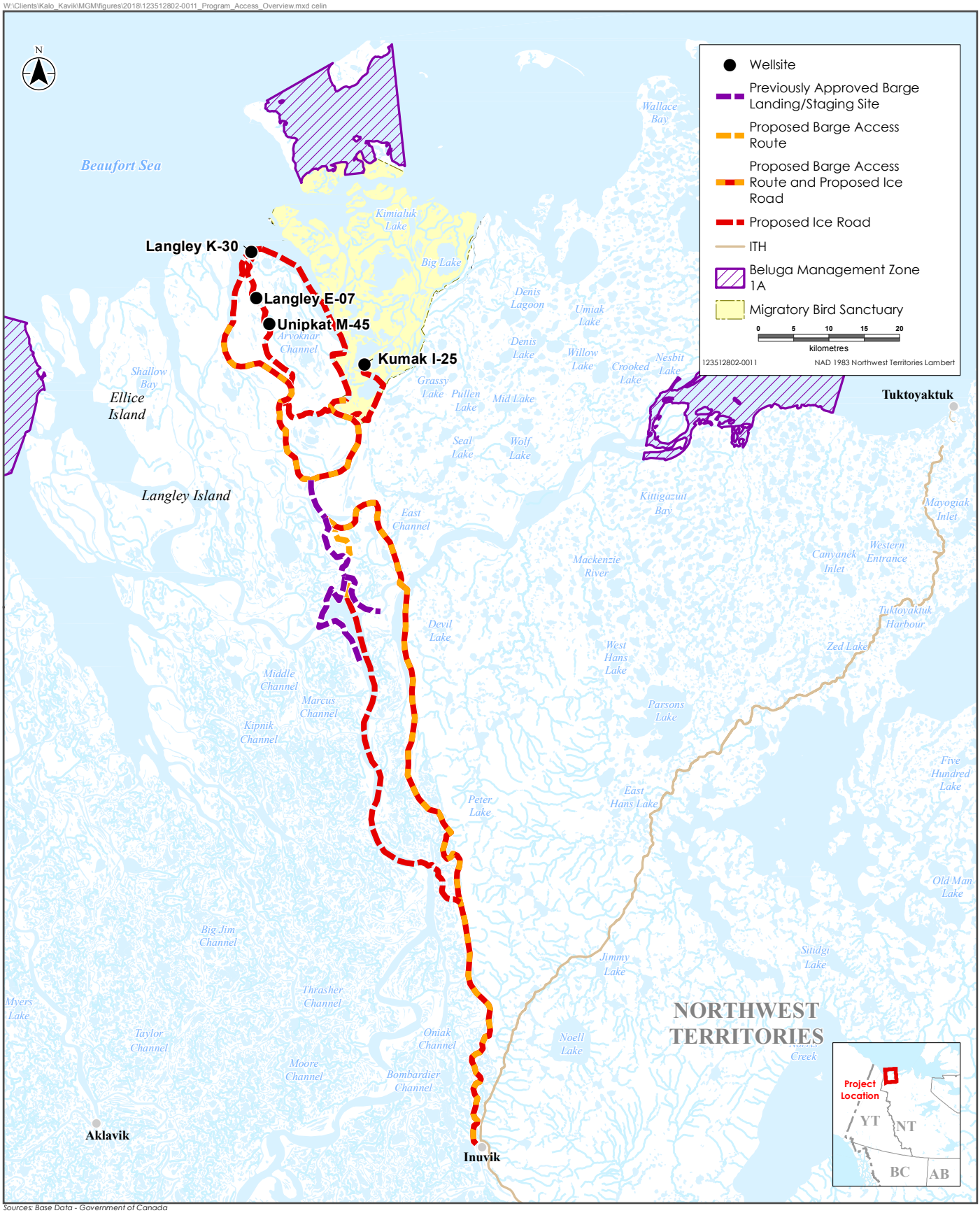


Sources: Base Data - Government of Canada

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Program Access Overview

KAVIK-STANTEC

MGM ENERGY

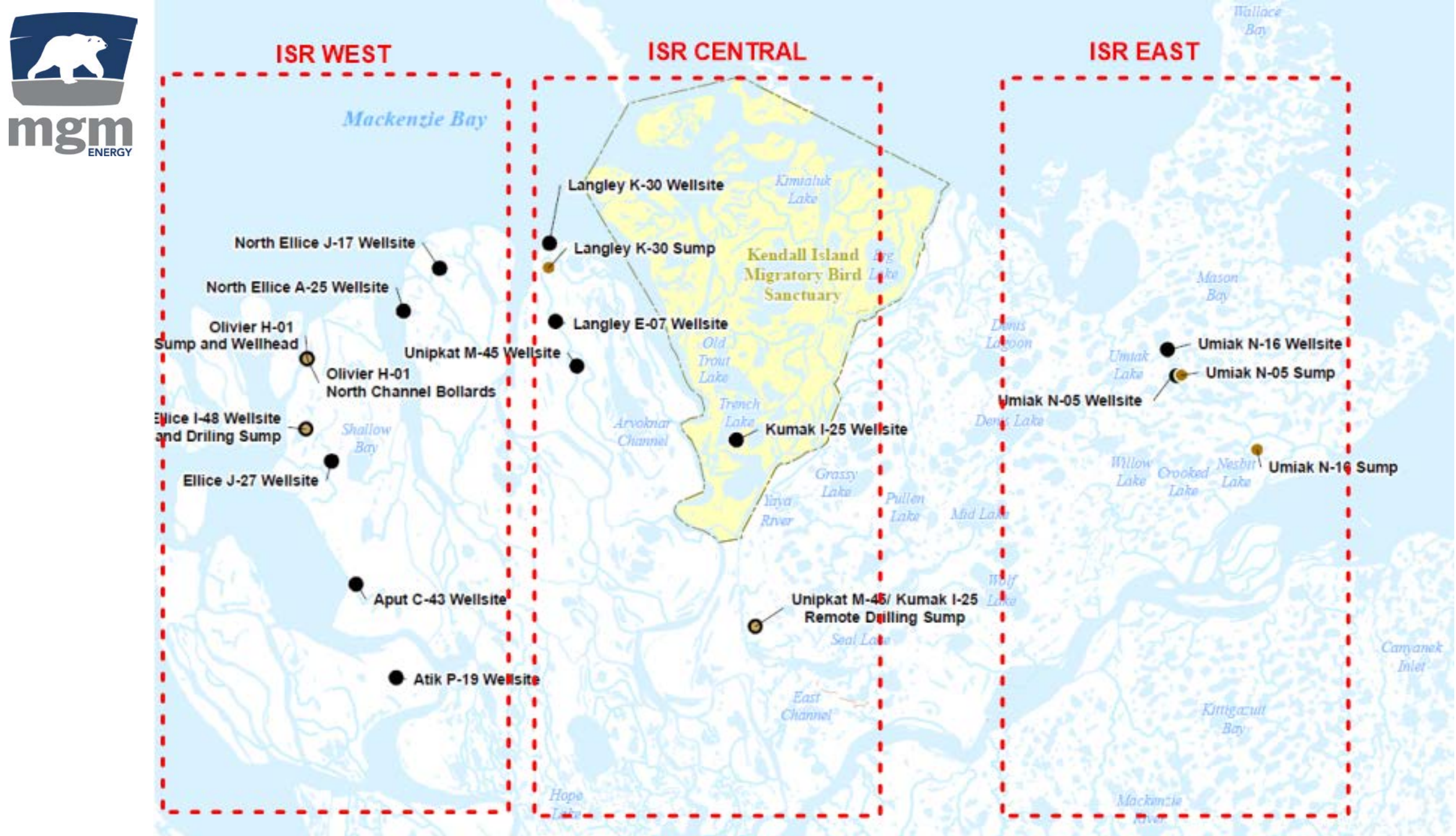
APPENDIX B Consultation Package and Presentations

Well Abandonments in the Inuvialuit Settlement Region

August 2018

MGM Energy Well Abandonment Timeline

- MGM Energy conducted a first round of engagement on the proposed project in June 2018
- August 2018 sent out an Engagement package and is following up with this round of meetings
- Finalize the project description and supporting documents for Q3 or Q4 2018 submission
- Q1 receive Land Use Permit and Water Licence in Q1 of 2019
- Undertake an abandonment program in 2019-2020 or 202-2021 or 2021-2022


ISR WEST
ISR CENTRAL
ISR EAST
Mackenzie Bay
Kendall Island Migratory Bird Sanctuary
Langley K-30 Wellsite
Langley K-30 Sump
Langley E-07 Wellsite
Unipkat M-45 Wellsite
Kumak I-25 Wellsite
Unipkat M-45/ Kumak I-25 Remote Drilling Sump
North Ellice J-17 Wellsite
North Ellice A-25 Wellsite
Olivier H-01 Sump and Wellhead
Olivier H-01 North Channel Bollards
Ellice I-48 Wellsite and Driling Sump
Ellice J-27 Wellsite
Aput C-43 Wellsite
Atik P-19 Wellsite
Umiak N-16 Wellsite
Umiak N-05 Sump
Umiak N-05 Wellsite
Umiak N-16 Sump
Kimialuk Lake
Old Trout Lake
Trench Lake
Arvoknar Channel
Shallow Bay
Grassy Lake
Yaya River
Pullen Lake
Mid Lake
Seal Lake
East Channel
Hope Lake
Wallace Bay
Mason Bay
Davis Lagoon
Umiak Lake
Davis Lake
Willow Lake
Crooked Lake
Nesbitt Lake
Wolf Lake
Campanek Inlet
Kittigazuit Bay
Mackenzie River

MGM Abandonment Program Options

There are several scenarios for the Project:

1- abandonment of all three wells to take place in a single season

2- abandonment of the priority well, K-30, to take place in a single season, with the abandonment of the remaining two wells (E-07 and I-25) in subsequent year(s)

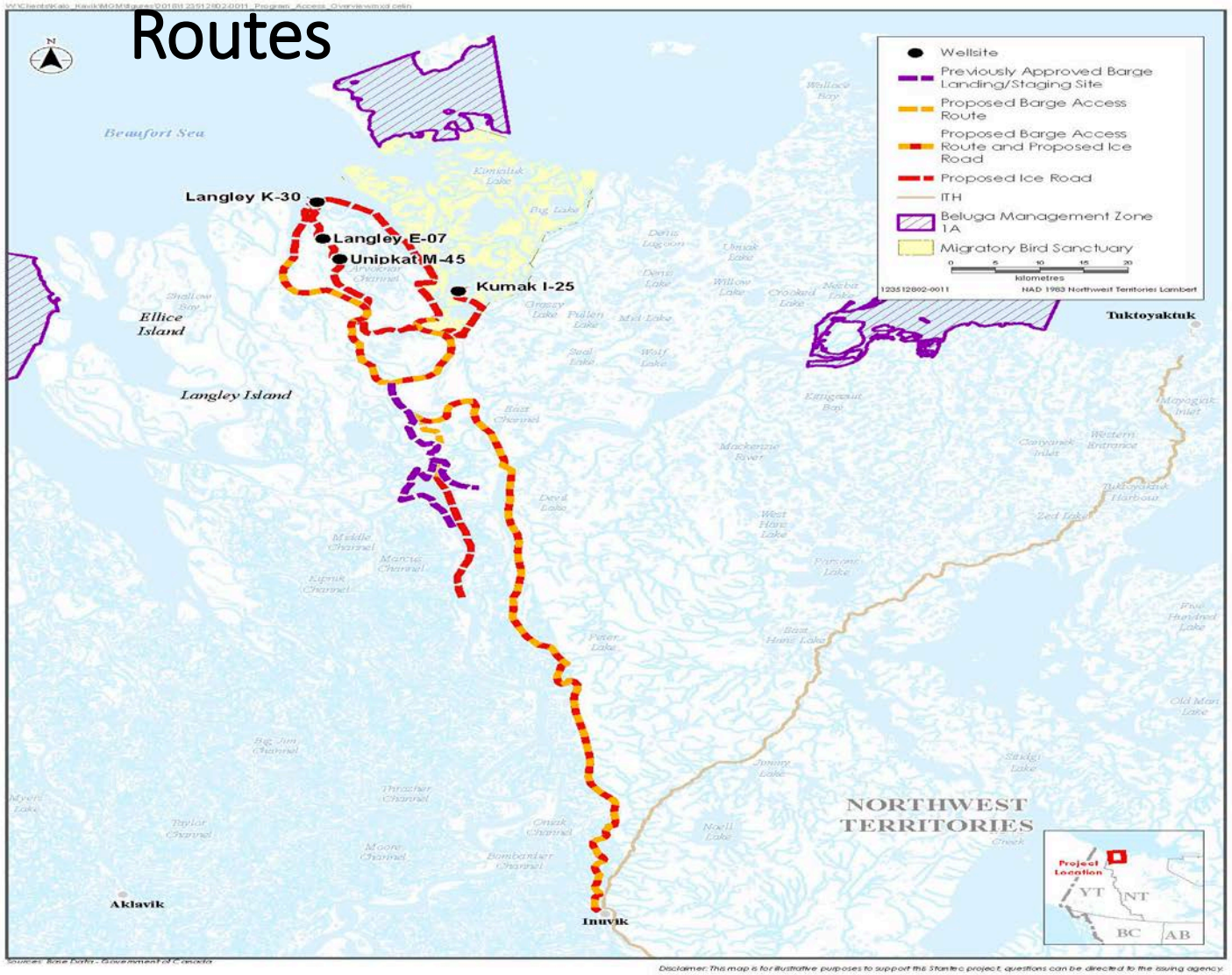
3- abandonment of the K-30 and E-07 wells to take place in a single season, and the abandonment of the I-25 in subsequent year(s)

- Progressive reclamation activities at Unipkat M-45 with any of the above scenarios

Regulatory Requirements

- A Land Use Permit and Water Licence are required to facilitate abandonment and reclamation activities. (5 year term with a renewal for 2 years)
- MGM would then apply to the National Energy Board for an Operations Authorization and individual Authorities to Alter Condition of a Well

Potential Barge and Access Routes



Program Access Overview

KAVIK-STANTEC

MGM ENERGY

K-30 Detailed Access

Proposed Ice Road Access Langley K-30

KAVIK-STANTEC

MGM ENERGY

E-07 Detailed Access

Proposed Ice Road Access Langley E-07

KAVIK-STANTEC

MGM ENERGY

I-25 Detailed Access

Project Activities

Program Activity	Associated Tasks	Equipment
Advance Barging and Staging	Includes the movement of equipment within the Program Area by means of such activities as barging to staging areas and off-loading, as well as barging and freezing in.	Barges and Tugs
Construction and Operation of Ice Roads and Ice Pads	Includes the construction and maintenance of ice roads and ice pads for barge landings, staging sites, camps, abandonment activities, and other associated infrastructure.	Vac and water trucks, loaders, snow cats, pick-up trucks, bulldozers, plough, snow making machines, support equipment (lights, generators, etc), communication equipment and sleigh camps.
Abandonment	Includes the abandonment of the well(s).	Camp, service rig, wellsite shacks, boilers, slick line unit, picker trucks, bed trucks, tanks, water trucks, vac truck, cement pumpers, P-tank unit cement bulkers, light towers, loader, pick up trucks, rig mats
Demobilization	Includes demobilization of equipment and material from barge landing, staging sites, camps and any other associated infrastructure by either ice road or storage in a barge at the end of the season.	Barges, tugs, bed trucks, picker trucks and pick up trucks
Monitoring and Final Reclamation	Includes reclamation to return the land to equivalent capacity and environmental monitoring of the lease, as required.	Helicopter, small heli-portable equipment

Project Equipment for Construction and Abandonment

Type	No.
Trucks (e.g., vacuum water)	4
Front end loaders with optional attachments	4
Graders	4
Plough/auger truck	4
Pick-up trucks (personnel vehicles)	10
bulldozers	8
Trackhoe	2
Backhoe (rubber-tired)	2
Snow cats	6
Dump trucks	4
Snowmobiles (gasoline)	4
Snow making machines(s) and/or spray ice pump & monitor(s)	4
Accessory and support equipment (e.g., power generators, light towers, tanks)	6
Communication systems (e.g., radios)	20

Type	No.
Abandonment related equipment	
40 Man Camp	1
Service rig	2
Service Rig Pump and tank	1
Spare Rig Pump	1
Catwalk & Pipe Racks	2
100 to 150 HP Boilers	3
Wellsite Shacks	3
Eline/Slick line unit combo unit	2
P-Tank unit with flare stack	1
Jet Cut equipment for cut and cap operations	1
Back Hoe for cut cap operation	1
Bed Truck for hauling equipment	2
Picker Truck for hauling equipment	2
Water tank truck for produced Fluid	2
Potable Water Trucks	2
Hydrovac truck	2
Vacuum Truck	2
Cement Pumpers	2
Cement Bulker	1
Heated insulated 63.56m3 tanks for fresh water	4
Heated insulated 63.56m3 tanks for produced water	2
Snow mobiles	2-4
Methanol Storage 10m3	1
Secondary containment for tanks	8

Project Personal for Construction and Abandonment

Role	Estimated Number of Personnel
Supervisor	2
Logistics supervisor	1
Equipment operators	20
Camp maintenance	2
Medical	2
Safety Coordinator	1
Environmental Monitor	1
Wildlife Monitor	1

Role	Estimated Number of Personnel
Abandonment supervisors	3
Rig managers	1
Rig personnel	4
Oilfield Trucking	2
Vacuum truck operators	2
Camp maintenance	2
Medical	1
Safety Coordinator	1
Environmental Monitor	1
Wildlife Monitor	1
Water Truck Operators	4
P-Tank-Test Crew	3
Logging/slickline Crew	3
Cement Pumper	3
Cement Bulker	1
Fuel farm attendant	1
Security/access control	1
Fuel truck driver	1

Potential Barge Camp

Examples of Equipment

Water Use Construction and Abandon

Program Activity	Estimated Maximum Daily Volume (m^3)	Estimated Duration of Use (days)[1]
Ice road / ice pad construction[2]	4,500	151
Construction camps	500	151
Total	5,000	N/A

NOTES:

[1] Days listed are total, not cumulative.

[2] Does not include ice road construction water volumes withdrawn from a Mackenzie River channel for development of roads on channels.

Program Activity	Estimated Maximum Daily Volume (m^3)	Estimated Duration of Use (days)[1]
Ice road and ice pad maintenance	240	151
Abandonment personnel camps	10	150
Abandonment activities	50	90
Total	300	

NOTES:

[1] Days listed are total, not cumulative.

Questions

Suspended well

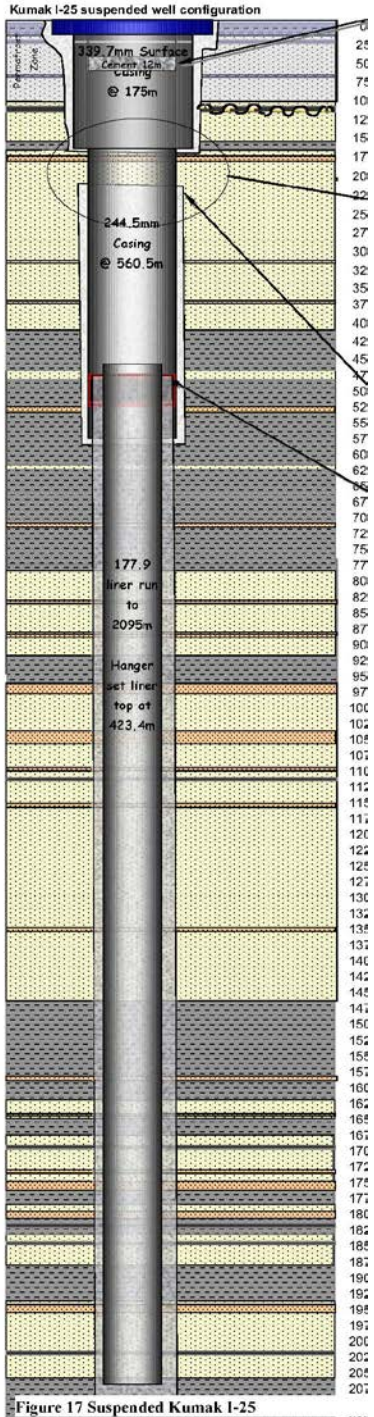
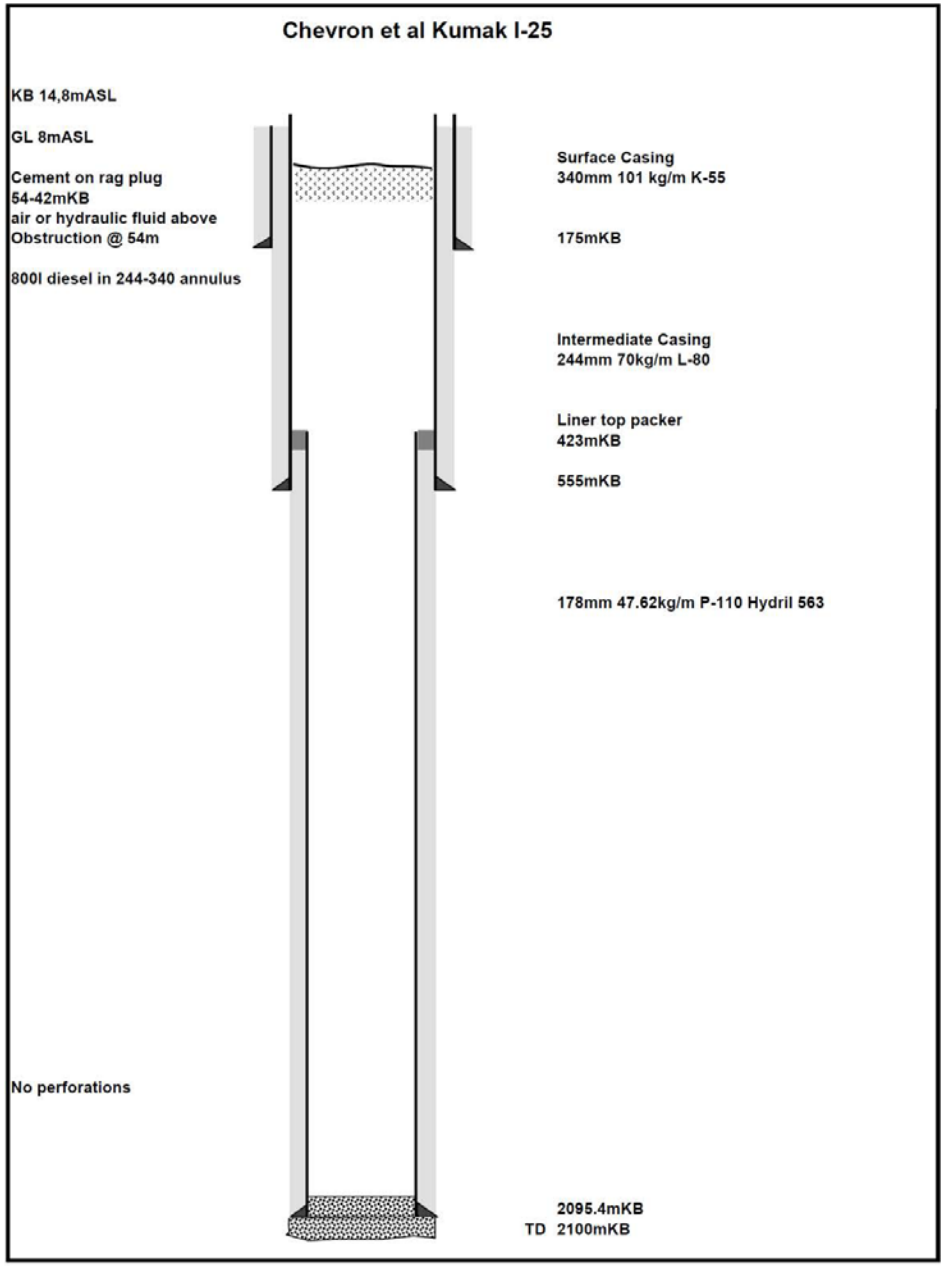


Figure 17 Suspended Kumak I-25



Well Abandonments in the Inuvialuit Settlement Region

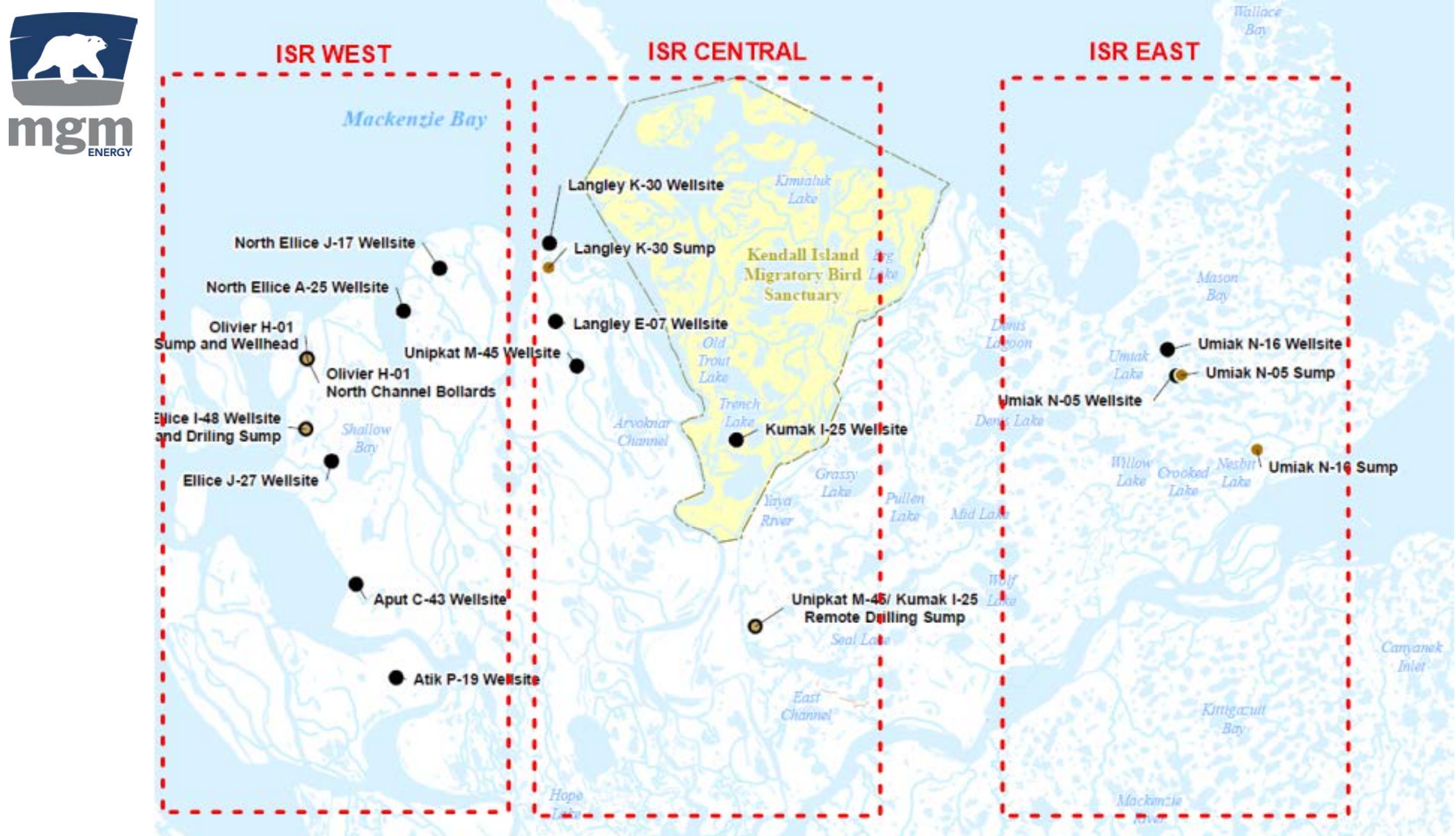
June 2018

MGM Energy History

- MGM Energy was spun out of Paramount Resources Ltd. in 2007 and became a stand alone publicly traded company
- Land base in the Sahtu Settlement Region and in the Inuvialuit Settlement Region
- Delays in the Mackenzie Valley Gas Project resulted in Paramount Resources Ltd. purchasing MGM Energy in 2014
- MGM Energy continues to exist as a wholly owned subsidiary of Paramount Resources Ltd.

MGM Energy 2014 to Current

- MGM has been conducting annual well head inspections and an annual environmental program
- Environmental program results are reported to the Inuvialuit Water Board
- Well head inspections are reported to the National Energy Board
- Environmental program has focused on monitoring, revegetation and invasive species elimination
- Local contractors have included Kavik Stantec, Canadian Helicopters, Canadian North and the Mackenzie Hotel.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Hope Lake
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Mason Bay
Davis Lagoon
Umiak Lake
Davis Lake
Willow Lake
Crooked Lake
Nesbitt Lake
Wolf Lake
Campanek Inlet
Kittigazuit Bay
Mackenzie River

Project Scope ISR Central

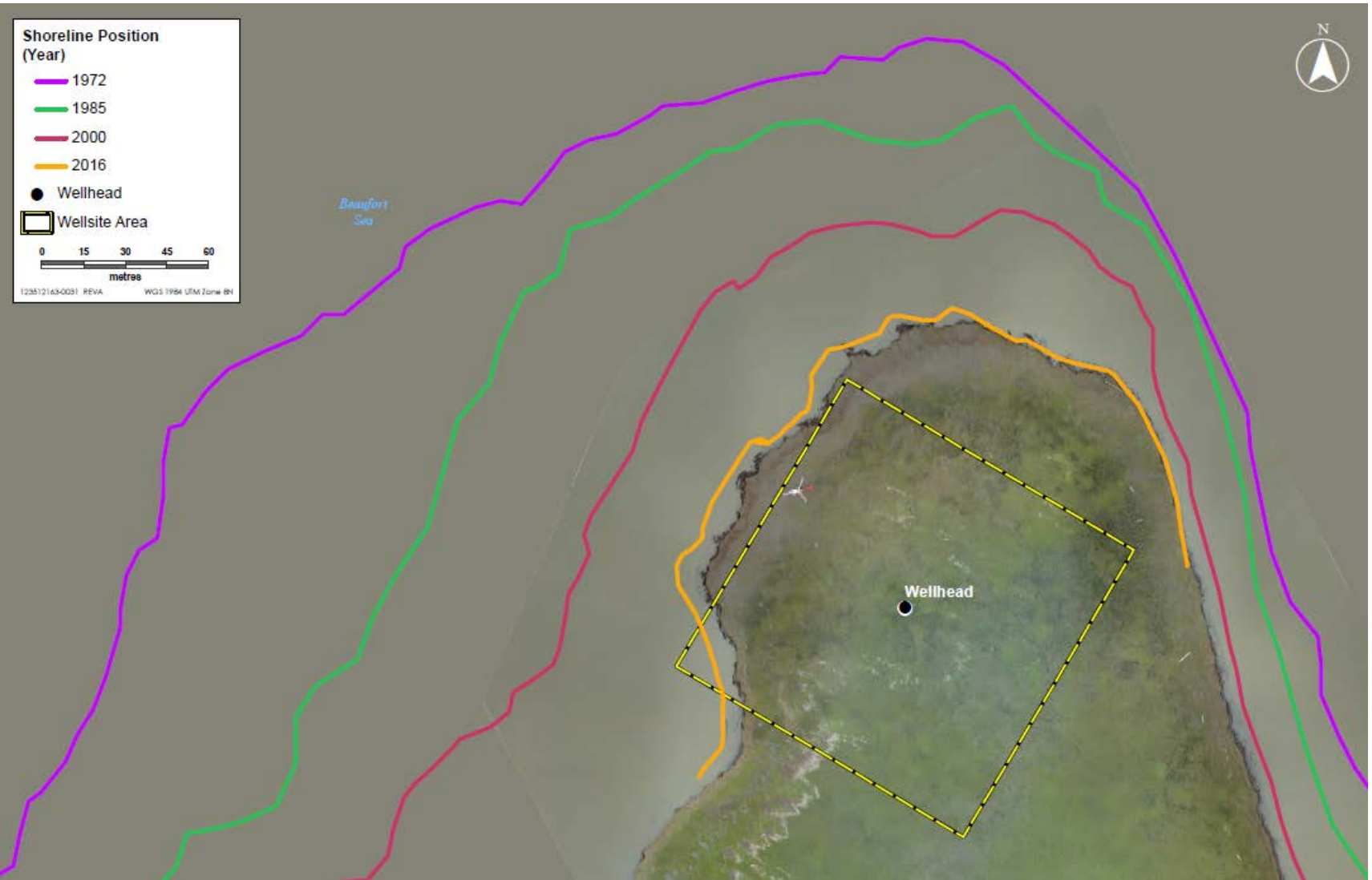
- Abandonment and Reclamation/Remediation activities
- Include barging, ice road building, service rig, abandonment operations, camps and remediation/reclamation activities.
- Leave operation options open so the Permit and/or Licence do not need to be amended in the future
- Use the Licence and Permit for ISR Central as a template for the East and West ISR.

Regulatory Requirements

- A Land Use Permit and Water Licence are required to facilitate abandonment and reclamation activities. (5 year term with a renewal for 2 years)
- MGM would then apply to the National Energy Board for an Operations Authorization and individual Authorities to Alter Condition of a Well

K-30 Site

Environmental Concerns



- Active shoreline erosion has taken place at the Wellsite Area
- The erosion is particularly severe to the west and northwest of the wellhead, where GPS measurements indicate that the minimum distance separating the wellhead from the eroding shoreline was 60 m (July 2017).
- Upwards of 10 m of erosion was measured since the 2016 site visit; the rate of erosion appears to be increasing. (previously observed 3-4m / year)
- Planning, design and construction of erosion control structures along the rapidly eroding shoreline will not be sufficient to effectively protect the wellhead in the long term.
- The shoreline will reach the wellhead in 5-6 years, with the current shoreline erosion rate.

Cost Estimate and Schedule

Environmental Impact Screening

- Pre- screening environmental studies
- Community consultations
- Q2 and Q3 of 2018

Land Use Permit and Water Licence Application

- Submission of required application
- Response to information requests
- Q3 and Q4 of 2018

Receive Regulatory Permit

- Approximately 1 year from project initiation – Target Q1 2019

Stakeholder Engagement Package

Inuvialuit Settlement Region Well Abandonments

August 2018

Introduction

In June 2018, MGM Energy ("MGM") undertook a first round of stakeholder's meetings in support of applying for a new Land Use Permit ("LUP") and Water Licence ("WL") to facilitate potential well abandonments and reclamation activities at Langley K-30, Langley E-07 and Kumak I-25. Additionally, potential progressive reclamation activities at the Unipkat M-45 will be included in the scope of the LUP and WL. The initial round of meeting outlined the project area, timeline and potential scope. This document along with follow up meetings in late August will provide greater detail on the project.

Project Location

A map of the Project can be found in Appendix 1. Distances from Inuvik, Aklavik and Tuktoyaktuk are summarized in the table below.

Well	Distance from Inuvik (km)	Distance from Aklavik (km)	Distance from Tuktoyaktuk (km)
Langley K-30	131	126	102
Langley E-07	125	120	100
Kumak I-25	112	115	84

Project Scenarios

MGM is proposing to carry out the abandonment of K-30 between 2019 and 2024, and the remaining two wells in that same timeframe or in subsequent years. The work associated with Unipkat M-45 could be done in any of the three scenarios below. All activities, apart from mobilization/demobilization of barges, will occur during the winter season. A single season is defined as mobilization in one summer through demobilization the following summer.

There are several scenarios for the Project:

- abandonment of all three wells to take place in a single season
- abandonment of the priority well, K-30, to take place in a single season, with the abandonment of the remaining two wells (E-07 and I-25) in subsequent year(s)
- abandonment of the K-30 and E-07 wells to take place in a single season, and the abandonment of the I-25 in subsequent year(s)

Project Activities and Equipment

The Project will need to be executed in multiple stages with each main activity requiring different equipment and personnel requirements. The table below provides a summary of the main activities and equipment for the proposed project.

Program Activity	Associated Tasks	Equipment
Advance Barging and Staging	Includes the movement of equipment within the Program Area by means of such activities as barging to staging areas and off-loading, as well as barging and freezing in.	Barges and Tugs
Construction and Operation of Ice Roads and Ice Pads	Includes the construction and maintenance of ice roads and ice pads for barge landings, staging sites, camps, abandonment activities, and other associated infrastructure.	Vac and water trucks, loaders, snow cats, pick-up trucks, bulldozers, plough, snow making machines, support equipment (lights, generators, etc), communication equipment and sleigh camps.
Abandonment	Includes the abandonment of the well(s).	Camp, service rig, wellsite shacks, boilers, slick line unit, picker trucks, bed trucks, tanks, water trucks, vac truck, cement pumpers, P-tank unit cement bulkers, light towers, loader, pick up trucks, rig mats
Demobilization	Includes demobilization of equipment and material from barge landing, staging sites, camps and any other associated infrastructure by either ice road or storage in a barge at the end of the season.	Barges, tugs, bed trucks, picker trucks and pick up trucks
Monitoring and Final Reclamation	Includes final clean-up of all areas of activity and monitoring of the lease, as required.	Helicopter, small heli-portable equipment

Personnel Requirements

Approximately 60 personnel will be required for the construction phase of the project, MGM is anticipating using two crews for the completion of the ice roads and ice pads. Approximately 40 personnel are expected to be required for the abandonment phase of the project.

Water Supply and Use

Water withdrawals from the Mackenzie River and associated channels, as well as suitable waterbodies (lakes) will be required for the construction of ice pads (staging sites, wellsite(s)), ice roads, and camp use. Fish screens meeting Department of Fisheries and Oceans Canada (DFO) guidelines (DFO 1995) will be used on all suction hoses. Potable water will be supplied from the Town of Inuvik for domestic use in camps. Bottled water may also be provided for consumption purposes (plastic bottles will be kept for disposal or recycling).

Estimated daily water use for construction is provide in the table below. The amount of water withdrawn for a single year is dependent on MGM's ability to complete abandonment activities at each wellsite within a single winter season. To provide a conservative estimation, the water withdrawal estimates provided in the table are calculated on the assumption that all ice roads and ice pads proposed for the Program are built in a single season.

Estimated Water Volumes for Construction Activities (Full Program Abandonment in a Single Year)

Program Activity	Estimated Maximum Daily Volume (m^3)	Estimated Duration of Use (days)[1]
Ice road / ice pad construction[2]	4,500	151
Construction camps	500	151
Total	5,000	N/A

NOTES:

[1] Days listed are total, not cumulative.

[2] Does not include ice road construction water volumes withdrawn from a Mackenzie River channel for development of roads on channels.

Estimated Water Volumes for Program Activities (Full Program Abandonment)

Program Activity	**Estimated Maximum Daily Volume (m^3)**	**Estimated Duration of Use (days)[1]**
Ice road and ice pad maintenance	240	151
Abandonment personnel camps	10	150
Abandonment activities	50	90
Total	300	
NOTES: [1] Days listed are total, not cumulative.		

Next Steps

MGM representatives will be in the Inuvialuit Settlement Region in late August for a second round of stakeholder engagement to answer questions about the project and receive comments. Following up on those meetings MGM will be finagling the Project Description for submission to the Joint Screening Committee in late Q3 or early Q4 of 2018.

If you have any questions regarding the information contained in this notification package or about the Project generally please contact either MGM or Kavik Stantec. MGM can be reached via email at terence.hughes@paramountres.com or via phone at 403-206-3859. Kavik Stantec can be reached via email at Michael.Fabijan@kavik-stantec.com or via phone at 867-777-4548.

Appendix 1: Project Map

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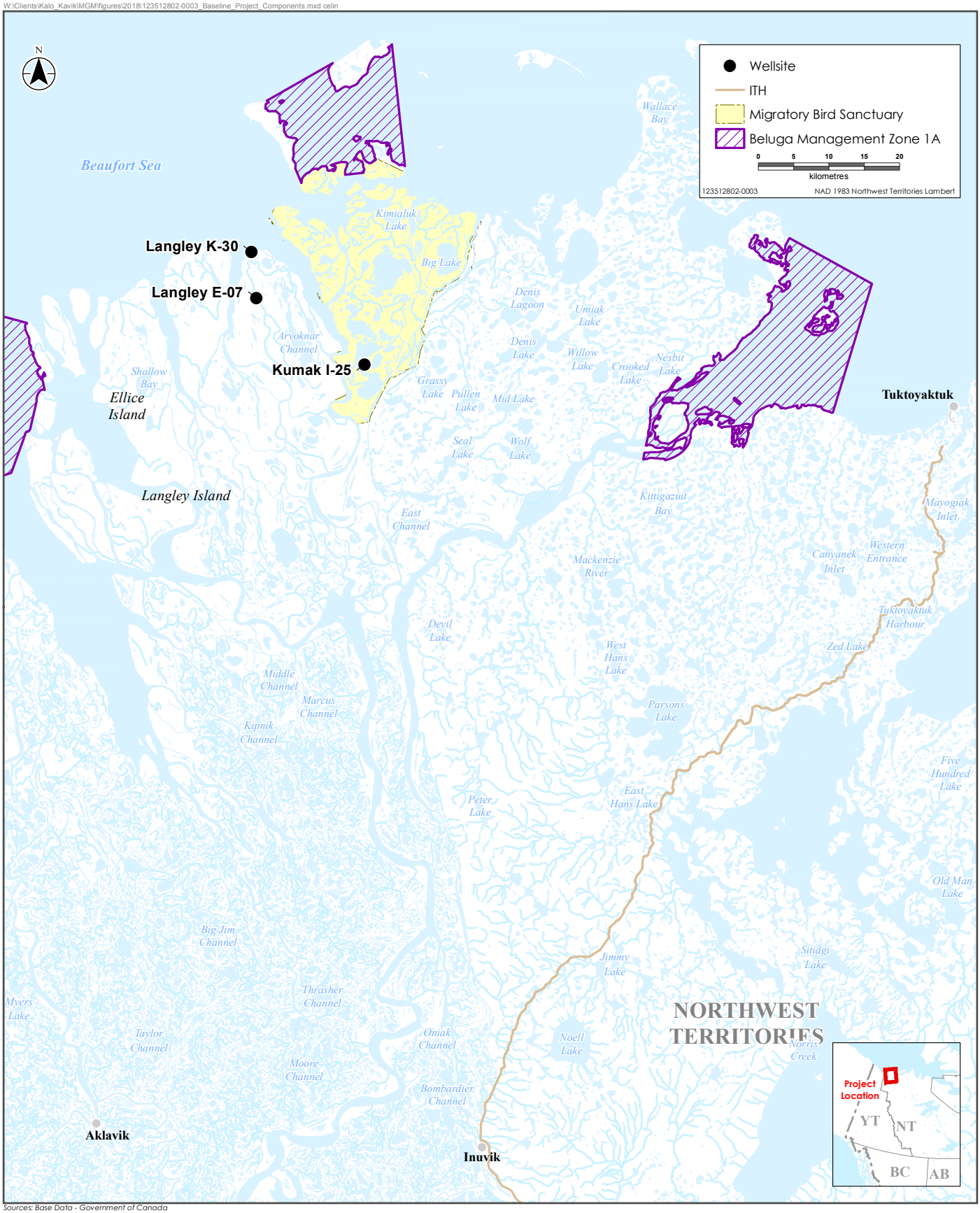

Sources: Base Data - Government of Canada

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Wellsite Abandonment Area

KAVIK-STANTEC

MGM ENERGY