



Project Introduction

Qulliq Energy Corporation (QEC) is proposing to construct and operate a new power plant in the Hamlet of Igloolik located in the Qikiqtaaluk Region of Nunavut (the Project). This multi-year project will include a new four-engine power generation facility (proposed generating capacity of 3,450 kilowatts) designed for a 40-year life and incorporate new technology to improve reliability, efficiency, operation, and safety. Construction will include a fuel storage system consisting of two 90,000 litre double-walled, 110% contained horizontal fuel tanks, appropriate fuel pumping facilities, Quonset garage, transformer storage, pole racks, oil and glycol drum storage and waste disposal area (with secondary containment berm). Space will also be provided for a transient staff accommodation unit, sea cans for storage, and a back-up emergency generator. Upgrades to the existing distribution system will also be required to connect to the new power plant. An approximately 250-metre fuel pipeline will be constructed to connect to the Petroleum Products Division (PPD) bulk fuel storage facility located to the south. The pipeline will be a combination of aboveground and underground construction. The new plant will be capable of integrating renewable energy sources.

Proponent Information

Qulliq Energy Corporation (QEC) is a Government of Nunavut (GN) territorial corporation. Through the operation of 25 stand-alone diesel power plants with a total installed capacity of approximately 76,000 kilowatts, QEC is the sole provider of electricity to approximately 15,000 customers in the territory. QEC provides mechanical, electrical, and line maintenance services from three regional centers: Iqaluit, Rankin Inlet and Cambridge Bay. QECs administrative activities are carried out at the Head Office in Baker Lake and the Corporate Office in Iqaluit.

QEC is committed to planning and developing cost effective and efficient ways to provide a safe, reliable and stable energy supply for all Nunavummiut.

Project Background

Igloolik is a community with increasing demand for electricity, reflecting its growing population. According to the Nunavut Bureau of Statistics (2010), the population of Igloolik is estimated to reach 2,431 by 2026. The 2017 Community Plan (By-Law No. 197) for the Hamlet of Igloolik is based on a projected population of 2,915 people in the community by 2037.

The existing Igloolik power plant was constructed in 1974; at 44 years old, the plant has exceeded its design life. The installed firm capacity of the existing power plant is inadequate to meet the community's projected required firm capacity as early as 2022/2023. Without changes to the power generation infrastructure, the capacity shortfall will steadily increase with increased electricity demand in the community resulting in reduced plant reliability.

The building structure, foundation, and ancillary equipment are in poor condition, having started to deteriorate. Generator set 'G13 has exceeded its engine life hours and generator set 'G2' is approaching its end of use limit soon; both generators need to be replaced to maintain reliability of service in the community. The existing switchgear is not Arc resistant. This increases the fire and safety risk of the facility. As the systems continue to age and become more outdated, it will become more difficult to maintain the facility, and plant reliability will become an issue. Without reliable equipment, QECs customers are at risk of system failure.

A new power plant equipped with fuel-efficient generators and plant automation is expected to increase fuel efficiency and overall plant reliability.



Alternatives Considered

QEC recognizes the need for a long-term approach to prioritize and maximize the benefit of capital expenditures while providing safe and reliable electricity service. The existing plant deficiencies mean the “Do Nothing” option is not a viable option. Operating assets beyond their service life also places a larger burden on QEC’s maintenance and operations personnel by trying to maintain and operate assets that should be replaced.

The following two alternatives were evaluated and are described further below.

- Major plant upgrade
- Construct a new plant at a new location

Major Plant Upgrade

A major plant upgrade would include replacement of major components and systems within the existing facility, including the generators, switch gear and fuel system. This option was determined to be not technically feasible for the following reasons:

- the plant buildings have deteriorated due to age and are beyond upgrading
- the existing plant footprint is too small to accommodate the space required for the new generator sets
- the existing plant site does not have sufficient land space to accommodate a plant expansion.

The existing power plant is located in an area defined by the Hamlet of Igloolik for community use. It is generally understood that the Hamlet of Igloolik is interested in the relocation of industrial land uses outside of the community core area where feasible (Igloolik Community Plan By-Law No. 187; 2017).

Construct a new plant at a new location

Taking into consideration the space issues associated with upgrading the existing facility, QEC considered the construction of a new power plant at a suitable location in the community. QEC explored three different location options (Figure 1) and considered a number of criteria that are important in selection of a new power plant location including, but not limited to the following.

- Proximity to Petroleum Products Division (PPD) Tank Farm: If the power plant is located near the PPD Tank Farm then QEC may be able to have a direct pipeline connection for fuel transfers. This reduces the health and safety risks associated with trucking fuel.
- Sufficient space: QEC requires at least 8,500 m² to accommodate the power plant building, fuel system, pole storage, transient unit, Quonset garage, and waste oil containment area.
- Current land use zoning: If an area is not currently zoned for industrial development, additional time may be required for re-zoning applications prior to securing land for the power plant.
- Flat and level: If an area is flat and level this reduces the cost and time associated with earthworks that would be required to prepare the site for construction.
- Airport Restrictions: Transport Canada Airport Zoning Regulations apply to areas within 4 km of an airport. Additional permitting and approval required.
- Previous Disturbance/Development: Preference is to avoid impacts to native tundra areas. Additional cost and schedule implications if an area has not been previously disturbed or developed (e.g., survey, site investigations, earthworks).



- Proximity to Migratory Bird or Wildlife Areas or Cultural Sites: Close proximity to migratory bird sanctuary, wildlife area or cultural site may increase environmental permitting requirements and environmental monitoring during construction and operation.
- Evidence of Groundwater or Surface Drainages: If present, increases the potential need for ground or surface water management for the site (e.g., to avoid contamination). Development closer than 50 m from natural surface drainages may result in additional permitting, environmental monitoring during construction/operations.
- Prevailing wind: Wind direction affects noise, odour and snow drifting considerations depending on if the wind prevails towards or away from the community.
- Known Contamination: May impact the type and extent of site investigation required and increase environmental risk. Additional permitting may be required if located within 450 m of a waste disposal site.

QEC met with Igloolik Hamlet Council on August 11, 2020 to present three proposed location options for the new power plant and outline the pros and cons of each location. Following these discussions, the Hamlet issued a letter of acceptance of the “Option 2” location dated August 21, 2020 (Attachment A). Site investigations were completed in September 2020 and included the completion of a geotechnical evaluation, Phase I and limited Phase II environmental site assessment, and topographic survey.



Figure 1: Alternative Location Options Considered for the Igloolik Power Plant Project (Image Source: Google Earth)

Project Location and Components

The results of the site investigations provided QEC with sufficient site specific information to confirm that “Option 2” would be technically feasible to support the construction and operation of the power plant. A preliminary site layout was prepared and a land application was submitted to the Hamlet of Igloolik on March 24, 2021. Subsequent to the application submission, QEC worked collaboratively with representatives of the Government of Nunavut (GN) Department of Community and Government Services (CGS) Planning and Lands Division to further refine the location. The resulting proposed location for the power plant considers the future plans of the Hamlet to establish a formal road easement for the existing road to the PPD bulk fuel facility as well as establish additional lots on the east side of the road for industrial land use (Figure 2). A revised land application was submitted on June 4, 2021.



Figure 2: Location Selected for the Igloolik Power Plant Project

The proposed lot is approximately 8,516 square metres located on unsurveyed, untitled Commissioner's land, east of Lot 1000 Plan 1567 (airport property), and approximately 225 metres north of the PPD bulk fuel facility. The proposed lot is identified as 'Lot A' with sketch number 609-SK-103. QECs land application was presented to and approved by the Hamlet of Igloolik on June 17, 2021 (Motion Number 77; Attachment B).

The power plant will include a four-engine generation facility (proposed generating capacity of 3,450 kilowatts) designed for a 40-year life. Construction will include a fuel storage system consisting of two 90,000 litre double-walled, 110% contained horizontal fuel tanks, appropriate fuel pumping facilities, Quonset garage, transformer storage, pole racks, oil and glycol drum storage and waste disposal area (with secondary containment berm). Space will also be provided for a transient staff accommodation unit, sea cans for storage, and a back-up emergency generator. Upgrades to the existing distribution system will also be required to connect to the new power plant. An approximately 250-metre fuel pipeline will be constructed to connect to the Petroleum Products Division (PPD) bulk fuel storage facility located to the south. The detailed design is anticipated to include the installation of industrial scrubbers and hospital grade silencers on the radiator and exhaust system to assist in the reduction of noise and exhaust emissions. The new plant will also be capable of integrating renewable energy sources. The main power plant building (40 m by 23 m) will include an office, electrical control room, mechanical room, and garage/workshop, in addition to the power generation hall. The specific location and orientation of these components within the area selected will be determined through detailed engineering; however, a preliminary site layout of the power plant is provided in Attachment C.



Anticipated Permit Requirements

The permits approvals anticipated to be required prior to starting construction of the project are listed in Table 3. Should additional permits or approvals be identified to be required throughout the process, QEC is committed to working with the applicable agency to obtain the necessary approvals in a timely manner.

Table 3: Anticipated Permit Requirements

Agency	Permit Requirement
Nunavut Planning Commission	Conformity Determination
Nunavut Impact Review Board	Screening Decision
Hamlet of Igloolik	Development Permit
Government of Nunavut – Community and Government Services	Lease agreement for new lot (Planning and Lands)
	Approval Letter (Nunavut Airports)
	Building Permit (Safety Services)
NavCanada	Land Use Proposal Review
Transport Canada	Aeronautical Assessment
Nunavut Water Board	Water Use and Deposit of Waste Licence for Hydrostatic Test

Community Engagement

QEC presented three proposed location options for the new power plant during a meeting with Igloolik Hamlet Council on August 11, 2020. The Hamlet issued a letter, dated August 21, 2020, accepting the “Option 2” location.

To initiate the process of securing the land required for the project, a land application was submitted on March 24, 2021. Correspondence with representatives from the GN-CGS Planning and Lands Division assisted in optimizing the proposed lot location and on June 4, 2021 a revised land application was submitted. The proposed lot was approved by the Hamlet of Igloolik on June 17, 2021 (Motion Number 77).

Environmental Effects

Potential environmental effects resulting from the Project and the proposed mitigation that QEC will put in place is provided in Table 4.

Activity	Potential Environmental Effect	Positive or Negative Effect	Mitigation
			<ul style="list-style-type: none"> • A spill contingency plan and community specific spill plan will be updated to reflect the location of the new power plant • Spill response materials will be kept on-site during operations
Fuel or oil leak from generators or other onsite activities during operation	Fuel or oil could leak or spill in the plant or on the ground resulting in contaminated soil or surface water	Negative	<ul style="list-style-type: none"> • There are no natural drainages, or watercourses within 100 metres of the project location; Turton Bay is approximately 400 metres east • Surface water will be diverted around project components and towards drainage ditches established adjacent to roadways • Surface water will be collected within the secondary containment berm and will be disposed of under the direction of a local wildlife officer or conservation officer • In the event of a spill or leak, contaminated soil will be collected for disposal at an approved facility • Environmental SOPs will be followed by operations staff • A lined berm will be onsite for storage of new and waste hazardous products (e.g., fuel, oil, glycol) • A spill contingency plan and community specific spill plan will be updated to reflect the new power plant location • Spill response materials will be kept on-site during operations
Fuel spill during fuel transfer	Fuel could spill on the ground resulting in contaminated soil or surface water	Negative	<ul style="list-style-type: none"> • Fuel transfers will occur via pipeline connection with PPD Tank Farm (tank to tank) • A truck fill station will be constructed as a back-up fuel transfer option; an appropriate secondary containment box will be included in the design of the truck fill station • QEC Environmental SOPs will be followed for all fuel transfers; this includes visual monitoring for the duration of the transfer • There are no natural drainages, or watercourses within 100 metres of the project location; Turton Bay is approximately 400 metres east • A spill contingency plan and community specific spill plan will be updated to reflect the new power plant location • Spill response materials will be kept on-site during operation and will be readily available during fuel transfers
Operation of the Power Plant	Operation of the new power plant may contribute to additional noise or dust in the community	Negative	<ul style="list-style-type: none"> • The new power plant location is outside the community core; noise and dust that may be generated during operations is anticipated to have less effect on the community in comparison to the existing power plant located in the community core • Prevailing wind is from the northwest; therefore, there is limited potential for dust or noise to be directed towards the community • New, more efficient generators and equipment are anticipated to generate less noise and dust in comparison to the older equipment at the existing power plant • The exhaust system will include industrial scrubbers to remove additional pollutants and dust from the exhaust before being released from the power plant. • The design of the exhaust system will consider the use of hospital grade silencers to further reduce the noise produced during operations
	The new power plant will be designed to meet the current and future energy needs of the community which will contribute to community growth	Positive	<ul style="list-style-type: none"> • None proposed as this is a positive effect
Reduction in diesel fuel usage	Operation of more efficient generators will result in a reduction in the amount of fuel used during operation of the power plant.	Positive	<ul style="list-style-type: none"> • None proposed as this is a positive effect
	Operation of more efficient generators will reduce the amount of fuel used during operation of the power plant which will result in the reduction of greenhouse gas emissions	Positive	<ul style="list-style-type: none"> • None proposed as this is a positive effect



Attachment A

Hamlet of Igloolik Letter of Acceptance



Municipality Of Igloolik

P.O. Box 30, Igloolik, NT X0A 0L0 Ph: 867-934-8830 Fax: 867-934-8757

August 21, 2020

Rick Hunt
Director of Safety, Environmental and Facilities
QEC Iqaluit

Acceptance of Option 2 for New Power Plant

The Municipal Council of Igloolik and I would like to thank yourself and Mr. Flaherty for your presentation concerning the new Power plant slated for Igloolik.

It is nice to see that some Government agencies value the opinions of the Municipalities. Your approach working with Municipalities is a step in the right direction.

I can honestly say that the Council was opposed to all your options and had selected a different site closer to the recreation facilities.

Your presentation concerning fueling up the power and the environmental hazards of a fuel pursued the Council to select Option 2. The reason for that is perhaps some waste heat may be used for the airport garage.

The reason we wanted the plant by the recreation facilities was for the community and QEC to work together and hopefully the Municipality could access the waste heat. Unfortunately this is now not possible.

The Municipality has acquired a solar panel system for our Municipal offices. This will allow us a command center during emergencies.

The Municipal Council feels the biggest threat to our community is the weather. QEC has an excellent reputation in Igloolik to keep the power running. Your operators should be commended. In saying that the Municipal Council nor your staff can control the weather. Our biggest fear is that we have a severe windstorm or freezing rain storm in the winter months. We all realize it would take some time for QEC to mobilize a team and do any repairs required. This could take days not hours.

The Municipality has 2 buildings that we could use as evacuation centers. The Arena and the Community Hall. Unfortunately neither unit has back up power supply for power outages.

We are requesting assistance from QEC to help us provide back up power during these stressful times.

We are looking at a 100 watt solar panel system that we could run power to both facilities to keep the heat and water on. These 2 facilities could house about 500 people in an emergency. Our priority would be Elders and very young children..

WE understand that that any support would have to be a joint effort. The Municipality, QEC and perhaps the Federal Government could work together to provide the financial support to make our community a safer and better community to live.

I would like to thank QEC in advance for looking at our proposal and giving

Yours Truly



Greg Morash
CAO
Municipality of Igloolik

CC James Flaherty



Attachment B

Hamlet of Igloolik Motion Number 77

Hamlet Council of Igloolik Igloolik, NU

MOTION NUMBER: 77 Meeting # 11 DATE: June 17, 2021

MOVED BY: Peter Awa

SECONDED BY: Lionel Evaluajuk

That: the application by Qulliq Energy Corporation
to lease unsurveyed land parcel identified
as Lot A (sketch Number 609-5K-103) be
approved.

FOR: 5

AGAINST: 0

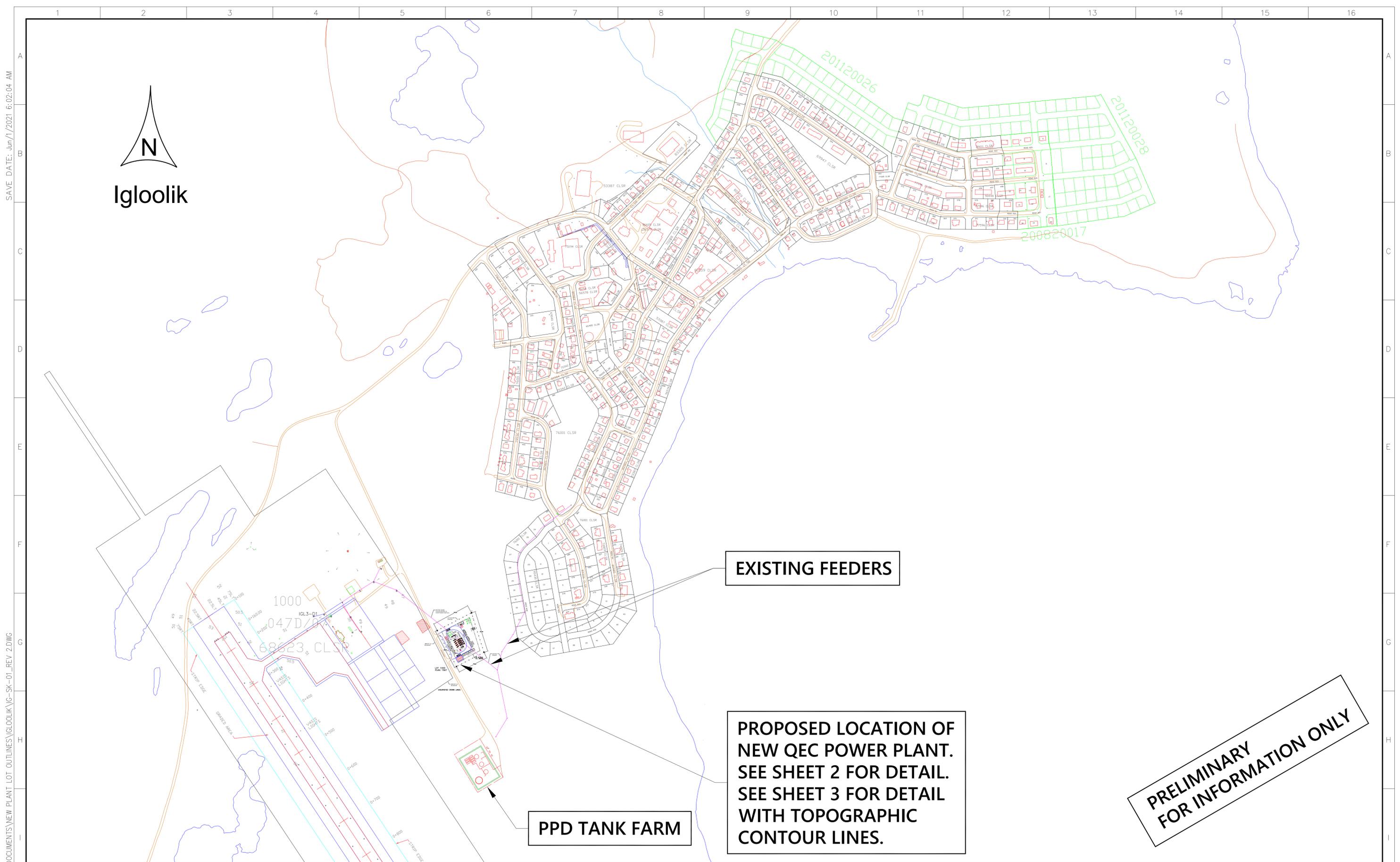
ABSTAIN: 0

SR. ADMIN. OFFICER: 



Attachment C

Preliminary Site Layout of the Proposed Power Plant



EXISTING FEEDERS

PROPOSED LOCATION OF NEW QEC POWER PLANT. SEE SHEET 2 FOR DETAIL. SEE SHEET 3 FOR DETAIL WITH TOPOGRAPHIC CONTOUR LINES.

PPD TANK FARM

PRELIMINARY FOR INFORMATION ONLY

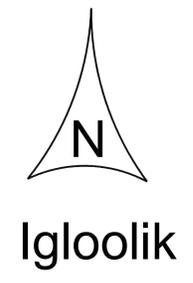
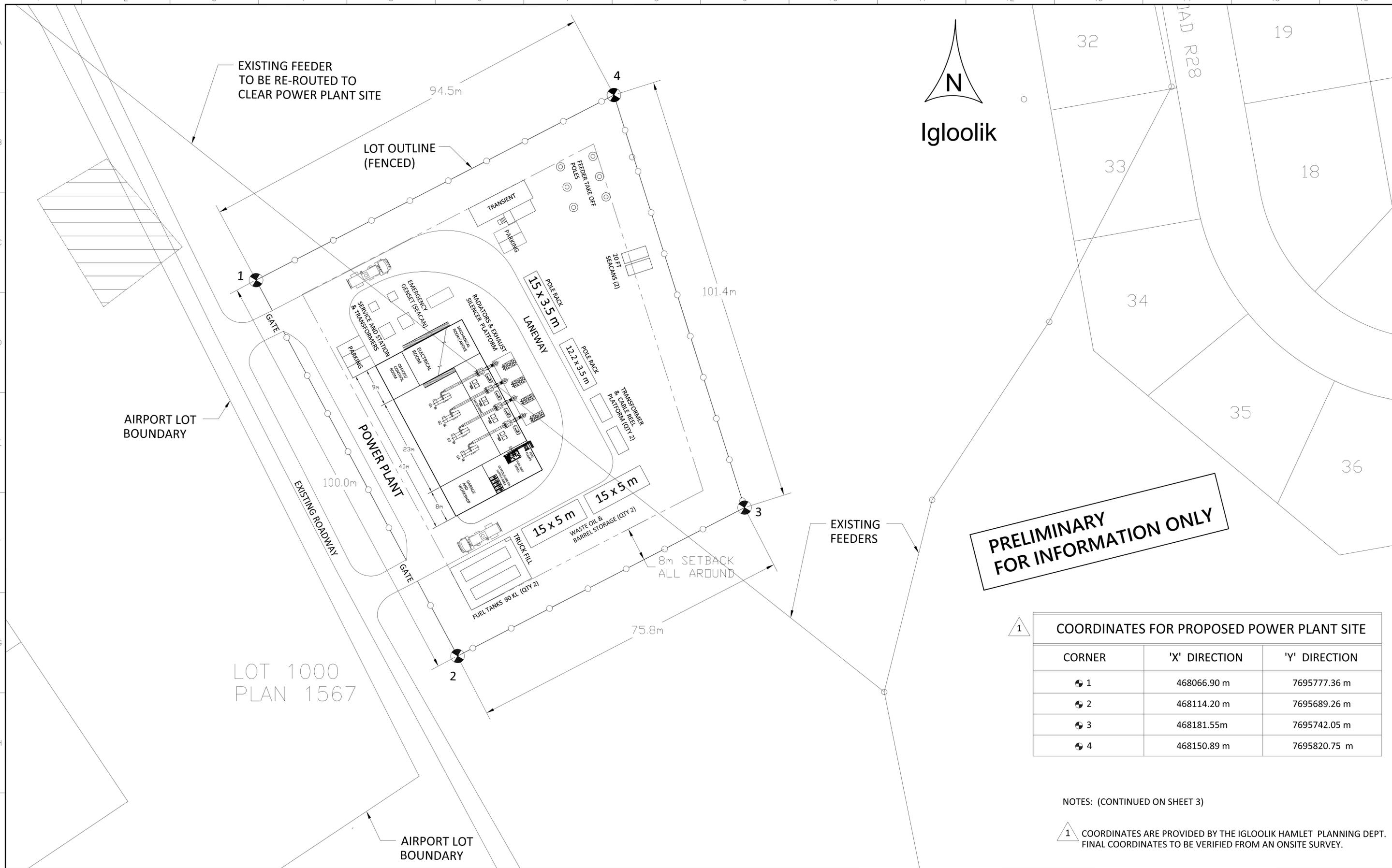
										PROFESSIONAL STAMP		PERMIT STAMP		 Qulliq Energy Corporation Société d'énergie Qulliq Qulliq Alruvaktuunik Ikumatjuitit		LOCATION IGLOOKIK NUNAVUT							
														TITLE PROPOSED NEW POWER PLANT SITE PLAN									
		2 PLANT SITE RELOCATED TO LOT 'A'. COORDINATES SUPPLIED BY THE HAMLET. BL JUNE 1/2021 FOR REVIEW JUNE 1/2021												SCALE NTS		SHEET 1 OF 3		DRAWING NO. IG-SK-01		REV. 2		REV. DATE JUNE 1/2021	
DRAWING NUMBER		DRAWING TITLE		REVISION LETTER		REVISION		PROJECT NUMBER		NAME		DATE		CHECKED BY		DESIGNED BY		STATUS OF DRAWING		DATE			
1		REFERENCE DRAWINGS		0																			

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SAVE DATE: Jun/1/2021 6:02:04 AM

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PRELIMINARY FOR INFORMATION ONLY

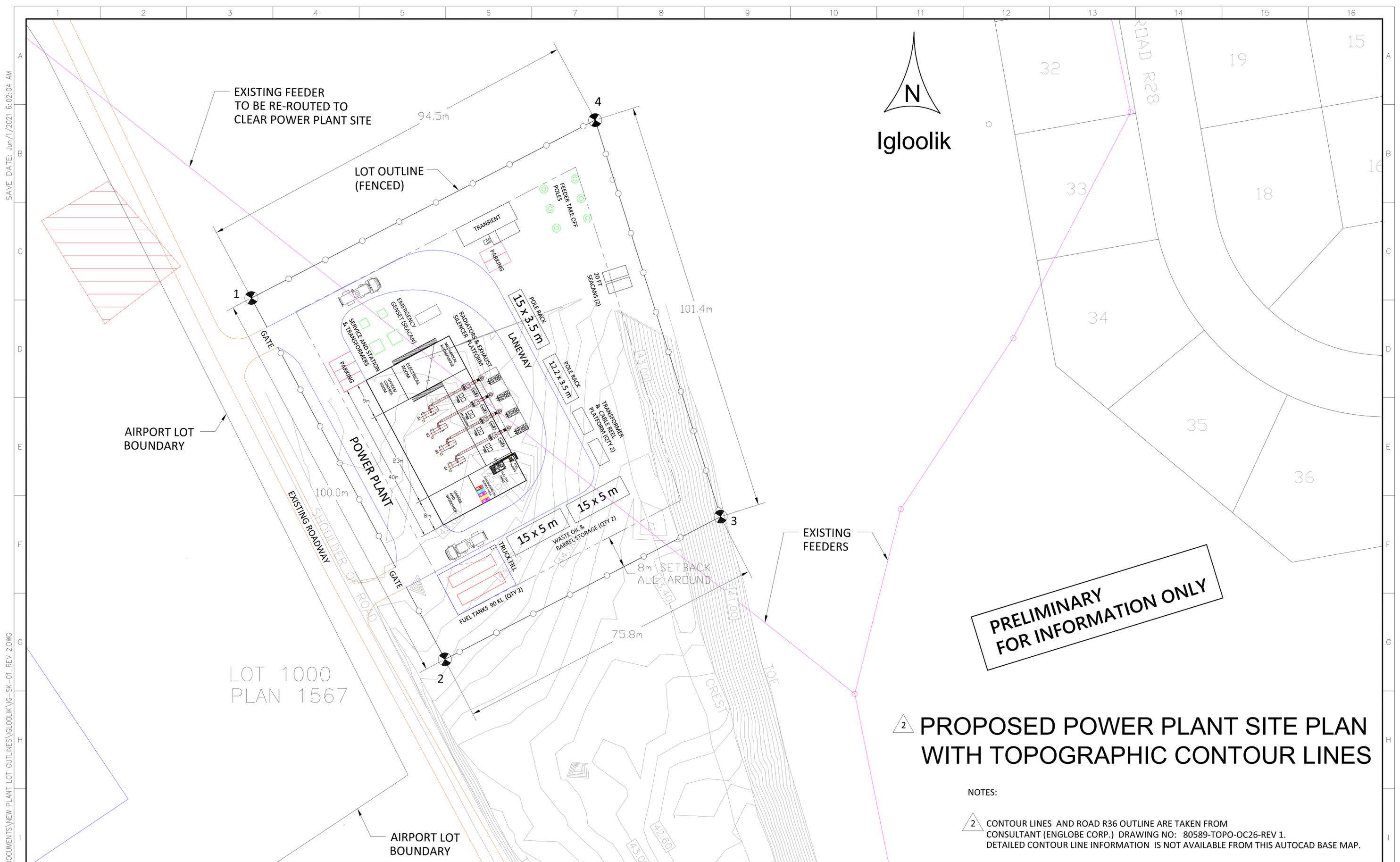
1 COORDINATES FOR PROPOSED POWER PLANT SITE		
CORNER	'X' DIRECTION	'Y' DIRECTION
1	468066.90 m	7695777.36 m
2	468114.20 m	7695689.26 m
3	468181.55m	7695742.05 m
4	468150.89 m	7695820.75 m

NOTES: (CONTINUED ON SHEET 3)

1 COORDINATES ARE PROVIDED BY THE IGLOOLIK HAMLET PLANNING DEPT. FINAL COORDINATES TO BE VERIFIED FROM AN ONSITE SURVEY.

DRAWING NUMBER	DRAWING TITLE	REVISION LETTER	REVISION	PROJECT NUMBER	NAME	DATE	CHECKED BY	DESIGNED BY	STATUS OF DRAWING	DATE
	REFERENCE DRAWINGS									
2			PLANT SITE RELOCATED TO LOT 'A'. COORDINATES SUPPLIED BY THE HAMLET.		BL	JUNE 1/2021			FOR REVIEW	JUNE 1/2021
1			LOT SHIFTED NORTHEAST TO AVOID AIRPORT LOT.		BL	MAR 10/21			FOR REVIEW	MAR 10/21
0			ORIGINAL		BL	FEB/21			FOR REVIEW	FEB/21

PROFESSIONAL STAMP	PERMIT STAMP	 <p>Qulliq Energy Corporation Société d'énergie Qulliq Qulliq Airuvaktuqunik Ikumatjutiit</p>	LOCATION IGLOOLIK NUNAVUT
			TITLE PROPOSED NEW POWER PLANT SITE PLAN
SCALE NTS	SHEET 2 OF 3	DRAWING NO. IG-SK-01	REV. 2
			REV. DATE JUNE 1/2021



2 PROPOSED POWER PLANT SITE PLAN WITH TOPOGRAPHIC CONTOUR LINES

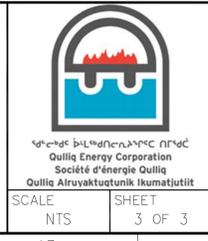
NOTES:

2 CONTOUR LINES AND ROAD R36 OUTLINE ARE TAKEN FROM CONSULTANT (ENGBLOBE CORP.) DRAWING NO: 80589-TOPO-OC26-REV 1. DETAILED CONTOUR LINE INFORMATION IS NOT AVAILABLE FROM THIS AUTOCAD BASE MAP.

DRAWING NUMBER	DRAWING TITLE	REVISION LETTER	REVISION	PROJECT NUMBER	NAME	DATE	CHECKED BY	DESIGNED BY	STATUS OF DRAWING	DATE
1	REFERENCE DRAWINGS									
2		2	PLANT SITE RELOCATED TO LOT 'A'. COORDINATES SUPPLIED BY THE HAMLET.		BL	JUNE 1/2021			FOR REVIEW	JUNE 1/2021
		1	LOT SHIFTED NORTHEAST TO AVOID AIRPORT LOT.		BL	MAR 10/2021			FOR REVIEW.	MAR 10/2021
		0	ORIGINAL		BL	FEB 1/2021			FOR REVIEW.	FEB 1/2021

PROFESSIONAL STAMP

PERMIT STAMP



LOCATION	IGLOOLIK NUNAVUT		
TITLE	PROPOSED NEW POWER PLANT SITE PLAN		
DRAWING NO.	REV.	REV. DATE	
IG-SK-01	2	JUNE 1/2021	

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